

The Soldier: America's Most Deployed Combat System



**PM Crew Served Weapons Overview
for the
Small Arms Symposium & Exhibition
*National Defense Industrial Association***

16-19 May 2006

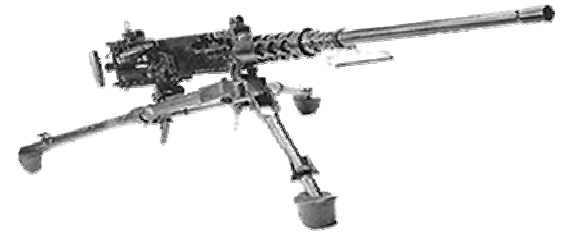
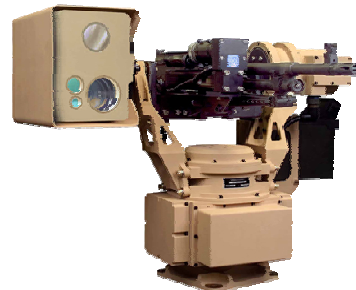
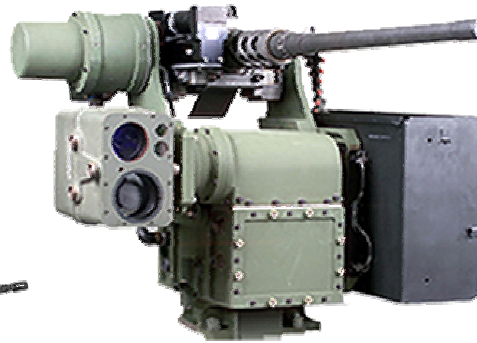
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Deputy PM Crew Served Weapons



Crew Served Weapons





PM Soldier Weapons Programs List



DEVELOPMENT

WEAPONS

Objective Individual Combat Weapon (OICW)

1. OICW Increment I
2. OICW Increment II - XM25 Air Burst Weapon

Advanced Crew Served Weapons (ACSW)

3. *Advanced Crew Served Weapon (ACSW) Programs*

SOLDIER ENHANCEMENT PROGRAMS

4. XM26 - 12 Gauge Modular Accessory Shotgun System (MASS)
5. Joint Combat Pistol
6. Family of Small Arms Suppressors
7. M68 Close Combat Optics (Dual Source Qualification)
8. *XM1068, 12 Gauge Non-Lethal Extended Range Round*
9. *XM1022, Sniper Ammunition for M107*
10. *XM110 - 7.62 Semi-Automatic Sniper System (SASS)*
11. Close Quarters Battle Kit
12. *XM1041/XM1042/XM1071 - Close Combat Mission Capability Kit*
13. *Advanced Sniper Accessory Kit (ASAK)*
14. XM320 - Grenade Launcher Module (GLM)

BLOCK MOD PROGRAMS

15. *CROWS-Lightning Remote Weapons Station*
16. *XM150, Magnified Combat Optic (MCO)*
17. *Enhanced Cal .50 Machine Gun*
18. *Platform Integrated Swing Arm Mount*
19. *M240E6, Medium Machine Gun Weight Reduction Program*
20. *M240H, 7.62mm MG High Capacity Feed System*
21. *M249 SAW 200 Round Soft Pack*

AMMO BLOCK MOD PROGRAMS

22. *XM1037, Short Range Training Round For M4, M16 and M249*
23. *Lightweight Small Caliber Ammunition*
24. *Proximity Fuze*
25. *40mm Day Night Training Cartridge (FCT)*

RFI FY05 ITEMS

- | | |
|--|--------------------------------------|
| 26. TA31F - 4X ACOG | ▪ <i>Back Up Iron Sight</i> |
| 27. Weapon Light | ▪ <i>M249 Rail</i> |
| 28. <i>M24 Small Binoculars</i> | ▪ <i>M240B Rail</i> |
| 29. <i>M122/A1 Tripods</i> | ▪ <i>M249 Ammo Soft Pack</i> |
| 30. <i>M249/M240B Spare Barrel Bag</i> | ▪ <i>M240B Combat Ammo Pack</i> |
| 31. Three Point Sling | ▪ <i>M192 Lightweight Tripod</i> |
| 32. <i>Improved Spotting Scope With Tripod</i> | ▪ <i>M249 Short Barrel</i> |
| 33. Improved Cleaning Kit | ▪ <i>M249 Collapsible Buttstock</i> |
| 34. Improved Buttstock For M4 Carbine | ▪ <i>M4/M5 Modular Weapon System</i> |
| 35. <i>Forward Grip Bipod</i> | ▪ <i>M145 Machinegun Optic</i> |
| 36. M203 Day/Night Sight | ▪ <i>M68 Close Combat Optic</i> |

