



# NORDIC UNMANNED

**ARE YOU PREPARED  
FOR THE UNMANNED FUTURE?**



# Solakonferansen

On UAS (Drones), Endless opportunities? Co-existence with  
Classic Aviation



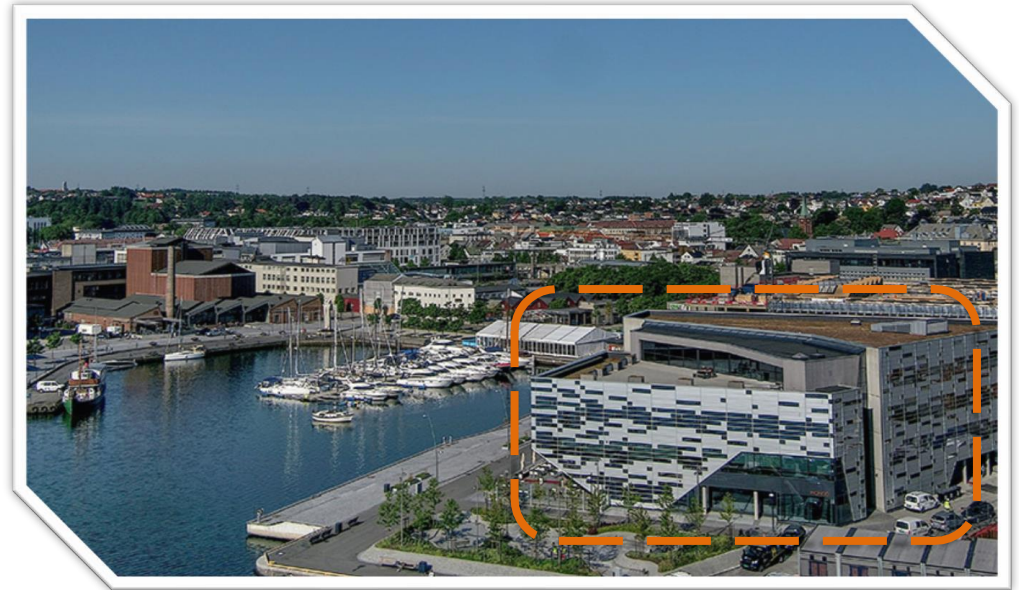
# Our Vision

Become the preferred provider of unmanned systems and  
services

within the Energy, Maritime and Governmental segments



# About Us



- Founded in 2014
- 25 permanent employees
- Located in Sandnes, Norway



# NORDIC UNMANNED

## Operations

- Inspection
- Survey / mapping (LiDAR)
- Frame agreement:  
Bane NOR, EMSA
- BVLOS x 6 countries
- VLOS x 6 countries

## Product Sales

- Camflight FX-8 / BG-200
- Lockheed Martin Indago
- Payloads
- Software solutions

## Research & Dev.

- Camflight FX-8 / BG-200
- Payloads
- Project based  
application



# Endless opportunities?

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Data collection

Sensors  
"on demand"

