



CCGS Louis S. St-Laurent

E-09 Air Receiver Renewals

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REVISION HISTORY

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0060EP-R0018

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Document Revision Table

Revision	Revision Location	Revision Description

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1.0 INTRODUCTION

The Canadian Coast Guard shall conduct a Vessel Life Extension refit on the CCGS Louis S. St-Laurent over multiple dry-docking periods starting in 2022, with work being completed at Davie Shipyard, Quebec. Adaptive Marine Solutions (AMS) is supporting Davie on key engineering scopes for the upcoming drydocking periods.



Figure 1 - CCGS Louis S. St-Laurent Alongside in St. John's, NL

2.0 Summary

This document is intended to demonstrate a viable route through which the 2 existing compressed air receivers can be removed and replaced with 2 new units on the 19' Flat level of the ship.

AMS conducted multiple scans of the affected area in order to establish a technical baseline, allowing a full simulation of the removal/install of the units to be modelled. Major obstructions were identified and a path through which the units could be removed/installed was established.

3.0 Unit Removal/Install Simulation

The 2 air receivers are located on the 19' Flat level, Stbd side (see Figure 2). The proposed route is to move aft through the engineering flat then raise them to the 24' platform and up through the flush hatch at frames 56-69 on centre line.

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A comparison between the old and new units was completed and determined the major dimensions were the same, details of both units can be found in Appendix A, Figure 9 and Figure . As such the routing and work in way involved with the removal will match the installation.



Figure 2 Existing Air Receivers

An area of concern related to clearance through the flush hatch itself. A detailed assessment of the hatch opening was completed and is shown in Appendix A, Figure . It can be seen that there is sufficient clearance to pass the unit through the hatch with a minimum of 1 5/16" clearance. As the unit is slung through the hatch it can be maneuvered to give additional clearance to the appendages and reduce the risk of contacting the hatch itself, but it is very tight.

Another area of concern is the space required to rotate the units to a vertical position underneath the hatch opening. A simulation was completed, details are shown in Appendix A, Figure . This shows that sufficient clearance for the unit does exist but again it is very tight. The tightest area is when the unit is approximately 15° from the vertical position, the clearance between the beam (overhead) and the edge of the 24' platform 3 1/2" total.

The simulation demonstrated that the receivers could pass through the hatch and be maneuvered into position once the work in way, detailed in section 4.0, has been cleared. The simulation considered only the air receiver and no allowance has been made for additional clearance that may be required for rigging equipment. No indication of lifting point positions within the compartment have been made.

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4.0 Clash Points Identified

In order to move the units in and out of the space several pieces of equipment, pipes and lengths of handrail will need to be removed. Further details are provided below.

- a) Lifting eye – Below the flush hatch is a lifting eye on the aft face. Although it does not protrude into the opening itself, as the unit is rotated this could be a clash point. The eye would need to be removed and replaced and load tested after the move is complete.

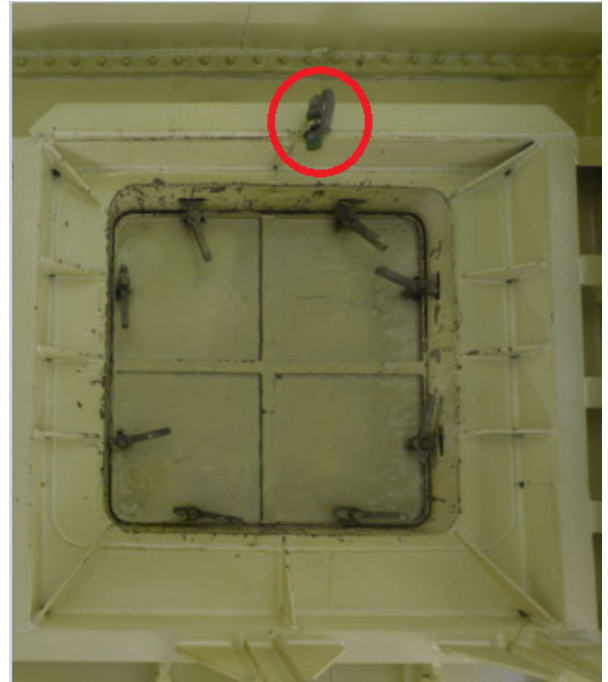


Figure 3 Lifting Eye Beneath Hatch

- b) 24' Platform Handrail – The handrail to the aft side of the platform must be removed to facilitate the rotation of the units, see Figure 4.

