

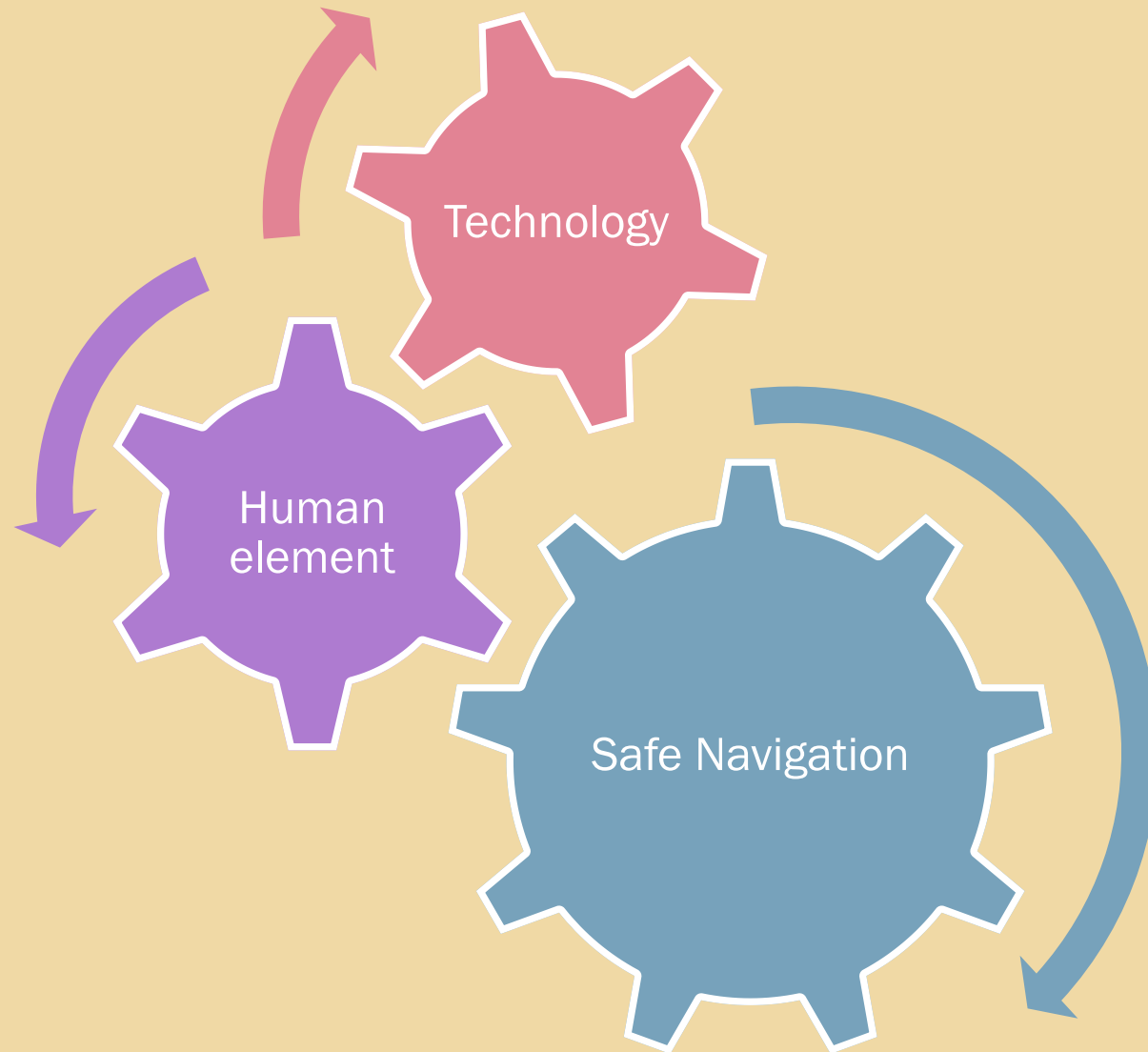


Interfacing technology and the human element for safe navigation

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Contents

- Technological advancement in the Bridge for safe navigation
- Human element – the dynamic phase
- Interaction of technology and the human element
- Management of outcomes from technology and human element