Logistics

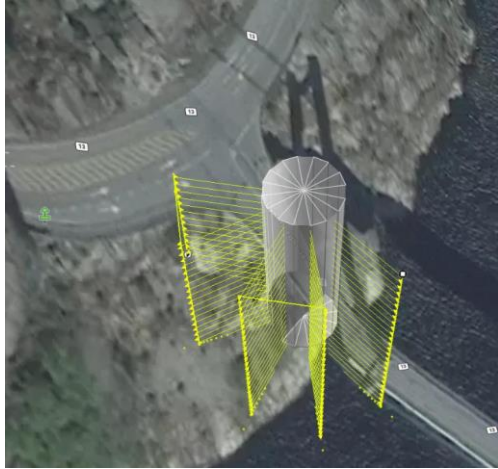
New work  
processes

Collate data

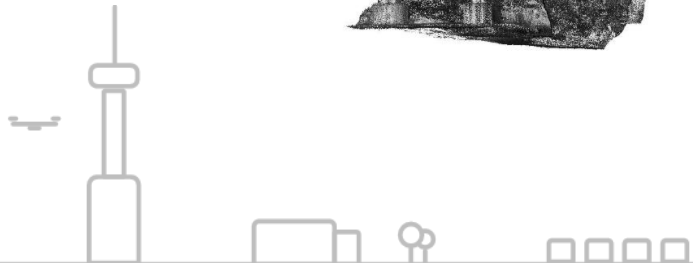
Manipulation

"Geo-reference"  
sensor data

# INSPECTION

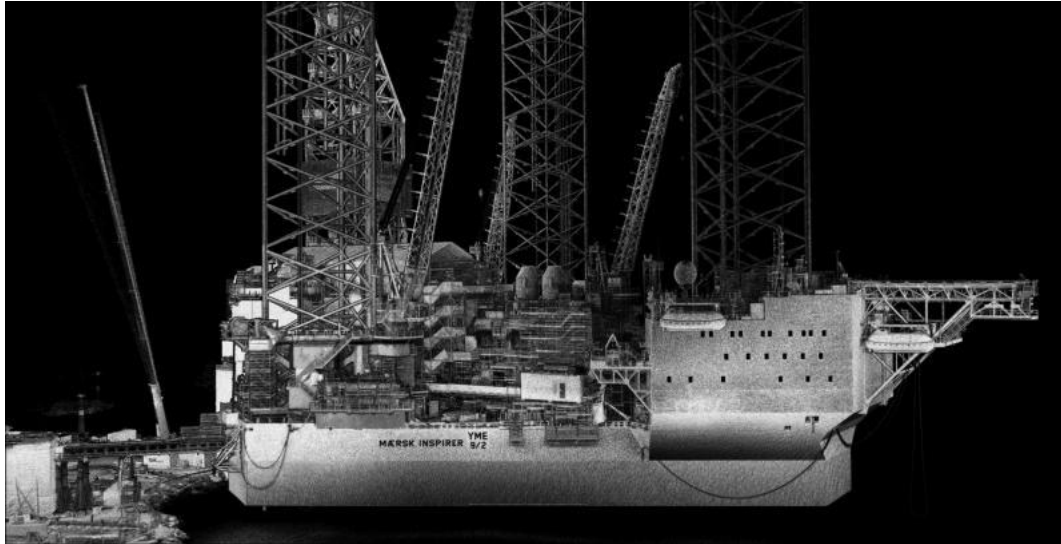


# DIGITALIZATION



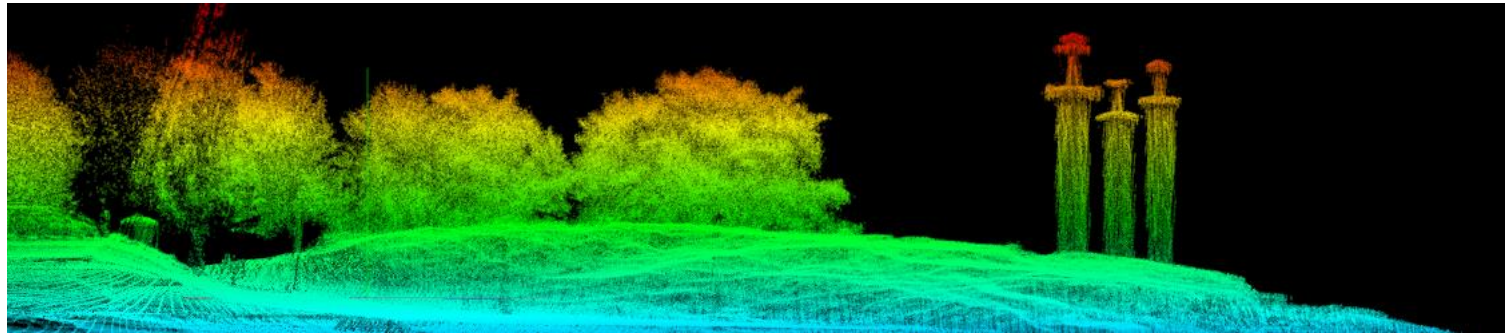
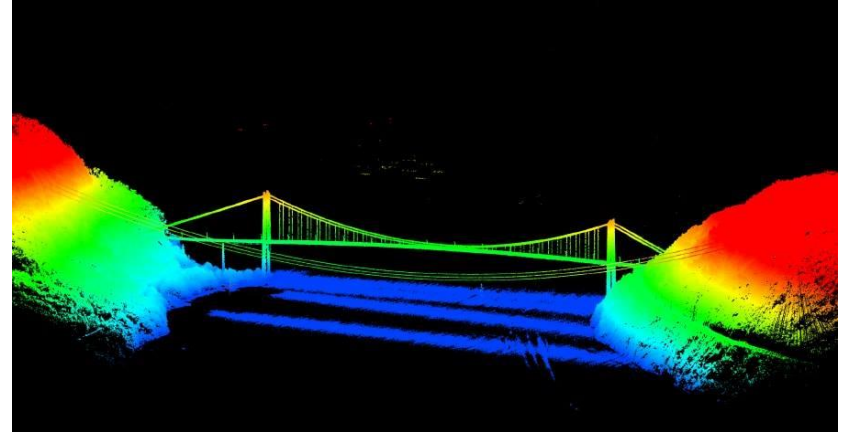


