Automated estimation of risk caused by ship traffic

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Risk assessment with traditional manual processing and models
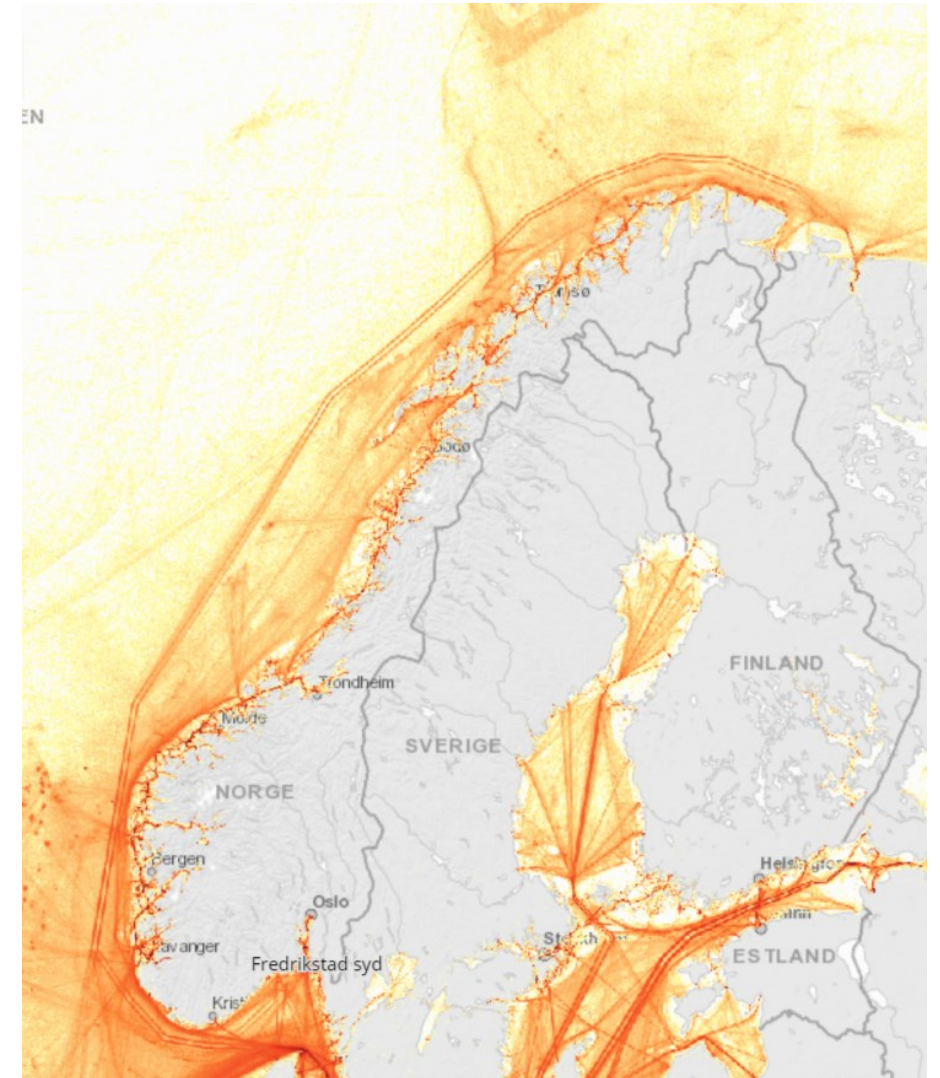
Background and objective

What is AISyRISK?

- AISyRISK is a method for automated estimation of risk in Norwegian waters. It is also a system for presenting the estimated risk.

What do we do?

