Hamnøy: Operational Wave measurements

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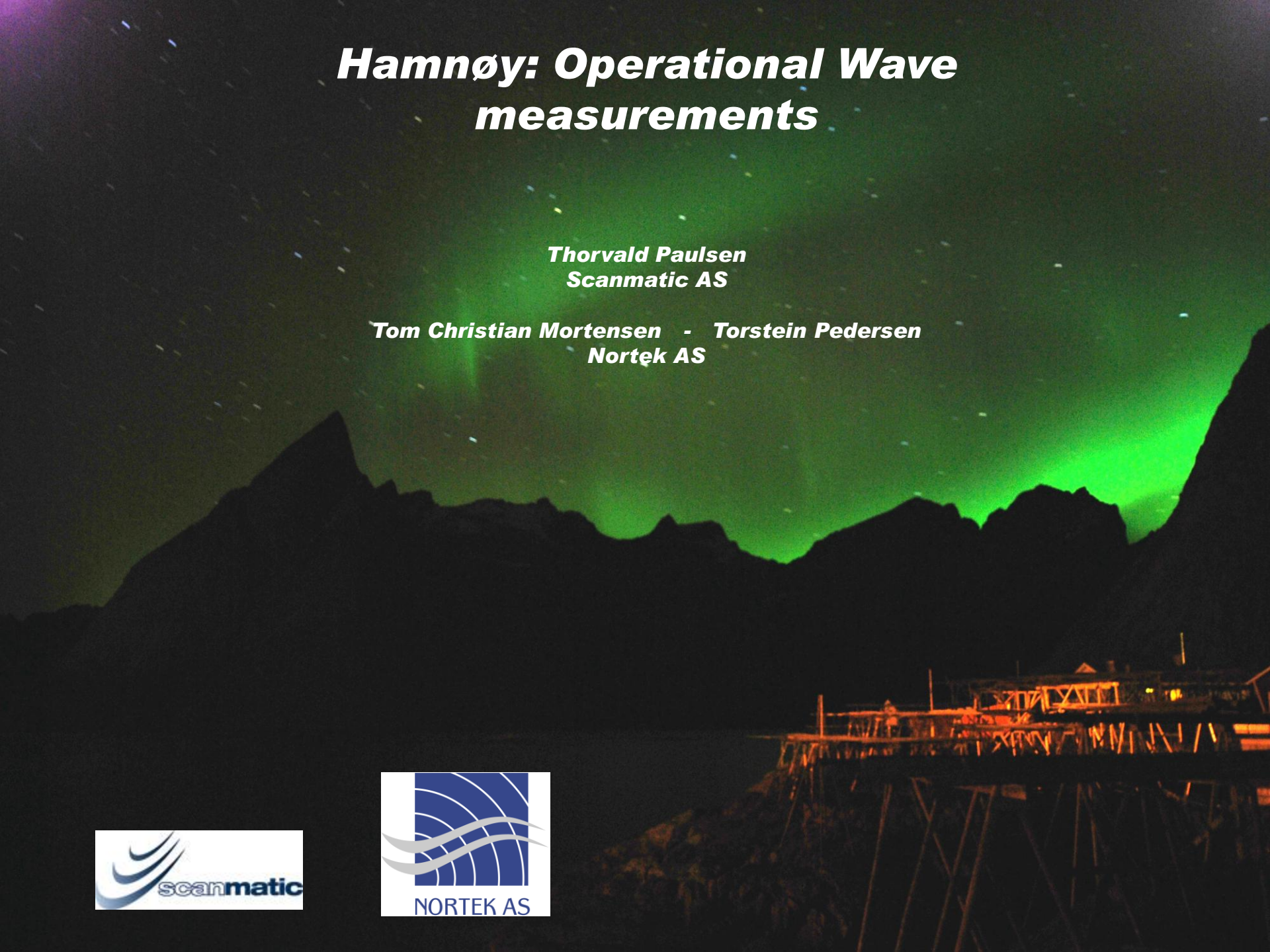

Background

Overtopping of waves along a coastal roadway presents a danger to both commercial and local traffic.

National roadway agency (Vegvesen) is seeking intelligent solutions to circumvent traditional solutions – i.e., construction of tunnels. ITS (Intelligent Traffic System)

Decided to automate the closing of the roadway during adverse conditions.

Nortek and Scanmatic teamed-up to provide an online measurement system that can aid in the automated decision making

Description of Problem

coastal roadway in northern Norway experiencing wave overtopping during extreme weather. This presents a danger to both commercial and local traffic.

National roadway agency (Vegvesen) is seeking intelligent solutions to circumvent traditional solutions – i.e., construction of tunnels. ITS (Intelligent Traffic System)

Decided to automate the closing of the roadway during adverse conditions.

Nortek and Scanmatic teamed-up to provide an online measurement system that can aid in the automated decision making

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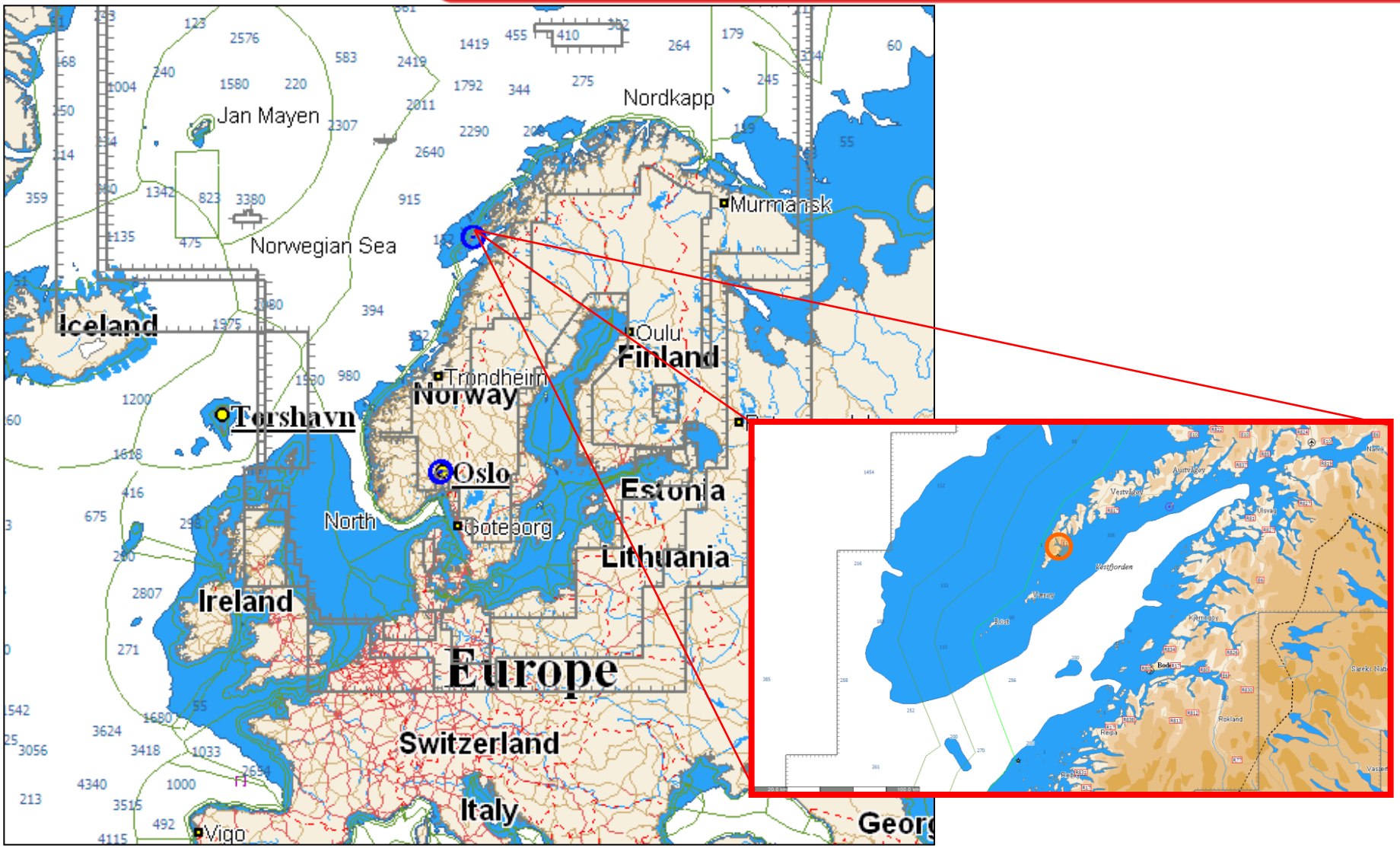
Location



