The Åsgard Subsea Compressor Module Replacement 2025

Helen Tunander, Project Manager

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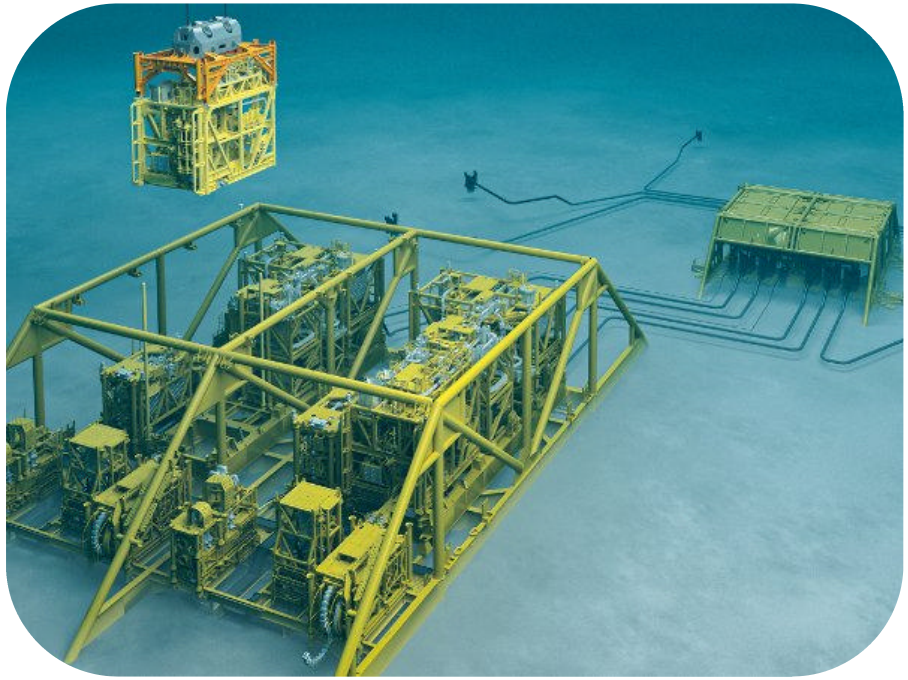
A Story of Strong Teamwork, Solid Preparations and Record-Breaking Lifts

What were the key success factors behind the safe and efficient offshore execution of this project?

Åsgard Subsea Compression – what is it?

- **The world's first subsea gas compression system** – Started operation in 2015
- **Enhanced recovery and field life** – subsea gas compression increases recovery from <60% to nearly 90% for Åsgard Unit and Mikkel Unit
- **Modular design** – a modular system and available spare parts allow for swift replacement of faulty modules or necessary upgrades
- **High reliability** – Very little need for maintenance during its lifetime

74m long - 45m wide - 26m high



Compressor module details

- The compressor module is the largest of the modules
- Required an upgrade to manage the reducing well pressure

- Planned weights:

New Compressor Module (Deployment)

- **323Te** (Dry weight + lift frame + rigging)

Old Compressor Module (Recovery)

- **361Te** (Dry weight + lift frame + rigging + 30Te water)

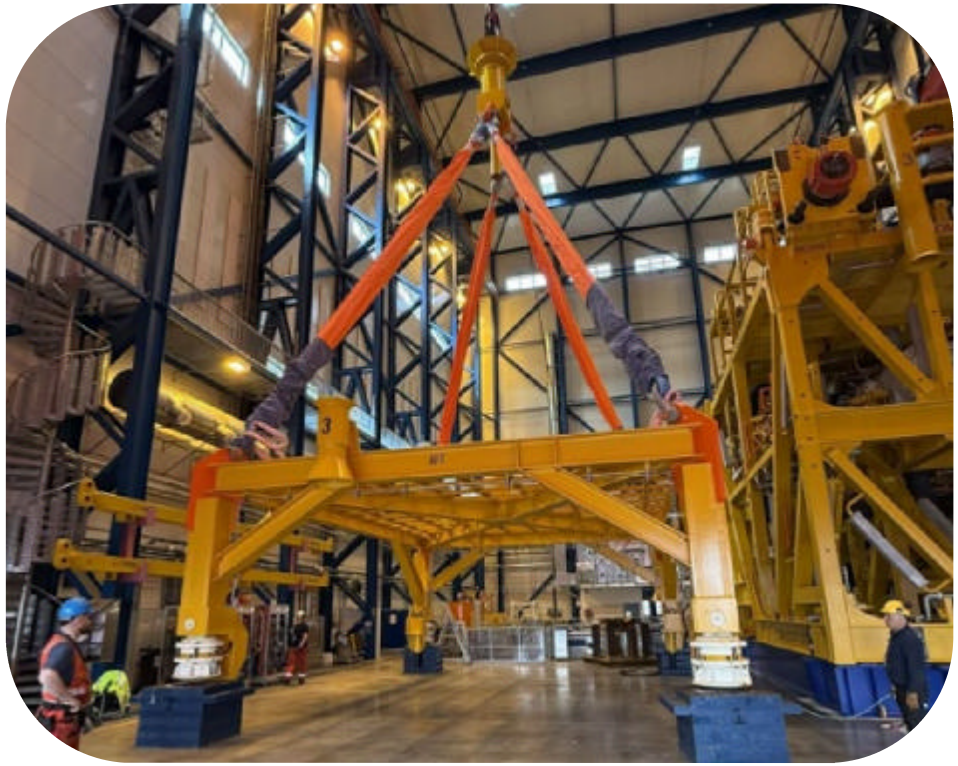
Previous record lift with Vision crane was a 328Te deployment in 2014

