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# ENHANCED GRENADE LETHALITY: *ON TARGET EVEN WHEN THE ENEMY IS CONCEALED*

ERIC KOWAL

**H**ow does the warfighter launch a grenade at the enemy and ensure that it hits the target if the enemy is defiladed or concealed behind natural or artificial obstacles?

According to Steven Gilbert, the solution is simple — use Small Arms Grenade Munitions (SAGM).

SAGM is a munitions round that aims to provide warfighters with the capability of shooting a 40mm low-velocity grenade from an M203 or M320 rifle-mounted grenade launcher with the certainty that, if their target is hiding or behind an object, damage will still be inflicted.

The round more than doubles the lethality of the current 40mm grenade against defilade targets. It also does not require the user to carry extra weapon accessories, reducing the Soldier's load.

Gilbert is a project officer from the U.S. Army Armament Research, Development and Engineering Center at Picatinny Arsenal, N.J.

He and a team of about 10 engineers from the Joint Service Small Arms Program are in the third phase of the SAGM three-phase project.

The project began in 2011. The first phase of the project entailed making the fuze component smaller while

maintaining its functionality using a standard M433 grenade round. Gilbert described the round as being complementary to the XM25. The XM25 is a Counter Defilade Target Engagement System, which has an onboard laser system that determines the distance to the target.

“SAGM is complementary to that. We are not competing against it,” Gilbert explained. “The XM25 provides direct fire. SAGM is indirect.”

The second phase was to make the fuze “smart” by including sensors, so that the round detonates — what is known as “airburst” — over and past defilade obstacles that are detected by the sensor.

During this phase, engineers worked to integrate sensors and logic devices that will help to scan and filter the environment and then autonomously airburst the fuze in the ideal spot.

Now, in the third phase, engineers are working to optimize the fuze sensor from phase two and improve its ballistic accuracy, as well as integrate the fuze with a live high-explosive warhead.



***A Mississippi National Guard Soldier fires the M203 grenade launcher during the individual weapons qualification weekend at Camp McCain, Miss.***

Photo courtesy of the Mississippi National Guard

With this new capability, much like a smart phone, the grenade can perform a task without being told to do so by the user. Thus, when it is fired, it will recognize its surroundings and can detonate over an obstacle that might conceal the enemy.

The ballistic trajectory of legacy 40mm ammunition inhibits optimal engagement of personnel threats under cover. For these reasons, engineers are also working to optimize ballistic trajectory and the overall accuracy and effectiveness of the grenade.

“There are three modes of firing,” Gilbert said. “Airburst after detecting defilade is the first. Then, the default is point detonation or when it hits the target. Lastly, there is a self-destruct feature which decreases collateral damage and reduces unexploded ordnance left on the battlefield or training ranges.”

The team successfully demonstrated the phase two sensor technology in November 2013.

