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Kongsberg Maritime

Tow Assist

Compelling technology for efficient
and secure towing operations

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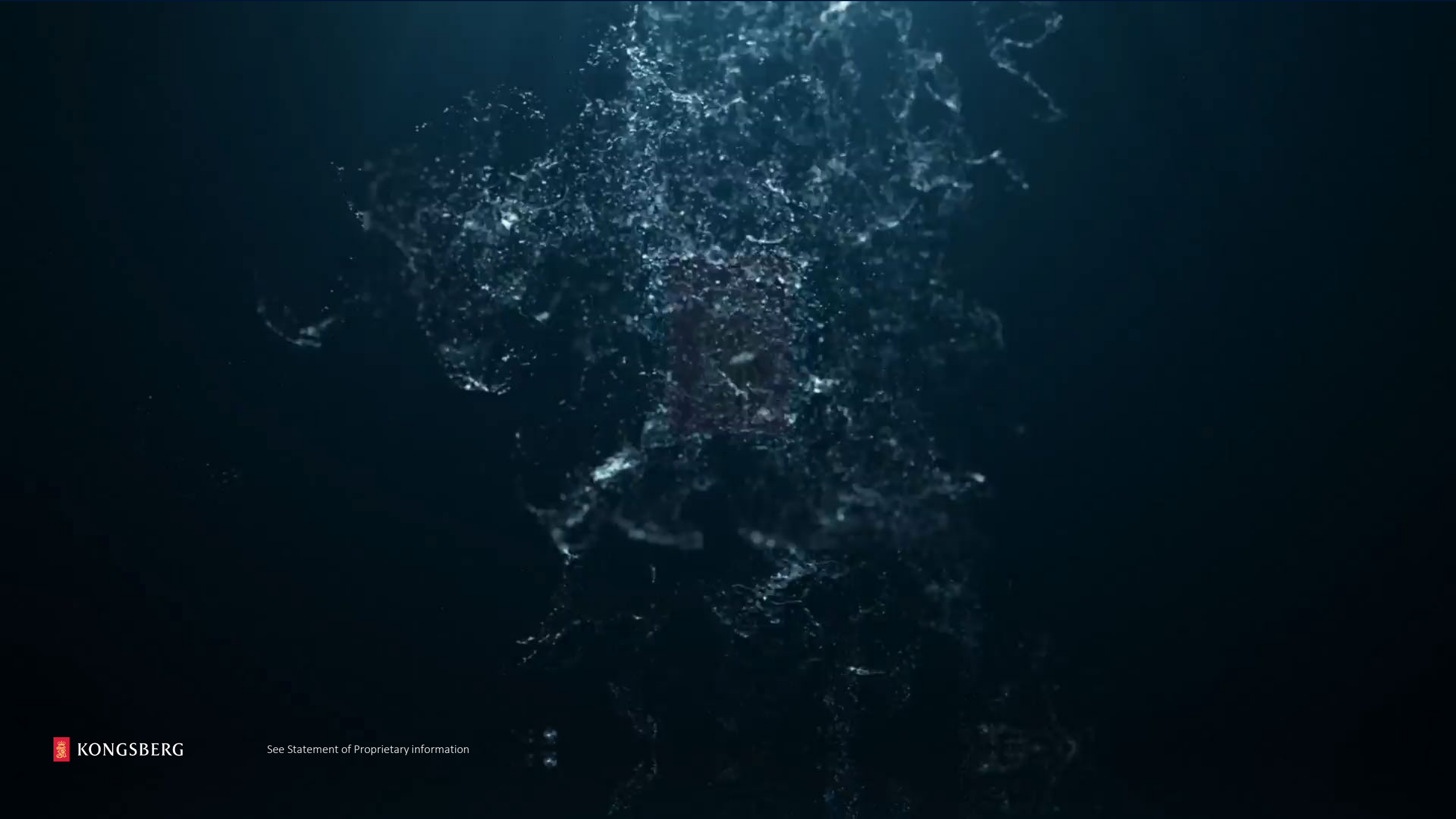

Kongsberg Maritime solutions for the

offshore energy market

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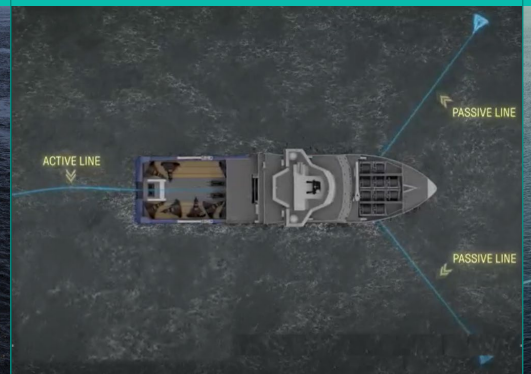
Our solutions empower owners and mariners to **take on new demands for complex and repeated offshore installation and transportation services** safely, efficiently, and confidently.

