Small Guided Munitions – Path Ahead

11 Mar 09

Distribution Statement A – Approved for public release; distribution is unlimited
## Viper Strike Snapshot

<table>
<thead>
<tr>
<th>Diameter</th>
<th>5.5 in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wingspan</td>
<td>36 in</td>
</tr>
<tr>
<td>Length</td>
<td>36 in</td>
</tr>
<tr>
<td>Weight</td>
<td>44 lb</td>
</tr>
<tr>
<td>Glide Ratio</td>
<td>9:1</td>
</tr>
<tr>
<td>Explosive</td>
<td>2.3 lb</td>
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- GPS / INS Navigation + SAL Terminal
- Precise <1m CEP
- Low Probability of Collateral Damage
- GPS Extends Glide Range to 10+km
- Agile: 360 deg. off-axis, steep/shallow, direct/indirect attack
- Key Target Set Capable
  - Personnel
  - Moving/Stationary Targets
  - Room in a Building

### Warhead Damage Area

- 500 lb. JDAM
- GBU-12
- SDB (est.)
- Hellfire
- Viper Strike

*Joint Pub 3-09.3 Joint CAS (.1% PI)*
Viper Strike Lineage

ATACMS Delivered Base BATs

Eagle Eyes Multi-Mode Seeker Proof of Principle

Viper Strike SAL Seeker Proof of Principle Demos I & II

Hunter-Viper Strike Quick Reaction Capability Munitions Fielded

AC-130-Viper Strike ACTD

Viper Strike Operational Use on Multiple Platforms for Multiple Missions

Platform Integration

New Production Viper Strike Munition Requirements

Multiple Manned & Unmanned Platform Viper Strike Demos

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Viper Strike Subsystems

- Integrated ASAL Seeker (GPS, G-Switch Fuze, ASAL, Compass, GPS Antenna)
- Deceleration and Stabilization Subsystem
- Tail Fin (4X)
- Wing/Flap (4X)
- Electronic Safe and Arm Device
- Squib Fire Unit
- Thermal Battery
- Air Data Sensor
- Main Charge
- Power Regulator
- Central Electronics Unit
- Control Actuator
- Inertial Measurement Unit
- Precursor removed

GPS - Global Positioning System Receiver
ASAL - Alternate Semi-Active Laser Seeker
Viper Strike Variants

Direct Attack
Fielded Capability
2004

GPS
Fielded Capability
2008

Air or Ground
Designation

• 8.5 to 18K ft AGL
• Up to 24.7K ft MSL
External Carry
• Up to 31K ft MSL
Internal Carry

1600’

10K’ AGL

Self, Buddy,
or Ground
Designation

Target Position

Ground
Designation

3 to 10+km

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Unclassified
Page 5
Launch Altitudes – 8K’ to 13K’
Low Circular Error of Probability – Less than One Meter CEP
Low Collateral Damage – 16 Meters for Urban Targets
Top Down Blast Effect – Limits Damage in Urban Canyons
Moving Targets – Up to 30 mph
Danger Close – ATEC Approved at 50 Meters
Double the Payload – Half the Weight of Hellfire
Multiple Laser Designation Options – Air, Buddy, or Ground
Day or Night Capability
Stand Off – 1/2km to 1km
Tandem shaped charge warhead for armored targets
Only Qualified Weapon for Hunter Class UAS
Capability Fielded in OIF – Proven & Certified
First Weapon employed from an Army UAS in combat
Direct Attack

SILENT

SWIFT

LETHAL

ViPER

Strike
Viper Strike
ASAL GPS Improvements

- ASAL GPS variant provides 360° “see and shoot” capability and significantly simplifies engagement execution versus Direct Attack VS
- Provides indirect and top/shallow attack capabilities (urban CAS, ground party targeting/designation)
- Increases standoff range by greater than 10 times that of Direct Attack
- Adds covert capability (no observable signature)
- Increases launch altitudes:
  - 24.7K’ MSL External Carry
  - 31K’ MSL Internal Carry
- ASAL Seeker dramatically increases Field-Of-View and Detection Range
- G-Switch replaces Impact Fuze Sensor for better reliability against soft targets
- GPS Munition Unit Cost reduced by > 40% in 2008
  - Lean Production Line Initiative eliminated many unnecessary tasks
  - Alternate Domestic Suppliers found for critical components
GPS Viper Strike
Viper Strike Missions

• “Golden Shots”
  - Pinpoint a moving armored car in a motorcade

• Restricted (Minimal Collateral Damage) Urban Targets
  - Reach down into cordoned urban canyons
  - Near vertical angle of attack projects warhead shrapnel into the target and ground minimizing collateral damage

• Convoy & TOC ISR & Security
  - At 10K’ AGL, UAVs relatively unseen, unheard, and undetectable
  - Allows observation of enemy preparations, IED placement, and ambush points

• Key Infrastructure ISR & Armed Response
  - Refineries, pipelines, politically sensitive locations, etc.

• Monitor critical situations with timely response
  - Undetected observation without ground troops in harm’s way

• (GPS) Extended Stand-off Range Attack
  - Up to and beyond organic sensor range

• (GPS) Close Air Support (CAS); Ground Party/Off Board Designate
  - Indirect Attack: 360° target relative azimuth attack
VS Weapon System

Viper Strike Munition  
Battle Management Systems (BMS)  
Laser Designators

Launch Tubes  
Launcher Racks  
Munition Interface Unit (MIU)

CONOPS / TTPs, Training, Logistics
APKWS Proven Performance

- Mid-body Design is Supportable
  - No platform modifications required
  - No changes to weapons loading
  - Limited pilot training required

- Mid-body Design is Reliable
  - Optics protected prior to launch from adjacent firings, sand, moisture, etc.
  - Wide FOV for broader capture area

No Impact on Warhead Effectiveness
- Warhead does not “fire through” guidance unit

Average laser spot to impact point <0.5m or ~1½ ft

News
- September 19, 2007
  USMC Cobra
  BAE SYSTEMS CONDUCTS FIRST EVER SHOTS OF ADVANCED PRECISION KILL WEAPON SYSTEM FROM AN AIRCRAFT

News
- December 20, 2007
  U.S. Army Kiowa Warrior
  BAE SYSTEMS COMPLETES TWO TEST FIRINGS OF ADVANCED PRECISION KILL WEAPON SYSTEM FROM ARMY HELICOPTER
Raytheon Missile Systems’ **Griffin™** Missile System

- Substantial internal investment by Prime Contractor.
- Extensive re-use and repackaging of proven weapon components.
- Highly successful flight-test and qualification series.
- Now in low-rate initial production.
- Tests show suitability for employment from host of ground and air platforms, and ground teams.
- Powered, maneuverable, small, lightweight, accurate and lethal, with reduced risk of collateral damage.
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