Technological advancement - Bridge

- From
 - *RADAR / ARPA , Satnav, LORAN / DECCA*

- To
 - *Global Navigational Satellite Systems such as GPS, Galileo, Glonass, Beidou etc. &*
 - *ECDIS*
 - *AIS*
 - *LRIT, BNWAS*

Technological advancement - Bridge

- Integrated Bridge Systems, Integration of ECDIS and RADAR for data sharing
- Updated ECDIS display with latest IHO updates on the PL4
- Fibre optic Gyrocompass, Solid state RADAR, Enhanced target detection
- Positioning - GNSS receivers or GPS receiver

Technological advancement - Bridge

- As per IMO initiative for safe navigation --

- E-navigation is defined as

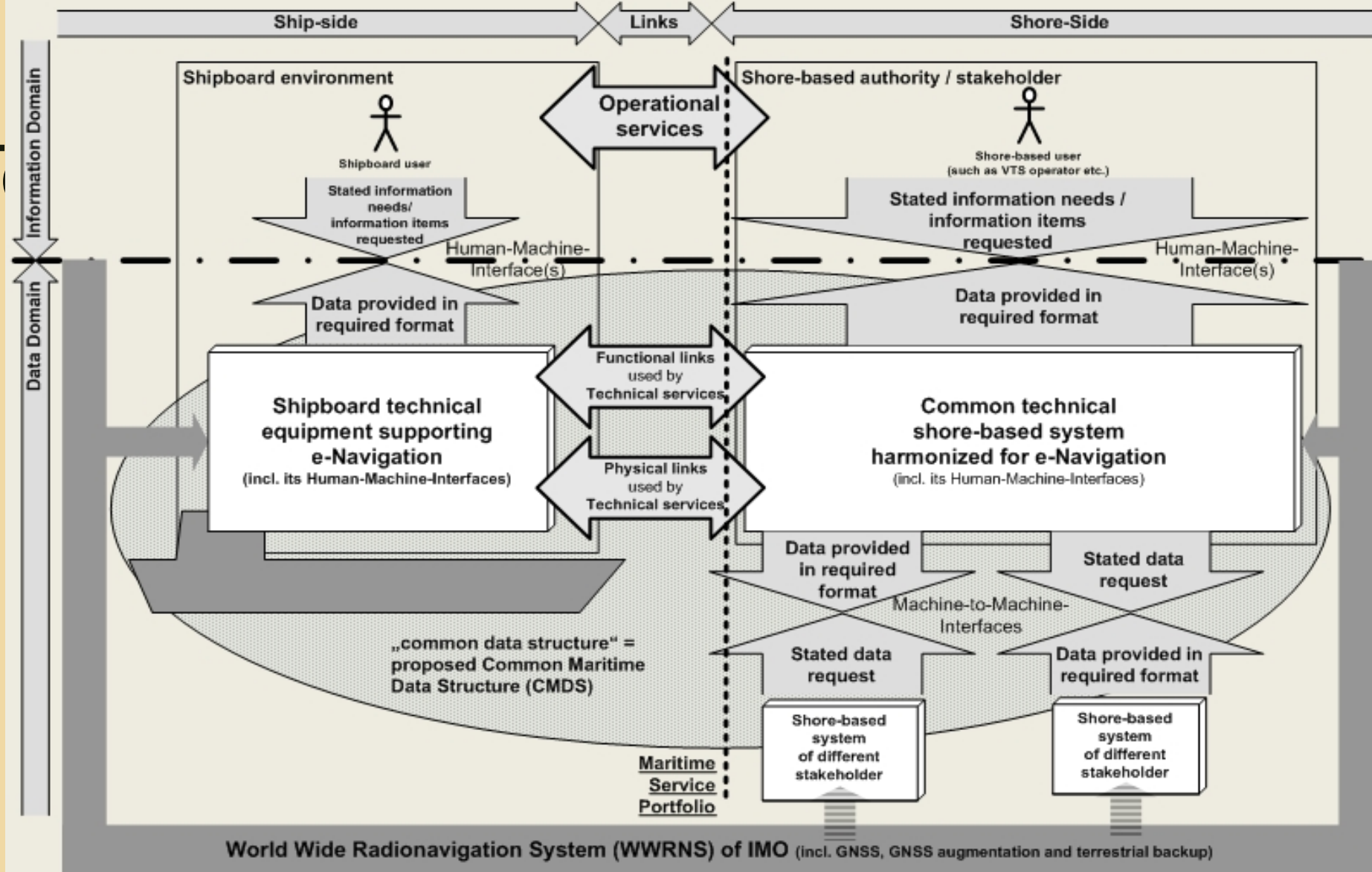
“the harmonized collection, integration, exchange, presentation and analysis of

