PILOT STUDY

SIMULATION IN SURVIVAL CRAFT TRAINING

AUDIT REPORT

(25-03-2015)

INTRODUCTION

A Pilot Study, supporting a simulator program related to launching and operation of a survival craft, as part of a proposed training course, has been advanced for consideration to Transport Canada Marine Safety and Security (TCMSS).

The said program was initially estimated on its own merits and, as a result, two TCMSS senior inspectors have been appointed in order to have it observed, inspected and, audited at Marine Institute (MI) of St. John's Newfoundland and at Survival Systems Training Ltd. (SSTL) from Dartmouth, Nova Scotia. The two inspectors were Natalie Godin, appointed to assess the system at Marine Institute (MI) of St. John's on April 22nd to 24th, 2014 and, Mario Lavoie at Survival Systems Training Ltd. (SSTL) from Dartmouth, NS, on July 20th to 23rd, 2014.

As a result of their reported observations, TCMSS has decided to sponsor the said Pilot Study. The two (2) institutions mentioned above implemented a program based on the proposed simulation system, in which aspiring coxswains are trained to launch, operate and recover a life boat as an alternative, compared to the traditional use of davits and its consisting components.

This decision has been adopted taking into account the following aspects:

A. Canadian course providers have requested for some time, that lifeboat training simulators be used, as an alternative to the traditional method of training, related to the practical launching and recovering by davits;

B. A key amendment to Table A-VI/2-1 of the Standards of Training, Certification and Watchkeeping for Seafarers Code (STCW Code) indicates that an "*approved simulator training where appropriate"* is a valid method to demonstrate and achieve the desired competence.

That being the case, TCMSS has taken the opportunity to determine, if using a simulated method may be considered acceptable, in order to acquire the specific lifeboat skills in a satisfactory manner.

While this report is the result of the Pilot Project performed at MI and SSTL, simulation is only considered a potential substitute for the lifeboat training elements related to launch and, recovery. Training elements related to equipment familiarization, survival and rescue will still be delivered using an actual lifeboat conforming to the Life Saving Appliances Code (LSA Code).

TECHNICAL INFORMATIONS

Location: Marine Institute, P.O. Box 4920, St. John's, NL, A1C 5R3

Date of Audit: April 22nd - 24th, 2014

Auditor: Nathalie Godin

Campus Staff: Lead Institutor: Mark Norris; Simulator Instructor: Steve Drake; Lifeboat Instructor: Randy Rose

Courses Instructors: Virtual Marine Technology (VMT).
VMT Curriculum Support : Anthony Patterson
VMT Technical Assistants : Andrew Edwards & Dan Sutow

****

Location: Survival Systems Training Ltd. 40 Mount Hope Avenue, Darmouth, NS. B2Y 4K9

Date of Audit: July 20th – 23rd, 2014

Auditor: Mario Lavoie

Survival Systems Training Staff: Dan Latremouille, Robert Baxter

Courses Instructors: Virtual Marine Technology (VMT).
VMT Curriculum Support: Anthony Patterson
VMT Technical Assistant: Dan Sutow

EVALUATION PROCESS

Transport Canada adopted a two stage evaluation in line with the *Institute of Electrical and Electronics Engineers* (IEEE) Standard 1730-2010 *IEEE Recommended Practice for Distributed Simulation Engineering and Execution Process (DSEEP)*.

The first stage was aimed to *determine*/*validate* if the lifeboat simulation had the required ability to replicate an appropriate training environment. As further described in the "Previous Research" section, the verification component had already been completed by Transport Canada and, other organizations.

The second stage is to *validate* if the lifeboat simulation under consideration produces the desired training results and, achieve the required competence for seafarers. Transport Canada elected to *validate* the lifeboat simulation through several field trials and, authorized the Canadian training providers to conduct two (2) pilot courses, in order to evaluate the use of simulation as an alternative to the davit mode of lifeboat launching and recovering into/from the water.

PREVIOUS RESEARCH

The following is a summary of the recent research carried in order to verify the lifeboat simulator effectiveness and, of other related small craft training.

Transport Canada Lifeboat Simulation Research Project (Expert Verification Assessment)

Transport Canada (TC) sponsored the evaluation of lifeboat simulation in fiscal year 2009/10. The research program was primarily an assessment done by the subject matter experts into the realistic aspect of a fully exercised lifeboat simulator.

