

## **MULTIPLE LAUNCH ROCKET SYSTEM (MLRS) M270A1 LAUNCHER**



The Multiple Launch Rocket System (MLRS) provides an all-weather, indirect, area fire weapon system to strike high-payoff threat targets at all depths of the tactical battlefield. MLRS consists of a self-loading launcher with an onboard fire control system. The MLRS launcher is the standard U.S. Army platform for firing surface-to-surface artillery rockets and missiles. It is mounted on a mobile, tracked vehicle that carries 12 rockets in two, six-rocket Launch Pod Containers or two Army Tactical Missile System (Army TACMS) missiles, which can be fired individually or sequentially. Rockets have a range beyond 30 kilometers, and the Army TACMS Block IA missile can reach beyond 300 kilometers.

The M270A1 program includes two major upgrades to the current M270 launcher. First is the Improved Fire Control System (IFCS), which replaces obsolete, maintenance-intensive hardware and software. It provides growth potential for future munitions and the potential for reduced launcher operation and support costs. IFCS includes a Global Positioning System (GPS)-aided navigation system. Second, the Improved Launcher Mechanical System (ILMS) improves reaction times and decreases the time to aim, fire, move and reload the launcher. A faster launcher drive system that moves simultaneously in azimuth and elevation reduces the traverse time from the stowed position to worst case aimpoint by approximately 80 percent, and decreases the mechanical system contribution to reload time by about 40 percent. Additionally, the M270A1 program includes the re-manufacture of selected components and the application of selected Engineering Change Proposals to the basic M270 launcher to bring all launchers to the same configuration.

### **BACKGROUND INFORMATION**

MLRS initial operational capability occurred in 1983. To combat growing obsolescence, the Army initiated the IFCS program in 4QFY92. In 4QFY95, the Army began the ILMS program to address a requirement for faster prosecution of highly mobile, short-dwell targets. In FY96, the Army combined the IFCS and ILMS test programs under the M270A1 to undergo system-level testing. In May 1998 LRIP of IFCS and ILMS hardware modification kits was approved. In 4QFY98, the 486-based executive processor was replaced with a PowerPC processor, and the proprietary software operating system was replaced with the commercial VxWorks software operating system.

In July 1999, IOT&E slipped 22 months to allow the program time to fix problems identified in developmental testing and the Maintainability Demonstration, and to include the planned replacement of the executive processors and operating system. In March 2000, DOT&E approved a revised M270A1 TEMP. Milestone III is scheduled for March 15, 2002.

In 1997 and 1998, the Army conducted an MLRS survivability program (SP) to complete survivability estimates, determine the effects of improvements on survivability of the fielded launcher, develop tactics to enhance MLRS launcher and crew survivability, and develop changes needed for the M270A1. The SP assessed survivability against ballistic threats and identified material and tactics changes needed to decrease vulnerabilities. Blast and shock tests were completed in 1997, payload sensitivity and component experiments in 1998 and a vulnerability analysis in 1999.

## **TEST & EVALUATION ACTIVITY**

In January through April 2001, crewmen and maintenance personnel performed a series of tasks in the M270A1 Maintainability and Logistics Demonstrations. Flight-tests in 2QFY01 of an ATACMS Block I missile, practice rockets, and M26 basic rockets; the Extended System Integration Test (ESIT) of an M270A1 platoon in April; and the Logistics and Maintainability Demonstrations in February through April showed that the launcher was ready for IOT&E.

The IOT&E was conducted from August to October 2001 in accordance with a DOT&E approved TEMP and test plan. DOT&E observed both the ground and flight phases. The IOT&E ground phase consisted of three 96-hour field exercises for one M270A1 launcher platoon, side-by-side with an M270 platoon and included the live firing of reduced-range practice rockets. The flight phase consisted of 35 M26 rockets, 6 extended-range rockets, and one ATACMS Block IA missile.

In October 2001, the materiel developer conducted a three-day exercise of time-ordered events to verify that minor changes made following the IOT&E software release did not create unexpected consequences. Additional flight tests will be conducted at White Sands Missile Range, NM, to ensure that software changes do not affect the launcher's ability to fire live munitions.

## **TEST & EVALUATION ASSESSMENT**

IFCS software and safety problems continued in early 2001. The safety problems involved an uncommanded LLM movement and undamped oscillations around the commanded azimuth. Software, hardware, and procedural changes were made to mitigate these problems.

During the Logistics Demonstration, soldiers successfully conducted 198 of 201 selected tasks. During the Maintainability Demonstration, maintenance personnel detected and isolated more than the required 95 percent of 115 electrical and mechanical faults tested.

A number of system vulnerabilities were found in the survivability program. Some can be corrected with minor engineering changes to such components as the fuel filter bracket and radiator cover to reduce the vulnerability of the system to cheap automotive kills. Others, however, are more significant, and their correction will entail additional armor protection to lessen the likelihood of payload initiation. The PMO funded the Army Research Laboratory (ARL) to investigate ways to improve the armor protection of the MLRS Launcher Loader Module, to inhibit a payload reaction from enemy fire. ARL is conducting a model-based analysis of three viable engineering solutions to improve payload protection. The analyses are not yet complete.

Analysis of the IOT&E data is ongoing. The emerging results show that the M270A1 launchers performed more effectively and reliably than the M270 launchers during the IOT&E. DOT&E will submit a B-LRIP Report to Congress prior to the Army's full-rate production decision.