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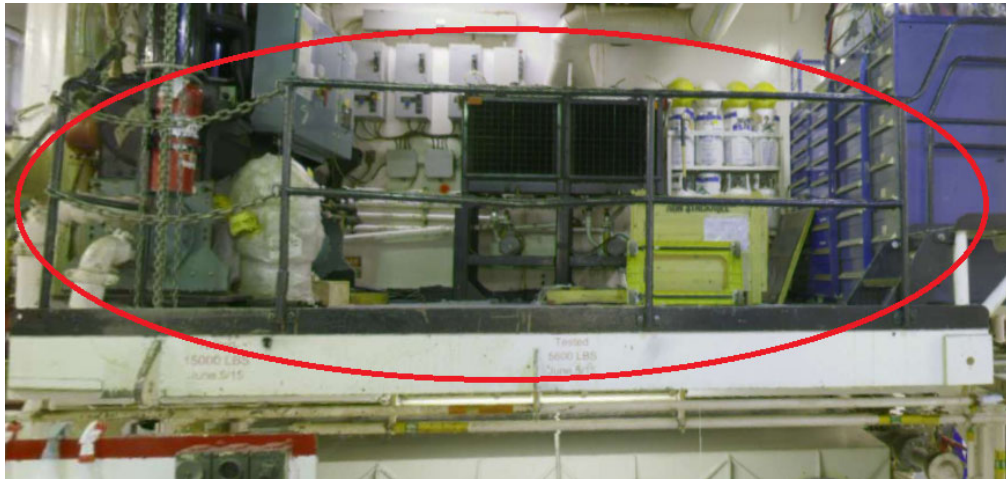


Figure 4 24' Platform Handrail

- c) Vertical Pipes – The vertical pipes next to the pillar on the 19' level will need to be removed, there is sufficient space to maneuver around the pillar, see Figure 5.



Figure 5 Vertical Pipes to be Removed

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- c) Hydraulic Press – The hydraulic press on the 19' level will need to be removed, this appears to be bolted to the deck, see Figure 6.



Figure 6 Hydraulic Press

- d) Air Compressor – The air compressor and associated pipe work will need to be removed. The pipework has not been accessed to see if it can be reused with the new air receivers. See Figure 7.



Figure 7 Air Compressor

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- e) Catwalk – The catwalk above the receivers will need to be removed to allow the upper unit to be removed/installed, see 8.

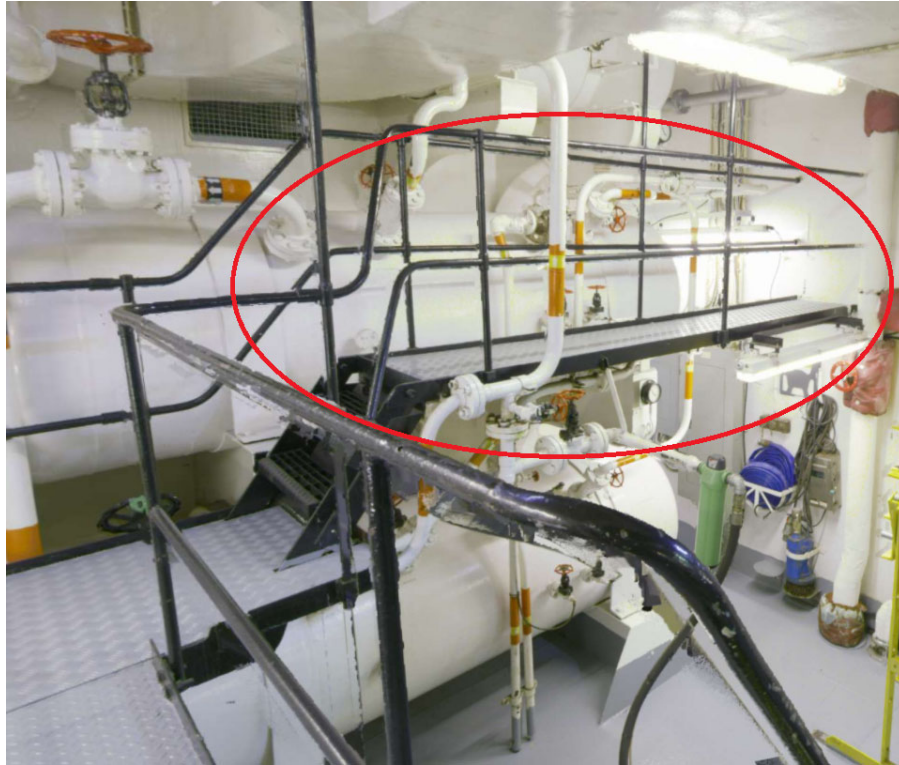


Figure 8 Catwalk Above Receivers

Snapshots of the modelled simulation, highlighting the clash points and routing through the compartment, are shown in Appendix A, Figure 7 to Figure 10.