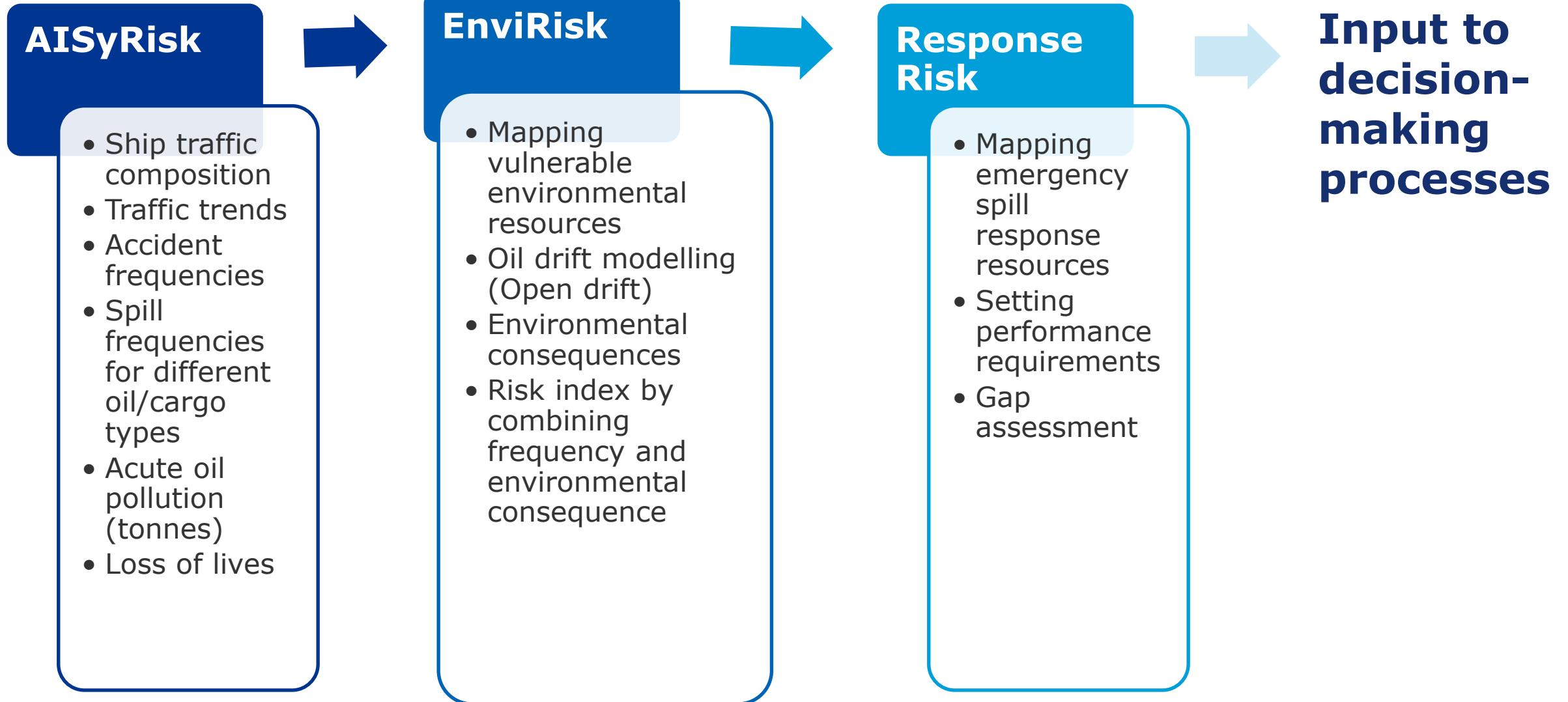- Use high-resolution AIS data to calculate navigational risk

Why do we do it?

- **Objective:** The aim of the risk model is to assist the Norwegian Coastal Administration (NCA) in their risk management activities related to maritime traffic.

  - Create an accurate and transparent system for monitoring trends related to frequency of accidents Norwegian waters, including identifying high risk areas

  - Enable the NCA to regularly deliver information about risk level trends etc. for use in transport planning and risk planning processes, including risk planning processes on local and regional level

