Miko Innovasjon

Real-time and on-board decision support for offshore lift operations

Innovation for us, means establishing **new business areas** and **further developing sustainable solutions** for the benefit and enjoyment of society, employees, and shareholders.

A family owned company with multiple subsidiaries

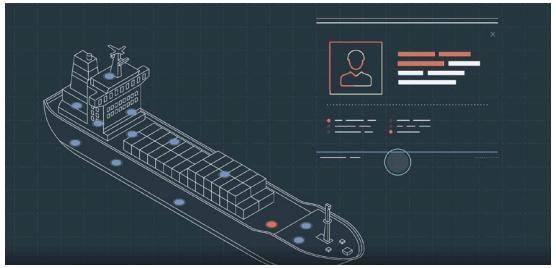
GROUP ENTITIES

MIKO PLAST | MIKO MARINE | MIKO TRADING | MIKO EIENDOM | MIKO INNOVASJON

MIKO INNOVASJON'S PURPOSE

Establish, commercialize and developing solutions following MIKO's Values. Turning ideas into practice through expertise, networks and capital investment.

MIKO INNOVASJON PORTFOLIO



DIMEQ

Digital communication in steel hulls

CARGOBEAMER

Rail transport for Norwegian seafood

SEAWEED

Climate-positive products from cultivated kelp

OFFSHORE SOLUTION

Core activity · Real-time relative-motion monitoring

Norwegian patent NO20220992

MIKO INNOVASJON

WE SOLVED A PROBLEM

Operation Managers follow a planned and conservative lifting operation. In practice, it's live, so why isn't real-time information utilized?

ONE CLEAR OPERATING DATASTREAM

A portable system temporarily attached to the load. Battery powered & wireless data transfer for real time and on-board decision making

COST REDUCTION

- Increased utilization of weather window
- More effective fleet/operations
- Real data for training AI tools

COST REDUCTION

FOCUS ON SAFETY

- Adjust/Abort operation based on real-time data
- (Potential) AI assistance based on the real data

SAFETY

3RD PARTY AS-BUILT DOCUMENTATION

- High replacement costs post-installation. Proof if within or outside of agreed limits?
- Documentation for insurance

DOCUMENTATION

MiKO INNOVASJON

Bigger turbines reduce unit count, but raise the stakes of every lift

Norway aims to allocate areas for 30 GW of offshore wind by 2040.

5 MW
126 m rotor · reference turbine

15 MW
240 m rotor · reference turbine

THE SCALE EFFECT

3× nameplate capacity per turbine

6 → 2 turbines for the same 30 MW capacity

MODELED UPSIZING POTENTIAL*

>23% lower LCOE in NREL's 20 MW / 2.5 GW scenario

MARINE OPERATIONS ARE THE COST LEVER

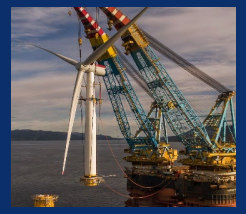
O&M can represent 30–40% of the overall cost of energy.

Reducing costs by increasing size should not come at the cost of safety both for personell and infrastructure.

Sources: Government of Norway; NREL 5 MW & IEA 15 MW reference turbines; NREL/Applied Energy (2021); DNV O2M. *Compared with 2019 global-average turbine and plant size.

TODAY'S CHALLENGE

A 500-tonne nacelle. Three moving bodies.



CRANE VESSEL

6-DOF response driven by sea state

SUSPENDED NACELLE

15 MW reference: ~500 t under hook

LANDING PLATFORM

Independent 6-DOF response

EVERYTHING APPROVED IN ADVANCE

Owners, operators, class and insurers plan and approve the lift using motion-response models (RAOs), safety factors and agreed limits for wave height (Hs) and wind speed.