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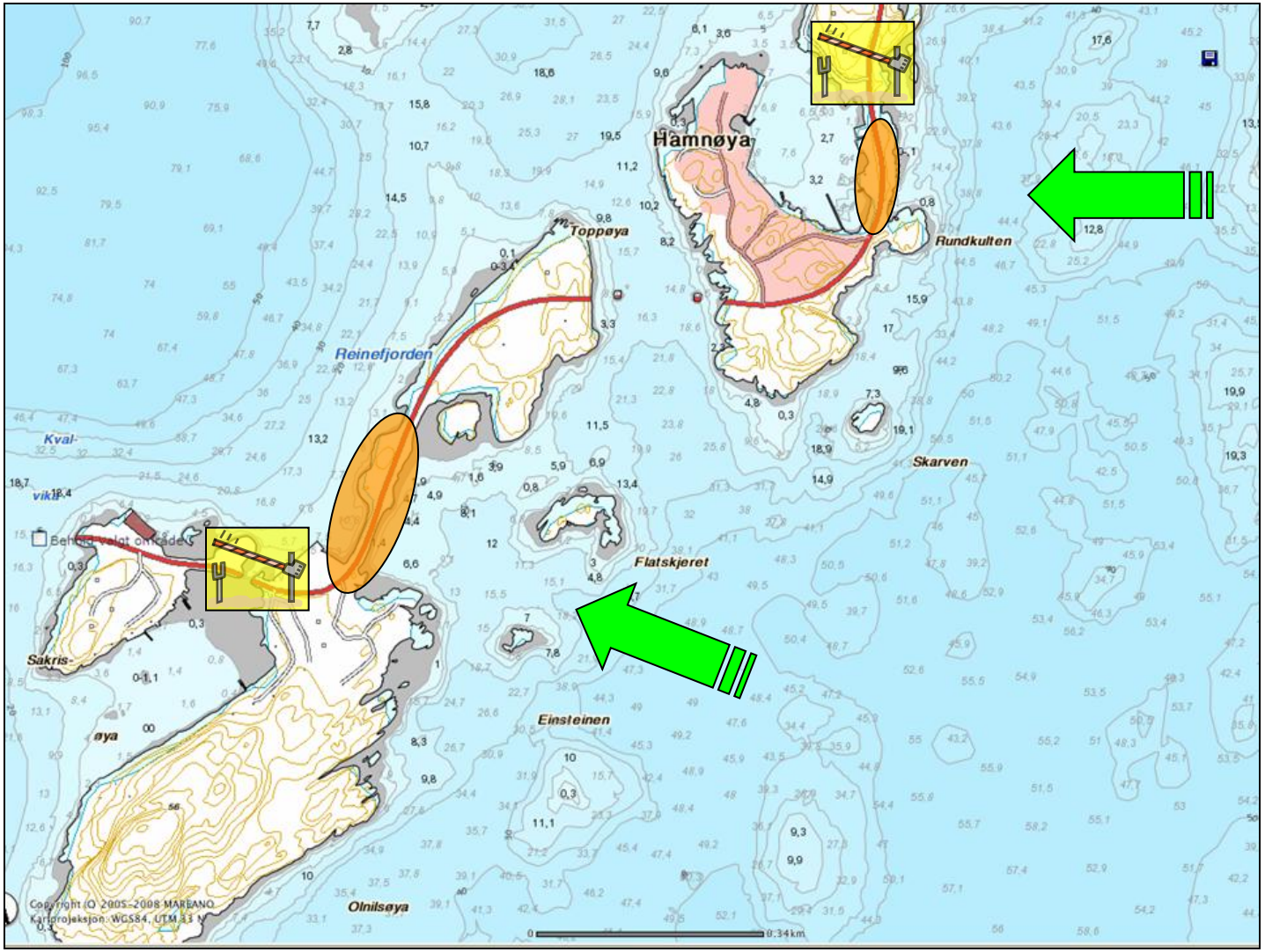


Decision Making Criteria

Overtopping of roadway is assumed to be based on the following:

- Wave height
- Wave period
- Wave direction
- Water level – location is characterized by tidal ranges of 1-3 meters. Vented pressure sensor suggested.

