Close Combat Missile Systems Overview to Precision Strike Association

Presented By
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# CCWS Portfolio

## AVIATION
- **Joint Attack Munition Systems (JAMS)**
- **Cruise Missile Defense Systems (CMDS)**
- **Counter - Rocket, Artillery, Mortar (C-RAM)**
- **Integrated Air and Missile Defense (IAMD)**
- **Lower Tier Project Office (LTPO)**
- **Precision Fires Rocket and Missile Systems (PFRMS)**

## FIRES
- **JAVELIN**
  - Tube-Launched, Optically-Tracker, Wire-Guided (TOW)
- **Improved Target Acquisition System (ITAS)**
- **Improved Bradley Acquisition System (IBAS)**
- **Lethal Miniature Aerial Munitions System (LMAMS)**
- **Precision Fires Manager (PFM)**

## MANEUVER
- **Close Combat Weapon Systems (CCWS)**
  - **JAVELIN**
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  - **Precision Fires Manager (PFM)**

## SMDC
- **Space**
  - **SNaP-3 Nanosatellite**
  - **Kestrel Eye (KE) Microsatellite**
  - **Soldier-Warfighter Operationally Responsive Deployer for Space (SWORDS)**

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**Any Warfighter - Anywhere - All the Time**
**CLOSE COMBAT WEAPON SYSTEMS HISTORY**

**TOW**
- **1970**: Basic TOW
- **1977**: ER - TOW
- **1981**: Improved TOW
- **1983**: TOW 2
- **1987**: TOW 2A
- **1991**: TOW 2B

**Block I CLU**
- Increased ID Range
- Increased Surveillance Time

**Block I Missile**
- Reduced Time of Flight
- Increased Lethality

**Close Combat Weapon Systems Used Effectively in Combat Operations since 1972!**

**Javelin**
- **1996**: Block 0
  - CLU & Missile
- **2006**: Block I
  - Increased ID Range
  - Increased Surveillance Time

**Fielding of AAO Complete in FY13, 76% Block I / 24% Block 0**

Any Warfighter - Anywhere - All the Time
TOW PRODUCT DESCRIPTION

Program Description

**TOW 2B Aero RF:**
- Range: 200M min / 4,500M max
- Weight: 65 lbs

**TOW Bunker Buster (BB) RF:**
- Blast fragmenting HE Bulk warhead
- IM Compliant PBXN-109 explosive
- Range: 65M min / 4,200M max
- Warhead optimized for urban targets and field fortifications.

**TOW 2B Aero RF & TOW BB RF:**
- Compatible with all TOW platforms and stowage racks: ITAS, Bradley Fighting Vehicles, Stryker Anti-Tank Guided Missile (ATGM) Vehicle and USMC platforms.
- Will be in the field beyond FY2035
- Prime Contractor: Raytheon Missile Systems (RMS), Tucson, AZ; Contract Type: Firm Fixed Price; FY12-16 Multi-Year Contract, $237.7M cost savings
- Customers: USMC and 43 Allied Nations
- Missile Prior Production: 156,806 U.S. Army / 699,386 Total

Capabilities/Improvements

**TOW 2B Aero RF:**
- Defeats all current and projected threat armor systems
- Dual Explosively Formed Penetrator (EFP) warheads configured for top attack
- Aerodynamic nose reduces missile time of flight to target
- 20% improvement in max range increases survivability by providing more standoff from threat weapons
- Increased Pk/s at extended ranges

**TOW BB RF:**
- Breaches 8" thick double reinforced concrete walls; provides overmatch against urban targets and bunkers.

