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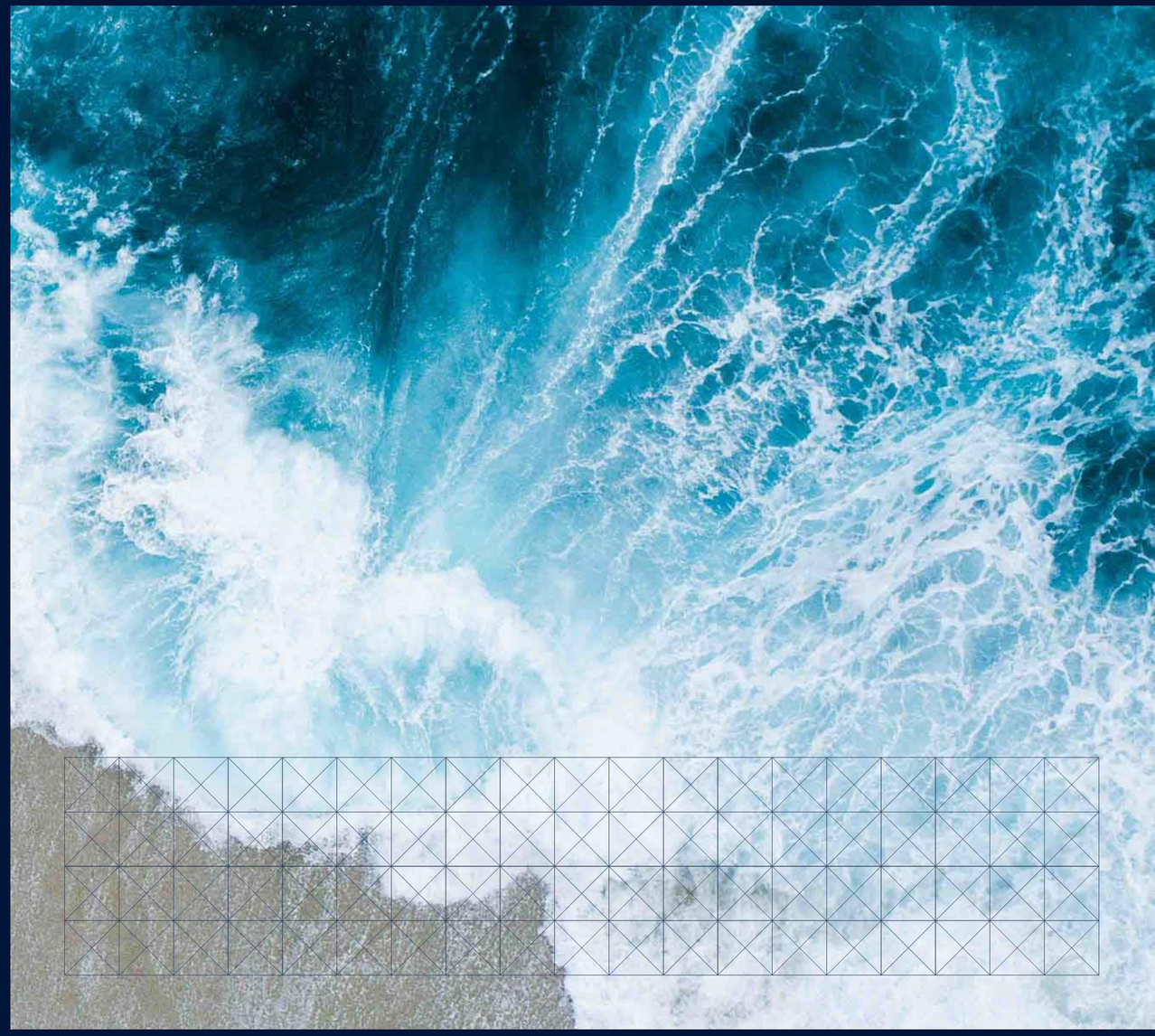
KONGSBERG DIGITAL

Dynamic Digital Twins

26/10/2018

Hege Skryseth President Kongsberg Digital



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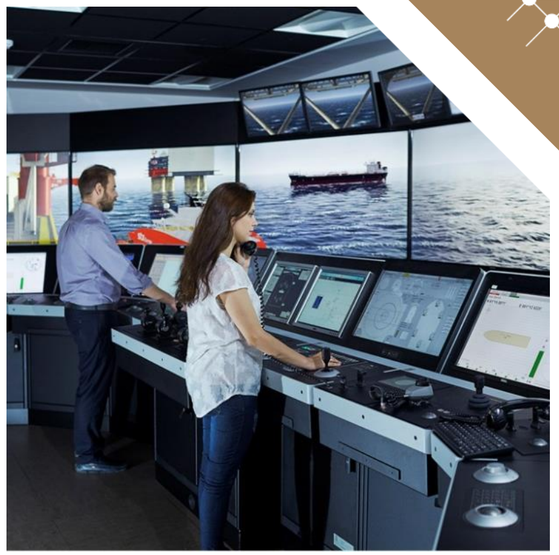
Kongsberg Digital

