

T-AKE Modified Repeat to Canadian JSS

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Canada's recently instituted National Shipbuilding Procurement Strategy aims to rebuild their shipbuilding industry while replacing all of the vessels in their fleet over the next three decades. The first vessels in need of replacement are the aging supply ships, the *Protecteur* class. The replacement, called the Joint Supply Ship (JSS), must fill the missions of both a traditional oiler and a dry cargo replenishment ship, as well as provide substantial sealift capability and several forms of task group support. A parametric study to identify an existing hull for modification to fill such diverse mission areas identified the U.S. Navy *Lewis and Clark* Class (T-AKE) as the most desirable candidate.

The T-AKE was built for the U.S. Navy to replenish dry stores and ammunition, supplemented with modest refueling capabilities. In converting the T-AKE design to meet the requirements for the Royal Canadian Navy's JSS, the design provided adequate propulsion and ice capabilities without modification. Aircraft, medical, fuel, and sealift capabilities all required upgrading to meet broader role of the JSS. Replenishment stations were simplified to a more robust and versatile set of 4 dual-purpose stations arranged in commonly supported port and starboard pairs. The hangar was upgraded to store a third helicopter and aviation maintenance facilities were expanded to provide greater fleet support services. Dry cargo areas were converted into fuel tanks deep within the ship and into Ro-Ro sealift on the upper decks. In accordance with MARPOL requirements, all fuel tanks were upgraded to double hull protection standards. Side and stern ramps provided access for Ro-Ro transfer. No existing landing craft were found to match the desires for the JSS, so space and cranes were included in the design to support either a larger craft that well exceeds requirements, like the U.S. Navy LCM-6, or a smaller craft with some capability short of desired levels, such as the LCVP currently in use in Canada.

The final design focused on simplicity and minimum cost, but engineering judgment in several spaces led the team to include more capacity than the minimum. Minimum thresholds were achieved for medical, joint task force headquarters facilities, aviation support, and container capacity. Capacities for ship fuel, cargo fuel, and aviation cargo fuel were all designed above minimum. Total accommodations and internal lane meters were all increased to maximum objective values.

Modifications to the design added 508 tons to the light ship condition. Major structural changes included transverse watertight doors for vehicle decks below the margin line, stern and side ramps for access to the main vehicle deck, and an internal fixed ramp with side-hinged cover to provide access to the lower vehicle deck. The inherent strength, stability, and seakeeping characteristics, as well as available reconfigurable space of the T-AKE allowed for a viable and capable baseline ship for the JSS. The final JSS variant improves upon the capabilities above the threshold requirements for a high return on investment for the Royal Canadian Navy.

Ship Characteristics	
Parameter	Value
<i>LBP</i>	210 meters
<i>Beam</i>	32.3 meters
<i>Draft</i>	9.42 meters
<i>Full Load Displacement</i>	42,692 MT
<i>Speed</i>	20 knots
<i>Loads (MT):</i>	
<i>Dry Cargo</i>	1494
<i>Ammunition Cargo</i>	600
<i>Cargo Fuel</i>	7456
<i>Aviation Cargo Fuel</i>	863
<i>Accommodations</i>	345
<i>Internal Lane Meters</i>	1500
<i>Helicopter Hangars</i>	3
<i>Lead Ship Cost</i>	\$1,249 M

