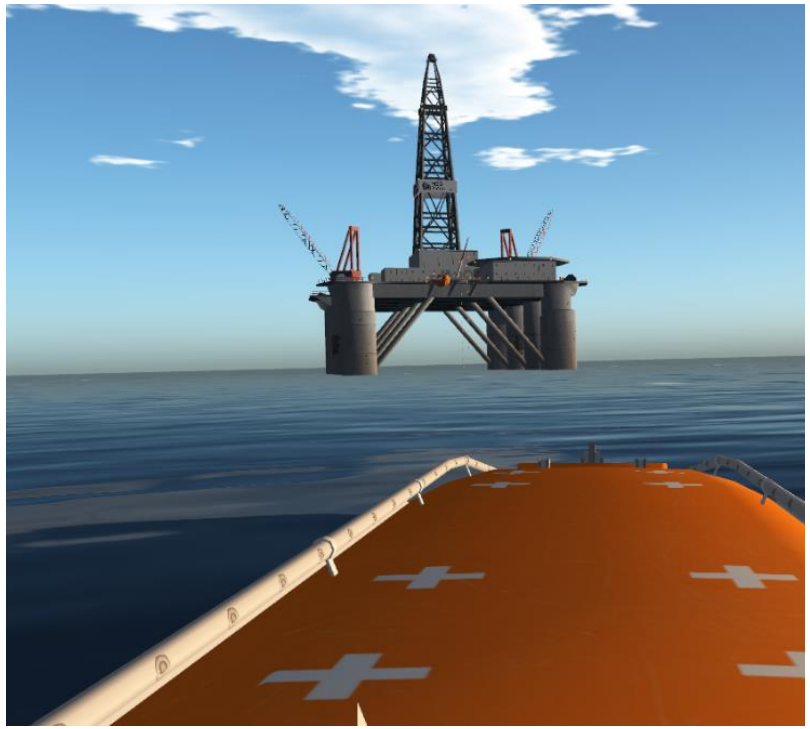
Simulator Training for Offshore Oil and Gas Emergency Preparedness

Randy Billard
Chief Technology Officer - Virtual Marine
Memorial University

Overview

- Experimental studies performed on lifeboat training
- Simulator used to measure performance and provide exposure to harsh environments
- Context for simulator users
- Future studies



Study Goals

- Investigate skills retention as lifeboat coxswains progress through a year long training program
- Assess how learned skills transfer to a plausible emergency

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Motivation

- Industry adopting simulation in lifeboat training programs
- Adopters sponsored study to validate simulator effectiveness
- Series of experiments completed from 2015-2018
- Transfer, retention, specificity of training

Recognitions of Equivalence

Transports Canada Transport Canada

Danish Maritime Authority

United States Coast Guard 1790

Norsk olje&gass

International Registries 1948

OPITO

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Retention and Transfer Experiment

Lifeboat Launching

- Representative of industry practice
- Initial training at an onshore facility
- Offshore quarterly drills consisting of launch of lifeboat in calm weather conditions
- Same exercise performed each quarter
- Hazards and fault conditions are not introduced

