

45th Annual NDIA Gun and Missile Systems Conference



Precision Guidance Kit

18 May 2010

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ATK Advanced Weapons

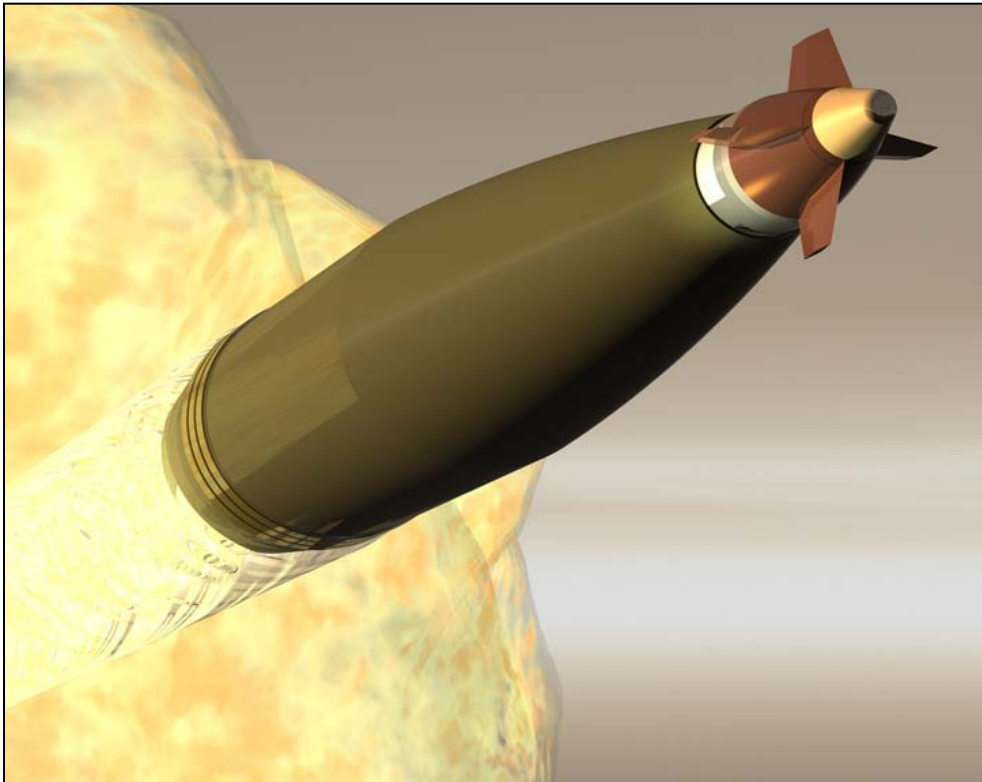


PGK

Precision Guidance Kit
XM1156

Approved for Public Release, PAO 614-10, dated 18 May 2010, 22 CFR 125.4(b)(13) applicable





ATK won a competitive shoot-off and was awarded an SDD contract in May 2007

- *M549, 18 shots, 21.1m CEP*

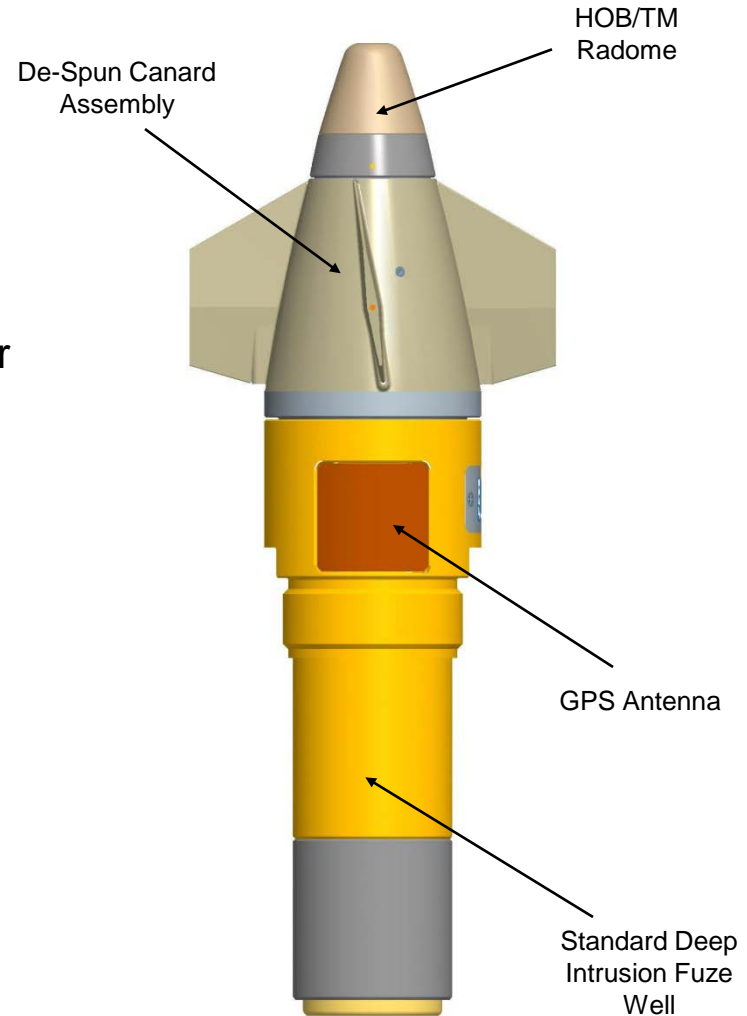
What is PGK?