PROCUREMENT

37. *M101, CROWS, Remote Mount*
38. *M151E1 & M151E2 Protector Remote Wpn System (RWS)*
39. **MK19**
40. *Mod Kit*
41. *Lightweight Adjustable Sight Bracket*
42. *Tactical Engagement Simulator (TES)*
43. *M107 Semi Automatic Long Range Sniper Rifle*
44. *M240B, 7.62mm Medium MG*
45. *M240B Collapsible Buttstock*
46. *M192, Light Weight Ground Mount For MG*
47. *Improved Bipod*
48. *Improved Flash Suppressor*
49. *Combat Ammunition Pack*
50. *M240B Short Barrel*
51. *M240B Improved Buttstock*
52. *Sling Assembly for the M240B*
53. *Short Barrel*
54. *M249, 5.56mm Squad Automatic Weapon*
55. *M192, Lightweight Ground Mount For MG*
56. *MG Front Rails*
57. *Improved Bipod*
58. *Collapsible Buttstock*
59. *Short Barrel for the M249*
60. *Sling Assembly For M249*
61. **M16A4 5.56mm Rifle**
62. **M16 Rifle Mods**
63. **M4, 5.56mm Carbine**
64. **M4 Mods**
65. *M145 Machine Gun Optics*
66. *M25 Stabilized Binoculars*
67. *M24 Mini Binocular*

AMMO PRODUCTION PROGRAMS*

- *M903/M962 Cal .50 SLAP/SLAPT*
- *M1001, 40mm Canister Round*
- *M100, Grenade Rifle Entry Munition (GREM)*
- *MK243 MOD 0 9mm Jacketed Hollow-Point*
- *M862 5.56mm Short Range Training Ammunition*
- *M1030 12 Gauge Breaching Round*
- *M973/M974, 7.62 Short Range Training Ammo*
- *M992 IR Illumination Cartridge*

* Programs Managed By PM Soldier Weapons For PEO Ammunition In Accordance With MOA



XM307



Description:

- The XM307 Is A Lightweight 2-man Portable Crew Served Weapon Which Will Provide Enhanced Capabilities To The Soldier Improving Lethality And Survivability. This System Has Been Proposed By ***TSM Stryker As A Weapon System Capable Of Meeting Stryker Future Lethality Requirements For Mounted/Dismounted Operations.***

Capabilities:

- Lightweight, 2-man Portable, Crew Served Weapon
- System With 25mm Air Bursting Munitions
- Subsystems Include:
 - Weapon
 - Target Acquisition/Fire Control (TA/FC)
 - 25mm High Explosive Air Bursting And Armor Piercing Ammunition
 - Lightweight Tripod

Status:

- SDD Contract Awarded
- Continue Development Of Dismounted Variant





Advanced Crew Served Weapon Firing





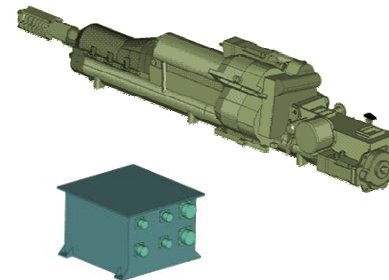
XM307 Evolution



- **XM307 ACSW originally developed for dismounted applications**
 - Pre-STO (FY92-94)
 - STO (FY95-98)
 - ATD (FY99-04)
- **FCS selected XM307 as the Common Close Support Weapon for 6 manned and 2 unmanned ground vehicles**
 - SDD (FY04-Present)
 - XM312 developed as reliability growth tool
- **FY05 - FCS redirects program to develop XM307 as a Remotely Operated Variant (ROV), with integral Dual Feed and Remote Operations, including an Electronics Control Unit**
 - XM307 ROV retains a common operating group with the ACSW, but dismounted capability removed



XM307 ACSW



XM307 ROV



XM307 / FCS Vehicle Integration

Common Weapon, Common Solution



The XM307 was selected as the Common Close Support Weapon for the Future Combat System Program

