25/40mm AirBurst Simulator / Trainer Technology

Presentation

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By

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The Purpose of This Presentation Is to Make the User community Aware of Current AirBurst Technology at General Dynamics – Ordnance & Tactical Systems
AirBurst Munitions

AirBurst munitions are receiving a great deal of attention in the military community.

- AirBurst Munitions are being primarily designed for troop suppression by exploding over the top of troops sending lethal fragments downward.

- The Airburst round defeats troops in foxholes and in prone & defilade positions where typical HEI point detonating rounds are not effective.
GD-OTS Systems Approach

- **AirBurst Munitions Need Identified for 25mm - 50mm**
- **Leverage Current GD-OTS Fuze Technology**
- **Develop Fuze Assembly for High G-Load**
- **Develop 30mm AB Sim./Training Round**
- **Develop Fuze Setter/Contactor**
- **Demonstrate**

Successful 30mm Demonstration in a Bradley Fighting Vehicle (BFV) at the Live Fire Demonstration at Aberdeen Test Center in November 2002
AirBurst Munitions

Key Elements of the System

- Fuze power-up and communication technology in the feed system
- Fuze setter and software with special progressive or digressive “string of pearls” variable position time of flight to burst.
- AirBurst simulator/trainer round comprised of:
  - Electronic fuze
  - Mechanical Safe & Arm
  - Pyrotechnic flash-bang charge
Current AB Simulator/Trainer
Fire Control System

MK44 Feed system w/Fuze Contactor

Barrel

Data to fuze

Fuze setter

Computer

Manual Range & Meteorological Data Inputs

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Planned Fire Control System for AB Trainer and Tactical Rounds

Note: The AB round will default to a Point Detonate (PD) function with delay if an object is struck before the timer functions.
GD-OTS FUZE COMMUNICATION

- Fuze Power and Communication in Feed System at “Dwell Position”.
  - Apply initial charge to capacitor bank.
  - Maintain a “Trickle Charge” to Keep Fuze at Full Power During Delays in Firing.

- Approach to communicate fuze data.
  - Communicate Nominal TOF Data to Fuze during initial Power-Up.
  - Every time firing solution is updated, new TOF data is communicated to the fuze and the fuze returns the data. This signal is repeated 5 times.
  - If the signal is not received and returned correctly, the round defaults to a PD function.

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AB Fuze Communication Timeline

300 msec cycling time (@ 200 spm)

- @200 spm, 300 msec available per round.
- Charging Fuze capacitors requires 80 msec.
- Data communication and talkback requires 24 msec.
- 196 msec available for chambering cycle.

196 ms available for chambering
30mm AirBurst Simulator Description

- GD-OTS is using a 30mm AirBurst Simulator/Trainer round as the test vehicle.
- The round has an AirBurst fuze assembly consisting of an electronic assembly and a Safe & Arm Device (S&A).
- Forward of the fuze assembly is a spotter charge. When ignited by the fuze, this charge pops off the nose and emits a flash-bang effect.
- This AirBurst simulator/trainer round is a very effective & safe training round.
30/40mm AB Simulator / Trainer

The GD-OTS fuze is without power and unarmed prior to setting within the gun.

~2.2gm Pyrotechnic Spotter Charge

Pop-Off Nose Tip for Spotter Charge
AirBurst Element Descriptions

Electronic Fuze Assembly

- Full integration with weapon and fuze setter
- Proven accurate time based logic circuitry with infinite talk back capability and independent power supply.
- 2-way communication between fuze and Fire Control System @ automatic high rate bursts
- 10-sec. time of flight power
- Structural Integrity and function in 100,000g environment
- New designed mechanical rotor safe & arm with setback & spin lock features
LFD – 30mm AB Simulator Test Data

GD-OTS has successfully fired the 30mm Airburst Simulator round out of a Mann Barrel at ranges of:

- 225m (+/- 1ms timing accuracy)
- 1200m (+/- 2ms timing accuracy)
- 2780m (+/- 2ms timing accuracy)
Camp Roberts Test Objectives

- Demonstrate High Rate Fuze Communication In Bradley/MK44 Feed System
- Demonstrate 30mm Air-burst Function
- Sept. 02

- 1st Vehicle (Bradley-A3) Firing Of The MK44 30mm Gun With Air-Burst Ammunition
- Demonstrate String-Of-Pearls (S-O-P) Capability
Camp Roberts Test Results

- Excellent Range and Timing Accuracy Achieved:
  - 600M
  - 1250M
  - S-O-P (1250M – 80M)

- MK44 Feeder / Fuze Setter Integration Successfully Demonstrated:
  - No Communication Errors
  - Single Shot
  - Hi-Rate (200spm)

- S-O-P Capability Successfully Demonstrated:
  - Various Range Spacings
  - Excellent Spacing Accuracy

Bradley A3--MK 44 30/40mm Firing Demo, Camp Roberts, Sept. ‘02

5-rnd Burst Fire S-O-P Air-Burst
String – Of - Pearls
30mm AB Accuracy

30mm AirBurst Simulator/Trainer rounds have demonstrated burst point accuracies of 2.5m SD at 1500m range when fired from a MK44 auto gun in a Bradley Fighting Vehicle.

Current design activities are focused on reducing the error by 50%.
AirBurst Munitions

- GD-OTS has developed an AirBurst system that can be applied to multiple platforms such as:
  - AAAV
  - Bradley Fighting Vehicle
  - LAV
  - Stryker
  - FCS
  - Ship Mounted Applications
AirBurst Munitions

● The GD-OTS ABM system can be integrated into the following caliber ammunition:
  ➢ 25mm
  ➢ 30/40mm
  ➢ 35/50mm
AirBurst Penetrator (ABP-T)

GD-OTS is developing 25/40mm tactical AirBurst rounds with multi-task capabilities.

- Current designs are for rounds with AirBurst capability combined with a delayed Point Detonate - Penetration capability.
- This type of round combines the features of an AirBurst round with Multi-functional penetration capabilities.
- The ABP-T round will provide capabilities against light armor and concrete/brick walls.
Summary

General Dynamics Ordnance & Tactical Systems is committed to the development and supply of superior AirBurst Munitions for our Military requirements.