# DIGITALIZATION w / SLAM



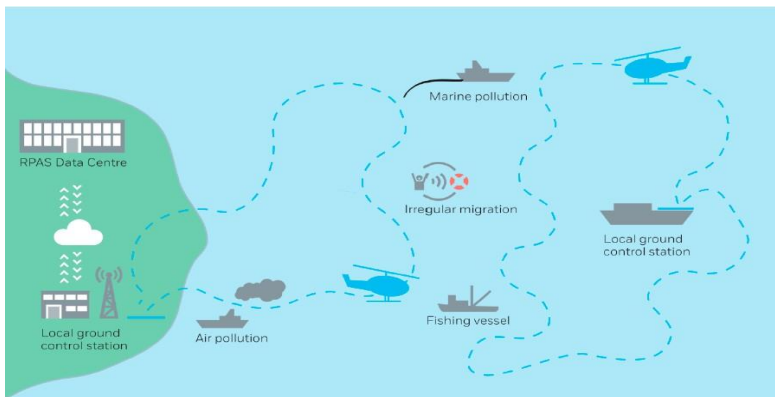
Digital twin of Mærsk Inspirer with laser scanner with Simultaneous Localisation and Mapping (SLAM)

# Survey and Mapping (w/LiDAR)



# Emissions monitoring

## Sulphur sniffing



### Scope

- Emission monitoring of marine traffic
- Maritime surveillance

### Equipment

- 4x Skeldar V-200 drone
- 2x GCS (Ground control station)

### Personnel

- 8 pilots on schedule and support organization

### Data

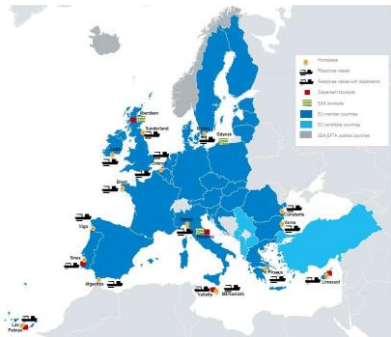
- Video and results stored in EMSA data center

### Contract

- Value up to 14 mill euro over 4 years

# Oil Pollution Response

## 24 /7 standby for European waters



### Scope

- Install and implement Indago UAS on up to 10 OPR vessels in various EU countries.
- Supply operational personnel during drills, exercises and incidents, 24/7 readiness.
- 4 additional systems in standby.

### Personnel

- Nordic Unmanned shall handle up to 6 simultaneous events

### Contract

- Value approximately 2.84 mill Euro over 4 years



# Camflight FX-8 / BG-200 Utility Drone



Max take-off weight	25 kg
Max payload	6 – 10 kg
Endurance w/ no payload	60 min
Endurance w/ max payload	35 min

## Prime use

- ⇒ Carry heavy payloads / sensors
  - ISR – Intelligence, surveillance, reconnaissance
  - ECM - Electronic Countermeasure
  - Logistics and Re-supply
  - Field-network relay
  - Ground Penetrating Radar (GPR)

## Key advantages

- ✓ Multiple payload options
- ✓ High payload capacity (6-10 kg)
- ✓ Robust, reliable, and redundant system
- ✓ Compact and transportable

# RESEARCH AND DEVELOPMENT

## Hybrid fuelcell

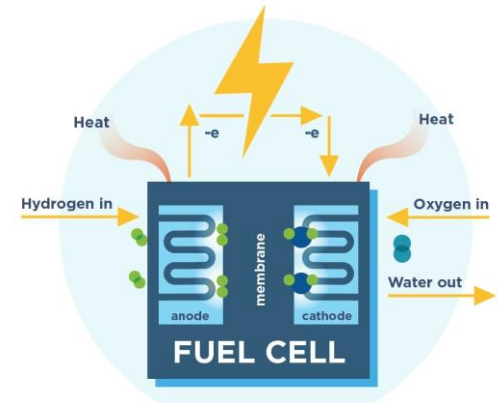
Title: Hybrid Energy Solutions for

Time: April 2018 => March 2021

### Overall goals:

- ❑ Extend the flight endurance of a RPAS compared to battery alone performance
  - ❑ Demonstrate a prototype with innovations from the research
- => Build competence and experience with design and use of fuel cell hybrid system:

Max take-off weight	25 kg	
Max payload	6 – 10 kg	
Endurance	<b>Battery</b>	<b>Fuel Cell</b>
no payload	60 min	120 min
with max payload	35 min	70 min

