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THE ORMEN LANGE MOON LANDING

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The Ormen Lange Moon Landing How a Learner Mindset Solved the 120-km Challenge.

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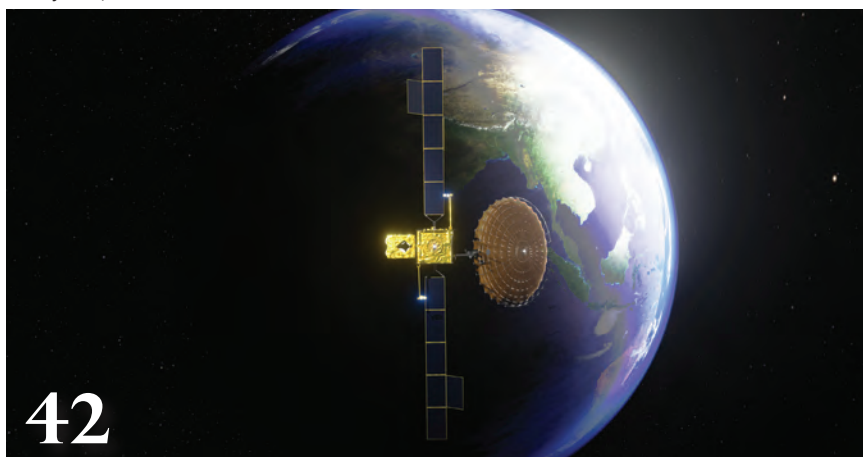
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Corporate leaders today must ID and implement a dizzying array of technological evolutions across global, complex organizations and fields. Use your favorite adjective to describe the pace of change in the maturity of AI, for example, and most likely you're correct. My point is not to discuss AI and all that it entails, rather to discuss the numbing factor it delivers. For example, to some, the Ormen Lange project may seem to be 'yesterday's news', but courtesy of **Josefine Spiro's** report from her interviews with OneSubsea CEO **Mads Hjelmeland** and Project Director at Shell, **Richard Crichton**, it is anything but. The title of our cover story says it all: "*The Ormen Lange Moon Landing.*"

OneSubsea, Shell, Subsea7, Aker Solutions and many more teamed on this world-record subsea compression system project which was inaugurated in Norway a couple of months ago, a project that exemplifies both leaps in engineering and how a learner mindset helped to solve the 120-km challenge.

Then there are oft-overused buzzwords – digitalization for example – that have their own hand in producing that very same numbing effect. Digitalization means 100 things to 100 people, but as deployed in this edition by **Wendy Laursen**, it is specific to a set of structural integrity tools, which today actually goes beyond digitizing old processes.

Here Laursen looks at several organizations and evolutions: how Akselos' SPM software changes the scale of sensor and strain gauge monitoring by providing a high-fidelity, near real-time structural twin of an entire FPSO; how Aker BP is already using AI to shape the future of its subsea infrastructure integrity management, how Elementz and its Blue Digital Ecosystem – an interconnected digital infrastructure where data, systems, and stakeholders work seamlessly together – is taking what was an isolated discipline and turning it into an intelligent, always-on layer that connects inspection gathering technologies, asset data, and decision-making across the entire subsea value chain.

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Marc Howson leads Welligence's activities across Asia Pacific. He has over 20 years of global energy experience, encompassing roles in the UK, USA, Qatar and Singapore. Most recently, he was as a Director at S&P Global Platts, responsible for global LNG pricing, and GLX. After analyzing energy markets at Wood Mackenzie, Marc held senior roles in the LNG marketing teams of Qatargas and Gazprom Marketing & Trading.

Wendy Laursen has 20 years of experience as a journalist. In that time, she has written news and features for a range of maritime, engineering and science publications. She has completed a Master of Science research degree in marine ecology as well as diplomas in journalism, communication and subediting.

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North American Projects, Players And Deals Take LNG Market Spotlight

In 2025 to-date, five out of the six liquefaction projects reaching Final Investment Decisions (FID) globally, representing around 90% of liquefaction capacity, are located on the U.S. Gulf Coast. Despite an inflationary environment, geopolitical tailwinds combined with U.S. LNG's flexibility and relative price competitiveness will accelerate further FIDs in the area over the next 12 months, including NextDecade's Rio Grande LNG Train 5.

By Marc Howson, Welligence Head of APAC and LNG

By 2030, the U.S. Gulf Coast will supply over 25% of global LNG production. Asian importers have concerns around high reliance on the area and are accelerating proposed projects elsewhere. Glenfarne Group is leading the proposed Alaska LNG project, from which CPC, PTT, and JERA have signed offtake agreements.

The 20 MMtpa-capacity development is targeted to reach FID in 2026 and benefits from low feed gas costs, much shorter shipping times to Asia, as well as plans to offer buyers a range of price indices. However, players are concerned about Alaska LNG's cost competitiveness, given the necessary construction of its ~1,300 km gas pipeline.

Canadian LNG Re-Energized

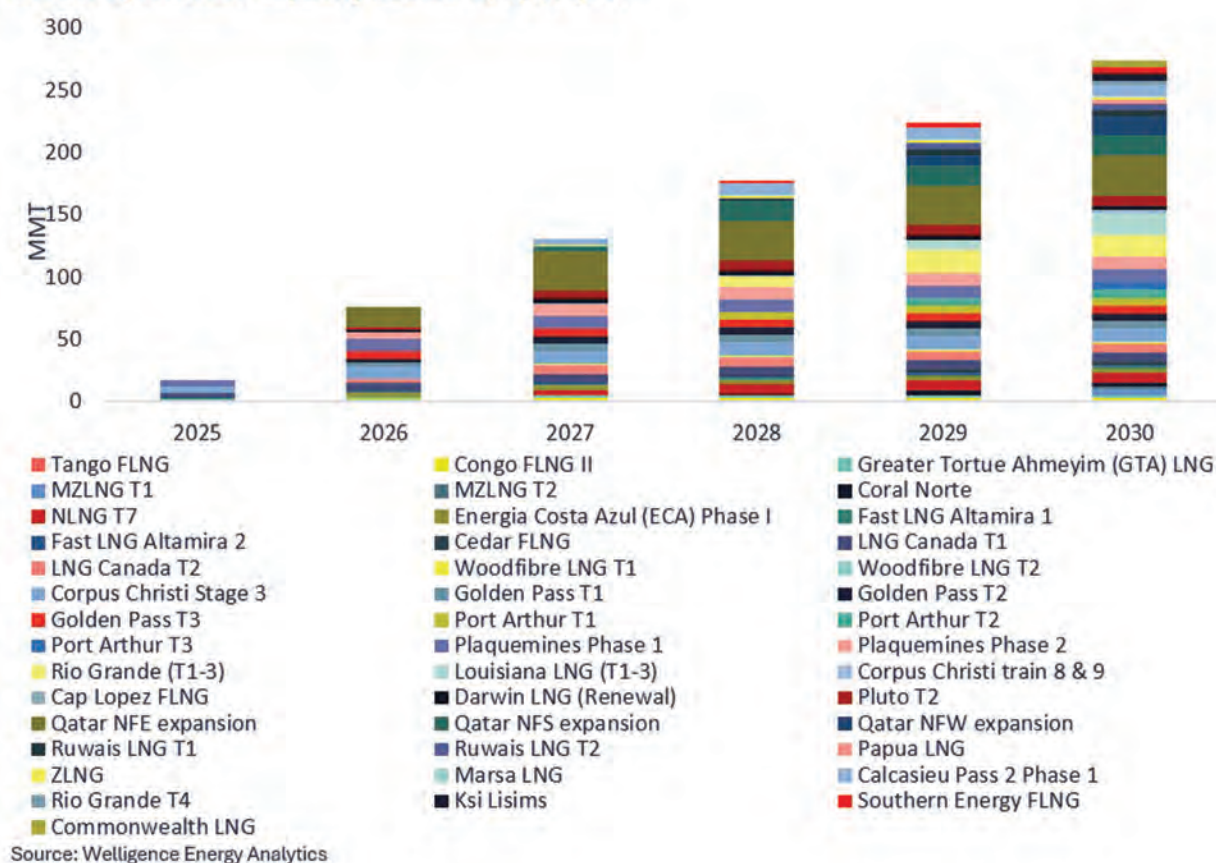
Attention is also focused on western Canadian projects, following the government's reinvigorated commitment to grow markets for the country's vast gas resources. While the Shell-led LNG Canada project started up in mid-2025 and the Cedar LNG and Woodfibre LNG developments

remain under construction, pre-FID opportunities are garnering most attention.

The Ksi Lisims LNG project is expected to reach FID in H1 2026, once it has contracted the majority of its output capacity. The development will harness two 6 MMtpa-capacity near-shore FLNG units, to be constructed over four years by Samsung, harnessing Black & Veatch liquefaction technology. While buyers' uncertainties persist over the cost of the proposed Prince Rupert Gas Transmission pipeline to transport the feed gas across the Western Sedimentary Basin, LNG shipping costs into Asia could be approximately \$1/MMbtu lower than from U.S. Gulf Coast projects. This month, Ksi Lisims LNG received its Environmental Assessment Certificate from the Government of British Columbia.

Furthermore, last month, the government created its Major Projects Office (MPO) to streamline approvals and help structure financing to accelerate critical Canadian projects. The 14 MMtpa-capacity LNG Canada expansion is expected to reach FID next year and is the first of five selected projects for MPO's consideration.

Global liquefaction capacity additions, by project



Argentina LNG: Vast Opportunities but Hurdles Remain

The only non-U.S. Gulf LNG project to reach FID this year so far is Argentina's 5.95 MMtpa-capacity Southern Energy FLNG. The development benefits from especially low capex, by harnessing feed gas from the world-class Vaca Muerta shale and chartering Golar LNG's Hilli Episeyo and MK II FLNG vessels, which are both converted conventional LNG tankers, for 20 years.

Argentina LNG Phases 2 and 3, led by Shell and Eni respectively, are proposing another combined 22 MMtpa of liquefaction capacity, with each phase requiring two new-build FLNG units. Last month, YPF CEO Horacio Marín reaffirmed 2026 FID targets for the Shell and Eni phases and highlighted positive discussions, particularly with Asian LNG players, regarding farm-in partners and LNG off takers.

The FLNG component of Southern Energy LNG's first phase was successfully admitted into Argentina's RIGI

incentive program, which provides it with legal stability, the ability to repatriate profits, dividends, and capital, and shields the project from new national, provincial, or municipal taxes. However, some players remain averse to making long-term investments in Argentine LNG projects, given the country's traditional political volatility and following its short-lived Tango FLNG export experience during 2019-2020.

North America Leads LNG's evolution

North American LNG production and FIDs will continue ramping up aggressively this decade, initially underpinned by the US Gulf Coast projects' competitiveness and unique flexibilities. The developments will be further boosted by independent North American gas producers' increasingly accelerating their international LNG volume and pricing exposures as well as the re-emergence of U.S.-focused banks in physical LNG.

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MAJOR OIL AND GAS PROJECTS DRIVE STRONG OSV DEMAND IN THE MIDDLE EAST

The Middle East has served as a stronghold for offshore support vessel (OSV) activity in recent years, largely driven by national oil companies (NOCs) with a clear strategy of increasing offshore oil and gas production. Several major projects have lately reached final investment decisions, such as the Hail and Gasha gas project in Abu Dhabi, the Zuluf Expansion in Saudi Arabia, and the North Field Expansion project in Qatar, resulting in attractive demand fundamentals for local OSV operators.

By Theodor Sørli, Senior Analyst at Fearnley Offshore Supply

In the United Arab Emirates, ADNOC is pushing towards increasing its overall production up to 5 million barrels per day by 2027, up from roughly 4 million in 2021. In Qatar, QatarEnergy's total LNG production is expected to reach 142 million tonnes per annum, up from 77 million in 2024.

During the 2020 oil price war, Saudi Aramco announced plans to increase production capacity to 13 million barrels per day. Subsequently, we saw a rise in the Kingdom's jack-up rig count from 49 during the COVID period to 90 by early 2024, raising the demand for OSVs in the region even higher. Last year, a revision of the production target led to the suspension of approximately 30 jack-ups. Although this development was expected to negatively impact the vessel market, a substantial engineering, procurement, and construction (EPC) project backlog largely absorbed the

redelivered vessels due to these suspensions, even allowing many shipowners to recontract at higher dayrates.

Fleet Growth Amid Global Market Contraction

Over the past decade, favorable demand fundamentals have contributed to a steady increase in the number of operational OSVs in the region. Specifically, the working platform supply vessel (PSV) fleet has grown from approximately 80 units in 2015 to an estimated 140 vessels by 2025.

Similarly, the working anchor handling tug supply (AHTS) vessel fleet expanded from around 300 units to 330 during the same period. Although these growth figures may appear modest over ten years, it is important to note that key OSV markets such as the North Sea, West Africa, and Southeast Asia experienced a reduction in aver-

age working AHTS and PSV numbers, with declines ranging from 25% to 50% over the corresponding timeframe.