Versatile and capable ship designs:

FWIV AHT
FWIV Subsea

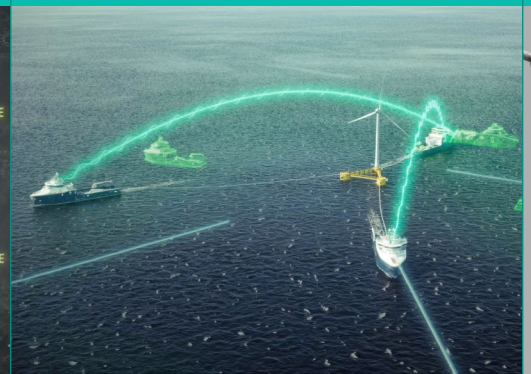
Bollard-pull-free tensioning:

Cross Tensioning



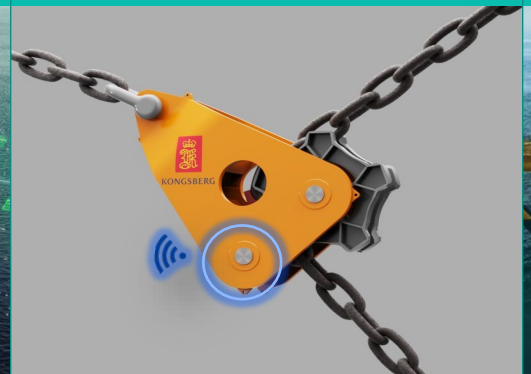
Precise and efficient transportation of floaters:

Tow Assist



Efficient and smooth hook-up:

Integrated tensioners



Vessel-based method for dynamic cable connection:

Remote Pull-In (RPI)

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Tow Assist

Tow Assist utilises Kongsberg Maritime's market-leading DP technology to **turn the towed floating object into a DP-enabled structure** for safe and efficient transportation and hook-up.

Giving **DP-like capabilities** to towed objects

Tow Assist

- Places the floating asset at the centre of the DP operation, utilising towing vessels in one coordinated endeavour (**spread DP function**).
- Measures the position of the floater and collects data from the connected vessels continuously.
- Embeds a model of the towed object to calculate precise advice and help **position the unit safely and efficiently** during towing or station keeping.
- Innovative utilisation of Kongsberg Maritime's proven DP technology.

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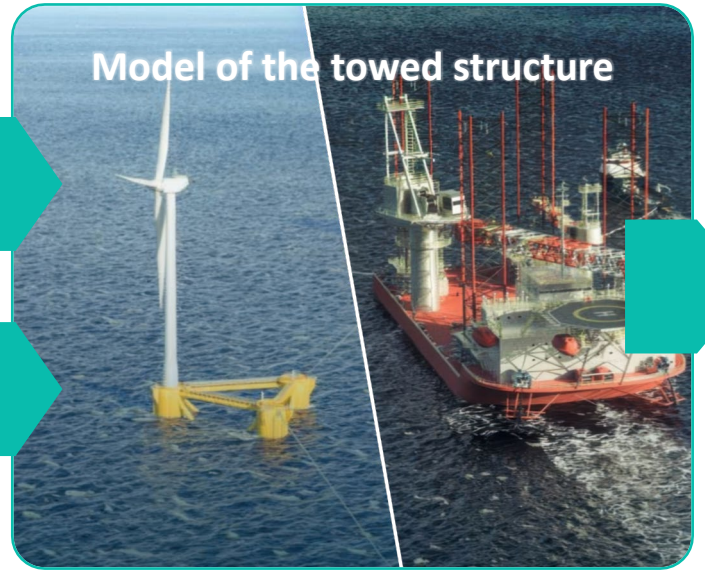
How Tow Assist works

Generating reliable advice using **trusted technologies**

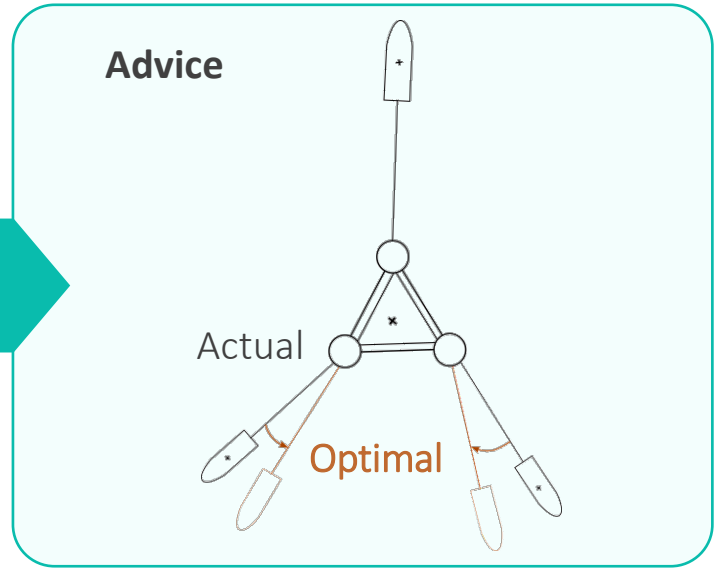
The system combines **sensor data sourced from the towed object and connected ships** with a **model of the towed object** to calculate setpoints for the assisting vessels and **show advice** to keep the floater on track or in a precise position.

