



Warfighter Ammunition Information Program

2013 MCoE Master Gunner Conference

PM-MAS

Warfighter Ammunition Information Program
Ammunition Update

WARNING

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Mr. Kevin P. O'Connor



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Small/Medium Caliber Agenda



- **WAIP Intro/Objective**
- **M855A1 Enhanced Performance Round (EPR)**
- **M862 Short Range Training Round (SRTR)**
- **Close Combat Mission Capability Kit (CCMCK)**
- **Grenade Rifle Entry Munitions (GREM)**
- **Drilled, Dummy, Inert (DDI) Training Rounds**
- **40mm Updates**



Who We Are...



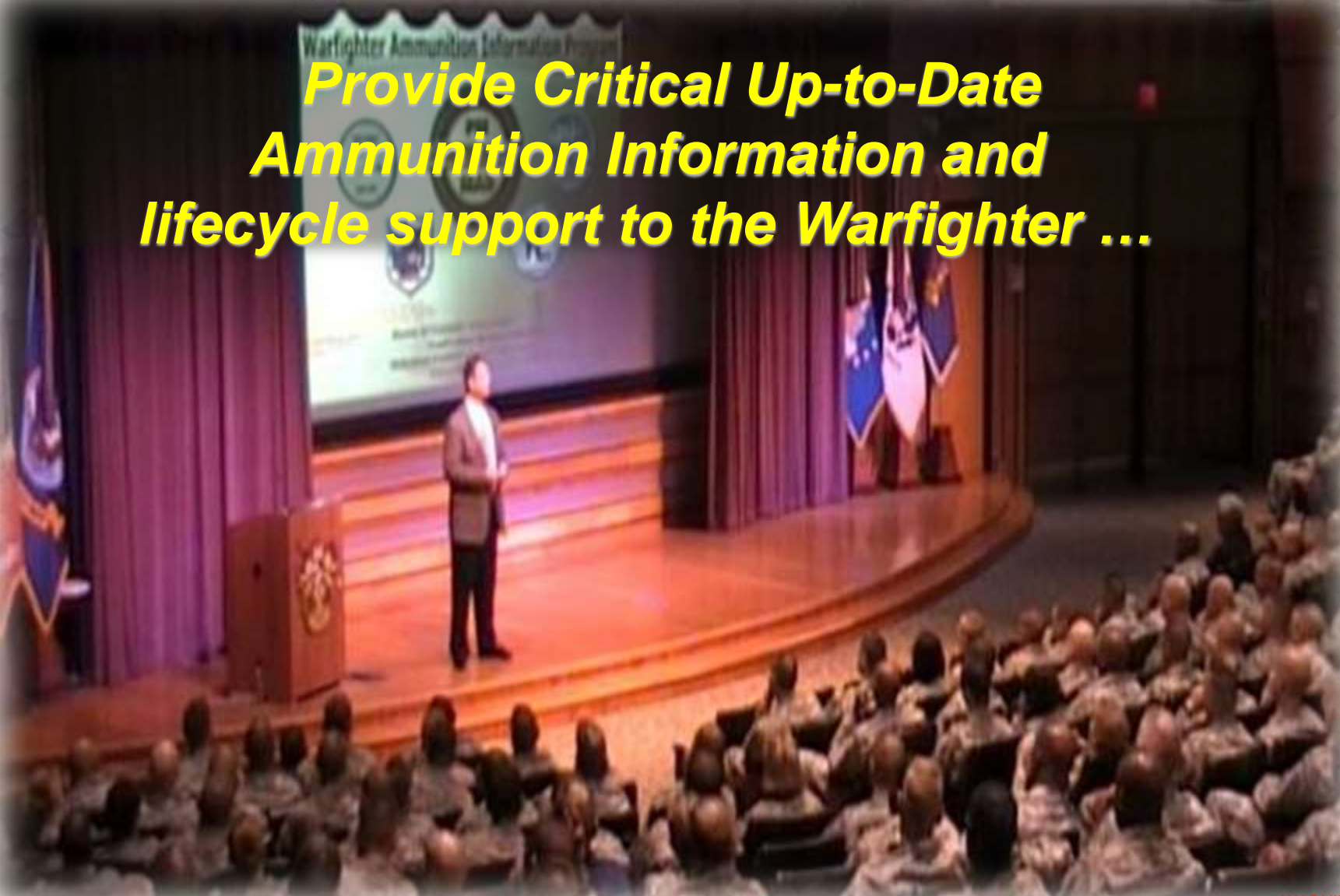
- ***Employed by the Project Manager, Maneuver Ammunition Systems (PM-MAS)-Direct Fire Branch Picatinny Arsenal, NJ***
- ***We are a team of retired Senior Enlisted Master Gunners, and SME's in the areas of Small- Medium-Large Caliber Ammunition Performance (Internal/External/Terminal Ballistics)***
- ***Our Service is provided at "No" cost to the Unit... PM-MAS fully funds our expenses to unit locations***