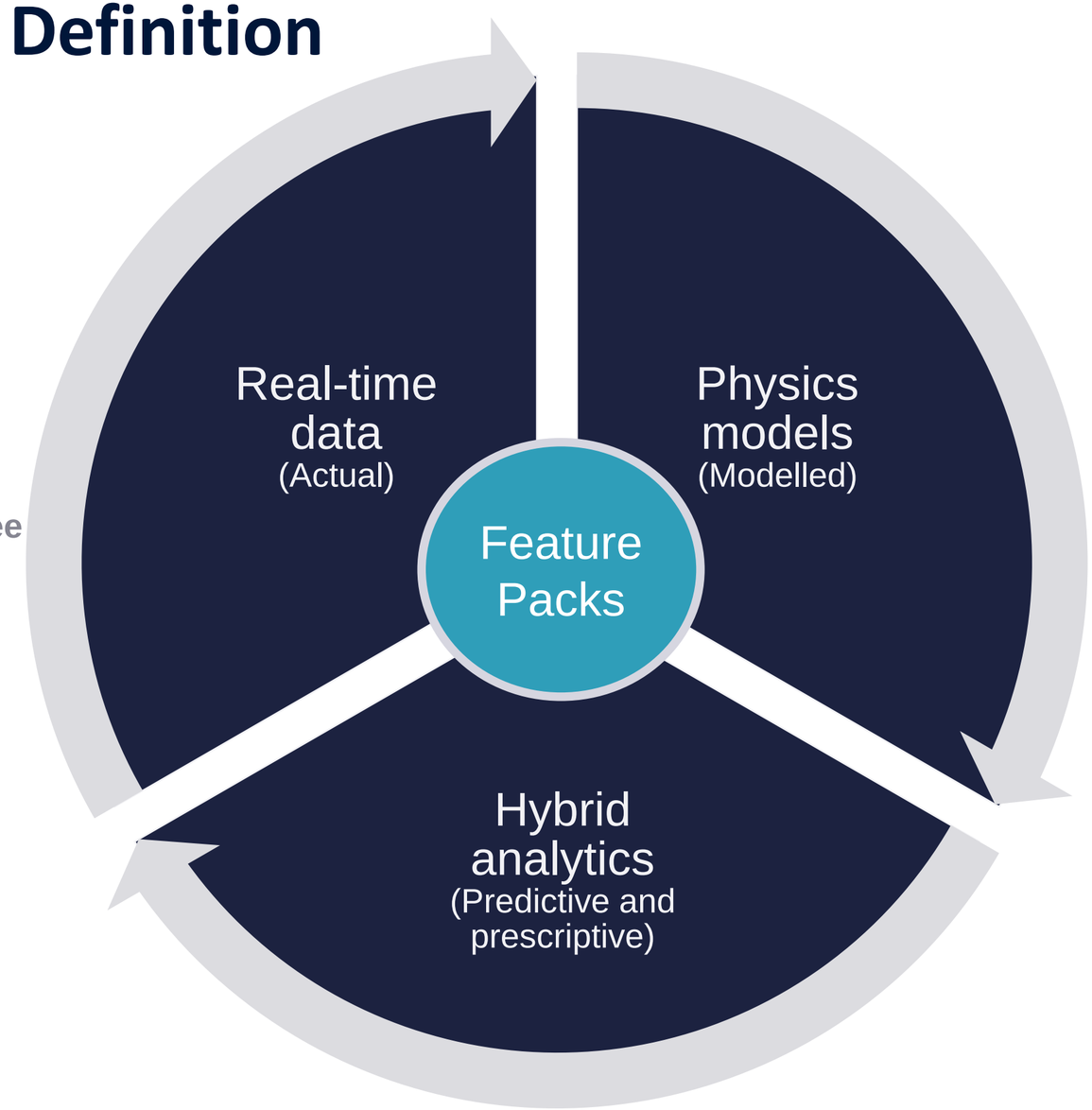
Digital transformation with deep domain- and digital competencies

- Oil & Gas
- Renewables & Utilities
- Maritime Simulations
- Maritime Eco-system
- Digital Platform



Digital Twin Definition

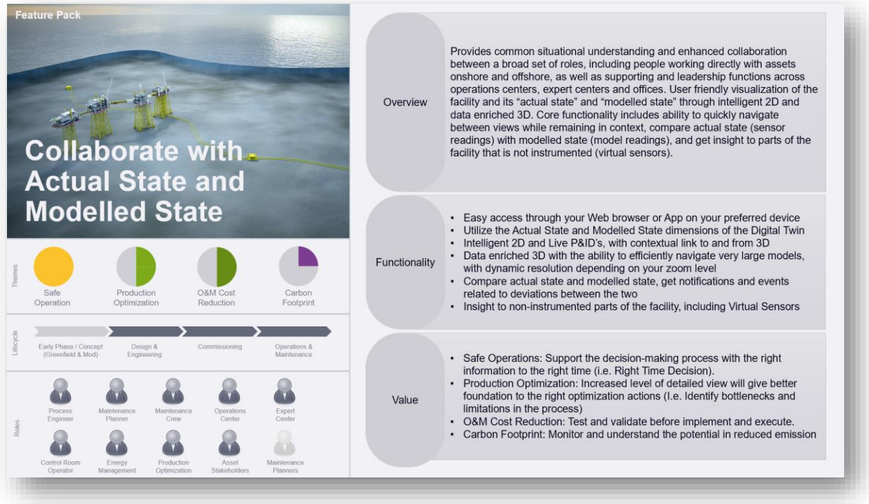
Our dynamic Digital Twin solution is defined by its three intertwined dimensions…



…powering feature packs that are easily available through any web browser or app on your preferred device