Sensor data from floater and vessels

Desired **floater path and speed**



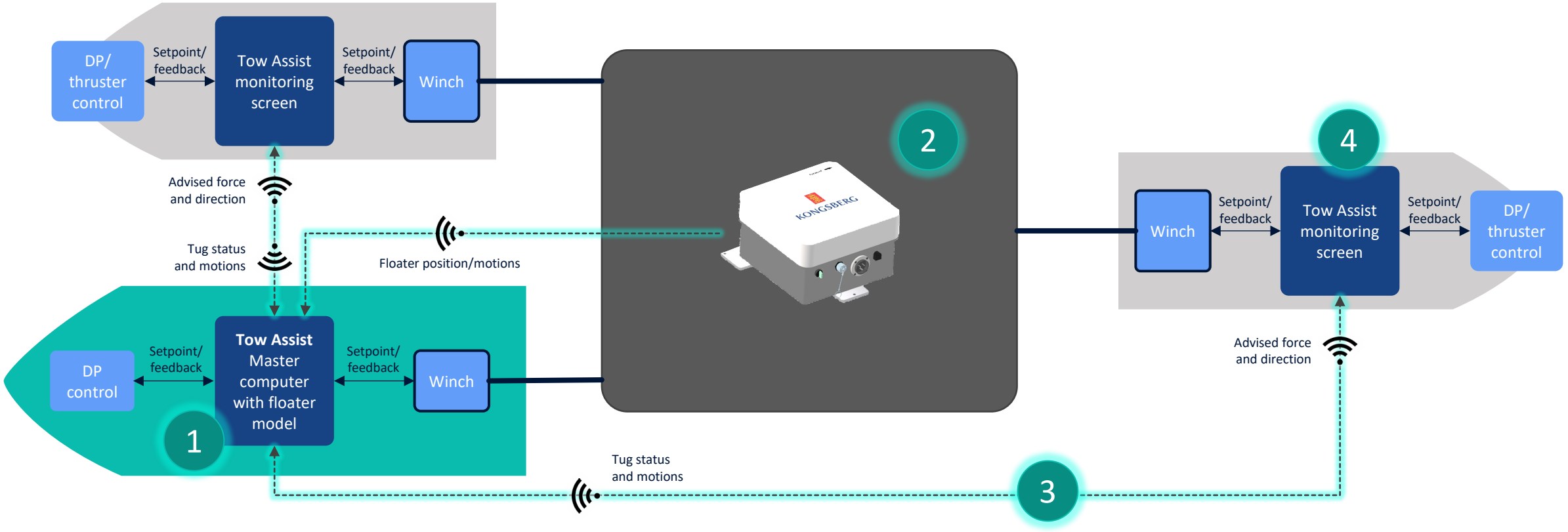
Vessel setpoints
(force & direction)



How Tow Assist works

Overview

1. One separate Tow Assist system integrated with regular DP and winch control system.
2. Integrated portable sensor package on floater with wireless transmission to towing vessel.
3. Wireless two-way link between the Master OS and assisting vessels.
4. Portable advisory/ control system on tugs, interfaced to local DP/thruster control.



This system is re-usable across a number of applications, e.g. eASOG, DP Remote dynamic cable Pull-In.

Advice generation and representation

Master Tow Assist computer

The Master Tow Assist computer, available for the Tow Master, **collects and treats data** from all connected objects, **calculates optimal setpoints**, and **displays and distributes the advice** simultaneously for optimal towing cooperation.

- Available from the Tow Master’s mobile or desktop workstation
- Communicates wirelessly with the assisting vessels to source data and distribute the advice
- Interfaces the vessels’ DP and winch control systems for data collection and setpoints calculation

Optimised views

Tow Master view

Tow system overview and advice

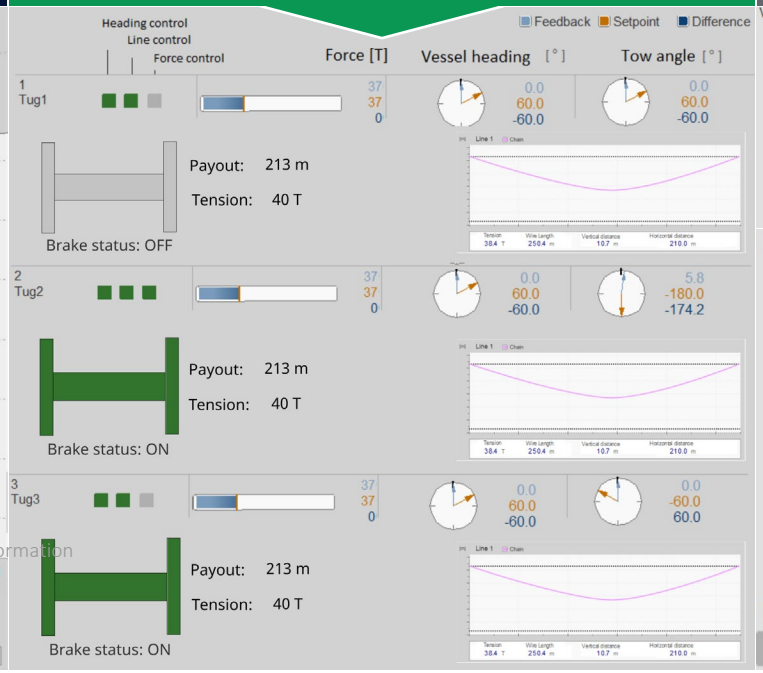
- Actual configuration
- Advised setting
- Environmental forces