FCS Manned Ground Vehicles



C2V
Primary Armament



FRMV
Primary Armament



RSV
Primary Armament



NLOS-C
Secondary Armament



MCS
Secondary Armament



NLOS-M
Secondary Armament

FCS Unmanned Ground Vehicles

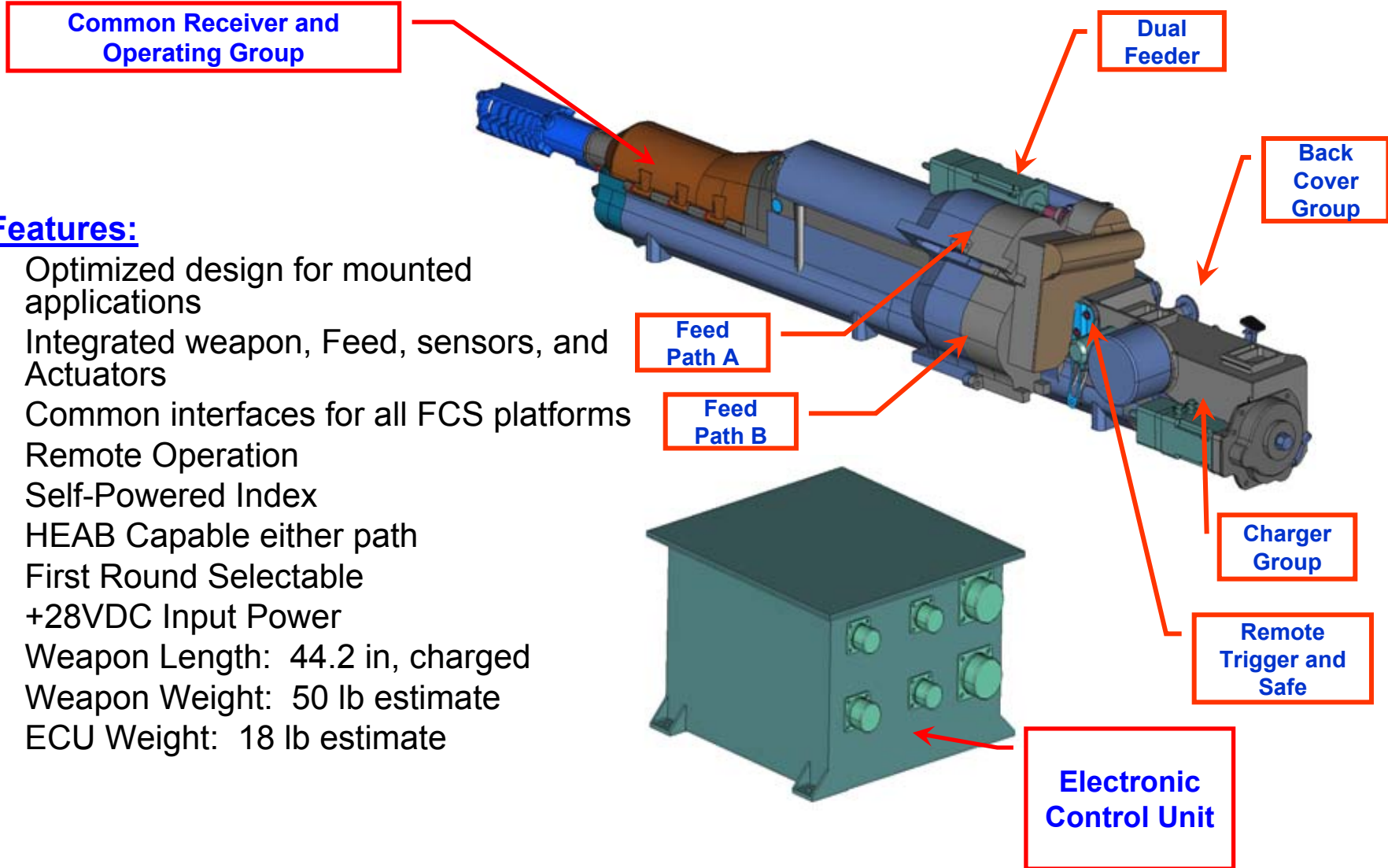
ARV-A(L)
Primary Armament



ARV-RSTA
Primary Armament



XM307 Remote Operating Variant (ROV) Weapon System Concept



Features:

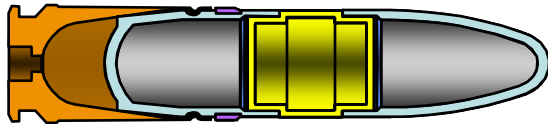
- Optimized design for mounted applications
- Integrated weapon, Feed, sensors, and Actuators
- Common interfaces for all FCS platforms
- Remote Operation
- Self-Powered Index
- HEAB Capable either path
- First Round Selectable
- +28VDC Input Power
- Weapon Length: 44.2 in, charged
- Weapon Weight: 50 lb estimate
- ECU Weight: 18 lb estimate



ACSW Ammunition

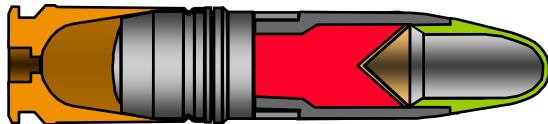


HEAB Cartridge



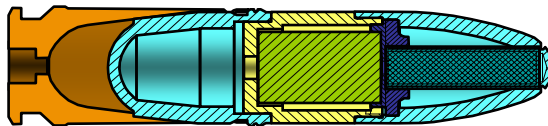
- **HEAB** Defeats Exposed and Defilade Targets
 - Precision Air-Bursting
 - PBXN5 High Explosive
 - Effective against PASGT Vest & Helmet
 - Controlled Fragmentation Warhead

AP Cartridge



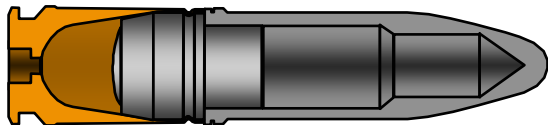
- **AP** Defeats Light Armor
 - Armor Piercing Shaped Charge Round
 - 51mm RHA (Threshold) / 51mm HHA (Goal)