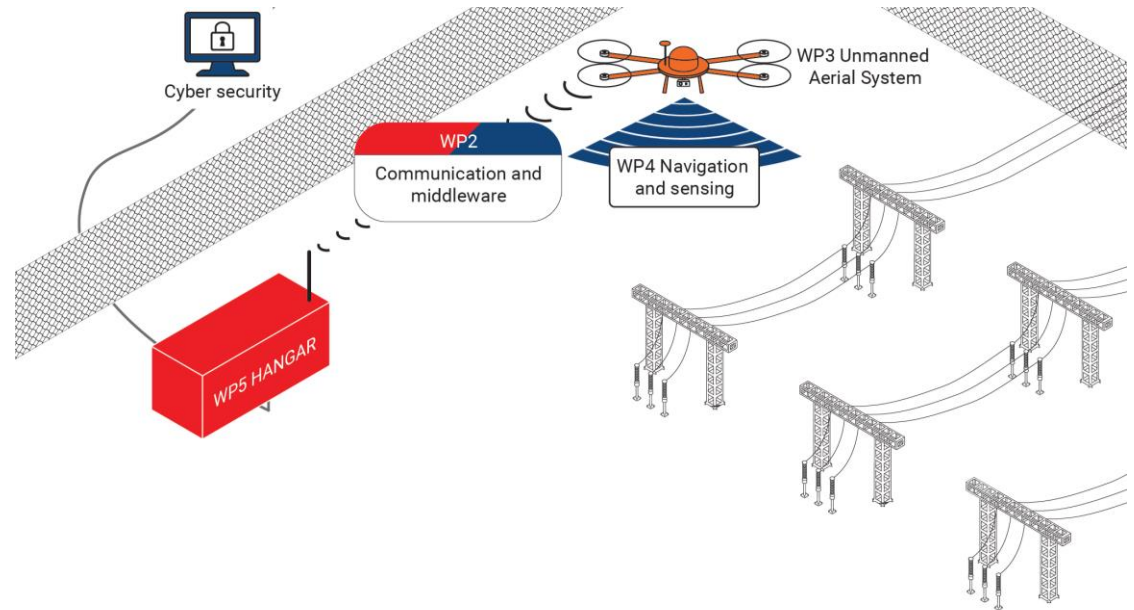


# Statnett Automatic Inspection – In Brief

- Total drone R&D budget: 5 mill EUR

## Our project:

- 2 years
- ~1.5 mill EUR
- Final demo 2019



# Co-existence with Classic Aviation



Credit: Airbus

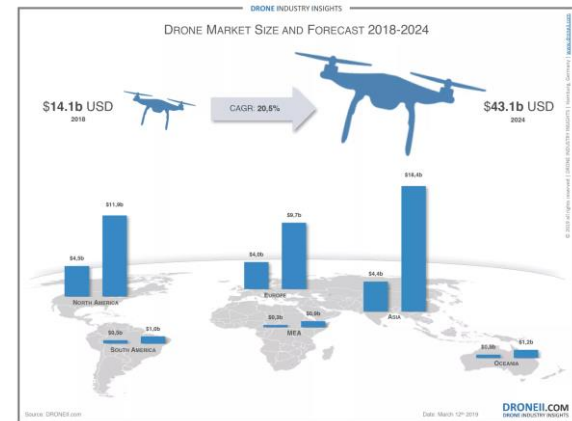


# Growth of the UAS industry

DRONE SALES WILL TRIPLE FROM 2018 TO 2024

By 2021, the commercial drone industry will have sold 1,000,000 units. Looking at the growth between 2018 and 2024, unit sales will have tripled in this time period

**Growth rate of 200.000 (?) + units per year**



# Co-existence with Classic Aviation today

A risk-based approach

Operator approval for operations

Pilots and UAS register

Risk assessments

Area/altitude restrictions and limits

Wireless command and control link

Flight plans



# JARUS

JARUS is a group of experts from the National Aviation Authorities (NAAs) and regional aviation safety organizations. Its purpose is to recommend a single set of technical, safety and operational requirements for the certification and safe integration of Unmanned Aircraft Systems (UAS) into airspace and at aerodromes. The objective of JARUS is to provide guidance material aiming to facilitate each authority to write their own requirements and to avoid duplicate efforts.



# New regulations - Operational Categories

3 operational categories

Category A: Open

Category B: Specific

Category C: Certified

Crafting an airspace where Classic and New Aviation coexist means a combination of pragmatism, cooperation and action

	UAS Operational Categorization		
	A	B	C
Operational Approval	No	Yes	No
Type Design (TC/STC)	No	Maybe*	Yes
Certificate of Airworthiness	No	Maybe*	Yes
Conformity to Design Standard	Maybe	Maybe*	Yes
Pilot License	No	Maybe*	Yes
Operator Approval	No	Maybe*	Yes
Maintenance Approval	No	Maybe*	Yes
Production Approval	No	Maybe*	Yes

\* - implies that some approvals may not be mandatory depending on the outcome of the risks assessment



# Use cases – Helicopters & Drones working together

## Helicopter SAR

UK Maritime Coastguard Agency – SAR services performed in a combination with Helicopters and Drones

SAR on the Norwegian Continental Shelf?

Offshore Emergency Response Organisations ?



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