- GPS Guidance Kit with Fuzing Functions
- Replaces the existing standard 155mm artillery projectile fuze
- PGK guidance greatly improves the accuracy of conventional artillery in the inventory
 - PGK \ll 50m CEP
 - Conventional $>$ 200m CEP at max range
- Maintains $>$ 90% of range capability of conventional projectile and fuze
- No Battery
- Reliable – Only one moving “part”
- Full 2D Guidance to Impact
- Point Detonation and Proximity Fuzing

Transforms existing artillery inventory into affordable precision weapons

Key Innovations

- **Fixed Canards**
 - No Mechanical Actuators
- **GPS with Roll Angle Determination**
 - L3/IEC TruTrack Evolution GPS Receiver
 - No Inertial Sensors
- **No Battery**
 - Super Capacitor (pre-flight)
 - On-Board Alternator (in-flight)
- **Simple Mechanical Design**
 - No Slip Rings
- **Built-In Tactical Telemetry**
 - Development Tests
 - Stockpile Surveillance
 - Lot Acceptance Tests



PGK is designed to guide a 155mm spin-stabilized projectile

Operational Range: 6-27 km
Speeds: 330-830 m/sec
Spin Rate: 100-275 Hz
Set-back: 20 KG's

Storage & Setting Configuration



- Stored 3 per Ammo Can
- Cover is removed before firing

Performance Requirements Summary



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	Increment 1 IOC FY11	Increment 2 IOC FY15	Increment 3 IOC FY18
Key Performance Parameters			
1. Net Ready	AFATDS, EPIAFS, GPS		
2. Reliability	92% (T); 97% (O)		
3. Accuracy	≤ 50m CEP (T) ≤ 30m CEP (O)	≤ 30m CEP (T=O)	≤ 30m CEP (T) ≤ 20m CEP (O)
Attributes			
Munition Type	155mm HE • M107 • M795 • M549A1	Add: • 105mm HE (T) • 105/155mm HE & Cargo (O)	155mm HE (T) 105/155mm HE & Cargo (O)
Platform Types	• M777A2 • Paladin	Add M119A3 (105mm) (T)	Add Future Cannon (T)
Fuzing Function	• PD • Proximity	Add • Delay & Time (O)	



M777A2 Lightweight Towed Howitzer

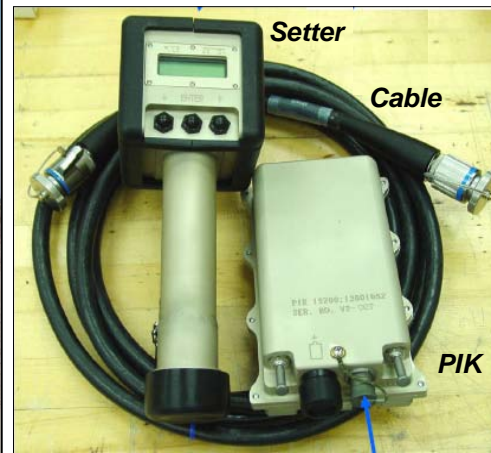


M109A6 Paladin Self-Propelled Howitzer



Projectiles

- **M107**
 - 95 lbs, 15 lb warhead
 - Range with PGK 6-17km
- **M795**
 - 103 lbs, 23.8 lb warhead
 - Range with PGK 7-21.2km
- **M549A1**
 - 96 lbs, 15 lb warhead
 - Rocket assisted
 - Range with PGK 9-27.7km



