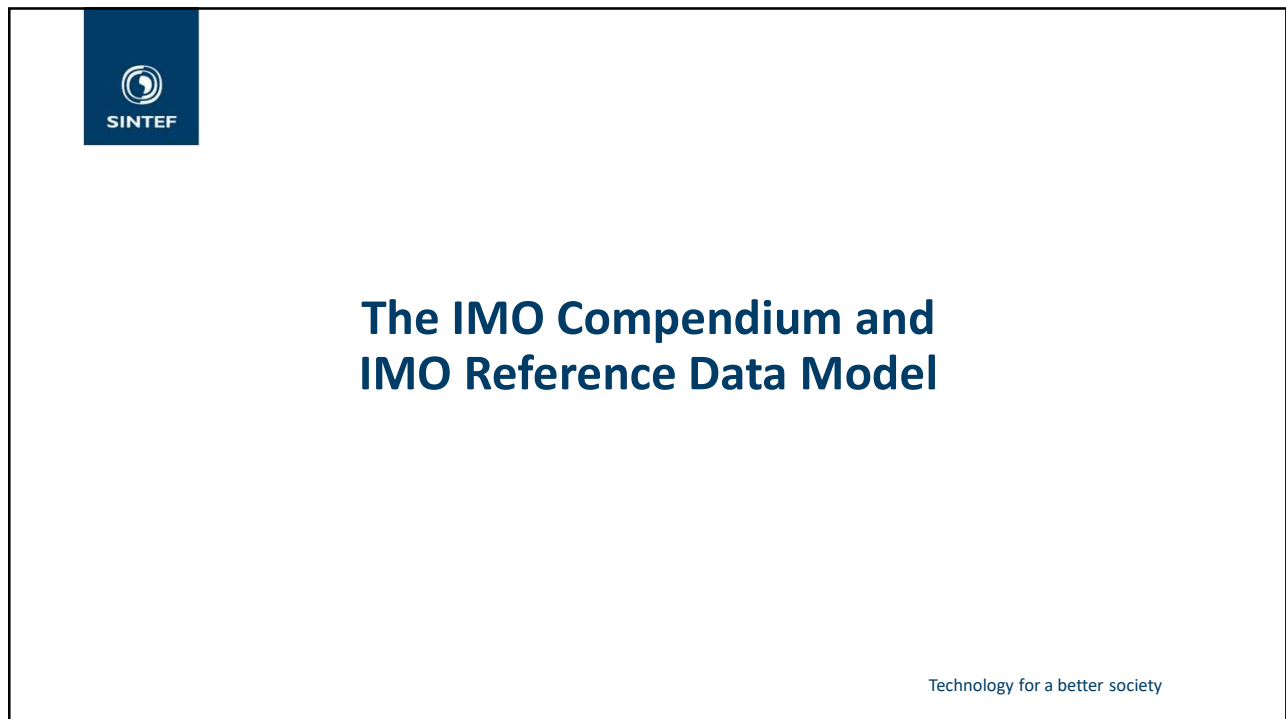





1



2



Started as a cooperation between IMO, UNECE, WCO and ISO

Trade data

Government data

Operational data

IMO Reference Data Model

"IMO Compendium"


Initial contributors

- IMO
- UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE
- ISO

Key sources of data

- The FAL Forms
- Maritime Declaration of Health
- Stowaways
- Waste reporting
- Just in Time arrival
- Ship Certificate list
- Mandatory Ship Reporting System
- Ballast water reporting
- ...

3



Harmonizes data elements between domains

Nautical data

Administrative data

Operational data


Agreed on common definitions

Growing number of contributors

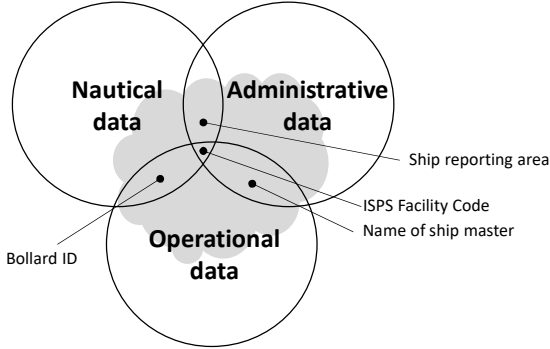

- IALA
- GS1
- IAPH
- dcsa
- BIMCO
- EMSA
- ...