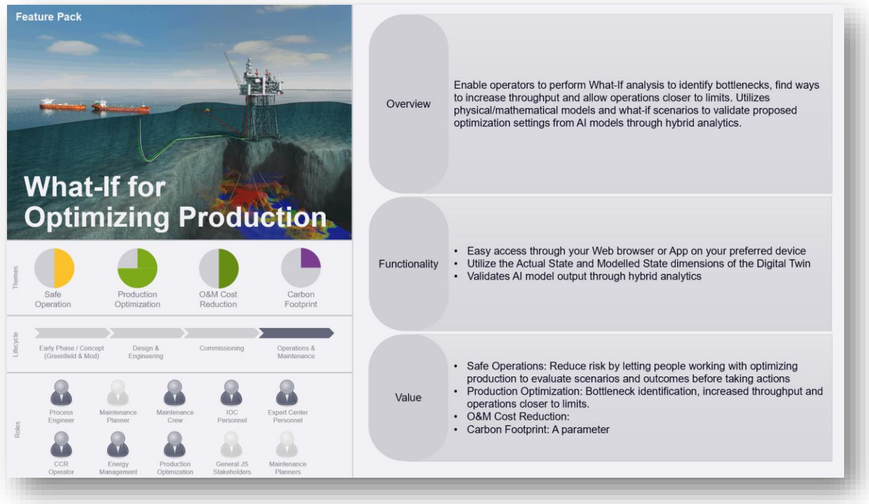
Feature Pack examples

Example 1

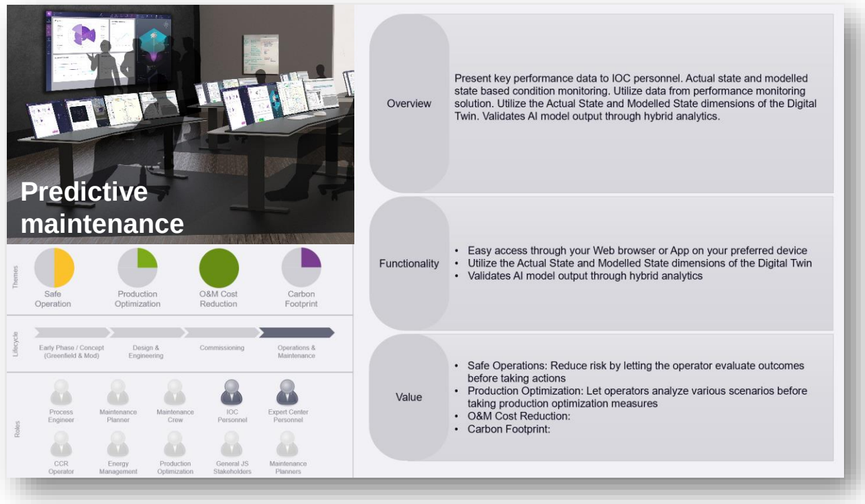


Example 2

Example 3



Example 4



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Digital Twin

Transforming workflows

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Digital Twin

Transforming workflows

DIGITAL TWINS UNLOCK SIGNIFICANT VALUE FOR OPERATORS ACROSS THE VALUE CHAIN - EXAMPLES

Upstream value chain

Exploration › Drilling & completion › Reservoir management › **Capital project delivery** › **Operations and maintenance** › Supply chain & overhead

Capital project delivery

- 30% - 70% reduction of engineering cost and time
- Reduced materials costs
- Labor man hours reduced by 30-80% across multiple key processes

-30% cost
-30% time

Operations and maintenance

- 5-15% higher production by higher uptime and prevention of unplanned events and failures
- 20-40% reduced maintenance costs
- 30-100% reduction of offshore manning

+10 % prod.
- 20-60% cost

SOURCE: McKinsey, Multiple cases from other industries, e.g. airline, chemicals, agriculture, automotive; O&G pilots; Estimates

Digital Twins and remote operations of unmanned facilities

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Digital Twin-film

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Thank you

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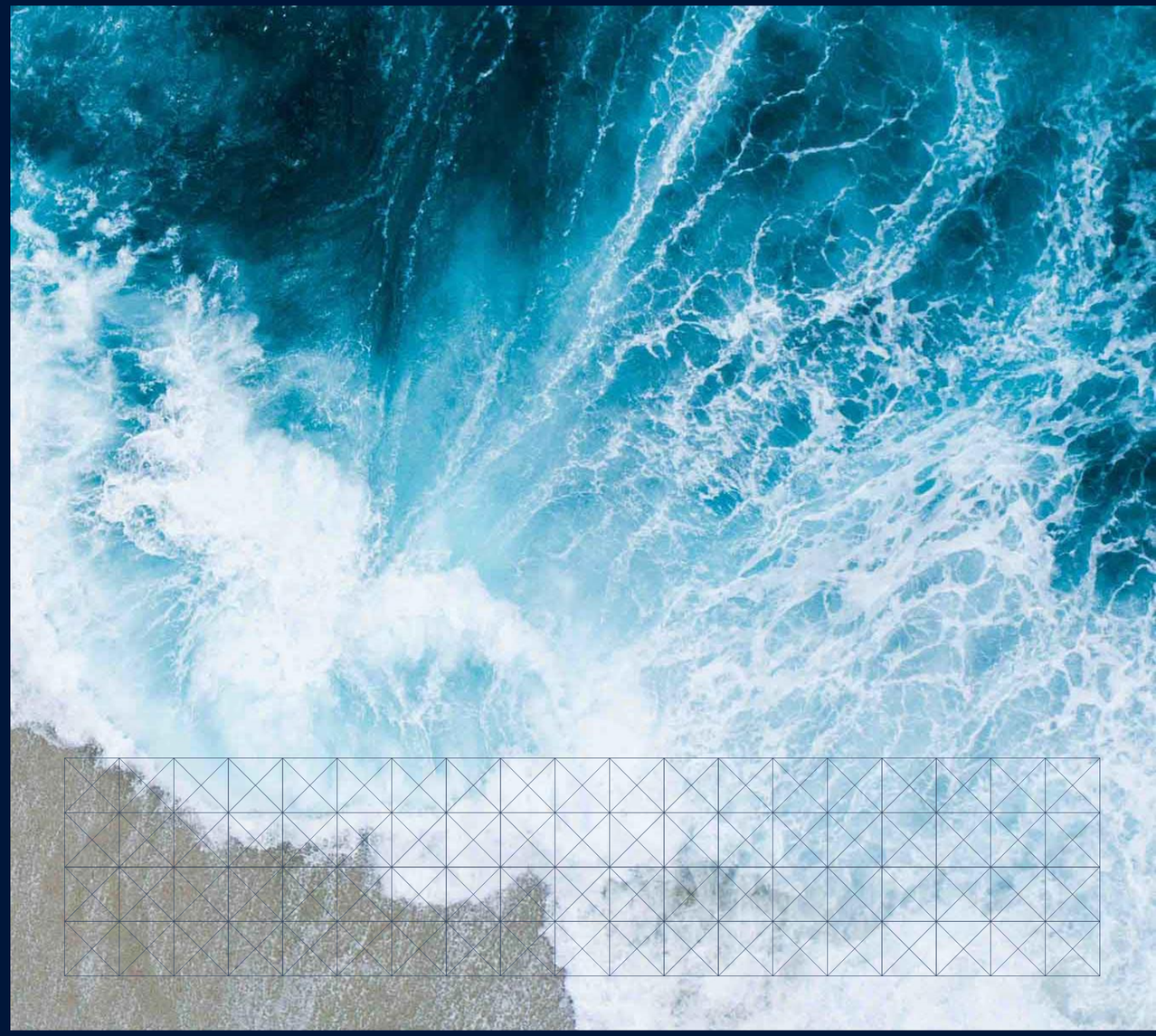
Kongsberg Defence & Aerospace

