



Ministerie van Infrastructuur
en Waterstaat

Steering clear of too much trust

*"Trust is like the air we
breathe – when it's present,
nobody really notices; when
it's absent, everybody
notices."*

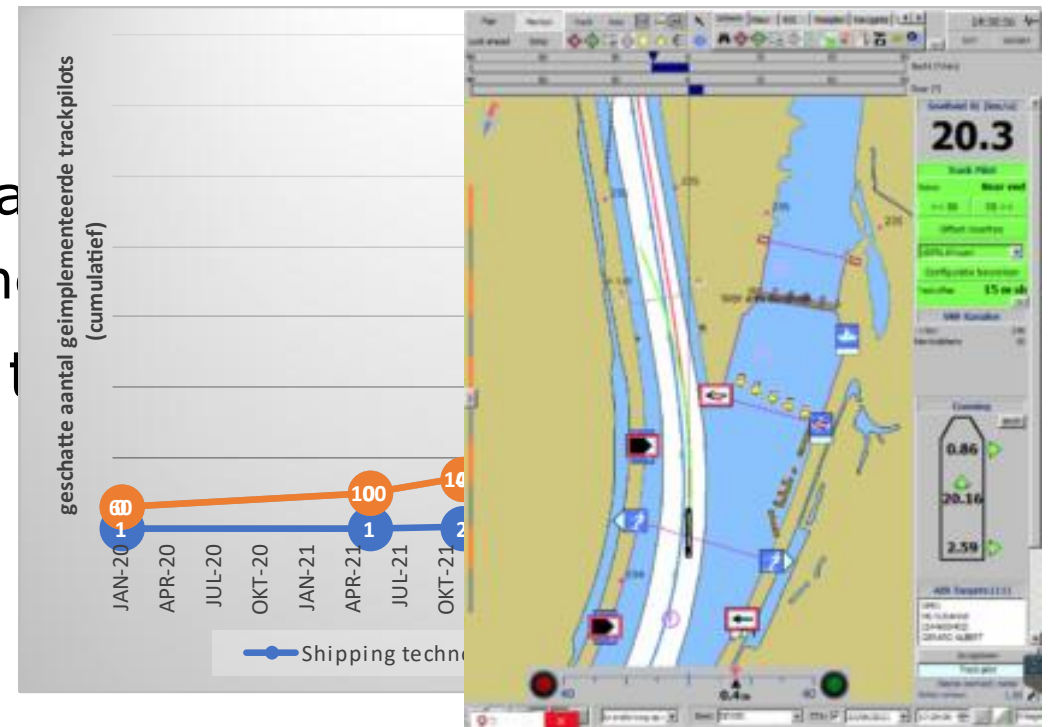
Warren Buffett

Patrick Potgraven
Program Smart Shipping



Use of track pilots in inland shipping

- Introduced in 2014
- Nowadays 3 manufacturers: Argonics, Tresco Engineering en Shipping Technology
- 2 functions:
 1. Create a sailing line from origin to destination
 2. Controls the rudder to keep the sailing line
- Suitable for additional functions, like collision warning, collision avoidance





MARIN survey on Intention sharing

- › Intention sharing between trackpilots in inland shipping
- › Outcomes:
 - Sharing intention information with the surrounding ships will have a positive effect on safety and efficiency





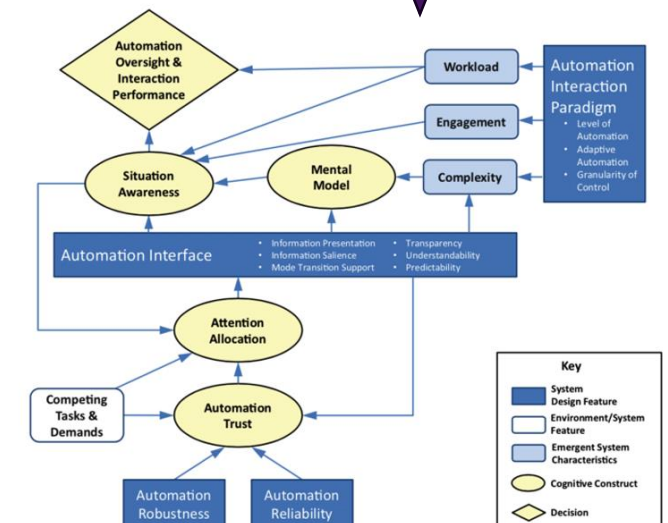
Assignment: best practices trackpilots

- MARIN develops guidelines, procedures and standards for the safe use of Trackpilots:
 - Concept of and interaction with the track pilot
 - User interface design guidelines
 - System performance requirements
 - Implementation of the track pilot on board
 - Maintenance and usage guidelines
- Research based on theoretical framework, but with a practical approach
- Research is supervised by a stakeholder group