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Experiment Overview

Initial training

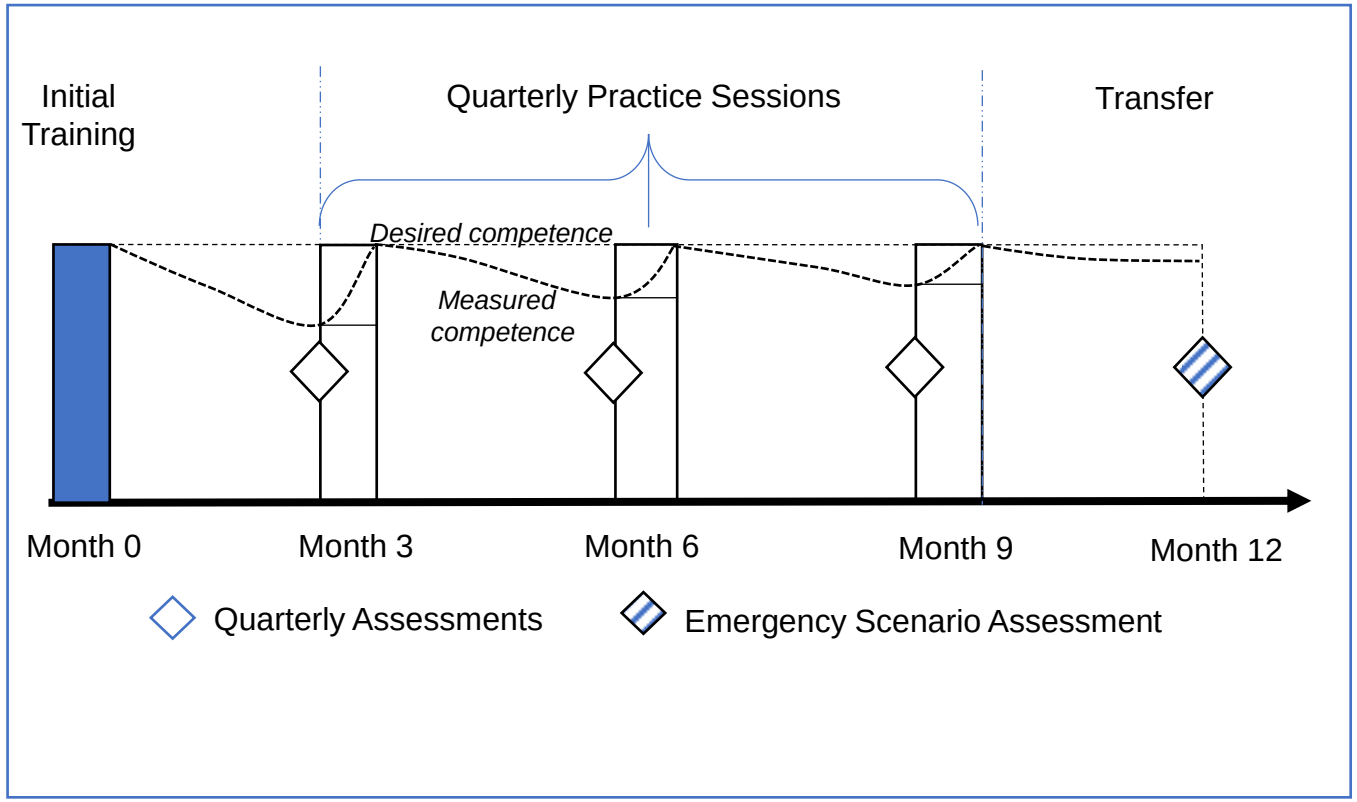
- Emulated onshore training
- Trained to baseline competence

Month 3, 6, 9

- Emulated quarterly drills
- Performance measured
- Practiced until competency regained

Month 12

- Performed in plausible emergency exercise



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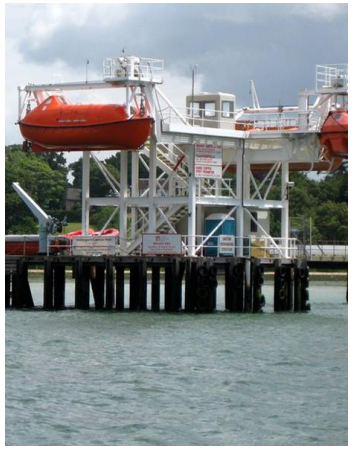
Launching Tasks

- Participants assessed on ability to successfully get lifeboat in water and move to a safe zone
- Include a combination of voice commands, procedural tasks, and skill based tasks
- Rubric based on model courses and developed by SME's



	Task Name	Task Objective	Expected Performance
Cognitive Tasks	PLI – Critical Errors	Perform visual Inspection of lifeboat in-preparation for launch and ensure no equipment is stopping vessel launch	No critical errors made in equipment inspection to prohibit launch
	Permission to Launch	Obtain permission to launch from OIM	Communication instructor (as OIM) indicating permission to launch
	Inform Crew Prior Launch	Inform Crew prior to Launch – "Launching Launching"	Verbal order given by instructor (as crew member)
	Lower w/o stopping	Pull brake release, lower lifeboat without stopping by keeping tension on release	Vessel lowered continuously without stopping
	Sprinkler and Air	The student orders the sprinkler and air system after being informed of gas, smoke or fire	If hazard present, verbal order to instructor (as crew member) to turn on air and sprinkler
	Engine Started	Ensure engine started before lowering/splashdown using engine run key	Start engine on before water entry
Physical Tasks	# of re-entries	Once lifeboat completely enters water and is fully buoyant release releasing hooks by looking at hydrostatic indicator on hook release as visual cue.	Vessel is lowered to become buoyant on first attempt with no weight returning to falls
	Splashdown zone	Promptly release Hooks using hook handle release and apply throttle	Release hooks within 10s, apply throttle within 5s
	Contact with platform	Maneuver vessel and do not make contact with platform after release of hooks	No collisions detected
	Clear Away Zone	Safely leave clear away zone by moving away from rig quickly and avoid hazard.	Clear platform within 45 seconds and move away from rig and any hazards

