Statens vegvesen

Standards? or No Standards (Between Trust and Regulation)

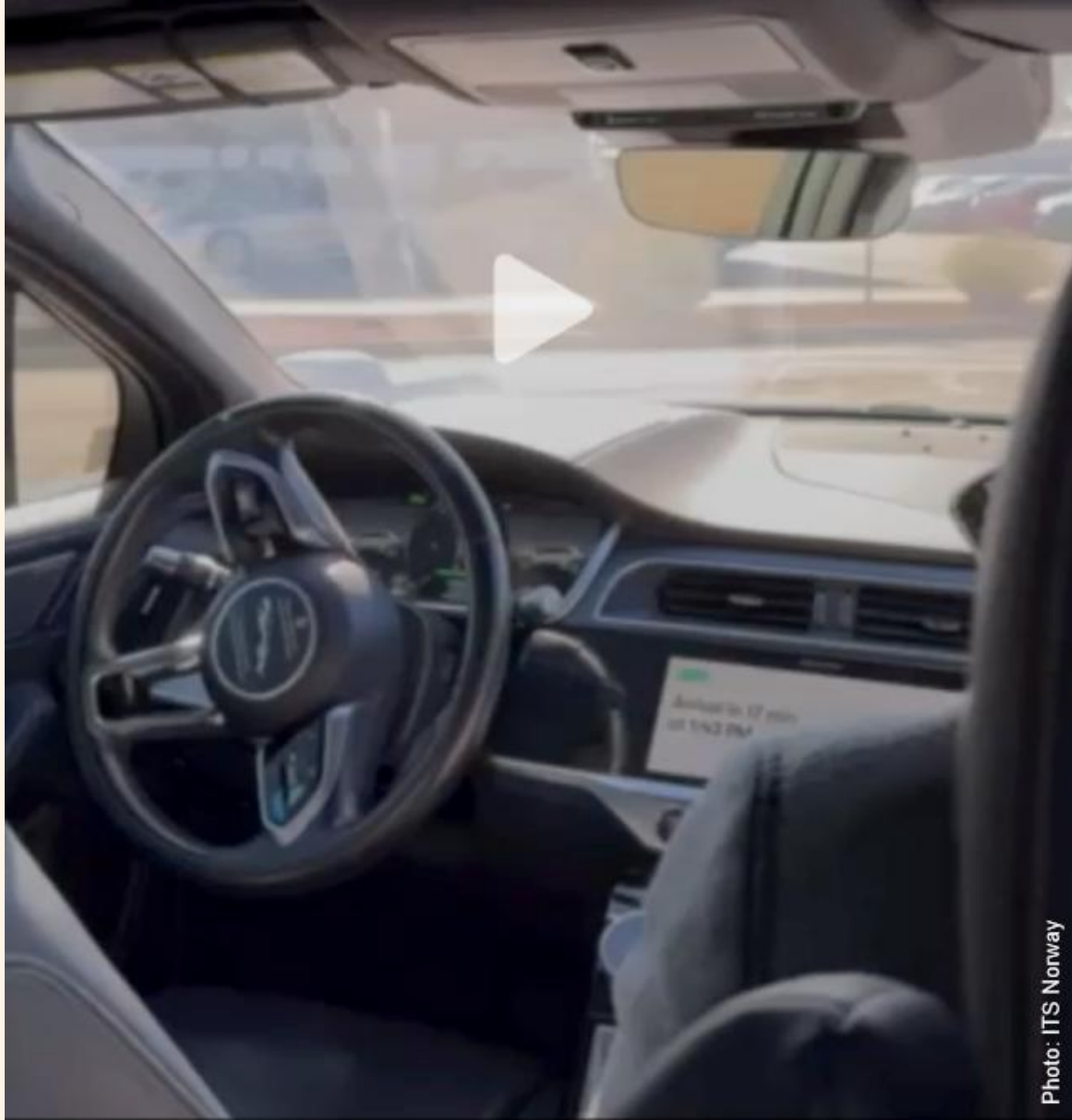
A Question of Perspectives?

Trond Hovland

Source: Trond Hovland

Content

1. On the Road
2. Maritime operations
3. An abundance of Data and Standards
4. At the Hub
5. The Trouble: Legal vs Trust/Perspectives
6. The End



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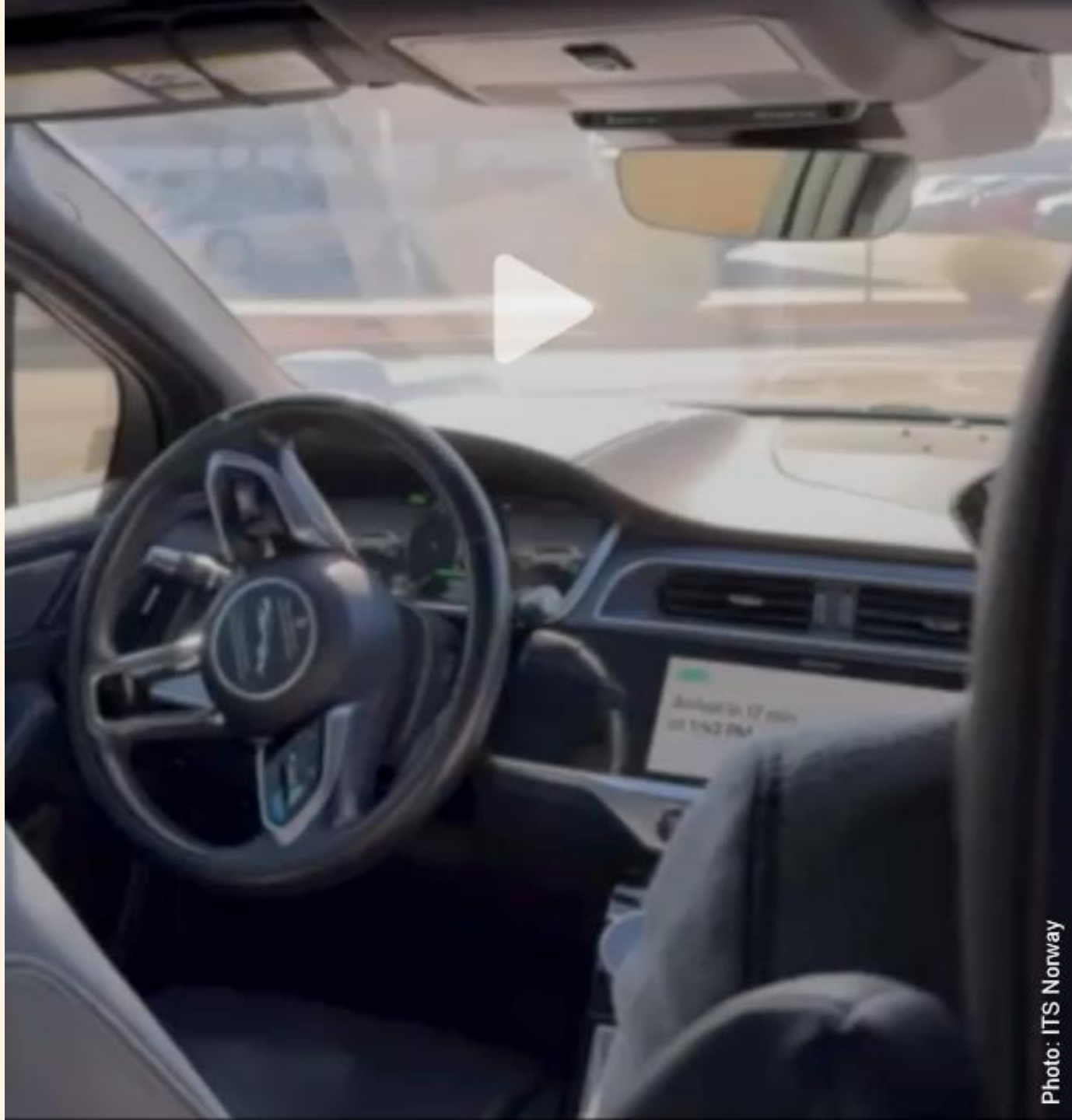


Waymo

- Taxi operation in Phoenix, San Francisco, Los Angeles, …
- Maps for navigation and HD maps for manoeuvring
- In cities and on highways
- If needed vehicle to communicate with back-office fleet operator to handle events and obstacles

