Autonomy On Manned Vessels

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The Nautical Institute

- International Professional Body
- For all Maritime Professionals
- Focus on Professional Development
- Members provide industry feedback
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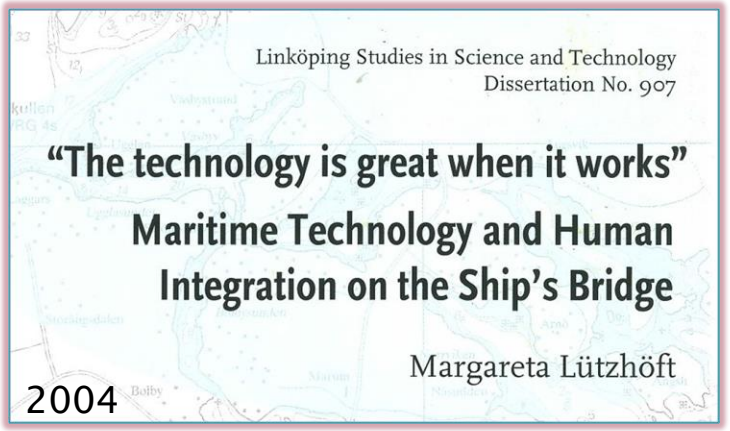
Concerns about autonomy

- Are we prepared
- How do we get prepared
- The extent of autonomy onboard
- What goes in – what comes out
- What is the relationship between humans and systems
- Level of redundancy
- When/if it goes wrong?



Autonomy with humans

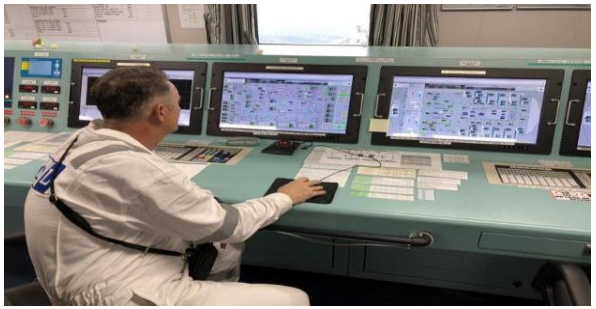
- 60,000 + SOLAS Ships designed for humans
- Fairly complex operations
- Challenge for Situational Awareness
- Challenge for workload
- Drive for more effectiveness and efficiency
- Transition period

Impressions

- Mariners are fairly pragmatic
- Probably more positive than negative
- Trust is a big issue
- Recognition of what technology is good at
- Recognition of what humans are good at
- Dubious of poor investment
- Dubious of technology for the sake of technology
- Would like to articulate the complexity of operating ships.

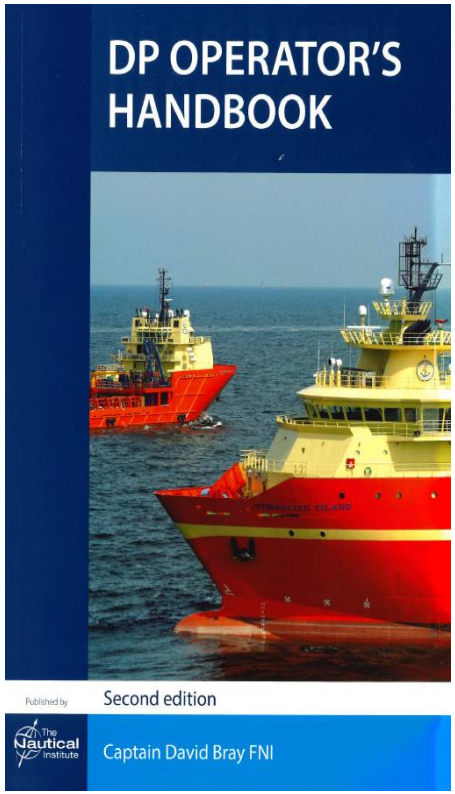
Lots of Automation

- Automatic Radar Plotting Aid (ARPA)
- ECDIS, Track Control, AIS, etc…
- Decision Support Systems
- Unmanned Engine Rooms, Cargo monitoring
- Maintenance & monitoring
- Emergency Response, etc…