  - A new national response plan with considerably higher quality than the old implemented in 2023. 2023 is set as a base year.
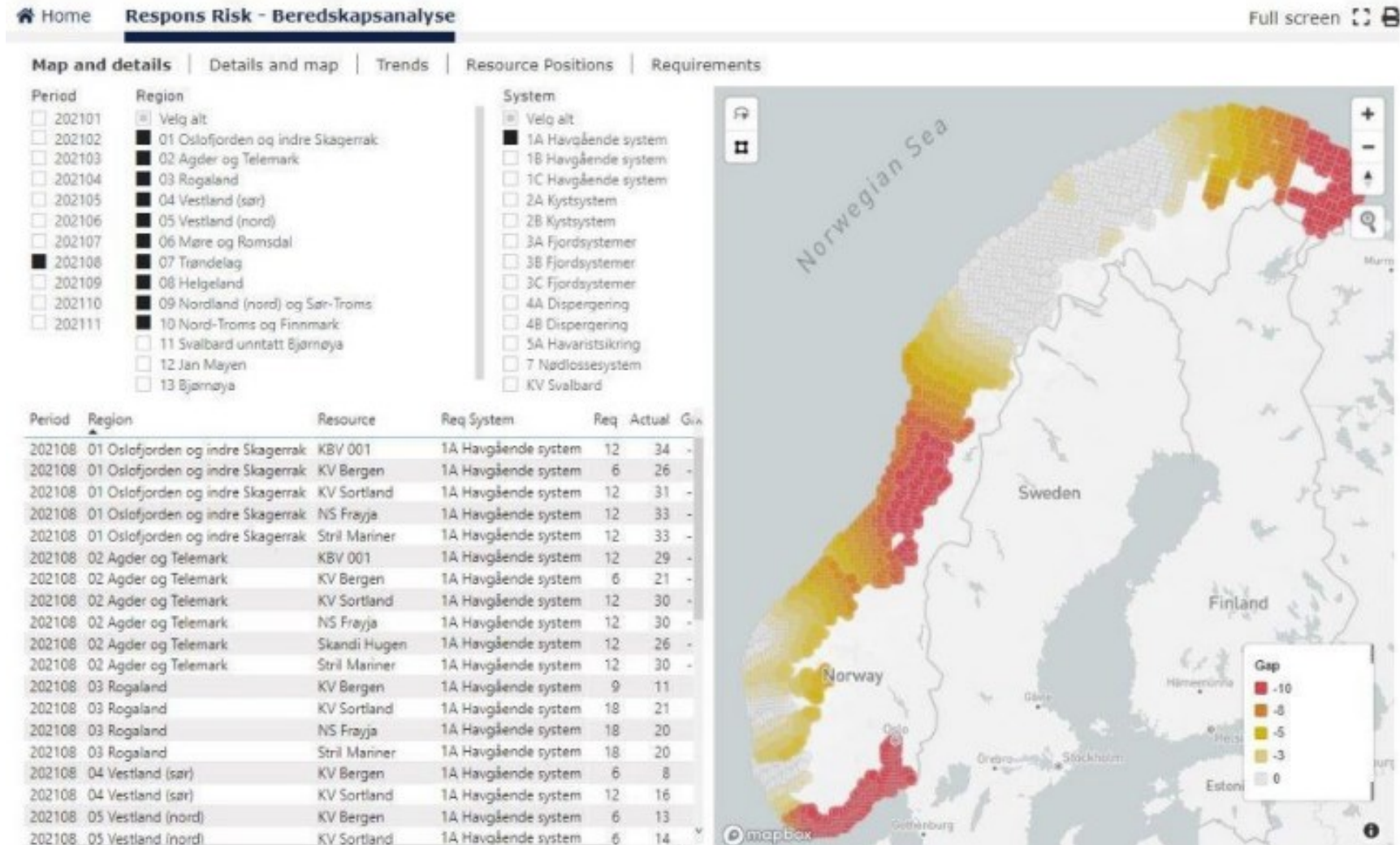
Existing framework developed for the Norwegian Coastal Administration
3 integrated modules

AISyRisk

- Ship traffic composition
- Traffic trends
- Accident frequencies
- Spill frequencies for different oil/cargo types
- Acute oil pollution (tonnes)
- Loss of lives

EnviRisk

- Mapping vulnerable environmental resources
- Oil drift modelling (Open drift)
- Environmental consequences
- Risk index by combining frequency and environmental consequence