The results of the study have concluded that a davit launched lifeboat simulator (lacking a hook training device) could replicate 38 of 76 (about 50%) of the CAPP course learning objectives.

For the STCW '95 compliant courses, described by the International Maritime Organization (IMO) Model Course 1.23 and Technical Publication (TP) TP 4957E, the simulator could replicate 43% of the lifeboat related learning objectives, while for the core competencies identified by Det Norske Veritas (DNV), 41% may be directly related to the launching a lifeboat and be performed in a davit launched lifeboat simulator. One of the outcomes originating from the TCMSS sponsored research study, was a redrafted IMO Model Course incorporating lifeboat simulation.

Det Norske Veritas Lifeboat Simulator Certification (Expert Verification Assessment)

Concurrent with the TC sponsored study, DNV, organized workshops in St. John's, Newfoundland, in order to define the required competencies for lifeboat coxswains under their Sea Skills program. The workshop results have been published by DNV under their Standard for Certification No. 3.321 *Competence of Lifeboat Coxswains*.

NRC Maneuvering Lifeboats in Ice Study (Field Trials - Validation)

The National Research Council of Canada (NRC), with the combined funding participation from the offshore oil and gas industry and the Federal Government, conducted in 2010 and 2011 an assessment of the simulator training effectiveness related to lifeboat coxswain proficiency to maneuver in ice covered/infested waters. The study compared the performance of a group of students trained to drive a lifeboat in a harbor versus, a second group of students trained to drive a lifeboat in a DNV certified simulator. The exercise included driving a real lifeboat through an ice field, while taking into account its key maneuvering characteristics. The study concluded that the simulator trained students had an overall better performance and higher confidence levels, compared to those trained in the harbor, using real boats.

USCG Defender Class Vessel (RB-S) Simulation Study (Expert Verification Assessment)

In 2007, the United States Coast Guard (USCG) conducted an evaluation of different configurations of simulator to determine their potential use in training personnel to operate the Defender Class vessel (Response Boat – Small). The USCG concluded that 47% of the Enabling Objectives in their coxswain "C" course could be effectively delivered using a simulator. Enabling Objectives judged suitable for simulation included: maneuvering, pacing, steering by compass, and station keeping.

Petroleum Research Atlantic Canada Hook Trainer Study (Expert Verification Assessment)

Petroleum Research Atlantic Canada commissioned a study to develop hook trainers, which could be added to a lifeboat simulator, in order to extend its capabilities by providing training in launch, recovery and hook maintenance. In 2013, an expert evaluation was conducted by senior marine crews within the offshore oil and gas industry in order to determine if the hook trainers had sufficient realism incorporated into training programs. The results of the study have concluded that the hook trainers conformed to their design criteria and, while maintaining a sufficient degree of realism during the entire exercise.

DESCRIPTION OF EQUIPMENT

A. Lifeboat: An operational totally enclosed lifeboat conform to the International Lifesaving Appliances Code ("LSA") and approved by Transport Canada for use in Marine Emergency Duties with respect to Proficiency in Survival Craft and Rescue Boats other than Fast Rescue Boats (MED PSC).

B. Launch facilities: Operational davit facilities which are able to launch the lifeboat (see above) into open water for maneuvering and approved by Transport Canada for use in MED PSC.

C. Lifeboat simulator: An operational lifeboat simulator with realistic controls, sensory cuing systems, instructor controls and mathematical models, DNV approved

D. Hook trainer: An operational hook trainer with realistic equipment and fully integrated with the lifeboat simulator (see above).

EVALUATION METHOD

In order to determine if simulator training, which included launching and recovering a virtual lifeboat, provides an equivalent sense of safety, security and environmental prevention, as the current traditional training method using a davit system and a lifeboat. For assessing the impact of the training method, the participating students were considered new arrivals, joining the ship for the first time and, conducting their first familiarization of lifeboat launching. In order to achieve this scenario the entire process went as follows:

A. Participating training schools were required to create a 'Simulation' version of MED PSC. The 'Simulation' version consisted of a lifeboat simulator with hook trainer used to deliver the launch, recovery and some parts of the maneuvering elements of the course. An actual lifeboat was also available in order to provide the familiarization and maneuvering exercises as required.

B. For the duration of the Pilot Study, participating training schools were authorized to deliver MED PSC courses, using the 'simulation' version of the course under supervision of TCMSS.