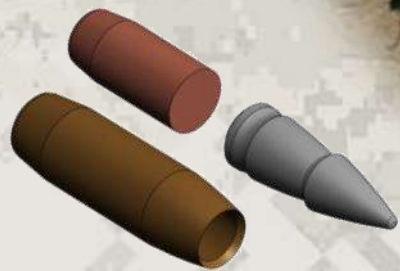
Objective...



***Provide Critical Up-to-Date
Ammunition Information and
lifecycle support to the Warfighter ...***



M855A1 (EPR) 5.56mm Enhanced Performance Round



UNCLASSIFIED//FOUO



Distribution Statement F:
Further dissemination only as directed by Project Manager for Maneuver Ammunition Systems, Attn: SFAE-AMO-MAS-PM, Picatinny Arsenal, NJ 07806-5000, or Higher DoD Authority. Dated: 10 May 2010.

WARNING - Export Control

Field Experience with M855 5.56mm



Not long after the US Army's entry into Afghanistan, reports from the field began to surface that in close quarters engagements, some soldiers were **experiencing multiple “thru-and-thru” hits on enemy combatants where the target continued to fight...**

~However field reports were not always consistent...

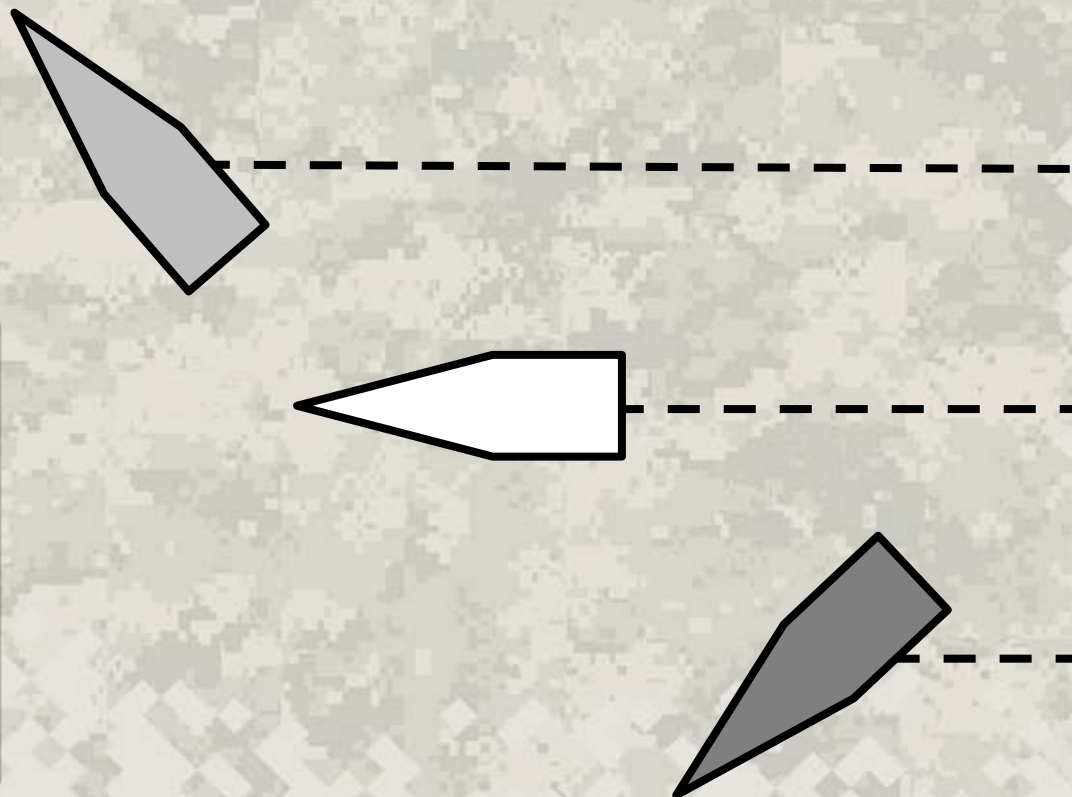
- Some units would report a “thru-and-thru” problem, while others expressed nothing but confidence in the performance of their M4 carbines or M16 rifles...
- Similar reports arose following the invasion of Iraq in 2003.
- As a result, the Army formed a joint lethality commission in 2006 to study these occurrences



