



Operating proficiently during the digital transformation

Brian Veitch, NSERC / Husky Energy IRC in Safety @ Sea

CiSMaRT Workshop on MASS

On-line, November 26, 2020



Brief to panelists

- Your thoughts on the MASS work underway in Canada, including those at NRC.
- Identify research projects to expand and enable MASS operations in Canada.
- 5 minutes.



◆ Thoughts on MASS work underway in Canada, including those at NRC

- Early days.
- What are the drivers for MASS?
 - Industry & government (regulators) specific needs
- Who are the drivers?
- Scope & focus of R&D?
- Audience & consumer of R&D?



◆ Research projects to enable MASS in Canada

- Safe and efficient shipping operations depend on...



◆ Research projects to enable MASS in Canada

- Safe and efficient shipping operations depend on...
 - Proficiency of the operators
 - The crew on board (some level of support)
 - The operator at a future SCC
 - The AI operator agent of future autonomous ships
 - ...and the ecosystem that supports operations, including VTS services, weather forecasting, ship management shore staff, ports...)



◆ Research projects to enable MASS in Canada

- Zoom in for the moment...
- Safe and efficient shipping operations depend on...
 - Proficiency of the operators
 - The crew on board (some level of support)



◆ Research projects to enable MASS in Canada

- The digital transformation involves the repeated introduction of new technology.
- Shipping is a complex socio-technical system, so technology needs to be considered in the context of the overall system, which will include new types of organization, workplace, and work.



◆ Research projects to enable MASS in Canada

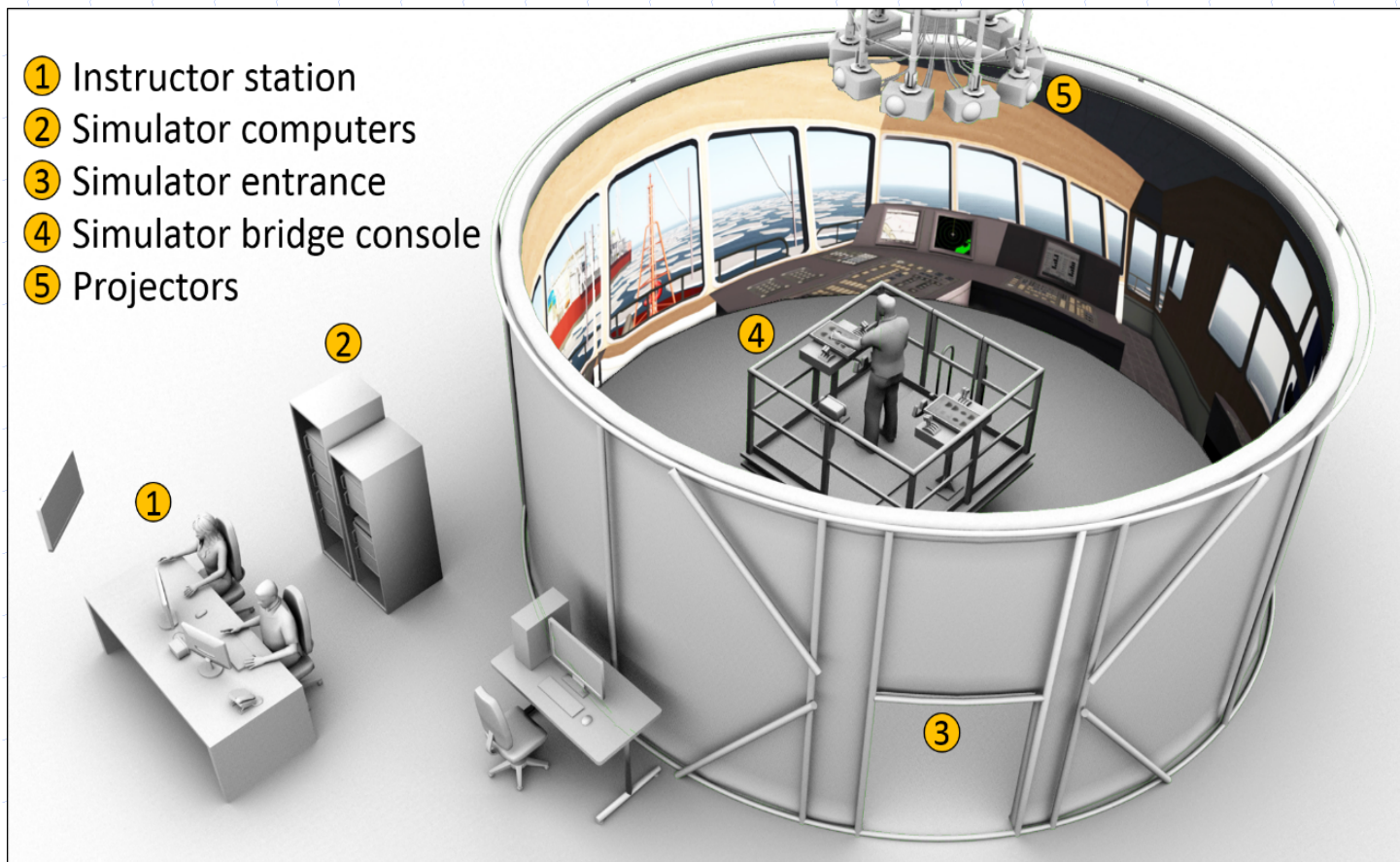
- Testing is needed to help ensure that the changes in the system's operations are well understood, work as intended, and are demonstrably safe and efficient.
- So that the system can be operated proficiently throughout the changes brought by the “digital transformation”.