The Middle East has maintained higher overall utilization rates than other regions, averaging approximately 80% since 2023 for conventional OSVs. This trend has resulted in significant vessel mobilization from areas such as Southeast Asia to the Middle East, reflecting steady demand. Consequently, the region has absorbed a substantial portion of the Chinese orphan fleet in recent years, estimated to total over 70 vessels in recent years, which has reduced the number of resale candidates at Chinese yards.

While the region's current average age is around 16 years across the PSV and AHTS fleet, which is fairly in line with global averages, it is important to note that this would have been a lot higher had it not been for the aforementioned entry of the Chinese abandoned newbuilds.

Newbuilding activity is starting to pick up after a prolonged period of constrained financials for many shipowners, yet the overall regional fleet age suggests significant fleet renewal required towards the end of the decade to follow persistently strict age requirements enforced by the NOC end-clients.

EPC Backlogs, Drilling Trends and Key Contract Awards

As of early October, market conditions indicate a decline in drilling activity compared to last year's peak, although activity remains robust relative to historical norms. The strong trend in dayrates and prevailing market tightness can primarily be attributed to a substantial backlog of EPC projects.

Among notable contracts, last September saw QatarEnergy awarding Saipem the EPCI of six platforms, including cables and subsea pipelines for the North Field expansion. The contract was worth roughly \$4 billion and tied to the aggressive LNG production growth target, leading to strong visibility on OSV demand.

Saudi Aramco has awarded more than \$6 billion in offshore EPC contracts year to date, which equates to one of the strongest years on record for its long-term agreement contracting market. Notably, Subsea 7 announced a new award in September, which covers EPCI of more than 100 kilometers of pipelines, topside modifications and hook-up activities, valued between \$750 million and \$1.25 billion with offshore construction in 2027 and 2028.



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Consolidation, Investment Stability and Outlook

Given the healthy market balance in the region, we have seen a string of high-profile enbloc deals and M&A activity. Prior to the general market recovery post-COVID, we saw Allianz Middle East acquiring 21 vessels from the Swissco restructuring. Shuaa Capital then took a leading position in Stanford Marine Group in 2020, followed by the acquisition of Allianz Middle East Ship Management in 2022, creating the one of the leading OSV fleets in the region totaling over 115 vessels.

State-backed ADNOC Logistics and Services also made major strategic moves with the acquisition of Zakher Marine International in 2022. ZMI controlled 62 jack-up barges and OSVs at the time of the transaction, enabling ADNOC L&S to further consolidate its position in the regional market.

Since 2023, we have seen Abu Dhabi Ports picking up 10 vessels in an enbloc transaction from private equity-backed ENAV Offshore, Astro Offshore becoming an 80% owned subsidiary of Adani Group, and Atlantic Navigation's divesting 20 vessels to a new consortium owned by Greece's Goldenport, Maas Capital and local shipowner Allianz Marine Services.

Several bolt-on transactions have been excluded, yet the number of completed deals remains high compared to other regions. In today's market, we do see current valuations at historically high levels, even for aging tonnage, leading to less volume in overall S&P activity.

However, capital available for investment in the sector has generally stayed consistent, influenced by stable activity levels, even with low energy prices for extended periods. Factors contributing to this include political, economic, and regulatory stability in the region's offshore segment, resulting in risk that is mainly confined to standard industry cycles.

Currently, there is a pipeline of projects anticipated to reach FID over the next few years, including the North Field West project in Qatar and the Dorra, Safaniyah, and Manifa expansions in Saudi Arabia. The combination of ongoing and upcoming projects is projected to support demand through the end of the decade.

Given the present fleet composition, characterized by a negligible quantity of vessels with keels laid after 2015, combined with restricted capital allocation by shipowners in speculative newbuilds, projections indicate that the Middle East can experience stable market fundamentals despite rising global market volatility.



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FROM REGIONAL CHAMPION TO GLOBAL POWERHOUSE:

Inside ADES-Shelf Drilling Fleet Merger

ADES is the largest jackup drilling contractor globally, with 44 rigs owned, and four under its management, and a fleet valued at \$1.98 - \$2.2 billion. Shelf Drilling, also among the TOP 5 jackup drilling contractors, has a modern 32-rig competitive fleet valued at \$1.42 - \$1.57 billion. Now, through a NOK 3.9 billion (\$380 million) all-cash transaction, the two are forming a combined entity that not only redefines scale but marks a shift in global offshore drilling power.

By Sofia Forestieri, Senior Analyst at Esgian

The initial offer was of NOK 14 per share, but in September ADES increased the cash consideration offered to Shelf shareholders to NOK 18.50 per share. In a moment of market uncertainty, contract suspensions and cost discipline, this merger appears to carry a strategic premium. This offer likely exceeds near-term standalone valuation metrics but reflects a long-term vision: the creation of the largest jackup fleet globally by far, a major geographic expansion, a more diverse client portfolio (specially IOCs) and operational synergies.

The jackup drilling market has undergone significant transformation over the past decade, reshaped by downturns, bankruptcies, and bold mergers. In 2012, the leading contractors were Valaris (then Ensco), Shelf Drilling, Hercules Offshore, Rowan, and Noble. Through a wave of restructuring and consolidation, today's dominant players are ADES, COSL, ADNOC Drilling, Shelf Drilling, and Valaris. While many past offshore drilling mergers were born out of financial restructuring or distress, ADES is paving a different way: leveraging capital strength and long-term vision to scale proactively, and strategically, on its own terms.

What could be the implications of this new merger for the market?

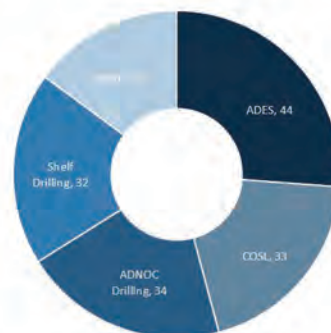
ADES' fleet is diverse in terms of age and design. 36% percent of the rigs were built in the 1970s and 1980s, such as Admarine 656, Admarine III, and Admarine 657. Meanwhile, 23% are young, built after 2010, including Admarine 695, Admarine 680, and Admarine 510. Esgian values the ADES fleet at \$1.98 - \$2.2 billion, with older rigs valued between \$2 and \$5 million, and newer rigs valued between \$91 and \$105 million. It is worth noting that for Schedule-G compliant rigs outfitted to work for Saudi Aramco, Esgian has increased their average value by 5% compared to non-compliant rigs.

Shelf Drilling has undergone a significant transformation over the past decade, shifting from a fleet of aging standard/vintage1 jackups to a portfolio of premium2 and harsh-environment rigs. 45% of its fleet was built in the 1980s and 1990s, including rigs such as High Island II and High Island IV. The most modern jackups were delivered after 2007 and include Shelf Drilling Tenacious, Shelf Drilling Enterprise, as well as 492-ft Shelf Drilling Barsk.

This strategic shift has increased its fleet valuation to \$1.42 - \$1.57 billion, with older rigs valued at \$7 to \$11

Top 5 rig owners in the jackup market

Competitive jackup fleet (rig count)



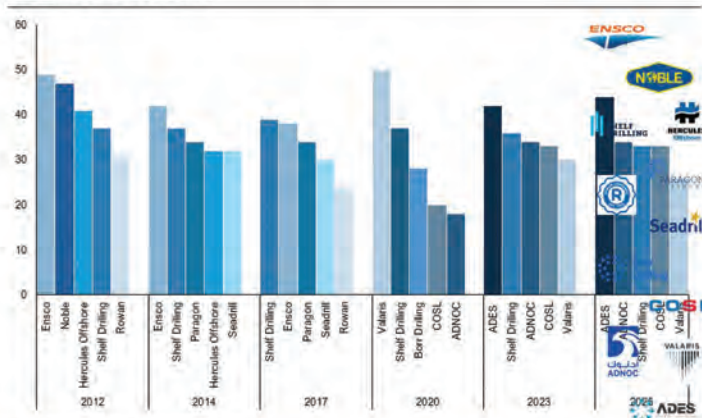
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Top 5 jackup rig owners' evolution since 2012

Competitive jackup fleet (rig count)



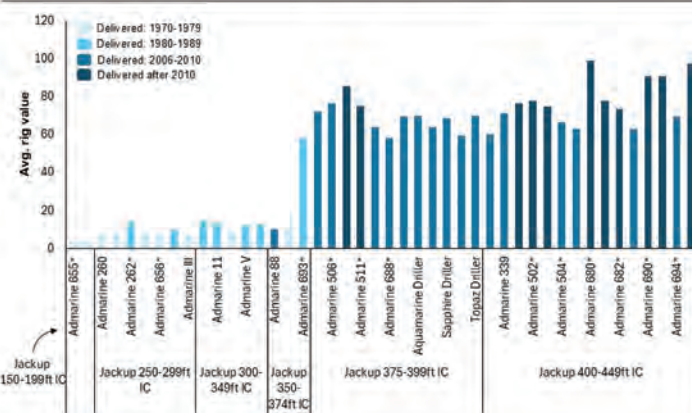
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ADES' fleet breakdown by design and age

Value in Million USD



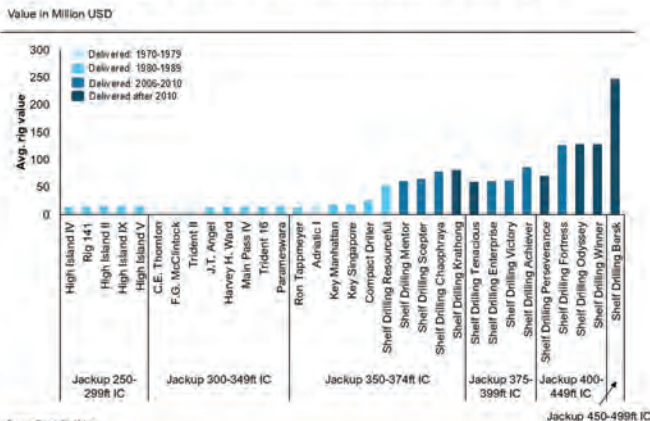
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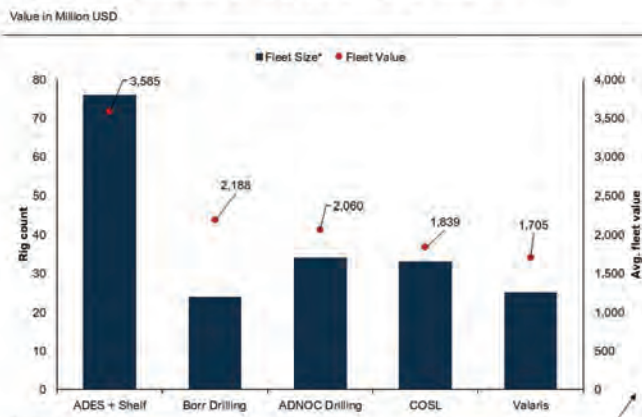
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Shelf Drilling's fleet breakdown by design and age



Top 5 jackup owners - post merger scenario



million, newer rigs valued at \$55 to \$65 million, and the harsh-environment Shelf Drilling Barsk being the fleet's highest valued jackup at \$235 to \$259 million.

The new entity will have a combined competitive fleet of 76 jackups* (Trident XII is currently held for sale for non-drilling purposes and thus considered uncompetitive by Esgian). This will skyrocket its fleet valuation to \$3.4 - \$3.77 billion. The next largest player, ADNOC Drilling, holds a fleet worth \$1.96 - \$2.16 billion, 42% lower.

Shelf Drilling's presence in Southeast Asia, India, and West Africa broadens ADES's geographic reach beyond its core Middle Eastern markets. The combination enhances the group's ability to serve clients across multiple regions, strengthens its position in the Middle East, and diversifies its customer base beyond Saudi Aramco.

ADES-Shelf Drilling Expanded Footprint Redrawing Competitive Map

As seen with the Noble-Diamond merger, consolidation often leads to divestment of older, less efficient rigs. Shelf Drilling has recently announced that it's holding the Trident XII for sale for non-drilling purposes. Earlier this year, the contractor sold the Trident VIII for recycling to an undisclosed buyer, and the Main Pass I to Perenco for conversion.

Building on Shelf Drilling's recent steps to streamline its fleet, Esgian has identified potential optimization opportunities the combined company may explore to improve efficiency and focus on higher-value assets. Likely candi-

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dates could be 1970s-built C.E. Thornton and F.G. McClintock, and Ron Tappmeyer.

In terms of market impact, this merger could create a power shift. With reduced competition, contractors may gain leverage in negotiating higher dayrates. Where ADES has aggressively grown through acquisition, Shelf has focused on modernization and diversification. Combined, they form a company with both cost discipline and strategic flexibility.

With this merger, ADES isn't just consolidating rigs, it's redrawing the competitive map. The combined entity becomes the clear leader in jackup drilling, not only in size and value, but also in geographic reach, fleet quality, and client diversity. It marks a turning point where Middle East capital, strategy, and energy ambition are no longer confined to local markets but are actively reshaping global

offshore drilling dynamics.

Competitors will be watching closely. The new entity's ability to offer competitive dayrates from a modern fleet, while leveraging scale and regional dominance, puts pressure on smaller players and reshapes the economics of shallow-water drilling. The industry may soon realize this was not just a smart deal, but as a turning point with lasting implications for fleet optimization, pricing power, and even future M&A activity across the sector.