6 Cognitive Tasks
4 Physical Tasks

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Simulator

- DNV-GL certified simulator
  - Representative of lifeboat in use
  - Allowed for practice in weather
- Simulator provided consistent scenarios and tracking
- Evaluation performed by an instructor

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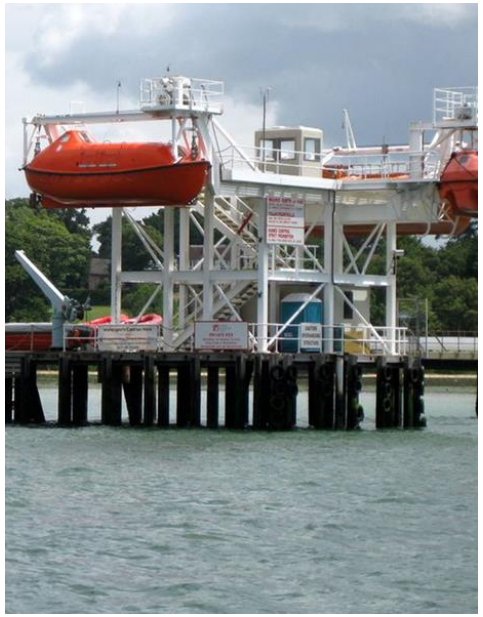
Scenarios

Initial and Quarterly Training



- Calm water
- Clear day
- No equipment faults
- 9 tasks to be completed

Emergency Scenario

- Moderate sea state
- Reduced visibility
- 9 common tasks to be completed
- +1 task due to hazard
- Conditions made some tasks more difficult

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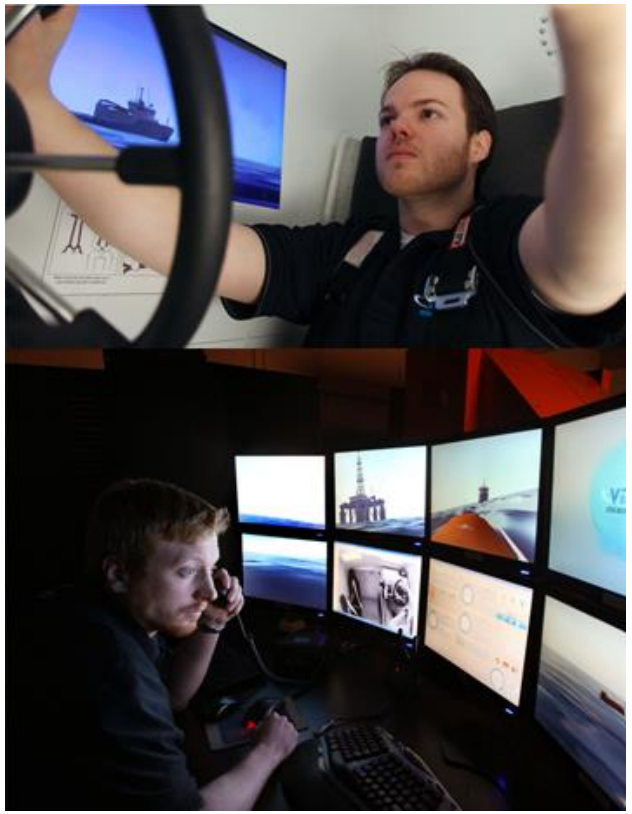
Measurements

Primary measure – ability to complete all launch tasks on first attempt

- Indicates skill retained
- For emergency scenario, is representative of expected performance