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Appendix A:

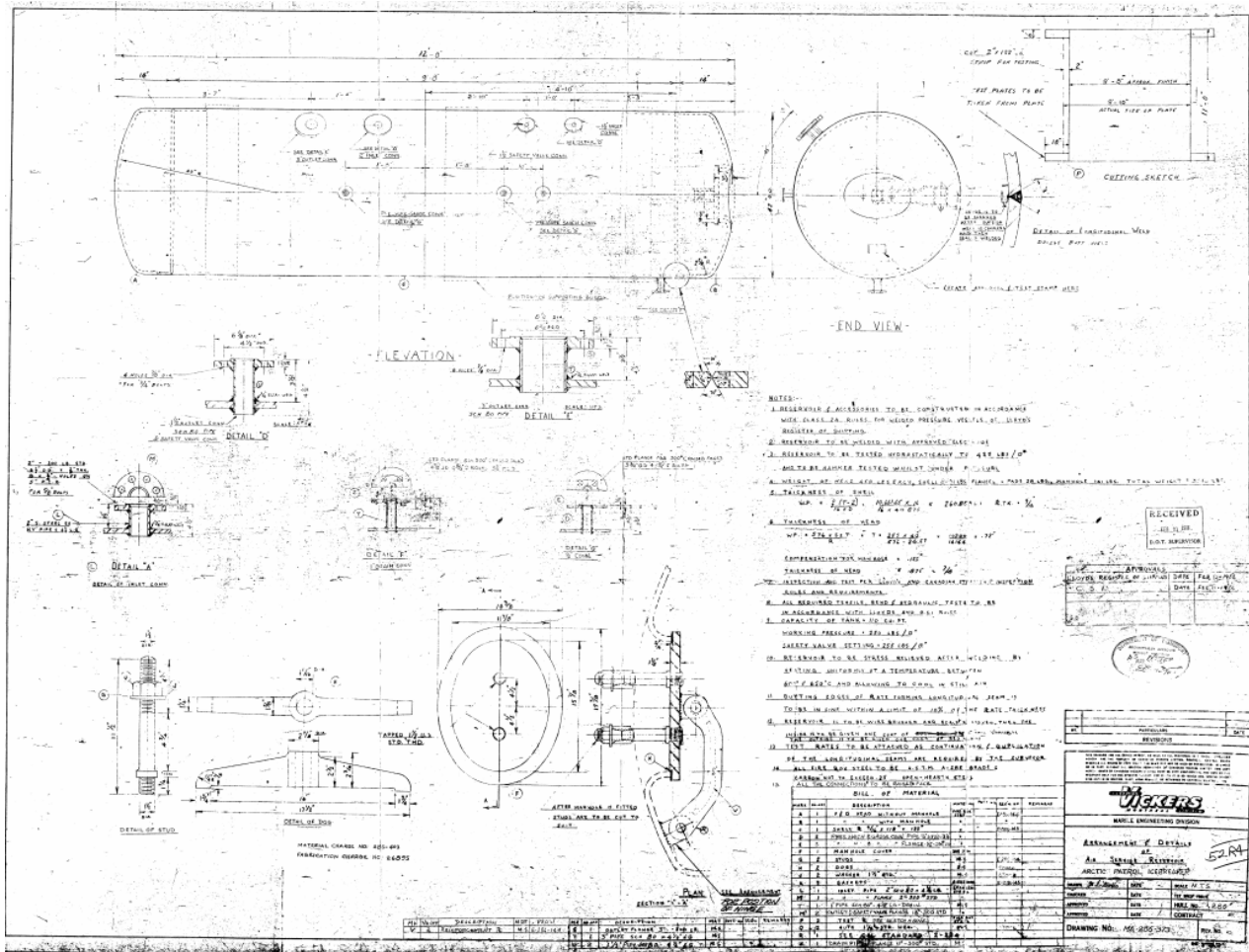


