

Precision Guidance Kit (PGK)

Executive Summary

- Results from the October 2012 Early User Assessment (EUA) demonstrated a Field Artillery unit equipped with Precision Guidance Kit (PGK) can provide near-precision (less than 50 meters) accuracy when firing existing conventional, unguided 155 mm high-explosive projectiles.
- In March 2013, DOT&E published a PGK Operational Assessment report. The assessment provided input for the Army's PGK urgent fielding decision and PGK Program of Record Milestone C decision.
- The government has accepted nearly 2,300 urgent fielding PGKs for the Army and Marines, fielding just under 1,300 PGKs to deployed units in combat. The Army indicates units are achieving accurate near-precision (less than 50 meters) target effects.

System

- The PGK is a combined fuze and GPS guidance kit that improves the ballistic accuracy of the current stockpile of high-explosive field artillery projectiles.
- The Army plans to develop PGK for 155 mm high-explosive projectiles (M795 and M549A1) with threshold accuracy of 50 meters Circular Error Probable (CEP) and objective accuracy of 30 meters CEP.
- The PGK will operate with existing and developmental artillery systems that have digital fire control systems and inductive fuze setters such as the M777A2 Lightweight Towed Howitzer, the M109A6 Paladin Self-Propelled Howitzer, and the M109 Family of Vehicles Paladin Integrated Management Self-Propelled Howitzer.

Mission

Field Artillery units employ PGK-fuzed projectiles in support of maneuver units to provide indirect fires with 30 – 50 meters



accuracy. PGK-fuzed projectile accuracy allows Field Artillery units to fire fewer projectiles to achieve comparable effects of conventionally fuzed artillery ammunition.

Major Contractor

Alliant-Techsystems Advanced Weapons Division – Plymouth, Minnesota

Activity

- The Army is procuring and fielding the PGK in two program tracks. The first track focuses on meeting an Army directed requirement for urgent fielding of PGK. The Army authorized urgent fielding of PGK on March 4, 2013. The second track is the PGK Program of Record with full-rate production planned for 4QFY14.
- In October 2012, the Army conducted an EUA, in accordance with a DOT&E-approved test plan, at Yuma Proving Ground, Arizona, as part of the urgent fielding track of the PGK program. This integrated operational and developmental test provided the first opportunity for Soldiers to fire a PGK-fuzed projectile. During the test, Soldier crews performed their tasks

- successfully in 6 operationally realistic end-to-end missions, firing 20 PGKs from an M777A2-towed digital howitzer. The Army used the demonstrated performance, accuracy, and reliability results to support the PGK urgent fielding decision.
- Following the EUA and into FY13, the Army continued with planned PGK developmental testing to address reliability failures observed in previous tests and the EUA. Firing multiple PGK-fuzed projectiles during each developmental test, the program determined the root causes of observed reliability and performance failures and is verifying proposed corrective actions.

ARMY PROGRAMS

- In January 2013, in accordance with the DOT&E-approved Test and Evaluation Master Plan (TEMP), the Army began initial Lot Acceptance Testing of PGKs produced to support urgent fielding. The Army conducted 8 Lot Acceptance Tests throughout 2013 in support of the planned urgent fielding of up to 2,238 PGKs to Army units and 695 PGKs to Marine units.
- In March 2013, DOT&E published an Operational Assessment report of the PGK program. The report analyzed data from two operational user assessments conducted by the Army Operational Test Command and developmental testing that occurred between August 2011 and January 2013. The assessment provided input for the Army's PGK urgent fielding decision and PGK Program of Record Milestone C decision.
- The Army Program Executive Officer for Ammunition conducted a Milestone C Decision Review in March 2013 and approved the PGK Program of Record for low-rate initial production (LRIP).
- In late 2QFY13, the Army initiated action to move the PGK production line from Minnesota to the contractors' permanent production facility in West Virginia. The Army validated the facility and its processes to produce LRIP test articles by firing PGKs manufactured on the new production line in developmental testing. The PGK test articles used in the production line validation testing incorporated hardware and software changes made to address remaining reliability and performance shortfalls.
- DOT&E approved the PGK Milestone C TEMP on May 6, 2013.
- In June 2013, the Army provided DOT&E an overview of its plan to conduct a combined PGK and Excalibur Increment Ib IOT&E. Excalibur is a precision-guided, extended-range, 155 mm artillery projectile. The combined IOT&E is scheduled for 2QFY14 at Yuma Proving Ground, Arizona. DOT&E concurred with the test concept and directed both programs to submit a TEMP update reflecting the combined IOT&E.
- During the EUA, the median observed CEP accuracy for the PGK-fuzed projectiles fired by Soldier crews from an M777A2-towed digital howitzer was 32 meters (within the 50-meter threshold accuracy requirement and near the 30-meter objective requirement).
- The demonstrated reliability of the PGK-fuzed projectiles fired during the EUA indicates the program is on the reliability growth path to meet its reliability requirements by Initial Operational Capability in 1QFY15. The program has not completed testing of the final corrective actions that address reliability failure modes observed in post-EUA developmental testing.
- Using a test-fix-test approach, the program has developed corrective actions for the following failure modes: the GPS antenna/radome separating from the PGK in flight, causing a GPS drop lock; PGK-fuzed projectiles impacting several kilometers short of the intended target; and frequent fuze setting failures attributed to the flexible cables imbedded in the PGK canard covers.
- Through September 2013, the program has completed 7 of 8 planned urgent fielding PGK Lot Acceptance Tests. The government has accepted nearly 2,300 PGKs for the Army and Marines, fielding just under 1,300 PGKs to deployed units in combat. The Army indicates units are achieving accurate near-precision target effects.
- Performance and safety testing of 28 PGKs produced on the new LRIP line in West Virginia demonstrated a median miss distance of 12 meters with 94 percent reliability.
- Test planning for the combined PGK and Excalibur Increment Ib IOT&E in 2QFY14 continues. Both program schedules remain on path for the combined IOT&E.

Assessment

- Results from the October 2012 EUA demonstrated a Field Artillery unit equipped with PGK can provide near-precision (less than 50 meters) accuracy when firing existing conventional, unguided 155 mm high-explosive projectiles.

Recommendations

- Status of Previous Recommendations. The Army has satisfactorily addressed all previous recommendations.
- FY13 Recommendations. The Army should:
 1. Continue planned testing to validate corrective actions that address remaining reliability and performance shortfalls.
 2. Provide an updated TEMP that documents the program's reliability test strategy for incorporating validated corrective actions into LRIP articles and the now combined PGK-Excalibur IOT&E.