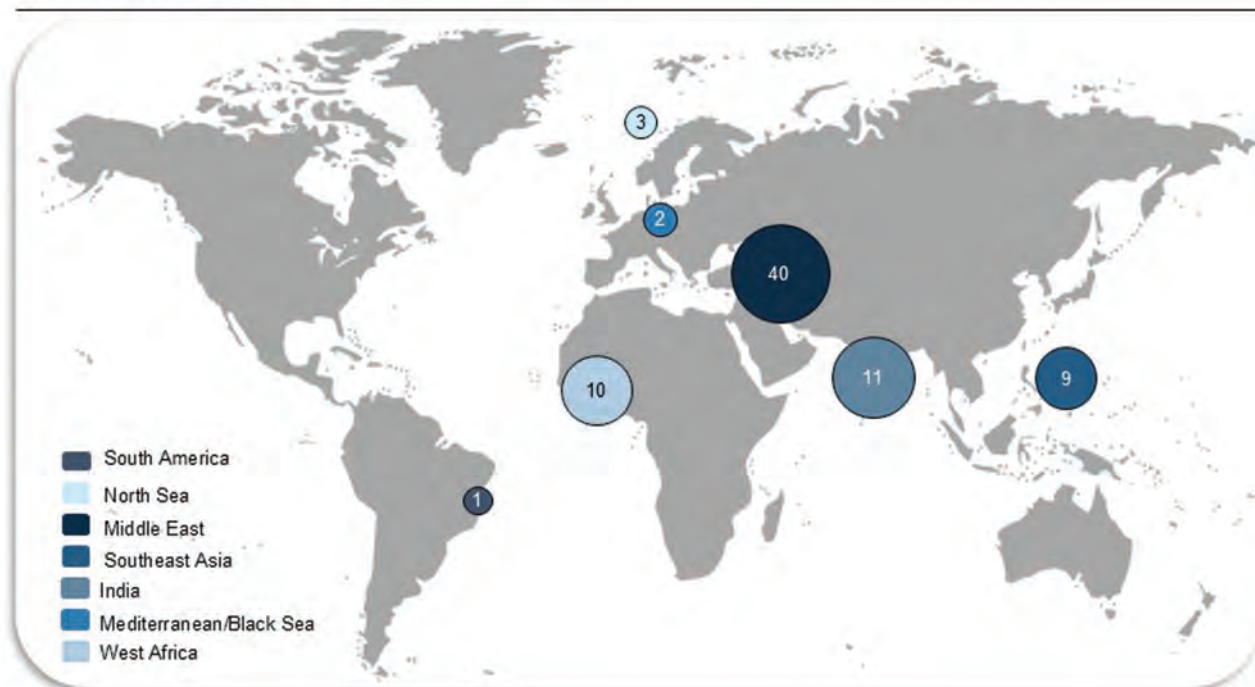
**Esgian only considers competitive jackup offshore drilling rigs and owned assets by each contractor (excluding jackup barges and mobile offshore production units "MOPU").*

¹Standard - built 2008 and later, with design water depth of <350ft, non-harsh-environment.

²Premium jackups - built 2008 and later, with design water depth of >349ft, non-harsh-environment.

ADES + Shelf expanded footprint*

Rig count (competitive) per region



*Includes current presence and future contracts.
Source: Esgian Rig Analytics

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MODERNIZING PERMITTING: Protecting America's Offshore Energy Future

By Erik Milito, President, National Ocean Industries Association

The American offshore energy industry is a cornerstone of our nation's energy, economic, and strategic strength. The U.S. offshore sector supports hundreds of thousands of jobs, drives investment, powers the energy we rely upon every day, and truly builds modern society. But the progress we've made needs to be made more durable. Without comprehensive permitting reform, the United States risks policy and investment whiplash, sharp swings in production and investment that hurt workers, communities, and our long-term wellbeing and energy security.

Today, companies want to invest across the full spectrum of offshore energy technologies: oil and gas, offshore wind, carbon capture and storage (CCS), deep-sea mining, and hydrogen. And technologies are being developed for the deployment of nuclear energy in the maritime sector. Each sector represents potentially billions of dollars in private capital, supports high-wage jobs, and anchors an entire network of offshore service providers, shipbuilders, vessel companies, fabricators, port operators, and technology companies.

But the federal permitting system is outdated, bureaucratic, and vulnerable to judicial and political disruptions, undermining the ability of these projects to move forward.

We've seen what happens when permitting breaks down. Under the previous administration, long-planned oil and gas projects were hit with punitive actions that stalled production and injected uncertainty into the industry. Years of planning and billions in investment were put at risk, costing jobs and U.S. energy output. Lease sales were canceled, shutting off new opportunities and driving capital overseas. And it's not just oil and gas. This year, the government halted construction on a permitted offshore wind project after \$5 billion had already been spent and the work was 80 percent complete.

This "stop-and-go" policy environment is harmful for every segment of offshore energy, whether it's traditional oil and gas or emerging technologies like wind and CCS.

The solution is straightforward: Congress must pass bipartisan permitting reform, and the reforms must include judicial and administrative measures that provide stability and predictability. This means establishing clear timelines for project reviews, protecting permits and contracts from being overturned without cause, and limiting litigation that can arbitrarily cancel permitted projects or hold investment in indefinite legal limbo.

Regulatory certainty should not be a political football, it should be the foundation that allows companies



to commit capital, hire workers, and plan for decades of energy production.

NOIA has been meeting with offices in both the House and Senate, on both sides of the aisle. Our member company executives have spoken directly with policymakers, making clear that permitting stability is the foundation of U.S. energy production. The response has been encouraging: there is genuine bipartisan interest in advancing reform. Lawmakers recognize what's at stake - energy security, economic growth, and industrial competitiveness - the momentum is building. Put simply, there's growing agreement across party lines that if we fail to modernize our permitting system, we risk higher costs for consumers and shortages in the power sector when supply falls behind demand.

Offshore energy is inherently interconnected. A single deepwater oil project doesn't just produce barrels; it sustains an ecosystem of vessel operators, engineers, fabrication yards, and ports. Offshore wind depends on many of the same maritime capabilities, and CCS will rely on pipelines, monitoring systems, and subsea expertise built by oil and gas operators. Deep sea mining will similarly leverage this industrial base.

Progress in one part of the offshore energy economy supports the entire network. Furthermore, American's offshore energy sector plays a substantial role within our na-

tional energy system, providing the fuel that moves America, fuel and natural gas for states like Florida, and a base for exports of oil and gas to help stabilize our allies in the midst of global conflict. When permitting delays or legal challenges disrupt one segment, the ripple effects impact every other project and our entire energy system.

Judicial reform is especially critical. NEPA and other environmental statutes play an essential role in ensuring informed project decisions, but the unnecessarily prolonged NEPA process and the litigation that inevitably follows, and the potential for vacatur of permits, create uncertainty. Projects can be tied up for years, discouraging investment and slowing production. By clarifying judicial review standards and establishing enforceable permitting timelines, Congress can provide the certainty that offshore energy projects need while maintaining strong environmental safeguards.

In other words, we will continue to produce energy we need while environmental laws remain in place.

Offshore energy is more than just power—it's jobs, investment, and economic strength. In the Gulf of America alone, oil and gas support over 400,000 jobs across all 50 states. Offshore wind is adding thousands more, fueling growth in ports, shipyards, and fabrication yards from the Gulf Coast to the Atlantic. These aren't competing industries, they're complementary, together building a stronger offshore energy ecosystem. And right now, offshore wind is leading the way in U.S. vessel construction, advancing the Administration's goal of maritime dominance. Permitting reform protects and accelerates all of it.

Time is of the essence. The United States is competing with nations that are moving aggressively to develop offshore resources. Every year of delay in the U.S. is a lost opportunity for investment, innovation, and leadership.

Congress has a chance to act decisively. A bipartisan permitting reform package that strengthens judicial certainty, sets enforceable timelines, and protects permits and contracts would anchor U.S. leadership in offshore energy for decades. It would prevent energy whiplash, ensure that existing and emerging projects can move forward without political or legal interference, and sustain the industrial base that underpins the entire sector.

Offshore energy is a national asset. It powers our economy, strengthens our energy security, and drives American innovation. But without a modern, durable permitting framework, our progress remains vulnerable. It's time for lawmakers to provide the certainty that businesses, workers, and communities deserve.

Image courtesy Steerprop



CHARTING HER OWN COURSE:

ANU PEIPPO'S MARITIME JOURNEY AND STEERPROP'S OFFSHORE FUTURE

*As the maritime industry faces a historic transformation, automation can only take the industry so far. People have always, and will continue to power the cumulative industry to ensure safe and efficient operations. In this segment of "A Maritime Life", we visit with **Anu Peippo, Offshore Segment Director, Steerprop**, a woman who started her career at sea onboard offshore service vessels and tankers, an experience she has parlayed into a vibrant shoreside career; today, as the offshore segment sales lead for Rauma, Finland-based propulsion specialist Steerprop.*

By Greg Trauthwein

When asked what first sparked her lifelong connection to the sea, Anu Peippo, Offshore Segment Director at Steerprop, doesn't hesitate to recall a childhood memory. "I must have been under ten," she says. "We were visiting my grandmother's friend who worked on a vessel carrying paper from Rauma, Finland to Germany. She was a stewardess on board. I remember being completely impressed that there was a swimming pool on the ship, and the food was so good. That was when the idea began to take root."

For Peippo, the sea was never far away. Her hometown of Rauma is one of Finland's maritime strongholds, and her family's history added to the pull. Both grandfathers had sailed in their youth, one on deck as an able-bodied seaman, the other in the engine room. Her grandmother kept cherished black-and-white photographs: her grandfather posed beside a classic car in Rio de Janeiro with Sugarloaf Mountain in the background, and in another image standing in front of the pyramids of Egypt. "She always told me, 'These are from the days when he was sailing.' And I thought, okay, that sounds really interesting," Peippo recalls.

When the time came to choose a career path after high school, her decision felt natural. She applied to Finland's university of applied sciences, where she enrolled in the captain's program. "That was the beginning," she says. "The maritime world had already found its way into my imagination."

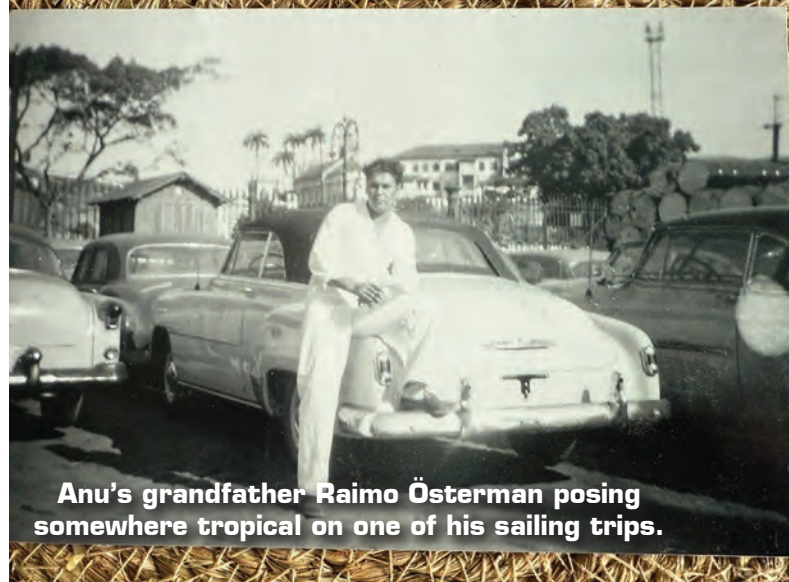
Life at Sea: From Tankers to Offshore

Peippo's professional seafaring career began with Neste Shipping, a Finnish state-owned tanker company. She describes it as an ideal start: "The oil companies have very high standards on health and safety. You learn how to do things properly. It sets a foundation." Sailing tankers carrying refined oil products across Europe, and occasionally as far afield as China and Indonesia, gave her invaluable experience—and a taste of the exotic. "I visited Greenland several times, and also Kaliningrad, this unusual Russian territory on the Baltic Sea. It was fascinating."

But she was hungry for more professional growth. That search took her to Norway's REM Offshore, where she joined as second officer. The transition from tankers to offshore support vessels proved pivotal. "On tankers, it's usually the captain who does the final maneuvering in port. But in offshore, vessels are constantly in and out of harbors and approaching offshore installations. That



Anu's great grandfather Anton Peippo [middle in the back row], working on a sail vessel.



Anu's grandfather Raimo Österman posing somewhere tropical on one of his sailing trips.

Images courtesy Anu Peippo

PROPULSION

ANU PEIPPO, OFFSHORE SEGMENT DIRECTOR, STEERPROP

Image courtesy Anu Peippo



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meant I got the opportunity to really learn vessel handling and maneuvering.”

It was also her introduction to dynamic positioning (DP), the precise system that holds vessels in place near offshore structures. “It was a steep learning curve,” she says, “but incredibly rewarding. You are in direct control, working very close to massive offshore installations. It really sharpened my skills.”