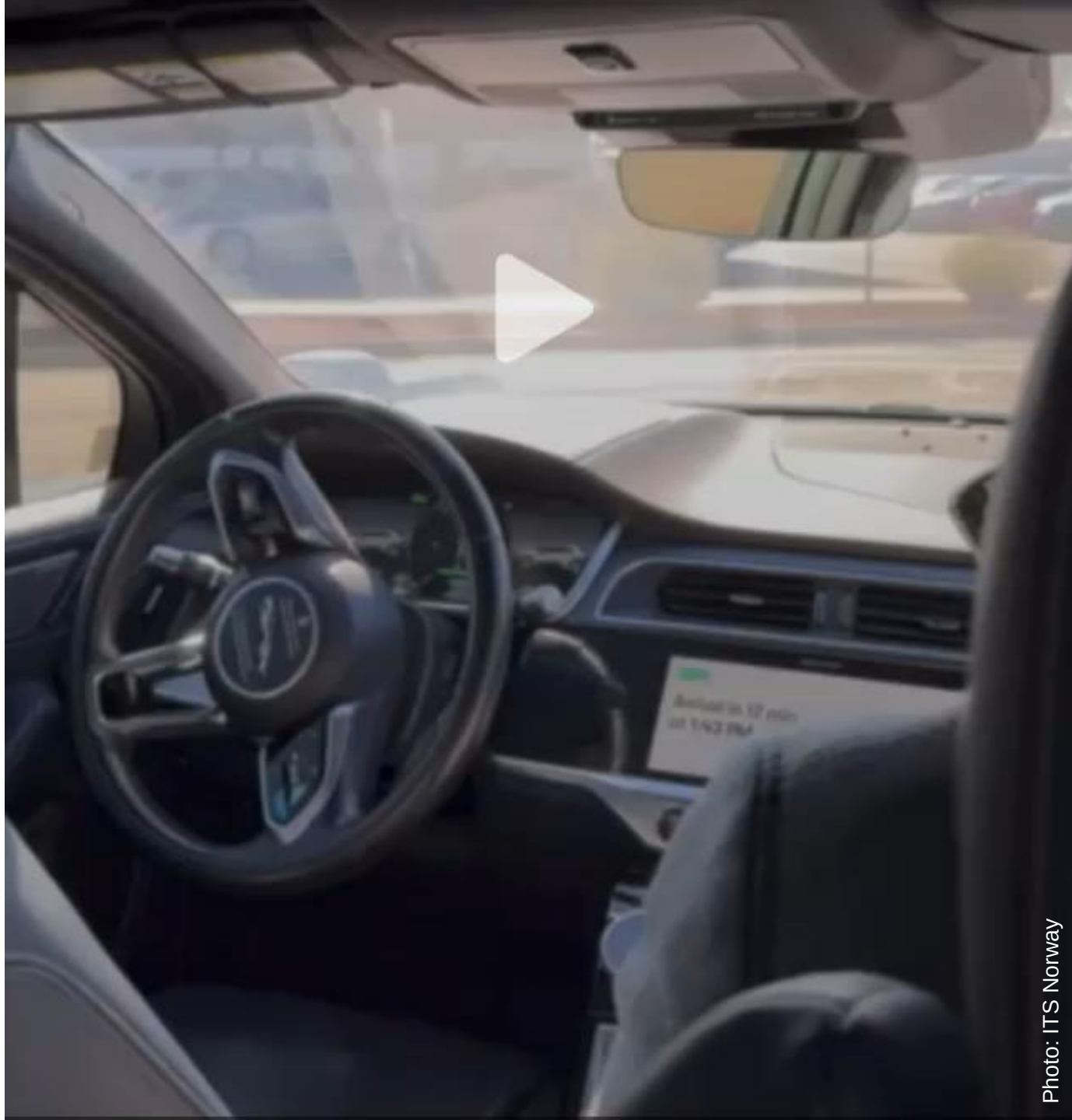
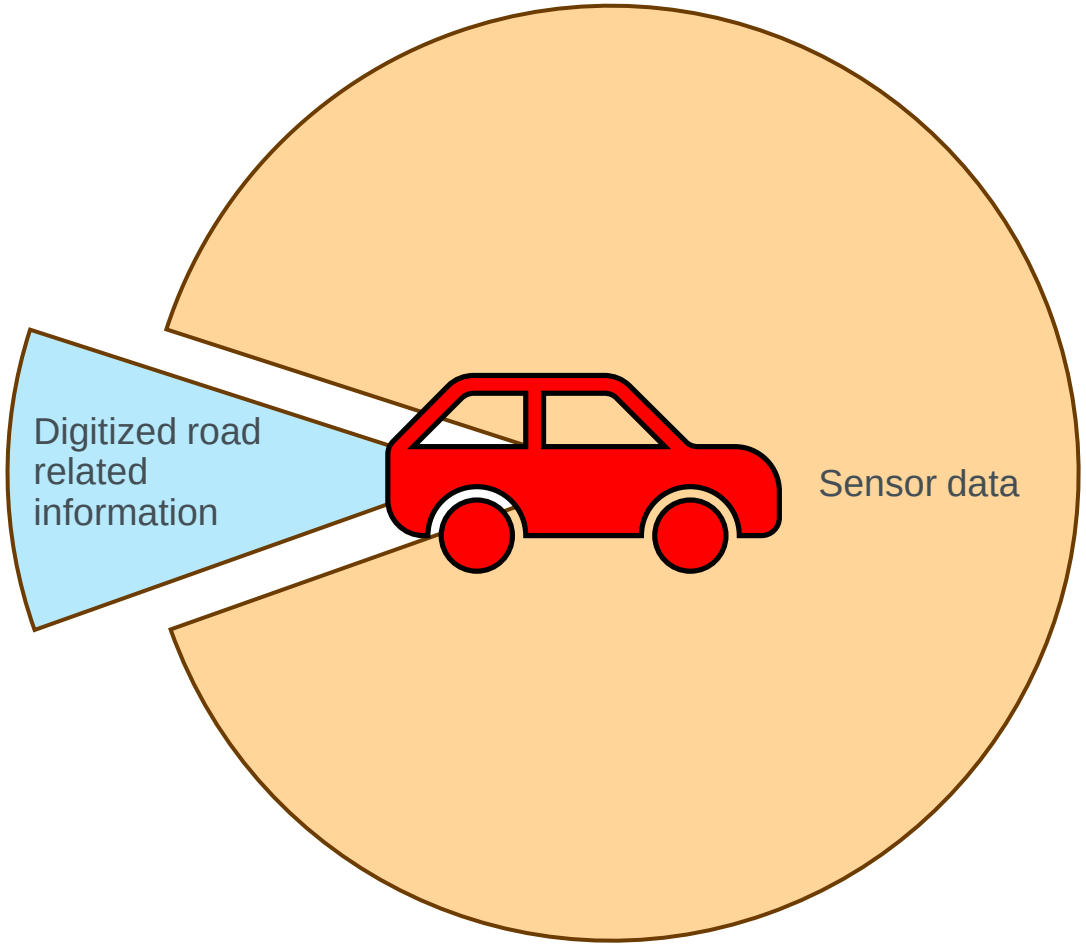


Photo: ITS Norway

The world of cars – lack of trust – wants to be autonomous

The authorities provide information like:

- Basic road maps
- Infrastructure conditions
- Regulations
- Events, accidents, roadworks, …



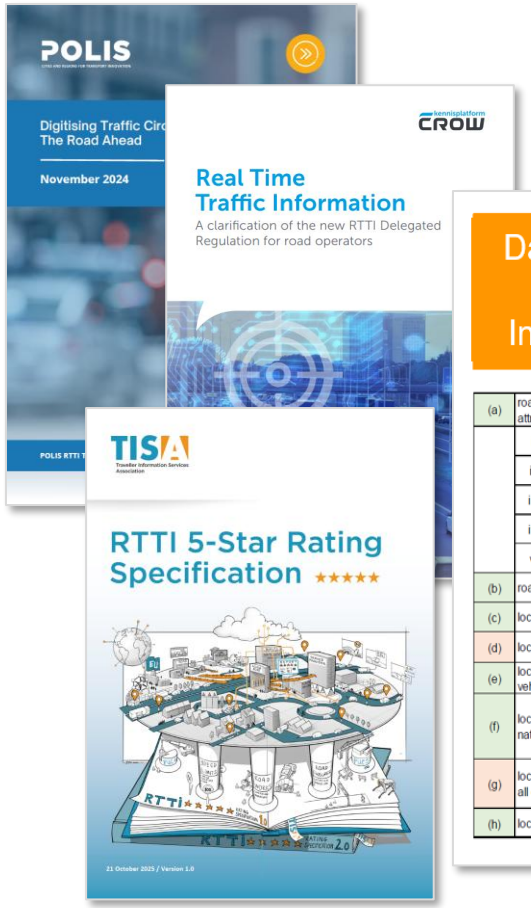
The cars can:

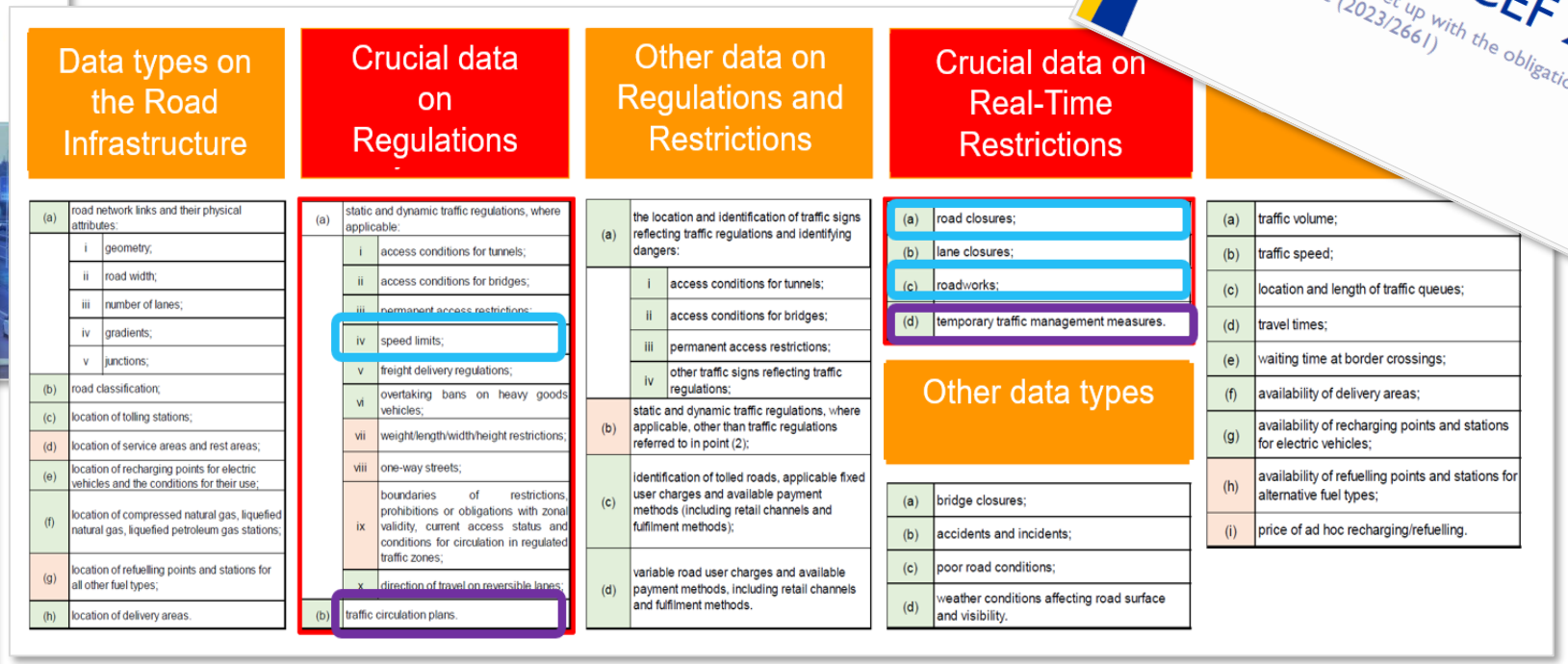
- Map its surroundings
- Observe
- Navigate
- Communicate
- Track routes and roads used
- Monitor all aspects of the car, like engine, lights, vipers, ESP, ABS, …

Source: NPRA/Trond Hovland

According to the Authorities: RTTI and SRTI

EU legislation demands data provisions for the carmakers and a feedback loop





Data types on the Road Infrastructure

(a)	road network links and their physical attributes:	
	i	geometry;
	ii	road width;
	iii	number of lanes;
	iv	gradients;
	v	junctions;
(b)	road classification;	
(c)	location of tolling stations;	
(d)	location of service areas and rest areas;	
(e)	location of recharging points for electric vehicles and the conditions for their use;	
(f)	location of compressed natural gas, liquefied natural gas, liquefied petroleum gas stations;	
(g)	location of refuelling points and stations for all other fuel types;	
(h)	location of delivery areas.	