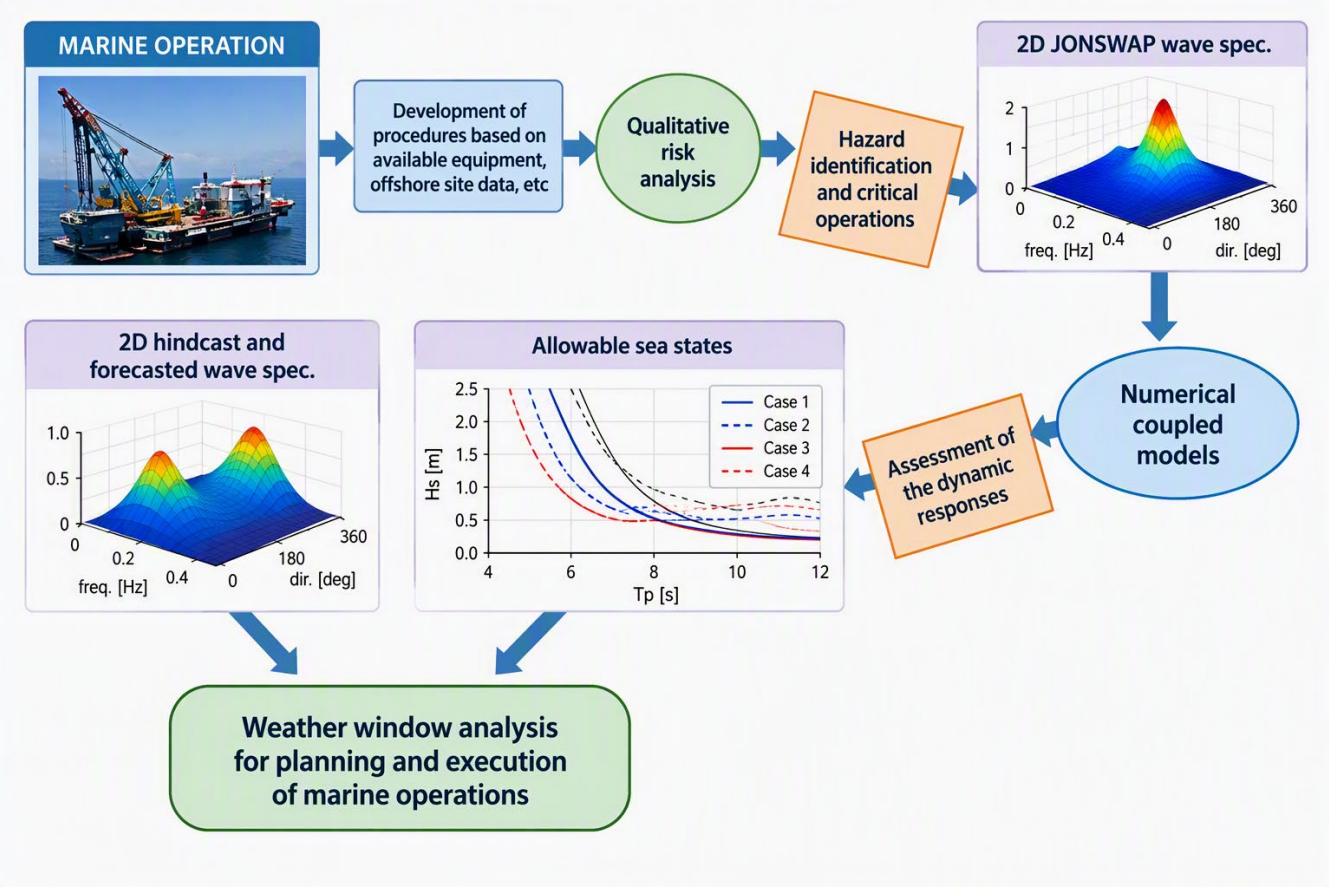
THE LIMITATION **A conservative operating window designed around uncertain coupled responses**

"We've had problems with the turbines. We will repair them – we've got one done and the other will be done soon. But, we're not doing it in the most efficient or effective manner, and there are much better ways of doing it." - Allan MacAskill on the **Kincardine project**

Developers battling issues at major Scottish floating wind farm (energyvoice.com)

MIKO INNOVASJON

Planning defines the window - but execution still carries uncertainty



THE GAP

Lifting operations are extensively planned, but what if conditions change and it does not go according to plans?

The operator lacks an on-board decision-making tool to act on real-time data

MIKO INNOVASJON

MEASURE ACTUAL MOTION.

MAKE BETTER DECISIONS.