Figure 9 Original Air receivers

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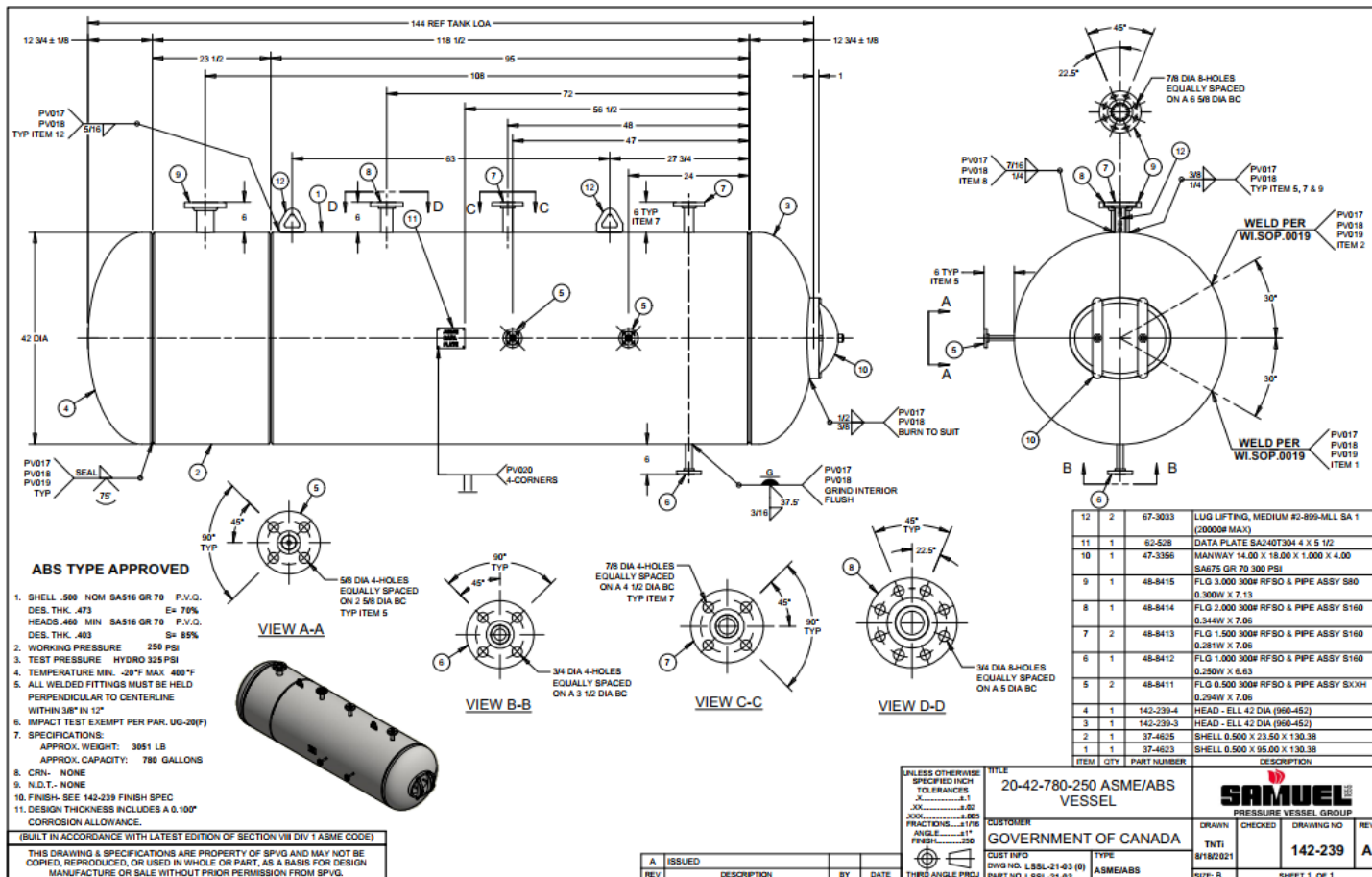
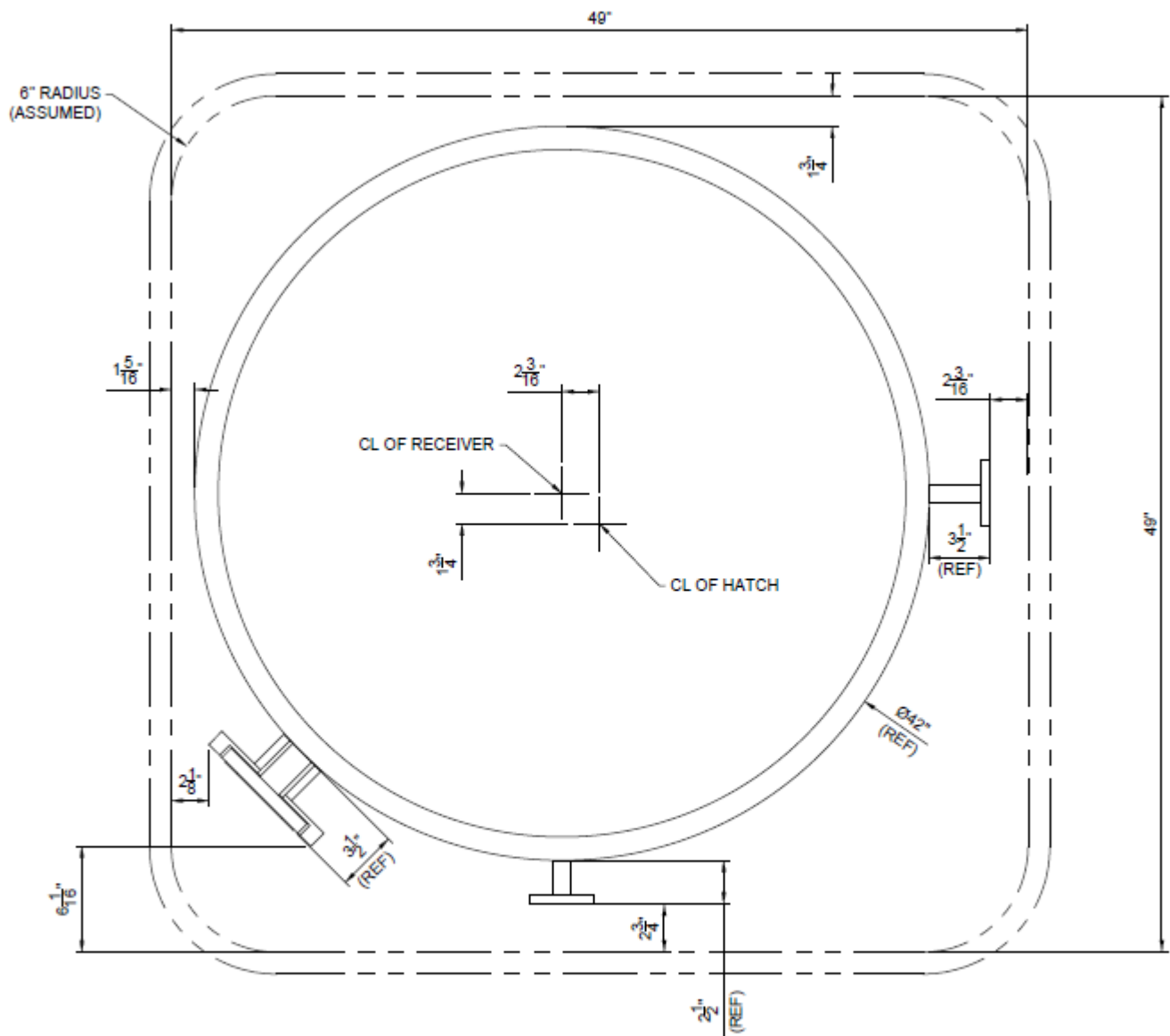


