



Finnish Transport Agency

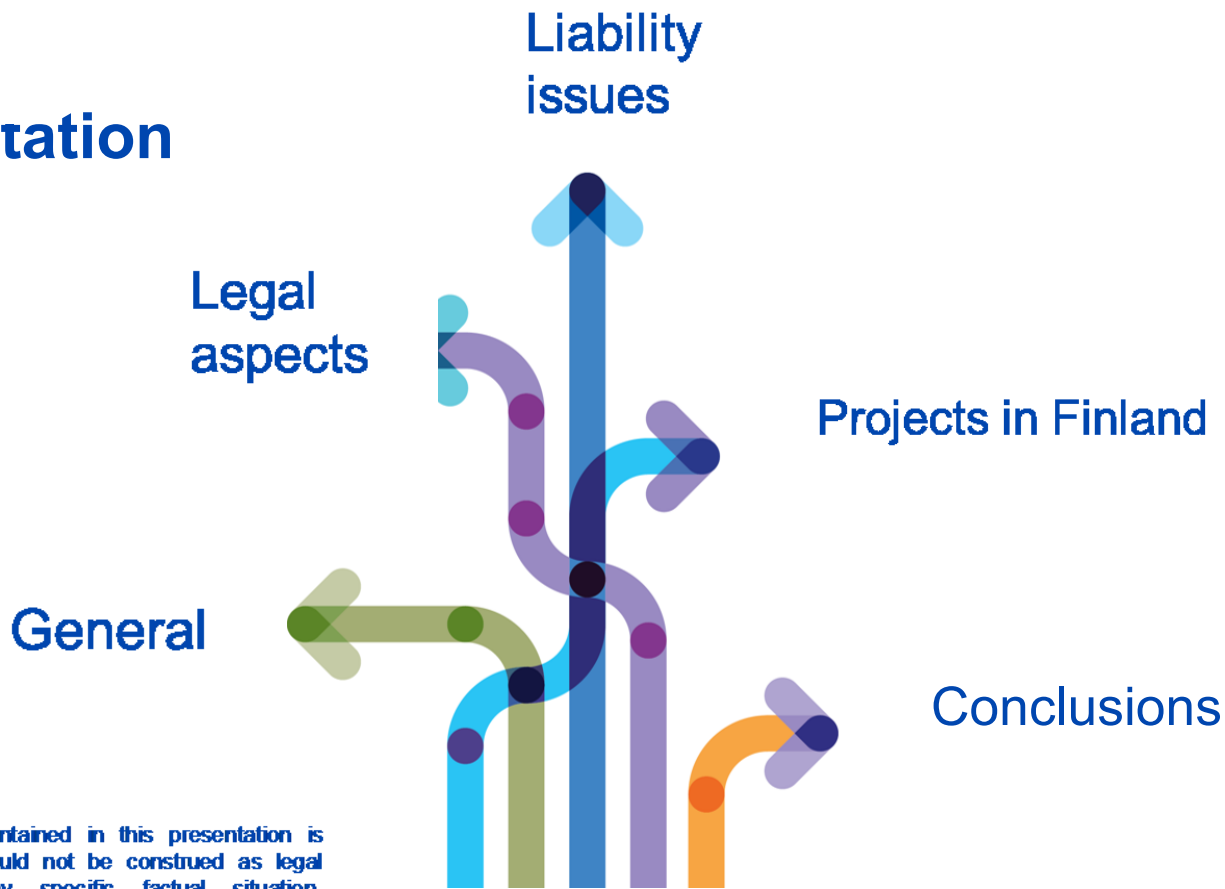


Legal aspects and liability issues concerning autonomous shipping

E-Navigation underway 2018
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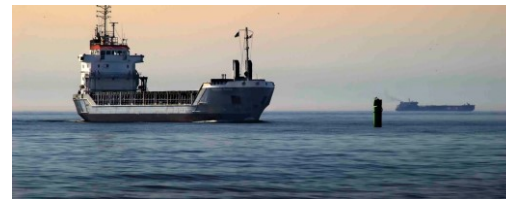
The presentation



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About automatization



All sectors of business and industry have for long been transformed into a digital society. This is also the case in maritime business. This has been called progress.

But new thing is the possibility of remote control through cloud services and fully automatic systems.

This leads to new legal and liability consideration.

This presentation intends to highlight some central issues in this regard. This presentation does not try to solve them or give clear answers.





Automatization is a tool



Automatization is a tool to reach something: safety, effectiveness, economical goals. It depends on customer's needs.

Automatization intends to take over human element.

As a tool the automative equipment must fulfil the technical requirements.



Grade of automatization	Legislation
Fully manual	Traditional legislative situation
Automatization as a tool	Technical requirements?
Unmanned ships, remote controlled ships	Does the legislation require master and/or crew onboard?
Fully automated system	Technical requirements? Legislation?