“The technology demonstration was conducted at



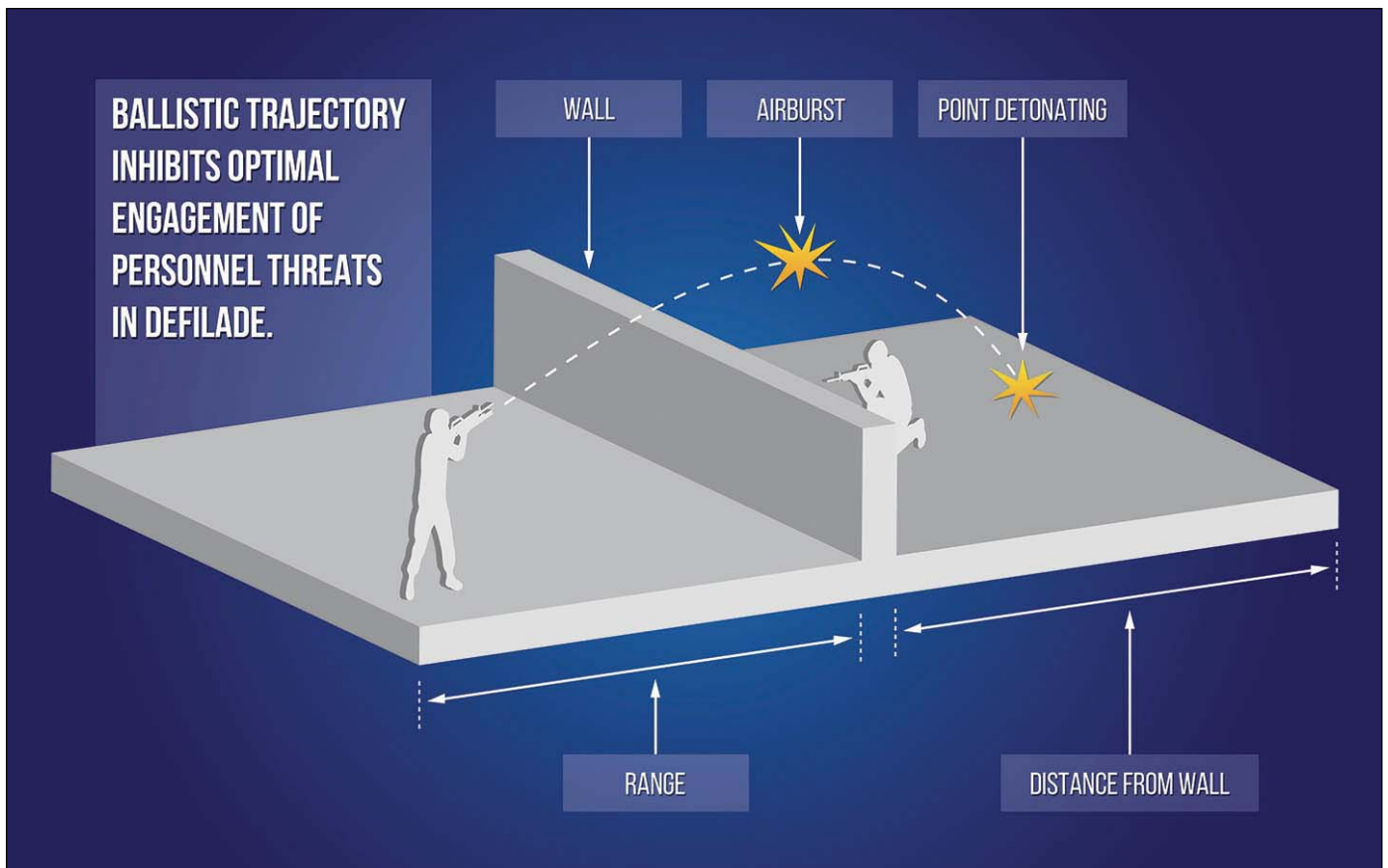
**Figure 1 — 40mm SAGM Grenade Prototype**

Redstone Arsenal (Alabama), and it was shown that the sensor correctly detected defilade and air-burst the round behind the defilade. This capability will inflict maximum lethality to any enemy personnel seeking cover behind defilade.”

However, the SAGM project is not expected to be in the hands of the Project Manager Ammunition Systems until July 2015.

*(Eric Kowal writes for the Picatinny Arsenal Public Affairs Office. This article appears in the September/October 2014 issue of Army Technology Magazine, which focuses on lethality. The magazine is available at <http://armytechnology.armylive.dodlive.mil/index.php/2014/09/02/army-turns-to-researchers-for-future-lethality/#more-5763>. The Armament Research, Development and Engineering Center is part of the U.S. Army Research, Development and Engineering Command, which has the mission to develop technology and engineering solutions for America’s Soldiers.)*

**Figure 2 — SAGM Ballistic Trajectory**



**BALLISTIC TRAJECTORY  
INHIBITS OPTIMAL  
ENGAGEMENT OF  
PERSONNEL THREATS  
IN DEFILADE.**

WALL      AIRBURST      POINT DETONATING

RANGE      DISTANCE FROM WALL

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