Her offshore years included time in the North Sea and later Brazil, where she advanced to chief officer. Working in Brazil also meant a multicultural environment. “The crew changed—Nordic sailors were the minority, Brazilians became the majority. Learning to adapt to different ways of working was a big part of the experience. And of course, the weather was a bonus,” she laughs. “For me, 20 degrees Celsius feels like summer. For them, it was winter, hats and coats came out. It gave me perspective.”

Coming Ashore

Life at sea shaped her, but eventually family came first. “I have two daughters,” she says. “After the second was born, I knew it was time to find a role on shore.” That opportunity came when Rolls-Royce launched its new Ship Intelligence division in Turku, Finland, focused on remote and autonomous vessel operations.

Her practical experience made her invaluable. “I became a maritime advisor. The engineers needed to understand how things actually work onboard—how processes from vessel life could translate into shore-based control centers. That was my role, to bridge that gap.”

Finding Steerprop

Her next chapter brought her back to Rauma, her hometown—and to Steerprop, a propulsion manufacturer she first discovered onboard a vessel. “I remember seeing Steerprop’s name in the manuals and noticing they were based in Rauma. It stuck with me. Later, when I was looking for new opportunities, I reached out. They were building their sales team, and it turned out to be a perfect fit.”

Today, Peippo serves as Offshore Segment Director, with responsibility for sales strategy, customer engagement, and aligning offshore market needs with Steerprop’s product development. “We have dedicated people for each segment—arctic, tug and workboats, ferry and cruise, and offshore. My role is to focus on the offshore sector: renewable energy vessels, special vessels, and the operators driv-

ing this market forward.”

Her seafaring background continues to shape her leadership. “When you’ve maneuvered a vessel into a quay in rough weather, you gain confidence. You learn resilience. Onshore, no challenge feels quite as daunting in comparison. And of course,” she adds with a smile, “after giving birth to two daughters, I feel unstoppable.”

Reflecting on her journey, Peippo offers clear encouragement to those considering a maritime career. “Go for it. It’s an incredible way to see the world, to learn about yourself, and to grow. You spend a lot of time with your own thoughts—it builds independence. And it gives you a strong foundation, whether you stay at sea your whole career or transition ashore. Maritime prepares you for anything.”

Steerprop Tech: Form Meets Function

Founded in 2000 and headquartered in Rauma, Steerprop specializes in azimuth propulsion systems—highly maneuverable propulsors that rotate 360 degrees to provide thrust in any direction. These systems are critical for vessels that operate in demanding environments, from offshore supply and construction vessels to tugs, icebreakers, and ferries.

“Azimuth propulsion is about precision and control,” Peippo explains. “For offshore operators, maneuverability is everything—whether approaching an installation, holding position, or working in tight harbor conditions.” Steerprop also delivers tunnel thrusters and retractable units, offering a complete package for vessels requiring advanced maneuvering.

Key customer drivers include:

- **Energy Efficiency & Sustainability:** “Owners are very focused on reducing environmental footprint. Our role is to design propulsors that are as energy-efficient as possible, helping lower CO₂ emissions.”
- **Reliability & Operability:** “Uptime is critical. Our systems are built to maximize vessel availability.”
- **Extended Maintenance Cycles:** “Some operators want longer drydocking intervals—seven and a half or even ten years, compared to the typical five. We can provide that flexibility.”

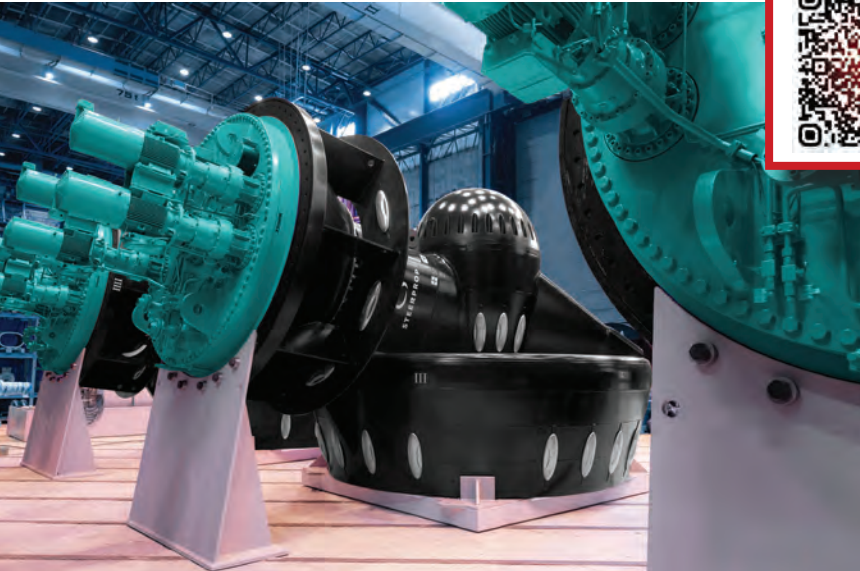
Adaptability is at the core of Steerprop’s philosophy. “We listen carefully to customers,” says Peippo. “Every project is unique, and we can tailor our technology to match requirements.”



Images courtesy Steerprop


**MARITIME
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Watch the full interview
with Anu Peippo,
Offshore Segment
Director, Steerprop, on
Maritime Reporter TV:

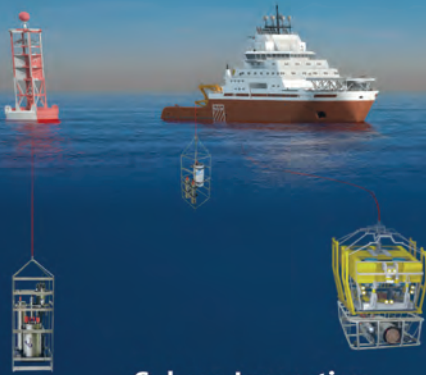


A Personal and Professional Voyage

From the spark of childhood curiosity aboard a vessel with a swimming pool, to navigating tankers through icy Greenland harbors, to maneuvering offshore vessels off Brazil, Anu Peippo's journey reflects the breadth of opportunity the maritime world offers. Today, she channels that experience into her role at Steerprop—helping deliver propulsion systems that enable offshore and maritime operators to meet the challenges of safety, sustainability, and efficiency.

“Every step along the way has taught me something,” she reflects. “Now, with Steerprop, I feel like I’ve come full circle—back to Rauma, back to where it all started, but carrying with me everything the sea has given me.”





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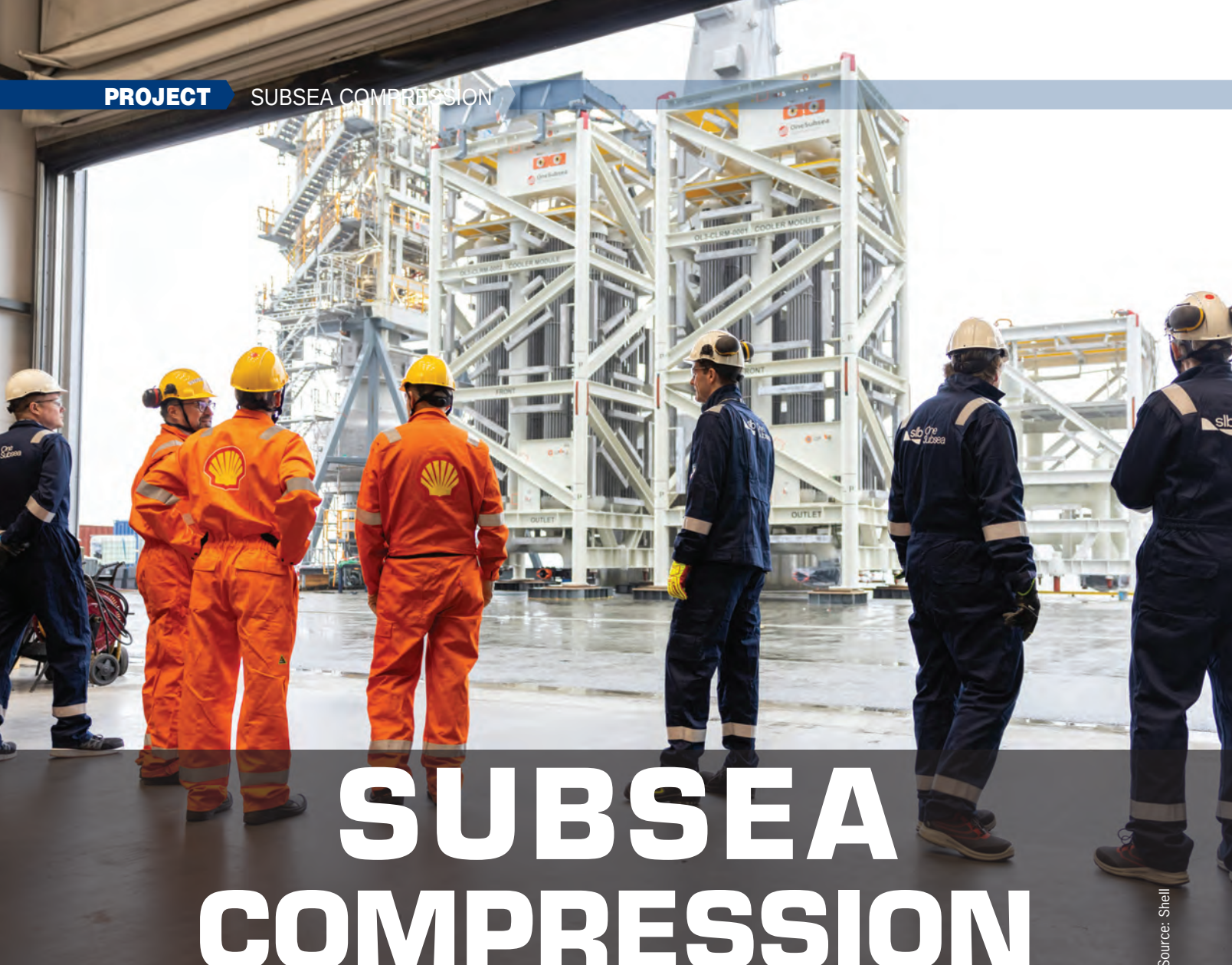
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Source: Shell

SUBSEA COMPRESSION AND THE ORMEN LANGE MOON LANDING

*The inauguration of a world-record subsea compression system in Norway in August 2025 marked a pioneering leap in engineering. Yet according to OneSubsea CEO **Mads Hjelmeland** and Project Director at Shell, **Richard Crichton**, its success hinged on one key ingredient: the close collaboration between operator Shell and the delivery alliance of OneSubsea, Subsea7, and Aker Solutions.*

By Josefine Spiro

When we carried out the final commissioning, it only took us 20 days from starting the compressors until we reached full power, which is quite extraordinary.

**– Richard Crichton,
Project Director at
Ormen Lange, Shell**



Source: Shell

This collaborative culture was put to its ultimate test in early 2023, at a test facility on Horsøy, an island outside Bergen. Here, the engineering team gathered for the first full-power run of the Ormen Lange Phase 3 subsea compression system. It was a pivotal moment in the multi-billion-dollar project, the culmination of five years of intensive work since the contract was awarded in October 2019. A massive 800-tonne compression station, submerged in a test pit, were connected to a simulator designed to mimic the 120-kilometer distance from the onshore gas plant at Nyhamna.

“The tension level in the room was quite high as we prepared to press the button for the first time. When we did and nothing happened, the anxiety rose even more,” said Mads Hjelmeland, CEO of OneSubsea.

That tense moment became emblematic of the Ormen Lange Phase 3 project. The resolution — diagnosing and fixing a software bug — was a testament not just to world-record engineering, but to a collaborative culture that Hjelmeland believes was essential to the project's outcome. The groundwork laid during that onshore test led to a remarkably smooth startup offshore, a success echoed by Shell's Project Director at the Ormen Lange Phase 3 project, Richard Crichton. “When we carried out the final commissioning, it only took us 20 days from starting the

compressors until we reached full power, which is quite extraordinary,” he said.

The Inevitable Challenge

The Ormen Lange field, Norway's second-largest gas field, has been a cornerstone of Europe's energy supply for over two decades. After years of production, however, the natural reservoir pressure was steadily declining, making it increasingly difficult to recover the remaining gas volumes. This presented Shell, OneSubsea and their partners with a significant challenge: how to maximize recovery and extend the life of a critical deepwater asset.

The mandate from the Norwegian government was established in the early 2000s, reflecting a forward-thinking approach to resource management. When the field's initial Plan for Development and Operation was approved, it included a specific condition that the operator must do everything possible to maximize recovery. “Subsea compression was set as a requirement when the time was ripe,” Hjelmeland said. When that time came, two main concepts were evaluated: a conventional floating platform and an advanced subsea compression system. After rigorous assessments, Shell and its partners concluded that the subsea option was superior, promising a higher recovery rate, greater energy efficiency, and a more favorable investment cost.

I believe a large part of the success was because we managed to break down the barriers in the commercial framework and share information openly, ... I don't think we would have succeeded without this collaboration.

