Agenda

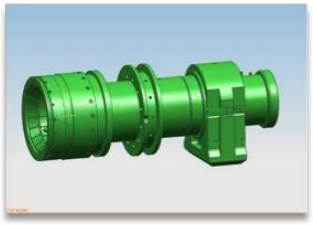
Need for EPC capacity outside Norway

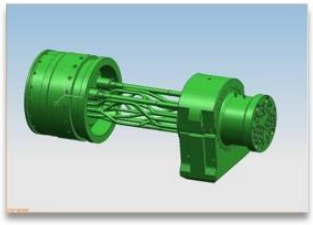
- EPC topside and sub-sea
- Co-operation with the technology ownwer and exchange of information
- Requirements and demands from field developer
- Confidentiality and property of technology
- Prequalification of suppliers
- Risk mitigation in all steps and functions

Typical supplies

Subsea Connections

- Global Capacity Agreement with FMC (2012-2015)
- World Class supplier of:
  - Termination Heads
  - Hydraulic Connectors





Typical supplies

Tools

- Connection Actuation Tools
- Module Running Tools
- Stroking Tools
- Override Tools

Connection systems

- Clamps
- Caps

XT Equipment

- Lower Frames
- Upper Frames
- ROV Panels
- Choke Module Structures / Roofs

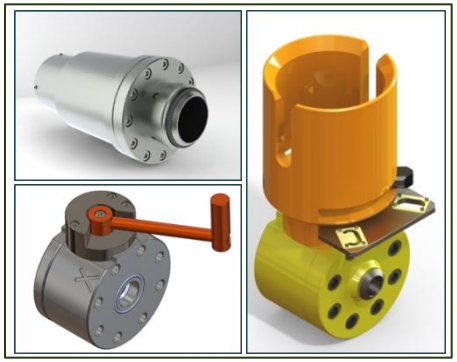
Miscellaneous

- Tension Frames
- EDP/LRP Packages
- Riser equipment
- Umbilical Disconnection Frames

Typical supplies

Valves

- Floating ball valves,
- Trunnion ball valves,
- Check valves
- Needle valves
- Product range: From 1/2” up to 4"



Stabs / Subsea Connectors

- ROV operated
- Product range: From 1/2” up to 4"
- Flow stabs
  - Hot stabs
  - Pressure caps
- Hydraulic stabs
  - Receptacles
  - Hydraulic stabs
  - Hydraulic receptacles

NLI Subsea

Typical supplies

Subsea Structures

- Manifold and Template structures
- SURF structures:
  - PLEM, PLET, Riser Bases
- Flow Bases
- Small to medium size subsea modules

Subsea Connections

- Termination Heads
- Hydraulic Connectors

Miscellaneous

- Bridges
- Topside Modules
- Drilling - structures

NLI Subsea

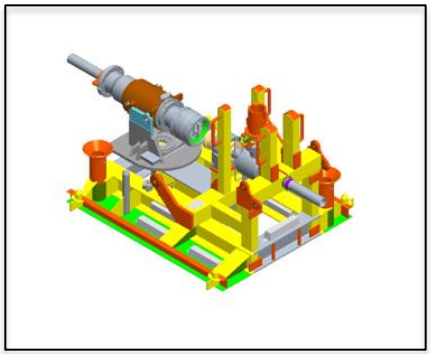
Typical supplies

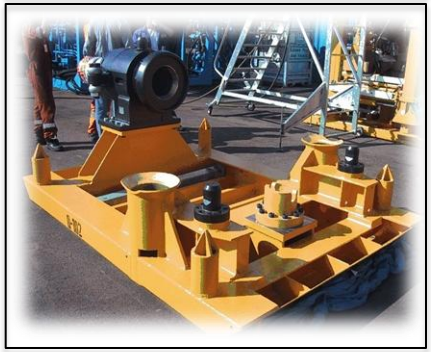
Engineering Services

- FEED Studies
- Concept Development
- Detail Engineering
- Structural and Piping Analysis
- Product Development
- 3.rd Party Verification
- Fabrication Assistance

EPC Contracts / Product Deliverables

- Manifolds
- Templates
- Protection Structures
- SURF structures:
  - PLEM/PLET
  - Riser Bases
  - In Line Tee´s