Does the international legislation allow the ship to be unmanned?

OR: Is there any rule that would require the ship to be manned?

- Norms that concern coastal countries. Mainly UNCLOS.
- Ships' technical requirements. Mainly IMO-legislation.
- Other legislation, soft law, business rules: liability issues, contracts, insurance etc.



Main international legislation

UNCLOS = The United Nations Convention on the Law of the Sea

- establishes rules governing all uses of the oceans and their resources
- *"Law of the Sea"*

SOLAS = The International Convention for the Safety of Life at Sea

- International Maritime Organization (IMO) legislation
- minimum safety standards in the construction, equipment and operation of merchant ships

COLREG = International Regulations for Preventing Collisions at Sea

- IMO legislation
- *"navigational rules of the road"* to prevent collisions between vessels



Main international legislation

STCW = The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers

- IMO legislation
- qualification standards for masters, officers and watch personnel on seagoing merchant ships

MARPOL = The International Convention for the Prevention of Pollution from Ships

- IMO legislation
- to preserve the marine environment to eliminate pollution to minimize accidental spillage of such substances.



Coastal countries are sovereign in their own territory, but some limitations:

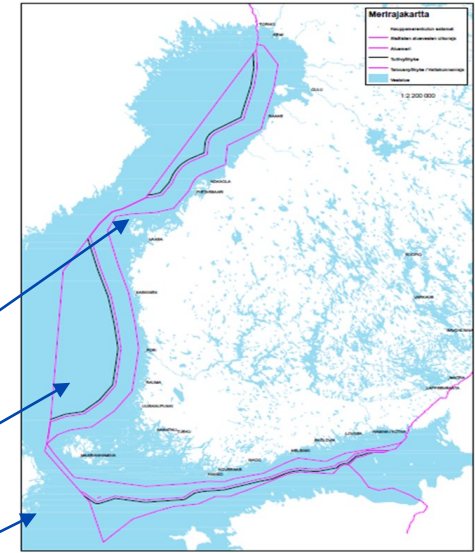
Areal waters

which are used to international traffic

Exclusive economic zone (EEZ)

High Seas

- Law of the Flag.





Areal waters

- Coastal states have wide rights to regulate. States shall fulfil the obligations of UNCLOS and shall exercise the rights, jurisdiction and freedoms recognized **in a manner which would not constitute an abuse of right.** (UNCLOS Art 300).
- Innocent passage (UNCLOS Art.19.1). The coastal State may adopt laws and regulations, in conformity with UNCLOS and other rules of international law, relating to innocent passage through the territorial sea (UNCLOS Art. 21.2.)
➔ **Also unmanned ships.**



Exclusive economic zone (EEZ)

- Freedom of the seas (UNCLOS Art. 58)
- Coastal states may set limitations that are based on generally accepted international rules and standards.
 - ➔ Importance of international cooperation at regulation process (IMO, IALA, IHO ...)



UNCLOS



Are the ships without master and crew onboard still called ships?

- The rules are similar for both manned and unmanned ships.
- The unmanned ships enjoy the same passage rights as other ships.
- Ships cannot be refused to access to coastal states' waters only with that ground that they are not crewed.



Is the master or crew required onboard?

UNCLOS Art. 94(4)(b) ... each ship is in the charge of a master and officers who possess appropriate qualifications ... the crew is appropriate in qualification and numbers for the type, size, machinery and equipment of the ship.

UNCLOS Art.98(1). ... master of a ship ... to render assistance to any person found at sea in danger of being lost.

➤ **Unclear situation.** How to be arranged? Radio communications?



COLREG



What is the meaning of the ordinary practice of seamen (Rule 2)?

- Human decision-making.
- Remote controlled ship: Question is that what and by whom the navigational decisions are made, not where this has been done.
- Unmanned ships: **Unclear** how this will be fulfilled in unmanned ships. Need more investigation.

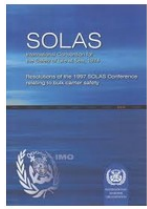
Requirement to arrange look-out by sight and hearing (Rule 5) ?

- **Unclear.** Arrangements. Electrical devices?



SOLAS

(some examples)



In general, the provisions of SOLAS apply to unmanned ships when they are on international voyages.

- Mainly no problems, but some changes may be needed.

SOLAS Ch V Reg 154: Ships are “sufficiently and efficiently manned”.

- Does this require that the crew is onboard.

Ch V Reg 15: Bridge construction. Pilot arrangements etc.

- May lead to changes.

Ch V Reg 24: Use of heading and / or track control systems.

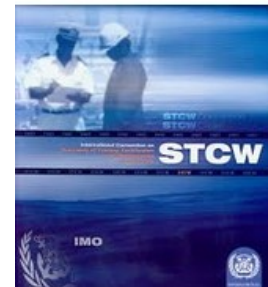
- This may require special arrangements.