Crucial data on Regulations

(a)	static and dynamic traffic regulations, where applicable:	
	i	access conditions for tunnels;
	ii	access conditions for bridges;
	iii	permanent access restrictions;
	iv	speed limits;
	v	freight delivery regulations;
	vi	overtaking bans on heavy goods vehicles;
	vii	weight/length/width/height restrictions;
	viii	one-way streets;
	ix	boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones;
	x	direction of travel on reversible lanes;
(b)	traffic circulation plans.	

Other data on Regulations and Restrictions

(a)	the location and identification of traffic signs reflecting traffic regulations and identifying dangers:	
	i	access conditions for tunnels;
	ii	access conditions for bridges;
	iii	permanent access restrictions;
	iv	other traffic signs reflecting traffic regulations;
(b)	static and dynamic traffic regulations, where applicable, other than traffic regulations referred to in point (2);	
(c)	identification of tolled roads, applicable fixed user charges and available payment methods (including retail channels and fulfilment methods);	
(d)	variable road user charges and available payment methods, including retail channels and fulfilment methods.	

Crucial data on Real-Time Restrictions

(a)	road closures;
(b)	lane closures;
(c)	roadworks;
(d)	temporary traffic management measures.

Other data types

(a)	bridge closures;
(b)	accidents and incidents;
(c)	poor road conditions;
(d)	weather conditions affecting road surface and visibility.

(a)	traffic volume;
(b)	traffic speed;
(c)	location and length of traffic queues;
(d)	travel times;
(e)	waiting time at border crossings;
(f)	availability of delivery areas;
(g)	availability of recharging points and stations for electric vehicles;
(h)	availability of refuelling points and stations for alternative fuel types;
(i)	price of ad hoc recharging/refuelling.

Source: TISGRADE

Thoroughly standardized dataflow – deterioration of data quality

1

Public Authorities

Road owners
Police

National
Road
Databases

Service providers

C-ITS (DEMN/CAM), OSM, OM,
TN-ITS, DATEX, TISA, Google,
TomTom/Here, other formats

Users/use-case

OEMs back-office
systems
Third party's DB

Vehicles

Request for corrections

Digital Service Productions for Road Users

Feedback loop
DATEX or no standards –
lack of structure

Request for corrections and input data
for service productions
Proprietary and unstructured data

2

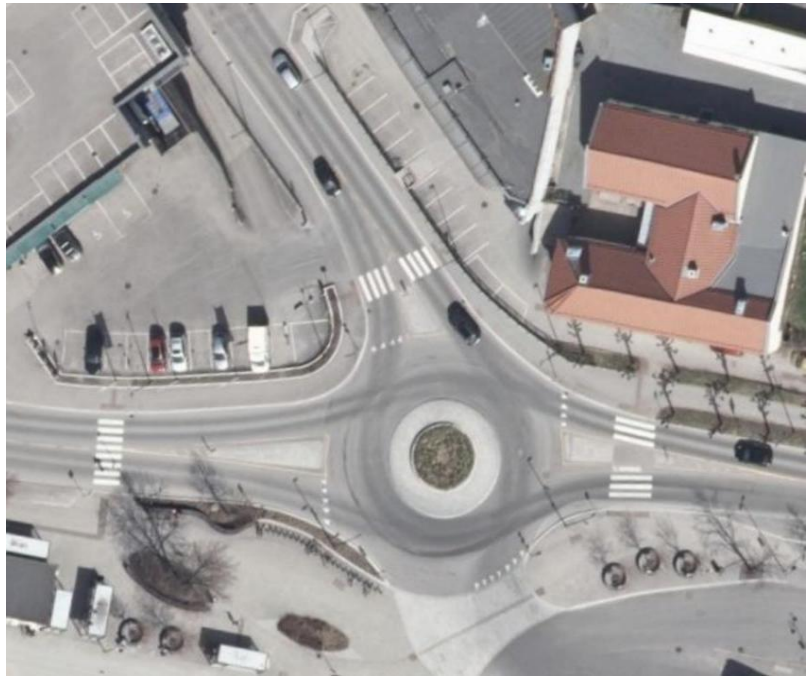
No standards / responsible actors

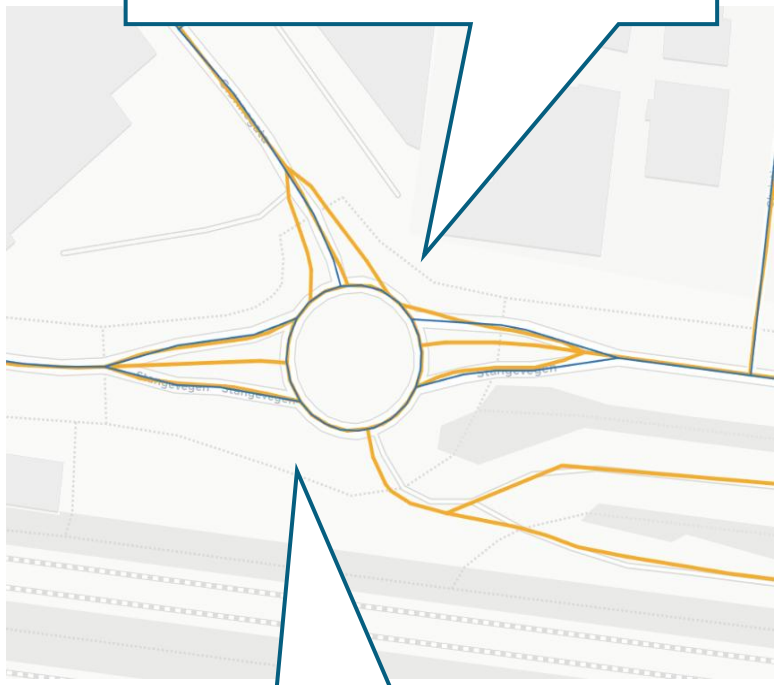
Almost no standards – little information about data quality

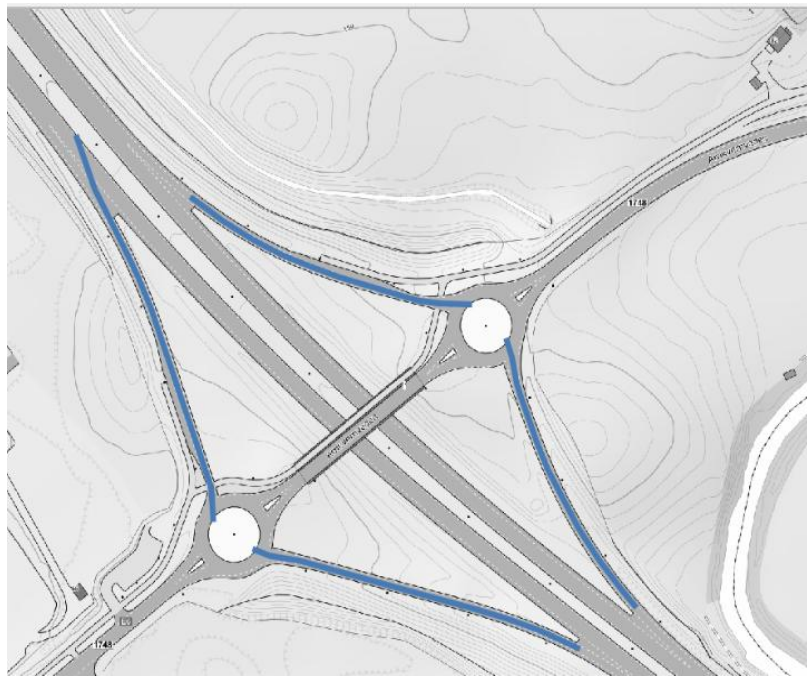
Source: NPRA/Trond Hovland

Same data different precision

- OM: 110km/h on the whole ramp
- NVDB: 110km/h on the part closest to the motorway, 80km/h on the other roads