Secondary measures

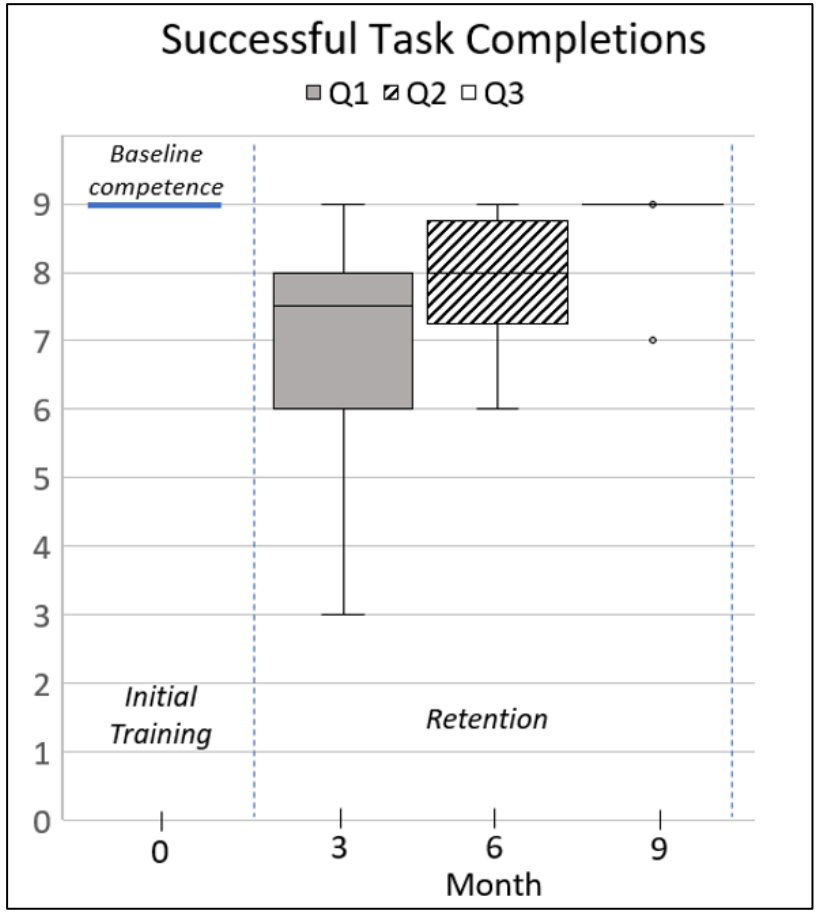
- Trials to criterion to regain competence
- Frequency and types of errors made



Results - Retention

Completion of Tasks on First Attempt

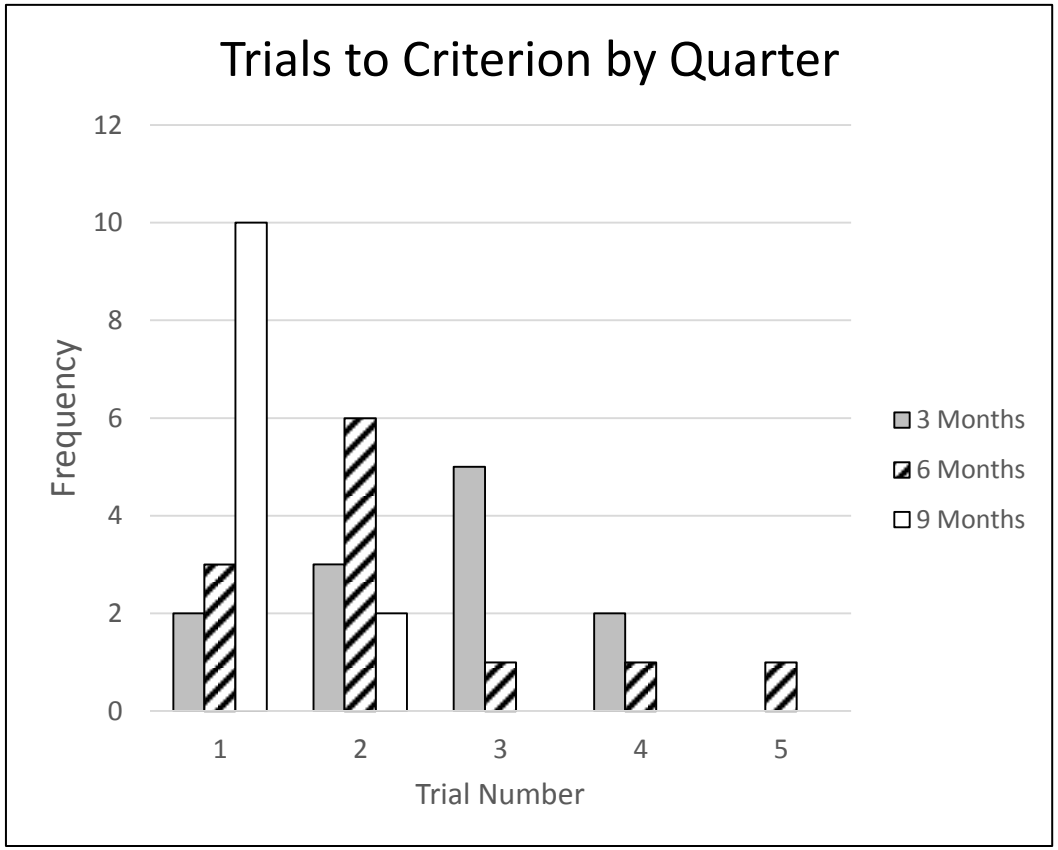
- Indicates initial skill fade between sessions
- After three training sessions:
  - Average number of successful tasks on first attempt increased to 8.67
  - 10/12 participants able to complete all tasks



