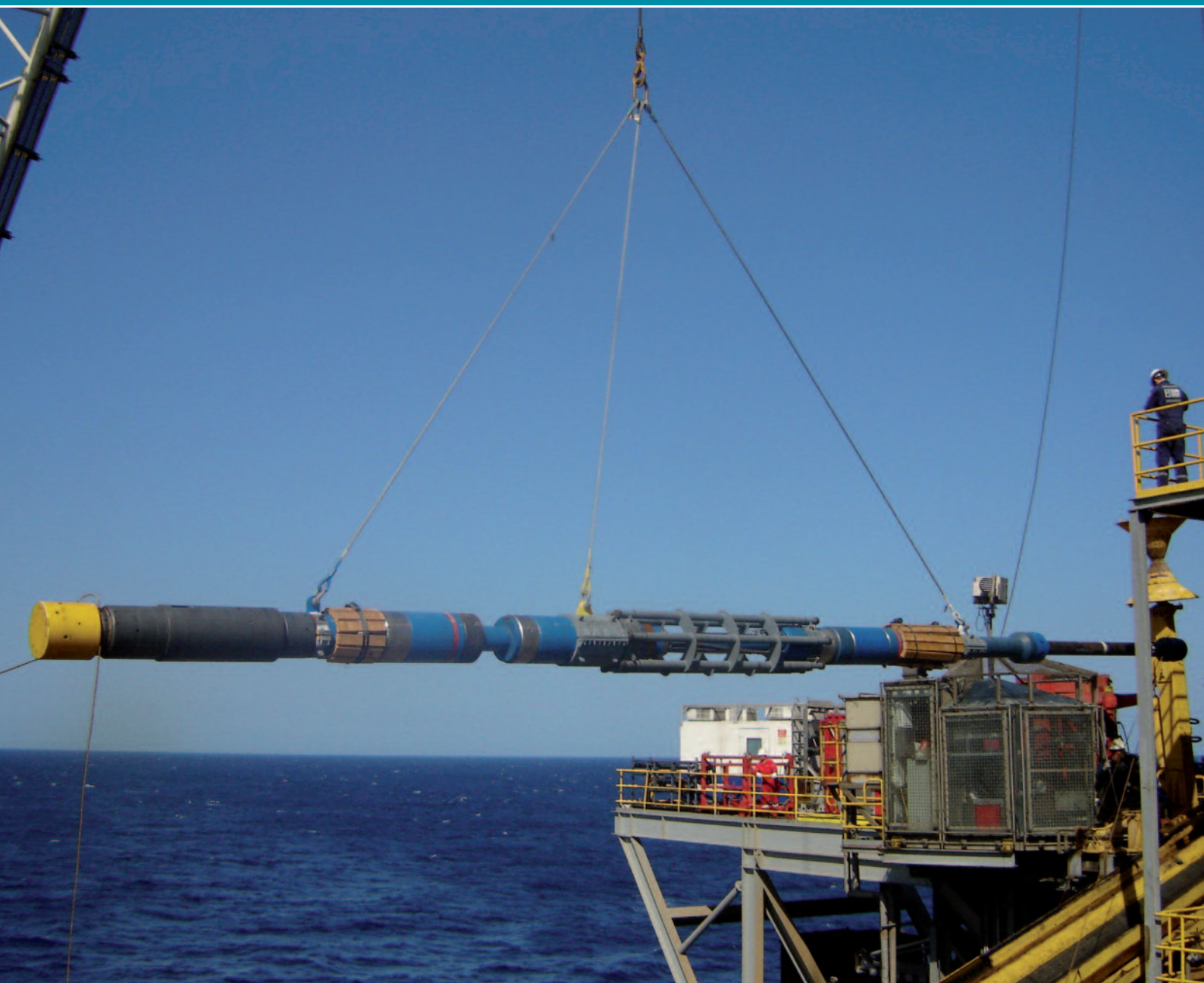


Subsea Safety Systems  
Deepwater well control systems



# Performance under pressure



Expro's subsea safety systems deliver critical well control functions in challenging oilfield production conditions. With over 20 years of deepwater well testing experience, we deliver cost-effective, engineered solutions which meet industry standards and client demands.

Our range of landing string assemblies (ELSA) and subsea control systems (EXPRESS) are specifically developed to minimise risk in subsea completion and intervention operations and achieve secure well status in the event of an emergency. Compatible with all horizontal subsea xmas trees, Expro systems are qualified for use in water depths of up to 10,000 ft. An extensive track record of over 500 operations means we are accustomed to liaising with clients and delivering projects globally. Our in-depth technology development process and unparalleled subsea experience enable us to provide innovative answers to client requirements.