Phenomenon



BULLET STRIKING YAW



Solution Sought



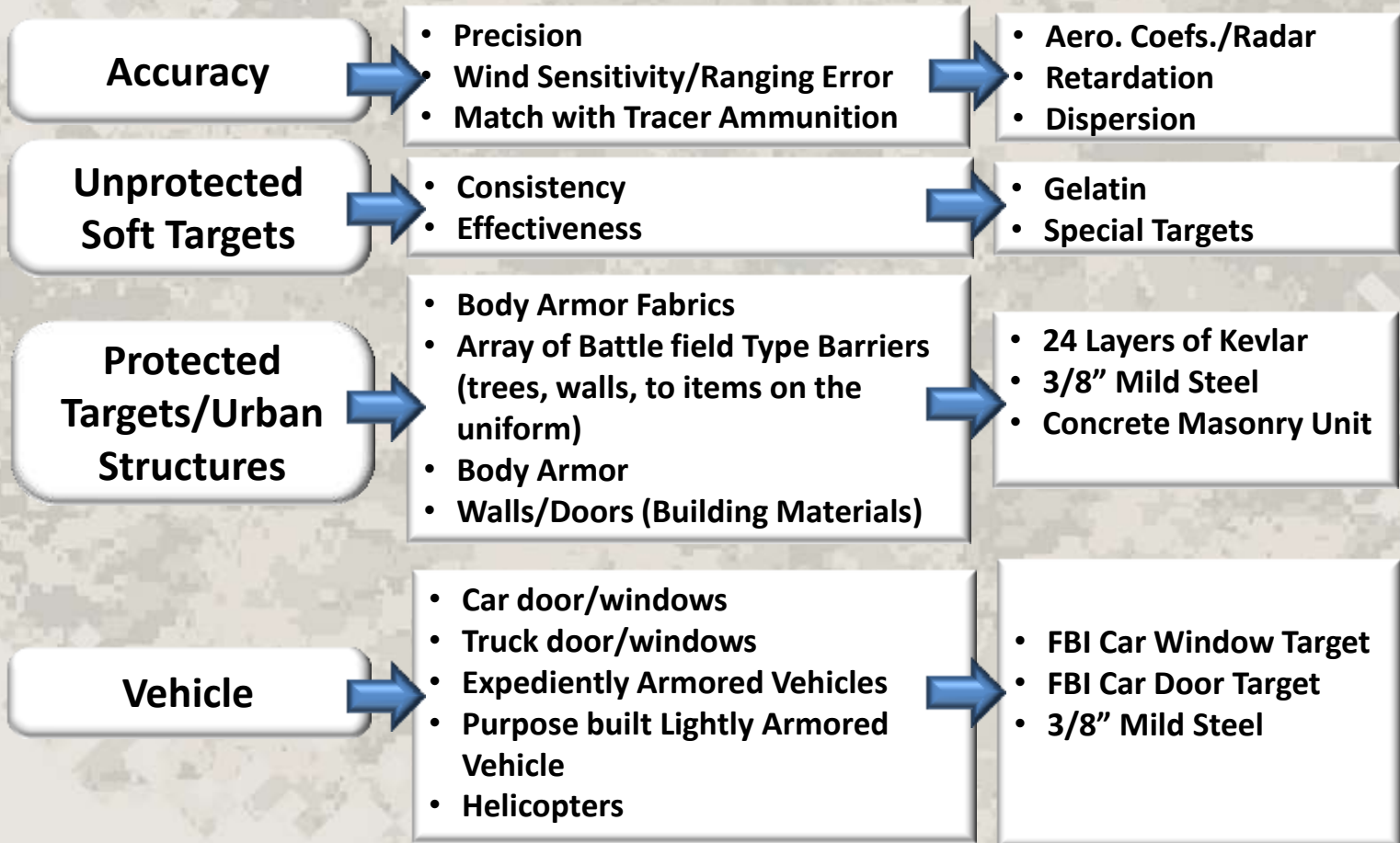
- Numerous documented accounts of enemy personnel being hit as many as 15 times before succumbing to their wounds, drove the Army to take action to address small caliber terminal performance failures
- Ballistic evidence proving M855 to be a truly “Yaw Dependent” round, formed the requirement to develop a more consistently performing small caliber bullet...



