

Executive Summary

The Military Sealift Command (MSC) currently has four active tug ships, the T-ATF 166 Class, and four active salvage ships, the T-ARS 50 Class, which are scheduled to begin phased retirement in 2020. To ensure there is not a gap in tug and salvage capability, the US Navy is investigating the development of a common hull T-ATS(X) to replace the missions of the T-ATF and T-ARS Class ships. The primary mission of the common hull T-ATS(X) will be to, “serve as a combat logistics support force providing, salvage, repair, towing, diving, and rescue services to the fleet at sea,” effectively merging the high-level mission capabilities of the T-ATF and T-ARS Class ships.¹ This study investigated the validity of using a commercial OSV, the UT-722L, as a candidate for conversion into the common hull T-ATS(X) Class ship. The UT-722L design is licensed by Rolls-Royce Marine with licenses for production worldwide.

Additionally, vessel traffic in the arctic region is increasing as polar ice continues to recede. As a result, special focus within this study was placed on incorporating the American Bureau of Shipping (ABS) C0 Ice Classification into the T-ATS(X).

An analytical hierarchy process was used to guide concept exploration and selection of the T-ATS(X) design. The design space included 24 variants based on crane selection, crane location, and arctic capability. Seven MOPs were used to measure the effectiveness of each T-ATS(X) variant. The OMOE vs. modification cost was plotted for each variant, and a final variant was selected to maximize OMOE and minimize cost.

The final T-ATS(X) variant incorporated a number of modifications from the UT-722L to meet the thresholds and objectives set by the customer requirements. Those modifications included: strengthening the hull structure to satisfy ABS Ice Class C0 requirements, adding extra heating capacity for arctic conditions, installing a 53-MT capacity crane, increasing electrical generation capacity, and creating additional accommodation spaces.

To verify the feasibility and performance of the T-ATS(X) several analyses were conducted. These included: an intact stability analysis, a powering and resistance analysis, and seakeeping analyzes for normal and VERTREP operations. Furthermore, a topside icing model was developed to analyze the stability of the vessel in arctic conditions with external asymmetrical topside ice accumulation.

In conclusion, the results of this study demonstrate the UT-722L can meet the Navy’s requirements for the T-ATS(X) with low-risk modification at comparatively low cost. The estimated lead ship cost of this T-ATS(X) conversion design is \$152 million (FY12), which is significantly lower than the projected cost of a 2008 MIT clean sheet T-ATS(X) design study.