Selectable Effects Warhead Technology Demonstration

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High output bombs/missiles cannot be used on ROE-restricted missions or near friendly troops

Current DoD solution: separate weapon for low collateral damage mission

- Focused Lethality Munition for Small Diameter Bomb
- BLU-126 Low Collateral Damage 500-lb Bomb

**Better Solution = Single “Dial-A-Yield” Warhead**

- **Flexible**
  - One bomb, many missions
- **Adaptable**
  - In-flight re-targeting option
- **Safe**
  - No hazardous duds

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Dial-A-Yield Bi-Modal Warhead Concept

- Initiation Based - Partially burn/Partially detonate explosive charge
  - Time delay between burning initiation & detonation initiation
- Compatible with MIL-STD-1316 approved fuzing systems
- Cockpit or in-flight selectable with data link

Scalable to 105mm and Greater Size Munitions

Initiators Set @ 3 Timing Delays

Burn Front

Detonation Wave

High Speed Video

Initiator Timing Control Demo
Preliminary Lethality Analysis

CTH Simulations of generic warhead shape to estimate fragmentation

JMEM software to calculate relative lethal area

More burned explosive = lower collateral damage
March 2009 ATK IR&D Demo Test Setup

- Camera (not shown)
- 4' x 8' Steel Witness Panel 20' from WH
- Pressure Gauges (4)
- Fragment Recovery Station
- Warhead: 6” diameter x 13” long, 60 lb warhead
- Camera Mirror
Three Warhead Tests
- Full Output Baseline
- Bi-modal low collateral damage
- Deflagration-only self destruct

Baseline

Bi-Modal

Deflagration
**Test Results**

<table>
<thead>
<tr>
<th>Test</th>
<th>Relative Fragment Velocity</th>
<th># Witness Panel Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>100%</td>
<td>30</td>
</tr>
<tr>
<td>Bi-modal</td>
<td>68%</td>
<td>20</td>
</tr>
<tr>
<td>Deflagration</td>
<td>9%</td>
<td>0</td>
</tr>
</tbody>
</table>

> 40% Reduction in Lethal Area

Didn’t break a mirror 5 ft away

**Back-Lit Witness Panels**

Baseline | Bi-Modal | Deflagration

No Fragment Impacts

Technology Ready for System Integration

Summary

ATK Team Selectable Effects (Dial A Yield) capability

- Initiation-based
- Adaptable to any warhead system

ATK Demo Test Series

- Successfully demonstrated initiator timing control
- Successfully demonstrated the bi-modal technology
  - Full output mode
  - Low collateral damage mode
  - Self-destruct mode

Ready for DoD system integration