STCW

Unmanned ships lead to new standards relating to training, certification and watchkeeping for seafarer.

- There are many articles in STCW that need to be checked and/or altered.
- IMO has started preparative work in this field.





IMO has taken the matter to agenda

In June 2017 MSC 98 included in its agenda a new item “Regulatory framework for Maritime Autonomous Surface Ships (MASS)”

- preparatory study: how this would be taken into IMO instruments?
- IMO needs to take the lead on this issue
- the human element, legal elements, responsibility matters, definitions
- new work item on the provisional agenda of MSC 99 titled “Regulatory scoping exercise for the use of maritime autonomous surface ships (MASS)”.



Question: Does the autonomous system *per se* have influence to the **liability matters**?

What kind of liability?

- Human factor: act of master or crew of the ship or others that are involved. **Liability as a tort.** A civil wrong that causes someone else to suffer loss. Causalisation. Negligence.
- The automative system: is the cause or failure in the system itself. **Product liability.** The one who make products available to the public is held responsible for the injuries those products cause. Strict liability.



Central issues on liability

- Is the system itself capable to interact with the traffic?
- Is the system capable of performing the tasks required, taking into consideration the type and level of services to be provided
- How has the organisation been arranged? Is the staff sufficient and properly qualified?
- Is the means of communication appropriate?
- Is the operation in accordance with the relevant international legislation and guidelines?



As long as the digitalization is kept as a tool, it does not have big influence to the liability issues.



- This means that the master onboard the ship and the remoted officer have the same navigational responsibilities.
- The autonomous navigation may have some effect to insurance premiums.
- In case the autonomous system itself has caused the damage, this may lead to product liability.



Projects in Finland



Intelligence Fairway Project

Integration of the bathymetric model and environmental data are combined with navigational software, electronic chart system (ECS).

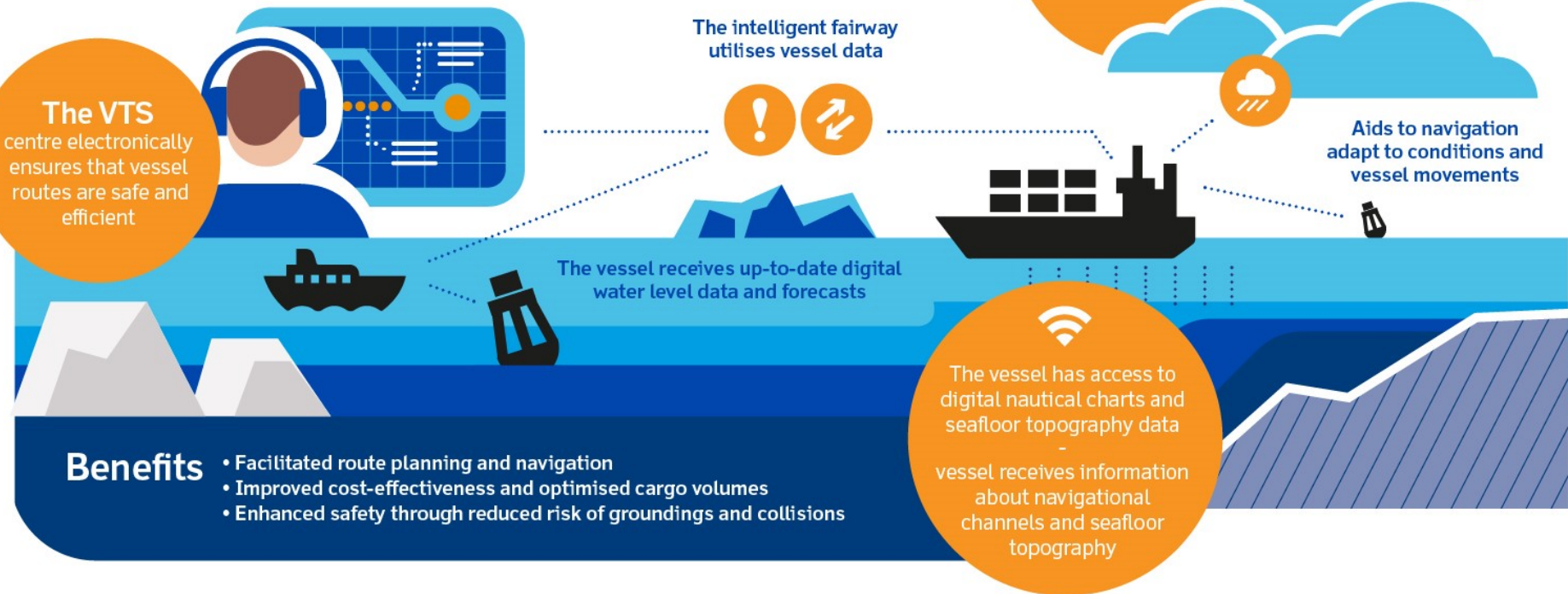
Study how the new tools would affect to mariner's work and situational awareness in the navigational task. Also feedback regarding the data and tools is collected.

