ARM7-5.1

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Autonomous vessels and “mobile aton’s”

ARM7, Paris

Guttorm Tomren

– Vi tar ansvar for sjøvegen

Full speed ahead

- Feb. 2016 – National transport plan
- 30. sept. 2016 – Established testarea Trondheimsfjorden
- 4. oct. 2016 – Norsk Forum for Autonome Skip (NFAS)
- 1. nov. 2016 – Hrönn (now SIMAROS project)
- Nov. 2016 – First tests of autonomous ferry (milli-Ampere)
- 9. may 2017 – YARA BIRKELAND annonced
- Now: 3 new test areas under way

NFAS Norwegian Forum for Autonomous Ships

Rules and regulations

DNV·GL

IMO

Lloyd's Register

SOLAS

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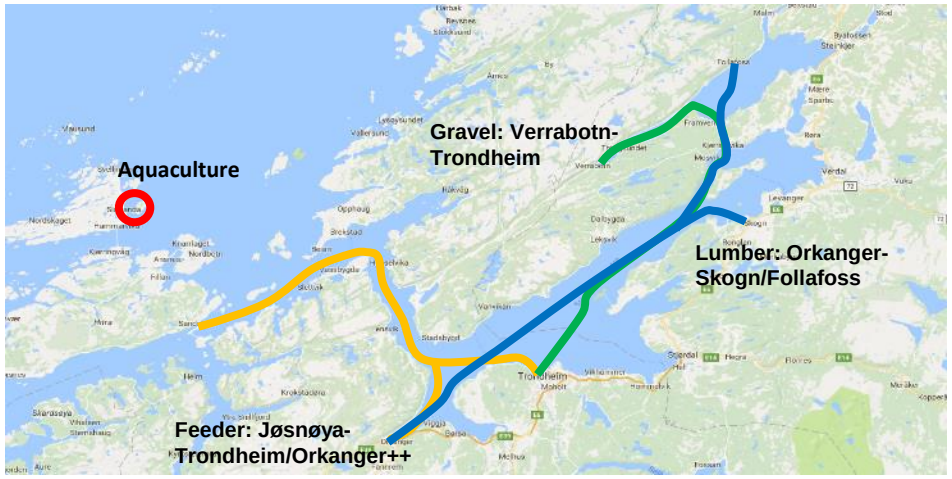
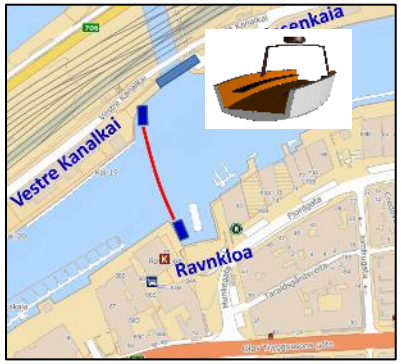
Some projects

Green Coastal Feeder Program

ASTAT



SIMAROS prosjektet
– Vi tar ansvar for sjøvegen



”Milli-Ampere”

YARA BIRKELAND

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Yara Birkeland – first requirements (still pending)

- Kystverket have choosen to adapt to new technology, to stimulate business and innovation
- Main requirement: Prove that safety is equal or better than with a manned vessel.
- In addition:
  - a autonomous vessel need to be able to communicate with a VTS center.
  - It has to be able to be towed
  - A autonomous vessels that requires pilot, need to address these requirements

First automatic control systems to Fjord1

- The automatic crossing system ensures safe and energy efficient transit by automatically controlling the vessel's acceleration, deceleration, speed and track.
- The captain will supervise the system, and intervene if needed
- The vessels are due for delivery in 2017