C. The entire class was trained using the simulator method.

D. As soon as the training has been completed, using the 'Simulation' version of the MED PSC, the participants were evaluated on their ability to launch and recover an actual lifeboat into the water by traditional method of a davit system.

E. Simulator trained students, were provided initially with a practical demonstration of how to conduct a launch and recovery operation by using a traditional lifeboat and

davit. This familiarization mirrored the training recommended by the boat manufacturers for all new crew members when assigned to a ship. Once the demonstration was completed, the simulator trained participant were evaluated on their ability to launch and recover the lifeboat using the performance standards as described in the section entitled "Standard of Competence".

F. The final observation has concluded, that simulator trained students had a similar level of performance, compared the ones trained by the traditional method of davit launch and recovery of a lifeboat

PILOT STUDY RESULTS

Marine Institute – April 22-25, 2014

A class of 12 students from the Marine Diesel Mechanic program was selected to participate in the first pilot course. Many of these students participating in the Pilot study were newcomers to seafaring and did not have previous experience with boat operations or seamanship.

A training program using a lifeboat simulator was developed and the schedule called for the class to be split into two parts during Day 2. In the morning of Day 2, one half of the class took practical training in rescue boat operations, while the other half took practical training in lifeboat operations. In the afternoon, the two groups rotated.

Within the group taking practical training in lifeboat operations, they were further subdivided into two sub-groups, with one sub-group of 3 people going to the simulator and the second sub-group of 3 people going to a lifeboat tied up alongside the wharf. At the end of 90 minutes the two sub-groups rotated. Each sub-group of 3 students received 90 minutes of simulator training and 90 minutes of equipment/survival training in an actual lifeboat.

Unfortunately the designated simulator instructor who had been trained and briefed in the 'simulation program' was unable to participate in the trial and, was substituted by another instructor just 30 minutes prior to the start of the simulation training. The substitute instructor delivered a modified simulation course which did not conform to the test protocol, however it covered all of the key instructional points required for the program.

Under the modified simulation program, each student was able to exercise a complete launch, sail-away, and recovery scenario. Subsequently each group member was able to participate in a launch scenario under simulated emergency conditions. In addition, after the evaluation had been completed, a lecture period was modified, in order to enable each student to launch a lifeboat into rough seas and conduct a search for survivors.

On Day 3, two hours of time, otherwise designated for practical boat training, was allocated in order to evaluate the performance of the students. For the evaluation, the students were divided into 4 teams of 3 people each. One person from each team was selected to lead a

launch and recovery operation, while the other two students where acting as their crew members. The launch and recovery exercise was evaluated by the lead course instructor and a Transport Canada Examiner.

During the Pilot course a number of improvements to the lesson plan were suggested, the key one being the provision of a pre-launch inspection training aid to be used during the simulated launch and recoveries. The training aid would help immerse the 'crew' members into the simulation, as well as teach them how to identify critical faults in the davit system. A pre-launch inspection training aid was created and used in the second pilot course.

Photograph illustrating the lifeboat and launch facilities used during the pilot course delivered by the Marine Institute. The arrow indicates the lifeboat used to evaluate launch and recovery competencies at the end of the pilot course

.

SurvivalQuest™ lifeboat simulator[1] manufactured by Virtual Marine Technology Inc. ("VMT") used by the Marine Institute during the first pilot course.

[1] DNV has issued a Statement of Compliance for SurvivalQuest™ indicating that it meets the requirements for the pilot course.

Interior view of the SurvivalQuest™ lifeboat simulator. All equipment is positioned in a realistic manner.

Illustration of a hook trainer. Two (2) hook trainers (fwd and aft) were integrated with the simulator at Marine Institute for the Pilot course. The operation of the hook trainer enabled students to practice prelaunch inspections of the hook system, reset the hooks for recovery, connect the falls once the boat was in the recovery position, and inspect the hooks once the boat was lifted out of the water.

Survival Systems Training Ltd. – July 20-23, 2014

A class of 11 cadets from the Canadian Coast Guard College (CCGC) was selected to participate in the second pilot course. Survival Systems Training Ltd. was training the students under a contract with the Canadian Coast Guard. CCGC delivers a 4 years cadet program for Deck and Engineering officers. The cadets participating in the study had completed their first year of studies and had not yet been assigned on ships for their first sea phase. There was a mix of engineering and deck cadets in the pilot course. The deck cadets had previously received some small craft training, while the engineering cadets had not received any previous training in small craft operations. Some of the cadets had previous experience in operating small pleasure craft, and one cadet was a former crew member in the Inshore Rescue Boat Program.