Program Schedule
**Program Description**

**Characteristics/Description:**
- Superior Long Range Surveillance (2nd Gen FLIR)
- Long Range, Lethal, Heavy Close Combat and Precision Assault Fires
- Laser Range Finder (10 km)
- Aided Target Tracker
- Fires all versions of TOW missile
- Automatic boresight capability
- Far Target Location Capability (10 digit grid to target)
- Embedded training
- 16 Hour Silent Watch Capability

**M41A4 ITAS**

- Position Attitude Determination System (PADS) (FTL capability)
- Target Acquisition Subsystem (TAS)
- Traversing Unit (TU)
- Fire Control Subsystem (FCS)
- Lithium Battery Box (LBB)

**Capabilities/Improvements**

- More lethal and survivable
  - Doubles target detection/recognition of Ground TOW
  - Increased probability of hit
  - Assists in the target location for other direct fire, indirect fire, and close air support weapons

- Improved supportability
  - 50% reduction of TOW 2's support costs
  - No higher level maintenance verification required
  - No support equipment required

**Program Schedule**

<table>
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<th>Program Events</th>
<th>FY13</th>
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<td>Prod CA</td>
<td>FY14 IE</td>
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<td>Fielding</td>
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**TOW ITAS IMAGE ENHANCEMENT**

- Reduces operator workload and mitigates lack of institutional training
- Optimizes image presented to gunner to increase stand-off range
- Provides hardware & software baseline to provide networked lethality capability

**Image Enhancement Provides:**

**Electronic Focus** – sets sensor for optimal focus on Operator command

**2X, 4X & 8X Zoom** - electronic zoom provides expanded range recognition

**Polarity Reversal** – provides image contrast polarity control, switchable between black hot and white hot

**Enhanced Local Area Processing (ELAP)** - Electronic contrast between target and background to make target acquisition and identification easier in low contrast scenes

**Frame Integration** – produces a better image using noise reduction techniques

**Electronic Image/Scene Stabilization** – provides the operator an image with jitter removed. Provides a path forward for image detection and accurate LOS measurements.

**D-Zipper** – removes the zipper effect from object edges, most apparent in zoom modes
### Program Description

- **48.8 pounds (Block I), Man-portable**
- **Medium range (2500 meters) precision fires**
- **Missile:** 64x64 I2R Staring Focal Plane Array (FPA)
- **CLU:** 240x2 Imaging Infrared Seeker (I2R) Scanning FPA
- **Enhances Battlefield Surveillance**
- **Multi-purpose warhead defeats a variety of targets**
- **Employed by Infantry Brigade Combat Teams (IBCT), Armor Brigade Combat Teams (ABCT) and Stryker Brigade Combat Teams (SBCT)**
- **Ability to defeat armored vehicles, fortifications, and soft targets.**
- **Will be in the field beyond FY2035**
- **Prime Contractor - Javelin Joint Venture (Lockheed Martin – Orlando & Raytheon – Tucson); Contract Type: Firm Fixed Price.**
- **CLU AAO:** 7,407
- **Customers:** USMC & 12 Allied Nations
- **Missile Prior Production:** 26,062 U.S. Army / 35,000 Total

### Capabilities/Improvements

- **High lethality against Advanced Armor**
- **Fire-and-Forget/Top & Direct Attack**
- **Fire-and-Forget capability provides increased gunner survivability**
- **Soft Launch (Fire from Enclosure)**
- **Range 2500 Meters (Qualified), 3600 Meters (Predicted)**
- **MPWH provides improved capability against non-armored targets & current lethality against traditional armored threats (Planned FY15 proc implementation)**
- **Cost Reduction Initiative missile includes uncooled seeker and guidance electronics unit for reduced cost missile (Planned FY17 proc implementation)**

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<tr>
<td></td>
<td>ProdCA (600 Mds)</td>
<td>ProdCA (498 Mds) 0.15x CLU (2M)</td>
<td>ProdCA (597 Mds)</td>
<td>ProdCA (584 Mds)</td>
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<td>Block I Fieldings &amp; CLU Retrofit</td>
<td>MPWH Implementation</td>
<td>Cost Reduction Implementation</td>
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**FY10 Missile & CLU Retrofit Deliveries**