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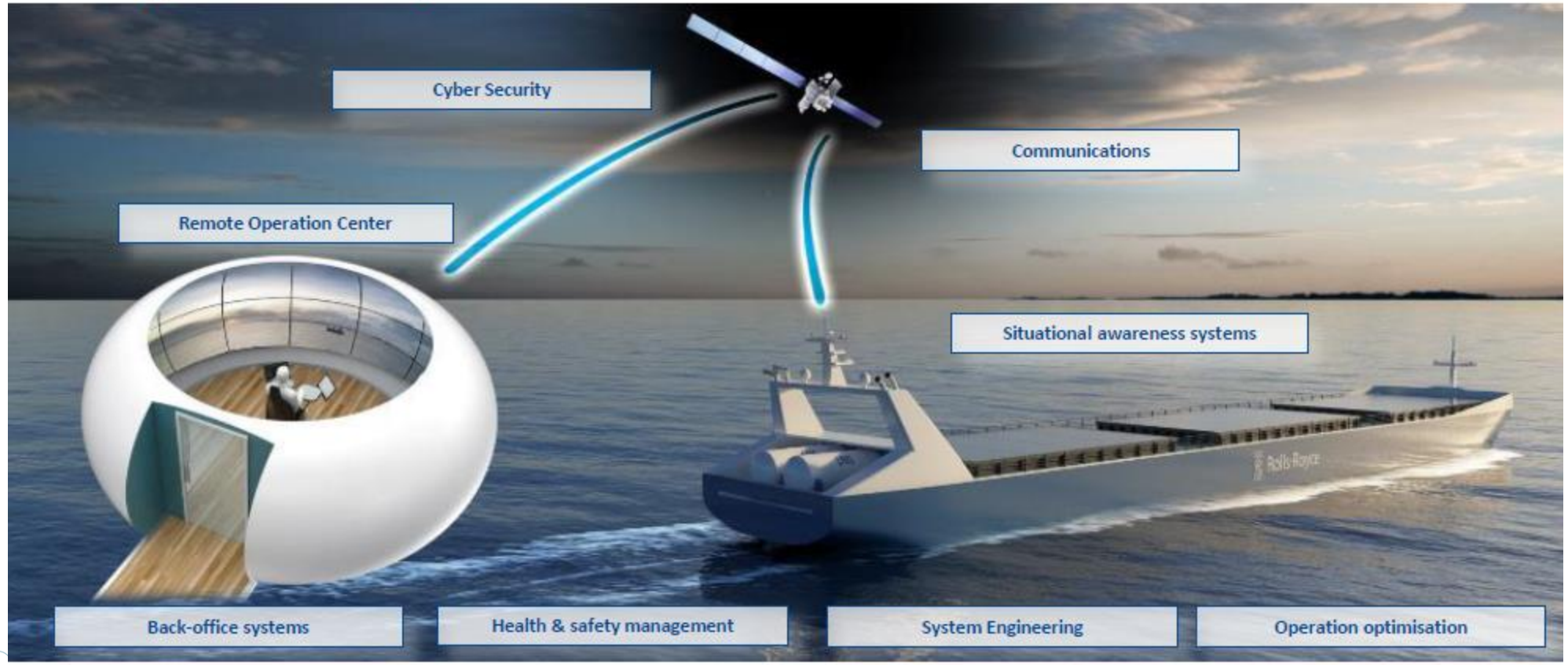
Key Development Areas



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And then?

Rolls-Royce joins forces with Google Cloud to help make autonomous ships a reality

Tuesday, 3 October 2017

Rolls-Royce has signed a deal with Google to develop further its intelligent awareness systems which are making existing vessels safer and are essential to making autonomous ships a reality. The agreement, believed to be the first in the marine sector, was signed today at the Google Cloud Summit in Sweden. It allows Rolls-Royce to use Google's Cloud Machine Learning Engine to further train the company's artificial intelligence (AI) based object classification system for detecting, identifying and tracking the objects a vessel can encounter at sea.

Kamo Tenovuo, Rolls-Royce, SVP Ship Intelligence said: "While intelligent awareness systems will help to facilitate an autonomous future, they can benefit maritime businesses right now making vessels and their crews safer and more efficient. By working with Google Cloud we can make these systems better faster, saving lives."

Eva Fors, Head of Google Cloud Sales Nordics said: "By exploring the possibilities presented by machine learning, Rolls-Royce can combine the latest technology advancements with its deep knowledge of the maritime industry, ultimately bringing significant improvements to the sector."

The Google Cloud Machine Learning Engine uses the same neural net-based machine intelligence software which powers many of Google's products including image and voice search. Machine Learning is a set of algorithms, tools and techniques that mimic human learning to solve specific problems. Machine learning methods analyse existing data sets with the objective of learning to recognise patterns in training data, making predictions from previously unseen data. The bigger the data set the more complex the patterns the model can recognise and the more accurate the predictions. Today, well trained machine learning models can perform predictive analytics faster and better than a human.

Rolls-Royce will use Google Cloud's software to create bespoke machine learning models which can interpret large and diverse marine data sets created by Rolls-Royce. Rolls-Royce's expertise in the maritime sector will be used to prepare the data to train models, ensuring that it is relevant and in sufficient quantity to create statistical significance. As part of the machine learning process, the models' predictions are evaluated in practical marine applications, allowing the models to be further refined.

By accessing this software through the Cloud, the models can be developed from anywhere in the world and are immediately accessible globally allowing thousands of users. Models can therefore be trained on large quantities (terabytes) of data. This will be essential as autonomous ships become commonplace.