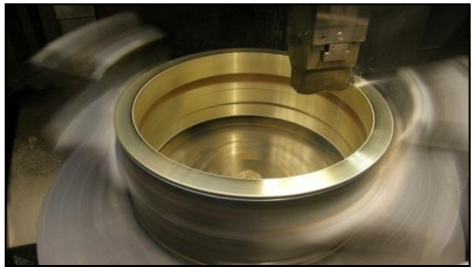


NLI Subsea

Typical supplies

Welding

- Clad / Strip Welding
- Buttering



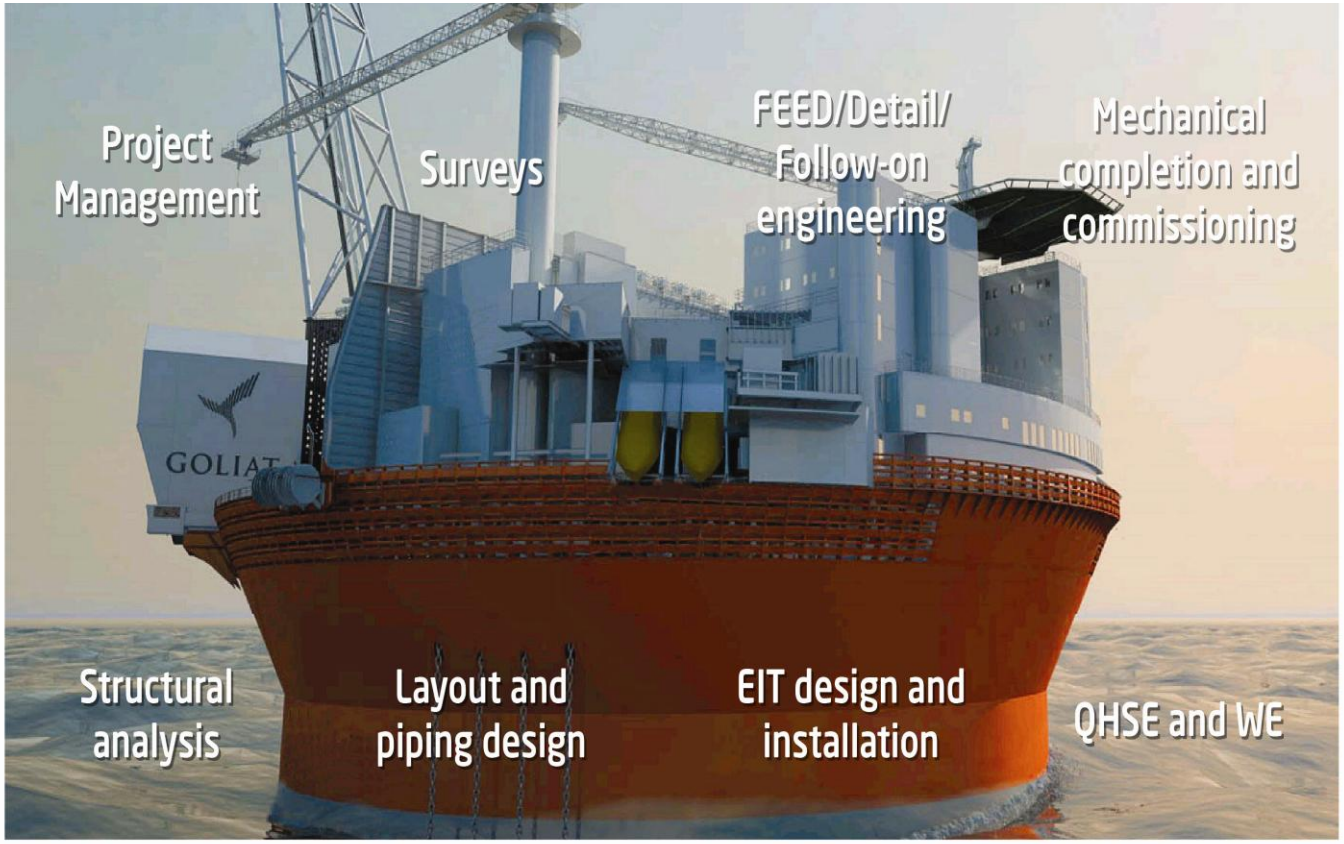
Machining

- Subsea Components
- Marine Components
- Drilling Components

Repair and Services

- Drilling Equipment
- Lifting Equipment
- Pressure Testing
- Functional Testing
- Assembly