◆ Research projects to enable MASS in Canada

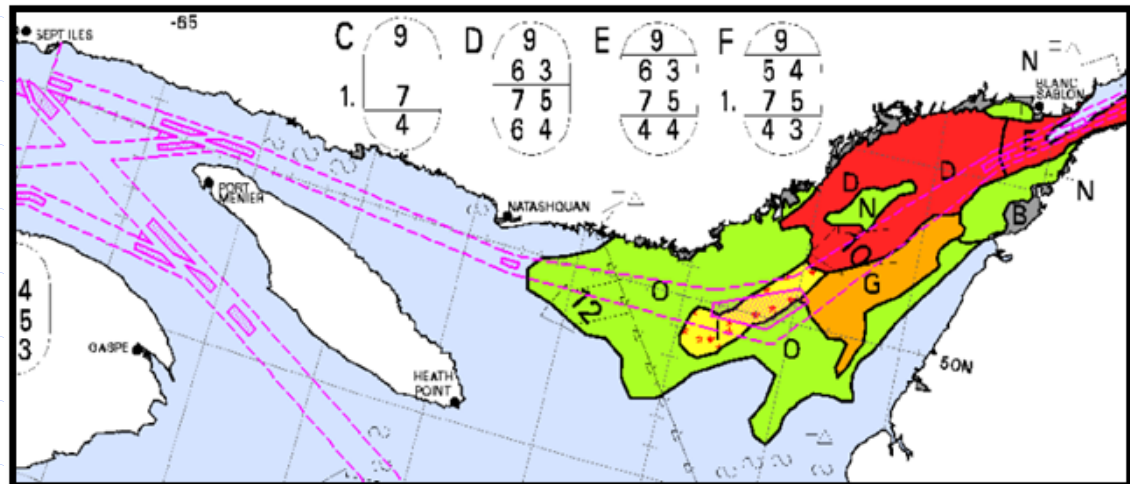
- Testbed for prototyping & testing new technology and its integration with on-board operations
- Testbed: bridge simulator
 - Reconfigurable
 - Credible scenarios

◆ Research projects to enable MASS in Canada



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- Example: DSS to enhance safe & efficient transit through pack ice





◆ Research projects to enable MASS in Canada

- Algorithm: that optimizes key indicators of operating “goodness” (e.g., duration of voyage, fuel consumption, safety – safe speed for ice conditions & hull design) for a given ship, voyage, and ice conditions.
- “Advises” ship driver on optimal route.



◆ Research projects to enable MASS in Canada

- Test in a simulator
- Can the operator follow the advice from the DSS?
Does performance improve compared to an operator who is not supported?
- If the DSS also provides real-time feedback to the operator during the voyage, is there a learning effect on the operator? If so, can the operator continue to perform well even when the DSS is unavailable?



◆ Research projects to enable MASS in Canada

- Test in the field
- Testbed: bridge
 - Real scenarios



Operating proficiently during the digital transformation

Thank you for your kind attention

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