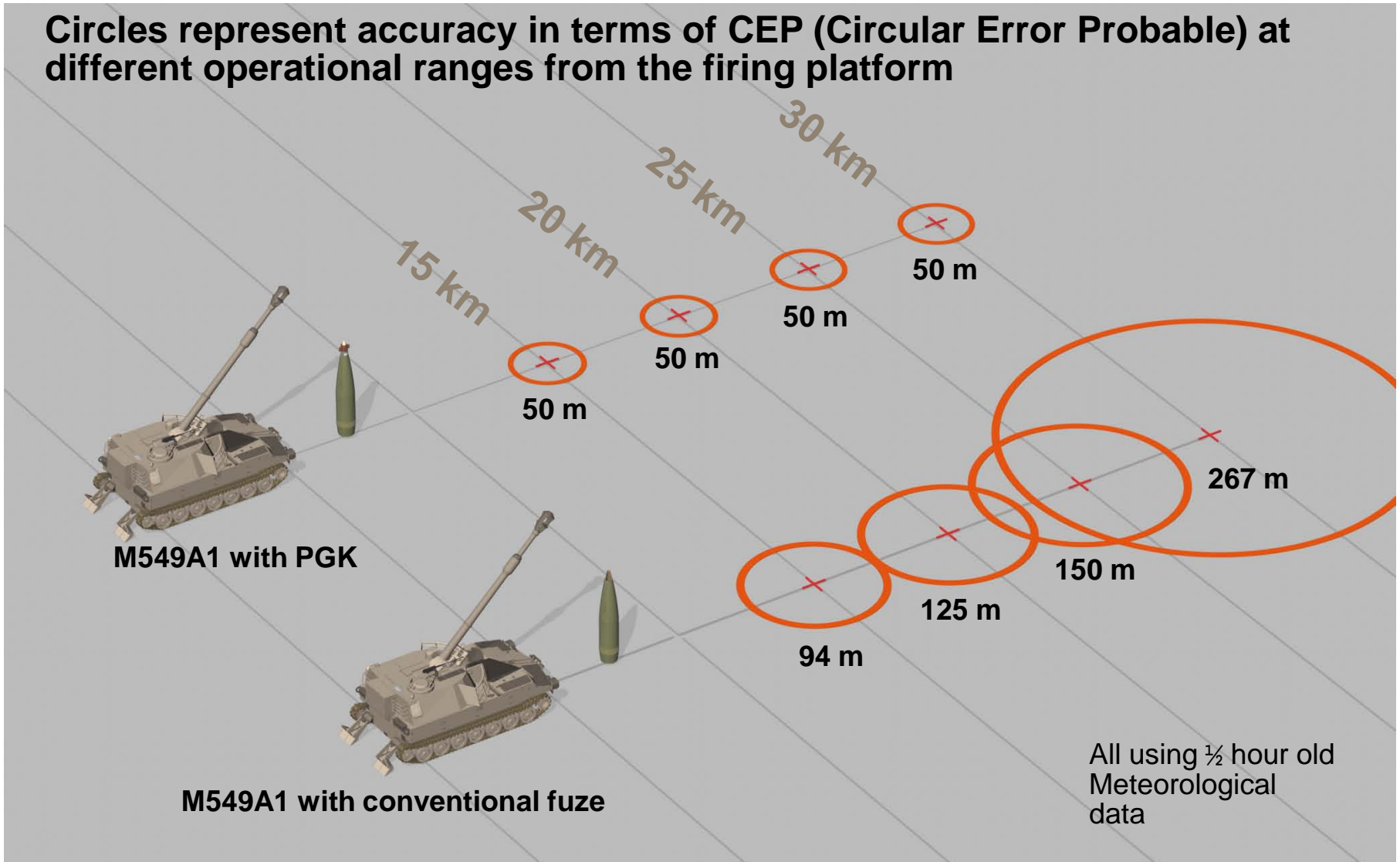
Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS)

Accuracy Comparison



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Circles represent accuracy in terms of CEP (Circular Error Probable) at different operational ranges from the firing platform



- **Technology Demonstration Contract Award – June 2006**
- Competitive Shoot-Off – April 2007
- **System Development & Demonstration Contract Award – May 2007**
- Preliminary Design Review – November 2007
- First Form-Factored Guided Flight Test – Oct 2008 (26m from target)
- Critical Design Review – January 2009
- Gov't End-to-End Interoperability Demo – April 2009
- First Guided Flight Test Using EPIAFS for Initialization – June 2009
- First Live Fire Tests – Aug 2009
- Final Contractor Qualification Tests with Gov't Fire Control – March 2010

Fired 166 Form-Factored PGKs to Date

PGK Major Milestones (continued)



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- Gov't Insensitive Munitions Tests – Complete