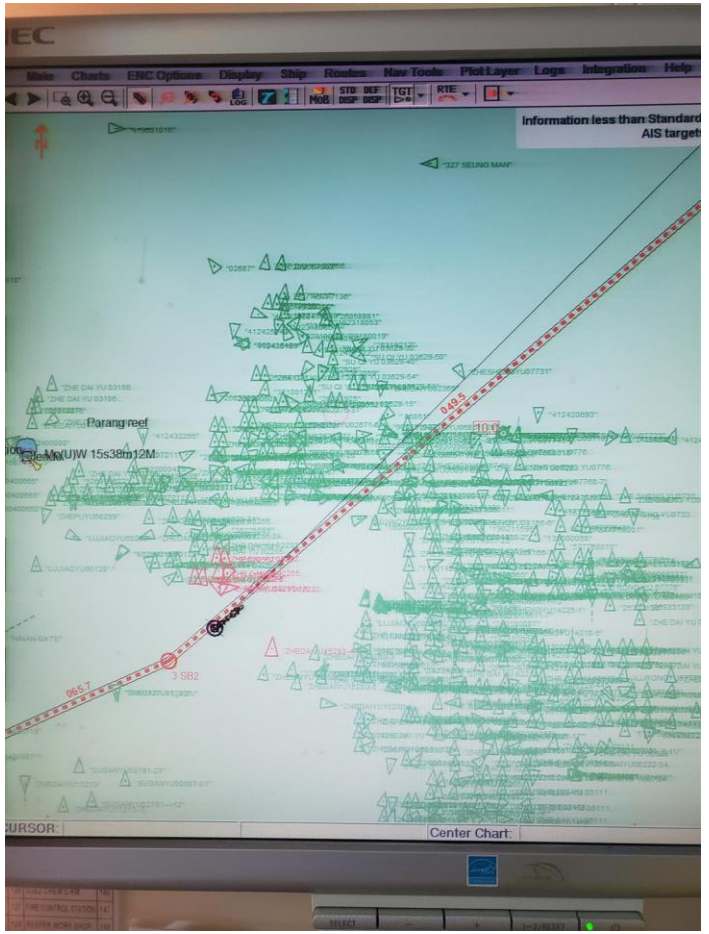
Dynamic Positioning

- Safety critical
- Good redundancy
- Extra training
- Focus on escape during failure
- Graceful degradation
- Failure Mode and Effects Analysis (FMEA)
- Annual Sea Trials



Learn from experience

- ECDIS/AIS
  - Early adoption of ECS
  - Complexity
  - Amount of information
  - Poor standardisation
  - Quality of data
  - Alarms!!!!!!!!



Seamanship

- Continuous monitoring and anticipating
- Situational Awareness
- 6th Sense
- Physical reactions (to shipboard challenges)

Wish list

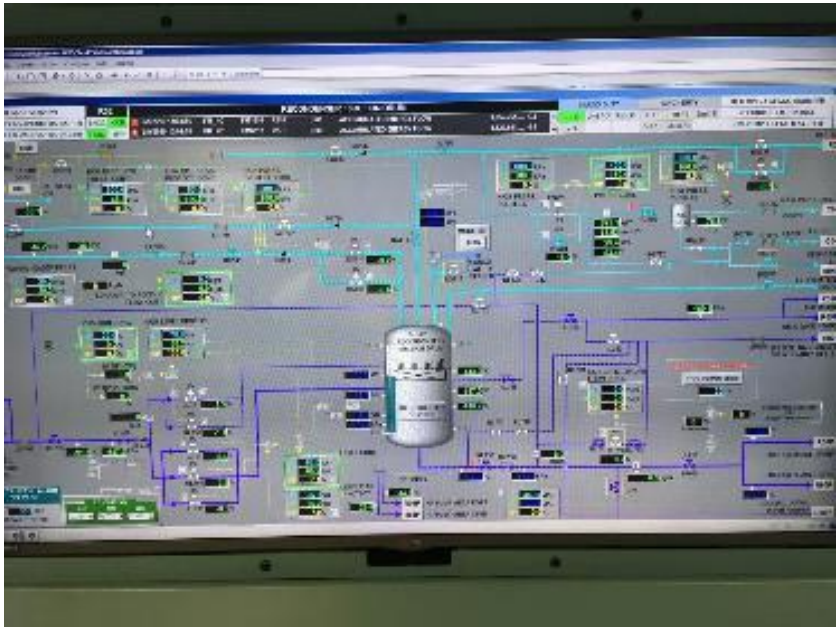
- Reliability!
- Improved Lookout, target acquisition
- Effective decision support
- Reduced workload (admin)
- Emergency response
- Maintenance
- Alarm management
- Automated logging

