Aviation Rockets and Small Guided Munitions (ARSGM) Information Brief

August 2013
This information brief contains references to U.S. Government military capabilities that may not be authorized for release to foreign governments. Mention of these capabilities in no way implies that the U.S. Government will release or consider release of them, or of any additional associated classified or unclassified information pertaining to them. This information brief may also contain references to U.S. Government future plans and projected system capabilities. Mention of these plans or capabilities in no way guarantees that the U.S. Government will follow these plans or that any of the associated system capabilities will be available or releasable to foreign governments.
Hydra Rocket System
Hydra System Capabilities

To provide air-to-ground suppression, smoke screening, illumination, and direct and indirect fires to defeat area materiel and personnel targets at close and extended ranges.

General Description
- HYDRA Rocket System utilizes a 70 millimeter (2.75”) diameter rocket and compatible launcher
- Warheads include high-explosive anti-personnel, flechette, multi-purpose submunitions, smoke, illumination, penetrator and training
- U.S. users include Tri-Service and Special Operations Forces (SOF) on both fixed- and rotary-wing aircraft

Characteristics
- Range 300-8,000 meters, Velocity > 700 meters/second
- Flechette warhead in a seven-shot volley yields 8,253 individual flechette projectiles
- Improvement efforts are addressing Insensitive Munitions (IM), Safety, Reliability, and Producibility
Hydra Overview

**U.S. Army**
- Apache
- Kiowa Warrior
- Little Bird
- Black Hawk

**U.S. Air Force**
- F-16
- A-10

**U.S. Navy/Marine Corps**
- Cobra
- F-18
- MH-60 Seahawk

**MULTIPLE WARHEADS**
- M264
- M255A1
- M257
- M278
- M229
- M151
- M156
- WTU-1/B
- M274
- M282

**CHARACTERISTICS**
- Area suppression
- Multiple warheads
- High degree of modularity
- Inherent immunity to countermeasures

**IMPROVEMENTS**
- Insensitive munitions capability improvements to Rocket Motor, High Energy (HE) warhead, and Shipping and Storage Container (SSC)

**USERS**
- United States
- Army - Navy - Marine Corps - Air Force - SOF

August 2013
# Hydra Warheads (Payloads)

<table>
<thead>
<tr>
<th>Warhead</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M264</td>
<td>Red Phosphorus (RP) Smoke</td>
</tr>
<tr>
<td>M255A1 / M149</td>
<td>Flechette</td>
</tr>
<tr>
<td>M257</td>
<td>Visible Illumination Flare</td>
</tr>
<tr>
<td>M278</td>
<td>Infrared Illumination Flare</td>
</tr>
<tr>
<td>M229 / M146</td>
<td>High Explosive - 17 pounds (lb)</td>
</tr>
<tr>
<td>M151</td>
<td>High Explosive - 10 lb</td>
</tr>
<tr>
<td>M156</td>
<td>White Phosphorous (WP) Smoke</td>
</tr>
<tr>
<td>WTU-1/B</td>
<td>High Explosive (10 lb) Practice (Inert)</td>
</tr>
<tr>
<td>M274</td>
<td>High Explosive (10 lb) Practice (Smoke)</td>
</tr>
<tr>
<td>M282</td>
<td>Multi-Purpose Penetrator</td>
</tr>
</tbody>
</table>

August 2013
M264 Smoke (Red Phosphorous) Warhead

### Characteristics

- Red Phosphorus is stable and has improved performance versus other screening agents in high temperature environments
- Utilizes the M439 Remote Set (RS) fuze to control the smoke initiation timing

### Capability

- Screen effect from 14 rockets establishes a concentration of smoke across a 300 to 400 meter front for 5 minutes in a 10 knot wind
- Full screening accomplished within 60 seconds after warhead smoke initiation

August 2013
M255A1 Flechette Warhead

**Characteristics**

- Each warhead contains 1,179 sixty-grain hardened steel flechettes
- Utilizes the M439 Remote Set (RS) fuze to control flechette expulsion initiation timing
- Full material release issued for use by Army Aviation units July 2006

**Capability**

- Primarily used for anti-personnel operations
### Characteristics

- Designed for battlefield target illumination
- The warhead is assembled to the rocket motor in the field
- Uses the M442 motor burnout fuze to deploy the illuminating candle at a fixed range of ~3,400 meters after launch

### Capability

- Provides 1,000,000 (one million) foot candles of visible illumination for approximately 3 minutes
- Illumination of approximately one square mile