For subsea safety systems in challenging environments, you can rely on Expro when it matters.

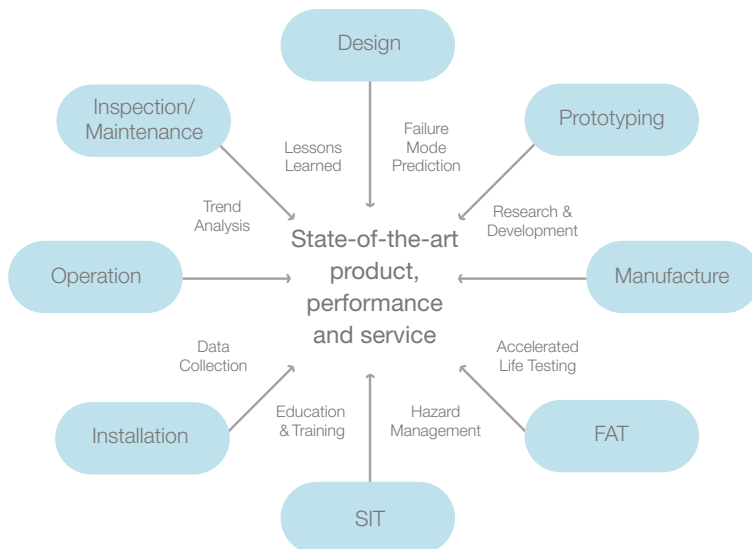


# Superior performance, independently qualified

Today's subsea operations in increasing water depths demand equipment with superior functionality, performance and reliability. With this in mind, Expro's subsea tools are developed using an integrated design and testing process, which ensures equipment meets the highest performance criteria. Operational feedback continually improves our understanding of system integrity and helps to eliminate failures that could lead to unnecessary downtime. This approach has been proven through the establishment of an industry-leading track record in the field.

All our subsea equipment endures a rigorous test regime to the highest standards in the industry, including:

- Factory Acceptance Testing (FAT)
- Qualification and performance tests on functional, environmental, thermal and endurance performance
- System Integration Testing (SIT) on complete assemblies and individual components



Expro subsea tools are designed to meet the ISO and API equipment standards and have the added assurance of independent technical certification. Expro has ISO 9001:2000 accreditation.

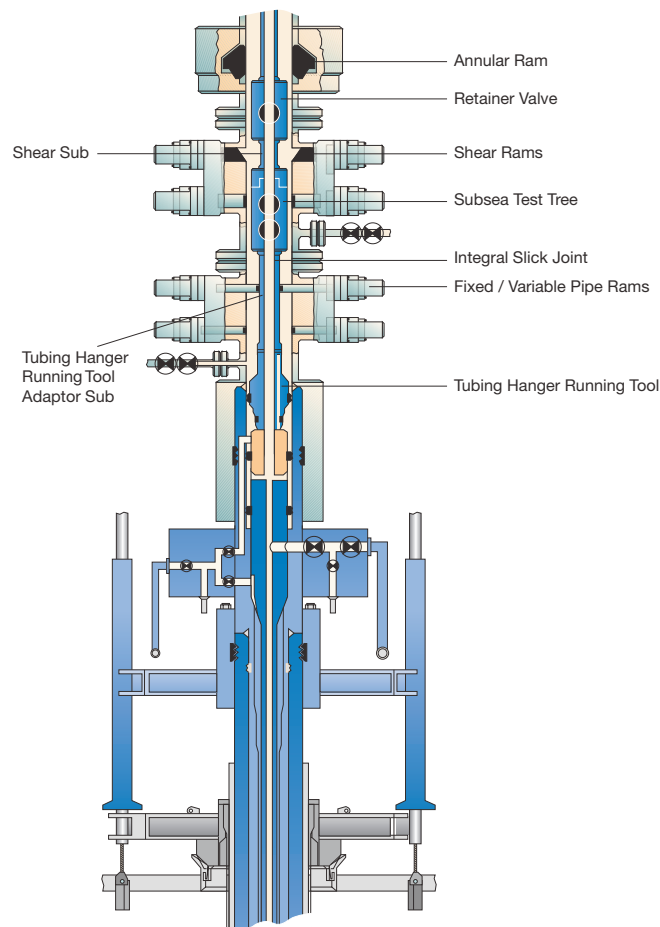


# ELSA, Expro Landing String Assembly



## Meeting the market needs

To cater for evolving market needs, Expro has developed its range of large bore subsea intervention tools, or landing strings assemblies, for well operations with horizontal subsea xmas tree architecture. These tools provide well control functions and disconnection capabilities during well installation, workover, intervention and well test operations. The landing string assembly is a critical component in the protection and safety of personnel, the well and the rig and provides the capability for safe, low-cost well re-entry for future well intervention and work-over.