bathymetric model "measurement of the depths of the seas"

environmental data "water level, forecasts, currents and wave height"

Intelligent fairways – a step towards autonomous vessel traffic

Objective: effective transports and safe navigation



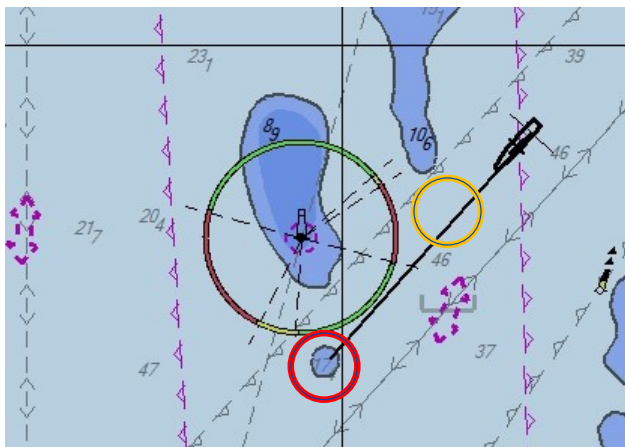


Intelligent Fairway Project

Open source ECS is used, the results would be available for anyone. FTA has published an RFI to collect information from the market before starting procurement of the integration of bathymetric model and water level data. DL line of the RFI is 31.1.2018, DL for entire project is 31.12.2018.

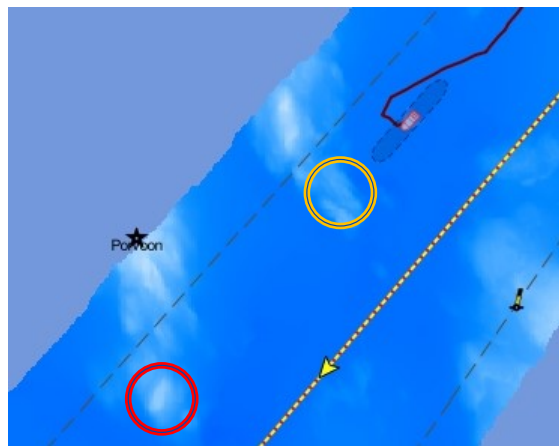
FTA has published an RFI to collect information from the market before starting procurement of the integration of bathymetric model and water level data. DL of the RFI is 31.1.2018, DL for entire project is 31.12.2018.

Simulator testing of S-101 / S-102



ECDIS / ENC

“the traditional way of presenting shallow areas based on ENC chart data”



S-102 COLOR RAMP

“the method based on bathymetric model”



“UNDERKEEL CAMERA”

“a screenshot from marine simulator with bathymetric model”

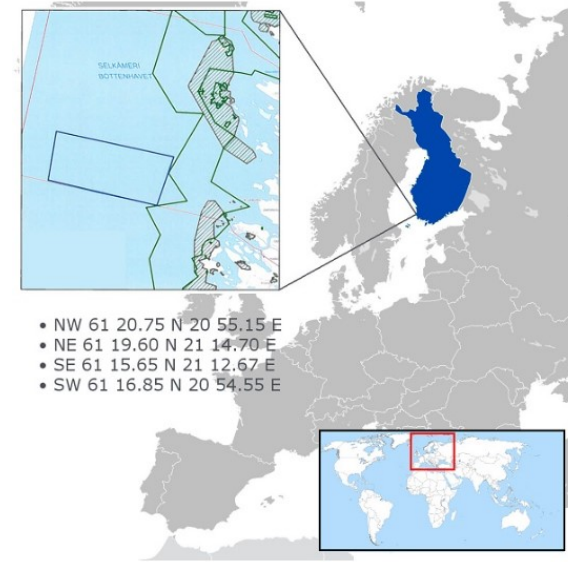


Jaakonmeri test area

The One Sea, Autonomous Maritime Ecosystem, has established an open test area off Eurajoki in Finland's west coast.

Area is open for anyone willing to run trials of autonomous surface vessels. During tests area is closed for any other traffic.

Area is available for test from January to April and again from July to December every year until end of 2025.





Conclusions



- Digitalization is a tool, which depends on customers' needs.
- Automation leads to need to check and alter the international legislation. Need for cooperation. IMO has taken this to agenda and started preparatory work.
- The new rules need to be implemented into national legislation.
- The liability issues are important when the rules are altered. This has impact to insurance field.
- Finland is in frontier in the development.



Allegro finale, manon troppo

Comments...?
Questions...?

Thank you for your attention!

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