CG-47 as Test Platform for Electromagnetic Railgun (EMRG)

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The core doctrine of the surface fleet's mission is to defend high-value units. Today's surface fleet faces the challenge of combating more sophisticated adversaries with longer-range weapons. The surface warfare enterprise is responding by shifting to a more offensive-minded concept of operations to affect an adversary's battlespace calculus by investing in weapons systems such as the Electromagnetic Railgun (EMRG). To support EMRG programmatic operational testing and evaluation a test ship needs to be identified.

This conversion design evaluated adding a 32MJ or 20 MJ Naval Surface Fire Support (NSFS) capable EMRG system to an existing CG-47 class cruiser. Evaluated EMRG systems were designed to have a battery, capacitor bank, and a pulse-forming network capable of providing all energy necessary for one 50 shot NSFS salvo. A hierarchal design process showed installing a 32MJ EMRG in the aft 5-inch gun space is feasible. Additionally, a weight-based labor cost estimate was performed.

Use of the aft 5-inch gun location and aft VLS spaces maximized retained mission capabilities. Because the heaviest components were arranged lower in ship, negligible changes to overall stability were predicted. Current CG-47 electric distribution plant capacity was shown to be able to meet EMRG system re-charging requirements and all static electric load conditions except 20 KW of winter battle load. An additional cooling system was designed and arranged that requires docking the ship to support the conversion design, although a trade space of alternatives was also presented.

	Disp. (LT)	Draft MS (ft)	KG (ft)	GMT (ft)	TRIM(ft)
Change Due to Conversion	22	0.02	-0.02	0.02	0.21 (less by BOW)