From planned uncertainty to live operational evidence

MIKO portable Motion control system

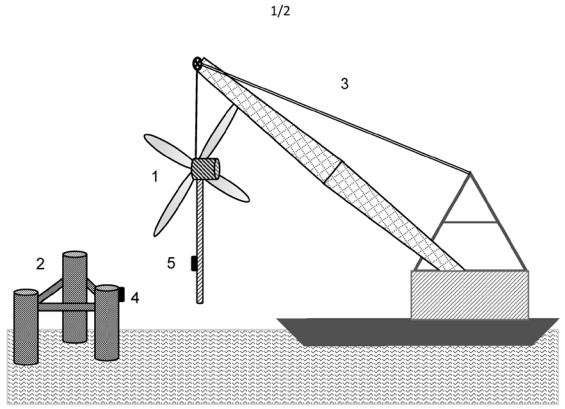


Figure 1

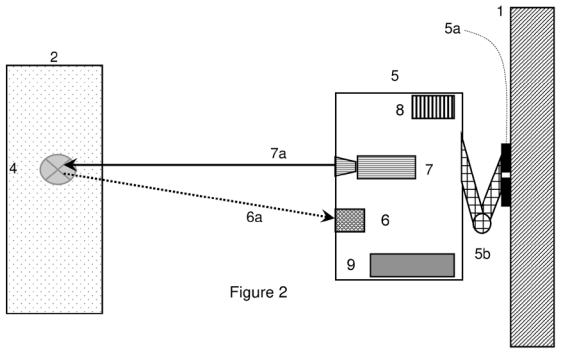
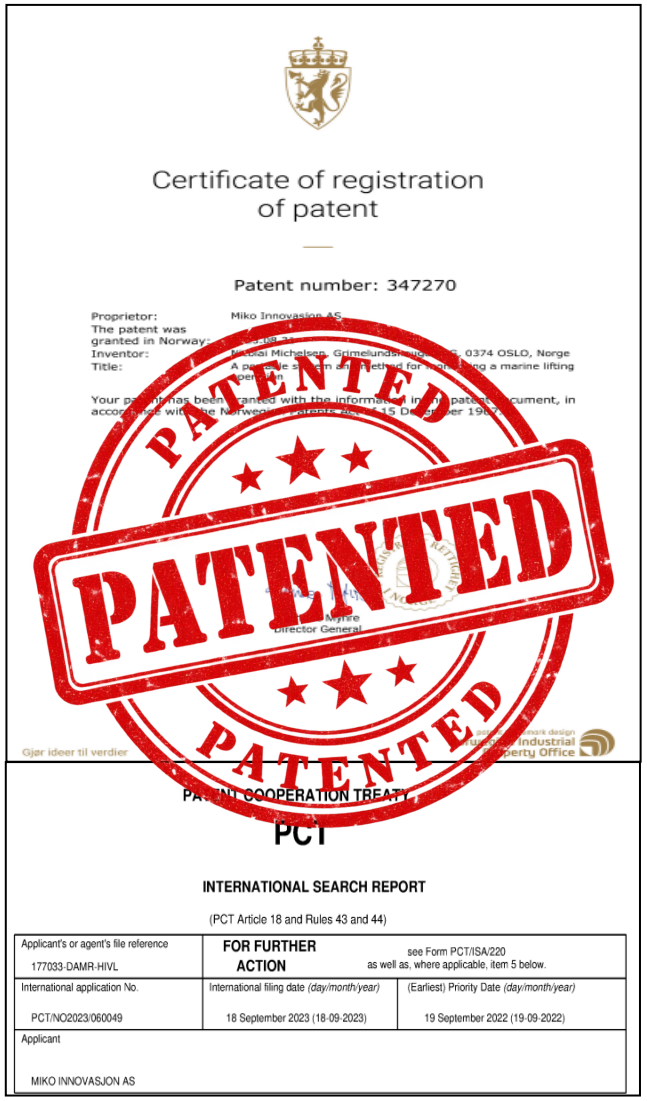


Figure 2



Certificate of registration of patent

Patent number: 347270

PATENTED

PATENTED

PATENTED

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 177033-DAMR-HIVL	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/NO2023/060049	International filing date *(day/month/year)* 18 September 2023 (18-09-2023)	(Earliest) Priority Date *(day/month/year)* 19 September 2022 (19-09-2022)
Applicant MIKO INNOVASJON AS		

MIKO INNOVASJON

Turn sensor data into an operating decision

01

CAPTURE

Measure positions

02

TRANSFER

Send data wirelessly to the control room

03

ANALYZE

Calculate relative motion in real time and compare with agreed limits

04

DECIDE

Make an informed on-board decision

Output: a live, graphical view of relative displacement, velocity and acceleration.