Source: Dr. Knut Jetlund, NMA

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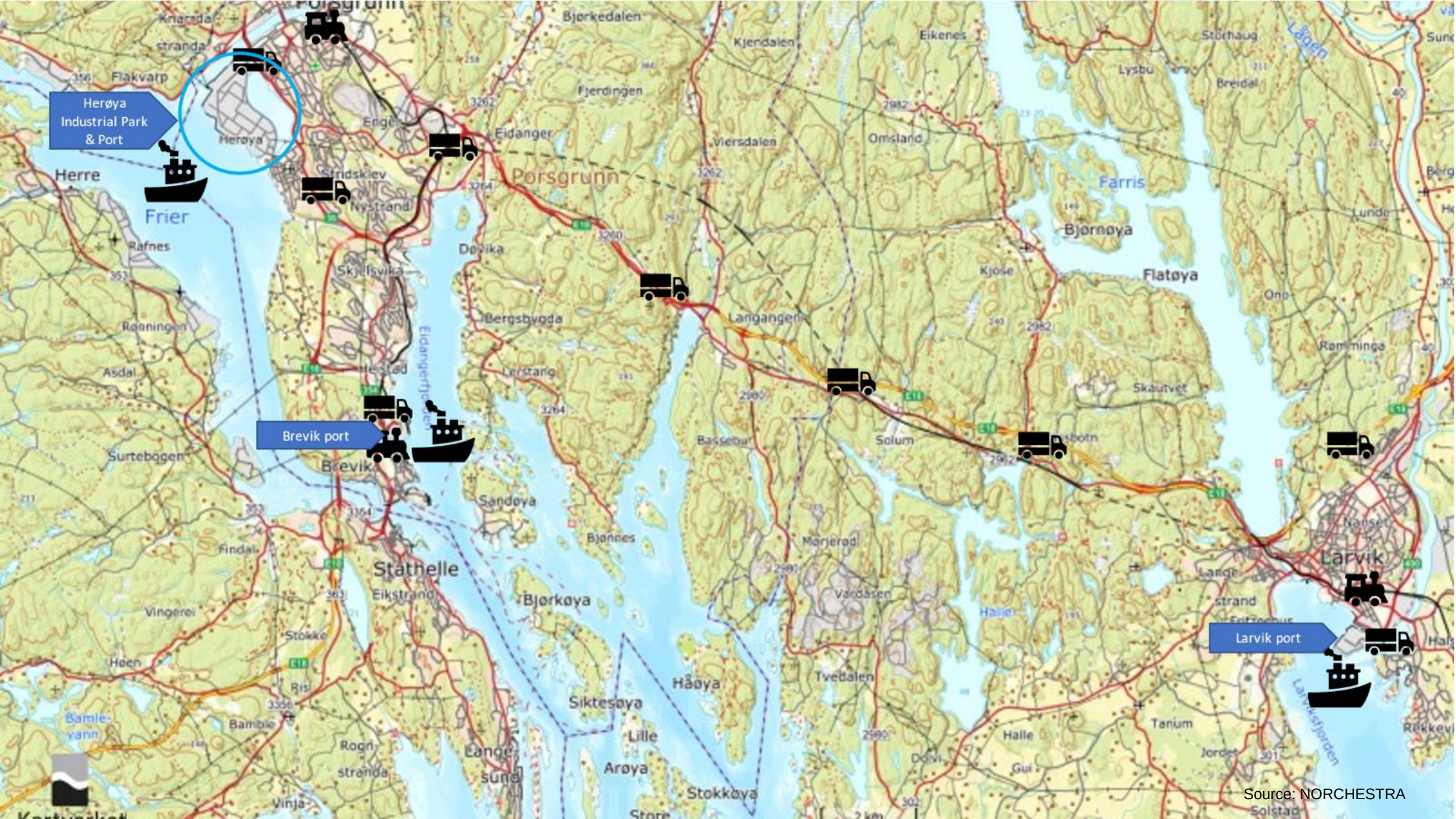
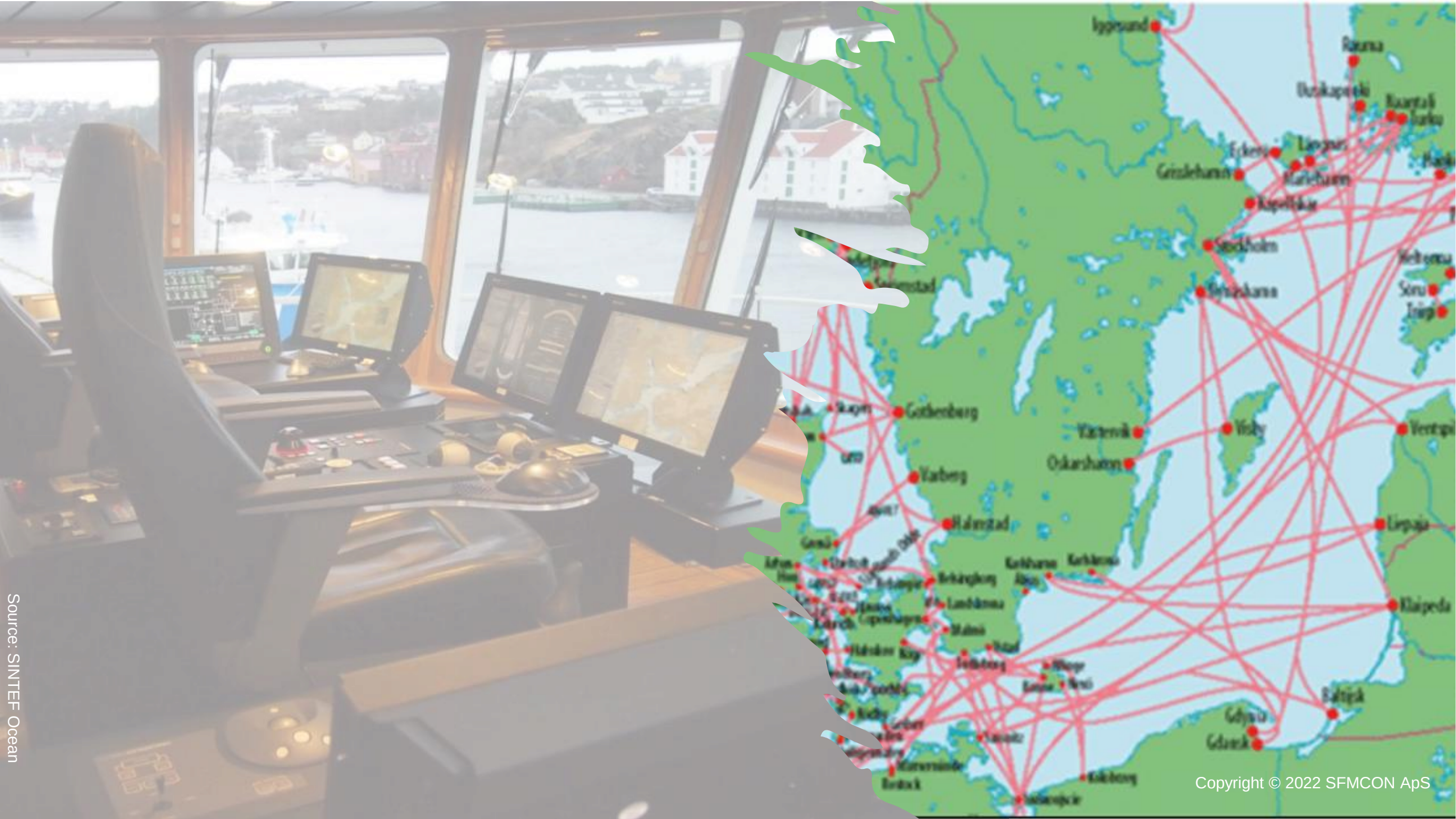
Source: Trond Hovland


hyke
zawas
YARA
Yara Birkeland
Zero Emission
ASKO
ASKO Maritime
ZERO EMISSION


Herøya Industrial Park & Port
Brevik port
Larvik port
Porsgrunn
Herøya
Frier
Herre
Eidanger
Brevik
Stathelle
Bjørkøya
Siktesøya
Håøya
Lille Arøya
Stokkøya
Langesund
Larvik
Farris
Bjørnøya
Flatøya
Solum
Langangen
Eidangerfjorden
Source: NORCHESTRA



Source: SINTEF Ocean

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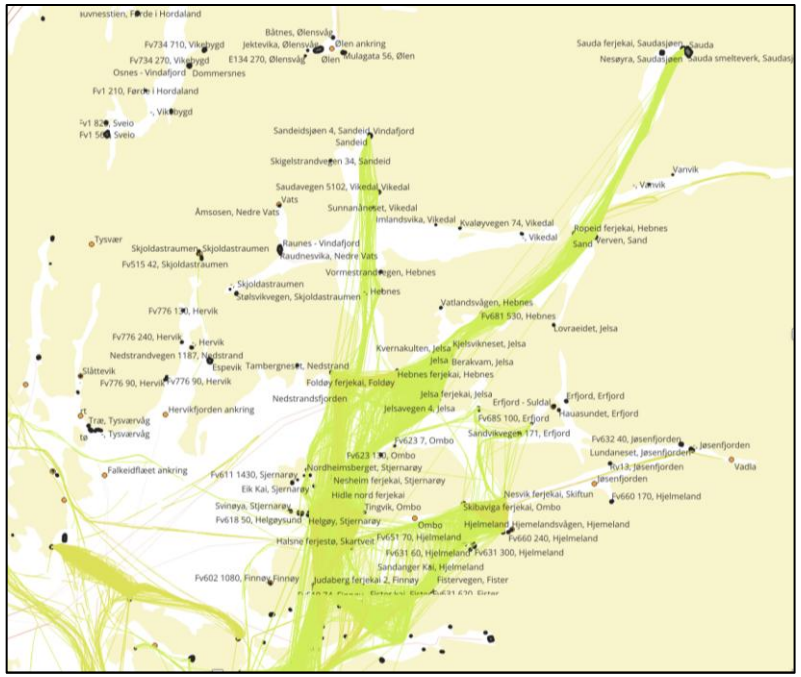
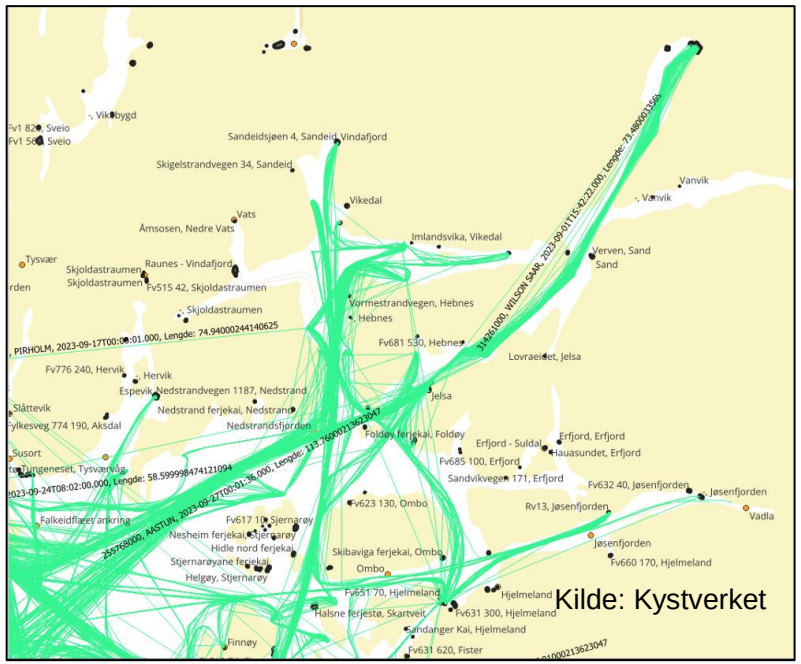
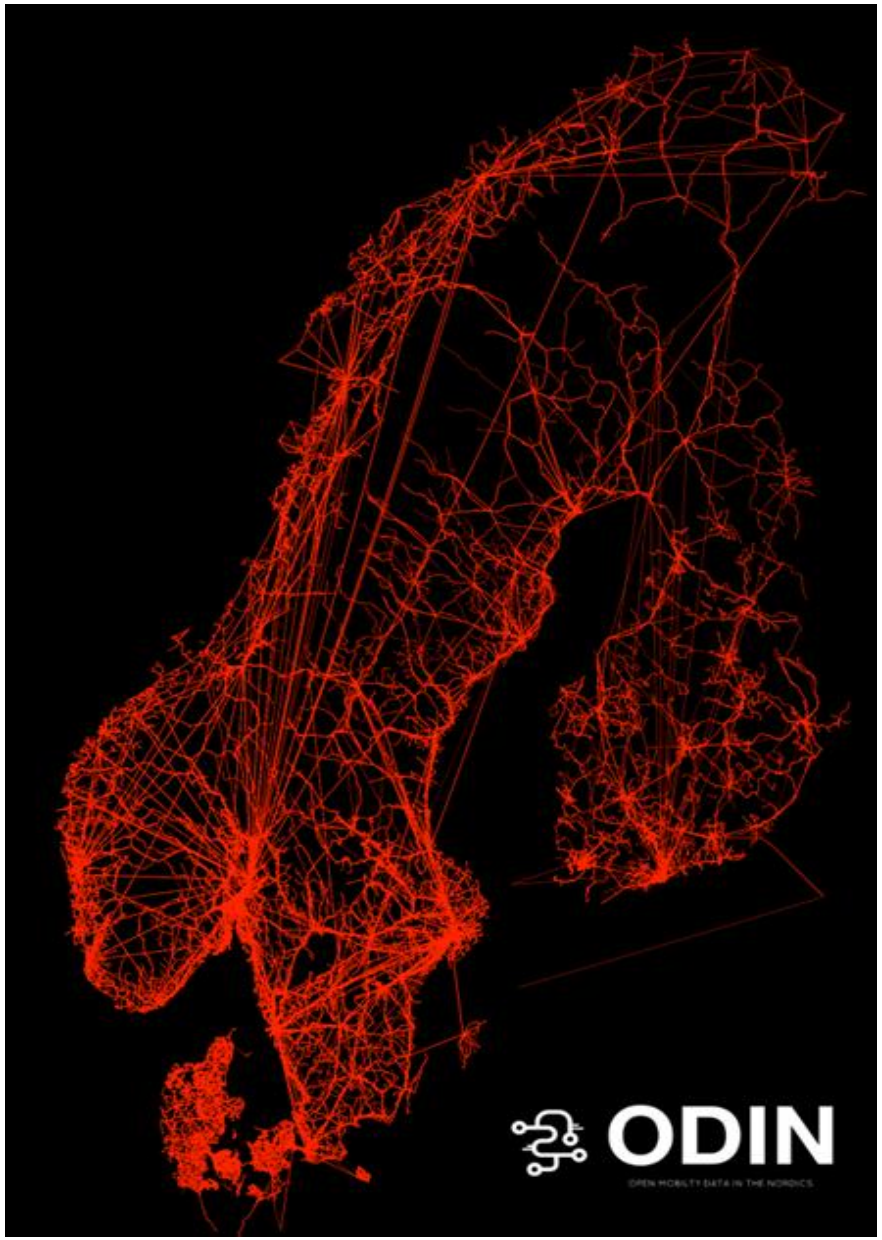
Kysttrafikk