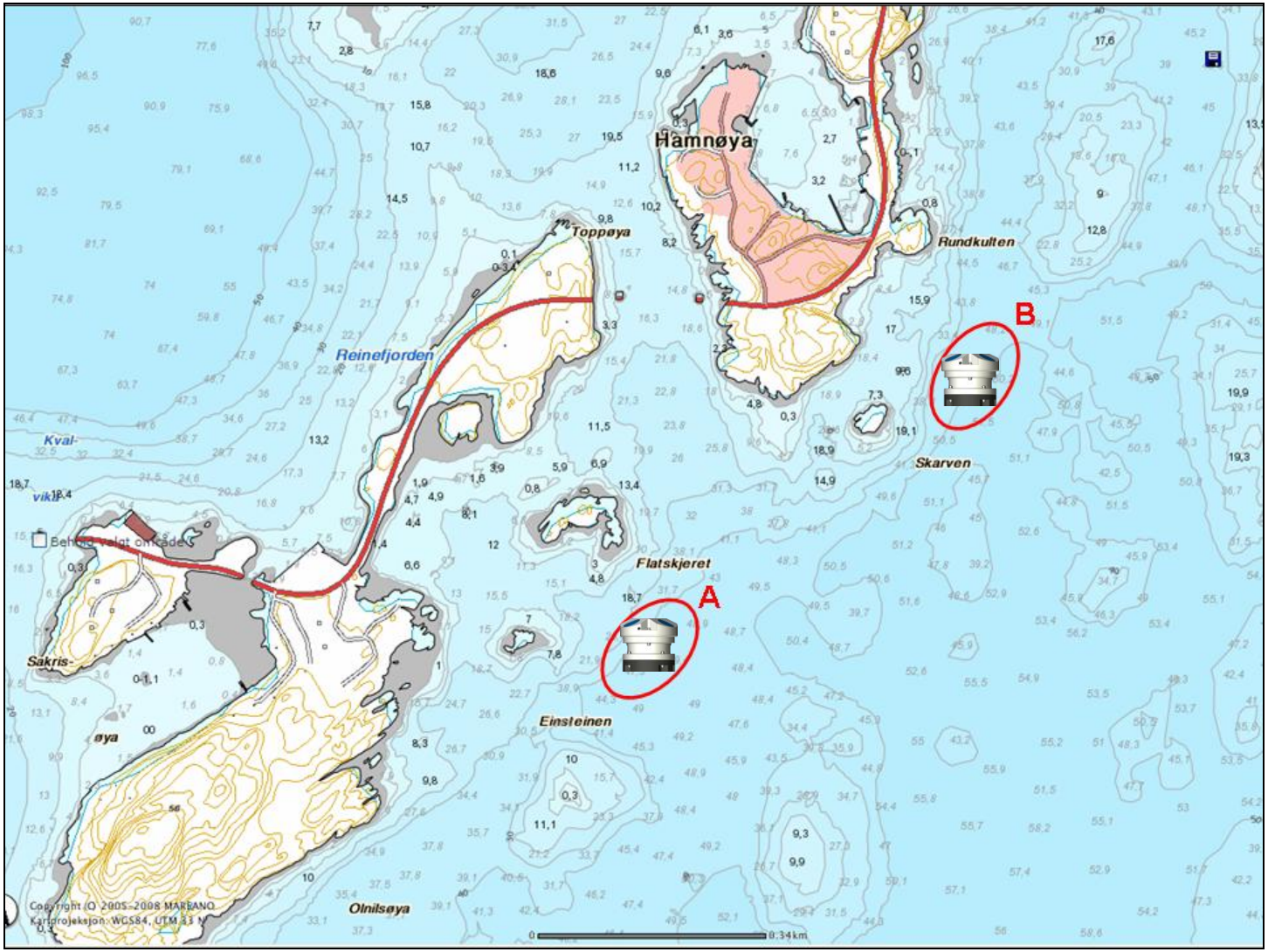
Initial criteria would have the following thresholds:

1. Water level + Significant wave height > Threshold A

   AND

   Water level + Maximum wave height > Threshold B
2. Peak Period > threshold C
3. Direction D < Peak Direction < Direction E

Measurement Locations



AWAC – NIP
50 meter depth

Cable to land

Transmit data products to Scanmatic office via GPRS modem

Redundancy with two AWACs

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Cable Location

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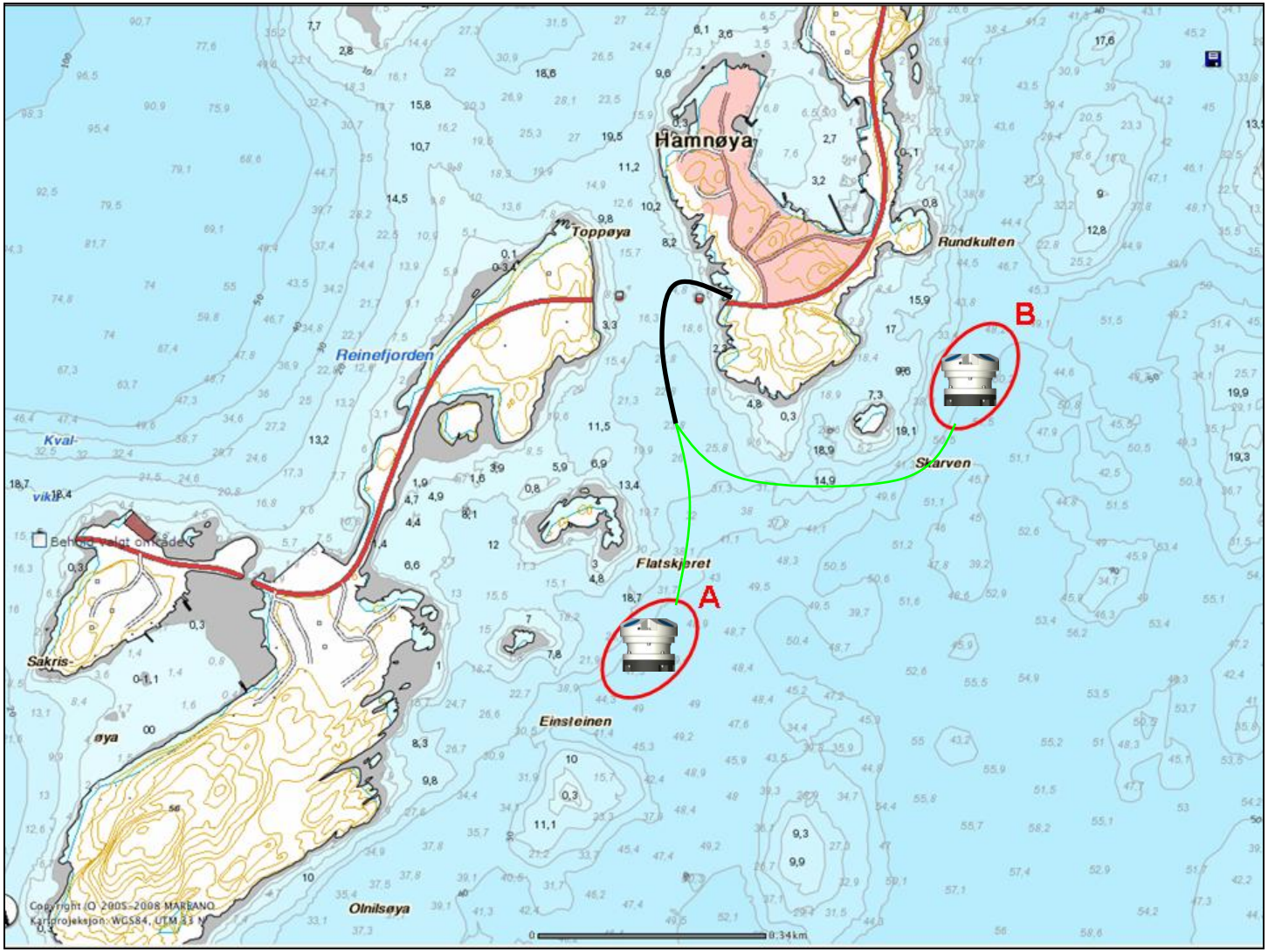