marine information on board and ashore by electronic means to enhance

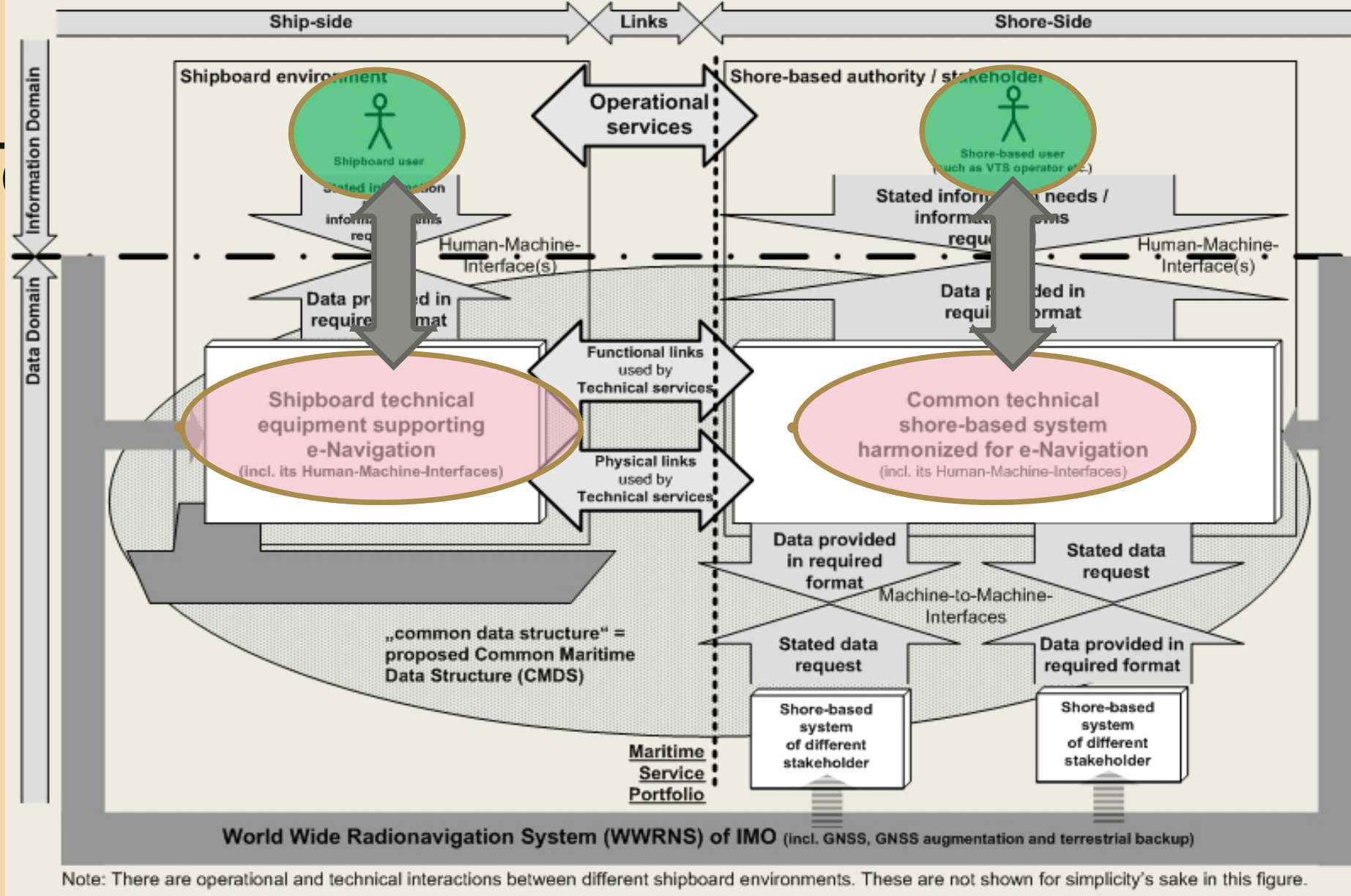
berth to berth navigation and related services