International Standards

4



Harmonizes data elements between domains

5



Note also complexity of identification

```
<xs:complexType name="LocationType">
  <xs:sequence>
    <xs:element name="Name" type="epc:string" minOccurs="0" />
    <xs:element name="CountryCode" type="epc:CountryCodeContentType" />
    <xs:element name="FacilityName" type="epc:FacilityNameType" />
    <xs:element name="FacilityCode" type="epc:GISISCodeContentType" />
    <xs:element name="GLN" type="epc:GLNContentCodeType" minOccurs="0" />
    <xs:element name="Position" type="epc:PositionType" minOccurs="0" />
    <xs:element name="UNLoCode" type="epc:UNLoCodeContentType" />
  </xs:sequence>
</xs:complexType>
```

6




International cooperation is needed!



International cooperation.
Using the relevant international standards organizations.

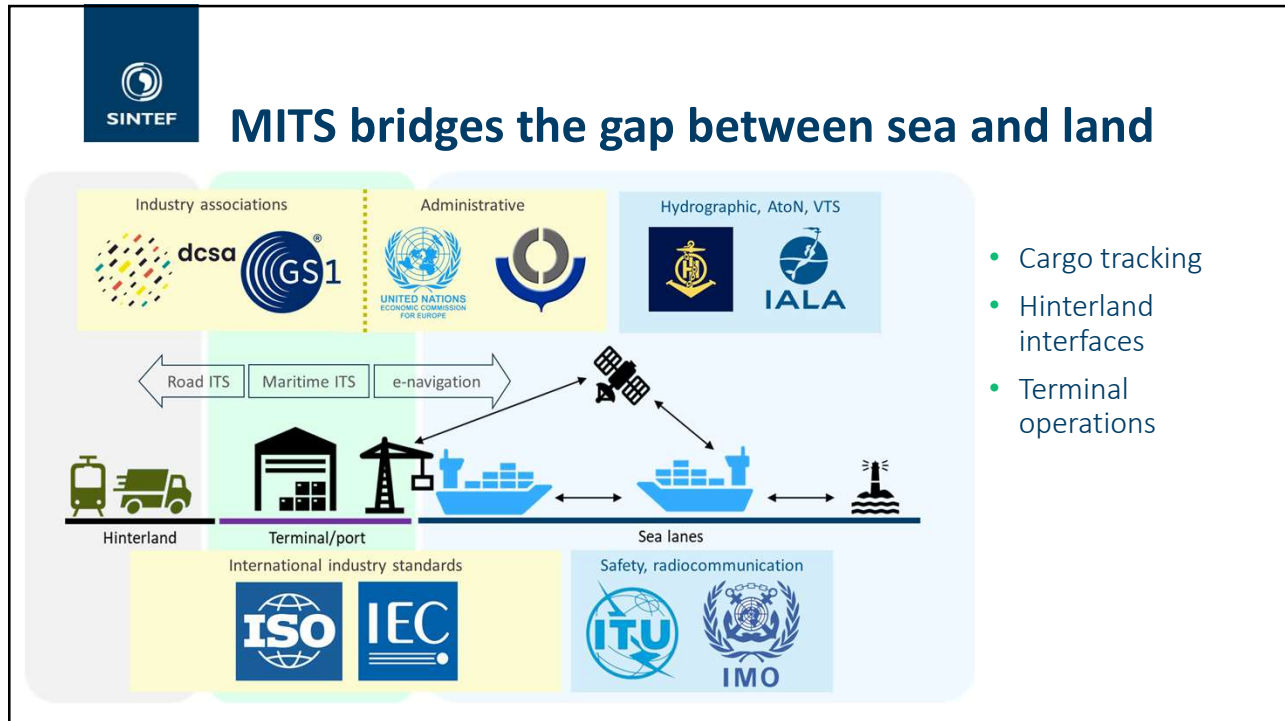
7



The role of Maritime ITS

Technology for a better society

8



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More cooperation in the ITS community

Timeline of key milestones in ITS development:

- 1969:** ARPA Anticollision radar
- 1981:** SatCom INMARSAT - MARECS
- 1982:** EPIRB COSPAS - SARSAT
- 1995:** IMO GPS Performance requirements
- 2000:** AIS into SOLAS regulation V19

Visuals include a radar unit, a satellite, a satellite communication diagram, a carpooling lane with a blue SUV and a blue sedan, and a large ASKO cargo ship.

