

# Guided Multiple Launch Rocket System (GMLRS) – Unitary

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The M31A1 GMLRS-Unitary rocket is operationally effective and lethal. Soldiers and leaders successfully executed 75 of 76 GMLRS-Unitary fire missions during ground phase testing and achieved required effects in 11 of 12 fire missions during the flight phase testing.

The M31A1 GMLRS-Unitary rocket is operationally suitable. During the IOT&E, the rocket achieved reliability and supportability requirements, demonstrating a reliability rate of 94 percent by completing 30 of 32 flights.

## System Overview

The M31A1 Guided Multiple Launch Rocket System-Unitary (GMLRS-Unitary) is a Global Positioning System (GPS) guided rocket with a 200-pound unitary warhead. The M31A1 GMLRS-Unitary has a multi-mode fuze with point detonate, delay, and proximity capabilities. The rocket is capable of attacking targets out to ranges of 70 kilometers and uses Inertial Measurement Unit guidance along with GPS to enhance accuracy. GMLRS-Unitary is launched from the M270A1 Multiple-Launch Rocket System (MLRS) and the M142 High Mobility Artillery Rocket System (HIMARS).

The M31A1 GMLRS-Unitary rocket is an improved version of the M31 GMLRS-Unitary rocket, replacing the previous dual-mode fuze with a multi-mode fuze with point detonate, delay, and proximity capabilities. The M31A1 GMLRS-Unitary warhead is designed to reduce collateral damage when employed against area and point targets in restrictive terrain.

The M270A1 MLRS and M142 HIMARS launch platforms provide the mobility, command and control interface, communications processing, computation, and Soldier-machine interface to accurately fire a single rocket or a multiple rocket sequence.

GMLRS-Unitary rockets, fired from the M270A1 MLRS or M142 HIMARS launch platforms, are fielded to Fires Battalions within Brigade Combat Teams and Fires Brigades. Artillery units will use GMLRS-Unitary rockets to accurately attack critical point targets, to include those in urban environments or restrictive terrain. Artillery commanders use GMLRS-Unitary to engage targets:

- Where DPICM submunitions are not effective or unexploded ordnance is not desirable
- With increased lethality and accuracy
- While minimizing collateral damage caused by or associated with area weapons or munitions

## Test Adequacy

The Initial Operational Test (IOT) and live fire testing were executed in accordance with Director, Operational Test and Evaluation approved test plans. GMLRS-Unitary test plan execution was adequate to assess operational effectiveness, suitability, and lethality. This evaluation is based on the IOT and live fire tests, supplemented by developmental testing and combat reporting of the M31 GMLRS-Unitary rockets in Operation Iraqi Freedom.

The GMLRS-Unitary Live Fire Test & Evaluation program was adequate to assess lethality and focused on target effects throughout the developmental and operational flight testing and static test firings. The live fire testing centered on the rockets warhead's ability to defeat threat targets of interest. The Army used modeling and simulation to augment live testing with estimates of expected lethality performance for conditions and environments not executed during actual testing.

## Operational Effectiveness and Lethality

The M31A1 GMLRS-Unitary rocket is operationally effective and lethal. Units equipped with M31A1 GMLRS-Unitary rockets can effectively process and execute GMLRS-Unitary fire missions using current Fire Support command, control, and communications systems. Soldiers and leaders successfully executed 75 of 76 GMLRS-Unitary fire missions during ground phase testing and achieved required effects in 11 of 12 fire missions during the flight phase testing. GMLRS-Unitary tactics, techniques, and procedures support effective system employment. Flight phase testing demonstrated the GMLRS-Unitary rocket can achieve effects on target in a GPS jamming environment. During the flight phase, 29 of 32 GMLRS-Unitary

rockets had effects on target. Three of 32 rockets (from two different fire missions) missed their intended aim points by more than 30 meters. One rocket impacted and detonated 760 meters from the target.

## **Operational Suitability**

The M31A1 GMLRS-Unitary rocket is operationally suitable. During the IOT&E, the rocket achieved reliability and supportability requirements demonstrating a reliability rate of 94 percent by completing 30 of 32 flights. The two failures occurred in the same fire mission. During the fifth planned fire mission three rockets were fired at the target. One rocket failed to function on impact (monolithic impact). The second rocket impacted approximately 760 meters from the desired aim point, which is outside the reliability requirement. The third rocket functioned properly.

The M31A1 GMLRS-Unitary rocket warhead and motor are not Insensitive Munition compliant.

## **Recommendations**

The M31A1 GMLRS-Unitary rocket is operationally effective, suitable, and lethal. The M31A1 GMLRS-Unitary program executed the IOT and live fire testing in accordance with the DOT&E approved test plans. I recommend the Army consider the following recommendations:

### **Operational Effectiveness and Lethality**

- Continue investigating and determine the root cause of the 760 meter target miss and detonation deficiency observed in the IOT. Implement and test the hardware manufacturing assembly procedures and software modifications recommended by the Government/contractor failure analysis team to mitigate reoccurrence.
- Implement and test the planned MLRS launcher software modifications to prevent M31A1 GMLRS-Unitary rockets from being launched without Global Positioning System data.
- Complete the planned testing of a design change to prevent further cases where the rocket remains restrained in the launcher after ignition.
- Update the Joint Munitions Effects Manual (JMEM) Weaponing System (JWS) to include GMLRS-Unitary effects against buildings in the JWS targeting tool.
- Pursue solutions and update the M31A1 GMLRS-Unitary tactics, techniques, and procedures for the reported combat failure modes which precluded completion of fire missions over the last year using M31 GMLRS-Unitary rockets.

### **Operational Suitability**

- Improve M31A1 GMLRS-Unitary Insensitive Munitions compliance of the rocket motor, warhead, and launch pod container.
- Pursue and test a method to improve the reliability of the M31A1 GMLRS-Unitary multi-mode delay fuze function.
- Qualify the M3A1 GMLRS-Unitary for transport on the Army's Palletized Load System (PLS) Trailer.