S40x180mm Ammunition for the MK44 Weapon

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“21st Century Weapon Systems - Providing the Right Response”
S40x180mm MK44 Ammunition

• Brief S40mm ammunition history
  – US Army Contract Efforts
  – Internal Research and Development (IRAD) Efforts

• S40mm Ammunition Family
  – Armor Piercing Fin Stabilized Discarding Sabot with Tracer (APFSDS-T)
  – Multi Purpose Air Burst with Tracer (MPAB-T)

• Summary
A S40mm MK44 capable weapon and ammunition solution is ready for U.S. Army study and test.

- The 30mm MK44 weapon is a battle proven system with a complete family of qualified ammunition ranging from target practice, armor piercing and high explosive cartridges.

- The proven MK44 weapon contains growth provisions for S40mm cartridges
  - Increasing lethality over 30mm where…bigger is better.
  - Minimal up-gun cost impacts due to a combination of MK44 weapon part commonality and interchangeability.
Why S40mm

- Maintains lethality overmatch against the most common/capable threats.
- Leverages existing scalable 30mm cartridge technologies and qualified explosive items.
- Can use existing and established US supplier base to meet growth objective needs.
- Allows use of common 30mm MK44 and S40mm MK44 weapon parts

30mm, S40mm, and larger caliber commonalities = Lower Cost

Scalable technologies for all calibers
S40mm Ammunition History

- US Army Contract Efforts
- Internal Research and Development (IRAD) Efforts
S40mm – US Army Contracts


• Propellant development for:
  – Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T)
  – Multi Purpose Air Burst with Trace (MPAB-T)
  – Target Practice with Trace (TP-T)

• Cartridge development:
  – S40mm x 218 APFSDS-T
  – S40mm x 165 MPAB-T

• Live fire demonstrations at High Rate Bursts (HRB) out of the MK44 mounted in a Bradley Fighting Vehicle.
• Successful APFSDS-T ballistic penetration performed.
• Successful MPAB-T ballistic function demonstrated.
S40mm–Internal Research and Development (IRAD)

2001-Present –IRAD:

• S40mm x 180 case design
  – Used with both MPAB-T and APFSDS-T rounds
  – Tooling and manufacturing process ready

• S40mm APFSDS-T cartridge:
  – Composite sabot successfully developed
  – Tooling and manufacturing process ready
  – Gun launch survivability proven
  – Favorable RHA penetration achieved with tungsten penetrator

• S40mm MPAB-T Cartridge Design
  – Induction or contact set fuze with:
    ➢ PD/PD delay for wall penetration
    ➢ Self destruct
    ➢ Selectable short/long fuze arming ranges

• S40mm TP-T Cartridge Design
  – Simple two piece metal projectile design for low cost production.
S40mm Ammunition Family
S40mm Ammunition Family

- **APFSDS-T** for armor targets. Features include:
  - Cobalt free penetrator
  - Composite sabot assembly

- **MPAB-T** for urban and troop targets. Features include:
  - PD/PD delay for wall penetration
  - Short or long selectable arming ranges
  - Airburst function
  - Self destruct function
  - Induction or contact communication fuze

Projectile technology is scalable to larger calibers for increased requirements.
S40mm Armor Piercing Fin Stabilized Discarding Sabot with Tracer (APFSDS-T)
S40mm APFSDS-T – Design Characteristics

APFSDS-T Cartridge
S40mm x 180 Case

- Lightweight Composite Sabot
- Traced Fin Obturator
- Nose Cap Tungsten Penetrator
- GD-OTS Propellant

_Note:_ Composite Sabot FEA
_Note:_ Projectile Launch Loads
_Note:_ Nose Cap/Penetrator Tip FEA
S40mm Composite Sabot Ballistic Testing

Continued S40mm success using composite sabot technology
S40mm Composite Sabot Ballistic Test: Successful penetration of RHA at Effective Range

Successful RHA penetration using:
• Tungsten penetrator
• Composite sabot
• St. Marks Powder Hybrid® Propellant
S40mm APFSDS-T

Status:
• Composite sabot mold fabricated, test parts produced, successful ballistic testing achieved. Sabot mass reduced by 43%
• RHA penetration test successful
• Long range trajectory test verification of modeling successful

Next Steps:
• Additional penetration testing against additional target sets
• Continued propellant development

Higher velocity = Higher kinetic energy on target = Increased penetration capability
S40mm Multi Purpose Air Burst with Tracer (MPAB-T)
S40mm MPAB-T Cartridge

MPAB-T Cartridge
S40mm x 180 Case

GD-OTS Propellant
Traced Aft Body with Driving Band
Explosive Body

Electronic Induction or Contact Set Fuze (contact version shown)

Induction communication option follows STANAG 4547 protocol
S40mm Air Burst – Fuze Characteristics

- Inductive or contact set, time-based, programmable electronic fuze.
- Airburst function
- PD/PD Delay feature to:
  - Increase capability of the ammunition and eliminate the need for HEI PD ammunition.
  - Defeat light materiel targets
  - Provide PD function in the unlikely event that an air burst communication signal fails.
- Selectable arming: allows user to select an arming range of short or long.
- Self destruct function
Summary

- The S40mm cartridges offer greater lethality than 30mm without reducing the number of stowed rounds:
  - APFSDS-T design provides more kinetic energy on target vs. 30mm
  - MPAB-T design is up to 3 times more lethal than 30mm using fuze technology that is scalable from 25mm to 50mm cartridges
- S40mm technology is scalable to larger calibers as required
- GD-OTS is committed to the advancement of lethal medium caliber solutions using technologies that are scalable to platform caliber and requirements

MK44 Weapon

S40mm Family

MPAB TP KE
Questions