for

safety and security at sea and protection of the marine environment.”



Note: There are operational and technical interactions between different shipboard environments. These are not shown for simplicity's sake in this figure.



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Human element

Technology

Human element

- Contribution of human element
 - *Design of equipment*
 - Original design
 - Retro fitting
 - *Operation of the ship*
 - Type of ships
 - Type of cargo
 - Multi-national crew
 - *Role of shore management*

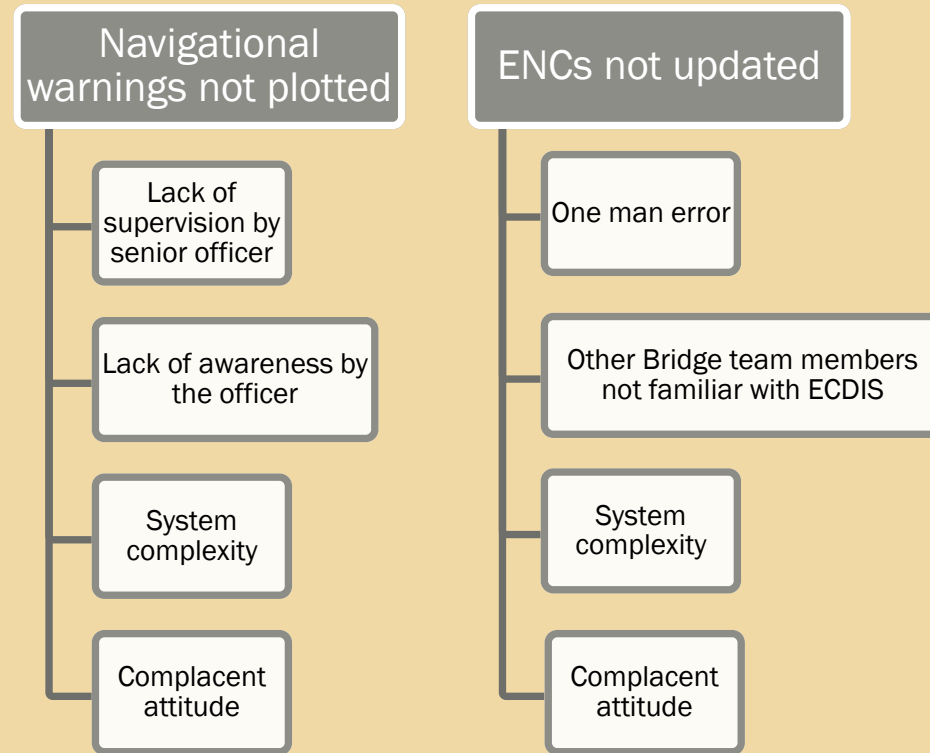
Human element

- Measurement criteria
 - *Efficiency of operations*
 - *Near-miss, incidents, accidents reports*
 - *In-house tools to do fleet performance*