Fear

- Failure and time to take over
- Misunderstanding
  - Of use
  - Of algorithms/data quality
  - Limitations
  - Responsibility / accountability
  - Authority
- Maintaining Situational Awareness

Involved in design

- Clear goal for automation
- Human Centred Design (HCD)
- Fit for purpose
- Intended users
- Training needs



Uncertainties

- Difficult to predict the future
- Perceptions
- Quality of AI
- Training of AI
- Social implications of AI

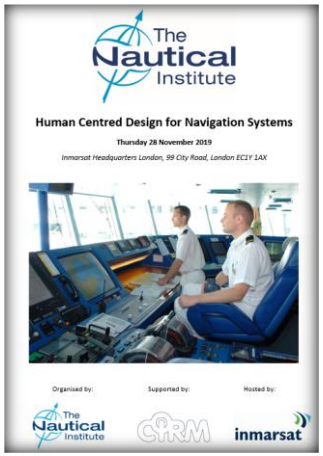
Training needs

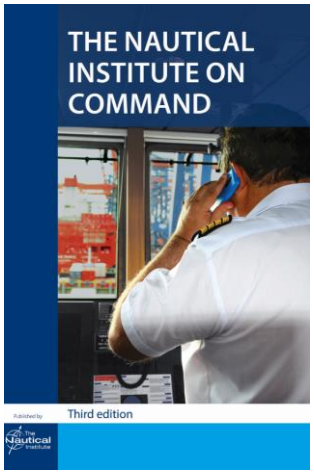
- Beware of skill fade
- IT Skills (many vessels don't ETOs)
- Understanding Algorithms
  - Algorithmic injustice…
- Understanding data quality issues
- Cyber Security

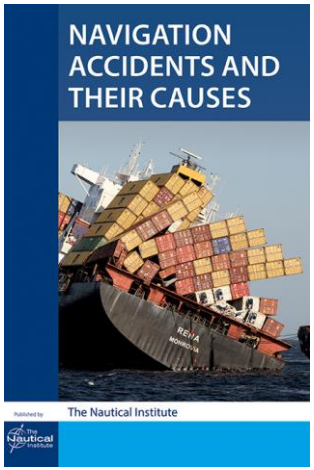
Way forward

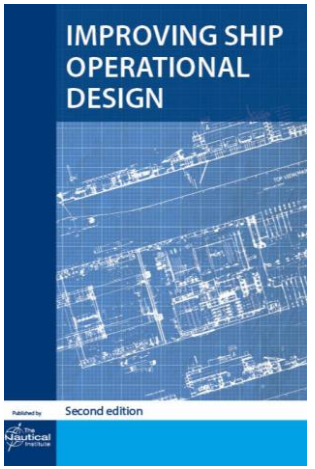
- Clear goals
  - Replace; augment; teaming
- Human Centred Design
- Onboard Human behavioural observations
- Line Operation Safety Assessment (LOSA)

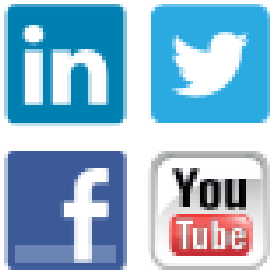
NI Activities











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Onboard Competency Assessment

Support of The Nautical Institute through membership and participation is very much appreciated!

Thank You

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