

Executive Summary

Sea mines pose the single largest threat to naval forces operating in littoral regions. Since the end of World War II, 14 of the 17 U.S. ships damaged by hostile action were the victims of mines. Forty-nine countries possess mining capability; 30 have demonstrated mine production capability; 20 have attempted to export mines. The end of the Cold War has brought about a swelling of asymmetric and regional threats that can capitalize on the low cost of mines to counter U.S. military strength. Adversaries need not sink U.S. ships for mines to be successful. The simple possibility of encountering mines can delay or stop naval operations. The current Mine Countermeasures (MCM) capability rests on a fleet of dedicated ships and aircraft. While these assets are very effective at mine detection and neutralization, their limited number, with their slow speed, requires significant advance planning for them to be near the theater of operations. This can prevent forward-deployed naval forces from responding to a rapidly developing situation. The Navy is developing the Remote Minehunting System (RMS) to provide some minehunting capability to operational ships. These will be located on DDG-51 and DD-21 class ships, but MCM operations will be a secondary function for these platforms, and the available number will be insufficient to meet the operational need. This study examines an alternative solution: convert FFG-7 class ships to serve as dedicated MCM ships that operate with deployed naval forces. This ship conversion is called the Near-Term Organic Mine Countermeasures Ship (NMCM).

The NMCM concept developed in this report removes the area anti-air warfare (AAW), anti-surface warfare (ASUW), and anti-submarine warfare (ASW) capability in the FFG-7 and installs a modern and robust self-defense capability. The focus of the design, however, is the insertion of systems and spaces to support MCM as the primary mission. The NMCM will operate unmanned undersea vehicles (UUV) for mine detection, classification, and identification. The NMCM will also operate CH-60S airborne MCM (AMCM) aircraft and systems, and support Explosive Ordnance Disposal (EOD) and Very Shallow Water (VSW) MCM detachments. The NMCM also includes space and support systems for a Mine Warfare Commander (MIWC) to coordinate MCM operations. The table below gives the NMCM general characteristics, while Figure 1, on page iii, shows the outboard profile.

LBP	408 ft	LOA	453 ft
Beam	45 ft	Full Load Draft	15.8 ft
Full Load Displacement	3987 long ton	Light Ship Displacement	3161 long ton
Full Load KG	18.28 ft	KG Margin	0.57 ft
C_p	0.596	C_x	0.749
Max Speed	29.5 kts	Endurance @ 20kts	3714 nm
UUV MCM	2 RMS or 10 LMRS-size UUVs		
AMCM	2 CH-60S with full suites of AMCM equipment		
Other MCM	2 EOD or 1 VSW detachments with associated gear		
MCM C³I	Space and support systems for MIWC and staff		
AAW Defenses	32 ESSMS in 8-cell Mk48 VLS, 21 RIM-116A RAM in Mk49 launcher		
ASUW Defense	4 AGM-119 Penguin Mk2, Mk46 30mm Bushmaster II gun		
Mine Defense	Advanced Mine Detection System (AMDS)		

The NMCM development reduces the weight and bending moment while improving the stability over that of the FFG-7 class. Initial cost estimates suggest that the first conversion would cost

\$67M, while follow-on ships would cost \$50M. The current Navy plan is to outfit 31 DDG-51 and DD-21 ships with one RMS system each for \$100M. The NMCM conversion would provide more capable MCM platforms that can support AMCM, EOD, and VSW in addition to twice as many UUV MCM systems. NMCM conversion would not dilute the primary mission of the DDG and DD ships but would keep these very expensive and valuable platforms away from MCM operations. The NMCM option would provide more MCM capability to the Battle Group (BG) or Amphibious Ready Group (ARG) than it can derive from RMS on DDs, and more rapid response than dedicated MCM assets can supply. It also supplies a near-term solution to the requirement for in-stride MCM for BGs and ARGs, allowing more time to develop the next generation of MCM ships.