Figure 10 New Air Receivers

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PLAN — AIR RECEIVER PASSING THROUGH LOWER DECK HATCH
AT 34' ABL

Figure 11 Air Receiver Through Hatch Plan

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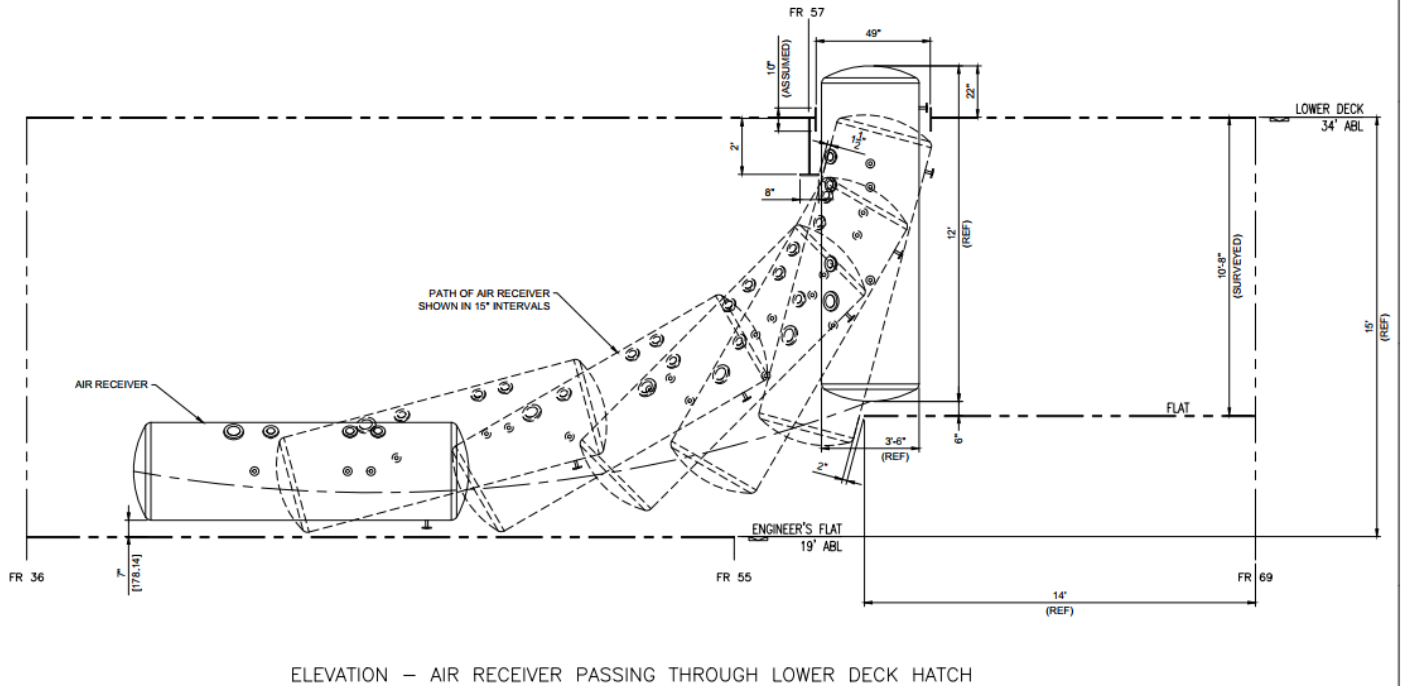


Figure 6 Air Receiver Rotation – Looking to Port side

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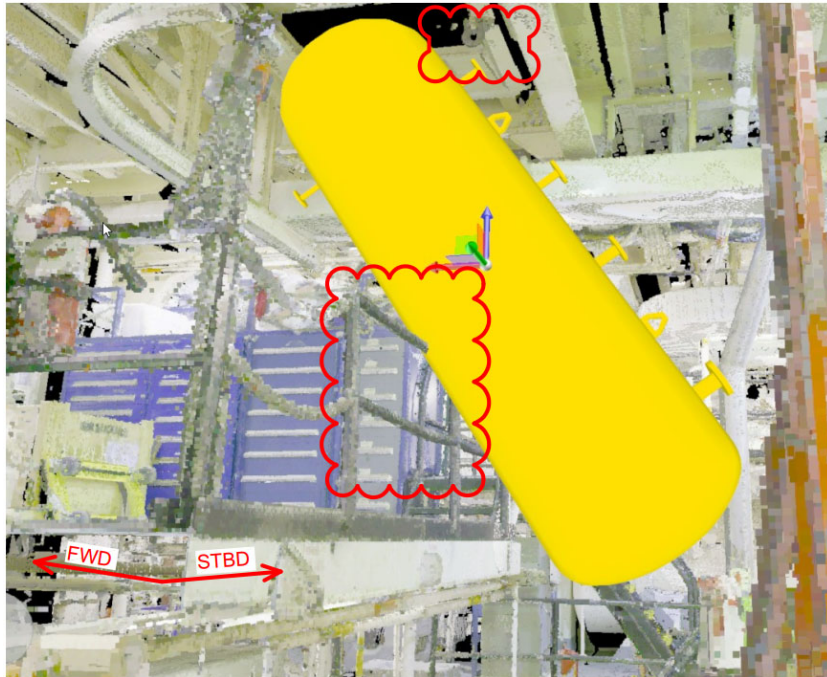