**– Mads Hjelmeland,
CEO, OneSubsea**



Source: OneSubsea

Cracking the “Impossible” Nut

The project's defining technical challenge was the 120-km step-out distance, which set a new world record for power transmission to a subsea compression system. “The longest distance we had delivered on similar systems before was around 35 kilometers,” Hjelmeland said, adding that there was considerable skepticism from some within the industry during the early verification phase. “There were people at the time who said this was not possible,” he recalled.

The technical crux was the power and control umbilical and the placement of the variable frequency drive (VFD) 120 kilometers away from the motor and its controls. To de-risk this, the alliance built a full-scale simulator of the umbilical and connected it to the actual subsea system for extensive onshore testing. “This is a unique capability that gives us the confidence to tell our partners that even if the technology is new, we can verify it together,” Hjelmeland

said. It was this achievement that he described as the project's “moon landing” moment—proving the impossible was, in fact, possible.

Psychological Safety was Key

While the technology was groundbreaking, Hjelmeland emphasized that the project's success was equally dependent on its collaborative framework. Facing unforeseen challenges like the COVID-19 pandemic and geopolitical turmoil, the alliance between OneSubsea, Shell, Subsea7, and Aker Solutions functioned as a single, integrated team.

“What I really want to emphasize is the ‘soft’ side of the collaboration,” Hjelmeland stated. From the outset, the partners established a clear platform for how they would work together, moving beyond a traditional client-contractor relationship.

A key tool introduced by Shell was the “learner mindset”. “As things emerge or incidents occur, we take a step

back and learn from these events. That is the essence of the entire collaboration," explained Shell's Project Director, Richard Crichton, who championed the philosophy. He said the goal was to build such a high level of trust that the lines between companies would blur into a true 'one team' approach. "In the end, you can't tell if someone works for Shell or for OneSubsea," Crichton stated. "That's when you get real collaboration."

Underpinning this was a foundation of psychological safety—the assurance that team members could report bad news unfiltered, without fear of blame. "A 'blame game' about why something didn't work would simply not have worked," Crichton noted. This sentiment was shared by Hjelmeland. "I believe a large part of the success was because we managed to break down the barriers in the commercial framework and share information openly," he asserted. "I don't think we would have succeeded without this collaboration".

A New Benchmark

From the tense moment of the initial failed test at Horsøy, the project culminated in a seamless inauguration on August 26, 2025. This success established several new industry benchmarks. It's the world's first subsea processing project that completely removes the need to build and maintain a platform, a true subsea-to-beach solution. Moreover, its 120-kilometer step-out distance from shore sets a new world record for power transmission to a subsea compression system. By providing compression energy close to the reservoir, the technology increases the recovery rate in Norway's second-largest gas field from 75% to a world-class 85%. This unlocks an additional 30 to 50 billion cubic meters of gas, which is enough to power all households in a city the size of Barcelona, and could generate up to 70 billion NOK in additional revenue for the Norwegian state.

Powered by Norwegian hydropower and processed in a closed system, the facility also has one of the lowest carbon footprints per unit of energy in the world. The legacy of Ormen Lange Phase 3 is a proven toolkit that is now replicable globally.

"The first lesson is technology," Hjelmeland concluded. "Subsea processing has enormous value. The second is the new way of working—in partnership, with a learner mindset. Taking this lesson with us, together with our technology portfolio, makes the future very exciting".

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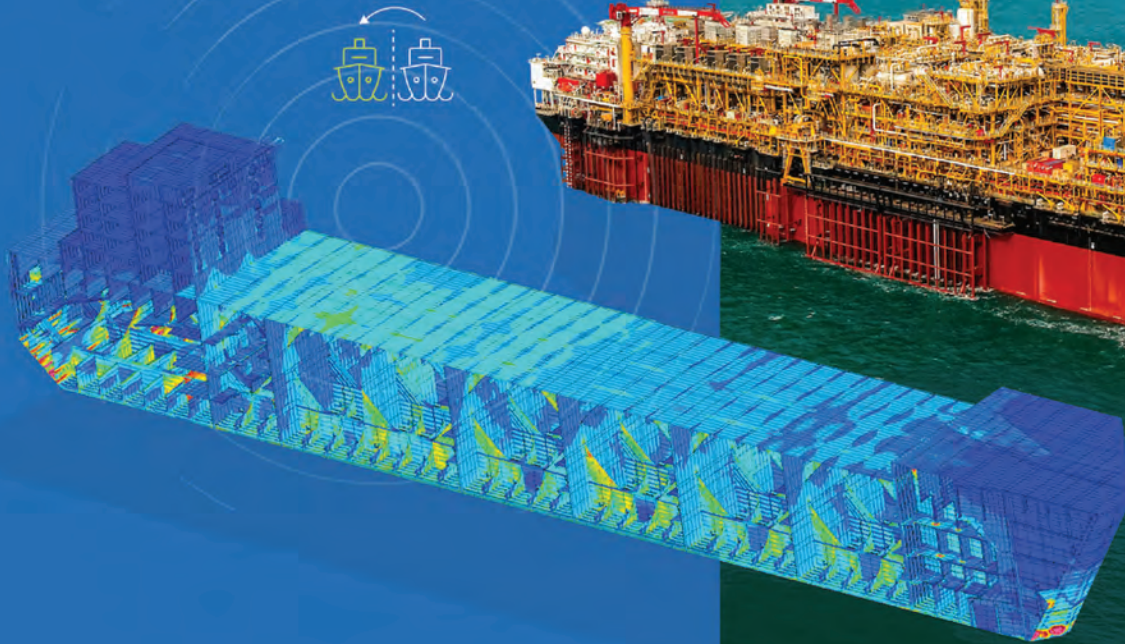
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THE FUTURE OF OFFSHORE ENERGY & TECHNOLOGY.

Akselos' SPM software changes the scale of sensor and strain gauge monitoring by providing a high-fidelity, near real-time structural twin of an entire FPSO.

Image courtesy Akselos



A WHOLE LOT OF STRUCTURAL INTEGRITY TOOLS

The transformation of structural integrity is no longer just about digitizing old processes.

By Wendy Laursen

Aker BP is already using AI to shape the future of its subsea infrastructure integrity management. The company plans to more than double its subsea infrastructure by 2027 and is moving toward a new operational paradigm.

“Our vision is to deliver world-class operational performance with high production efficiency, low environmental discharges, and low costs,” says Camilla Leon, VP Subsea, Aker BP. “We believe we can achieve this by liberating and sharing data, applying automation and advanced analytics, and building a common situational awareness across our ecosystem of partners and internal stakeholders.”

Leon is a board member of Elementz, a software-as-a-service company that is supporting that vision with its integrity management software. Elementz CEO, Jason Brown, says structural integrity and inspection is undergoing a fundamental transformation, moving from traditional time-based strategies to data-driven approaches. This evolution is being accelerated by advances in real-time monitoring, autonomous inspection, and predictive analytics.

For Elementz, the change is best understood through the lens of its Blue Digital Ecosystem, an interconnected digital infrastructure where data, systems, and stakeholders work seamlessly together. “Integrity is no longer an isolat-

ed discipline,” says Brown. “It is becoming an intelligent, always-on layer that connects inspection gathering technologies, asset data, and decision-making across the entire subsea value chain.”

He says the future of structural integrity will include interconnected digital twins sharing intelligence across operators and assets, including applying insights from oil and gas to renewables.

The next wave of technologies is already reshaping structural integrity management with digital twins that mirror real-time structural conditions and allow simulation of fatigue, stress, and extreme events. IoT and structural health monitoring systems continuously capture vibration, strain, and motion data; fleets of drones, ROVs, AUVs, and climbing robots conduct routine inspections; and AI-driven analytics optimize inspection schedules and predict failures before they occur.

Light Structures is expanding the scope of its structural health monitoring system to include jack-up rigs as well as FPSOs and offshore wind platforms. Mobile drilling platforms present a distinct set of structural risks, as they face uneven leg loading during jacking, variable soil conditions that affect stability, and fatigue at the leg-hull interface, all within a structure with safety margins that can shift quickly depending on water depth and seabed behavior. Traditional inspection regimes

Structural integrity and inspection is moving from traditional time-based strategies to data-driven approaches.

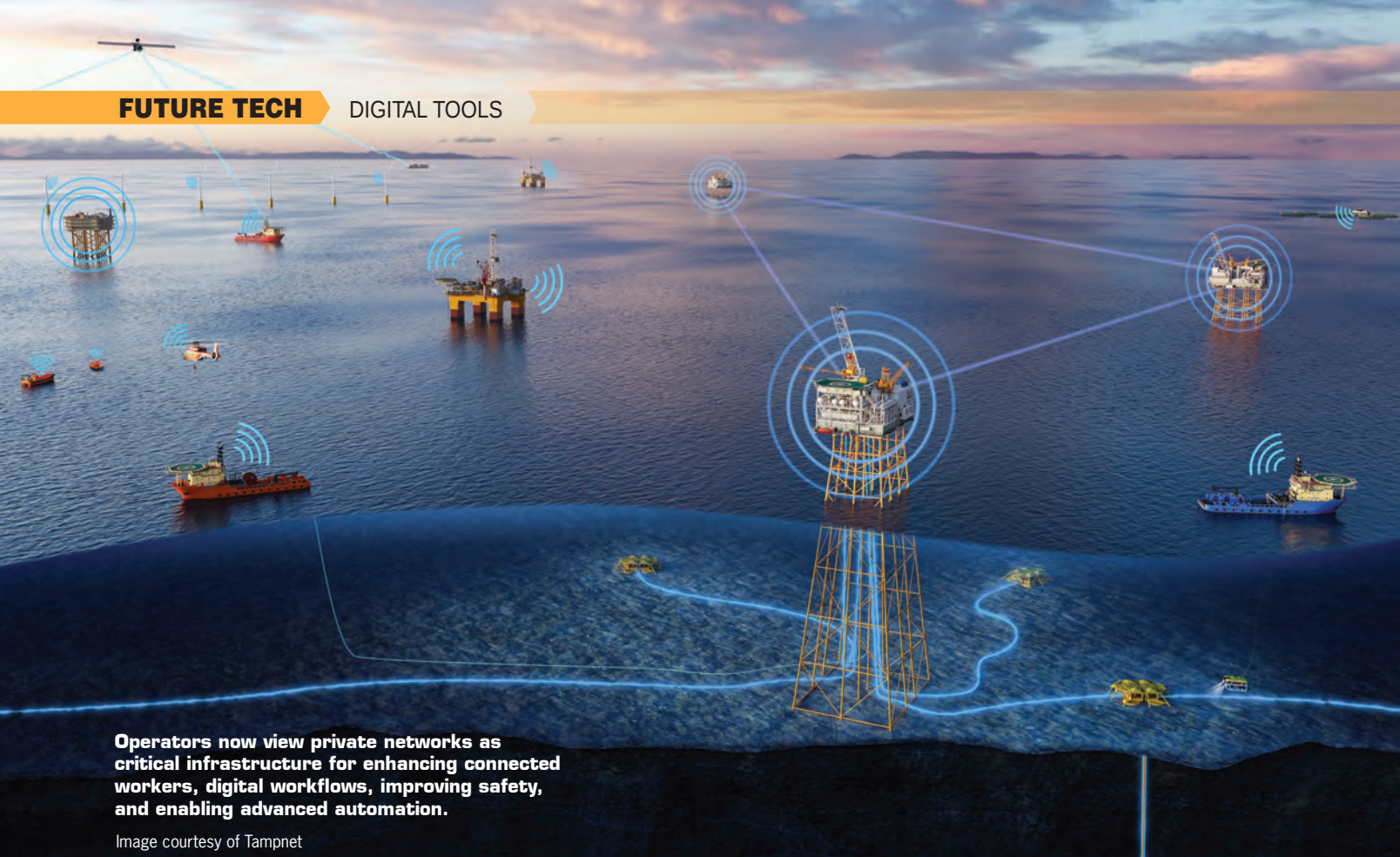


Image courtesy of Elementz

Asset integrity is becoming an intelligent, always-on layer that connects inspection gathering technologies, asset data, and decision-making across the entire subsea value chain.



Image courtesy of Elementz



Operators now view private networks as critical infrastructure for enhancing connected workers, digital workflows, improving safety, and enabling advanced automation.

Image courtesy of Tampnet

struggle to account for these dynamic factors, especially during preloading or storm conditions when structural loads can peak.

The Light Structures system involves installing fiber optic sensors in each jacking house. These sensors measure the strain in the structural members that transfer loads into the legs. The system then converts these readings into sectional loads and stress values using a digital twin that adjusts for operational conditions like water depth and seabed stiffness. This provides real-time feedback on leg balance, structural stress, and proximity to critical limits, which enables operators to intervene early if asymmetry develops or a leg becomes overloaded.

One of the system's advantages is its ability to shift operators from calendar-based maintenance to condition-based strategies. When a rig experiences a storm, a difficult jacking sequence, or preloading operations, the system captures exactly where and how hard the structure was worked. This allows inspections to be targeted and justified, avoiding unnecessary downtime while still addressing risk. Over time, this also supports more accurate life-extension decisions based on actual fatigue data.