New recovery solution - AXTech Module Recovery System (MRS)

- Modular, can be mobilised to different vessels
- Three Active Tension Winches with sheave towers
- Three Bumpers designed to take load of CM impact on recovery
- Compressor Module Seafastening Frame re-used with modifications

Light Lifting Frame

- Light Lifting Frame 44Te
- Designed by Equinor & Worley
- Ballgrab interfaces by Balltech – towards module and towards crane
- OI & Equinor achieved reduced sling angles / rigging height on lifting frame to allow use of normal mode on crane

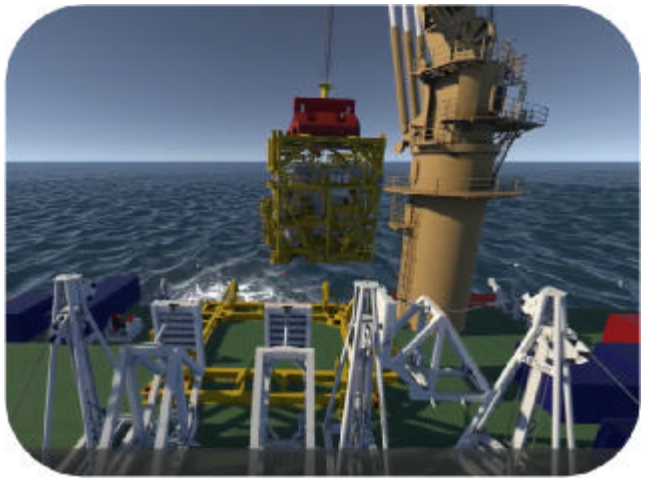


Simulations at OSC in Ålesund

Simulator sessions to train the crew and identify improvements for the offshore operation

Modelling by OSC:

- Normand Vision, including vessel motion response
- Crane in normal mode
- Crane in special lift mode
- Compressor Module
- Lifting appliances
- AXTech MRS system including winches and bumpers
- Seafastening grillage
- Existing subsea infrastructure - Åsgard Compressor Station



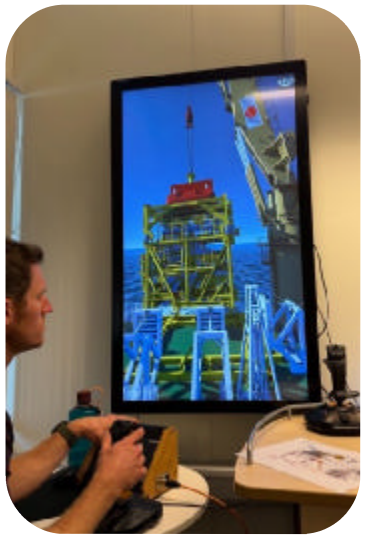
Simulations at OSC Ålesund

Key offshore personnel attending:

- Offshore Manager / Shift Supervisor – Management oversight
- Marine Crew – Bridge personnel
- Crane Operator – driving simulated crane
- Deck Foreman – Running deck operations
- AXTech – MRS winch control