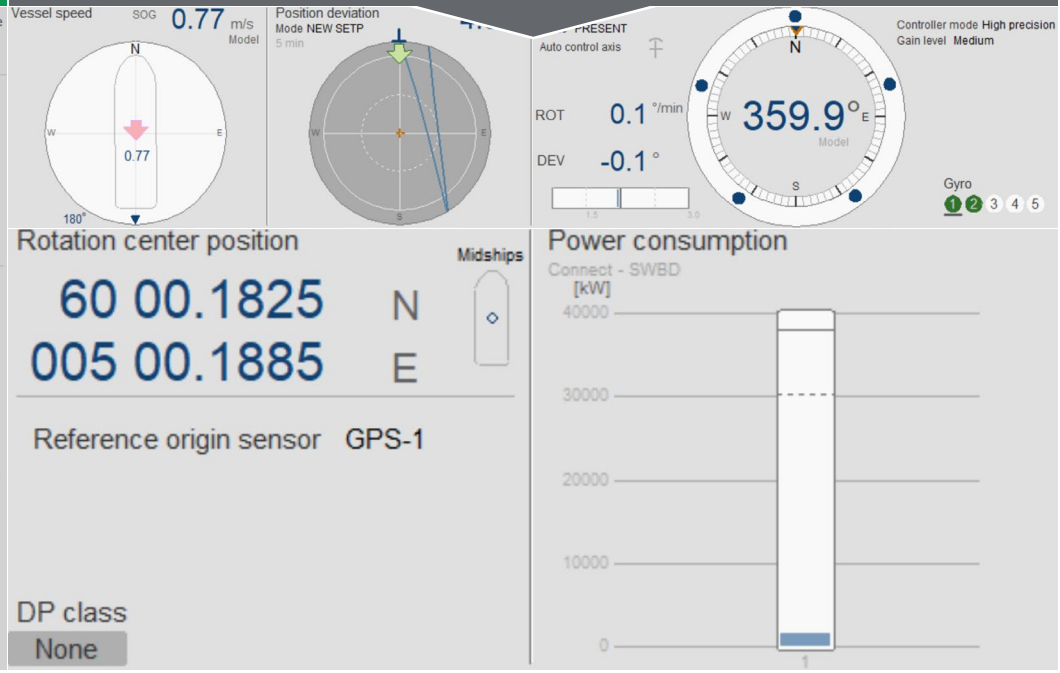
Live status of the vessels

- Towing winch parameters: tension and length of towing lines, winch brake status
- Vessel settings: current, advised, and deviation
- Controller mode: heading control, line control, force control

Individual vessel parameters

- Speed
- Position deviation
- Heading
- Power consumption





Optimised views

Captain view

Tow system overview and advice

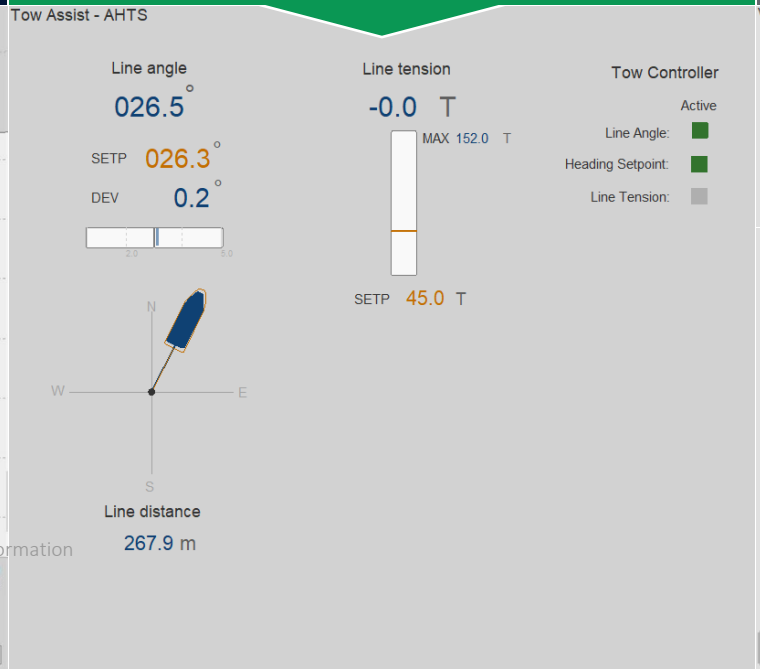
- Actual configuration
- Advised setting
- Environmental forces

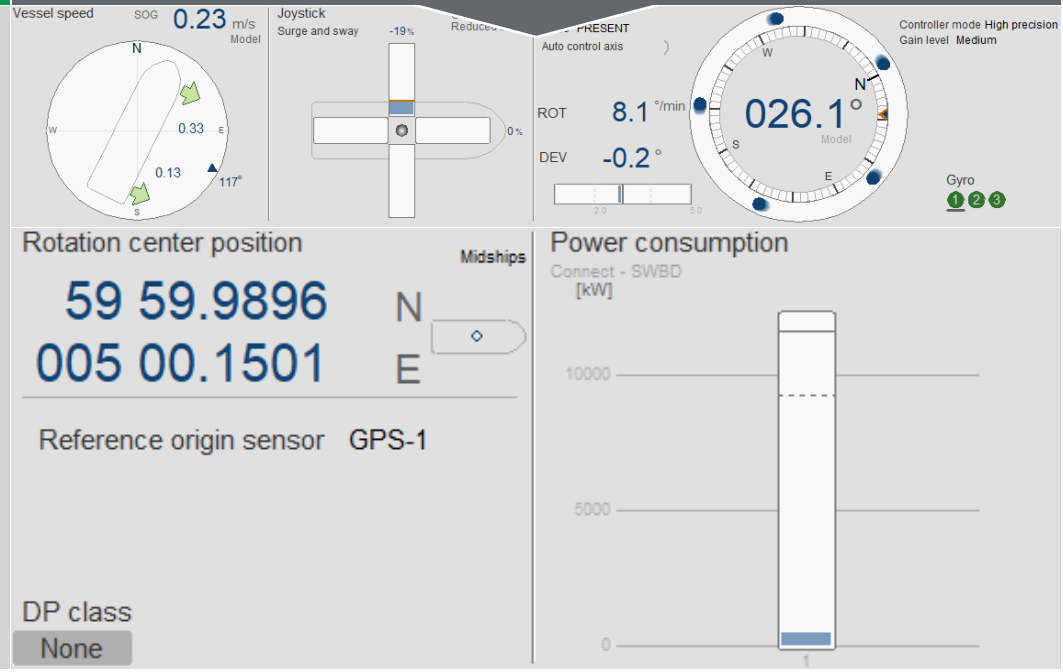
Individual towing overview

- Towing parameters: line angle, tension and length of towing lines, and deviation (actual vs. advised)
- Tow controller setting: line angle, heading, line tension