Cables 2x500 meters

15 cm diameter PVC (?) pipe in 3x80 meter segments

Data cabinet on land has power and Nortek interface box

Deployment

Depths make diver deployment difficult and Bottom is non-uniform

Chose the Sea Spider for its non-corrosive properties and gimbal mount

System Description

Cable buried in a conduit

Data cabinet

Met and comms mast

AC power

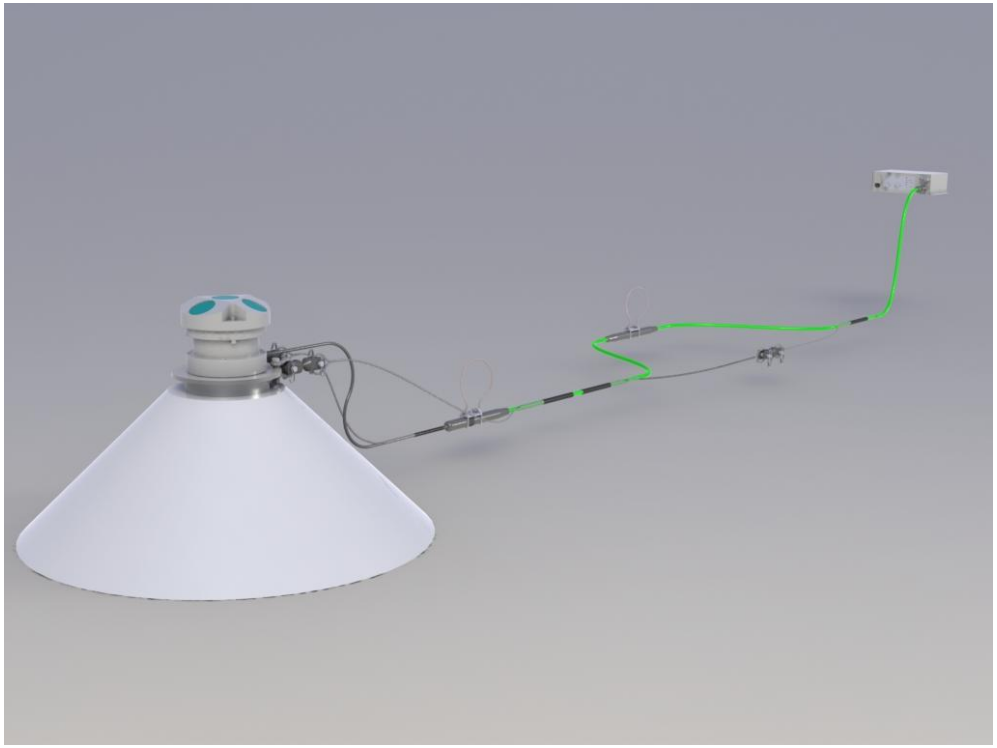
If things can go wrong…

Cables

- Cable – “issues”
  - Transition between land and sea (cable cuts)
  - Fishing activity and anchor handling (cable cut or damaged)
  - Bad weather (abrasion)
  - Ability to provide energy all the way to the instruments
  - Connectors corrosion
  - Cable repairs
- There is no questions that cables are a possible solution for underwater communication but not always at ”our” cost level