Markets Offshore Oil & Gas Greenfield and Brownfield



E EP EPC EPCIC

Technical software

Layout/ Piping/Structure	Structure	Analysis	Pipe Stress	Planning
PDMS	TEKLA	Staad Pro SAP 2000 ANSYS	Triflex Caesar II	Safran

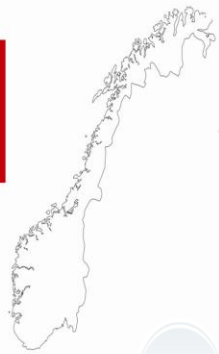
Global

PDMS Master

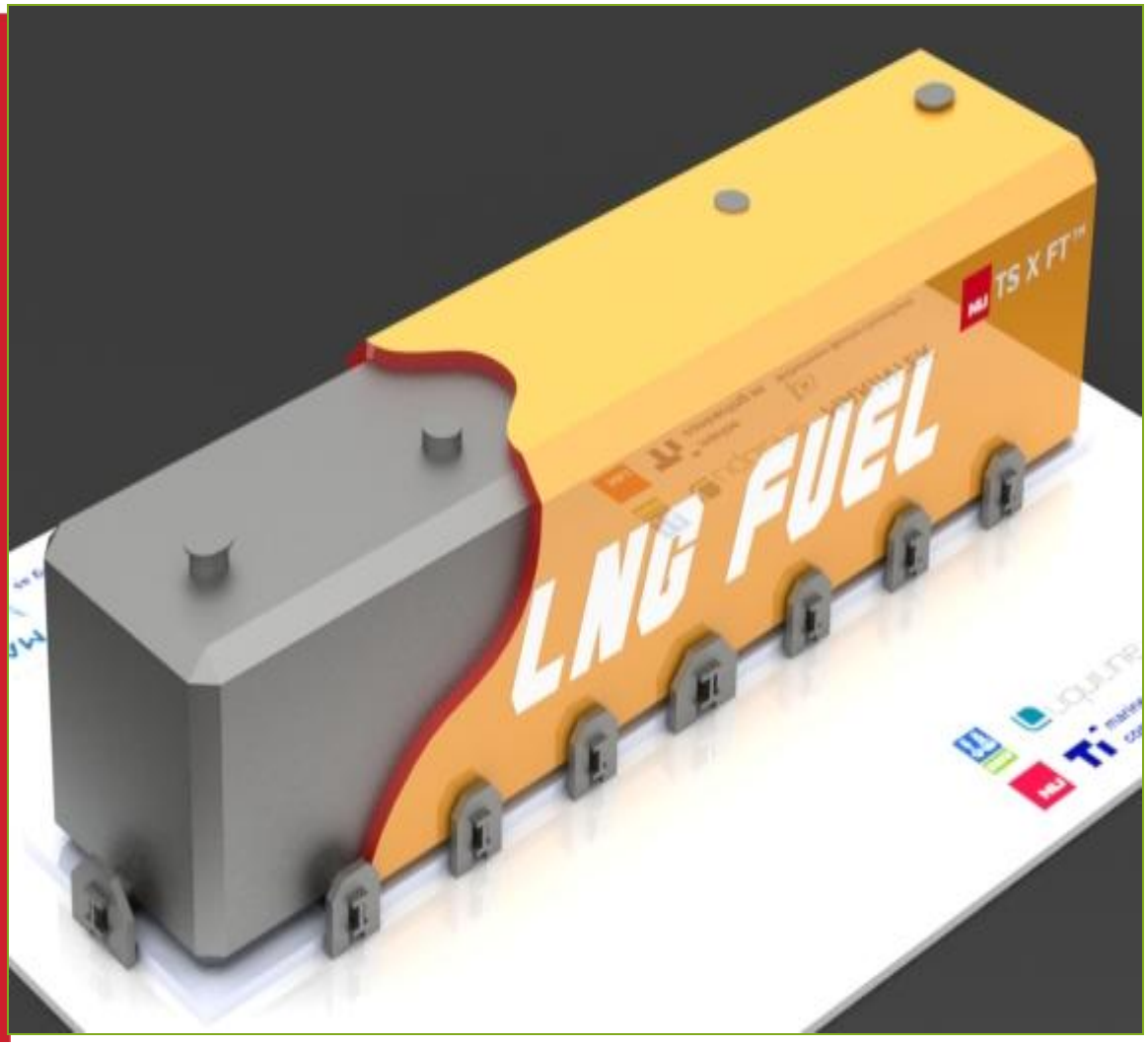
Global Setup

PDMS

Norway



LNG storage solutions



LNG tank systems

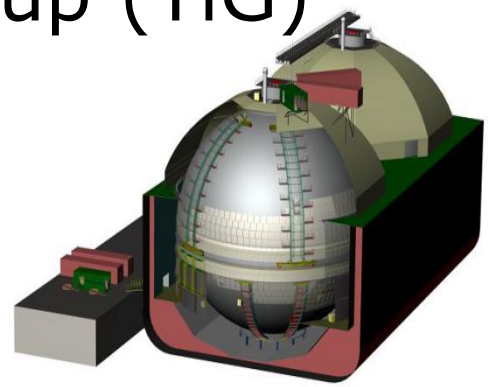
Together with several partners NLI has developed a new LNG tank design suitable for the small scale LNG supply chain.

The design is based on a prismatic low pressure concept and the design has recieved an Approval in principle from DNV as a IMO-type B tank.

The tank design can be applied as a fuel tank for LNG fueled vessels as well as a storage tank on bunkering vessels and land based storage

A typical size range that the NLI tank design is suited for is 800-30.000m3

Insulation partner; TI Group (TiG)



TI Group (TiG) has worked in the cryogenic field for 50 years and has been at the forefront to develop new technology.

Proven technology, economical and environment friendly solution

Flexible design, insulation system can be fitted to different geometries

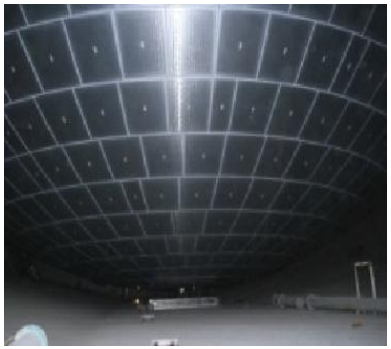
Low boil off solutions (below 0.8 %/day available, dep. on tank size)

Thermally efficient and tight design

Simple fixation method for easy and efficient installation

TiG has more than 40 years of experience with LNG cargo tanks

Totaly 38 vessels delivered since 1972



Wilhelmsen Technical Solutions
Part of Wilhelmsen Maritime Services, a Wilh. Wilhelmsen group company

Large potential market

Fuel tanks for LNG fuelled vessels

DNV expect up to 1000 LNG fuelled vessels built by 2020

Tanks for floating bunkering infrastructure