TP-S Cartridge



- **TP-S** Flash Bang Training

TP Cartridge



- **TP** Simple Two-Piece Projectile for Training

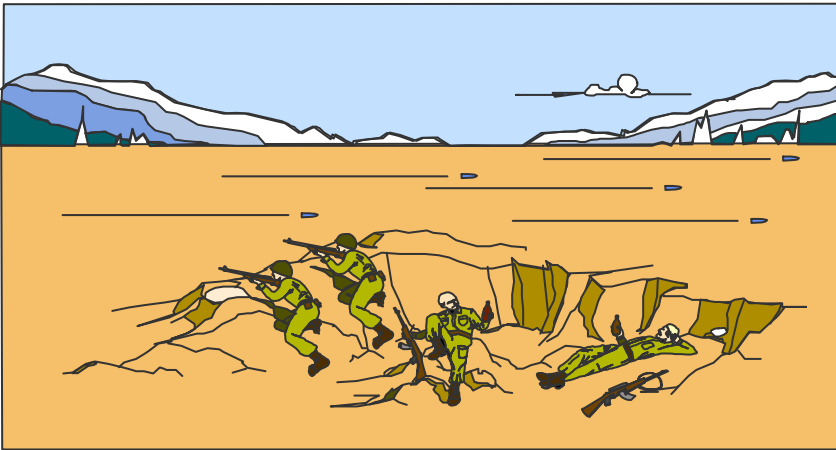


Air Bursting Munitions

Increased Lethality for Infantry Warfighting



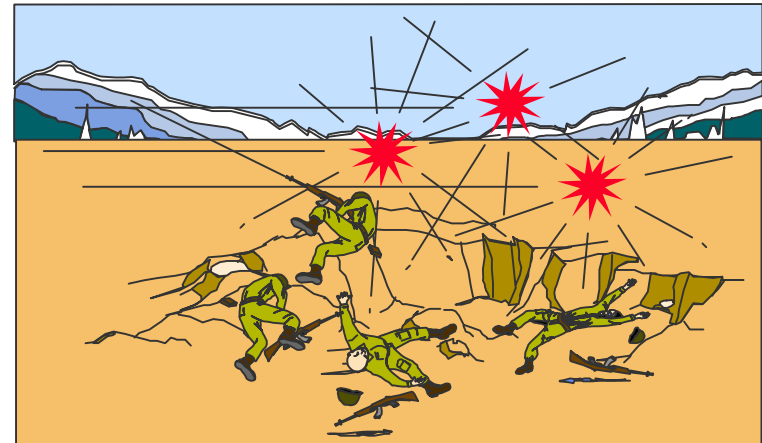
KE Ammunition Can Only Suppress Personnel In Defilade



Target Postures

- Percent of the time
 - 5% Standing
 - 20% Gone to ground
 - 75% Gone to defilade

Air Burst Ammunition Kills



System Operation

- Laser range on target or near terrain
- Adjust aim point on target
- Fire
- Projectile air burst on target



Muzzle Velocity Correction



Electronic Timed Fuzes Need Accurate Velocity Data To Burst On Target

Too Slow



Corrected



Too Fast



- Muzzle velocity of packaged ammunition differs from round to round
- Fuze is updated with actual (individual projectile) velocity
- Ammunition Velocity Correction Yields Precision Air-Burst

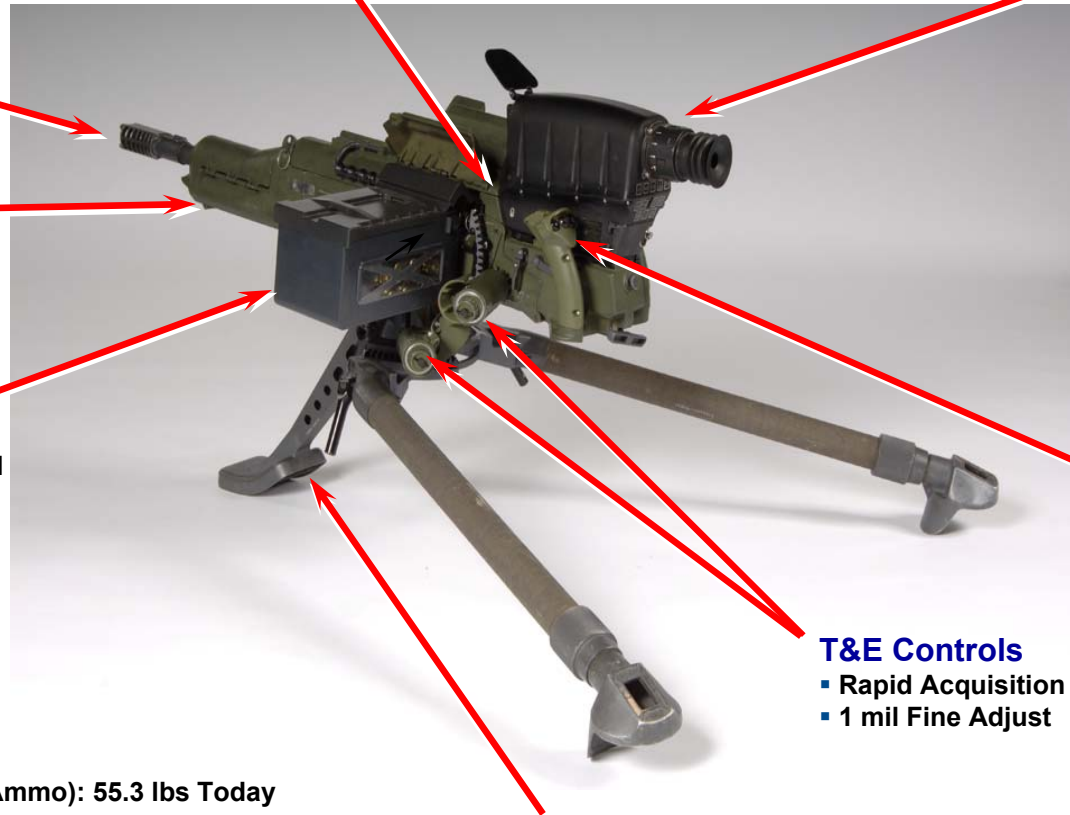


Target Effects





SDD System Description (Ground Mounted)