Individual vessel parameters

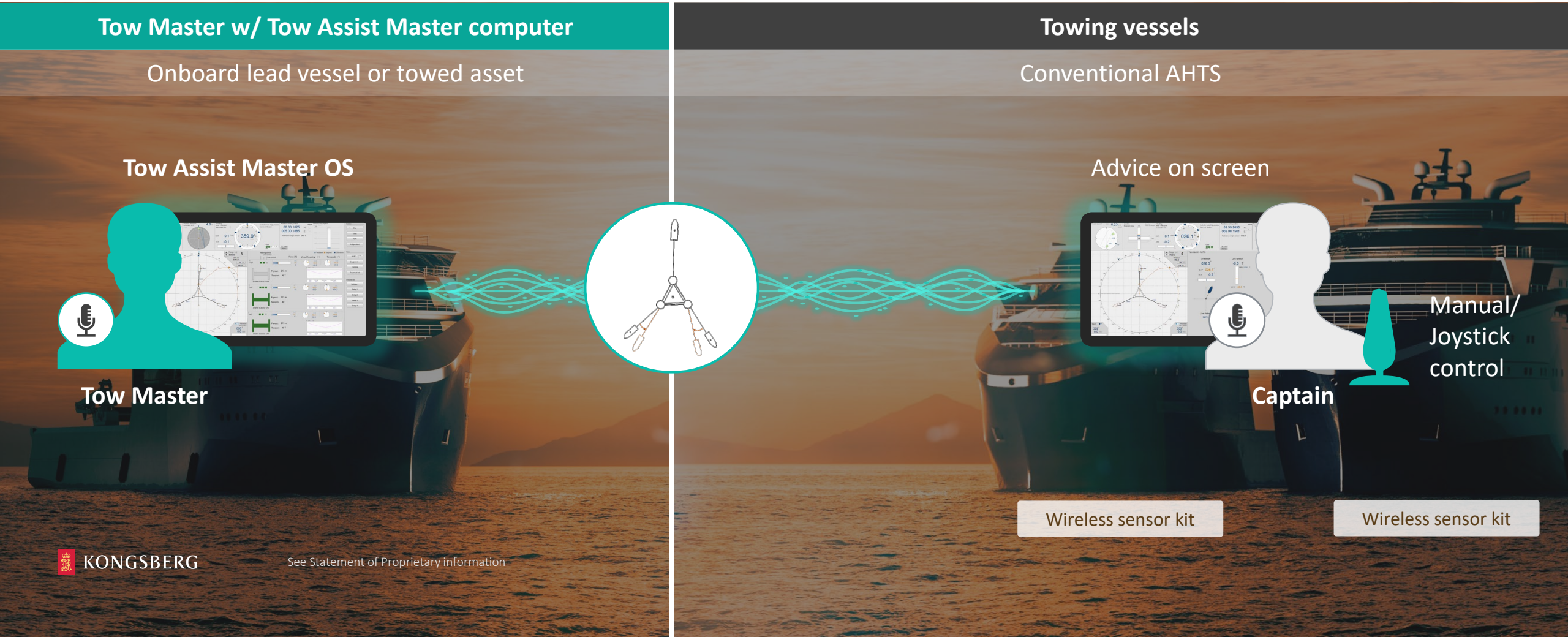
- Speed
- Joystick control
- Heading
- Power consumption