Results - Retention

Trials to Criterion

- First quarterly session – 3 months
  - 2 participants successful on first attempt
- Third Session – 9 months
  - 10 participants successful on first attempt



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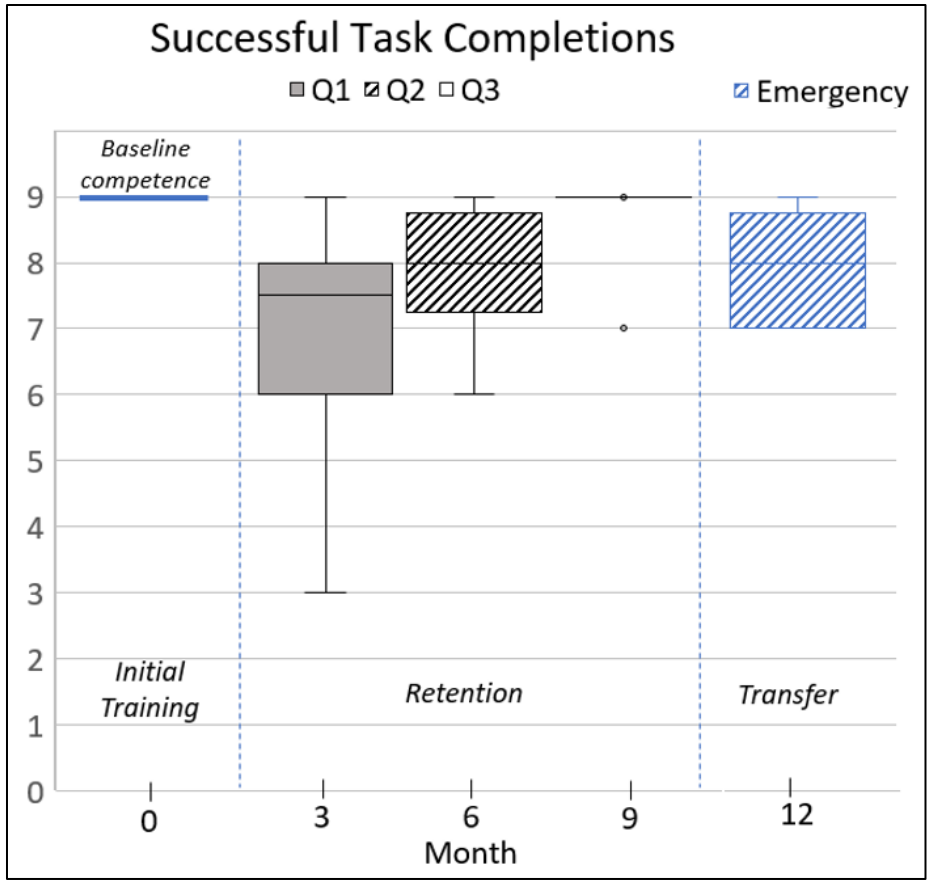
Results - Transfer