August 2013
### Characteristics

- Designed for battlefield target illumination in conjunction with infrared goggles
- The warhead is assembled to the rocket motor in the field
- Uses the M442 motor burnout fuze to deploy the IR illuminating candle at a fixed range of ~3,400 meters after launch

### Capability

- Provides an average near IR light output of 250 watts per steradian with less than 1,000 candle power visible light
- Provides IR illumination for approximately 3 minutes

---

**M278 Infrared (IR) Illumination Warhead**

August 2013
### M151/M229 High Explosive Unitary Warheads

**M151 High Explosive (10 pound)**
- General purpose explosive warheads
- Point detonating (impact) fuze
- Malleable cast iron case fragments upon detonation
- 10 lb warhead (M151) and 17 lb warhead (M229) versions

**M229 High Explosive (17 pound)**
- Area suppression
- Anti-personnel
- Anti-material

---

August 2013
WTU-1/B (Practice) Non-Functional

**Characteristics**

- Ballistic match to the M151 warhead
- Inert unit – No fuze, No explosives
- Weighs 9.4 pounds
- Utilized for training by the U.S. Navy and U.S. Air Force

**Capability**

- Safe for use on both live-fire and electronic instrumented ranges

August 2013
## M274 Signature (Practice) Warhead

### Characteristics
- Training practice warhead for the M151 warhead
- Ballistic match to the M151 warhead
- Provides flash, bang, and smoke signature at impact for accurate scoring on firing range

### Capability
- Smoke and flash visible up to 8 kilometers
- Useful for both day and night training
- Safe for use on both live-fire and electronic instrumented ranges

August 2013
M282 High Explosive Incendiary (HEI) Warhead

**Characteristics**
- Proprietary design by Norwegian Ammunition Company (NAMMO)
- Uses a M423-modified Safe & Arm
- Fuze has a “delay from impact” feature
- Contains plastic vent plugs, which improve the insensitive munitions (IM) performance

**Capability**
- Provides both blast fragment and incendiary effects
- Considered a “bunker buster”, the M282 is for engaging light armored vehicles, bunkers, and reinforced MOUT targets
- Currently in inventory with U.S. SOF and the U.S. Navy

August 2013
### Description
- Detonate on impact
- Includes mechanical Safe & Arm (S&A)
- M423 fuze used for low speed aircraft
- M427 fuze used for high speed aircraft
- Used on both M151 & M229 HE warheads

### Characteristics
- Weight - 0.75 pounds
- Length - 4.03 inches
- Diameter - 1.75 inches
- Arming distance
  - ~300 meters (M423 fuze)
  - ~450 meters (M427 fuze)
M439 Remote Set Variable Time Fuze

Description

• User selectable time delay for warhead activation (airburst) set by platform electronics
• Used on M264 and M255A1 warheads
• Mounted in base of warhead

Characteristics

• Weight - 0.24 pounds
• Length - 2.75 inches
• Diameter - 1.05 inches
• Maximum delay time from rocket launch ~25 seconds
M442 Fuze

**Description**
- Airburst, motor-burnout followed by a delay
- 8 to 10 second delay from motor-burnout (pyrotechnics)
- Used on M257 and M278 illumination (flare) warheads

**Characteristics**
- Weight - 0.6 pounds
- Length - 3.1 inches
- Diameter - 1.5 inches
- 17 to 22g’s to arm

August 2013
Mk66 Rocket Motor

Description

- Current version is Mk66 Mod4
- Solid propellant
- Folding, wrap-around fins on nozzle
- Nozzle-induced spin (roll) for inertial stability
- Compatible with all U.S. DoD Hydra rocket warheads

Characteristics

- Weight – 13.6 lbs
- Length – 41.7 inches
- Burn time ~1.05 to 1.10 seconds
- Average Thrust ~1,300 to 1,370 lbs
- Burnout range ~1,300 feet

August 2013
U.S. Army Hydra Launchers

Description
- Light weight aluminum launchers
- Two variants
  - 7 rocket capacity (M260)
  - 19 rocket capacity (M261)
- Compatible with U.S. Hydra rockets, including remote set fuze rockets

M260
- Weight – 35 lbs
- Length – 66.19 in
- Diameter – 9.75 in
- Standard 14” spaced suspension lugs

M261
- Weight – 82 lbs
- Length – 66.19 in
- Diameter – 15.875 in
- Standard 14” spaced suspension lugs

August 2013