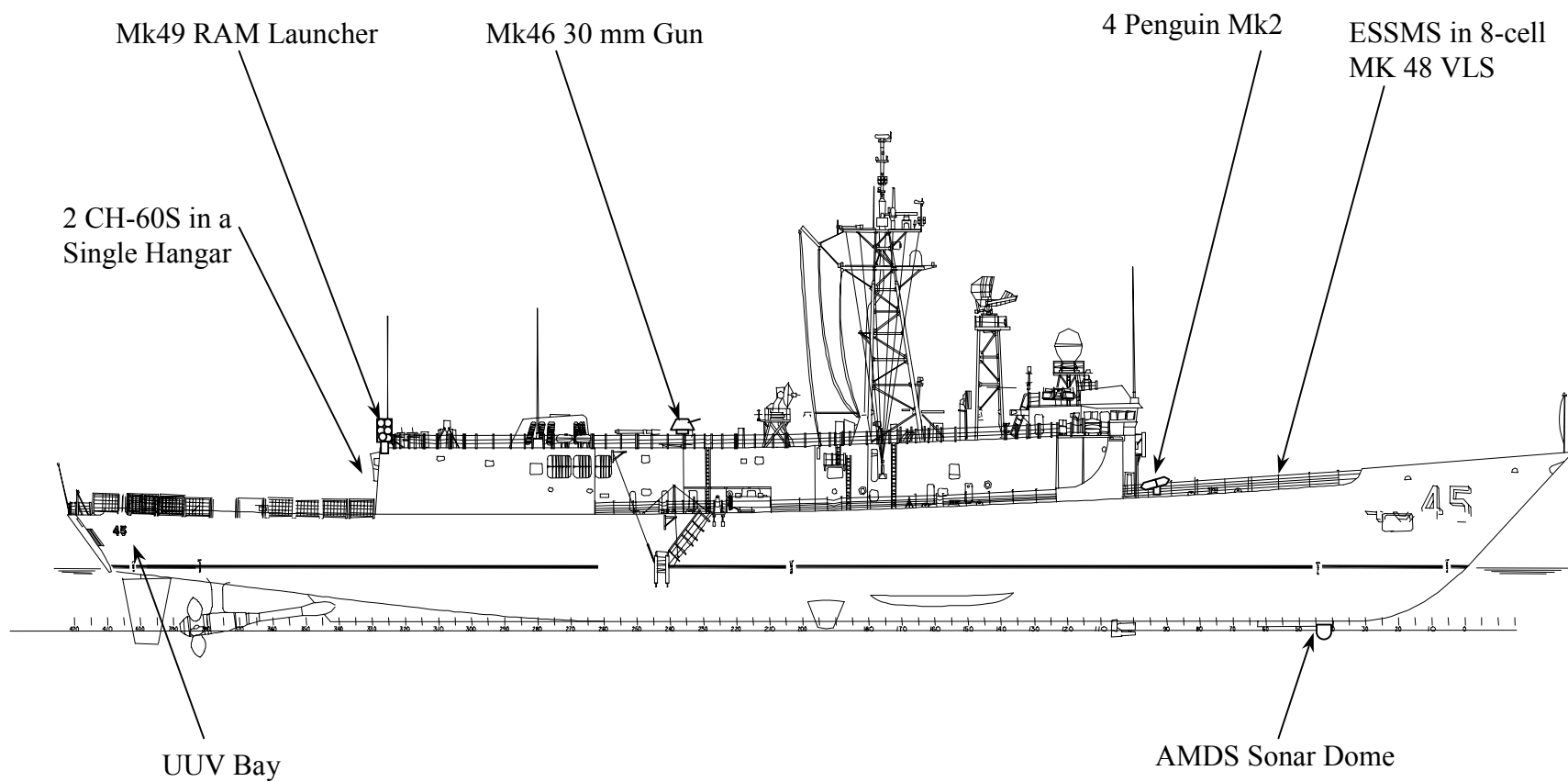


Figure 1. Final Concept Design Outboard Profile