Fuze Setter Contacts

Muzzle Device

- Flash Suppression
- Inherently Reliable

Weapon

- Light Weight, 30 lbs
- 25mm, 260 spm
- Soft Recoil
- Gas Operation

Ammo Can

- Right Or Left Mounted
- Linked Belt
- 31 Round Capacity
- All XM307 Ammo Types

- System Weight (No Ammo): 55.3 lbs Today
- Range: 2000m
- Time Of Flight: 8.9 Sec. To 2000m
- Penetration Requirement (mm RHA): 51mm
- Stowed Kills (200rds): 27.9
- Integrated Full Solution Fire Control

Ground Mount

- Lightweight, 18.8 lbs w/ T&E, Pintle
- Stable Without Ballast
- Height Adjustable

Target Acquisition/Fire Control (TA/FC)

- Direct View Optics (DVO)
- Range Finder/CIDDS/MILES/Pointing Lasers
- CCD Video/FLIR/Tracker Module
- Full Solution Ballistic Calculation/Reticle Aimpoint
- Fuze Programming/Powers And Sets Fuze
- Digital Compass/Environmental Sensors
- 6.5 lbs w/o Thermal

TA/FC Controls

- Grip Mounted Switches
- TA/FC Rear Panel Switches
- Lase & Menu Select
- Increment/Decrement

T&E Controls

- Rapid Acquisition
- 1 mil Fine Adjust

Land Warrior Interface

- Lanyard Style "Breakaway" Connector
- Power, Data And Video Over Interface
- Compliant To LW Requirements



Target Acquisition Fire Control System



Characteristics/Component:

- > 2.2 Km Performance (day only)
- Laser Rangefinder: ± 1 meter Accuracy
- Thermal Sensors Interface (ISM)
- Direct View Optics 5x, 9.5° FOV
- Laser Steering (TA/FC#102)
- Digital compass
- Fire Control Ballistic Processor
- Motion Tracker (TA/FC#102)
- Land Warrior Ready
- Fuze Setter

TA/FC Features

- Full Solution Fire Control
- High reliability: "100% Solid State"
- Reduced exposure to enemy
 - Reduced engagement time
 - Increased stand-off range
- Simplified soldier training
- Planned evolutionary growth
- Low power
- Low Weight
 - 6.5 lbs w/o Thermal
 - 8.6 lbs w/ External Thermal

- *3 Systems Built to Support 2001 Government Testing*
- *Demonstrated Over 3500 Live Rounds on Weapon*
- *3 Systems Still In Use and Meeting Performance Requirement*



ACSW 25mm and .50 Caliber



Swap out of only 4 unique components required to convert a .50 caliber weapon to a 25mm weapon (<1.5 min by User)



1. Barrel
2. Bolt
3. Cartridge Guide
4. Sprocket



2 Modern Weapons For Virtually the Cost Of One

- Low Recoil Reduces Vehicle Structural Mounting Requirements
- Lower Weight For Improved Transportability & Employment
- Lower Logistic Burden
 - Reduced Maintenance Due To Fewer Parts And Improved Design
 - Smaller Class IX Parts Inventory
- Operational Flexibility with Increased Lethality
- Low Cost Training Capability For The XM307
- Improved Safety & Reduced Maintenance – Soldier Uses One System

XM312 = Commonality with XM307



Mobility

Heavy Firepower For The Close Combat Fight



System	40mm Mk-19 Mod3	Cal .50 M2HB	7.62mm M240	25mm XM307
Weapon Weight (lb)	75.6	84.0	24.2	28.0
Tripod Weight (lb)	65.4	46.1	19.2	13.0
Fire Control (lb)	N/A	N/A	N/A	6.5
Unloaded System Weight (lb)	141.0	130.1	43.4	47.5
Peak Recoil (lbs)	800	1000	80	250
Relative Lethality (lbs Ammo / Kill)	37	39	8	1

- Low Recoil Burden On Weapon Station
- Quickly Dismountable From Vehicle Platform
 - Portable Over Rough Terrain
- Light & Compact
 - 80-90 lb Weight Savings

Enhances Close Combat Employment Flexibility



Stryker Integration



Stryker Program Overview



- 7 Brigades funded by the U.S. Army
- Nearly 1000 vehicles built and delivered
- Over 300 vehicles deployed to Iraq
- Exceeding contract requirement for Operational Readiness Rate
 - Contractual ORR = 90%
 - Performance for 30 months deployed averages at 95.5%
- #1 Program Priority – **INCREASED LETHALITY**



Infantry Carrier (ICV)



Engineer Squad (ESV)



Mobile Gun System (MGS)



Reconnaissance (RSV)



Anti-Tank Guided Missile (ATGM)



NBC Reconnaissance (NBCRV)



Medical Evacuation (MEV)



Fire Support (FSV)



Mortar Carrier (MCV)



Command (CV)



M151 Protector Remote Weapon System



Weight:

Above the roof including (4) M6: 279 lbs (w/o M6: 245 lbs)
Total weight: 372 lbs (w/o M6: 338 lbs)

Supported Weapons:

