

Abstract

A changing world economic situation requires navies to search for the most cost-effective means to continue to support their nation's foreign policy. Often, by developing a modified-repeat design of an existing ship, considerable research and development savings can be capitalized on and carried over into additional savings over the original design. For this reason, the study investigates converting the DDG-51 Flight IIA into an Area Air Defence Destroyer that meets the specific needs of a foreign navy.

The DDG-51 Flight IIA has enough combat mission system flexibility to permit reasonably simple modifications to suit the combat systems needs of any foreign navy. The topside payload modifications are completed with little impact to the existing configuration. The biggest change is due to the removal of the aft VLS system to accommodate hangar modifications to suit a single helicopter with larger dimensions than the SH-60 currently used in the DDG-51.

Most interestingly, however, the study finds that by sacrificing less than two knots of maximum sustained speed, and decreasing the endurance speed from 20 to 18 knots, the installed power requirements offer exceptional opportunity to deliver fuel consumption savings approaching 40%. The study recommends adoption of a CODOG propulsion plant arrangement such that the maximum fuel consumption benefit is derived from ship speeds at or below endurance.

Lastly, the study leverages modern advances in automation technology to bring ship manning levels to an acceptable and sustainable level.

	DDG-51 Flight IIA	AADD
LBP (m)	142	142
LOA (m)	154	154
Beam (m)	17	17
Displacement (Full Load) (mtons)	9191.6	8828.2
Displacement (Light Ship) (mtons)	7072.6	6872.0
GM _t (m)	1.64	1.66
GM _t /B	0.096	0.098
VCG (m)	7.7	7.52
Maximum Sustained Speed (knots)	30+	28.4
Range (nm)	4500	7520
Manning (pers)	380	240
Installed Power (kW)	78300	52198
Fuel Usage Reduction (%)		38%

The AADD conversion is a feasible concept that may not necessarily be the ideal platform for a foreign navy, given the development of specific, smaller, and more modern destroyers; however, this conversion does give the United States Navy some food-for-thought to consider regarding the development of still highly-capable, yet more economically-sound platforms.