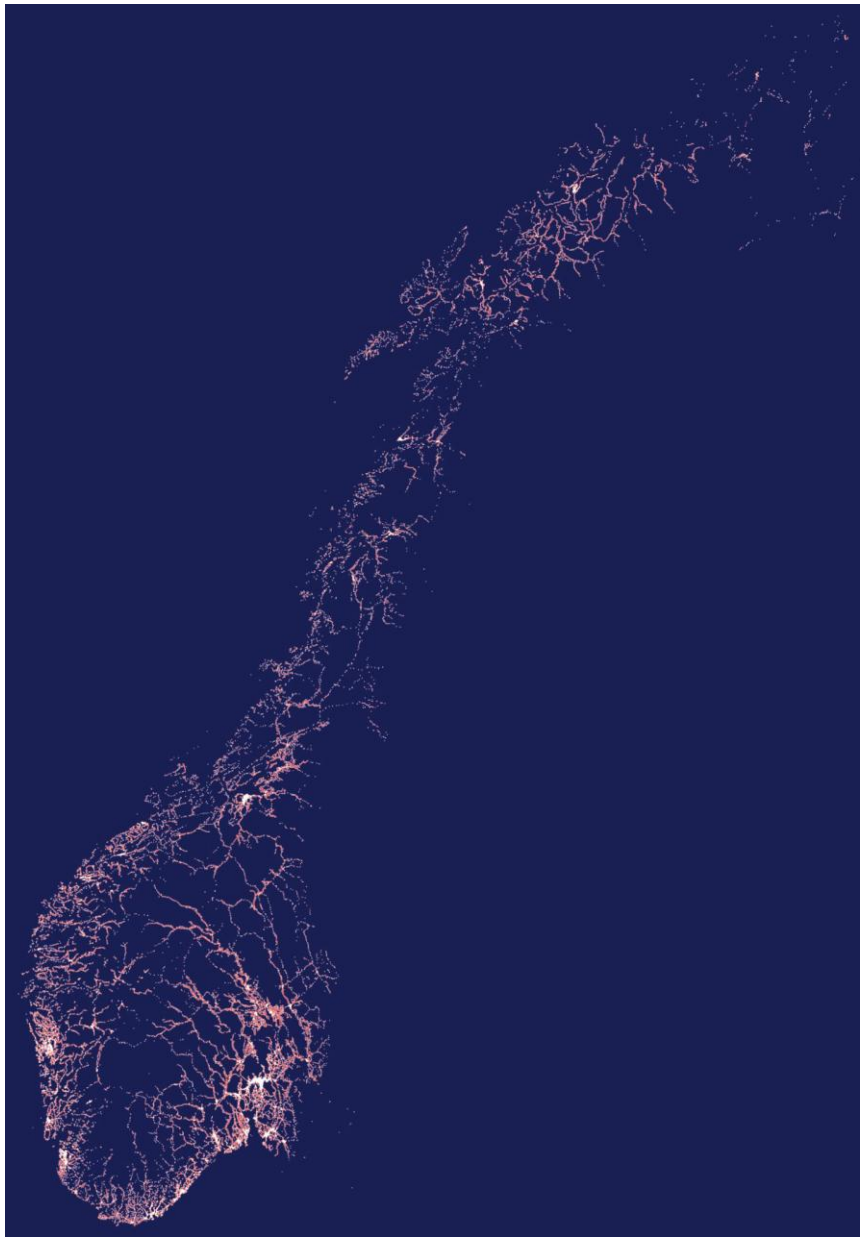




Kilde: Kystverket

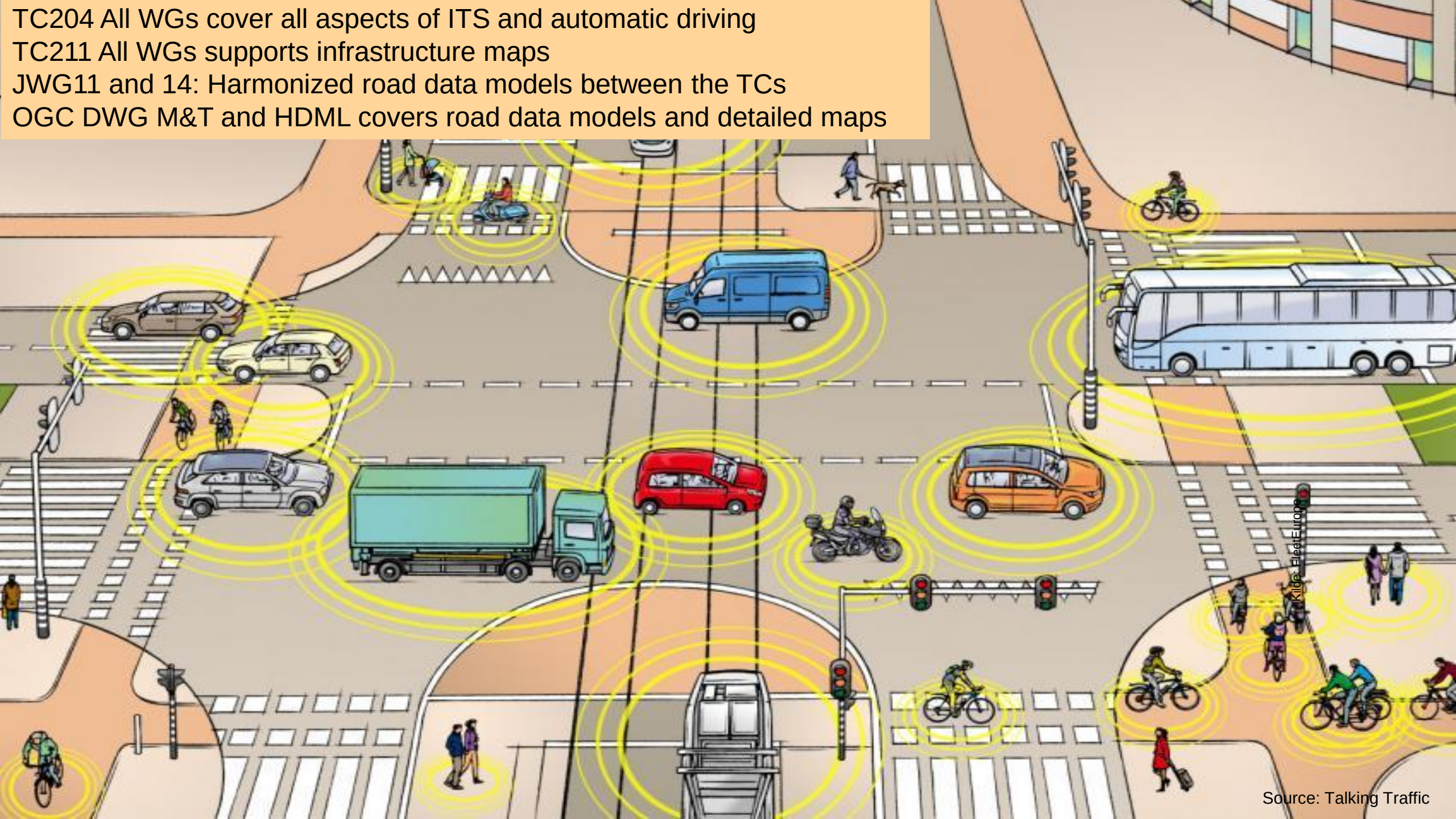
Kollektiv- transport ruter og holdeplasser