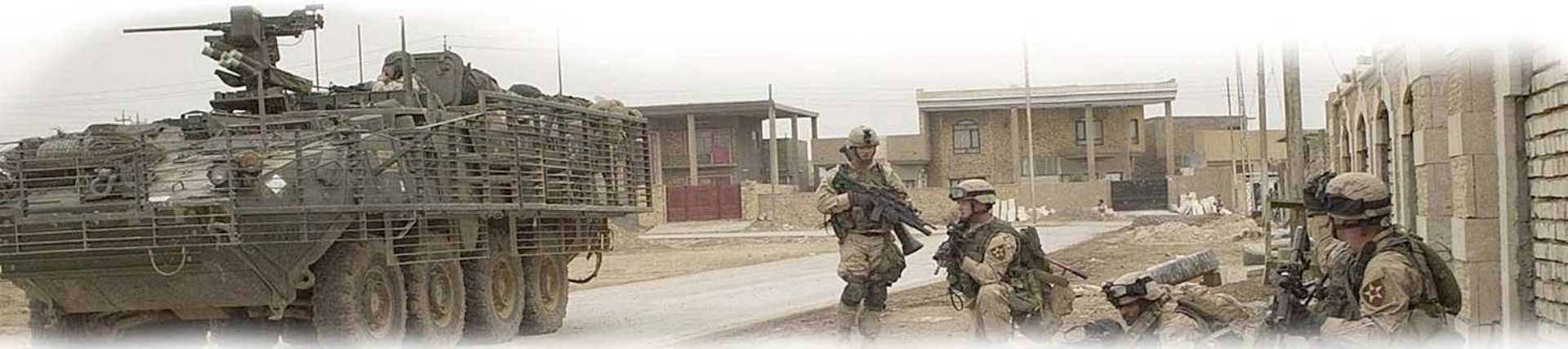
MK19, M2, M240 (Deferred)
Growth To XM312/XM307, MK47 & Javelin

Sensor Suite:

Color 27X Day Sight
Dual FOV Night Sight (w/2x E-Zoom)
Auto Focus
STORM -Laser Range Finder
IR Pointer (low and high)
Visible Pointer
Low Ammo Sensor

Additional Features

- Stabilized
- Four-axis independent system – Automatically corrects for super elevation and drift
- Embedded Training & Diagnostics





ACSW/RWS/Stryker Integration

Summary of Phases 1, 2, & 3



- Phase 1: Conduct integration, testing, and demonstration of XM312 .50 cal on RWS at GDATPs Ethan Allen Firing Range (EAFR) – **Accomplished!!**



- Phase 2: Conduct integration and testing of the 25mm XM307 ACSW on a (prototype stabilized) RWS system with hybrid fire control at EAFR, and successful targeting and fuzing of TP and TP-S rounds – **Accomplished!!**



- Phase 3: Conduct integration and testing of the XM307 25mm and XM312 .50 cal ACSW with a stabilized RWS system on a moving Stryker vehicle at Redstone Arsenal **11 May Demonstration!**





Protector RWS Block 2 / XM307 ACSW

Increased Lethality for Stryker



- RWS Block 2 provides the latest capability for the Stryker to engage targets with operational weapons
- XM307 provides low weight, low recoil, and increased lethality
- Combined, the RWS Block 2 and XM307 will provide the Stryker vehicles with:
 - Fire on the move
 - 25mm HEAB rounds
 - 25mm AP rounds
 - Dismount capability
 - Converts to .50cal XM312



Summary



- XM307 provides low weight, low recoil, and increased lethality
 - 25mm HEAB
 - 25mm AP ammunition
- XM307 ROV, as funded by the FCS Program, shares a common operating group with the XM307 ACSW, but does not support dismounted operations
- The XM307 ACSW supports integration on a vehicle as well as dismounted operations
 - Demonstrated at RTTC 11May06
- When combined with the RWS Block 2, the XM307 ACSW will provide the Stryker vehicles with **INCREASED LETHALITY**



Common Remotely Operated Weapon Station (CROWS) Description



- Provide Soldiers With Capability To Acquire And Engage Targets At Maximum Effective Range While Protected By Vehicle Armor
- Supported Weapons
 - MK19 GMG, Cal .50 M2 MG, M249 SAW, M240B MG
 - Growth To M230 & XM307
 - Weapons Can Be Quickly Interchanged By Soldier
- Sensor Suite Supports Day/Night Engagements
- Can Zoom Optics On Target Independent Of Gun Super Elevation
- Two-axis Stabilized Mount, Laser Rangefinder & Fire Control Software Support On-the-move Target Acquisition & First Burst Target Engagements



Provides Extended Range Surveillance And Detection Of IED Emplacements



M101 CROWS Operations





M101 CROWS Ongoing Applications



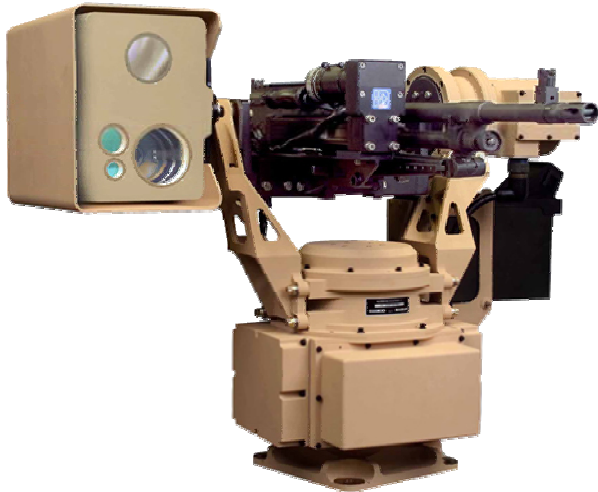
Integration Into Existing Platforms Is Critical