Response Risk

- Mapping emergency spill response resources
- Setting performance requirements
- Gap assessment

Input to decision-making processes

Gap analysis in RespRisk (response risk) – Gap in hours

Dynamic risk planning 1 – new response plan when it is required

A dashboard focusing of above threshold increase in risk in the 10 preparedness analyses regions along the Norwegian coast to be developed soon

A yearly short status report on risk focusing of change in risk compared to the base year 2023

If increase in risk in one region has been detected, or generally risk has increased above thresholds in several regions, it may trigger the start up of establishing a new response plan

Dynamic risk planning 2: Correct dimensioning of oil respons equipment and Resources according to the risk level

- If risk change re-positioning equipment to the best strategic locations is considered
- Vessels with oil response equipment dynamically re-located according to the risk.
- Monthly updates of the risk level

Risk model method

**AISyRisk has developed a new methodology for the following accident types**

- Powered grounding
- Drifting grounding
- Collision

Probability of foundering and fire/explosion is based on traditional probabilistic method

Powered grounding model – Type II: Sailing close to land

- Grounding for ships sailing very close to shore or in shallow waters
- Establishing a "safety zone" around each vessel
  – Checks for when the safety zone overlaps with land or too shallow water → Accident candidate
- To capture causes: *Navigational error, unmarked reefs or rocks, misconceiving position etc.*

Safety zone overlap with land → Accident candidate

Land
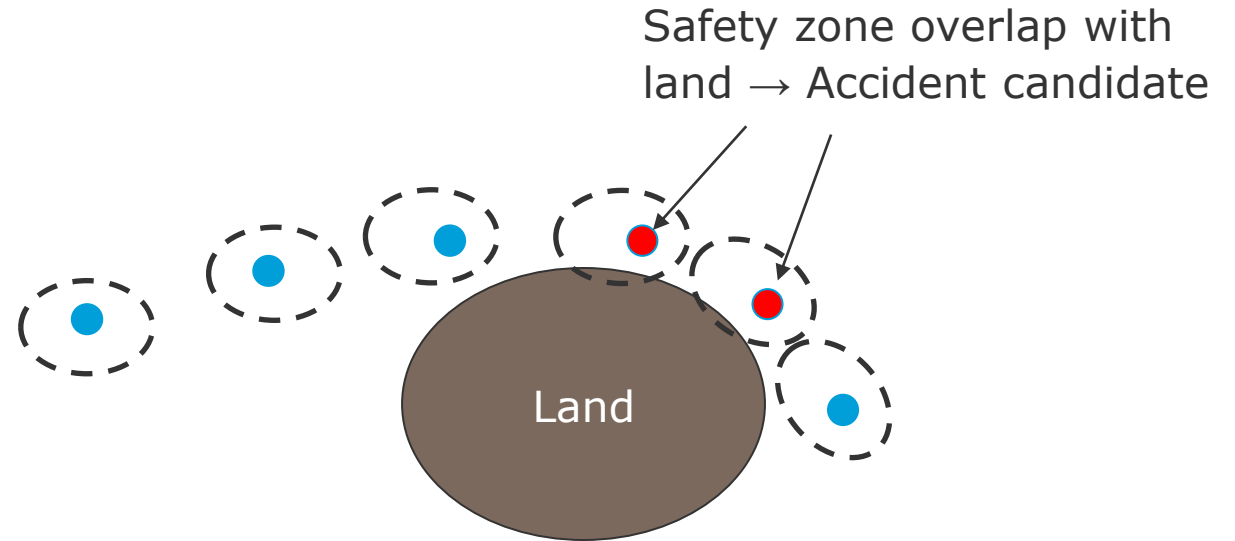
Accidents = Number of safety zone overlaps ("accident candidates") × Causation Probability (P_C)

Improvements to AISyRisk

- Ice module required – Openrisk 2
- Forecast module required
  - Forecast should include change in ship types and ship sizes
  - Change in type of fuel should also be considered
    - Ammonia
    - Hydrogen
    - Methanol
    - Traditional fuel (ULSFO, VLSFO, Distillates)

Thank you!