- ROV Supervisor – Familiarisation with Subsea operations

- Project Engineers – Capturing lessons for procedural updates



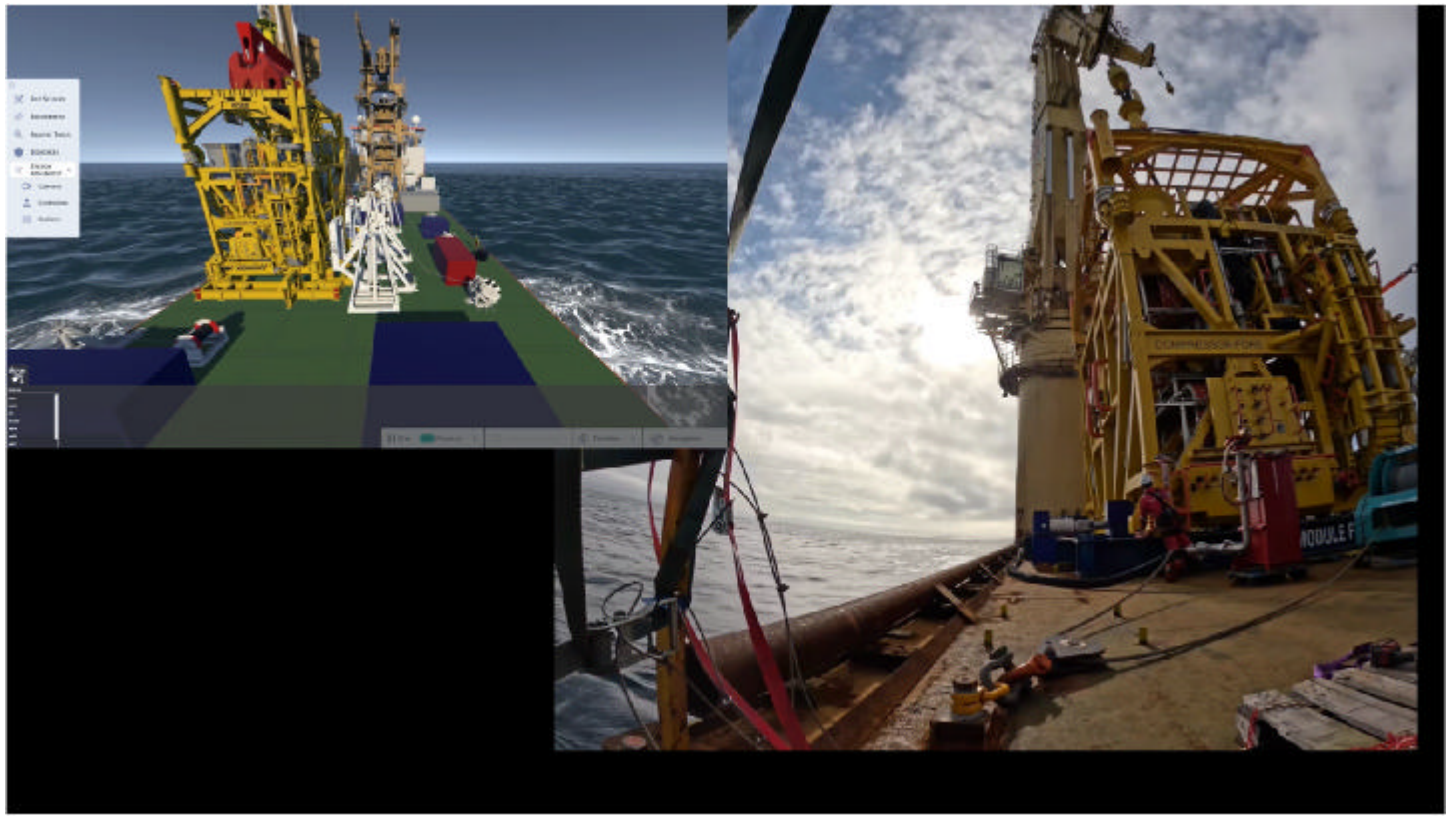
Simulations at OSC Ålesund

Simulation cases

- Deployment of Compressor module from deck to sea
- Recovery of Compressor Module from sea to deck

Variables:

- Sea states
- Wind speeds
- MRS winch settings
- CT winch settings
- Crane in normal and special lift mode
- Position of MRS Bumper Towers



Test lift on Normand Navigator

- Test lifting with a correctly weighted dummy module and the AXTech MRS system
- Performed on Normand Navigator in March 2025
- Learnings with regards to:
  - MRS tensions, settings and winch positions
  - Wire routings
  - Rigging lengths
  - Communication & coordination

Test lift during Vision mobilisation

- The actual Compressor Module was lifted on and off while at quay
- Learnings with regards to:
  - Winch wire routings
  - Winch control
  - Available lift height
  - Bumper tower locations