Architecture Layers diagram:

- Architecture Layers:** Institutional, Transportation, Communications, Legal Architecture, Physical Architecture, Standards, Security
- Legal Architecture:** Data Flow, Architectural Hierarchy
- Physical Architecture:** Equipment, Architectural Hierarchy
- Standards:** Standards, Security
- User Services:** User Services, Architecture User
- Architecture User:** Use in Project, Use in Project Development

<http://www.iteis.com/itsarch/html/menu/hypertext.htm>

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The role of Maritime ITS Two examples

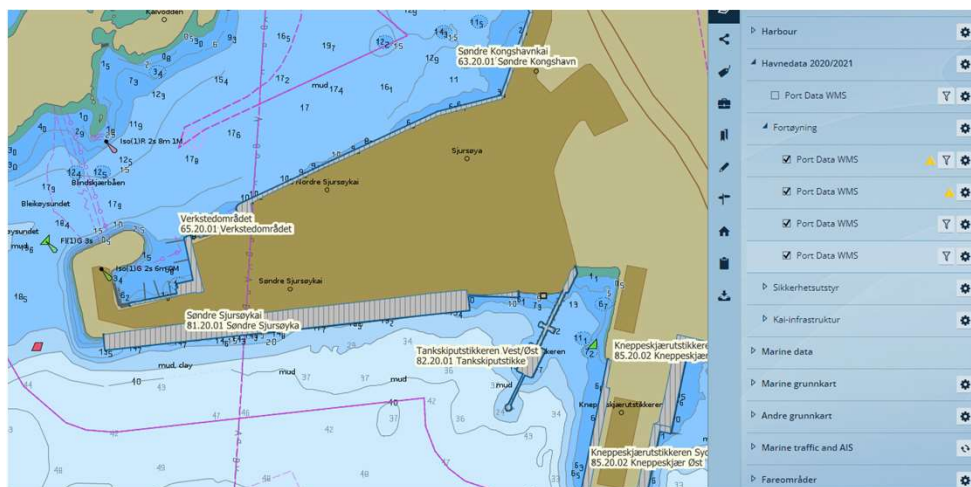
Technology for a better society

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Port Information: Maritime ITS <-> Marine Geospatial Information

Example - Port of Oslo, Norway

An initiative to establish a national port information system with reference to S-131 Marine Harbour Infrastructure



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Digital routes for navigators

From routeinfo.no you can download over 600 digital reference routes for navigation to all major Norwegian ports – to support route planning. The service also gives important information for safe, efficient and sustainable route planning.



Download reference routes (RTZ) directly to the ECDIS/ navigation display on board



KYSTVERKET

Route Information Service

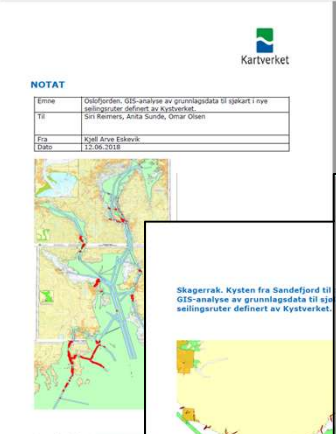

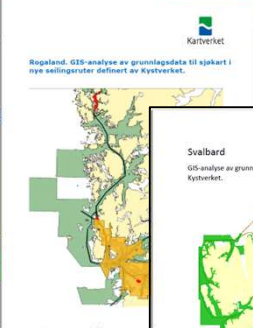
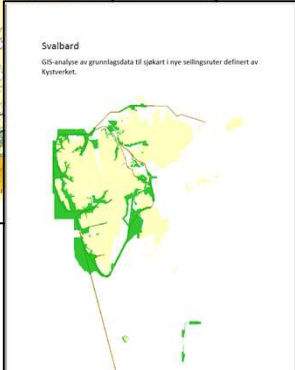