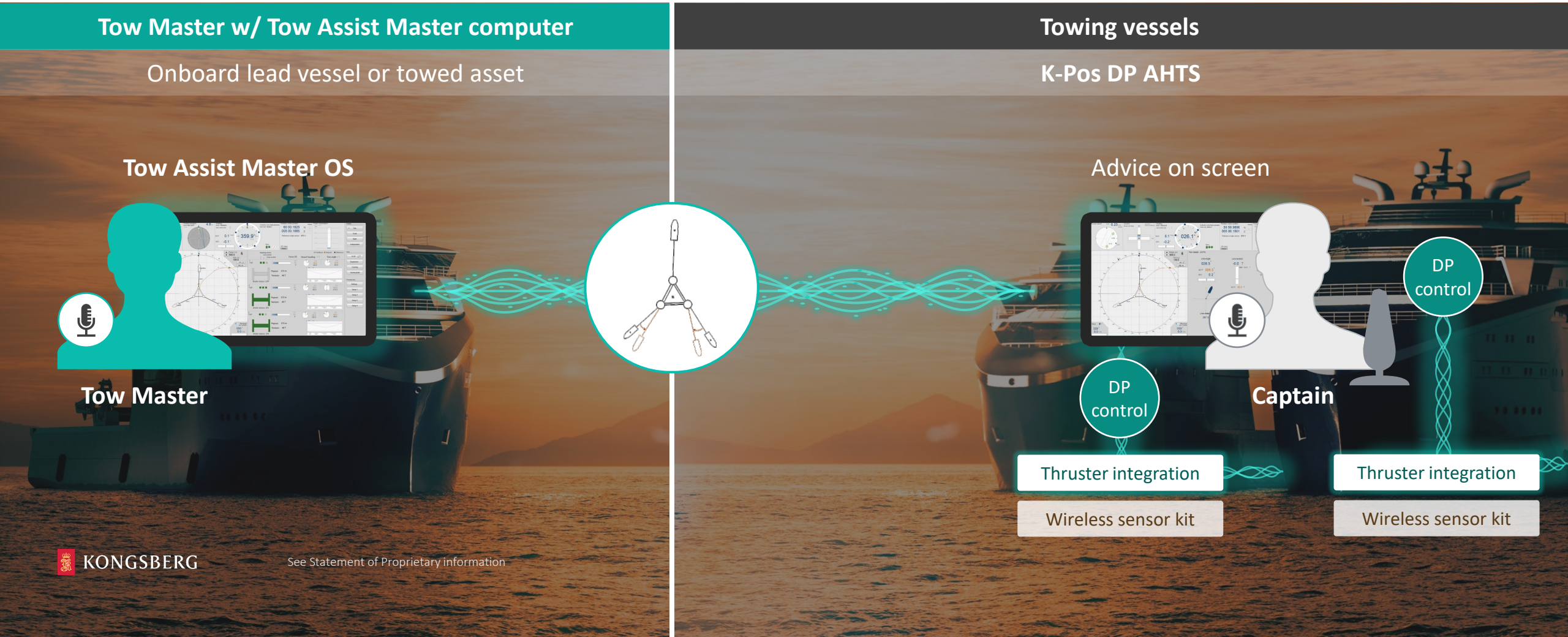
Utilising and distributing the advice

Shared advisory: wireless system communication



Utilising and distributing the advice

Automated control: DP vessel operation



Comprehensive assistance

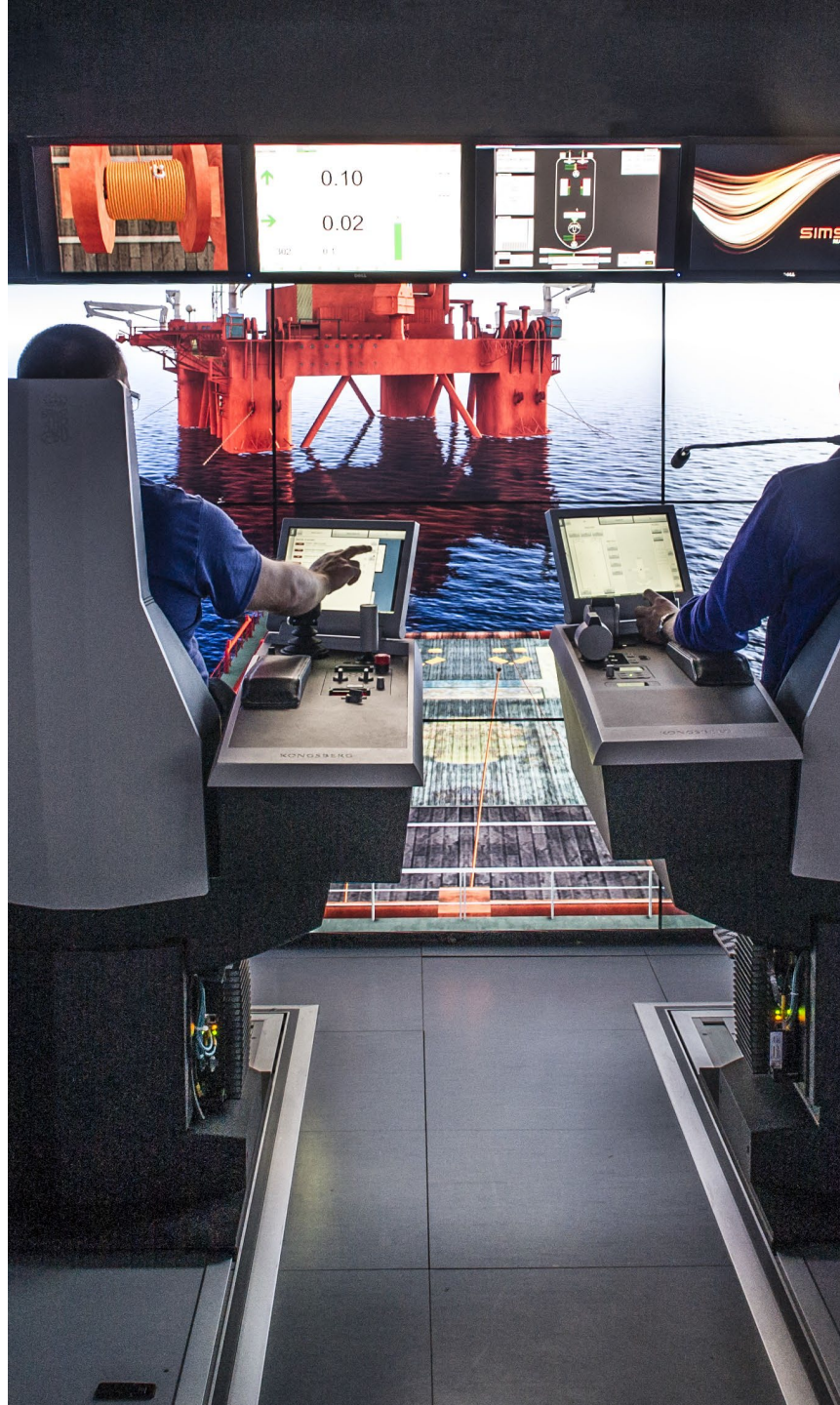
Enhancing planning and preparation

Enhanced planning

- Incorporates advanced insights on the operation in the planning phase
- Can be used to verify operational criteria and test scenarios for maximised safety

