

The History and Future of Subsea Well Access and Light Well Intervention

By Grant Pierce

TFMC RLWI Stack #4 stacked up for Systems Integration Testing.

Photo Courtesy Grant Pierce



It is amazing how far Subsea Well Access & Light Well Intervention (LWI) technology has come over the last three decades. We have moved from water depths of less than 100 m down to 3000 m.

The first trials using a Flopetrol designed subsea well intervention lubricator took place at a depth of 20 m in the Zakum Field, offshore Abu Dhabi, in the 1970s.

In 1984, a joint venture between BP and Camco further developed the subsea wireline lubricator to access subsea wells, which was subsequently deployed and used on wells throughout the North Sea. In the same year, Otis Engineering also got serious in this space by filing a patent for a subsea intervention lubricator.

LWI has since become a standard operation in the North Sea, and there has been a general increase in expansion of services globally to include operation-specific Light Well Intervention Vessels (LWIV) and Well Intervention Units (WIU).

So, who are today's leaders in this space, and of those contractors, what are their backgrounds, and what assets are they operating today?

AKOFS Offshore

AKOFS offshore is Aker Solutions vessel solutions provider for subsea well intervention, subsea support, construction, etc. The parent company Aker Solutions has been active in the well access business for many years via its subsea x-mas trees and multiple other product lines.

In 2013 the AKOFS Seafarer was brought to market as the Skandi Aker. Last year, AKOFS gained a five-year contract for Equinor on the NCS. AKOFS utilizes an Aker Solutions 7 3/8" riser/ riserless based well access package. It also operates the Skandi Santos and Aker Wayfarer SESV's on contracts in Brazil.



Photo Courtesy Grant Pierce

Pressure Control Head (PCH) skid in the moonpool with TFMC Stack #4 in background, LWIV Island Performer

Baker Hughes

Baker Hughes has been around the well access for many years, pooling experience from Vetco Gray and GE. The systems utilized today for well intervention work are a culmination of acquisitions from the Cross Group, Wild Well Control, and new developments from within.

Today Baker Hughes is maximizing its LWI offering globally via alliances with established LWIV owners such as C-Innovation and with the use of vessels of opportunity. The company has the largest range of both riserless and riser-based well access systems from 3 1/16" to 7 3/8". Baker Hughes continues to capitalize on its successes and has been active recently in the Gulf of Mexico together with C-I under a five-year BP contract.

C-Innovation (C-I)

C-Innovation is Edison Chouest's (ECO) owned subsea service provider. C-I has been a mainstay in the ROV and subsea construction business for a number of years. In the LWI space, C-Innovation operates the Island Intervention, the Island Performer, the Island Venture, and the largest amount of owned construction support vessels in the GoM. C-Innovation also owns a major stake in Caltex Oil Tools which provides hydraulic intervention systems. The company is currently operating under a five-year contract for BP performing LWI services in the GoM and is experienced in Brazil, Australia, & Trinidad & Tobago.



Photo Courtesy Grant

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Preparations to land TFMC RLWI Stack #4 post-deployment

Expro Group

Expro Group has a well-known name in well access. In earlier years, Expro was heavily involved in developing the AX-S system, which unfortunately never made it to market. Fast forward to today, the company is performing projects globally with a 7 3/8" Intervention Riser System and at the same time developing its 7 3/8" Riserless Well Intervention System (RWIS). Expro has recently formed a three-year alliance agreement with FTAI Ocean, and will begin a five-year contract with Chevron in Australia.

FTAI Ocean

FTAI is a new LWIV provider on the scene with the MV Pride and its Smart Tower System (STS) from OSBIT. The MV Pride is FTAI's answer to state-of-the-art well intervention, able to provide riser-based operations and riserless abilities from 80m to 1500m. The STS is one of a kind, including a vertical racking system for CWOR, which significantly increases safety by reducing the need for personnel to be on the intervention deck. FTAI Ocean is based in the Asia Pacific with intentions of covering the market globally and is currently preparing the vessel for well intervention operations on a three-year alliance agreement with Expro.

Halliburton

Halliburton has in the past focused on subsea well access operations through its Subsea Test Tree (SSTT) offering, though recently have introduced its Light Well Intervention System (LWIS). The 6 3/8" 15k system was designed and built by Trendsetter Engineering and offers a wide range of flexibility in operation modes to include stimulation, CWOR, Riserless convertibility. Due to the fact that the control system is built into the subsea system, heavy surface equipment is avoided.