Prior to the second pilot course in July, a revised training program was developed and instructor training was conducted. The schedule called for the class to be subdivided into two groups during the afternoon of Day 1. One half of the class reported to the simulator room while the second half of the class went to the harbour front for training in an actual lifeboat. On Day 2, the two groups switched places with one half of the class reporting to the simulator and the other half of the class reporting to the boat.

The students reporting to the simulator room were further subdivided into three (3) groups of two (2) persons each. The first group of two students conducted basic launch and

recovery drills using a simulator. The second group of two students was briefed on how to conduct prelaunch inspections using Computer Based Training. The third group of two students was briefed on operations in rough seas and the procedure to recover persons in the water. At the end of 30 minutes, each group of two students rotated until all students had completed basic launch and recovery training at each of the three stations (90 minutes total elapsed time).

After a short break, the students were reorganized into two (2) boat crews of three (3) persons each. One boat crew was assigned to the simulator to conduct an emergency evacuation drill, while the second boat crew was tasked to observe and lead a peer debrief at the end of the scenario. The boat crews rotated position at the end of each exercise.

During the simulation exercise, one of the boat crew members was designated as the coxswain and the other two were assigned the roles of crew members. The lesson plan required that each student be provided with an opportunity to act as the coxswain during an emergency scenario.

At the end of Day 1, it was noted, the lesson plan had to be adjusted in order to ensure there was sufficient time for each student to act as coxswain during at least three (3) scenarios (i.e.: 2 basic scenarios and 1 emergency scenario). The lesson plan was adjusted by reducing the amount of time allocated during basic exercise in lifeboat manoeuvring training.

On Day 2, the students were trained using the modified lesson plan, and all students were able to act as coxswain for three (3) scenarios.

The instructional staff noted, the utility of the Pre-launch Inspection training aid, as well as the improvement in hands-on practical training arising from the modification of the lesson plan at the end of Day 1. The peer debriefing technique was also noted as a very powerful tool to reinforce the operational procedures, as well as to stimulate useful discussions on the practical means of improving evacuation and rescue strategies under emergency conditions. The instructors, also noted a marked improvement throughout the simulation training session in the students ability to launch, recover and operate a lifeboat.

Photograph illustrating the lifeboat and launch facilities used during the pilot course delivered by Survival Systems Training Ltd. July 20-23, 2014. The arrow indicates the lifeboat used to evaluate launch and recovery competencies at the end of the pilot course.

SurvivalQuest™ lifeboat simulator[2] used by Survival Systems Training Ltd. during the second pilot course.

The photograph illustrates the 'Open Configuration' lifeboat simulator with hook trainer. The *open configuration* has the same functional attributes as the *enclosed configuration*.

The hook trainers are identical in both the 'open' and 'enclosed' configurations of the lifeboat simulator.

OBSERVATIONS

Competence

Transport Canada assessors noted that in both pilot courses, the simulation trained students were able to launch an actual lifeboat into the water using davits, while displaying the same level of competence as those who have been trained using the existing traditional methods.

Increased Practical Training

During the pilot courses, the instructors noted that the students trained in the simulator were able to achieve an enhanced level of competence by virtue of having multiple opportunities to launch and recover a boat under realistic emergency conditions.

[2] DNV has issued a Statement of Compliance for SurvivalQuest™ indicating that it meets the requirements for the pilot course.

In a fully loaded course, conforming to the minimum times listed in TP4957, students would normally have one (1) opportunity to act as coxswain while launching and recovering an actual lifeboat using davits. The single launch and recovery is used to simultaneously teach *and* evaluate the student.

The impact of the difference between the two levels of competence was most clearly observed during the second pilot study (Dartmouth). While not part of the pilot study, the instructional staff had an opportunity to provide simulation training to a group of students who were trained to launch and recover an actual lifeboat into the harbor using a davit system. The instructional staff noted that although the students had already performed an actual launch, they observed a marked improvement throughout the simulation training session in the ability of the traditionally trained students to launch, recover and operate a lifeboat in *both* basic *and* emergency scenarios.