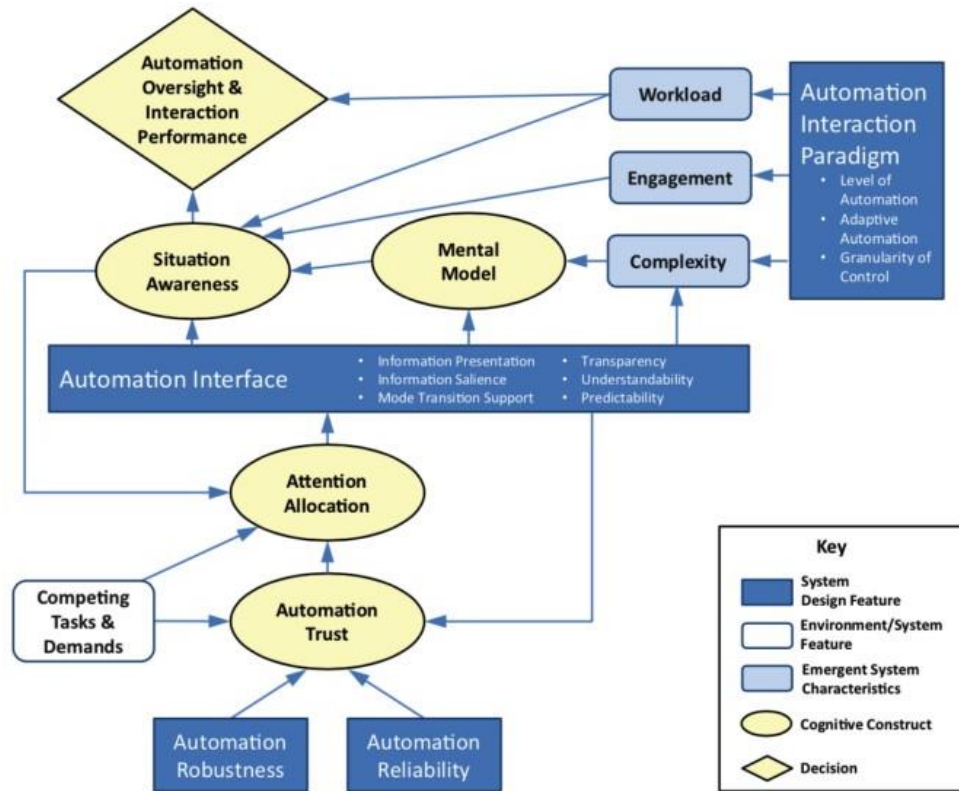
The most important risks

- › Situational awareness / out of the loop
- › Misplaced salience
- › Presence in the wheelhouse
- › Incorrect use (misunderstanding) of the system, due to:
 - Inadequate training or instructions
 - Operation and presentation of the information
 - Problems with taking over
- › Installation errors and problems
- › Hardware/software problems
- › Loss of competences





HASO Features, constructs and characteristics



- > Situational awareness/ out of the loop
- > Trust
- > Attention allocation
- > Level of automation
- > Adaptive automation
- > Granularity of control
- > Automation reliability
- > Automation robustness
- > Automation interface

- › The system assists the helmsman
- › The system becomes more and more advanced:
 - More and more tasks are included
 - The system gets more and more capable
- › The helmsman intervenes less and less
- › Is he able to take over when the systems fails?
- › (Is he even there?)

The automation paradox on
situational awareness



Identification of relevant issues to address in Best Practices

- Number and nature of tasks affected by the automation
 - Voyage planning
 - Vessel monitoring
 - Environment monitoring
 - Vessel navigation and manoeuvring
 - Normal and emergency operation
- Design features that are not directly connected to the navigation task
 - Technical installation and implementation
 - Integration with ship systems
 - Calibrating/tuning
 - Maintenance and repair



We identified Risks and defined 'best practices' on the following subjects (1) :

- › (In)adequate installation on board (f.e. wiring, compatibility);
- › (In)adequate Tuning/Calibration;
- › (In)adequate Reliability of the TP-automation;
- › (In)adequate Voyage Planning
- › (In)adequate Attention Allocation
 - Especially in case of reduced workload, unintentionally leading to loss of attention or falling asleep



We identified Risks and defined 'best practices' on the following subjects (2) :

- › (In)adequate Controls (f.e. change over, track planning)
- › (In)adequate Education & Training
- › Long- and short-term declination of Engagement and/or Competence
- › (In)adequate Information Generation and Presentation, settings, warnings, alarm.
 - What, Where, How and How Salient information is presented
 - Distinguish between safety critical and non-critical information



Best practices were defined for:

Safety case 4: Emergency/failure operations



| | Risk | Best practice subjects |
|---|---|--|
| 1 | Sensor failure: incorrect or no data | Certification of sensors & guideline incorrect data identification |
| 2 | TP navigates with wrong data | Incorrect/ wrong data identification procedure |
| 3 | TP inadequate keeps track in corners/ with current | Operational test/ certification procedure |
| 4 | Drifting in corner with larger error than predicted | Operational test/ certification procedure |
| 5 | System shuts down unplanned | Fail safe guidelines/ procedures |



All safety cases in the MARIN rapport





Example: Leaving the wheelhouse unattended?

- › Prohibited, but nevertheless the case
- › Also done without trackpilot, but a trackpilot
- › Does the trackpilot manufacturer feel responsible?
- › They felt that a watch alarm should be more





Concluding

- Using a trackpilot has positive effects on navigation:
 - Reduces the workload
 - Navigation is more precise
- Nevertheless: trackpilots do have limitations
 - Challenges regarding safe sailing
 - Manufacturers feel obligations to mitigate those risks





And then?

- › Jan '24: The industry is willing to bring out an industry standard
 - › Mar '24: CESNI start work to include the trackpilot in ES-TRIN-27
 - › Apr '24: The industry waits for development in CESNI
-
- › Suggestions from the best practices study are implemented voluntarily by the manufacturers
 - › 2024: Start of an inventarisation study to the safety aspects of remotely operated inland sailing



Ministerie van Infrastructuur
en Waterstaat

Room for questions and discussion



Volg ons op
PleinIenW