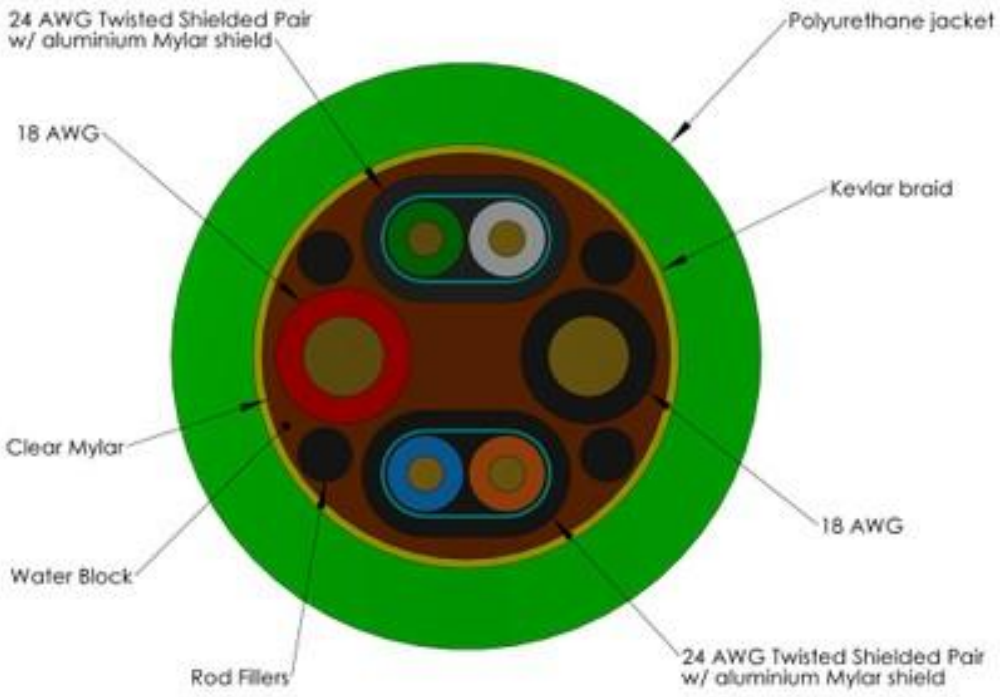
Cabled online systems – Nortek solution

- 10 years of experience put into the latest cable/connector/interface design



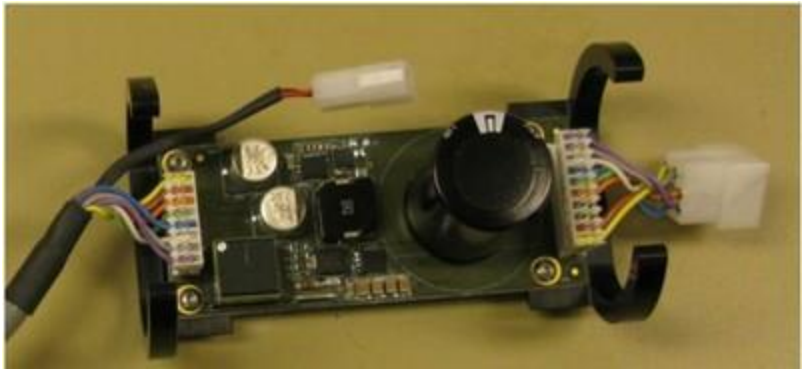
Cabled online systems – Nortek solution

- First a new cable designed for ocean use



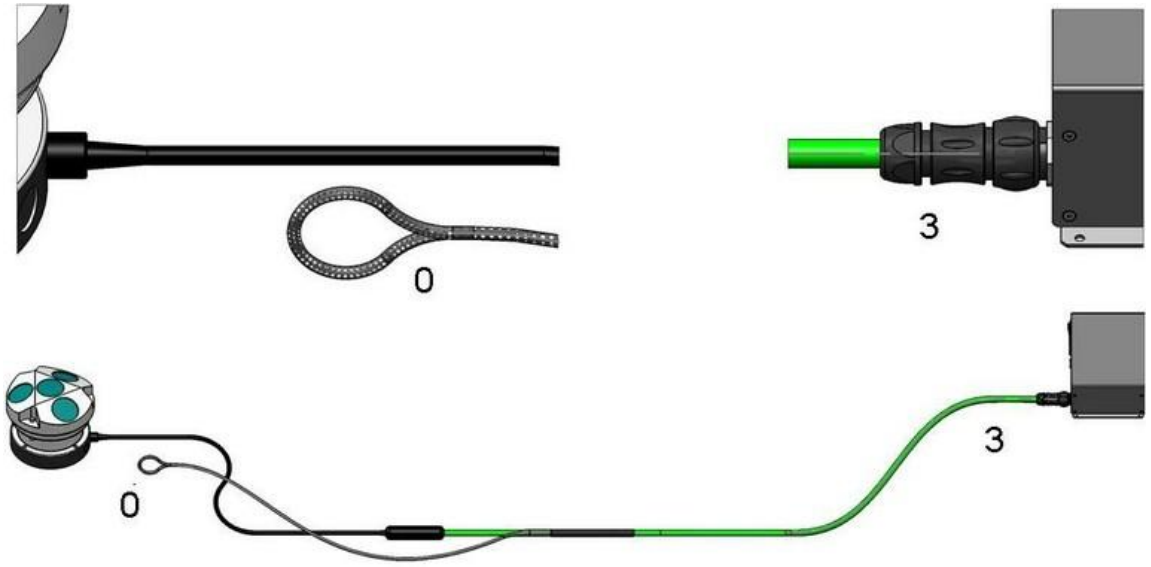
Cabled online systems – Nortek solution

- Then an interface box with 48V supply voltage



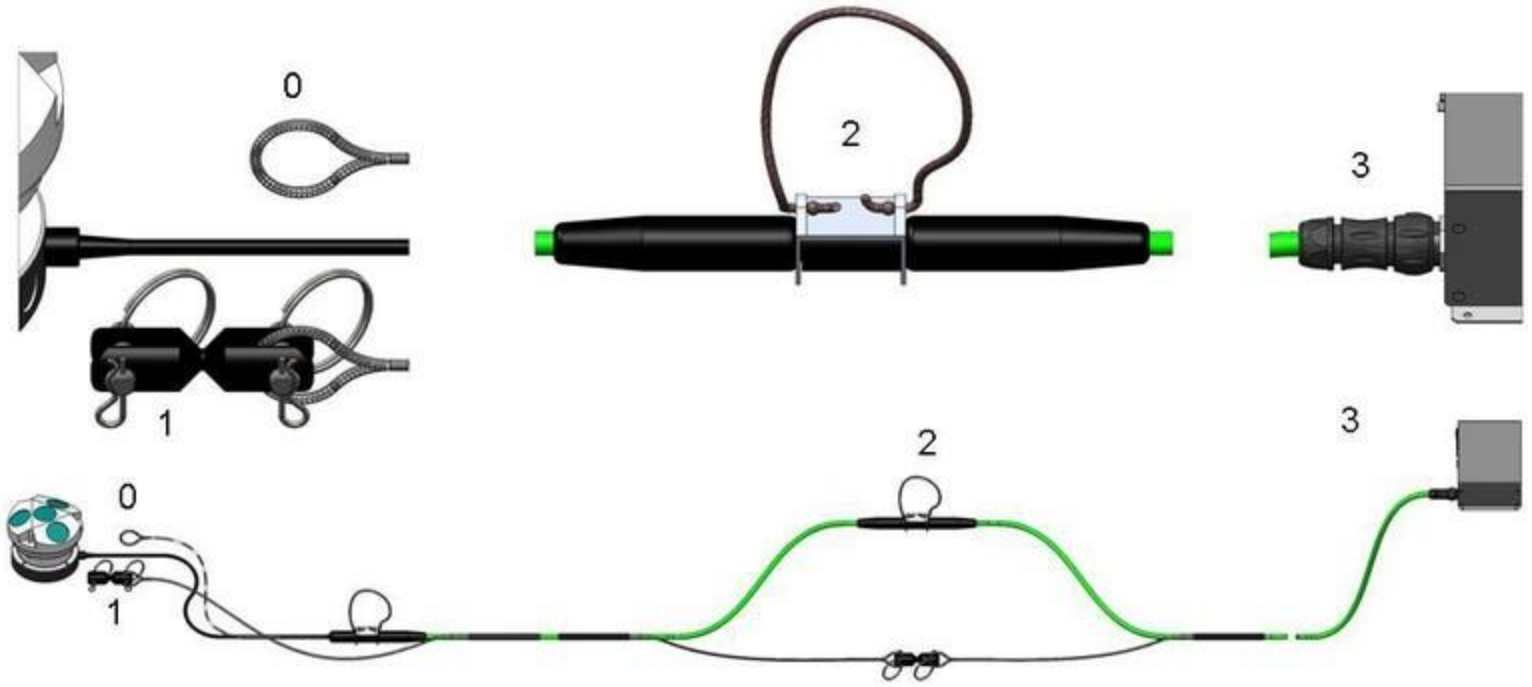
Cabled online systems – mechanical solution

- Standard, basic solution with strain relief



Cabled online systems – mechanical solution

- ”Exposed” version that includes link and short circuit protection



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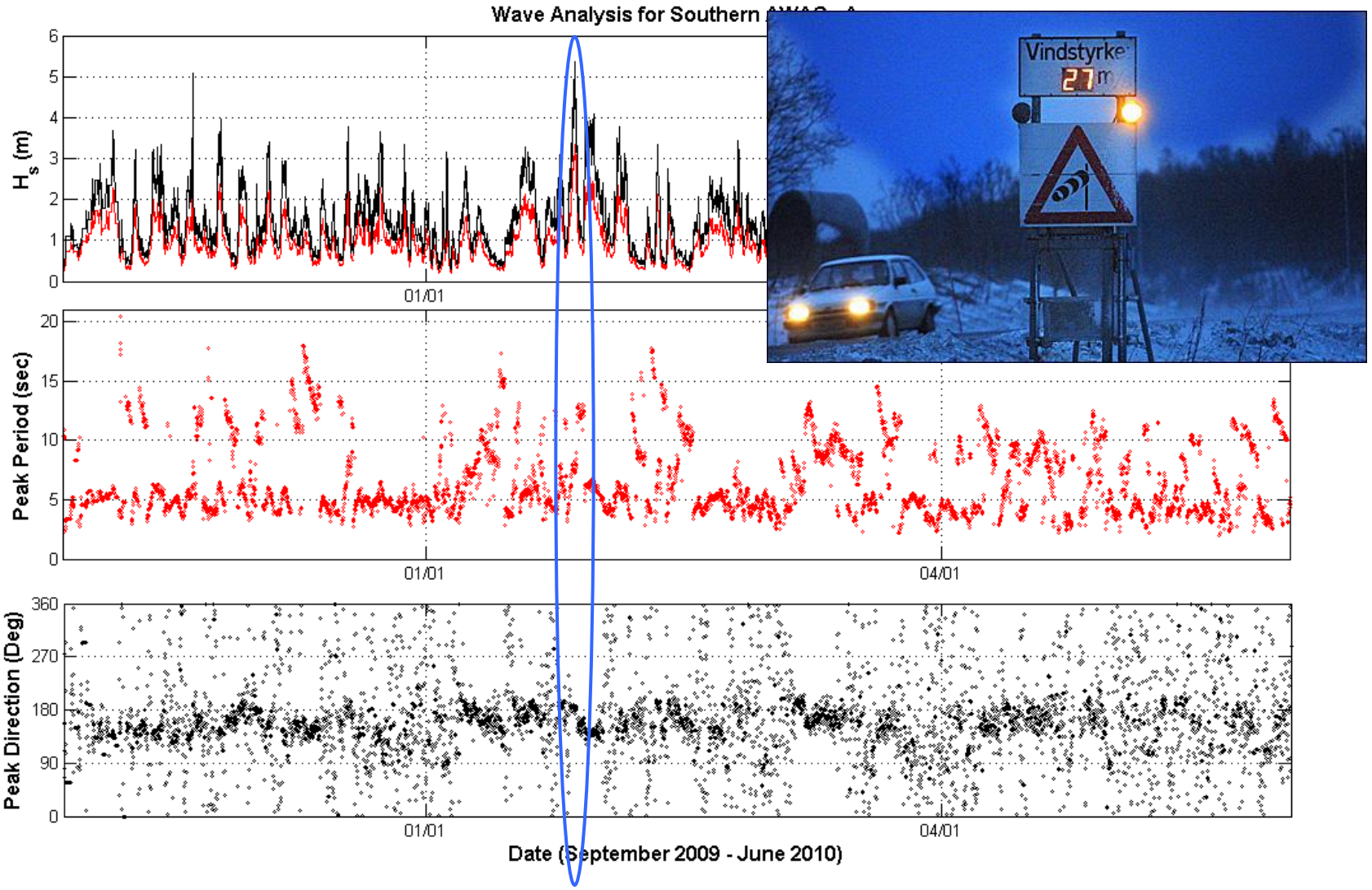
Winter 2009-2010 Storm Season