Designed to support the operation manager, crane operator and relevant third parties.

Capture: Portable by design

TEMPORARY ATTACHMENT

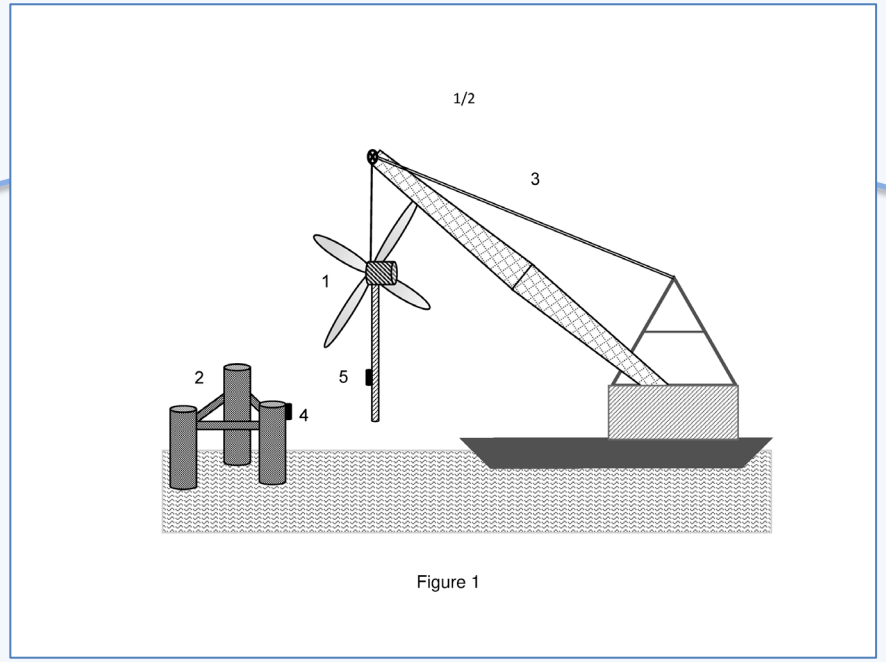
Installed for the operation

BATTERY POWERED

No vessel power dependency

WIRELESS DATA

Streamed to the control room



VESSEL-INDEPENDENT

Supports flexible deployment

Analyse: Dashboard answers one question: are we within agreed limits?

LIVE MOTION

A shared view for the operation manager, crane team, class and insurance representatives.

DISPLACEMENT

m

Where is the load relative to the landing point?

VELOCITY

m/s

How fast is the relative gap changing?

ACCELERATION

m/s^2

How rapidly is the motion developing?