**FY11 Missile Deliveries**

**FY12 Missile Deliveries**

**FY13 Missile Deliveries**

**FY14 Msl**
JAVELIN MISSILE
MULTI-PURPOSE WARHEAD

Capability/Benefits

- Meets Current Lethality Requirement against Traditional Armored Targets
- Fragment Sleeve Increases Capability against Non-Armored Targets
- 2X Improvement in Lethal Area against Exposed Personnel
- Provides Overmatch for IBCTs and SBCTs in Close Combat Engagements
- No Training or Logistics Impacts
- System Safety Improvements
  - Insensitive Munitions-Compliant Explosive

Capability Fielded in FY 2016 Timeframe
JAVALIN LIGHTWEIGHT CLU

Greatly Improved Size, Weight and Power (SWaP) over Block I
- 70% Size Reduction
- 40% Weight Reduction
- 50% Battery Life Increase

Lightweight CLU

Block I CLU
LIGHTWEIGHT CLU FEATURES

• Long-wave IR Sensor
• 5 Megapixel Color Camera
• Laser Pointer
  – IR and Visible
• Hi-definition Display
  – Improved Spatial Resolution
  – Picture in Picture
    » IR and Day Camera
    » Network and CLU Image
• Far Target Locator
  – GPS, Laser Range Finder & Heading Sensor
• Integrated Handgrips
• Modernized Electronics
  – Extended Battery Life
  – Networking Support
  – Embedded Training

Lightweight Javelin CLU provides small units the ability to see first, understand first, act first and finish the fight decisively.
OPERATIONAL IMPACT
(TOW AND JAVELIN NON-ANTI-ARMOR USE IN CURRENT OPERATIONS)

• Since 2003 in OIF & OEF, 10,887 TOW (1,521 fired from IFVs/Stryker) and 2,074 Javelin variants have been fired against non anti-armor threats.

• Key AAR comments:
  – The TOW/ITAS weapon enabled Friendly forces to find, fix and kill Threats with an immediate, lethal response in a firefight.
  – Javelin and TOW are force multipliers providing a single-shot, precision-guided, direct fire capability to engage Threat.
  – When faced with an irregular Threat, firing a Javelin and TOW end the firefight resulting in reduced Friendly force casualties and minimal collateral damage.

The Finger of God – “The TOWs were our most lethal weapon system on the battlefield. We had the ability to destroy fighting positions from 300m to 3800m.”
- 1 PLT/D Co/2-327 INF

“When you have big-bang precision munitions like the Javelin and the TOW, the ability to put the same effect as for example a 155 round on the enemy, but make sure you hit the enemy with it – it not only stays within the ROE, I think it makes it that much stronger.” - 3/10MTN, 1-32IN, OEF

TOW and Javelin Expenditures

TOW/Javelin Expenditures

Army/USMC TOW & Javelin Expenditures

TOW and Javelin Engagements against Threat Targets
1-101st OEF Deployment May 2010 – May 2011 Kunar Province, AFG
LETHAL MINIATURE AERIAL MUNITIONS SYSTEM (LMAMS)

Components
- Air Frame
- Warhead
- Launcher
  - Small Visual & Thermal Signature
- Ground Control Unit (GCU)
  - Modular
  - Raven
  - Fits Inside Backpack
  - Quiet Launch
- Hardware & Custom Software

Notional Specifications
- Weight:
  - Warhead: < 0.7 lbs
  - Air Frame & Warhead: < 5.5 lbs
- Launcher Length: < 22 in
- Range: < 10 km
- Flight Time: >10 min

Capability/Benefits
- Single-Use, Man-Portable, Ground Launched, Unmanned, Direct Fire Missile
- Selectable Range Laser Radar Proximity Fuze, Low Collateral Damage Warhead
- Infrared & Electro-Optical Cameras and Target Tracker to Allow Surgical Defeat of Troops and Fleeting Soft Targets Not Within the Direct Line-of-Sight of other Organic Weapons
- Potential to Fly Switchblade/Raven/Puma/Wasp Simultaneously from Small Unmanned Aerial Sensor (SUAS) Controller
CLOSE COMBAT WEAPON SYSTEMS

CCWS

One Shot - One Kill