Immersive training (simulator)

- Practice in close to real-life conditions
- Creates familiarity with the tool ahead of the task
- Can be used to test scenarios and select the optimal one
- Opportunity to practice critical operational steps with the operators appointed to the actual work offshore
- Ensures optimal utilisation of the tool at sea for maximised benefits



Verification and proofing at sea

First pilot (August 2024)

Project:

- Towing of a spar-type Hywind Scotland wind turbine

Delivery:

- **Risk assessment** with client
- Tug **interface**, **advice**, and **partly automatic control**
- Tow Assist with **situational awareness** and **modelling/ allocation**

Verifications:

- Project organisation
- Practical installation
- Wireless interfaces between different vessels and floater

Hywind Scotland pilot (August 2024)

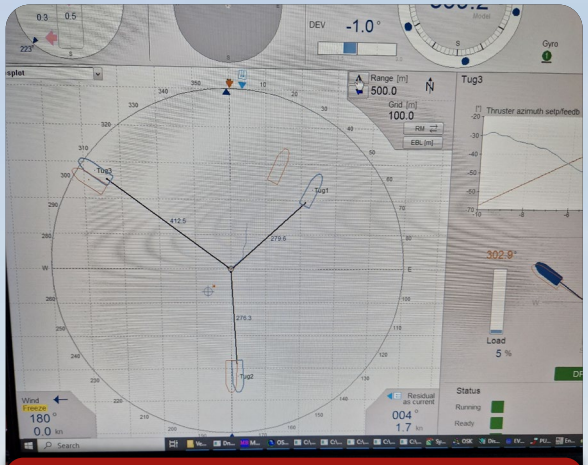
Installation

Normand Ferking **Hywind Scotland** **Skandi Vega**

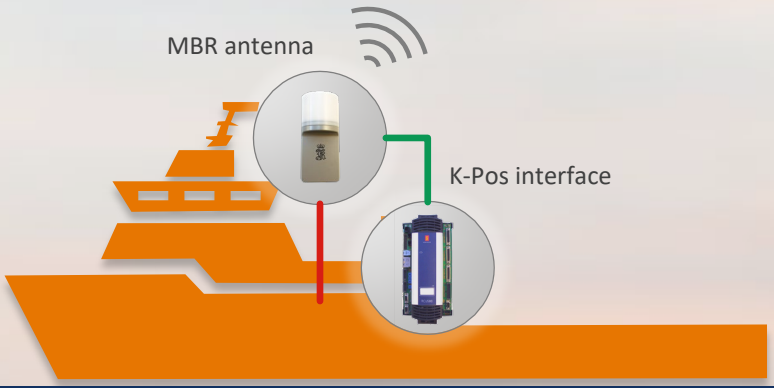
Hywind Scotland pilot (August 2024)

Installation ✓ Success

View on existing K-Pos
(Skandi Vega/Normand Ferking)

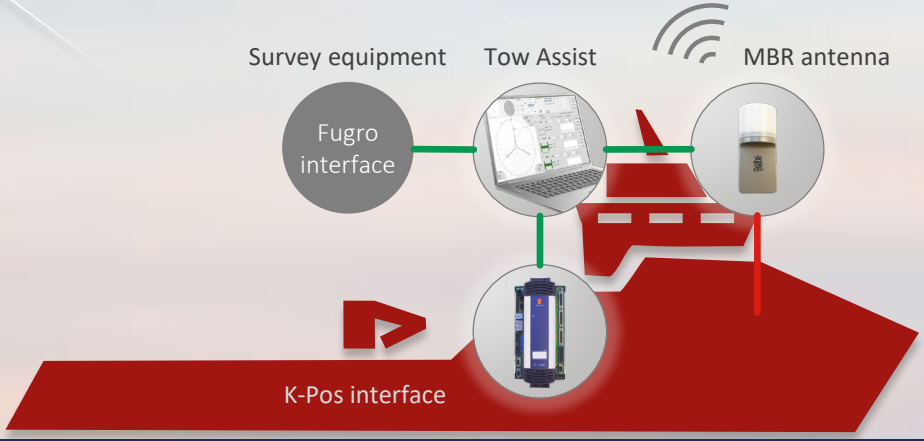


Tow Assist station
(Skandi Vega)



Normand Ferking

Interface to existing K-Pos
(Skandi Vega/Normand Ferking)



Skandi Vega

Hywind Scotland pilot (August 2024)