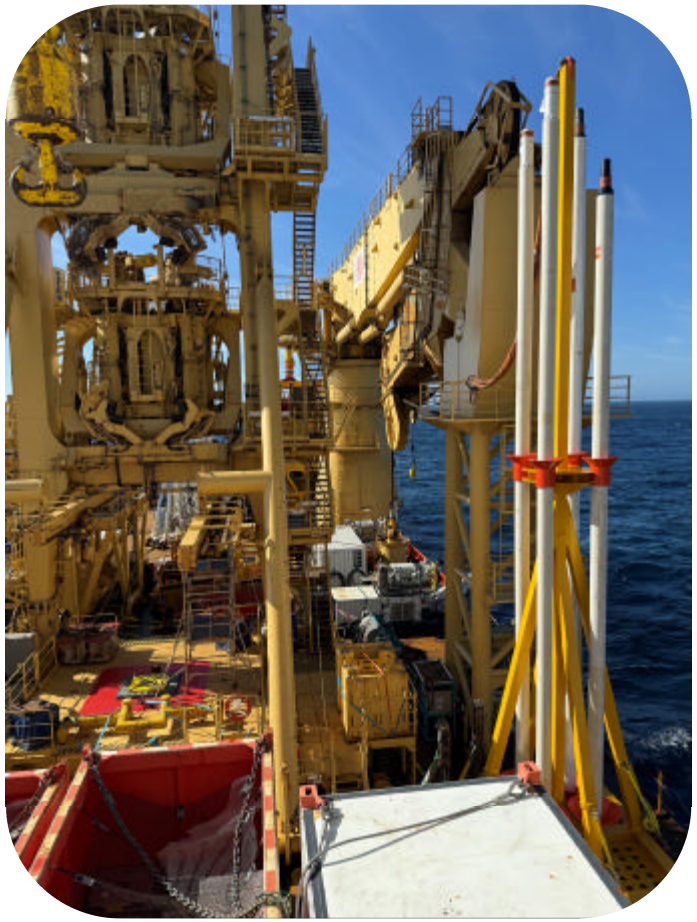
Vision Crane Alarm Upgrades

Making use of the full capacity of the 400Te main crane

Crane Load	Previous Alarms / Stops	Upgraded Alarms / Stops
90% SWL (360Te)	Warning alarm in crane cabin	None
100 % SWL (400Te)	Solid Alarm and knuckle / boom motions that decrease SWL stopped	Pulsating alarm
>110 % SWL (>440Te)	Solid Alarm and winch wire stops	Solid Alarm and knuckle / boom motions that decrease SWL stopped

Bonus tip: Guide Post basket

- 16,5m long guide posts – challenging to store and handle safely on deck
- New deployment basket designed and fabricated
- Allowed deployment of all 4 guide posts in one lift
- Saved space on deck
- No need for upending of posts on deck
- Manual reach to rigging from crane boom rest balcony



Record-breaking 352Te offshore lift with Normand Vision completed without accidents or incidents

Success is built together

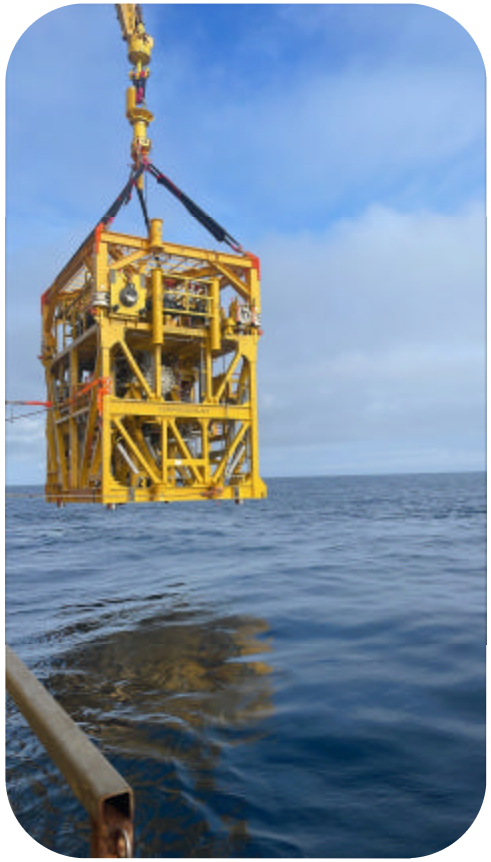
- Close cooperation between several subcontractors and Equinor

Success is driven by skill and dedication

- Engaged teams with detailed knowledge from all involved parties, including Equinor

Success is built on continuous learning

- Support of thorough testing and implementation of all learnings



Acknowledgements

Partners in the Åsgard and Mikkel units

Åsgard unit

- Equinor Energy AS
- Petoro AS
- Vår Energi ASA
- TotalEnergies EP Norge AS

Mikkel unit

- Vår Energi ASA
- Equinor Energy AS
- Repsol Norge AS


Ocean
Installer