Helix Energy Solutions

Helix Energy Solutions is part of a subsea services alliance that includes Schlumberger and OneSubsea increasing their service offering. Helix has the only semi-submersible units enabling them to perform heavier worksopes and also offers Saturation Diving.

The WIU it owns and operates include the Q4000, Q5000, & Q7000. LWIV's they own and operate include the Seawell and the Well Enhancer based in the North Sea, and it also crews and operates the Siem Helix 1 and the Siem Helix 2 in Brazil. Helix has a variety of well access systems ranging from 5 1/8" Intervention Riser Systems to 7 3/8" Subsea Intervention Lubricator. Helix's job count is extensive (1500+ subsea wells), and the company operates globally from the North Sea to GoM to West Africa to Brazil to Asia Pacific and Australia. The

Q7000 is currently in Nigeria performing operations, and next year will be in Australia on a long-term decommissioning contract.



TFMC RLWI Stack #4 stack in garage LWIV Island Performer.

Photo Courtesy Grant Pierce



TFMC RLWI Stack #4 landing post-deployment.

Photo Courtesy Grant Pierce



TFMC RLWI Stack #4 Systems Integration Testing.

Photo Courtesy Grant Pierce

Oceaneering

Oceaneering has been in the riserless game for 20+ years, initially developing its own Subsea Intervention Lubricator System (SILS) together with Superior Energy Services in the earlier days of RLWI. In recent years Oceaneering acquired Blue Ocean Technologies and started developing the 7 1/16" IRIS and 7 1/16" BORIS systems. Oceaneering performs LWI from the Ocean Evolution and a wide range of other owned and partner vessels. Oceaneering has been focused on Angola and the GoM, and holds some record water depth records with its systems. Currently, Oceaneering is performing LWI operations in Angola on a BP contract.

Sapura Energy Well Services (SEWS)

Sapura has been Australia's go-to intervention vessel provider now for several years. It has been operating since 1993. Sapura has been using its 7 3/8" RLWI Subsea Intervention Device (SID) together with its Intervention Compensation System (ICS), which were also upgraded to industry standards with the help of Baker Hughes in the not too distant past. The company operates the Sapura Constructor, which has been very active in the Asia Pacific - Australia region.

TIOS Group

In 2018 Island Offshore Subsea joined forces with TechnipFMC to create TIOS Group, where they operate the Island Frontier, the Island Wellserver, & the Island Constructor utilizing TechnipFMC well access systems. Both IOSS and TFMC have an established track record over the last 20+ years in the North Sea. TIOS is a mainstay in the North Sea, where it has been operating on yearly contracts, and the company has performed successful operations in West Africa. TechnipFMC operates a range of well access systems from 5 1/8" CWOR to 7 1/16" RLWI systems. TIOS Group has a large job count (600+ subsea wells) the company will continue to build on.



Photo Courtesy Grant Pierce

LWIV Island Performer quayside

Trendsetter Engineering

Trendsetter Engineering, known for its capping stacks, is one of the smaller niche engineering companies that provide a wide range of subsea services. The company offers a 6 3/8" Light Riser Intervention System (LRIS), which is a riser-based package, which it says will soon be available with riserless convertibility and high-temperature ability. Trendsetter is a GoM 'resident' though its equipment and services have been utilized on a global scale. The LRIS is to be used in Brazil on a subsea intervention contract when restrictions due to Covid-19 allow.

Worldwide Oilfield Machine (WOM)

WOM has been operating in the subsea intervention space for the last 25 years. Not only has it supplied Intervention Riser Systems to major contractors such as Helix and Expro, but it has also an extensive track record with their Deepwater Riser System (DRS) offered in both 6 3/8" and 7 3/8" sizes. WOM also has a similar 7 3/8" Riserless well intervention (RLWI) system. WOM is unique in its service offering and will continue to be present on a global scale.

So as you can see, there are established companies servicing this space in the industry. As we move to deeper waters where we see higher pressures, the newer systems built are 15k psi systems. We also are seeing more options with well access systems convertible from riser to riserless.

What does the future hold? Considering the value of well intervention to unlock new reservoir value vs. drilling new wells, I believe we will see more activity in this space. Also, considering a large percentage of plug and abandonment/decommissioning can be performed from these lighter assets, I think we will see more utilization in this space.



About the Author:

Grant Pierce is a subsea deepwater completion and well intervention professional with more than 28 years of experience globally. He is a USA expatriate based in Vietnam, where he resides with his wife and two daughters.