A comparison between the performances standards which were able to be achieved using the simulator are indicated in the table below:

<table>
<tr><td colspan="2">Correctly launch a lifeboat that is securely fasted under davits and clear the ship's side quickly (TP4957 reference: 4.11.7)</td></tr>
<tr><td>Performance Standard (Traditional Training)

Given a boat which is hoisted clear of the water, as well as a checklist covering the specific procedure to safely launch a particular LSA compliant lifeboat; the seafarer will be able to perform pre-launch inspections, lower the boat into the water, release the hooks and sail clear of the launch site; with coaching and oversight from an instructor.</td><td>Performance Standard (Simulator Training – <u>changes underlined for emphasis</u>)

<u>Given a simulator configured with a virtual boat secured to the davits, a prelaunch inspection training aid</u>, as well as a checklist covering the specific procedure to safely launch a particular LSA compliant lifeboat; the seafarer will be able to perform pre-launch inspections, lower the boat into the water, release the hooks and sail clear of the launch site; <u>unassisted</u>.</td></tr>
<tr><td colspan="2">Safely recover the boats (TP4957 reference: 4.11.14)</td></tr>
<tr><td>Performance Standard (Traditional Training)

Given lectures, videos and witnessing practical demonstrations; the seafarer will be able to describe how to visually inspect a particular LSA compliant hook system to ensure that it is properly set for recovery, as well as describe the precautions to be taken during recovery; without the use of reference materials.</td><td>Performance Standard (Simulator Training – <u>changes underlined for emphasis</u>)

<u>Given a simulator configured with a virtual boat in the water</u>; the seafarer <u>will be able to visually inspect</u> a particular LSA compliant hook system to ensure that it is properly set for recovery, <u>maneuver the lifeboat into the recovery position</u>, and <u>demonstrate</u> the precautions to be taken during recovery; <u>unassisted</u>.</td></tr>
</table>

Training Realism

It was noted by both the instructional staff and the Transport Canada assessors that the emergency scenarios presented during the simulation training exposed students to realistic situations. Through simulation, the student was able to develop practical competencies necessary for operations in rough seas, poor visibility, and complex survival situations that would have otherwise been provided through a lecture.

Equipment

Both the 'Open Configuration' and the 'Enclosed Configuration' of the lifeboat simulator used in the pilot program were suitable to meet the training objectives as long as they are integrated with hook trainers. Without a hook trainer integrated with the simulator, it would not be possible to demonstrate the competencies required to recover a boat.

It was noted by both the instructional staff and the Transport Canada assessor that it is necessary that an 'Open Configuration' simulator must used in a dedicated classroom space to avoid distracting the students during the simulation. The 'Enclosed Configuration' isolates the student from the rest of the classroom and is not as susceptible to external distractions.

It was also noted by the Transport Canada assessors that the use of real equipment in the simulator was essential to enable the students to transfer the skills they had obtained in the simulator to an actual boat. In addition, the assessors noted that the closer the simulator replicates the equipment found in a boat, the easier it is to transfer knowledge from one to another.

For example, the hook release and engine controls in the simulator operated by Survival Systems Training Ltd. are almost identical to the controls found in their lifeboat. During the evaluation launches, *none* of the simulator trained students required *any prompting at all* during the launch, sail-away, or recovery. In contrast, the Marine Institute students required a full briefing on the operation of the hook release mechanism in the lifeboat prior to the evaluation since the boat's release mechanism was quite different than the one used in the simulator.

Finally, the Transport Canada assessors, instructional staff, and students all noted the importance of having a real lifeboat in the initial MED PSC course. The simulator only replicates a portion of the lifeboat and its equipment. Even though it would be possible to replace davits with a simulator, it is still important to have an actual lifeboat in the MED PSC program to develop the competencies not provided through simulation training.

Instructor Qualifications

The Transport Canada assessors noted the importance of appropriate training for instructors using lifeboat simulation in the MED PSC. The optimal use of simulation requires that practical boat instructors employ fundamentally different teaching techniques than they currently utilize.

FINDINGS

As a result of the technical verification and observation, made by the two inspectors (see Audit Report) during the pilot course validation, TCMSS has determined the following findings:

A. The use of simulation training to launch and recover a virtual lifeboat (in Marine Emergency Duties with Respect to Proficiency in Survival Craft and Rescue Boats other than Fast Rescue Boats, including the refresher PSC), provides an equivalent degree of safety, security and environmental protection, as the current traditional method of launching and recovering an actual lifeboat in open waters using a davit system.
B. The group of cadets participating in the study were compare with another group of cadets who had been trained using the traditional method of lunching and recovery. As a result both inspectors observed no major differences between the two groups.