Akselos' SPM software is also being used for life-extension analysis. The system changes the scale of sensor and strain gauge monitoring by providing a high-fidelity, near real-time structural twin of an entire FPSO. This has been made possible by a new, faster patented RB-FEA calculation method the company developed. By combining inspection records, metocean conditions, and cargo operations into one dynamic model, operators gain a live, continuous view of structural performance. This allows for real-time monitoring, identification of stress concentrations, and on-demand fatigue analysis to support data-driven maintenance and risk-based inspections.

Dr. Claus Reimers, Chief Product and Technology Officer at Akselos, cites the case where the Bonga FPSO was close to end-of-life. "They could not model the whole structure in one go, so they made very conservative assumptions. That could have meant retiring the asset way too early. For Bonga, we helped them unlock a significant life extension."

Amine Boumnijel, Product Owner for Offshore Structures at Akselos, explains that during the design phase, many assumptions are made about how an asset will be



HISTORY REPEATS ENERGY, BORDERS AND NARRATIVE IN THE AR

By Wilfred de Gannes

Image courtesy Shipbuilding and Repair Development Company of Trinidad And Tobago Limited



S ITSELF: D THE WAR AMERICAS

Oil and gas have not only fueled economies but created rivalries, territorial disputes and wars. In the last one hundred years or so, since petroleum resources have been commercially extracted it is central to numerous armed conflicts. Some notable examples, are seen in Europe, Middle East, Africa and now extending into the Southern Caribbean:

1. World War II (1939-1945)

- **German Expansion:** One of Hitler's strategic goals was to access oil in the Caucasus (Baku, Gronzny and Mailok areas). The 1942 Battle of Stalingrad was directly tied to Germany's push toward the enormous Soviet oil fields.

2. Middle East Conflicts

- **Iran (1953 Coup):** The nationalization of the Anglo-Iranian Oil Company (now bP) by Prime Minister Mossadeqh led to a United States-United Kingdom backed coup, reinstating the Shah. While not a direct war, it set the stage for decades of instability.

- **Gulf War (1990-1991):** Iraq's invasion of Kuwait was triggered by Kuwaiti overproduction which had the direct effect of keeping oil prices low and alleged directional drilling into Iraqi oil fields. The U.S.-led coalition intervened to secure Gulf oil supplies, whereby major U.S. Oil and Gas corporations such as KBR (NYSE: KBR) was heavily involved in providing wide ranging post-war engineering, maintenance and construction services to Iraq's oil and gas sector, leading the development of the Majnoon Oil Field and Front-End Engineering Design (FEED) for a fertilizer plant.

3. Africa

- **Niger Delta Region (Nigeria):** Since the 1990's, conflicts between the government, multinational oil companies, like Shell Nigeria, and militant groups such as the Movement of the Survival of the Ogoni People (MOSOP) have resulted in pipeline sabotage, kidnapping and armed conflicts over wealth distribution.

- **Sudan (1980-2000s):** Oil discovered in southern Sudan intensified civil wars, where control of oil fields became a major driver of conflict, eventually resulting in South Sudan declaring independence in 2011.

4. Russia-Ukraine War (2022 – present):

- While more about geopolitics and security, and control over natural gas transit routes to Europe factored into tensions. By 2020, Ukraine transited more natural gas than any other country in the world as it remained the main route for Russian natural gas sold to Europe, earning Ukraine about



SBM Offshore constructed and installed the ONE GUYANA FPSO for ExxonMobil's Yellowtail field, the fourth and largest project in the Stabroek block.

USD\$3 billion per year in transit fees, before the launch of the Nord Stream pipeline, which bypassed Ukraine.

The Russian-Ukraine gas disputes caused a significant fall-off in supplies to the European Union. This alongside coincidental attempts by Ukraine to monetize its huge natural gas resources in the Donbas region since 2014 and now occupied by Russia as a means of controlling the supply side of European energy equation. Russia's share of EU imports of pipeline gas dropped from over 40% in 2021 to about 11% in 2024.

GUYANA'S ESSEQUIBO: PROSPERITY FOR SOME, PROVOCATION FOR OTHERS

The ongoing Essequibo dispute with the Bolivarian Republic of Venezuela is one of today's clearest examples of how oil and gas can intensify long-standing territorial conflicts. Venezuela claims about two-thirds of Guyana's land area, known as the Essequibo region which is made up of around 160,000 kilometers square. It argues that the 1899 arbitral award giving Britain (then-colonial ruler of Guyana) the territory was invalid. When Guyana gained its Independence in 1966, Venezuela renewed its claim. The Geneva Agreement that same year left the issue unresolved, with the United Nations later becoming involved.

EXXON MOBIL'S OFFSHORE DISCOVERIES PUT GUYANA CENTER STAGE

With the recently concluded elections held in September resulting in the incumbent government led by Dr. Mohamed Irfaan Ali being democratically voted to serve

another five-year term, ExxonMobil Guyana Limited (EMGL) could soon receive approval for its eighth Ultra Deep-water oil and gas development in the Stabroek Block, known as the Longtail project, following review of EMGL Field Development Plan (FDP) by the Petroleum Department of the Ministry of Natural Resources. This alongside the simultaneous review of their Environmental Impact Assessment (EIA) by the Georgetown headquartered Environmental Protection Agency.

As of August 2025, over 8,900 persons are employed directly and through contractors, and Guyana's offshore infrastructure comprised of some four (4) operational Floating Production Storage Offloading ships (FPSOs) named LIZA DESTINY, LIZA UNITY, PROSPERITY and ONE GUYANA with a fifth, the JAGUAR currently under construction at the Seatrium yard in Singapore by SBM Offshore (AMS: SBMO). With a design name plate capacity to handle crude production at a rate of 250,000 barrels per day (b/d) JAGUAR is expected to be permanently moored about 200 kilometers offshore Guyana. This design is based on its Fast4Ward program and reinforces SBM Offshore "commitment to standardize efficient and sustainable offshore productions solutions."

TRINIDAD & TOBAGO JOINS THE ULTRA DEEPWATER RACE

These immense offshore discoveries found in the prolific Cretaceous-aged formations in Guyana, and nearby Suriname estimated to be larger than the entire Gulf of Mexico (renamed by U.S. authorities in 2025 as the Gulf of America) can easily mirror into cross-border success in the adjacent 7,165 square kilometers Ultra Deep-1 (TTUD-1)



block. The no-bid Production Sharing Contract (PSC) for the ultra-deepwater exploration block was signed between The Honorable Prime Minister Kamla Persad-Bissessar, S.C., M.P., and ExxonMobil (NYSE: XOM) Vice President of Global Exploration John Ardill at the Diplomatic Center in Port of Spain, on August 12, 2025.

During a follow-up meeting, ExxonMobil Trinidad and Tobago operations manager Dr. Bram Willemsen said the block's operations for the next six (6) months remain on track, including permit applications, and geological and geophysical work required for conducting the 3D seismic survey in 2026. Once surveys look favorable the venture would utilize advancements in offshore deepwater drilling technology, including innovations in drill ships and high-pressure, high temperature systems, making the 2,000 to 3,000 meters ultra deep-water acreage viable.

The recent internal corporate restructuring of the Atlantic LNG plant, located on Trinidad's South-western peninsula now allows for additional natural gas throughput by non-shareholding entities thereby setting the stage from ExxonMobil to possibly become major a gas supplier for the three (3) operational LNG trains at Point Fortin, alongside BP PLC (NYSE: BP), and Shell PLC (NYSE: SHEL) who are currently the largest shareholders.

CARICOM

Prime Minister Kamla Persad-Bissessar has also reiter-

ated more than once "Should Venezuela invade Guyana, Trinidad and Tobago would definitely step forward to defend of our cousins, brothers and sisters in CARICOM."

Trinidad and Tobago and the Republic of Guyana being founding member states of the Caribbean Community (CARICOM), an intergovernmental organization that serves as a political and economic union of fifteen (15) member states and five associated members throughout the Americas, the Caribbean and Atlantic Ocean. Headquartered in Georgetown, Guyana, CARICOM plays a central role in regional integration and cooperation. It is also noteworthy to mention that the U.S. Virgin Islands, located in the central Caribbean region have initiated steps for eventual associate membership in March 2024.

SUPPLYING BUT NOT BELONGING: VENEZUELA'S CARIBBEAN ENERGY ROLE

From the long ongoing territorial dispute and Guyana's Independence in 1966, it is not difficult to understand why the Bolivarian Republic of Venezuela was never accepted to be a CARICOM member, despite its 1,700 miles of coastline along the Caribbean Sea and Atlantic Ocean. Venezuela through its Petróleos de Venezuela, S.A. (PDVSA) has long supplied petroleum products to smaller Caribbean island-states like St. Vincent and the Grenadines and Jamaica through its PETROCARIBE agreement, established in June 2005.



[R to L]: Minister in the Ministry of Energy and Energy Industries, Hon. Ernesto Kesar, M.P. alongside ExxonMobil V.P. John Ardill, with The Hon. Prime Minister of Trinidad and Tobago Kamla Persad-Bissessar, S.C., M.P., and Minister of Energy Hon. Roodal Moonilal, M.P.

This flagship initiative by the late popularist President Hugo Rafael Chávez Frías provided discounted oil and preferential payment terms to seventeen (17) Caribbean and Central American nations, allowing them to pay up to 25-years at a low interest rate, with flexibility to also settle through goods and services.

GUNBOAT DIPLOMACY RETURNS: ENERGY AND THE RISK OF CONFLICT

Southern Caribbean energy production is at the heart of a growing geopolitical storm. Guyana's offshore oil boom already surpassing 900,000 b/d with ExxonMobil's ONE GUYANA Floating Production Storage Offloading ship. Overall total output is projected to reach 1.7 million b/d by 2030 has reshaped the regional energy landscape. This rapid rise has made Guyana one of the world's fastest-growing oil exporters, drawing in massive foreign investment while simultaneously escalating tensions with Venezuela, which claims sovereignty over the Essequibo region and its adjoining waters. Offshore production ships, sub-sea umbilical pipelines and maritime shipping lanes have become strategic assets and potential targets in a dispute that risks destabilizing the Caribbean.

For Trinidad and Tobago the stakes are equally pressing, where its 117-years energy sector comprises eighty percent (80%) of export revenues in fiscal 2023/24 and is now more than ever heavily reliant on offshore gas, as several locally-based Methanol, Ammonia and the 15 million

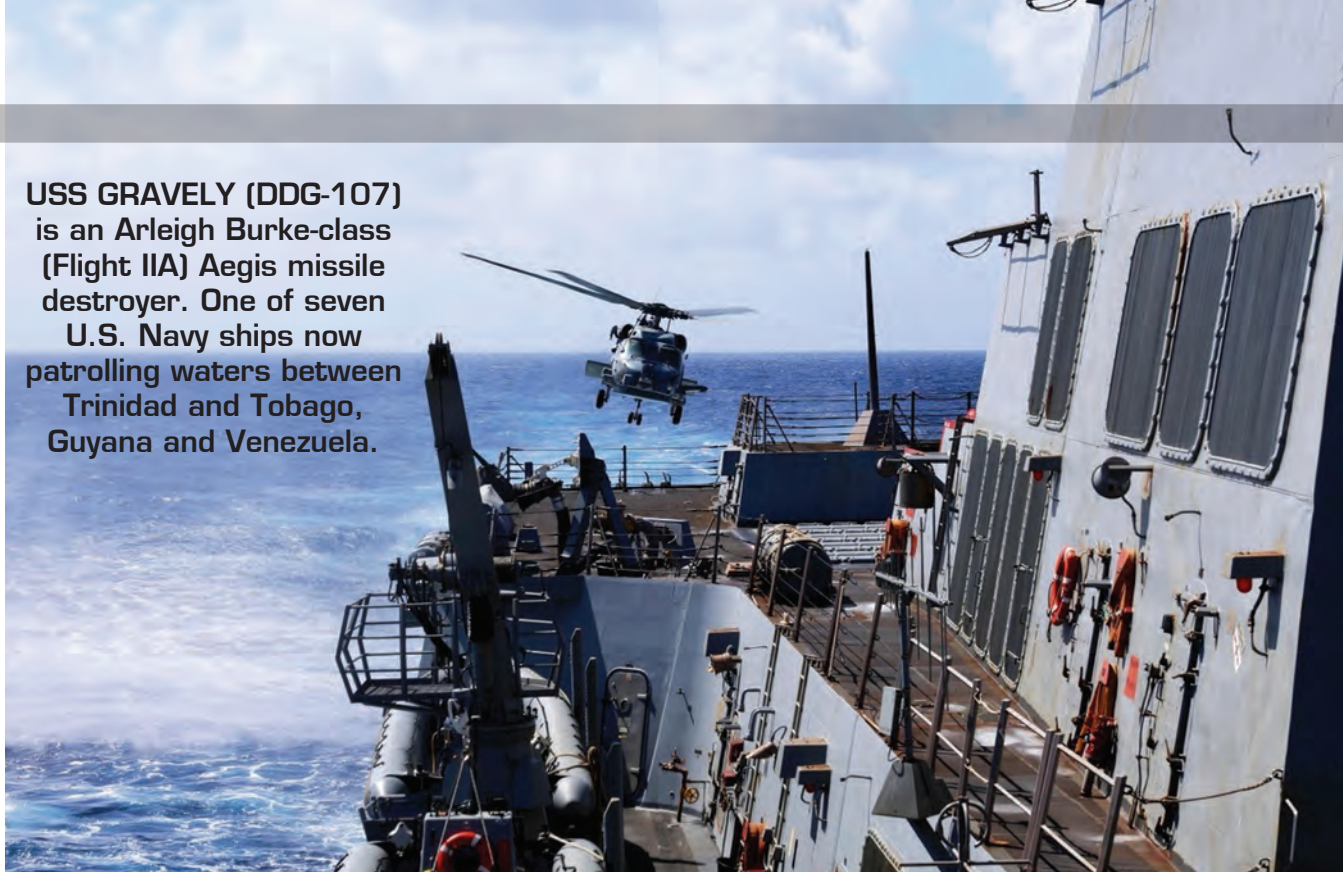
metric tonnes per annum (tpa) LNG trains have been consistently running below their engineered capacity. Projects near the Venezuelan maritime border such as the Dragon and Cocuina-Manakin offshore gas fields represent critical opportunities to stabilize declining output, but are vulnerable to current diplomatic rifts.