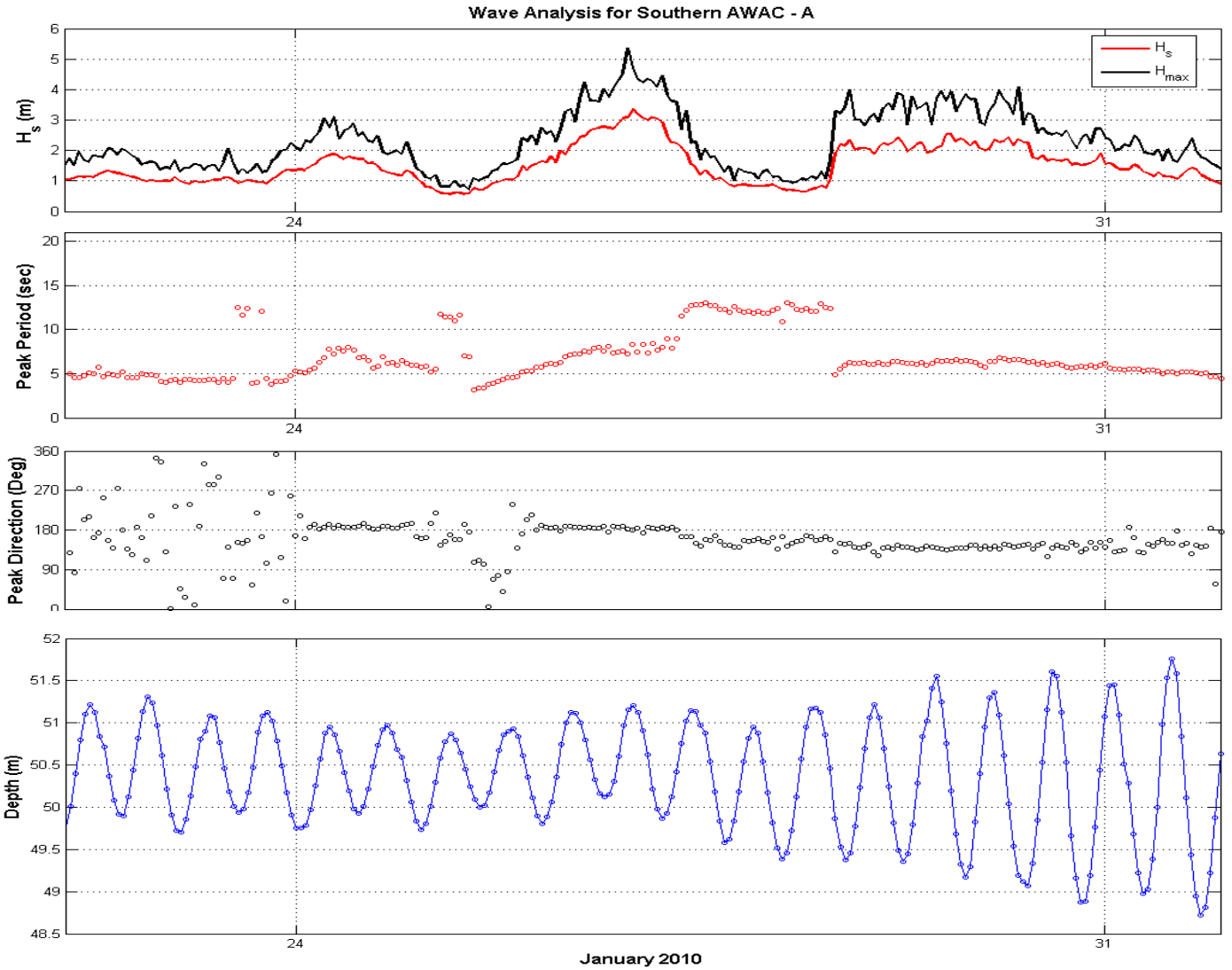


Winter 2009-2010 Storm Season

Stood ready to drop the boom…. Never happened.

Man on site based on weather forcast.

Could have been more mild storm with overtopping characteristics without person on station



Status

- Still collecting data but now entering the peaceful season.
- Intention was to get the system in the water early collecting data *AND* correlating with observations. Scanmatic will install a camera directed to where overtopping occurs next season.
- Backup event logger is fisherman who lives between booms.