APPROVAL PROCEDURE

A lifeboat simulator can be used to develop and assess the competencies associated with taking charge of a survival craft or rescue boat during and after launch, including manoeuvring in rough seas, subject to the following conditions:

A. Simulation is only considered a substitute for the lifeboat training elements related to launch and recovery. Training elements related to equipment familiarization, survival and rescue will still to be delivered using an actual lifeboat conforming to the LSA Code.

B. The training institution must submit a gap analysis explaining how the following performance standards will be achieved by the students:

    1. Use a pre-launch inspection training aid to conduct a visual inspection of the launching system, key boat systems and the engine prior launching;
    2. Prepare and safely launch a lifeboat and clear the ship's side quickly;
    3. Prepare and safely launch a lifeboat in rough sea; and
    4. Safely recover the lifeboat.

C. Additionally:

    1. The equipment must be certified by a Classification Society as a Survival Craft Operation Simulator with type designation as a davit launched lifeboat, indicating that the simulator conforms with the requirements contained in STCW Regulation I/12;
    2. A copy of this Statement of compliance to be forwarded to TCMSS;
    3. The simulator must use physical controls identical of those found on lifeboats conforming with the LSA Code, and must have hook trainers integrated with the

simulator to emulate the bow and stern hook positions;

4. Simulation exercises must include the use of a pre-launch inspection training aid enabling the students to conduct a visual inspection of the launching system, key boat systems and the engine prior launching;

5. If the simulator is to be deployed in an 'Open Configuration', it must be operated in a dedicated learning space free from distractions;

6. Each student must perform the duties of the coxswain in charge of the boat for at least three (3) launches, one of which must include the recovery of the lifeboat and one of which must include launching into rough seas;

7. Each student must perform the duties of a crew member for at least three (3) launches; and,

8. One (1) approved simulator can be used to train a maximum of six (6) students at any one time.

9. Training providers incorporating lifeboat simulation into their MED-PSC course and refreshers shall develop a training course manual along with scenarios and instructions for the training of their instructors and submit to TCMSS for approval.

10. TCMSS must be contacted in advance of the scheduled date of delivery of the first course incorporating lifeboat simulation to arrange an audit of the instructor and the course by an inspector/examiner

D. Equipment requirements:

1. One (1) lifeboat with equipment which meets the functional requirements as stated in SOLAS and which is in compliance with the requirements of the LSA Code for cargo vessels. (Note: The lifeboat does not require to be approved for usage at sea but shall be a training model of what is found on SOLAS cargo vessels);
2. One (1) davit launched lifeboat simulator, certified by a Classification Society Society as a Survival Craft Operation Simulator with type designation as a davit launched lifeboat, equipped with a physical hook trainer containing two hook/ring assemblies normally found on a twin fall lifeboat meeting the SOLAS requirements; and
3. One (1) prelaunch inspection training aid to enable the inspection of davits, boat systems and engine systems prior to launch.

ANNEXE A - SIMULATOR COMPONENTS

Simulator Cabin

A. Open or Enclosed Configuration with approximate dimensions of 1.40m x 2.20m x 2.00m (L x W x H)

B. Coxswain seating position with seat and harness (enclosed configuration only)

C. Lifeboat helm and launch controls
    1. Steering wheel
    2. Throttle
    3. Ignition panel
    4. Battery switch
    5. Break release
    6. Hook release
    7. Sprinkler system controls
    8. Air system controls
    9. Magnetic compass
    10. VHF radio simulator

D. Visual system that presents a bow, port and starboard fields of view

E. Audio system which presents environmental noise consistent with lifeboat operation

F. Hook trainer integrated with the simulator

Computer Server System

A. Approximate dimensions of 0.65m x 0.50m x 1.20m (L x W x H)
B. Server cabinet
C. Server PCs

QUEST Simulation Software or equivalent

The simulation software architecture provides the following functionality:

A. Real-time simulation of the following physical phenomenon:
    1. 3D wave models based on recognized wave spectra for Beaufort Sea States zero (0) to eight (8)

2. Ocean current effects and wind mathematical models, with wind speed and direction having an effect on the appearance of the sea, environmental elements, and the handling of the ownship
3. Collisions between parent vessel, ownship, target vessels, and target objects