26/10/2018



President & Group EVP Eirik Lie

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KONGSBERG DEFENCE & AEROSPACE

KEY FIGURES

33 offices in 17 countries

2,600 employees

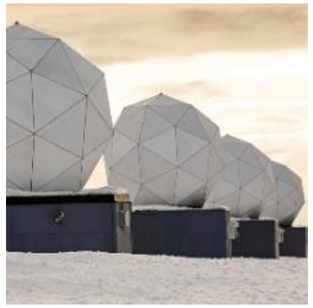
Revenues LTM 6.5 BNOK

Order backlog 10.5 BNOK

International success in selected niches

INTEGRATED DEFENCE SYSTEMS
System: Land, Sea, Air

MISSILE SYSTEMS



SPACE & SURVEILLANCE

AEROSTRUCTURES

DEFENCE COMMUNICATIONS

PROTECH SYSTEMS

PATRIA

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INCREASE MARKET PENETRATION WITH A MODERN PRODUCT PORTFOLIO

Home Market –

Defence Partnership

Leading position in Northern Europe

N-Europe campaigns

Strong US alliances

Raytheon

LOCKHEED MARTIN

GD

US & International campaigns

Strengthened International Competitive Power

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STEADY GROWING BASE

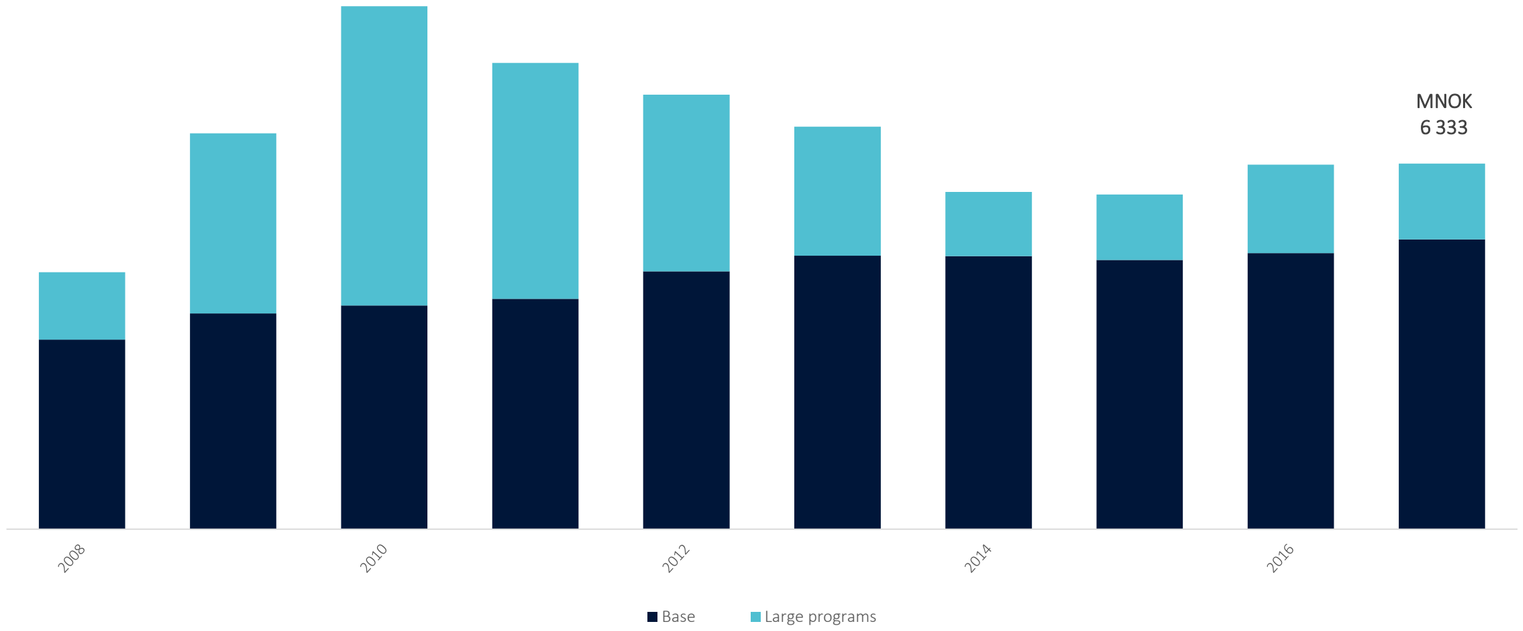
NSM Norway 2007

CROWS II 2007

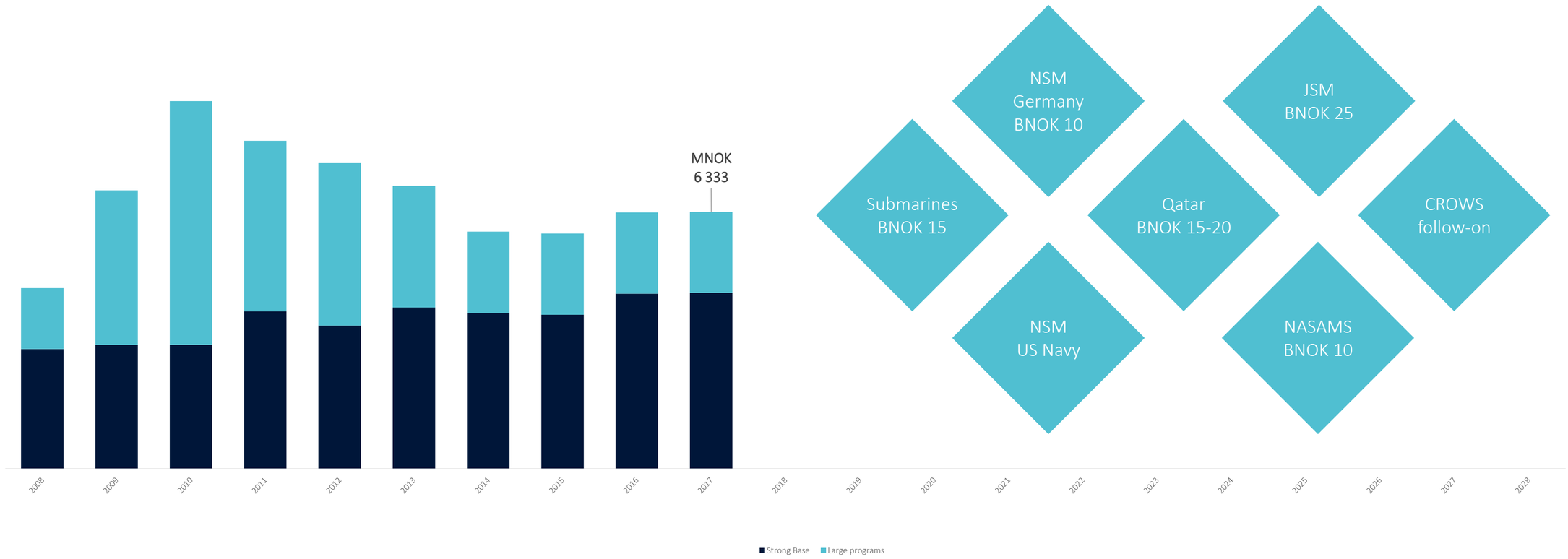
NSM Poland 2008

NASAMS Finland 2009

NASAMS 2014



SECURED POSITIONS FOR FUTURE GROWTH



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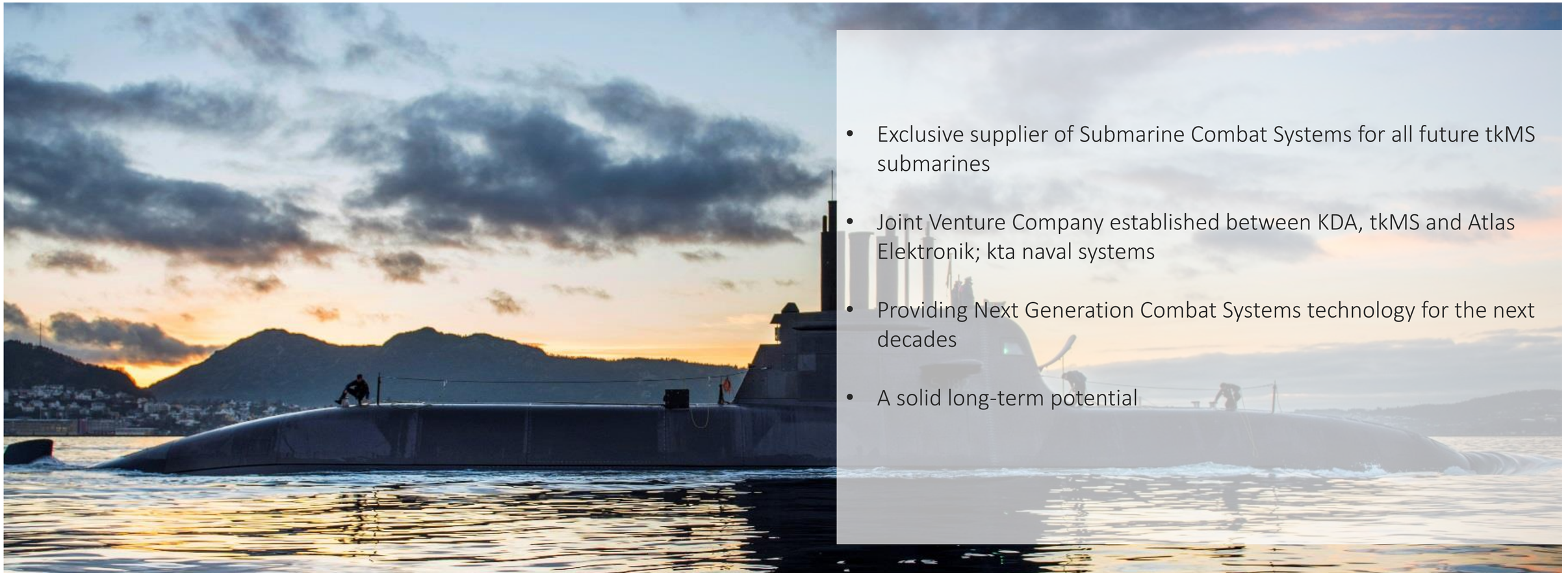
PARTNERING WITK tkMS TO PROVIDE SUBMARINE COMBAT SYSTEM