Murmansk Disposal: Operational wave measurements

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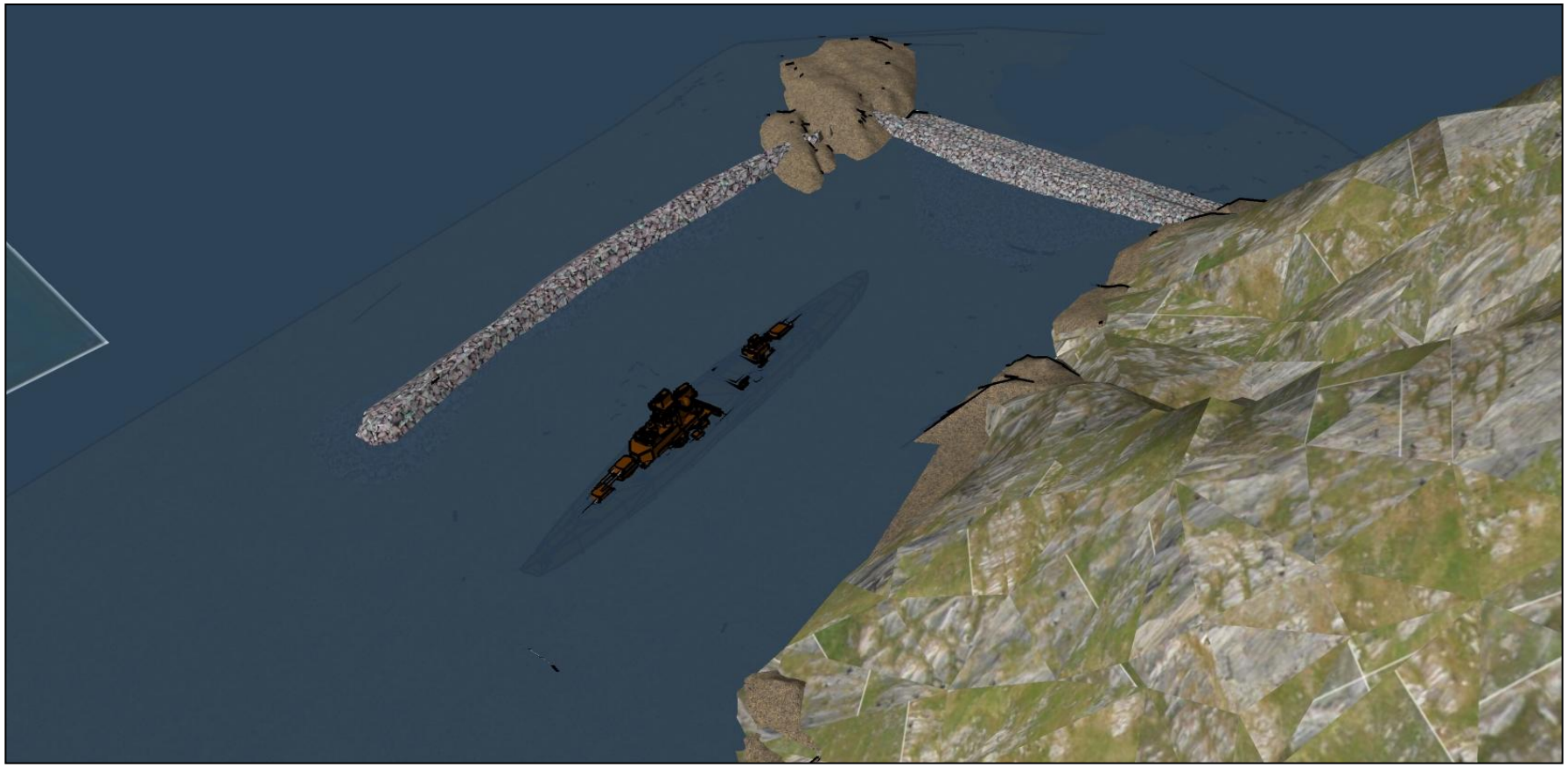
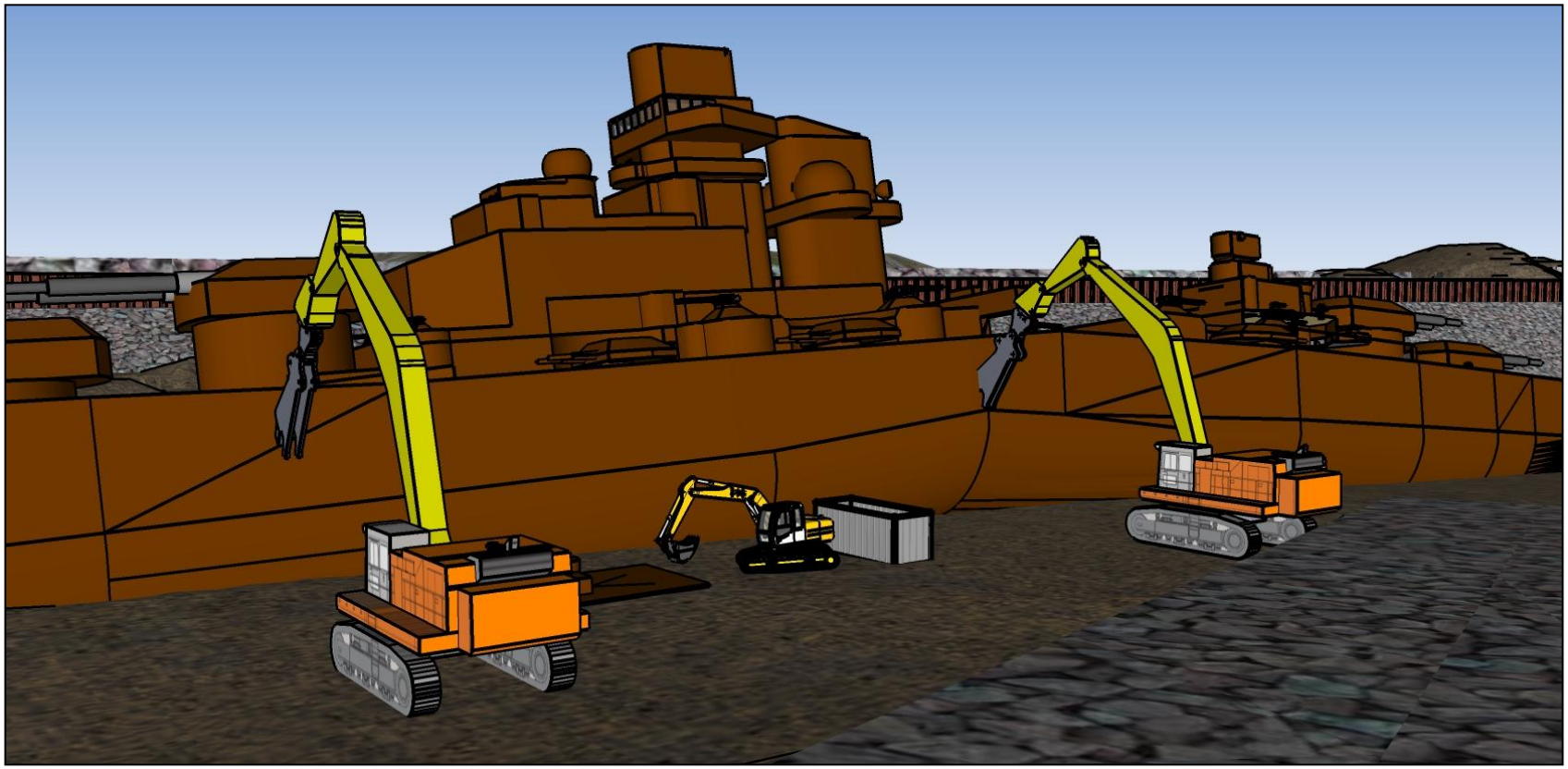
Murmansk in full glory