B. Realistic 6DOF motion models of marine vessels including:
    1. The ownship vessel as affected by speed heading and waves
    2. The parent vessel as affected by speed, heading and waves
    3. Target vessels affected by speed, heading and waves

Instructor Control Station

The instructor control station includes the following:

A. Hardware
    1. Approximate dimensions of 2.25m x 2.20m x 2.00m (L x W x H)
    2. Display monitors that present the following:
        i. Bow, starboard and port views as seen by student in the simulator
        ii. 'World view' of the simulated lifeboat in the virtual environment
        iii. Third person video feed of the student operating the simulator controls (enclosed configuration only)
        iv. Simulation exercise display interface showing position of all simulation entities on a chart display
        v. Simulation exercise environmental control and equipment fault interface
    3. VHF radio simulator

B. Functionality
    1. Allow instructors to create and edit lifeboat simulation exercises.
        i. Select and place ownship and launch platforms
        ii. Place target vessels and assign speed, course and routes
        iii. Define the magnitude and direction of wind, waves and current
        iv. Define visibility by changing time of day, precipitation and fog
        v. Assign equipment faults
    2. Allow instructors to load, play, pause and stop simulation exercises
        vi. Manipulate simulation exercise conditions in real time
        vii. Communicate with student using simulated VHF radio
        viii. Allow instructors to save and replay simulation exercises

ANNEXE B – LESSON DESCRPTION

A. Prior to commencing the simulation session, the instructor/technician: starts the simulator in accordance with the manufacturer's instructions and loads the familiarization launch scenario;

B. The students (6 maximum) are provided a safety briefing while paying attention to the safety associated with the hook training device;

C. The Transport Canada Approved (TCA) instructor demonstrates the launch and recovery procedures;

D. On direction by the TCA instructor, all students gather around the Procedure Briefing Station. The TCA instructor describes how to navigate through the lessons loaded in the Procedure Briefing Station;

E. The students are each assigned to one of the following roles:
   1. Coxswain (X2)
   2. Crew (X2)
   3. eLearning Student (X2)

F. The Crew students go to one of the Procedure Briefing Stations and begin Lesson 1. The students are provided the PLI training aid and instructed to become familiar with the 'correct' and 'fault' conditions throughout the CBT session. The students work independently until Lesson 1 is completed;

G. The eLearning students go to one of the Procedure Briefing Stations and begin Lesson 2. The students work independently until Lesson 2 is completed;

H. The Coxswain students are provided an overall briefing outlining the objectives for the upcoming group of exercises "Practice Drill" by the TCA Instructor;

I. The one of the coxswain students will operate the simulator, while the second coxswain student will operate the hook trainer and assist the instructor as required. Students are instructed to create a launch/recovery checklist on a cue card. Students rotate positions between scenarios;

J. Once the coxswain students are ready, the TCA instructor starts the scenario and provides prompts and inputs as required. The objective of the first group of exercises is to provide multiple opportunities for the coxswain students to work together to launch and recover the boat. The TCA instructor can vary the environment as desired to match the skill level of the students;

K. The students rotate positions and steps until all students have acted as a coxswain for the group of "Practice Drill" exercises:

L. At the end of the "Practice Drill" sequence, the students receive a short debrief by the TCA instructor;

M. The TCA instructor sets up the Pre-Launch Inspection (PLI) board. For each Emergency scenario, the students will place the image cards in their allotted places with the correct image facing upwards. The PLI board is inspected at the end of the exercise and any errors are noted during the De-brief;

N. The students will be allocated into two boat crews of three (3) people. For each of the remaining exercises, one of the students will be designated as coxswain and the other two as crew members. The crew members should be used primarily to conduct prelaunch inspections operates hooks and act as look-outs;

O. The remaining scenarios are "Emergency Scenarios" and are intended to replicate realistic evacuations from a ship using the lifeboat. The TCA instructor should attempt to enable each student to complete at least 1 scenario as coxswain, and each boat crew should be exposed to rough sea conditions;

P. For each "Emergency Scenario", one boat crew will be designated to use the simulator to evacuate the ship while the other boat crew will observe and prepare notes for an instructor guided peer debriefing. Boat crews will rotate from one scenario to the next;

Q. Some Exercises are designed so that it can be repeated multiple times by the students. The TCA instructor can create variety by adjusting environmental conditions as well as the position of the PIW from one scenario to the next.