Most major european ports are looking to establish infrastructure with 1-3 bunker vessels in each port

Small terminals and distribution hubs, landbased or floating

Several small terminals and distribution hubs beeing built in Europe and US

Tank size range

800m3 ⟷ 30.000m3

LNG tank design drivers

- Low weight (prelim figures: about 100 tons for 800m3 tank, about 400 tons for 4000m3 tank)
- Low cost
- Short fabrication time
- Short on-site build time for use onshore (LandTank)
- Easy/low cost modification, can adjust to different shapes if needed (mainly applicable for the FuelTank)
- Prismatic tank technology enables flat production deck
- Optimal utilization of ship hull
- Low boil-off
- Cold LNG storage, important in Small Scale Distribution = premium LNG quality

Key Technology elements

Self supporting, IMO-B tank, independet of ship hull

Integrated insulation/foundation sandwich system

- This system ensures a light weight and cost effective foundation for the tank as well as insulation against ship hull.

System for side support of tank ensuring horizontal stability of the tank

System for uplift-support ensuring that the tank will not float in case of water filling the tank room

System for secundary barrier outside the tank protecting agains cryogenic liquid spill to the ship construction

System for early identification of crack propagation in the tank primary barrier

NLI's supply chain

NLI has supply network covering all critical cryogenic components

Steel tank

Valves

Instruments in tank

Piping

Tank Insulation

Inert gas system and gas detection systems

Cryogenic submersed pumps

Bunker barge concept in cooperation with Rolls Royce marine

Basic concept design of self-propelled bunker vessel for bunker operations in ports