In this climate, the presence of U.S. Navy warships in the southern Caribbean are increasingly regarded as vital for de-escalating regional tensions, deterring military posturing, and safeguarding critical ultra-deepwater oil and gas infrastructure. Without such stabilizing measures, the region known as a 'Zone of Peace' by CARICOM members risks seeing its energy lifelines transformed in flash-points of conflict, undermining both regional economies and global oil and gas security.

FORGING STRONG BILATERAL TIES: TRINIDAD AND TOBAGO AND THE UNITED STATES

The United States Department of State's Bureau of Overseas Building Operations (OBO), in partnership with the U.S. embassy in Trinidad and Tobago, has just announced the start of construction on the new US\$400 million embassy in Port of Spain. Set on an 11-acre site acquired in 2023, this facility is expected to be one of the largest and most secure U.S. diplomatic compounds in the Western Hemisphere. This significant investment underscores Washington's commitment to its diplomatic

USS GRAVELY (DDG-107) is an Arleigh Burke-class (Flight IIA) Aegis missile destroyer. One of seven U.S. Navy ships now patrolling waters between Trinidad and Tobago, Guyana and Venezuela.



Credit: U.S. Navy photo by Mass Communication Specialist 1st Class Ryan Williams

"U.S. Navy warships in the southern Caribbean are increasingly regarded as vital for de-escalating regional tensions, deterring military posturing, and safeguarding critical ultra-deepwater oil and gas infrastructure."

and security relationship with its key Caribbean trading partner, while also creating employment opportunities for hundreds of Trinidad and Tobago nationals throughout the construction phase.

The longstanding relationship between the United States of America and Trinidad and Tobago has always been of strategic importance and cultural exchange. During World War II, Trinidad served as a critical location for U.S. naval and air bases, laying the foundation for enduring ties. Today, those connections remain strong and visible from shared diplomatic and economic interest to cultural expressions abroad. A striking example is the annual presence of Trinidad and Tobago's top steel bands performing under the bright lights in the center of Times Square, New York City – an enduring reminder of how the islands' music continues to resonate on the global stage.

The legacy of this cultural innovation is rooted in the oil industry. Between 1956 and 1985, the TEXACO refinery at Point-a-Pierre played an unlikely role in shaping Trinidad and Tobago's musical identity. The reuse of 55-gallon oil drums from the refinery provided the foundation for the widespread development of finely tuned steel pans, as instrument now celebrated worldwide as the national in-

strument of Trinidad and Tobago. That journey came full circle earlier this year when Harvard University officially welcomed the Harvard College Steelpan Ensemble, an achievement made possible by the dedication of Trinidadian student Adam Bartholomew. What began as recycled oil drums has evolved into a global symbol of cultural pride and academic recognition.



Reuse of 55-gallon oil drums utilized to make musical steel band instruments.

Credit: Adam Bartholomew



Revised ABS Guidance Makes Tank Entry Safer, Smarter

Modified requirements mean operators can halve the number of inspections required, driving safety and operational efficiency.

By **Matt Tremblay**, VP Global Offshore, ABS, and **Russell Ford**, Chief Surveyor-Offshore, ABS

ABS has responded to the trend towards longer operating lifecycles with guidance that enables offshore asset owners to increase the intervals between tank openings.

In an industry first, ABS has published guidance that accommodates the periods between internal examination of tanks beyond the typical five-year requirements to once every 10 years.

The guidance has the potential to maximize operational uptime for site-dependent assets such as floating storage and regasification units (FSRUs), floating production, storage and offloading vessels (FPSOs), floating storage and offloading vessels (FSOs) and floating offshore liquefied gas terminals (FLGTs).

Such units are often engaged in long-term deployment on a single site, which can make it challenging for operators to maintain the tank examination schedule during the traditional five-year period.

Most importantly, and in line with ABS's safety-first mission, internal tank inspections are also potentially hazardous, so reducing the inspection frequency without compromising the structural integrity of the asset can ad-

vance safety performance. Put simply, fewer people, inside fewer tanks, less often, is safer for the personnel tasked with performing the inspections.

Additionally, opening cargo tanks on such assets is disruptive in terms of OpEx and lost operating days so reducing the number of required inspections by half offers significant potential cost savings for operators.

Beyond the Standard

Drawing on the use of enhanced design criteria, ABS has updated its technical requirements for the design and construction for tanks that go beyond the typical five (5) year class cycle. Based on achieving required safety factors, enhanced coatings requirements, and adherence to specified corrosion margins, it is possible to significantly extend the period between tank inspections. These enhanced requirements include but are not limited to:

- Adoption of a Risk Assessment for tanks enrolled in the program
- Cargo and Ballast tanks are to be fully coated in accordance with the applicable ABS CPS notation
- Improved cathodic protection requirements

- Bottom and shell scantlings of sufficient thickness to withstand any possible corrosive effects of cargo tank contents
- On FPI conversions, welded repairs for pitting, grooving and other areas to restore the original design hull scantlings
- A minimum safety factor for fatigue beyond what is normally required – in co-ordination with the enhanced design requirements
- Enrolment in an ABS PMP program where cargo equipment is located inside the cargo spaces
- Improved operational requirements such as periodic Cargo Oil (Tank) Washing (COW)

How it works

- **What's covered:** The MTEP includes the structural and cargo containment aspects of the tank along with all associated electrical components, mechanical piping, valves as well as machinery and components inside the tank normally subject to close-up surveys. MTEP can be applied to one or across all compartments within the cargo block of an asset. For example, it can be applied to only cargo oil tanks or for cargo, ballast and void tanks.

- **Eligibility:** In terms of asset age, the program is generally intended for newer units, with older units considered on a case-by-case basis, up to five (5) years from delivery or conversion. All eligible assets must be designed and maintained in compliance with ABS standards and guidelines. All units under the MTEP must have an approved Preventative Maintenance Program, or PMP, in place. Assets with integral equipment in the cargo tanks are to be enrolled in an approved preventative maintenance program (PMP) that allows for alternative means to credit surveys to qualify for the MTEP. It's also important to note the specific requirements that apply to units carrying liquefied gas cargo as well as those carrying oil cargo, ensuring that the unique risks associated with each cargo type are appropriately managed.

- **Application:** Operators must submit comprehensive documentation as part of the MTEP approval process, including detailed operational descriptions, inspection and maintenance schedules, and a thorough risk assessment plan. Conducting a robust risk assessment is critical for developing an inspection and monitoring plan that is tailored to the specific asset. The program further mandates the implementation of risk-based inspection (RBI) techniques, as well as continuous condition-based monitoring of internal machinery and systems. ABS will review and approve these risk assessments to ensure that all potential

risks are identified and adequately addressed.

- **Survey requirements:** The MTEP outlines clear expectations for implementation, including annual, intermediate, and special surveys across various tank types, including cargo tanks for liquefied gas, cargo oil tanks, ballast tanks, and void spaces. Each tank type is subject to specific survey protocols, which may include the use of advanced condition monitoring techniques and risk-based inspection plans to optimize safety and reliability.

- **Operating knowhow:** The provision of detailed operational manuals is a fundamental requirement under the MTEP. These manuals must cover the cargo system and all associated systems, and should clearly define system limitations, control and monitoring systems, as well as emergency shutdown arrangements. This ensures that all operational personnel have access to the necessary information to maintain safe and efficient operations throughout the asset's lifecycle.

- **Execution:** The program begins with an implementation survey to establish baseline conditions for the asset, followed by regular annual health checks to monitor the condition of the tanks. Comprehensive examinations are then conducted at each ten-year interval to ensure continued compliance and asset integrity.

- **Additional extensions:** Adoption if intervals beyond the initial ten-year period are possible subject to rigorous reassessment and continued compliance with ABS guidelines, providing the flexibility needed to adapt the program to the evolving needs of each asset.

Why now?

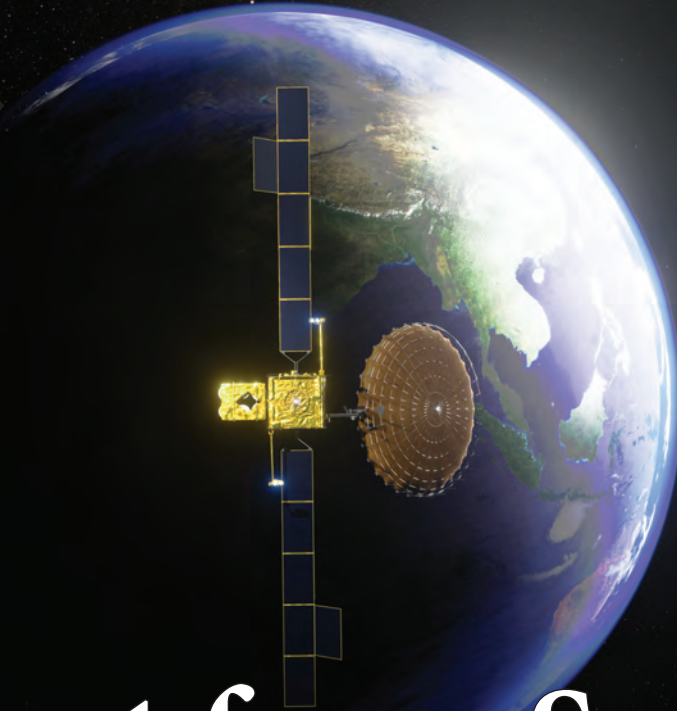
ABS created the enhanced requirements to reflect the fact that today's floating offshore assets have longer working lives than in previous generations, a trend it expects to continue. ABS wants to support the industry in ensuring that these assets can meet these expectations.

Conclusion

Maximizing operational efficiency and uptime while promoting safety is crucial in the dynamic offshore production sector, especially as longer-term lifecycles for FPSOs and FSRUs become increasingly common.

The modified tank entry program represents a pivotal change for qualified assets, minimizing operational downtime without compromising safety. Indeed, fewer tank inspections reduces the exposure of personnel to these potentially hazardous situations, providing a clear win for a safety-first culture.

Image courtesy Viasat



Support from Space: How Satellites Can Help Energy Operators Improve Workforce Safety

By Eric Verheylewegen, VP Strategic Initiatives Enterprise and Land Mobile, Viasat

With recent reports highlighting the challenges faced by rig operators in the North Sea and other challenging environments, the energy industry faces an urgent imperative: safeguarding its workforce. Such incidents underline the pressing need for innovative ways to shift the industry from reaction to prevention: demanding the energy sector to deliver a more proactive approach to crew welfare.

Oil and gas operators are increasingly turning to Internet of Things (IoT) technologies, which promise to revolutionize safety protocols through real-time monitoring, predictive maintenance of critical machinery, and continuous crew-safety monitoring.

Reliable connectivity is needed to effectively operate all these technologies, but the very nature of remote energy

assets—often situated far beyond the reach of traditional cellular networks—means traditional networks are not always available.

This is where satellite-enabled solutions become indispensable. By leveraging advancements in satellite connectivity, oil and gas operators can activate these vital IoT technologies, helping to mitigate dangerous situations and improve worker welfare.

Safety Challenges in Remote Energy Ops

The energy industry workforce faces inherent dangers and unique safety challenges, particularly those operating in remote and volatile environments like offshore rigs. Recent hazardous incidents underscore the growing scrutiny of workforce safety across the sector.

These challenges can broadly be categorized into two primary areas. Firstly, on-site dangers encompass risks associated with heavy machinery, complex operations, and the potential for accidents. There is a critical need for continuous monitoring to prevent equipment failures, 'person overboard' situations, and human error. Secondly, transit dangers involve the hazards of reaching and departing remote sites, including difficult terrain or conditions, and the risk of vehicles going missing or encountering accidents.