Figure 7 Simulation #1

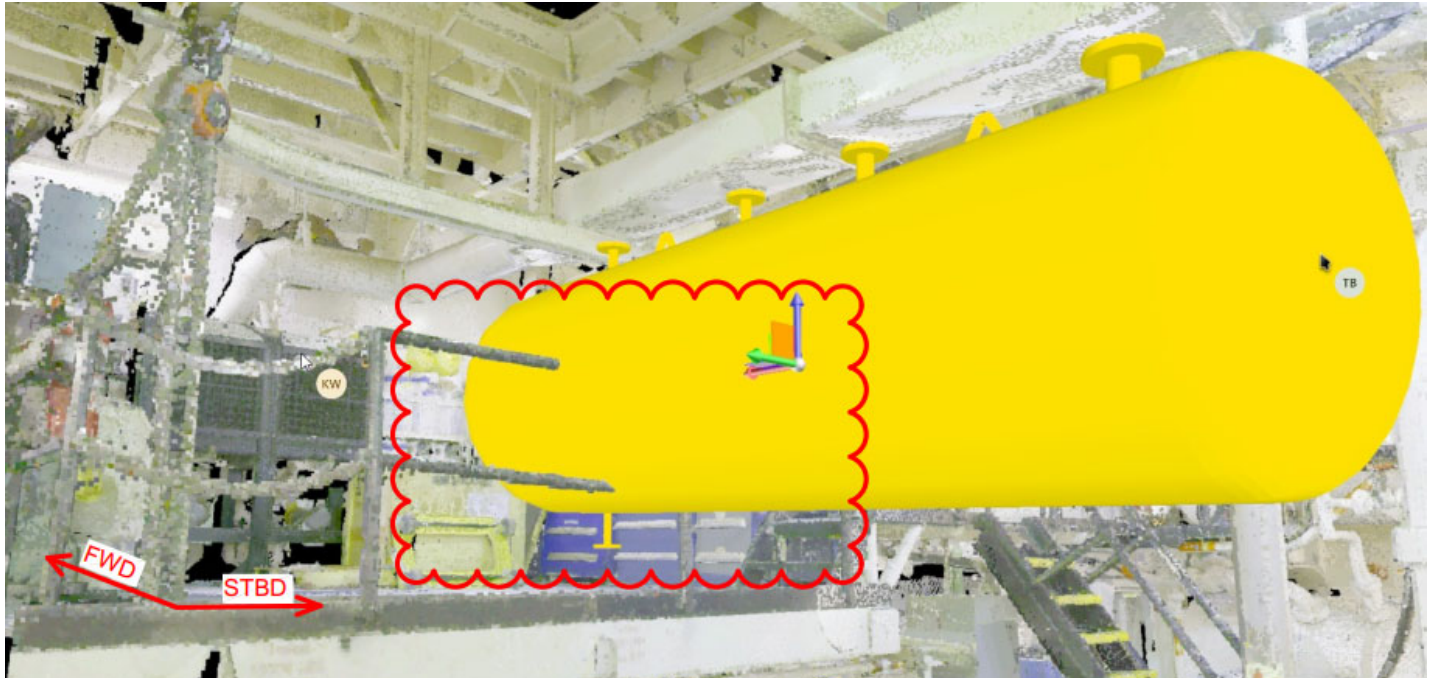


Figure 8 Simulation #2

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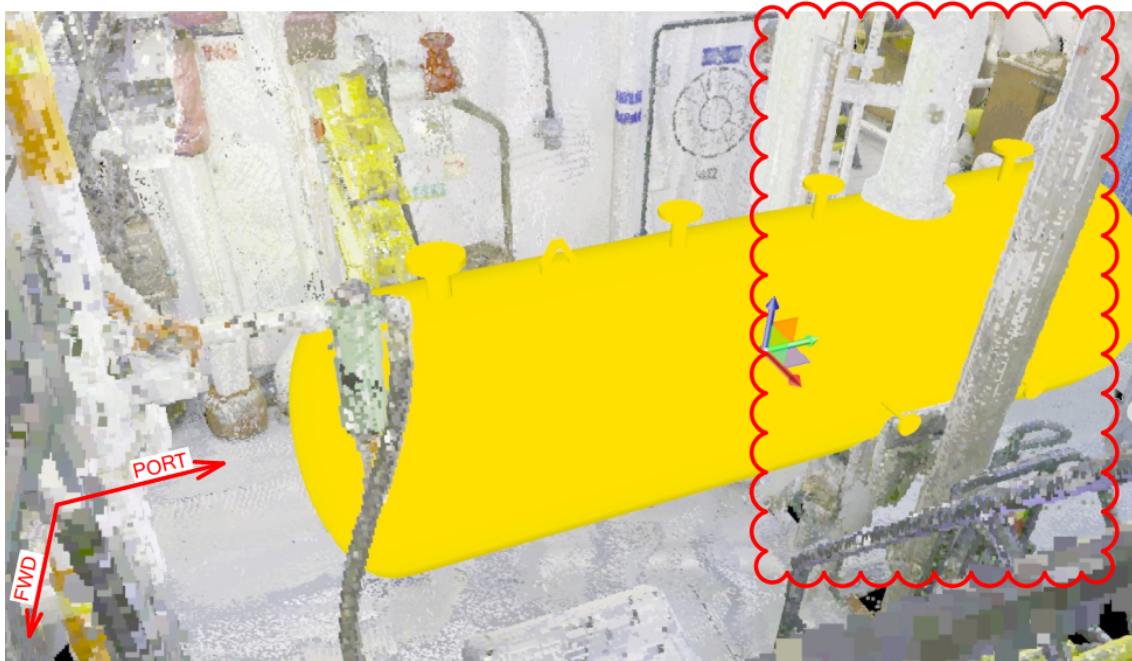