CROWS-Lightning Description



- Lightweight Application For Various Wheeled & Tracked Vehicles (From Hmms & Heavy Trucks To Armored Personnel Carriers)
 - 200 Lbs Above Roof Including Weapon & Ammo (200 Rds)
- Moves Unprotected Gunners Into Vehicle Interiors
- Day/Night Capability To Identify & Defeat Targets Out To Max Effective Range Of Weapons While On-the-move
- M240 Or M249 Machine Guns W/Growth To Advanced Crew Served Weapon (XM307)



- Powered By Current Vehicle Capability
- 2-Axis Stabilization
- Traverse: 360° Continuous
- Range Of Elevation: -15° To +45° (Objective: -20° To +60°)
- Slew Rate: >30°/sec
- Safety Features:
 - Programmable Stops In Traverse
 - Manual/Emergency Back-up Operation Of Weapons Through Top Hatch



SASS



To Acquire, Qualify & Field a

Commercial & NDI

Semi-Automatic 7.62 x 51mm

Caliber Weapon System To Address

M24 Sniper Weapon System (SWS)

Shortcomings

Approved FY04 Soldier Enhancement Program (SEP)



XM110, 7.62mm Semi-Automatic Sniper System (SASS)



Description:

- Effective Against Personnel Targets And Light Materiel Targets
- Supplements Sniper's Role In Combat Operations
- Greater Firepower & Possible Standoff Ranges To Improve Sniper Survivability

Capabilities:

- Rapid Fire/Rapid Reload
- Suppressed Sniper Rifle
- Exceeds Rate Of Fire And Lethality Of M24 SWS
- Reduced Weight
- Primarily Anti-personnel Ranges \geq M24
- Enhanced Sniper Spotting Scope And Bipod

Status:

- In Operational Testing





XM110 Weapon Capabilities



The SASS Will Provide:

- **Suppressed, Rapid Fire Lethality** Against Personnel and Light Materiel Targets with **High Capacity, Ammo Configurable, Quick Change Magazines** and a **Greater Shooter Focus**
 - *A “stay on the scope/stay on the gun” capability to rapidly engage multiple targets with multiple follow-on shots against moving/fleeting personnel and light skinned vehicles.*
- Additional **Responsiveness** and **Versatility** That Supplements Sniper’s Role To Support Combat Operations
- **Easily Adaptable RSTA Systems** For All-Weather, Day/Night Operation Based on METT-TC
- **Enhanced Accessories** For An Exponential Increase To Sniper Team Lethality, Survivability and Mission Flexibility

Bottom Line: Greater, Quicker, Focused Firepower with Increased Flexibility



XM110, SASS Specifications



- Ammunition: 7.62x51mm, M118 LR (anti-personnel) and M993 (armor piercing).
- Barrel Rifling and Twist: 20" barrel (not including flash suppressor), 1:11 right-hand twist, 5 grooves.
- Muzzle Velocity: 2,571 fps (784 mps) M118LR Ammunition / Barrel Length: 20" (508 mm).
- Max Effective Range: 1,000 meters (M118LR Vel: 1,099 fps @ 1km).
- Overall Length: 40.5" with Collapsed Buttstock (1028 mm).
- Max Height w/20-Rd. Magazine and Day Optic: 10.25" (260 mm).
- Rifle Weights Unloaded: w/o sights/adapters/mounts: 10.81 lbs. (4.90 kg).
 - w/ Front & Rear Iron Sights, Bipod Adapter: 11.06 lbs. (5.01 kg).
 - w/ Iron Sights, Bipod Adapter, Leupold 3.5 x 10 SASS Scope: 12.82 lbs. (5.81 kg).
- M110 Complete: w/Leupold 3.5 x 10 SASS Scope, Bipod Adapter w/ LM Type S Bipod: 13.7 lbs. (6.21 kg).
- Sound Suppressor Weight: 1.96 lbs. (.89 kg.). Weapon Length with Sound Suppressor: 46.5" (1,181 mm).
- Unloaded 20-Round Magazine: 0.46 lbs. (.21 kg).
- Magazine w/20-Rounds of M118 LR: 1.62 lbs. (.73 kg).
- Bipod LM Type S Weight: 0.87 lbs. (.39 kg).
- Bipod Adapter Weight: 0.12 lbs. (.05 kg).
- Leupold 3.5x10x40mm w/ Illuminated TMR(0.5 MOA Elevation & Windage Adjustments) and 30mm SASS Mount: 1.76 lbs. (.79 kg.). w/M2 type (double revolution) Ballistic Cam



Fully Loaded
15.3 lbs

40.5"



Fully Loaded
17.3 lbs

46.5"



Weapon System Components



- 7.62mm SR-M110 Match Rifle
- 20-Round Magazine (4 each)
- 10-Round Magazine (4 each)
- 600 Meter Backup Iron Sight
- Harris Bipod LM-S
- Bipod Rail Adapter
- Leupold 3.5-10x Scope with TMR® Reticle
- Padded Scope & Crown Cover
- Zippered Scope Soft Case
- Scope Caps
- One-Piece Long Range Scope Mount
- Tan Leather Competition Sling Assy.
- Military Sling Swivels installed on sling.
- SASS 7.62mm Sound Suppressor
- Magazine Pouches
- System Transport & Storage Case
- Weapon & Optic Cleaning Kits
- Weapon Deployment Kit
- Dewey Special 35.5" Coated Rod
- Bore Rod Guide for Dewey Rod
- DMR Flex Rod Kit