In the longer term, Rolls-Royce and Google intend to undertake joint research on unsupervised and multimodal learning. The two companies will also test whether speech recognition and synthesis are viable solutions for human-machine interfaces in marine applications. They will also work on optimizing the performance of local neural network computing on board ships using open source machine intelligence software libraries such as Google's TensorFlow.

Intelligent awareness systems will make vessels safer, easier and more efficient to operate by providing crew with an enhanced understanding of their vessel's surroundings. This will be achieved by fusing data from a range of sensors with information from existing ship systems, such as Automatic Identification System (AIS) and radar. Data from other sources, including global databases, will also have a role.

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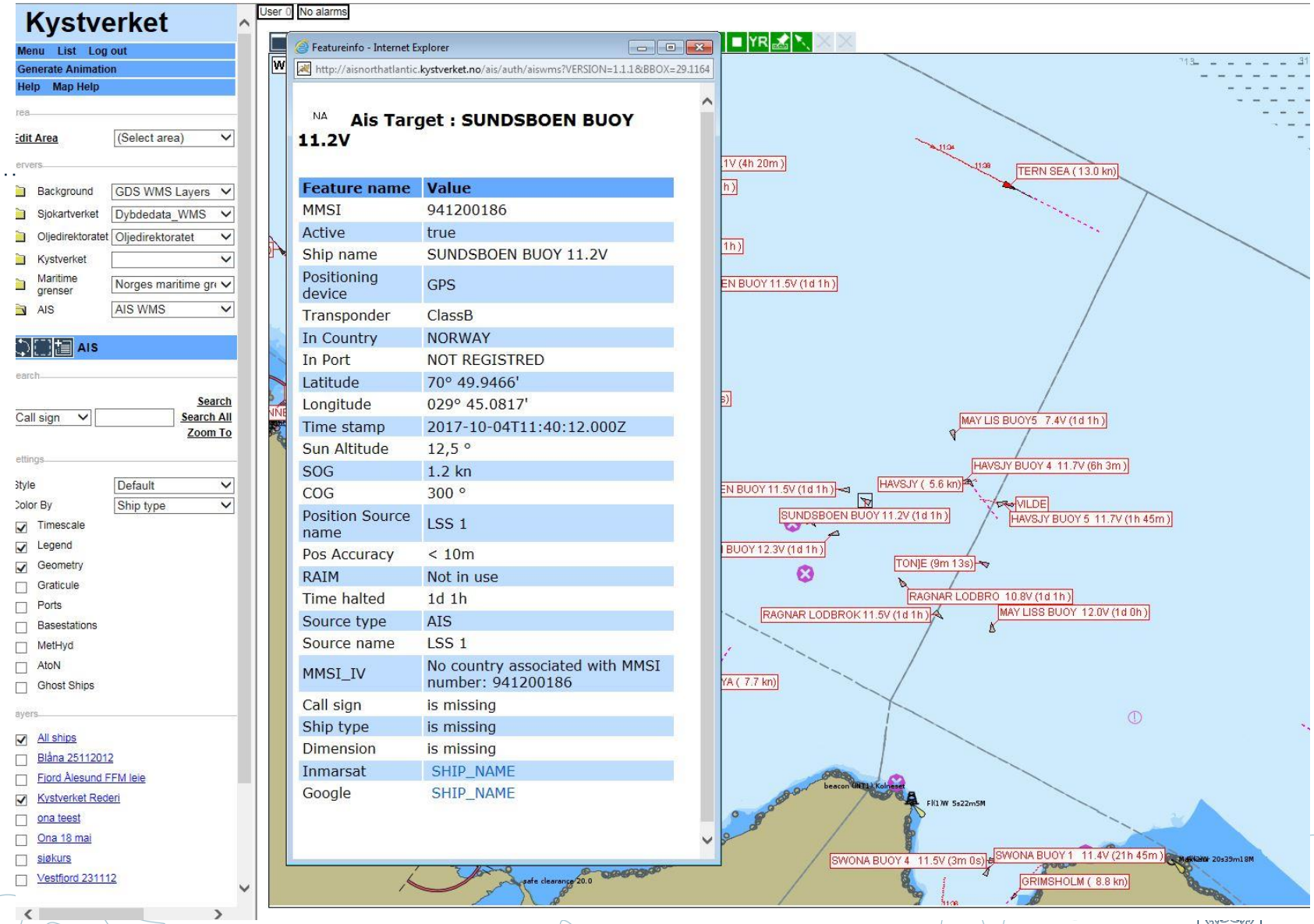
Classed as vessels
- Displays name on www

No name on ECDIS
- Not specified vessel type

Sold/advertized as AtoN



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Questions to VTS center

Seasonal fishing activities

Large numbers

Outside NCA jurisdiciton

– Vi tar ansvar for sjøvegen

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