Rolls Royce vessel design

4000m3 LNG storage tank

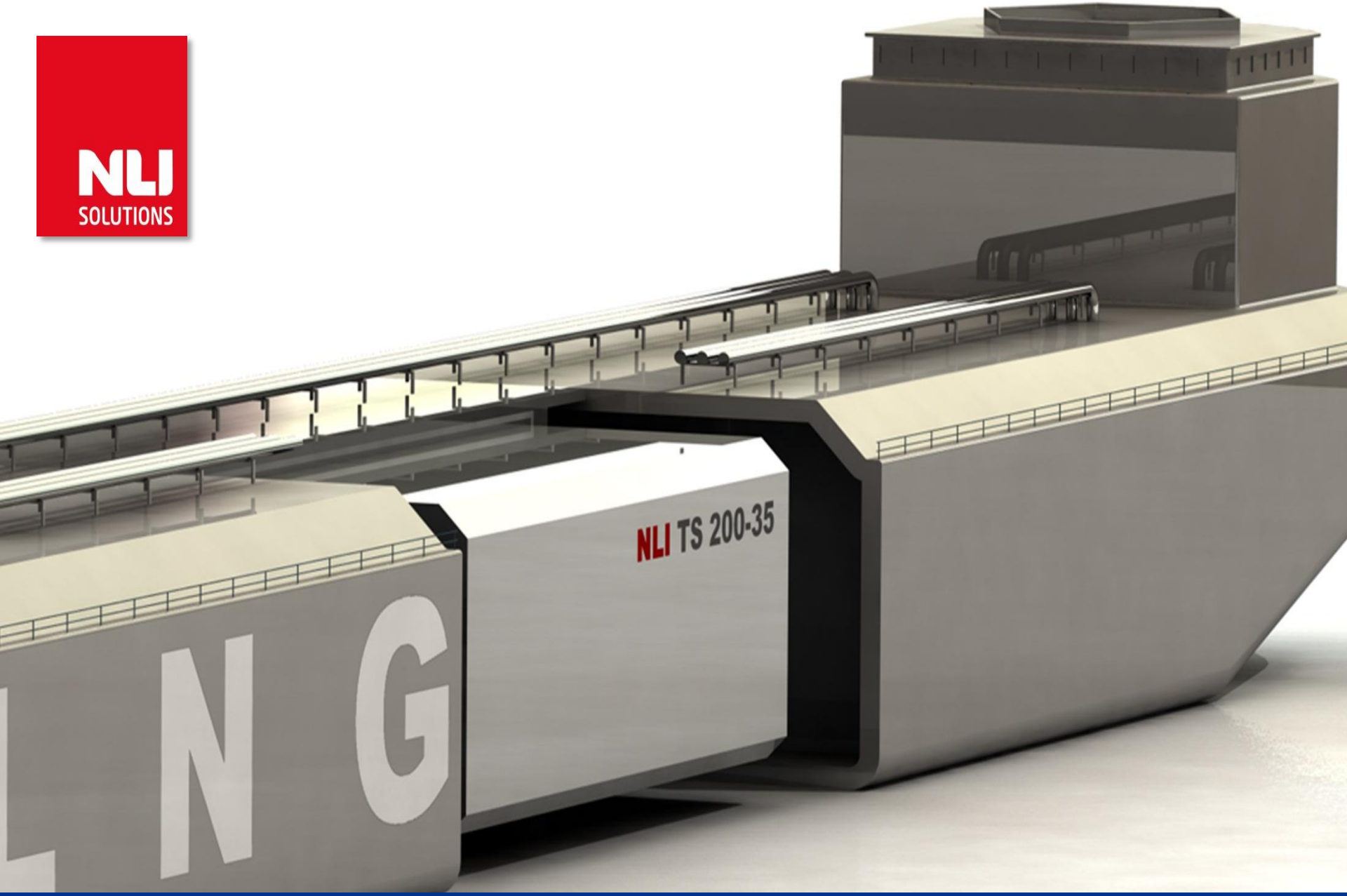
Gas electric propulsion with Rolls Royce engines consumes boil of gas

Excess boil off gas can be delivered to land based gas grid or used to produce electricity to land based grid when vessel is idle.

