

Executive Summary

The role of small surface combatant in the U.S. Navy is to be filled by the Littoral Combat Ship (LCS) in the years to come. However, due to limited shipbuilding funds and the increasing cost of the LCS and its mission modules, there is reason to believe that the intended goal of 55 LCS may never be achieved. In order to bridge the gap and provide small surface combatants that are capable of fulfilling some of the LCS missions, a fleet rehabilitation and modernization (FRAM) of the FFG-7 class frigates is proposed. The portion of the LCS mission set which the FFG-7 FRAM can fulfill includes anti-piracy, counter-narcotics, counter-terrorism, humanitarian assistance/disaster relief, and global fleet station.

A series of potential modifications was created based on the requirements of the mission set, and using weighted sum and analytical hierarchy process decision methods, a preferred concept was chosen. The preferred concept used the baseline FFG-7 hull form. The propulsion plant was changed to maximize fuel economy due to reduced maximum speed requirement and thereby decrease lifecycle cost. Superstructure modifications were made to reduce the converted ship's radar cross-section, which is beneficial for a ship intended to operate in coastal waters. The topside equipment configuration was altered by removing the 76 mm gun and placing a 30 mm Bushmaster cannon above the pilothouse. All these modifications would be in addition to service life extension work that would be required to extend these ships another 10-20 years.

With the propulsion plant modification the converted ship endurance increased by 50% over the baseline FFG-7 while only giving up a 17% decrease in maximum speed. The location of the Bushmaster cannon provides an anti-surface warfare weapon with a greater arc of fire that is more maintainable than the 76 mm cannon. The structural integrity of the pilothouse was analyzed due to the weight of the Bushmaster and found to be adequate.

The cost of the converted ship was estimated based on the weights removed and added to the ship. The estimated cost of the modifications is \$94-126 million. Service life extension is estimated to cost another \$150-200 million based on the U.S. FFG midlife extension and the Australian Navy's FFG service life extension. The largest portion of cost is the propulsion plant modifications; however the added fuel efficiency could pay for itself over the expected service life taking into account the number of operating days and increasing fuel cost.

While the FFG-7 FRAM will not have all the capabilities of LCS there are a number of LCS missions that it can fulfill satisfactorily. It is estimated to be considerably less costly than the construction cost of the LCS and its mission modules. Also there is the added benefit that the FFG-7 FRAM can be delivered faster than the LCS thereby having more ships available now for a lower cost.