- Gov't Electromagnetic Environmental Tests – Complete



- Gov't SET-S and SET-P Tests – In Process at Yuma Proving Ground
- Gov't Transportation Handling Qualification Tests – July 2009
- Gov't Milestone C – July 2009
- Gov't Air-Drop Certification Tests – Aug 2009

On Track for MS-C in July and Production FAAT Build in August



Gov't End-To-End Interoperability Demo



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Preparation for Firing – LW155



Remove PGK from Ammo Can



Install PGK on Round



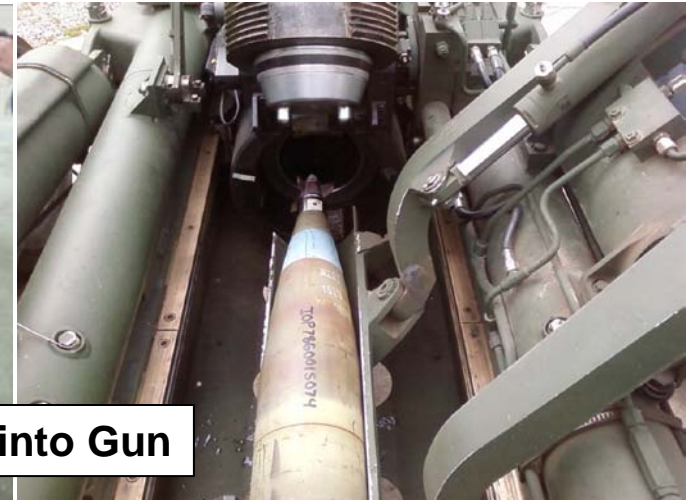
Set PGK with EPIAFS



Remover PGK Cover



Load Round into Gun



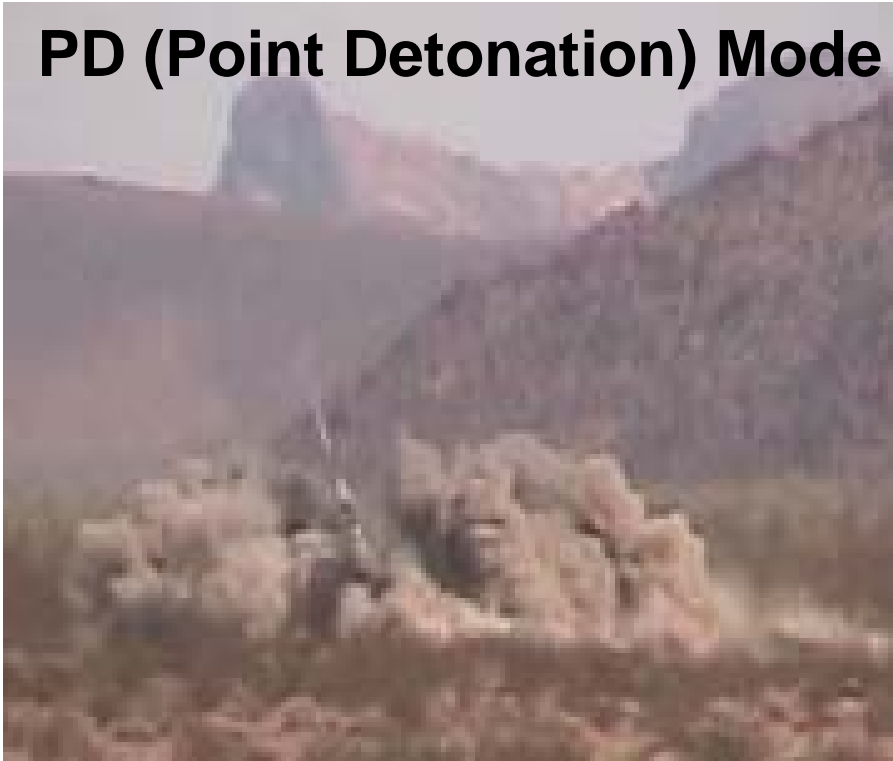
Recent Live Fire Test Results (PD and PROX)



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PD (Point Detonation) Mode



PROX (Proximity) Mode



M549 Projectile
Fired at cold temp (-25°F)
19.8km Range
MACS-4 Charge



M549 Projectile
Fired at hot temp (145°F)
19.8km Range
MACS-4 Charge



PGK (PRECISION GUIDANCE KIT)

INSTALLS IN FUZE WELL

SIMPLE AND RUGGED

ONE MOVING PART

NO BATTERY REQUIRED

GPS ACCURACY

SAASM

FULL CONTINUOUS 2D GUIDANCE



Contact Information

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Innovation ... Delivered.

Precision Guidance Kit (PGK) for Artillery

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