

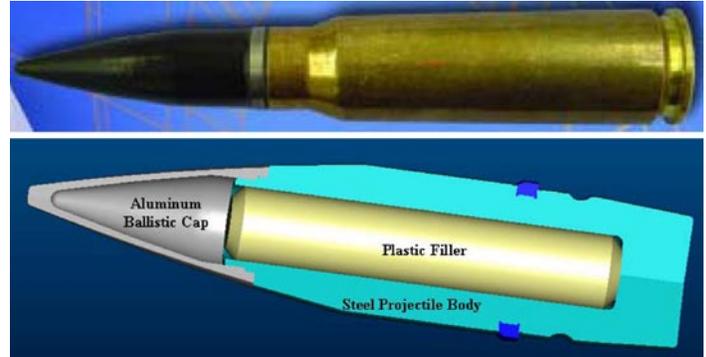
## 20 mm PGU-28/B Replacement Combat Round

### Executive Summary

- Following lethality and operational testing in 2007, the Air Force's Air Combat Command assessed the Penetrator with Enhanced Lateral Effects (PELE) as effective and lethal, but not suitable. DOT&E agreed with that assessment.
- The suitability determination was due to ballistic differences between the PELE and the legacy PGU-27 that would require Aircraft Operational Flight Program adjustments and an unacceptably high rate of nose cap damage.
- The program is on hold pending resolution of the nose cap problem.
- The Air Force will conduct additional follow-on testing, to include lethality testing, to assess the effectiveness and suitability of the modified PELE. Results of that testing will determine further actions.

### System

- The PGU-28/B Replacement Combat Round program is intended to restore combat capability to tactical aircraft following PGU-28/B removal from service due to safety issues.
- Alliant-Techsystems, in a cooperative effort with Diehl Munitionssysteme of Germany, developed the 20 mm PGU 28/B replacement cartridge by integrating PELE projectile with an ATK 20 mm cartridge case.
- The PELE does not use explosives or a fuzing mechanism. Rather, it is a kinetic energy projectile that converts forward momentum into lateral fragmentation and penetration.
- The projectile case is steel, whereas the inner core is plastic. Target impact causes the plastic filler to expand in diameter



with very high pressure. The rapid expansion of the plastic filler ruptures the steel case, achieving fragmentation with lateral velocities of about 300 meters per second.

- The Air Force intends the PELE cartridge to be compatible with the 20 mm cannons on the F-15, F-16, and F-22 aircraft.

### Mission

Fighter aircraft pilots will use the PELE cartridge to produce mission kills against enemy fighter and light civilian aircraft, produce mobility kills against light utility vehicles, and to inflict personnel casualties.

### Prime Contractor

- Alliant-Techsystems, Armament Systems, Clearfield, Utah

### Activity

- The Air Combat Command released their final report on the PELE in January 2008. That report contained both lethality and OT&E results and assessments and concluded the PELE was effective and lethal, but not suitable.
- Following a material change in the nose cap, instituted to address suitability problems sighted by the Air Combat Command, the Air Force conducted additional operational and lethality testing in 2008.
- That follow-on testing revealed that though the modified nose cap did address nose cap damage issues, in one instance, the nose cap separated from the main projectile following muzzle exit. As a result, the program is on hold pending resolution of that issue.

### Assessment

- DOT&E concurred with the Air Combat Command's 2008 assessment that the PELE was effective and lethal, but not suitable. That determination was due to ballistic differences between the PELE and the legacy PGU-27 that would require Aircraft Operational Flight Program adjustments and because of an unacceptably high rate of nose cap damage.
- Testing conducted in 2008 to assess a modified nose cap demonstrated that the material change did not affect the lethality of the PELE. DOT&E again assessed the PELE as lethal against its intended target set.
- As noted above, an instance of nose cap separation did occur during that follow-on testing. The Air Force believes that the nose cap failure is related to a material issue that develops

# AIR FORCE PROGRAMS

during the nose cap molding process. The material issue, while it cannot be eliminated from the manufacturing process, can be identified via ultrasonic inspection of the nose caps prior to them being installed on the projectiles. The prime contractor is implementing this inspection process and is having new caps manufactured. Cartridges already produced will be modified. DOT&E concurs with that action.

- Follow-on testing will validate the success of the nose cap solution.

## **Recommendations**

- Status of Previous Recommendations. The Air Force is satisfactorily addressing the two FY08 recommendations.
- FY09 Recommendation.
  1. Conduct additional ballistic testing to confirm that there is no change in lethality as a result of any modifications to the round.