Pod propulsion drives for good manouverability

State-of-the-art electronics for early threat detection

Discussions with DNV about class regulations


NLI TS 200-35
L N G

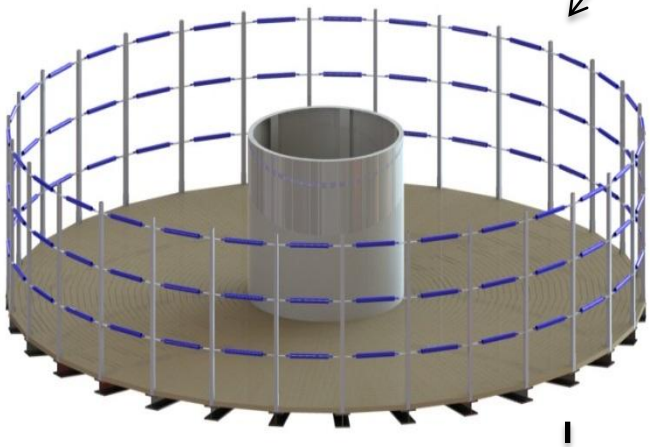
Reels

- NLI provides a wide range of transportation, installation and storage reels to both offshore and onshore use.
- NLI customize the reels to comply with customers specification and wishes.
- All reels and reel accessories are delivered with final documentation on DVD
- NLI deliver Design verification Report (DVR) and Product Certificate upon request.
- NLI deliver reels to customer site

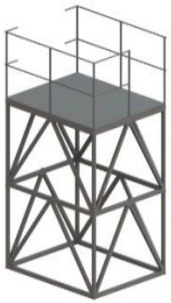
Turntables

Key components

Turret
- ✓"World Wide Unrestricted" -> Welded design
- ✓Onshore / Payload < 500T- > Modular design
- ✓ID, from 3,6 m. OD, up to ≈20m



Controltower
- ✓ Cabin & remote control

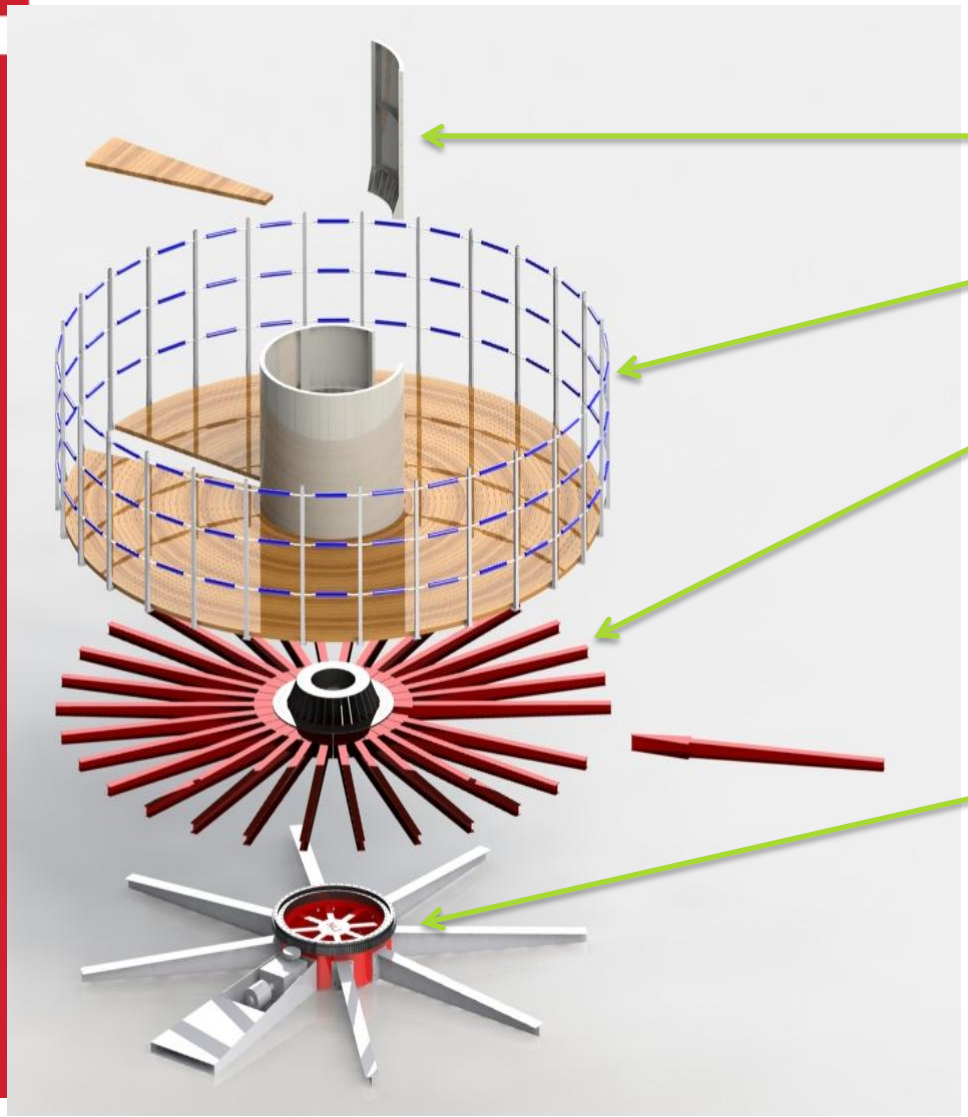


- ✓ Frame

Grillage
- ✓ "World Wide Unrestricted" -> Welded design
- ✓ Onshore / Payload < 500T- > Modular design