First Phase

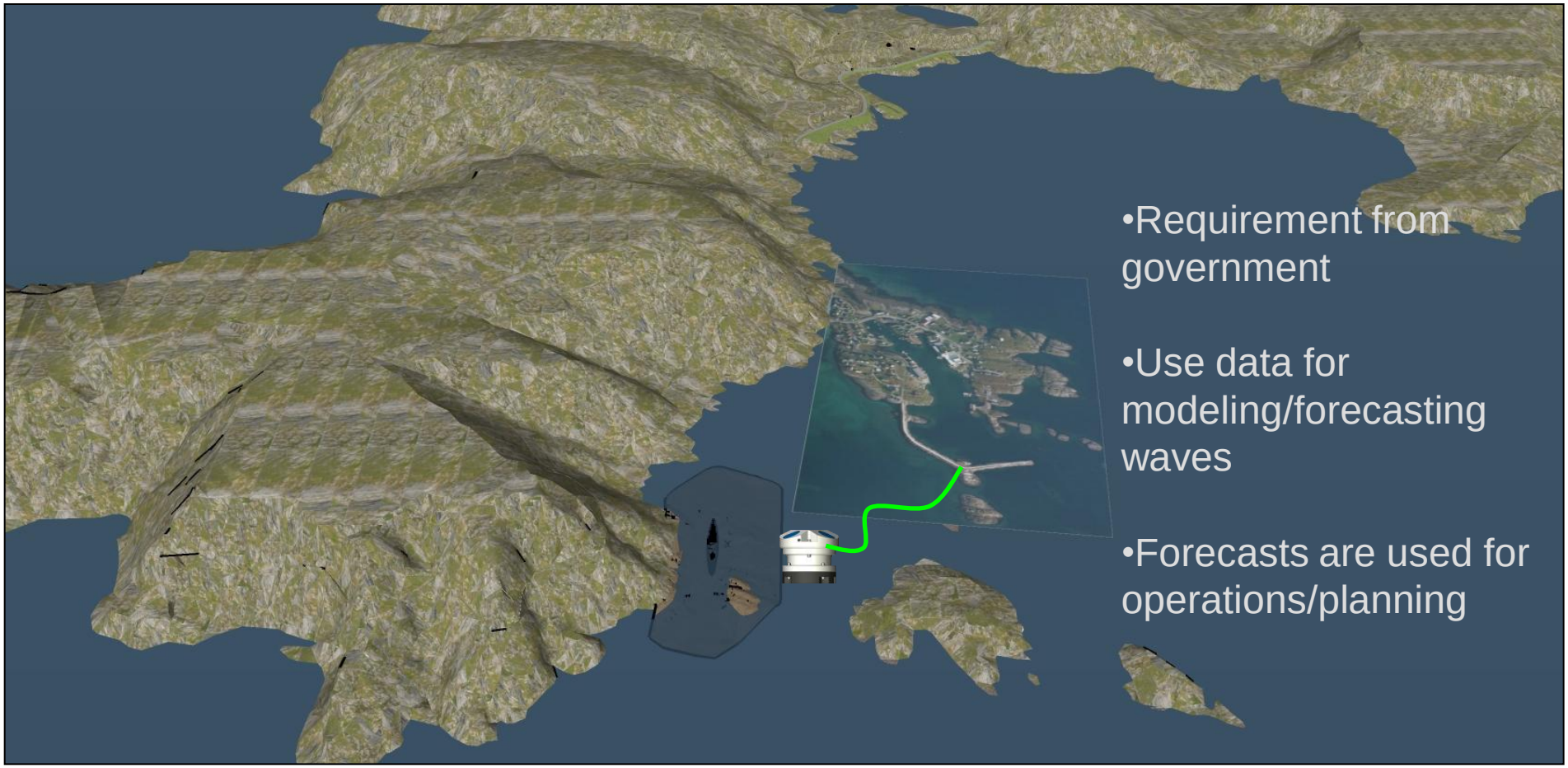


Phase two

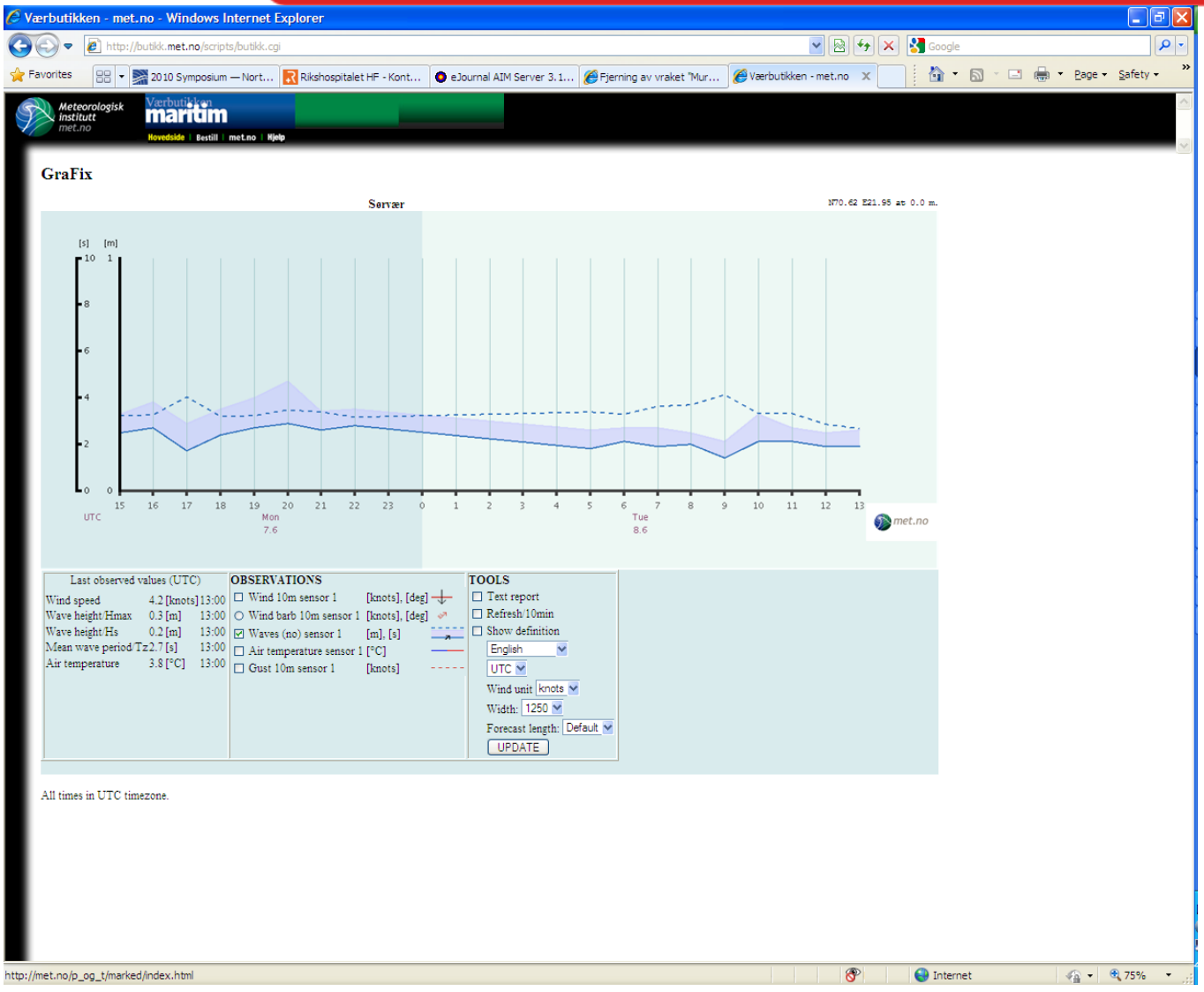


Phase Two

Location: Sørvær



Online Data by governement met office




Questions?