Figure 9 Simulation #3

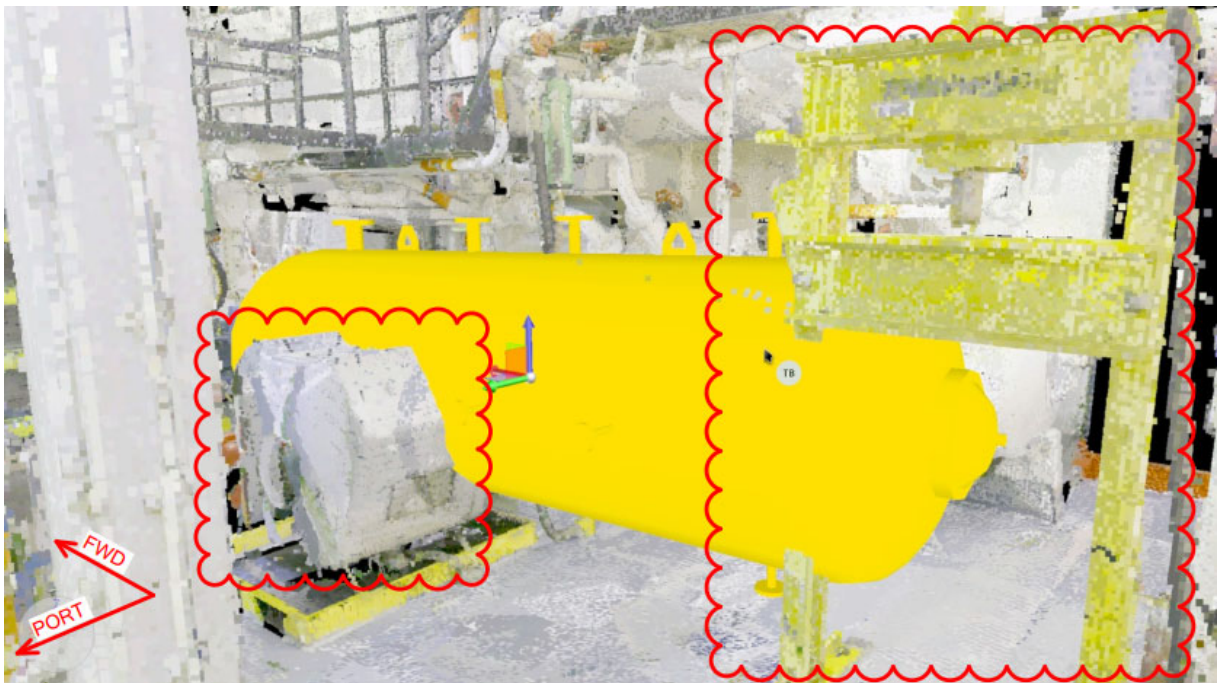


Figure 10 Simulation #4



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