Kilde: Entur/ODIN

TC204 All WGs cover all aspects of ITS and automatic driving
TC211 All WGs supports infrastructure maps
JWG11 and 14: Harmonized road data models between the TCs
OGC DWG M&T and HDML covers road data models and detailed maps



Source: Talking Traffic

S-100 WORLD

Source: IHO

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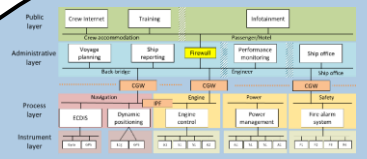
Source: SangKi Hong

Maritime ITS versus «Conventional» ITS



Onboard data networks

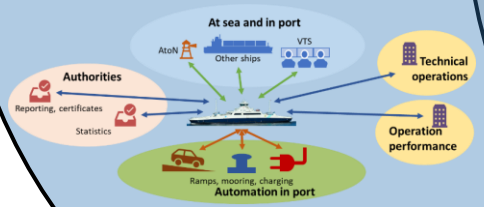
Ferries

Traffic management

Autonomous ships

Driver information

Ports and terminals

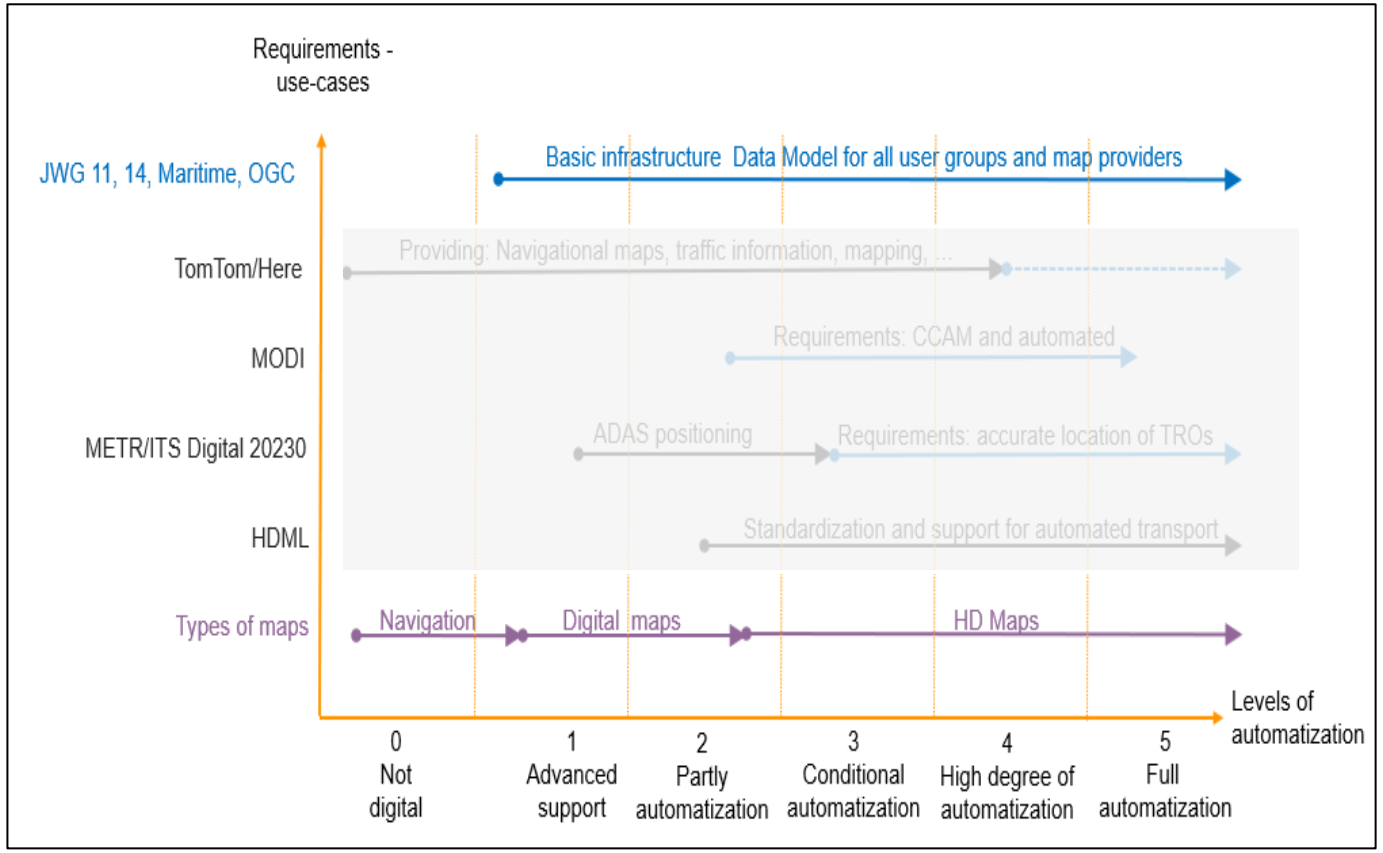


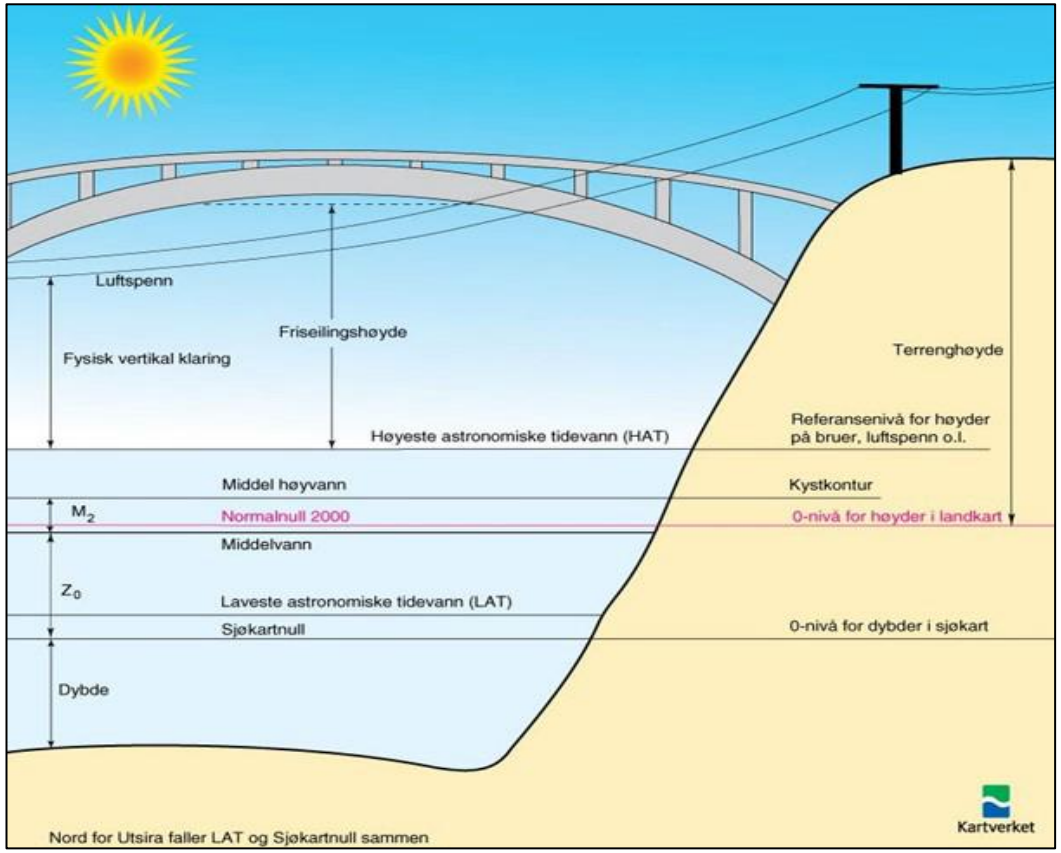
e-Navigation,
shore communication

Autonomous cars

Source: Ørnulf Rødseth

Maps: Lack of coverage? Different observation of Sea Level?