- ✓ Power Container

Modular Turntables – (Long term)



Key components:

- ✓ Modular innerwall
- ✓ Modular rail
- ✓ Replaceable spreaders
- ✓ Grillage with NLI HUB-drive, multipurpose configurations:
  - Turntable mode
  - Basket mode
  - HUB- drive spreaders designed acc to surface (deckload) limits


NLI
SOLUTIONS
XDS 3600

Abstract

- With the drilltower concept Northern Light, NLI Engineering has developed an innovative drilltower design that improves the structural design, geometric dimensions and physical properties as opposed to a traditional derrick.
- The tower provides a wide range of possibilities when it comes to the arrangement of the drilling equipment, improvement of operation and maintenance processes and provides an efficient integration with the ship's hull.
- The Northern Light Drilltower is IP protected and patented

Three Versions

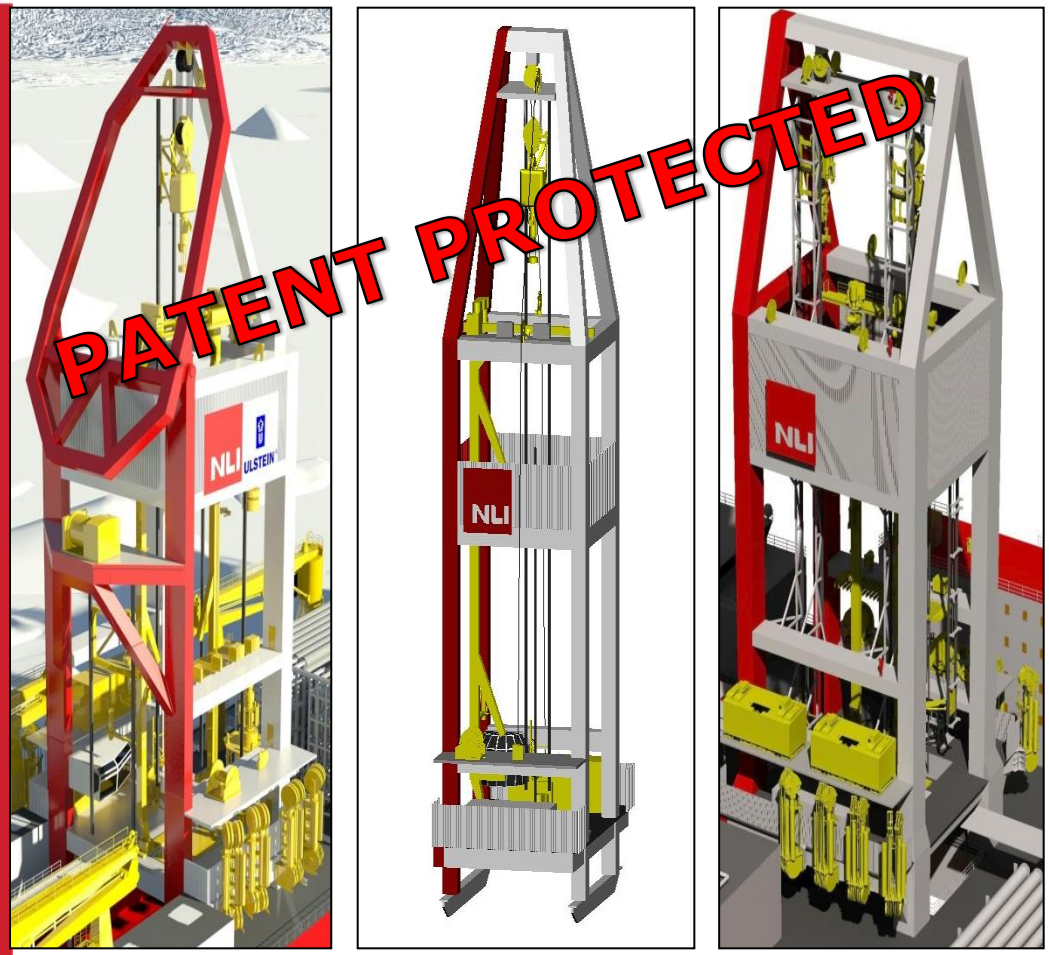


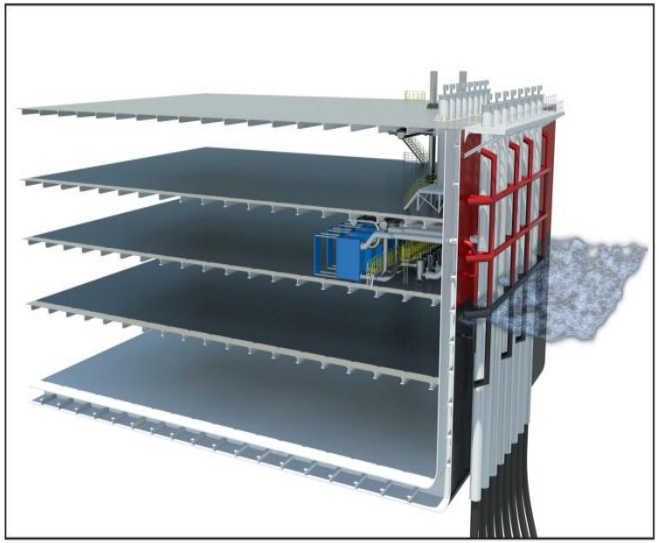
Illustration 1: Northern Light Drilltower with foldable top

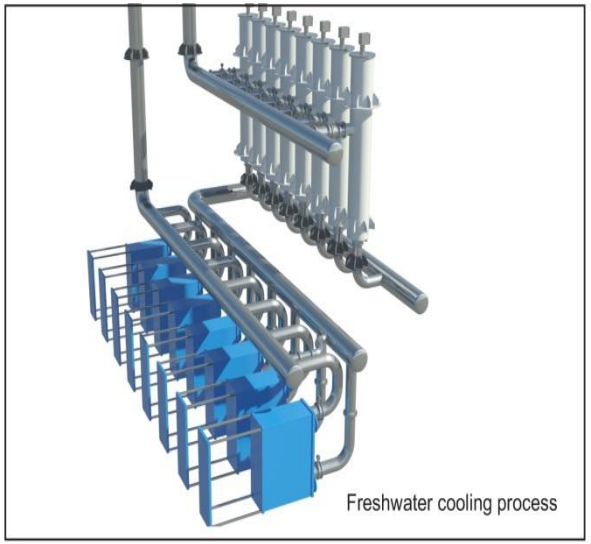
Illustration 2: Northern Light Single Drilltower

Illustration 3: Northern Light Dual Drilltower

Products & Technology; Deep Sea Anchors AS:
NLI Innovation, Statoil, GeoProbing Tech.