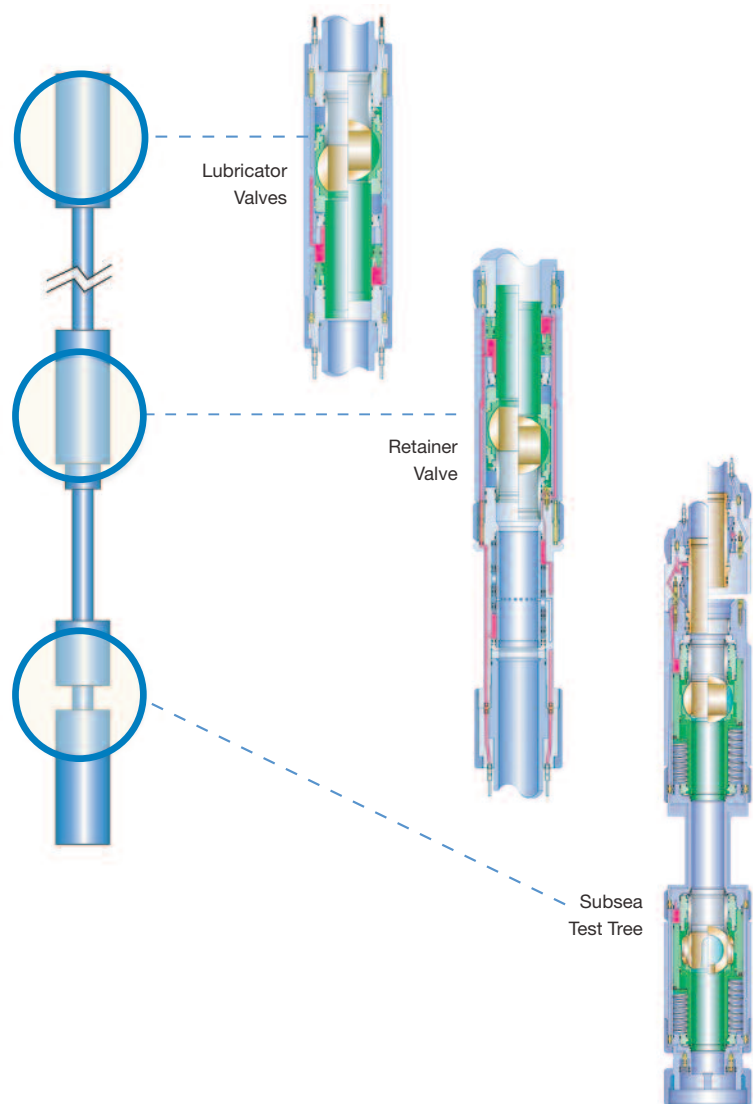
## The heart of the landing string

Expro's landing string assembly is a safety system which can be latched to either the tubing hanger (TH) or the tree cap profile. The system provides the dual barriers required during intervention operations on horizontal subsea xmas trees over a live well. The assemblies are available in diameters from 3" to 7.375". Each system is certified to deal with all intervention situations and will seal after cutting coiled tubing and/or logging cable used for well intervention.

Our award-winning landing string technology utilises a patented high-integrity ball valve system that enables the landing strings to provide reliable cut and seal capability in a single device. The ball valve is particularly suitable for the harsh conditions associated with the flowing or pumping of aggressively abrasive fluids from or into the well.

# ELSA valve description

- The lubricator valve enables long intervention tool strings to be made up or recovered from the live well. Valves can be deployed at depths to suit client requirements and result in reduced rig time during well intervention work.
- The retainer valve closes prior to unlatching the subsea landing string from the xmas tree, thus preventing any hydrocarbons in the landing string from escaping into the environment (marine riser or onto the drill floor). For enhanced system safety, this valve functions in an automatic, pre-defined logical sequence, with the emergency disconnect facility.
- The subsea test tree allows for safe operations on a live well during well test or completion operations. Dual ball valves provide primary well control barriers. A latch within the assembly provides the means to disconnect and reconnect the landing string, leaving the closed-in valve section in place. Once again, the valve sequencing is automated with the emergency disconnect facility.