Faced with multiple safety risks, technology will be essential in facilitating this shift. Energy industry operators are already increasingly turning to IoT monitoring technologies to improve safety protocols, with the energy operators highlighted as the largest investor in IoT solutions in Viasat's recent IoT report.

Satellite IoT Can Transform Workforce Welfare

Satellite-enabled IoT provides continuous, always-on connectivity even in areas without cellular coverage, making it ideal for remote energy operations. This technology unlocks significant benefits, including the continuous, real-time monitoring of heavy machinery, always-on crew-safety surveillance, and remote vehicle tracking – helping to mitigate dangerous situations even in the most isolated environments.

IoT sensors on heavy machinery, such as drills and pumps, can continuously collect data. Overlaying this with AI then allows for real-time data analysis to detect anomalies, predict potential failures, and flag exceptions, thereby preventing accidents and optimizing maintenance schedules.

For example, by gathering data from pumps and pumping stations, if an anomaly is detected, workers can activate video monitoring services, such as those provided by Harvest Network, to conduct remote inspections, assess criticality, and schedule general maintenance or dispatch help. This not only reduces the need for constant physical checks but also allows for more efficient resource allocation and, crucially, gets staff out of harm's way.

The application of AI extends to video monitoring of sites, enabling the identification of "person down" scenarios or other unexpected activities. Solutions such as those provided by our partner AST Networks deliver real-time, high-speed video enabling the remote monitoring and management of operations, allowing for immediate response if crew are in danger. AI systems can also ensure compliance with safety equipment protocols, such as detecting if workers are not wearing required vests, thereby promoting a stronger culture of safety.

What's more, IoT devices in vehicles enable real-time

tracking of location, speed, and sudden changes in acceleration or deceleration. This allows for immediate notification in case of an accident, adherence to speed safety limits, and more efficient fleet management. Geofencing can also be employed for automated check-ins, ensuring personnel arrive safely at remote locations.

The Future of Safety

A significant shift in the cost-effectiveness of satellite IoT devices is underway, thanks to the potential of Narrowband Non-Terrestrial Network (NB-NTN) solutions. This new development brings together satellite and cellular connectivity, through one module, without the need for traditional satellite terminals. With NB-NTN, the need for costly user equipment hardware is substantially reduced compared to traditional satellite user terminals, opening up scale and new use cases for energy operators eager to deploy IoT solutions.

This means what was once a prohibitive, costly investment is now significantly more cost effective, making it feasible to track and protect a vast array of resources – from generators to ATVs – and more importantly individual crew members. The inherent scalability of NB-NTN allows for widespread deployment of trackers, enabling comprehensive oversight of personnel and assets across vast and remote energy landscapes.

Robust satellite connectivity is also a vital enabling layer for advanced technologies like autonomous hauling operations, such as remote trucks collecting oil and gas, and remote inspections, like drones for offshore rig maintenance.

Looking ahead, there is exciting potential for remote detection and even fixing of smaller issues in vehicles or equipment as they operate through smart software, further saving time and money.

The energy sector stands at a pivotal moment, grappling with inherent risks and the pressing need to safeguard its most valuable asset: its workforce. Satellite connected IoT empowers rig operators to move decisively from a reactive stance to one of prevention – from the continuous, real-time monitoring of critical machinery to the proactive surveillance of personnel.

Satellite-enabled IoT is not merely a technological upgrade; it is now a tangible, affordable, and scalable solution that is fundamentally transforming safety protocols. This is a strategic investment that promises a return, not just in workforce safety but also in operational efficiency, helping to build a more resilient and responsible energy industry for the future.



China Unveils World's Most Powerful Floating Wind Turbine Prototype

The world's most powerful direct-drive floating off-shore wind turbine, rated at 17 MW and co-developed by Dongfang Electric Corporation and China Huaneng, has been rolled out in China.

With the highest single-unit capacity and the largest rotor diameter globally, the milestone marks a new breakthrough in China's offshore wind power equipment manufacturing and provides vital technological support for expanding into deep sea offshore wind development.

The turbine has a rotor diameter of 262 meters and a swept area of about 53,000 square meters, roughly equivalent to 7.5 standard football fields.

The hub height reaches approximately 152 meters, comparable to a 50-story residential building.

Compared to other floating offshore wind turbines, the unit features superior motion adaptability, capable of maintaining power generation even under greater platform tilts, with a time availability rate exceeding 99%.

It is also designed to withstand waves over 24 meters high and survive Category 17 super typhoons.

The unit is capable of generating 68 million kWh of clean electricity annually, enough to meet the annual electricity needs of approximately 40,000 households. Next steps include demonstration and validation deployment.

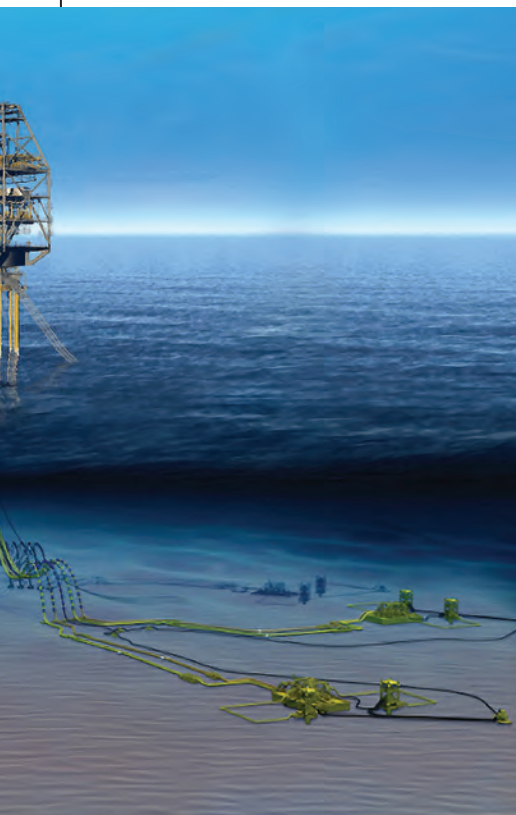
Offshore Fuel Cells to Cut Emissions from MODEC's FPSOs

MODEC has entered into a contract with Eld Energy, a Norwegian fuel cell system company, to design and manufacture a solid oxide fuel cell (SOFC) system pilot unit intended for installation on one of the MODEC-operated floating production, storage and offloading (FPSO) units.

The SOFC development is one of MODEC's critical decarbonization initiatives, which aims to demonstrate the viability of solid oxide fuel cells in offshore environments – offering a cleaner, more efficient alternative to traditional power sources.

The companies are currently in the second phase of collaboration, which includes engineering, manufacturing, installation, and offshore pilot testing of a 40 kW SOFC system.

The unit, to be manufactured by Eld Energy at its facili-



ty in Bergen, Norway, is scheduled for installation in 2026.

Eld Energy's solution offers high-efficiency power generation with low emissions, aligning with the maritime and energy sectors' drive toward more sustainable operations.

By integrating advanced SOFC systems into offshore infrastructure, the companies aim to reduce environmental impact while maintaining operational reliability. The second phase pilot test represents the first real-world implementation of SOFC technology on an FPSO.

"Although we foresee technical hurdles to overcome in this R&D journey, we are committed to pioneering into it with a strong will to provide solutions that deliver stable energy with low GHG emissions," said Koichi Matsumiya, Chief Technical Officer of MODEC.

Pushing the Limits: Subsea Compression Reaches New Depths at Offshore Field

Two SLB OneSubsea subsea compressor stations have been brought online at Shell's Ormen Lange field, the second largest gas field in Norway, setting the record for the deepest installation of such systems ever.

The SLB OneSubsea subsea compressor stations, in-

stalled more than 900 meters below sea level in Norwegian Sea, represent the deepest subsea compression system ever deployed.

Gas is transmitted 120 kilometres to Shell's Nyhamna processing plant onshore, also marking the longest subsea 'step-out' in history.

SLB OneSubsea's award-winning subsea multiphase compressor is said to be the world's first and only true subsea wet-gas compressor.

Conventional compressors require perfectly dry gas to operate safely and efficiently. The subsea compression system from OneSubsea, on the other hand, can operate with the unprocessed multiphase well stream, including condensates, produced water, and mono ethylene glycol (MEG), with liquid fractions ranging from 0% to 100%. It also tolerates sand and solids.

The Ormen Lange system uses two compression stations, each containing two compression modules. Each compressor can provide up to 50-bar differential pressure, configured in parallel for a large volumetric flow capacity.

The 32-MW subsea multiphase compression system will use onshore variable speed drives (VSDs) located 120



km away, eliminating subsea VSDs or topside alternatives to improve project economics.

Shell said the technology will unlock an additional 30 to 50 billion cubic meters of gas reserves from Ormen Lange as part of the project's phase III, raising recovery to as much as 85% and providing increased supply to Europe.

Digitally Enabled Well Completions Tech from SLB Targets Production Boost

Global energy technology company SLB has launched Electris - a portfolio of digitally enabled electric well completions technologies that boost production and recovery while reducing the total cost of ownership of an asset.

Electris completions digitalize control of the entire productive area of the wellbore, providing real-time production intelligence across the reservoir.

This enables operators to predict, adapt and act with confidence in response to dynamic production conditions - improving reservoir management over the life of the well and accessing reserves that conventional systems leave behind.

There have been more than 100 installations of Electris completions technologies across five countries.

In Norway, Electris completions were deployed offshore

to enhance oil production in an extended-reach well. The operator is using intelligence from the system to determine which zones are contributing to production to optimize oil output and minimize produced water.

Controlling water production with Electris completions has decreased the energy needed to lift and then pump treated water back into the reservoir, according to SLB.

Allseas Eyes Nuclear Power for Energy-Intensive Vessels

Dutch offshore contractor Allseas has made a pioneering step into the next generation of clean energy - developing an advanced nuclear power system tailored for energy-intensive offshore vessels and onshore industrial clusters.

Allseas has launched a five-year plan to design, develop and deploy a Small modular reactor (SMR), capable of delivering stable, high-density, zero-emissions energy in even the most remote, demanding environments.

Designed for marine propulsion and auxiliary power, the technology has potential for wider application - helping industrial clusters reduce reliance on fossil fuels, overcome grid congestion and secure a resilient, carbon-free electricity and heat supply.



The company has opted to explore High-temperature Gas-cooled Reactors (HTGRs) – a fourth-generation nuclear technology known for its inherent safety and exceptional reliability.

These compact reactors (25 MWe class) are powered by TRISO fuel particles, each no larger than a poppy seed. Each particle contains a uranium oxide core, coated with several advanced protective ceramic layers that securely contain fission products – even under extreme conditions.

Allseas' five-year plan is already underway. In the first year, it plans to finalize initial design studies for offshore and onshore use.

This will be followed by prototype development and pre-licensing discussions in consultation with key stakeholders.

Consortium to Explore Floating Nuclear Plants for Ports, Islands and More

American Bureau of Shipping (ABS), CORE POWER and Athlos Energy have formed a consortium to evaluate the potential of positioning the floating nuclear power (FNPP) platforms to meet the energy demands of islands, ports and coastal communities in the Mediterranean Sea.

The group will research how FNPPs can potentially unlock a range of applications including the establishment of grid-scale electricity to remote locations, the delivery of emission-free energy to ports and the distribution of reliable clean energy to desalination plants that could provide potable water to drought-affected coastal communities.

According to ABS, the consortium will develop original FNPP concepts of operations (CONOPS) and publish a visual display of their prospective locations.

The ABS Global Ship Systems Center based in Athens will lead a Political, Economic, Social, Technological, Legal, and Environmental (PESTLE) study alongside key stakeholders with the aim of assessing the feasibility of adapting CONOPS to supply power and other benefits in the Aegean Sea.

“As global efforts accelerate to reduce emissions, improve energy efficiencies and strengthen energy security, the use of small modular reactors on floating platforms could offer a viable alternative. Floating nuclear power facilities show promise in supporting power grids, microgrids, industrial and port operations and data centers, among others,” said Christopher J. Wiernicki, ABS Chairman and CEO.



POWERING THE FUTURE OF FLNG INSTALLATIONS

Floating Liquefied Natural Gas (FLNG) installations are an expanding contributor to meeting the world's increasing energy demand. As the offshore energy sector advances, cutting-edge power solutions are unlocking new opportunities to boost efficiency, safety and sustainability. ABS has released *Powering Nearshore FLNG Installations from an External Source*, a report that explores the use of external power in FLNG operations.

Electrification is revolutionizing FLNG installations. Transitioning from traditional gas turbines and diesel generators to external power systems sourced from onshore grids, renewable offshore energy, or power service vessels has the potential to deliver greater energy efficiency, lower maintenance demands, improve safety and enhance reliability in even the toughest environments.

This report dives into external power interfaces, high-voltage cables and emergency disconnects to elevate system performance and resilience. It also explores the importance of cyber-resilient technologies, providing practical guidance for adopting external power solutions while meeting the highest safety and reliability standards.

Powering Nearshore FLNG Installations showcases ABS's forward-thinking approach to energy innovation, empowering the industry to tackle challenges like emission reduction and adopt scalable, flexible energy solutions.

Download your free copy today at
www.eagle.org/NearShoreFLNG