Connect engineering limits to the live operation

ENGINEER

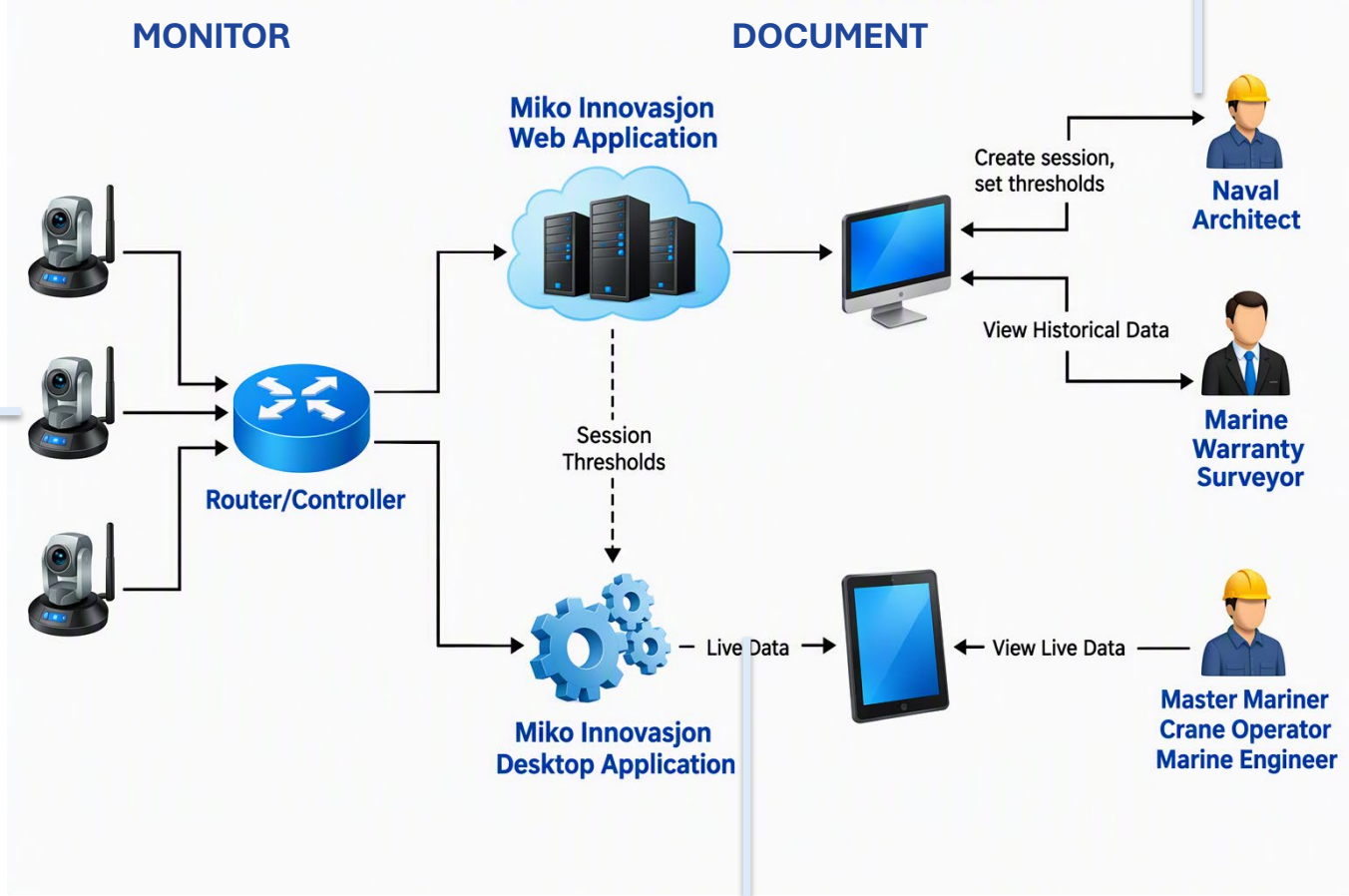
01

Define allowable displacement, velocity and acceleration.

DEPLOY

02

Attach and configure the portable sensor package.



03

Track relative motion during the operation.

04

Retain an as-built record of measured motion.

One solution across the lift campaign

ONE PORTABLE MEASUREMENT LAYER

NACELLE

Monitor relative motion at the connection point

TOWER

Monitor relative motion at the landing interface

ROTOR BLADE

Monitor relative motion at the blade anchor

TRANSITION PIECE

Monitor relative motion at the tower top

VALUE PROPOSITION

Turn motion uncertainty into an operating decision

Miko's portable system is designed to help offshore teams:

REDUCE COST + TIME

Select from a larger fleet of (now) eligble and available vessels. Temporary and easy installment.

ONBOARD DECISION MAKING

Give the team a live view of the actual motion condition which enables an on-board decision tool.

DOCUMENTATION & EVIDENCE

Third party as-built documentation returns value for clients in terms of risk and liability

NEXT STEP

Explore a field trial, integration or commercial partnership.

Nicolai Michelsen
CEO, Miko Innovasjon AS

nmi@miko.no
www.miko-innovasjon.no

MEASURE ACTUAL MOTION. MAKE BETTER DECISIONS.

MIKO INNOVASJON