# EXPRESS, Expro subsea control system



Subsea production wells have to be controlled safely, reliably and economically; this is especially important when operating in deepwater conditions where costs increase in proportion to water depths. Expro's subsea control systems have been designed to meet current Emergency Shut Down (ESD) and Emergency Quick Disconnect (EQD) requirements.

### Shallow water, moored vessel (<5,000 ft)

Expro offers direct hydraulic control systems for subsea well interventions in water depths up to about 5,000 ft from moored vessels.

### Shallow water, dp vessel, (<5,000 ft)

Our hydraulically-piloted downhole accumulator (EXPRESS-HC) and associated test string equipment is ideal for worldwide well testing applications from semisubmersible and drill-ship-type vessels. The EXPRESS-HC delivers the reduced subsea shut-in and unlatch times required for operations from dynamically positioned vessels.

### Deepwater (up to 10,000 ft)

In these extremely challenging conditions, conventional hydraulically controlled systems have significant response time constraints. Our most technologically advanced range of control systems (EXPRESS EH, CI and HP), has electro-hydraulic control functionality for additional response and functional flexibility and employs electrical communication for high speed primary control. Field-proven in the Gulf of Mexico and West Africa, it achieves rapid response times that meet and exceed the industry emergency disconnect requirements for well closure and disconnect in less than 20 seconds.



The modular design of EXPRESS means it can be adapted to a wide range of operator applications and subsea test tree configurations. It can be deployed in applications with differential pressures of up to 15,000 psi (1,034 bar) and temperatures up to 250°F (121°C). Fully adaptable to 3", 5" or 7" bore landing strings, EXPRESS can provide hydraulic and electrical control and monitoring of subsea valves and completion equipment. EXPRESS CI and HP can operate THRT and tubing hanger functions. The EXPRESS systems have a separate electro-hydraulic control system and uses multiplexed data feedback of pressures and temperatures to confirm downhole tool functions and well performance.

By selecting Expro's subsea safety and well control systems, clients get the best technology for their particular requirements, delivered on time at a realistic cost. For subsea safety systems you can count on, Expro is the reliable choice.

Express



Express CI



# Global delivery on demand

Expro's subsea focus is on delivering the best deepwater technology solutions to clients around the world, in areas such as the Gulf of Mexico, West Africa and Asia. We understand the long term and increasingly complex nature of deepwater subsea well operations.