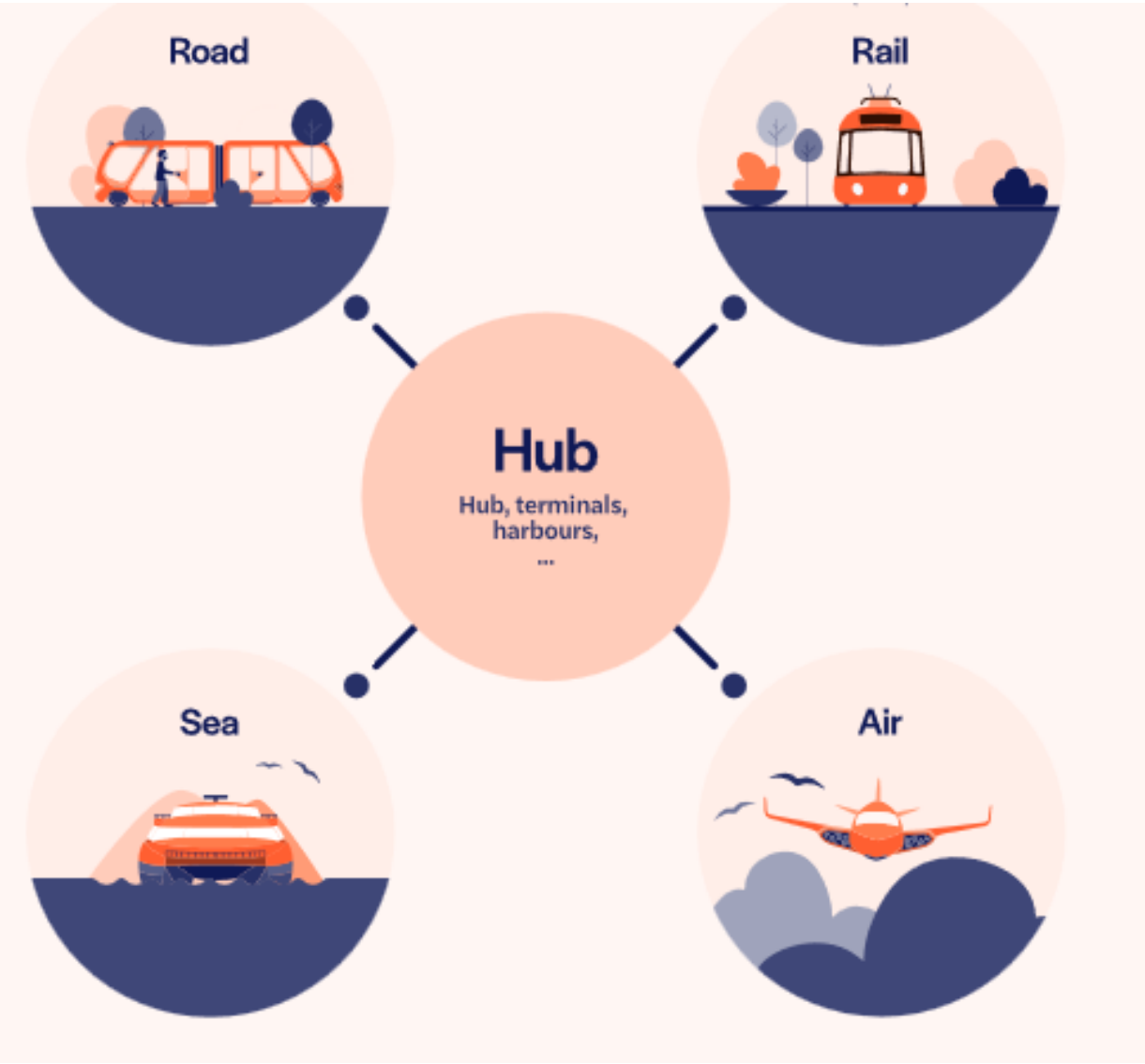




Source: NMA, Dr Wu / Trond Hovland

Hub Breakdown

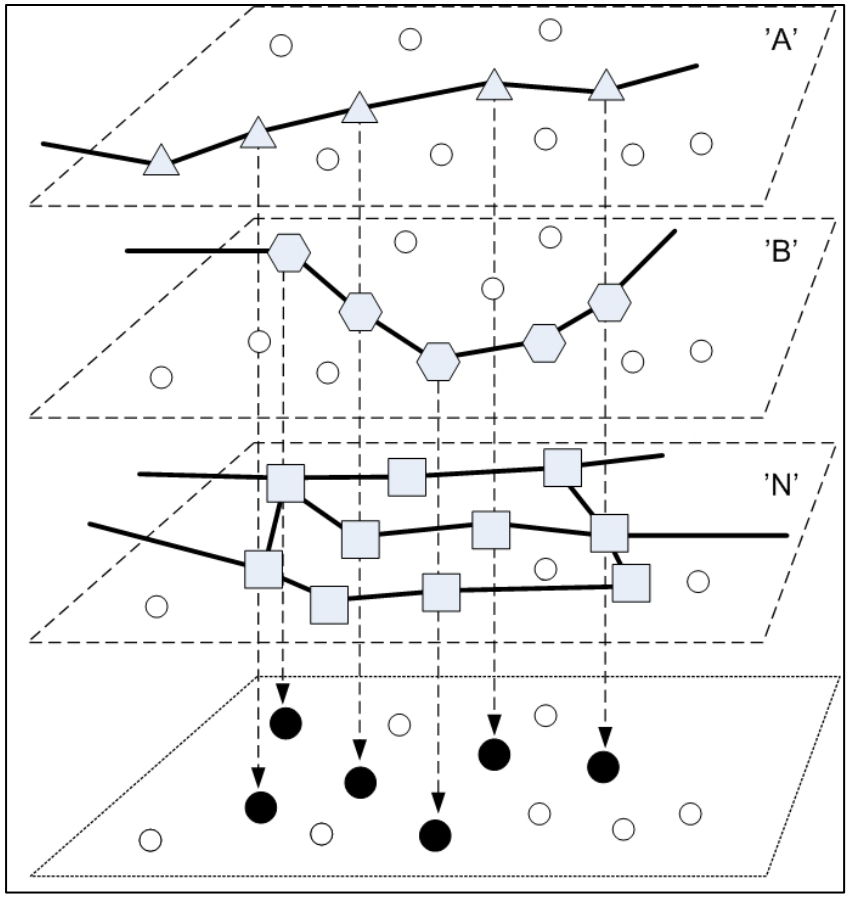
- Road:
  - Many standards to choose from – still deterioration of data …
  - Lack of standards lead to flourishing of proprietary data formats
- Maritime:
  - Consistence standard series S 100, 200, series
  - Accurate enough for automatization?
- Hub:
  - Standardization breakdown?
  - No standards for intermodal stream of data
  - Except for single business enterprises like DB Schenker, Maersk, UPS, …
  - Different map and datums

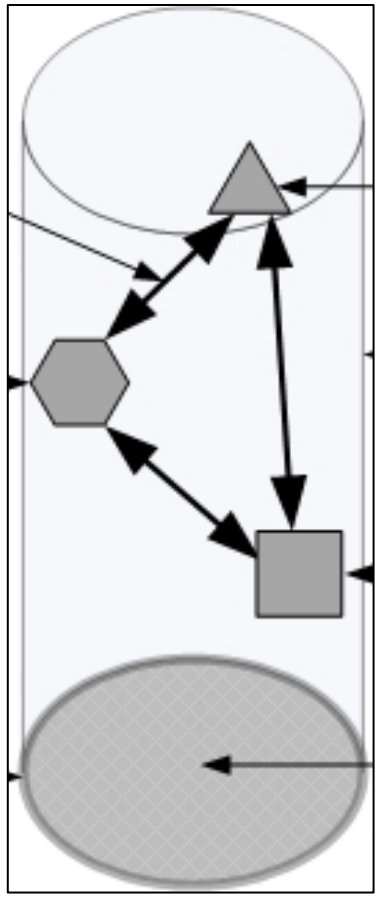


Source: ITS Norway

Hubs – Transfer Nodes

- ISO 19147
  - Minimum information need to change mode time:
- IFOPT
  - Stop place model
- Transmodel
  - Stop place for mobility
- ARCTRANS
  - Framework for the transportation sector
- ORCHESTRA
  - Data Model/Architecture for intermodal/multimodal mobility and transport





Source: ISO19147/Trond Foss

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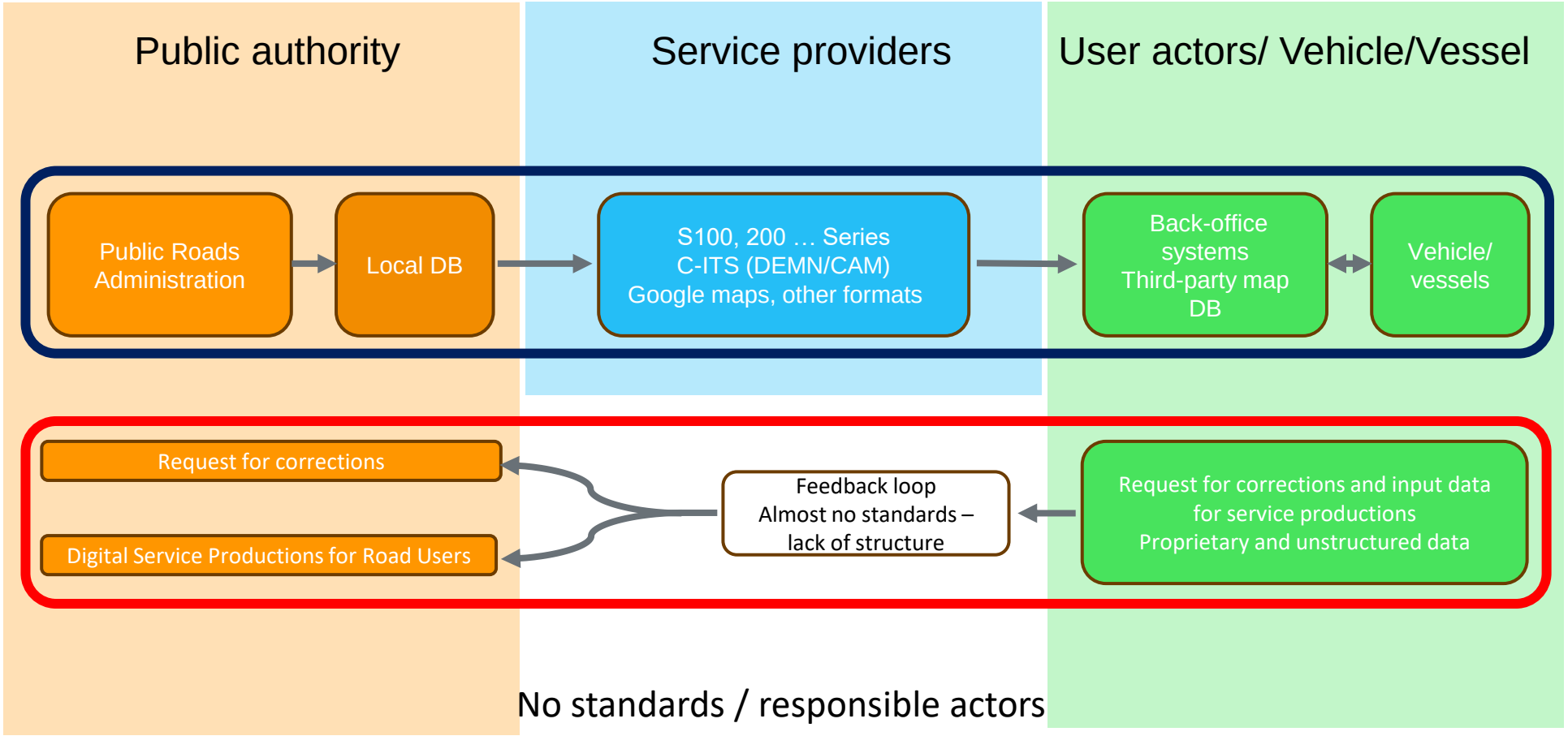
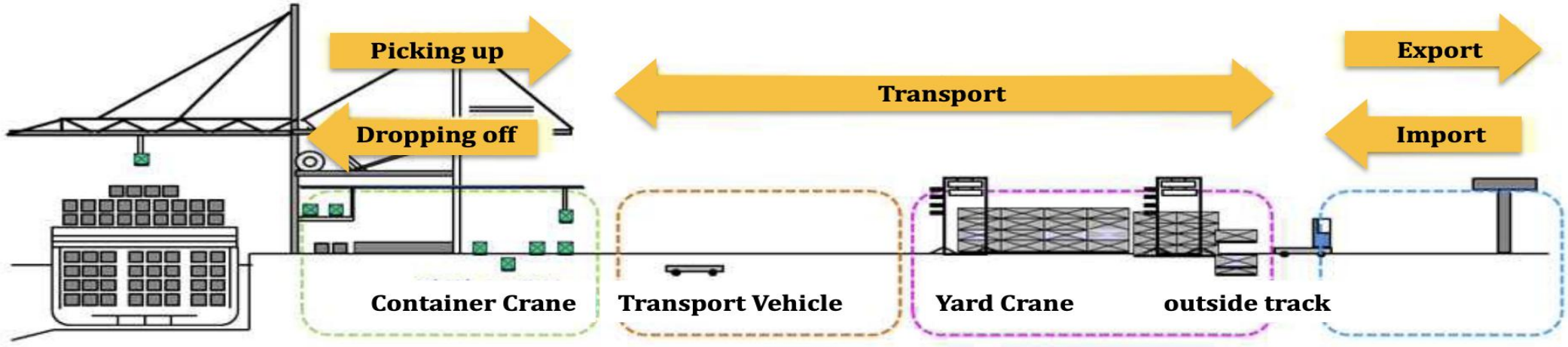
Source: Herøya Industry Park