FNLG Cooling Water System





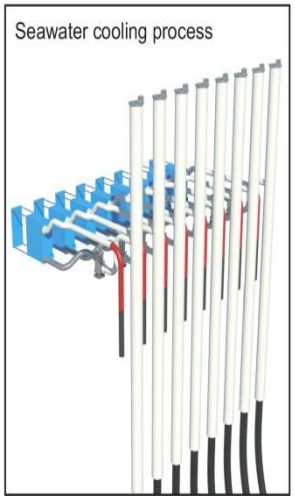
- Complete, all inclusive system
- Hull integrated
- No topside installation
- Optimum operating conditions
- Reliable and field proven equipment
- Submersible SWL pumps
- Submersible CWC pumps
- Compact layout
- Reduced innstallation weight
- Optional deep suction hose

FRAMO

Concept owner and responsible for design, manufacturing and delivery of seawater pumps and cooling water circulation pumps.

NLI

Responsible for system engineering, layout and fabrication in addition to delivery of coolers, valves and the complete piping system.



Process Industry; CO2 capture, test plant
Mongstad. Client: Alstom (2011)

Process Industry; Prosess Building
Addcon Nordic AS (2009)

Bridge Builder

- Long traditions and experience as a bridge builder (since 1923).
- Throughout the last 40 years, the company has been one of Scandinavia's most important supplier of road and rail bridges.

Udevalla bridge, Sweden
Client: Skanska(2000)

Infrastructure; Several railwaybridges in Norway, prefabricated and erected. Client: Jernbaneverket (2003-2013)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Thank you for your attention
Presentation by Hans Jørgen Rånes
Heading for the future