- Exclusive supplier of Submarine Combat Systems for all future tkMS submarines
- Joint Venture Company established between KDA, tkMS and Atlas Elektronik; kta naval systems
- Providing Next Generation Combat Systems technology for the next decades
- A solid long-term potential

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NSM SELECTED BY BOTH US NAVY AND GERMAN NAVY

US NAVY has contracted NSM for Littoral Combat Ships and Future Frigates

German NAVY has selected NSM for its Harpoon replacement

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QATAR
MAJOR OPORTUNITIES WITHIN SEVERAL FIELDS

Major vehicle program in Qatar

- Program announced 13 March 2018
- KONGSBERG selected to supply medium calibre turrets, remote weapon stations and other essential parts of the program
- Ongoing negotiations
- Total scope still to be defined, BNOK 15 estimated potential
  - Upside of up to BNOK 5 announced on Q2 2018 depending on ongoing scope- and price negotiations

Air defence program – NASAMS to Qatar

- Raytheon has announced MoU for a major NASAMS system
- KONGSBERG is exclusive partner on the NASAMS system
- Potential of USD 2 Billions on total program according to Raytheon
  - Typical KONGSBERG scope 30-40%

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JSM – THE ONLY LONG RANGE PRECISION STRIKE MISSILE BEING INTEGRATED ON F-35

- Offered and Supported as standard F-35 weapon
- The only long range precision strike missile being integrated on F-35
- On track with missile development and flight testing
- Significant market potential with an increasing base of F-35 customers

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TEAMING AGREEMENT WITH RAYTHEON AIR DEFENCE HAS GENERATED SOLID REVENUES OVER DECADES

- 20 years Teaming Agreement with Raytheon
- NASAMS is the most sold Air Defence system in NATO
- NASAMS deployed in Washington DC since 2005
- NASAMS is unique with its network architecture, high firepower and dual-use of effector
- Increased demand for this fundamental defence capability
- Selected in Australia
- Selected in Qatar
- Selected as Mobile Ground Based Air Defence System for Norwegian Army

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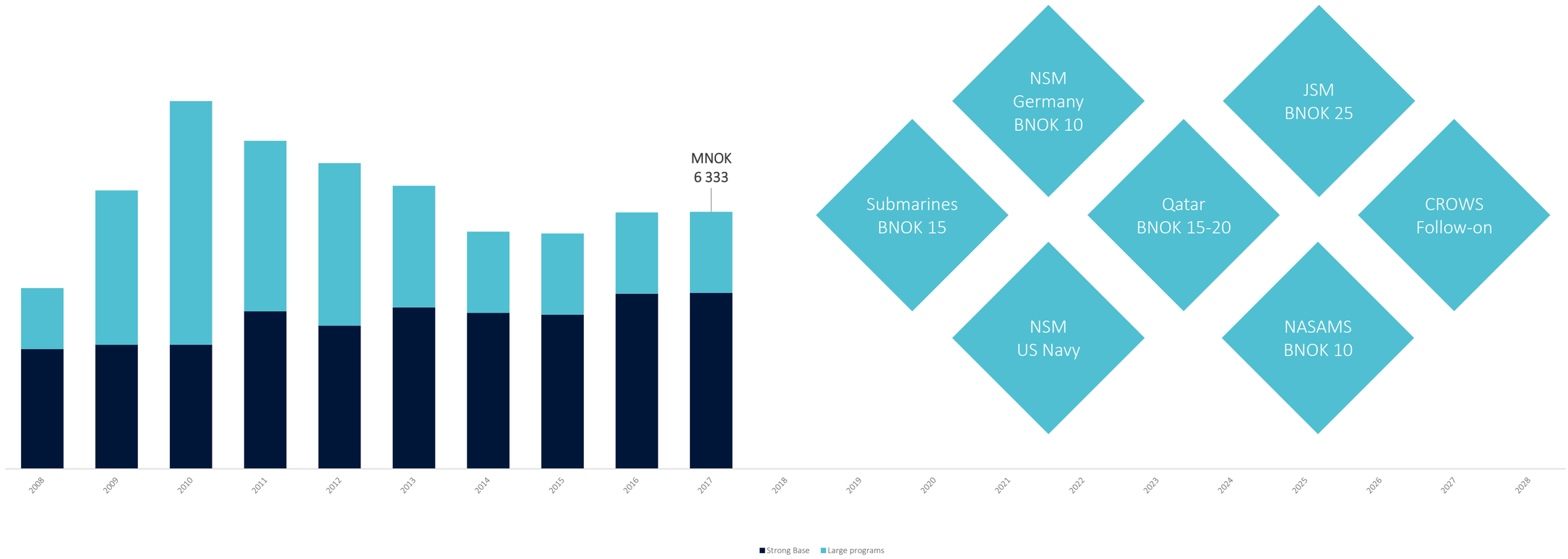
SECURED POSITIONS FOR FUTURE GROWTH