- The use of Route plan standard IEC61174:2015 (S421 / RTZ) - Reference routes for navigation

Film: <https://youtu.be/eCVOKJwAQwE?t=0>
temporary link, https://youtu.be/k7_WjxxBhR8

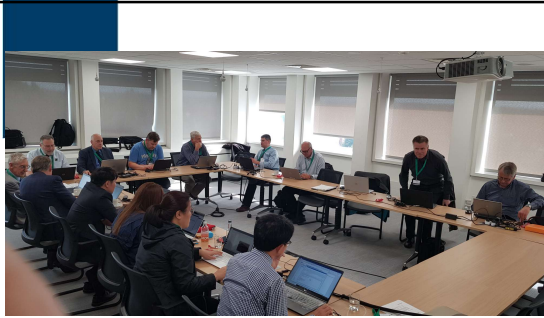
Digital standards:

- From paper chart to digital charts (ENC), app. 2010ish
- AIS (ais automatic ship identification) app. 2002-06ish
- Route plan (RTZ/S421) 2015ish

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Oslofjorden 24.9.2018					 <p>KYSTVERKET</p>
Skagerrak 31.5.2019					
Rogaland 31.5.2019					
Vestlandet 15.1.2020					
Møre og Trøndelag 15.6.2020					
Nordland 8.10.2020	<p>step by step approach</p>				
Troms og Finnmark 18.1.2022					
Svalbard					

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IEC T80 WG 17, 2019-2021



International reference

(ex. IEC T80 WG 17 / NIPWG6 (2019))

Digital Route Service based on IEC 61174:2015 (RTZ v. 1.0)

Recommended routes
+ Route information

Locations:

- Ports (SafeSeaNet Norway including places of interest and Anchorage)
- Port facilities (NECA register of ISPS and facilities)
- Quays (registered in SafeSeaNet Norway for the ports)

Regulations not available in RouteInfo:

- PEC (Pilot Exemption Certificate)
- VTS (Vessel Traffic Services) areas for Vessel Traffic Centres

VTS Factsheet
Sailing distance

On RouteInfo you can also access route information:
VTS info, sailing distance, locations (ports, port facilities and quays), Local regulations for Pilot Exemption Certificate (PEC), Local VTS regulations

Example: Route Oslo West Inboard.

NIPWG6 (2019)



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Efficient and secure information flow, (S-102, RTZ)

- API's / PRIMAR etc.



Automatisk henting av data via API

S-1xx

C-Scope

S-100 Demonstrator

Remote Update Protocol (B2C)

Njord Pilot

PRIMAR

- Login
- Basket
- ENC
- S-102
- S-111
- RTZ
- Nautical Publications
- WMS

ENC Coverage
ENC Coverage by Usagebands
S-102 Coverage
S-111 Coverage
RTZ Coverage
Nautical Publications Coverage
WMS Coverage


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MAIN FINDINGS FROM THE FRAM-ANALYSIS




To get and provide rough estimates of the benefit of the potential risk reduction associated with introducing quality assured sailing routes for the Norwegian coast, through routeinfo.no, we have conducted two analyses using FRAM. FRAM is the Norwegian coastal administration's model to calculate costs and benefits at sea. First, we perform an analysis where we **reduce the probability of grounding by 1 percent**, thereafter we perform another analysis where we reduce the probability for collision by 1 percent. The results are thereafter analyzed in a cost-benefit framework and a net present value over ten years is calculated.

Routeinfo.no is primarily used by ships above 70 meters. Additionally, the accident data we have used to evaluate the risk reductions only cover accidents concerning such ships. The analysis restricts itself to **benefits for ship of length above 70 meters**.


The results are highly uncertain and do not take other costs or benefits into consideration. They do, however, **illustrate the possible benefits** the quality assured routes provided by the Norwegian Coastal Administration through Routeinfo.no, could deliver through improved maritime safety.