Completion of Tasks on First Attempt

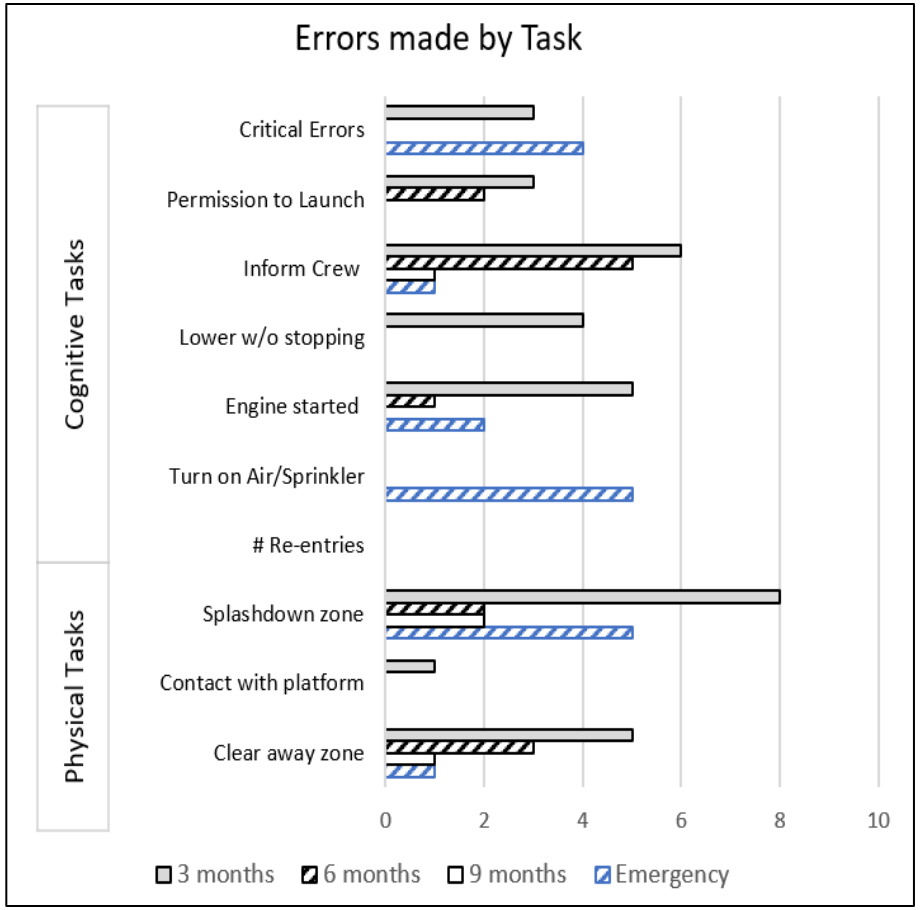
- In emergency scenario, the average number of successful tasks dropped to 7.92
- 3/12 (25%) participants were able to complete all tasks on their first attempt compared to 10/12 (82%) at the end of the quarterly training sessions



Results - Type of Task

Individual Tasks

- Quarterly Sessions – show progressive performance in all skills
- Emergency scenario
  - Increase in errors on cognitive and physical tasks
  - Consistent performance for 5/9 tasks
  - 5/12 participants did not deal with new hazard successfully



Summary of Outcomes

- Accumulated practice with quarterly intervals improved retention
- Initial training + 2 quarterly practice sessions needed for more than half of participants to successfully launch lifeboat on first attempt
- Training did not fully prepare trainees for emergency scenario
  - Environmental conditions, context, new scenario

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Context for simulator users

- Current simulator users train more than once a quarter using progressive scenarios
- A deployed simulator is a means to apply learning principles – variability in training, overtraining, training for real life events
- Controlled means to measure competence and readiness

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Future Studies

- Future Studies – how to improve skill retention and transfer
  - Frequency of training
  - More training time
  - Representative scenarios
  - Type of training (hands-on vs. CBT)
- Expect improved competence and proficiency with more practice

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Thank you!

Randy Billard
randy.billard@virtualmarine.ca

With acknowledgment to fellow researchers:

Lochlan Magee
lochlanmagee@yahoo.com

Jennifer Smith
jenniferjesmith@gmail.com

Anthony Patterson
anthony.patterson@virtualmarine.ca

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PERFORMANCE SIMULATION & TRAINING
BE READY

petroleum RESEARCH
newfoundland & labrador