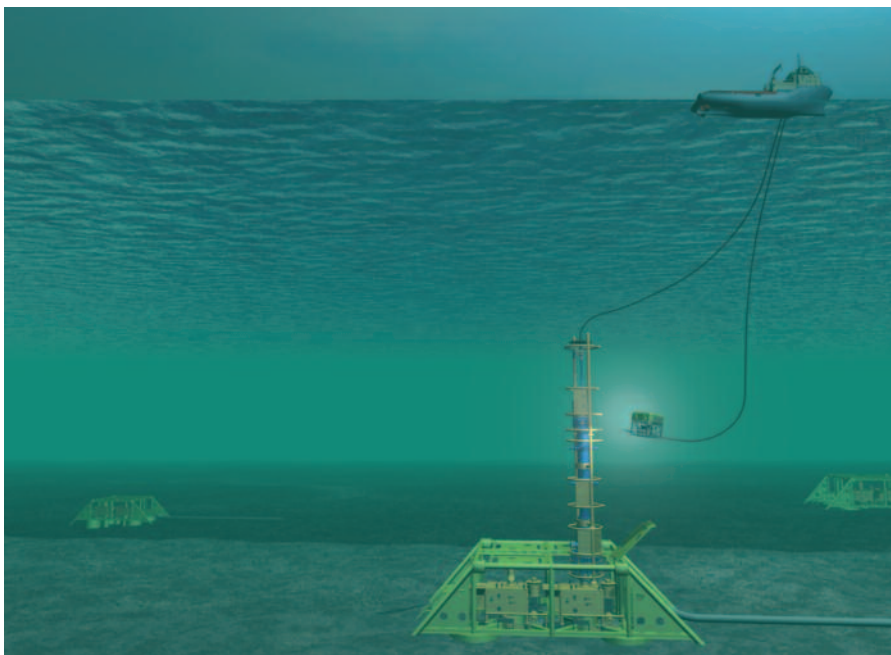
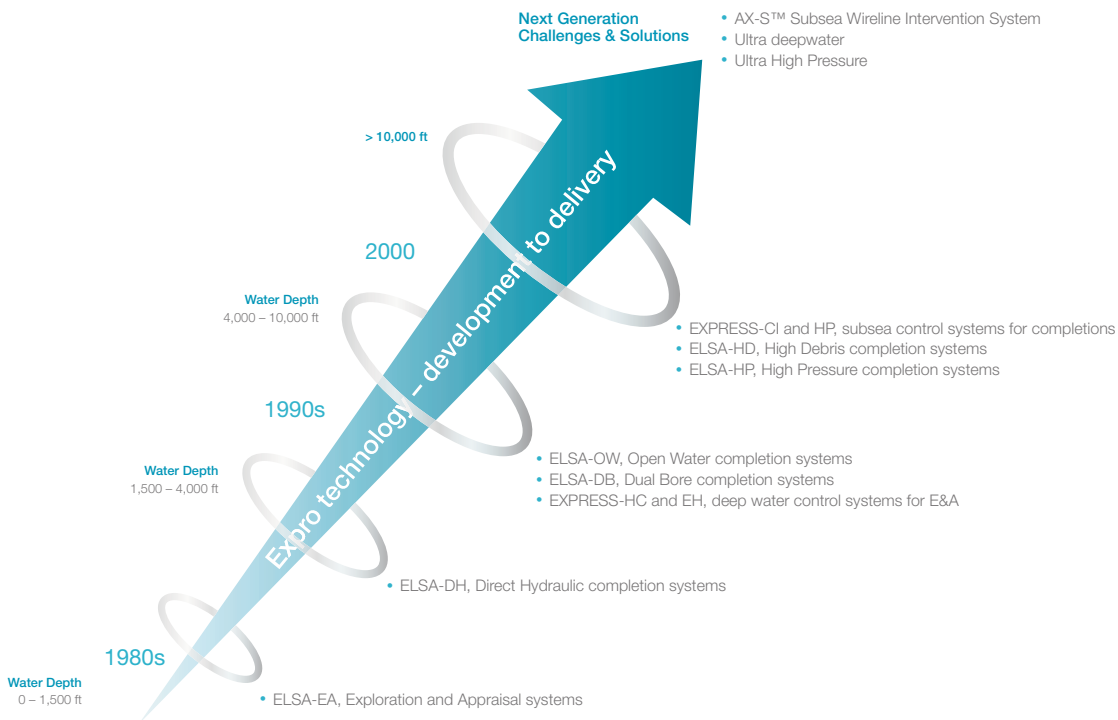
Dedicated centres of excellence are located in Aberdeen and Houston with specific, multi-disciplinary teams allocated to projects management as required. These teams ensure that critical path deliveries are attained, even within the most demanding of schedules.

Operational support is provided by our global network of bases. In-depth awareness of client needs ensures the requirements of deepwater well installation and intervention operations are met in a cost-effective and timely manner.

# Innovation for the future



Expro's ongoing commitment to the deepwater subsea market is realised by the innovative design and application of new technology over a sustained period of time.



AX-S™ subsea wireline intervention system

## Applications

- Subsea Completions
- Subsea Intervention
- Stimulation
- Well Testing

## Benefits

- Modular, flexible designs enable customised solutions
- All tree vendor specifications and designs are met
- Proven technology and qualified systems provide excellent reliability
- Technical expertise and service quality ensure client objectives are satisfied

## Features

- Deepwater operational reliability
- Operating Parameters: up to 15,000 psi/ 250°F (NACE)
- Range of Diameters: (ID) 3" to 7.375"
- Electro-hydraulic controls for deepwater DP operations
- Unique patented Ball Valve design
- Debris tolerant latch mechanism
- Valve commonality – simplified system
- Modular assemblies reduce turnaround time and provide string flexibility/ interchangeability
- Rapid response system – reduces ESD/EQD times
- Full redundancy via secondary system backup

Expro's business is well flow technologies and specialist services, and our mission is to:

- **measure**
- **improve**
- **control and**
- **process**

flow from high-value oil and gas wells.

Our expertise is marketed through five segments:

**Well Testing & Commissioning, Production Systems, Wireline Intervention, Connectors & Measurements and Deepwater Intervention.**





**EXPRO**

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