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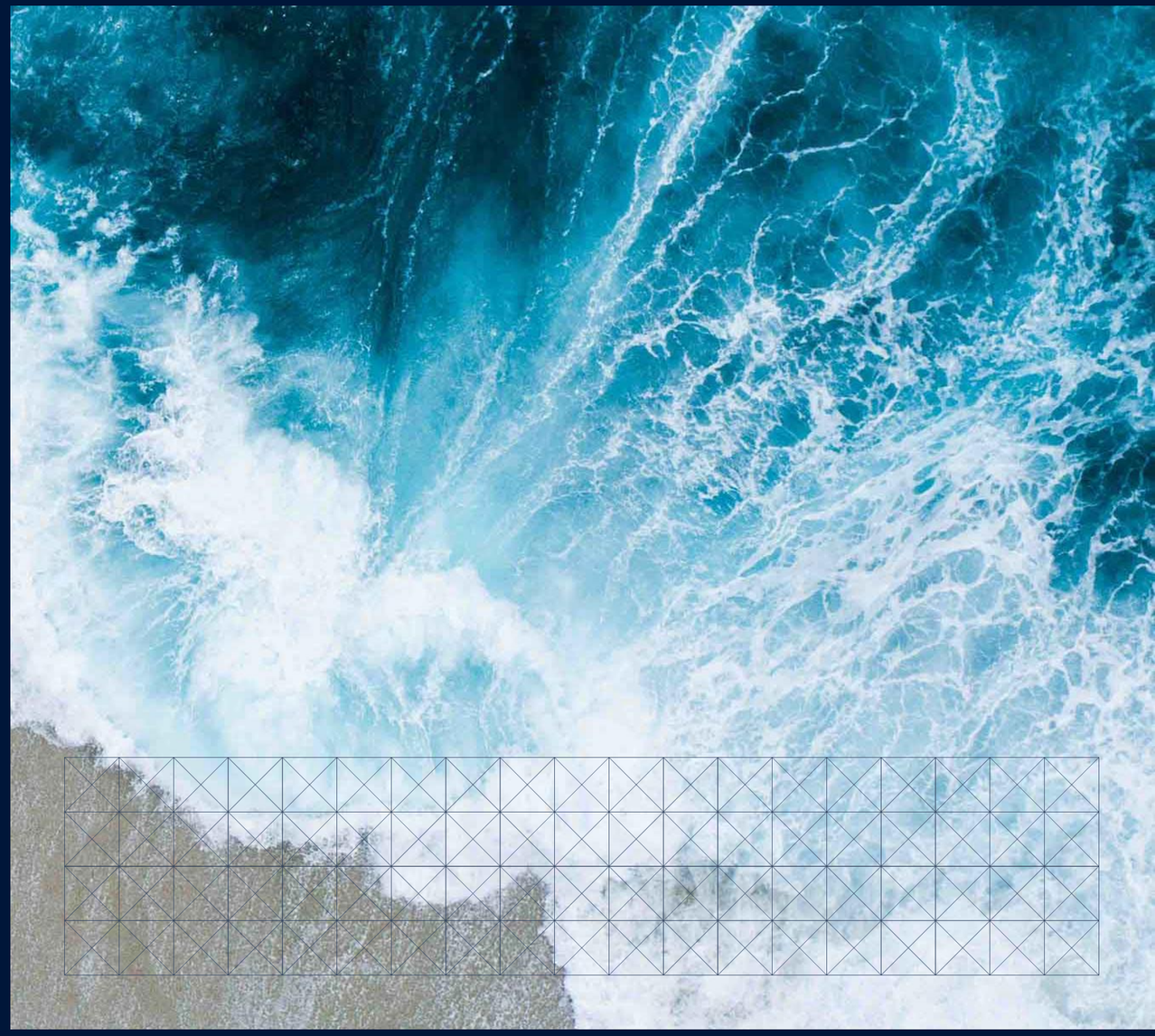
KONGSBERG MARITIME

Shaping the maritime future

26/10/2018

EGIL HAUGSDAL

PRESIDENT, KONGSBERG MARITIME



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KONGSBERG MARITIME

An ocean of opportunities

KONGSBERG

Offshore,
Merchant Marine, Subsea
and Emerging Business

Dynamic positioning, navigation, automation, engineering, subsea and seismic instrumentation, marine robotics, sustainable fisheries, handling and energy solutions