Installation – MBR

Normand Ferking

Hywind Scotland

Skandi Vega

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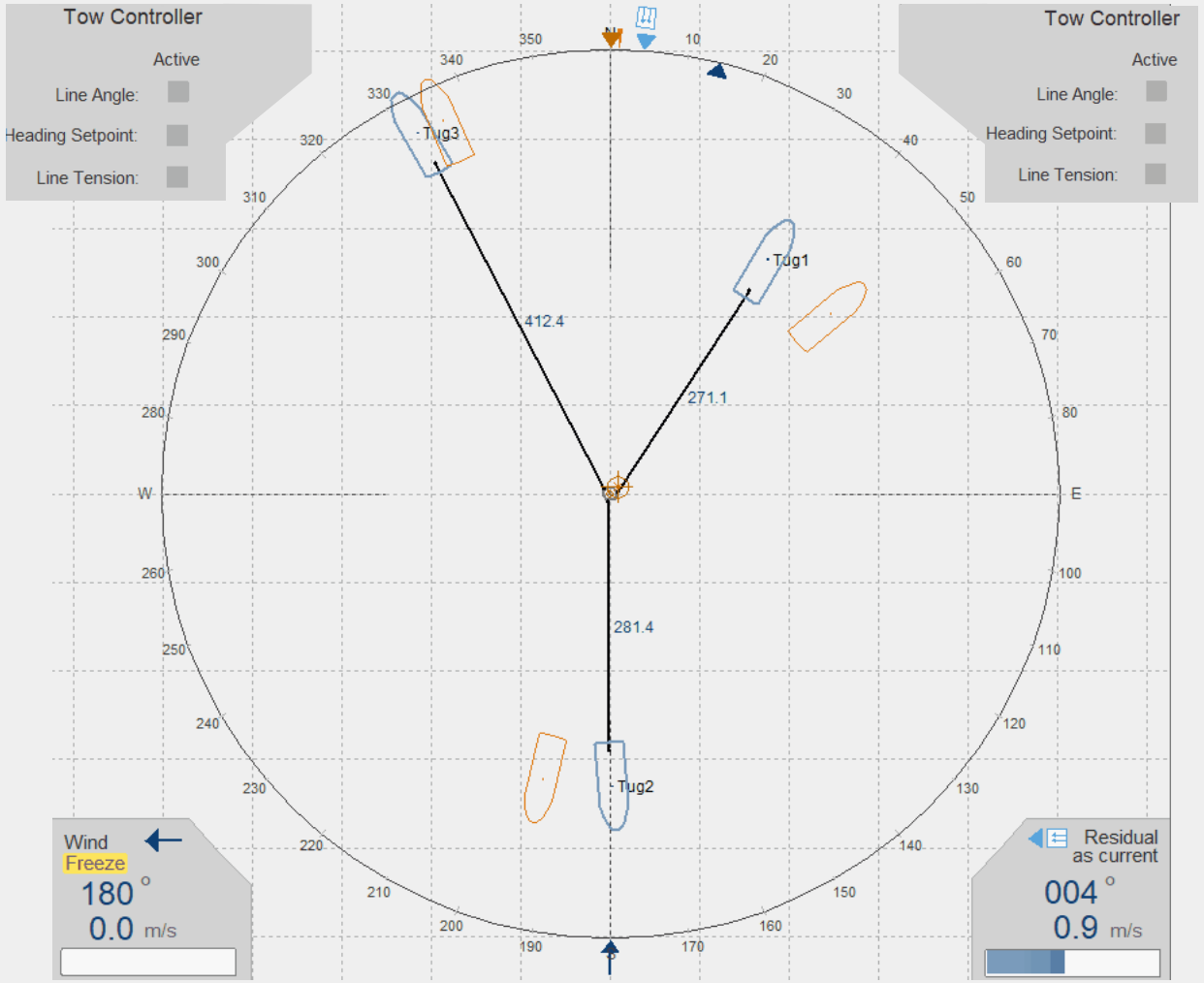
Hywind Scotland pilot (August 2024)

Resulting allocation and response on field



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Verification and proofing at sea

Second pilot (Mar./Apr. 2025)

Project:

- Towing of the Jotun FPSO for Vår Energi by Ocean Installer

Delivery:

- Analysis
- Training
- On board installation
- Bonus: Live analysis during operation based on weather forecast

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Championing operational excellence

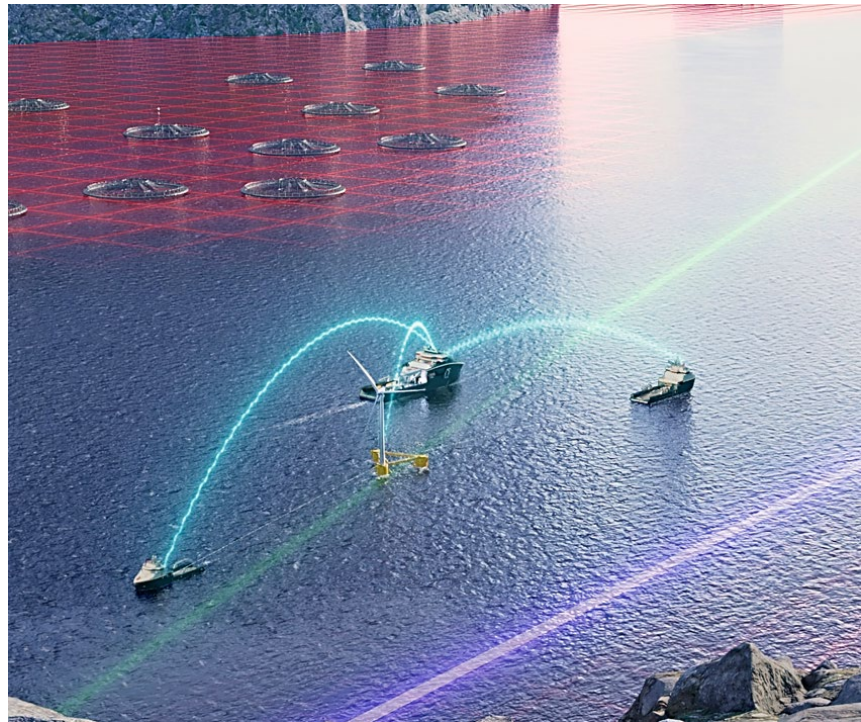
in offshore towing and installation projects

Maximised control and safety in complex environments

Efficient and straightforward operation

Confident decisions in all conditions

Improved **operational consistency** and project schedules



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Empowering offshore services

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Thank you!

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