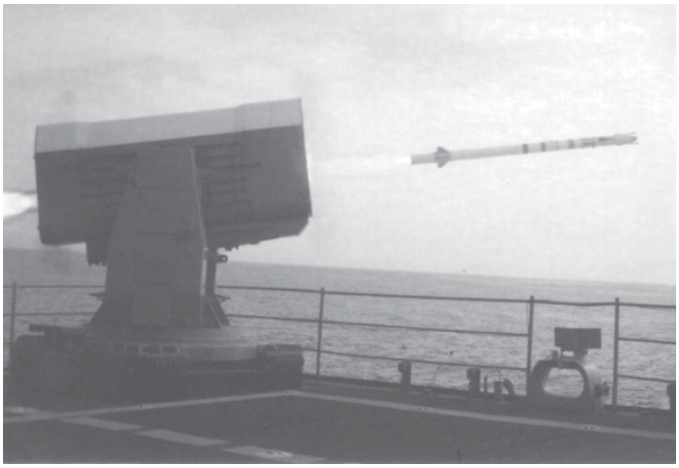
Rolling Airframe Missile (RAM) Weapon System

SUMMARY

- The operationally realistic environment provided by the Self Defense Test Ship produced Rolling Airframe Missile (RAM) Block 1A operational test and evaluation (OT&E) results that led to discovery and correction of software errors as well as understanding of Block 1A capability and limitations against current threats.



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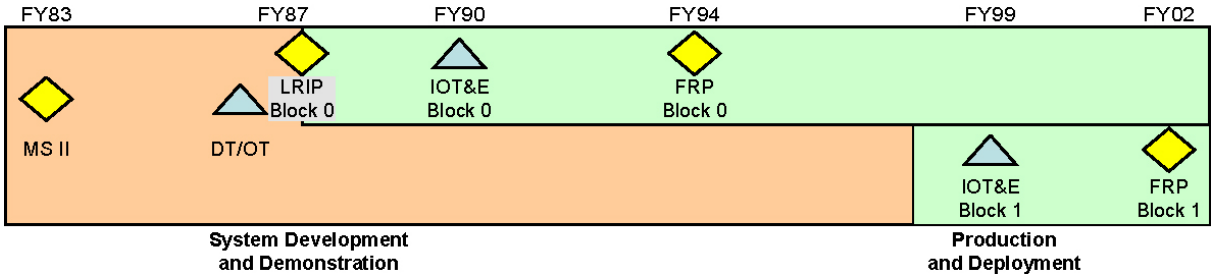
SYSTEM DESCRIPTION AND MISSION

The RAM, jointly developed by the United States and the Federal Republic of Germany, provides surface ships with a low-cost, lightweight, self-defense system to defeat anti-ship cruise missiles (ASCMs). There are three RAM variants. RAM Block 0 uses dual mode, passive radio frequency/infrared guidance. RAM Block 0 Initial OT&E (IOT&E) completed in FY90. RAM Block 0 enhances ship self defense against several radio frequency-radiating ASCMs, while RAM Block 1 extends that defense against non-radio frequency radiating missiles. The RAM Block 1 operational evaluation in 1999 used the Self Defense Test Ship and the USS *Gunston Hall*. RAM Block 1A extends the capability of RAM Block 1 against non-ASCM targets, including helicopters, slow aircraft, and surface threats (HAS).

A variety of combat systems use the RAM weapon system. The AN/SWY-2 and -3 combat systems account for most RAM weapon system installations. AN/SWY-2 installations use RAM as the only hard-kill weapon. AN/SWY-3 installations use both RAM and NATO Seasparrow systems as hard-kill weapons. RAM integration with the Ship Self Defense System Mark 1 provides self defense on the LSD 41/49-class of amphibious ships. RAM, integrated with the Ship Self Defense System Mark 2 on LPD 17-class, LHD 1-class, and CVN 68-class ships provides short-range self defense (the NATO Seasparrow is also on the latter two ship classes). HAS integration into combat systems is not funded at this time.

TEST AND EVALUATION ACTIVITY



Combined developmental test/operational test of RAM Block 1 extended into FY04 with a follow-on phase using the Self Defense Test Ship. In addition to carrying out deferred testing from the FY99 operational evaluation, these operationally realistic tests determined that RAM, with the new HAS software, retained capability against ASCMs. Developmental tests in FY04 also examined RAM capabilities against HAS targets using a fixed launcher on San Nicolas Island at the Point Mugu, California, sea range.

TEST AND EVALUATION ASSESSMENT

RAM Block 1, as supported by an LSD 41-class combat system, is operationally effective against most current ASCMs. RAM Block 1 is operationally suitable and is lethal against most current ASCMs. Follow-on Test and Evaluation for Block 1 (or Block 1A) still needs to address missile capability against the threat category that was not tested during the operational evaluation, against ASCMs under conditions of electronic jamming of the combat system sensors, in low visibility (high aerosol) environments, and in the presence of other infrared sources. For the threat category not tested during the operational evaluation, the Navy's subsonic target upgrade program may deliver targets by FY06 that are adequately representative of the threat for some acquisition programs. The Navy's target developers did not accord high priority to providing the characteristics required to make the target adequately threat representative for RAM program testing. Overall combat testing, using RAM as a weapon, will not be adequate without testing against ASCMs under conditions of electronic countermeasures against the combat system sensors. Until such testing is accomplished, the fleet users of the system will remain uninformed about their self-defense capability in that environment.

RAM HAS Capability. The program sponsor has yet to issue detailed performance goals for RAM HAS. From an OT&E perspective, the absence of operational requirements undermines objective assessment of operational test results and hampers the program manager's ability to understand the impact of performance trades on mission accomplishment and operational effectiveness against HAS targets. In addition to the combined developmental test/operational test against ASCMs on the Self Defense Test Ship in FY03/FY04, developmental tests included RAM (with Block 1A flight software) fired from a fixed launcher to successfully intercept a coastal patrol boat and destroy two helicopter targets.

The combined developmental test/operational test against ASCMs ended with two stressing scenarios in November 2004. Results of this combined developmental test/operational test reaffirmed the value of operationally realistic testing conducted with the Self Defense Test Ship. Problems with Ship Self Defense System Mark 1 and with the RAM HAS software discovered during these realistic tests against ASCMs could not have been discovered in testing with a manned ship.

The LFT&E strategy for RAM HAS includes ground testing of the warhead against whole targets and/or components, flight-testing, and simulation based analyses. There is little data on RAM warhead lethality against the new target set and for the development of simulations used to predict lethality/effectiveness under a variety of scenarios. During RAM Block 0 and Block 1, LFT&E only evaluated lethality against various ASCMs.