XM151 Enhanced Spotting Scope & Tripod



- Associated Support Item Of Equipment (ASIOE) To SASS
- Addresses Shortcomings of M144 Scope for the M24 SWS
- Makes RFI Item Army Standard & Supportable



XM107 Urgent Requirement Fieldings

FY02	150
FY03	258

Rapid Fielding Initiative Fieldings

FY03	24
FY04	770
FY05	519
FY06	1029
FY07	690
FY08	105
TOTAL	3545
SASS AAO	4492
Left To Buy	947



Answers CSA's Edict: Make RFI Items Army Standard & Supportable





R09

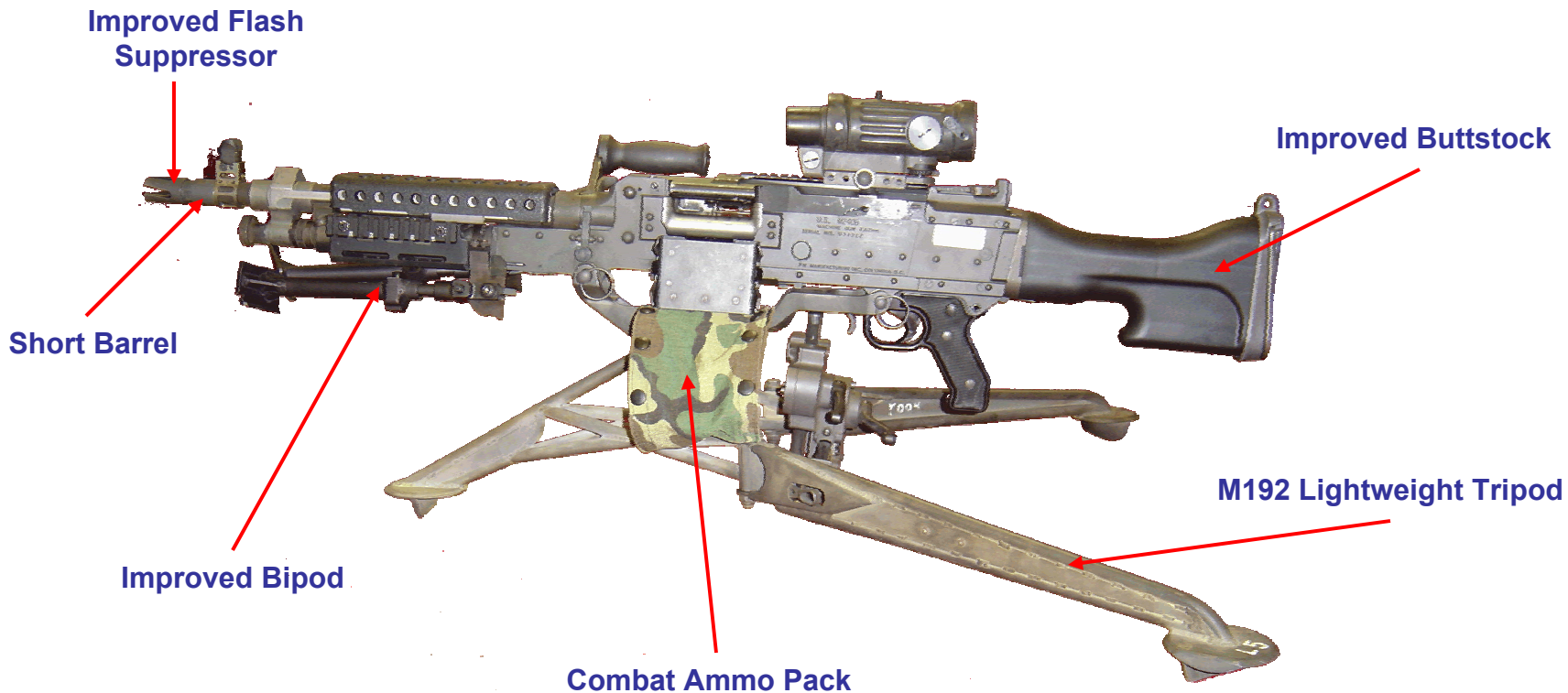
R09

R09

20 LOTS, 2 AT 200
1000 RANGE MILES



M240B Medium Machinegun





M240H, 7.62mm Machine Gun (Aviation Version)



Description:

- M240H 7.62mm Machine Gun Designed For UH-60 & CH-47

Capabilities:

- Demonstrate Reliability Equal To The M240B
- Deliver 2 Minutes Of Suppressive Fire And Be Removable/Employable In A Ground Role

Status:

- Fielding Complete End Of FY07





M240H, 7.62mm MG (Aviation Version)



Description:

- 7.62mm Aviation Machine Gun which improves the Self Protection capabilities of the UH-60 and CH-47 Helicopters



Capabilities:

- Demonstrate Reliability Equal To The M240B.
- Removable/Employable In A Ground Role



Pre-Planned Product Improvements (P3I):

- Hydraulic Buffer added to Spade Grip
- Lightweight Aluminum Ammo Can
- Lightweight Receiver



High Capacity Feed System:

- Provides two minutes of continuous suppressive fire (UH60 Flight tests May 06)

2,041 systems fielded to date, fielding complete end of FY07



Ground Firing





Ramp Mount





Ramp Gunner





The Soldier “America’s Most Deployed Weapon System”

**“Every Soldier Is A Rifleman First”
GEN Schoomaker**