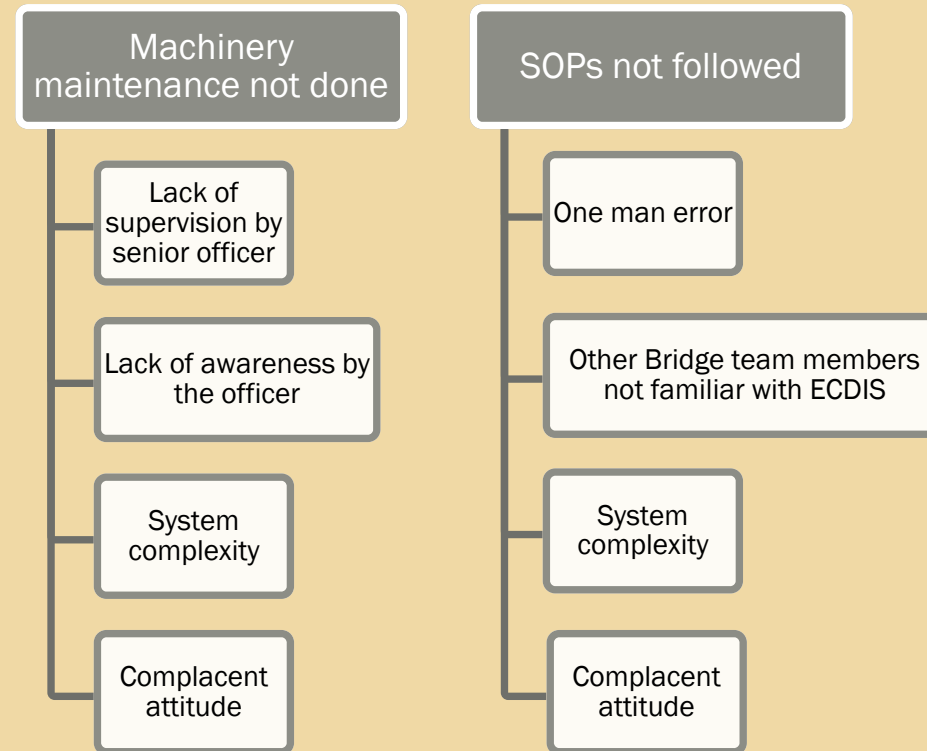
Human element

- Marine accidents and incidents
- Findings from the investigations
 - *Lack of awareness about navigational warnings from various systems such as Inm – C, Navtex*
 - *Chart corrections including management of corrections on ENC's*
 - *Fatigue*
 - *Not following standard procedures – crew injury, breakdown of equipment ..*
 - *Lack of maintenance – machinery*

Human element



Human element



Interaction of technology and human element

- Ship specific equipment training
- Shore based management for effective monitoring
- Mentorship role by Senior officers

Interaction of technology and human element

- Cybersecurity issues
- Advancement of technology
- Crew selection
- Training and continued professional development

Management of challenges

- Suggested methods to manage the challenges
 - *Motivation of the staff*
 - *Regular training as per Gap Analysis*
 - *Participation in grooming officers / crew for long term employment*

Management of challenges

- Suggested methods to manage the challenges
 - *Close monitoring by shore staff*
 - *Open communication culture*
 - *Participation of ship staff in ship design*
 - *Walk the talk*

Management of challenges

- Suggested methods to manage the challenges
 - *Awareness about company procedures – SMS and SOPs*
 - *Independent assessment of work culture including fatigue management*
 - *Management of change*

Conclusion

- Systematic planning and execution can ease the target of being safe in every shipboard operation
- Managing behaviour and attitude is equally important for safe navigation as the required technical skills
- Shore based support and mentorship on-board is the key element to achieve better results

Thank you