World-wide operations

More than 3,700 employees

Revenues LTM 7.4 BNOK

Order backlog 6.0 BNOK

Installed base more than 18,000 vessels

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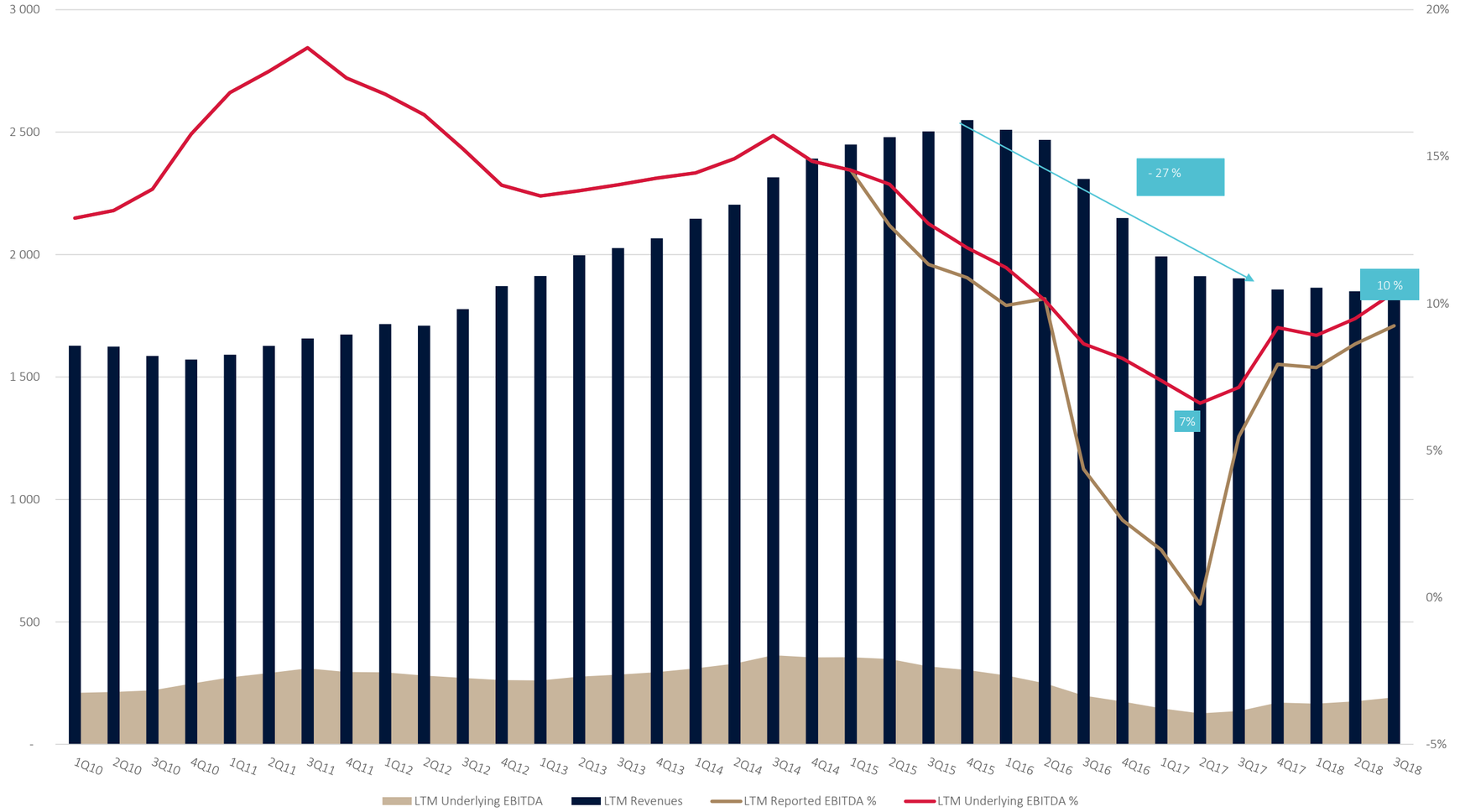
We are navigating through extreme conditions…

…margins gradually more influenced by single-contract-impact



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Adapting, Delivering & Positioning

Delivering operational excellence

Adapting to changing markets

Positioning for future markets

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Targeting opportunities in cyclic industries

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MARO

Global market for marine robotics has grown steadily over the past years, both in the naval, as well as in the commercial survey segment
Geographical – Global

MARO

FLNG FSRU

TANKERS

Young fleet the forcast is down 42% in 2017 - 2021
Geographical –Asia

Crude Tankers

NAVAL

NAVAL

Extended COTS and MODS offering will open up new potential in growing market segment
Geographical – Norway, Europe, USA

Aqua-culture

AQUACULTURE

New market segment for offshore fish-farms
Geographical – Norway & China

FISHERY

Largely localized market and traditional in technology development;
Geographical – Europe

Fishery

BULK

Dry bulk seaborne trade forecast to 3.4% annually in the next 10 years.
Geographical –Asia

Bulk

Merchant

CONTAINER

The container vessels are going from big vessels to ultra-big vessels combined with smaller container feeders
Geographical –Asia

Chem Tankers

Container

Product Tankers

OPU

Driven with leased FPSO and Oil major production units
Geographical – Europe, Brazil, West Africa & Asia

OPU

Offshore

Research

RESEARCH

New-build activity expanded to incl. global market
South Africa, USA, Taiwan, China

PAX

PAX (CRUISE, FERRIES)

Ordering is expected to be at good levels due to increased passenger volumes
Geographical – Europe & Asia

Wind

OFFSHORE WIND ENERGY

Overall industry growth expected at 10-15% CAGR for purpose built SOV's for windfarm maintenance.
Geographical - Europe

LNGC

LNGC / FLNG / FSRU

Increased liquefaction trains coming onstream, driving mid stream (LNGC) & down stream (FSRU – LNG Small Scale bunkers)
Geographical – Asia & Middle East

OFFSHORE & SPECIAL VESSELS

The oil price has picked up which gradually gets improved business conditions. Market is in general affected by the over-contracting which took place the last 5-10 years for OSV (AHTS and PSV's) and Jack-Up and Floating Drilling Units; De-commissioning and heavy lifts are currently active; Geographical – Asia

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A perfect fit

KONGSBERG + Rolls-Royce Commercial Marine

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