The Trouble … the black and red boxes



Source: NPRA/Trond Hovland

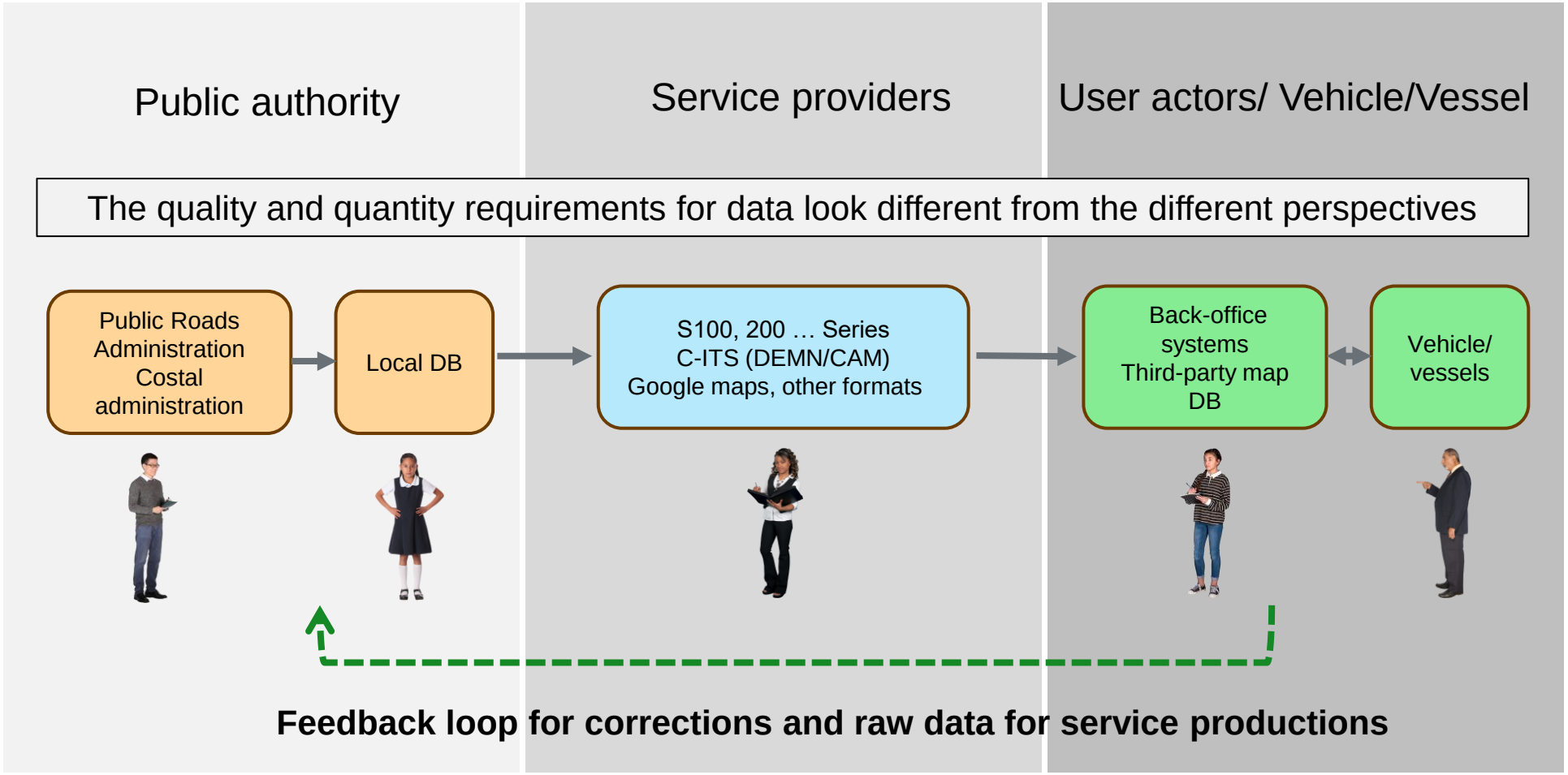
Port Information Model for Seamless Maritime Logistics



Port Area	Shipping Area	Transfer Area	Yard Area	Gate Area
Major Agent	• Remote Crane	• Auto Guided Vehicle(AGV), Autonomous Truck	• Remote Crane	• Autonomous Truck
Geospatial Feature	• Container Crane • Area for Container picking up and dropping off	• Port road network for Transport Vehicle	• Yard Crane • Container Yard	• Truck Gate Out • Train Gate Out

Source: JWG11/SangKi Hong

Perspectives!



Source: NPRA/Trond Hovland

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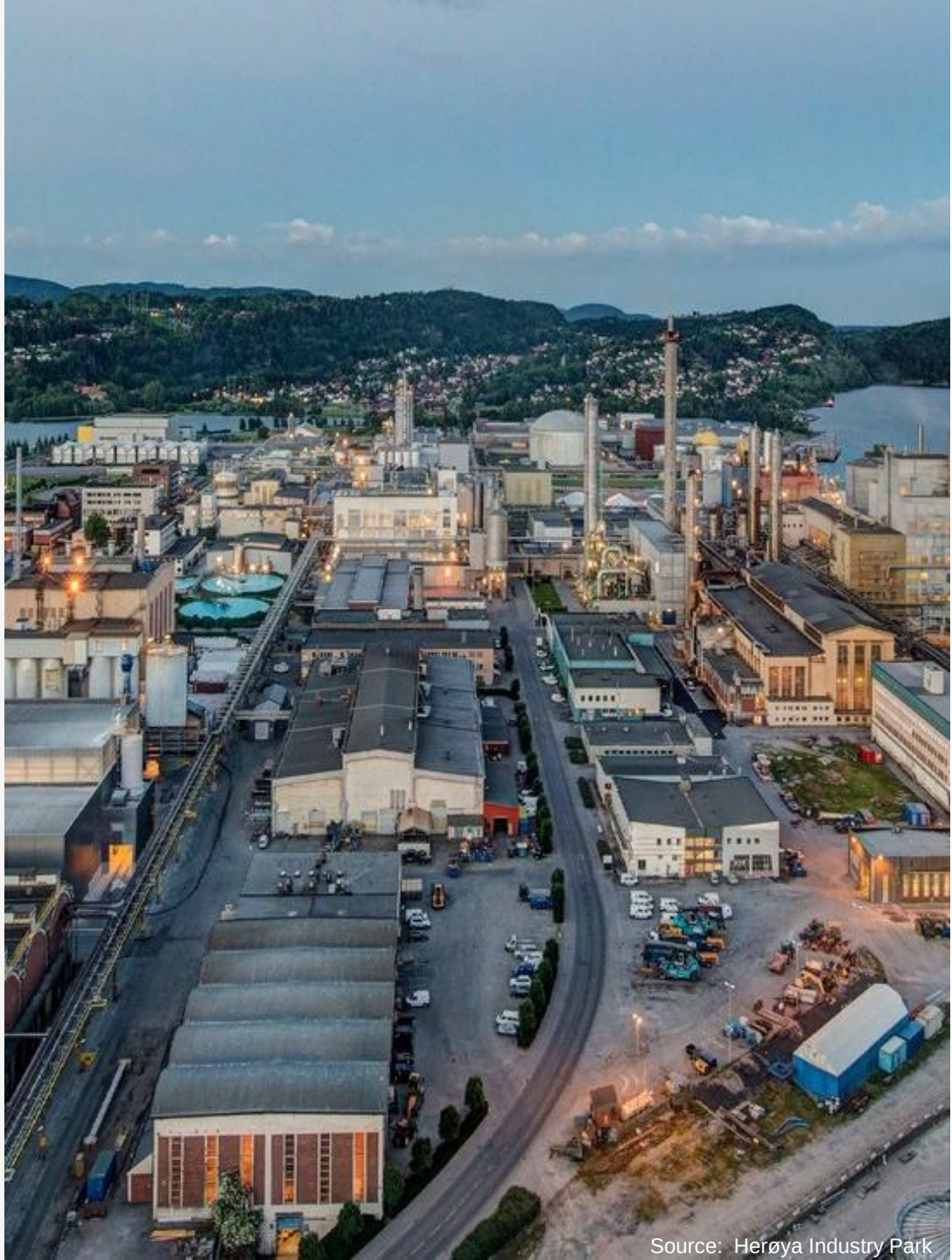

Source: Herøya Industry Park

Thank you for listening!

Trond Hovland

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