Given our assumptions, our rough estimates of the net present value of the benefit of reduced risk of grounding over the forthcoming ten year period amounts to 37 MNOK. The equivalent figure is 8 MNOK for collisions, but this estimate is more uncertain and must be interpreted as an upper bound. In total the potential benefit adds up to 45 MNOK.


The benefit of improved maritime safety (net present value over 10 years)



Grounding:
NOK 37 million



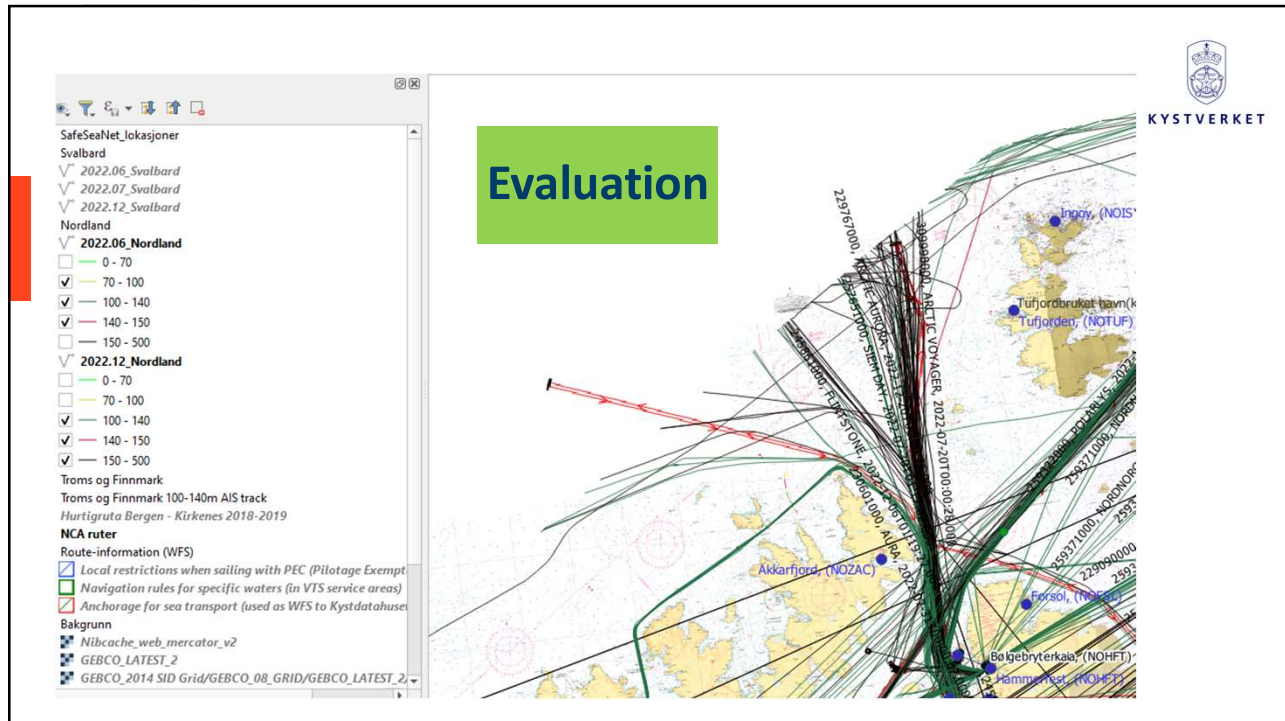
Collision:
Up to NOK 8 million



**Joint potential benefit:
NOK 45 million**

It is important to note that the benefits above does not take incurred costs of implementation of routeinfo.no. Thus, the report simply shows the potential benefits of routeinfo.no with regards to maritime safety.

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The slide features the following content:

- SINTEF** logo in the top left corner.
- Text: "Thank you for your attention!"
- Text: "The work presented here has received funding from the Research Council in Norway and the ISTS project (Project number 326679)."
 - Funded by The Research Council of Norway** logo.
- Text: <http://ists.mits-forum.org/>
- MARITIME ITS** logo in the bottom right corner.

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