Army Requirements for General Purpose Ammunition

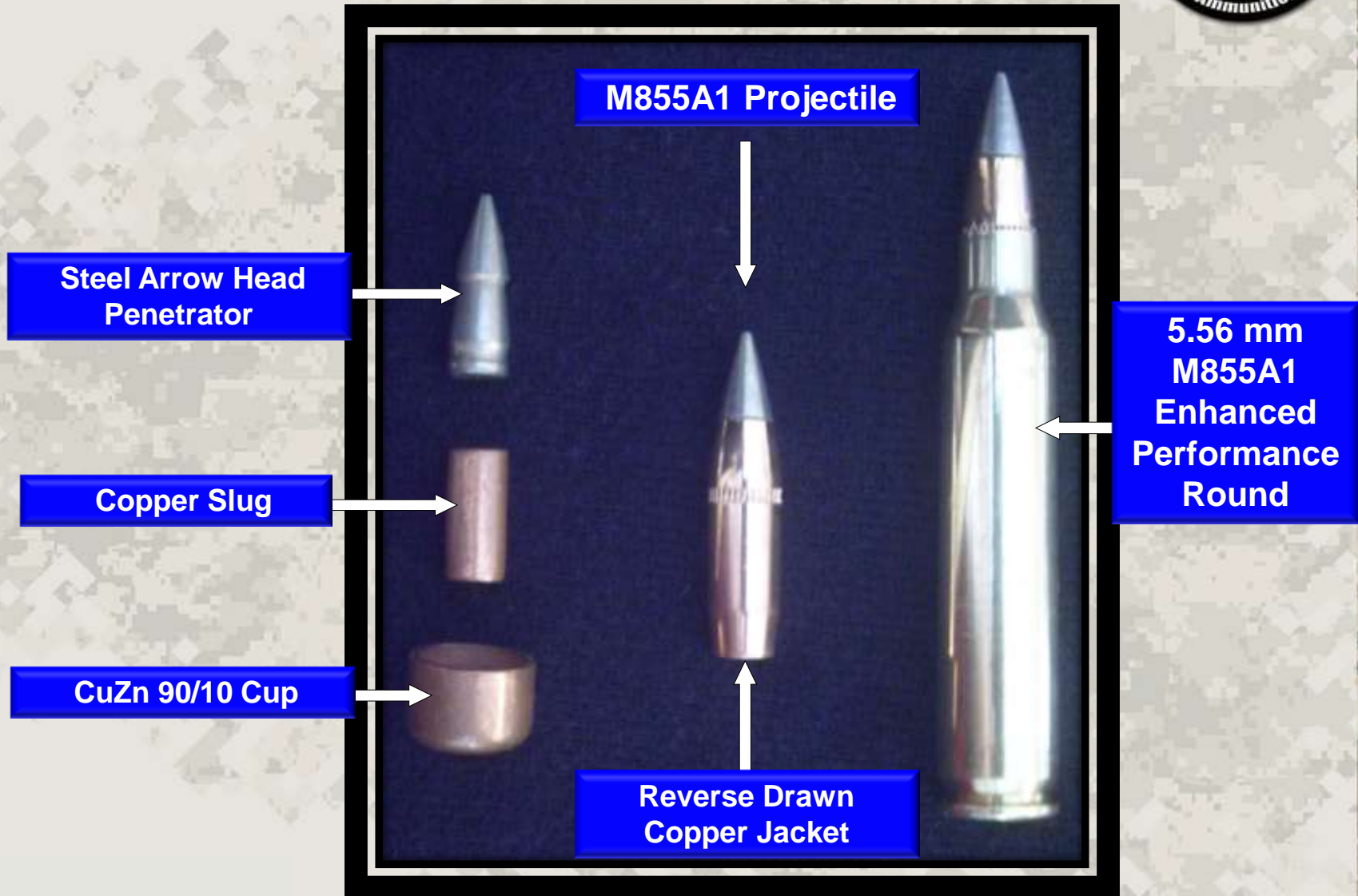


Performance Measures



Must be Able to Engage a Wide Array of Targets

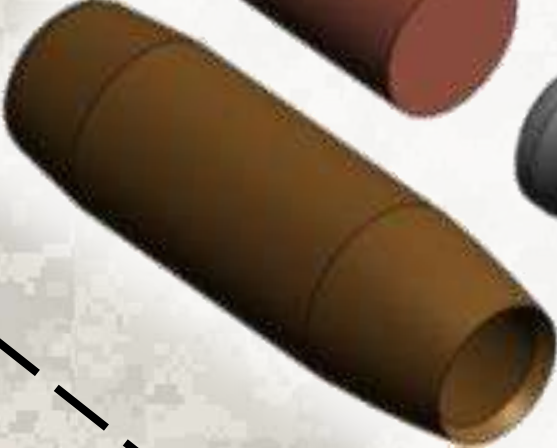
Your NEW 5.56mm *Enhanced Performance Round*



M855/ M855A1 EPR



M855



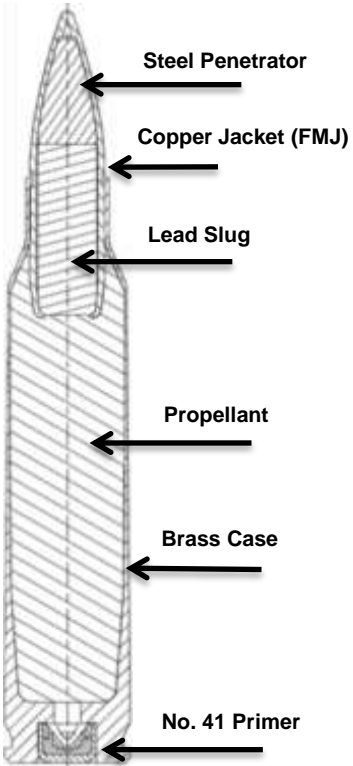
M855A1 EPR



Comparison of Changes

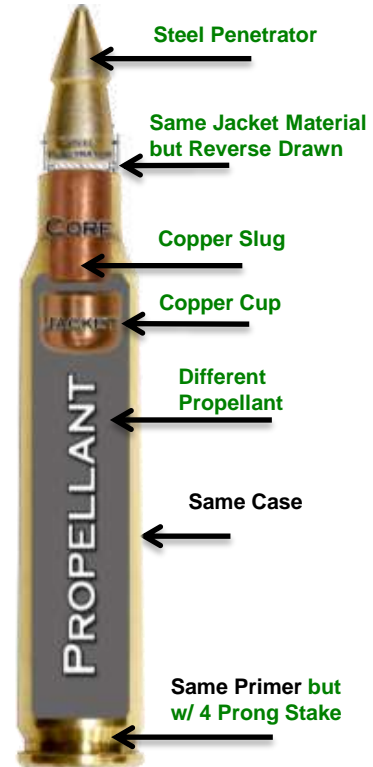
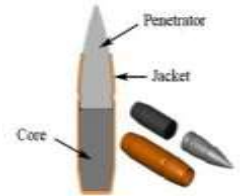


M855



Characteristic	M855	EPR
Cartridge Length	2.248 in	No Change
Bullet Weight & Length	62 gr, 1 in	62 gr, .995 in
Tip ID	Green	Bronze/Tan from Corrosion Protection
Slug	32 gr, Lead	24.3 gr, Copper
Cup/Jacket	CuZn 90/10 Full Metal Jacket	CuZn 90/10 Reverse Drawn
Penetrator	10 gr, Steel Contained within FMJ	19 gr, Exposed Steel Arrow Head
Corrosion Resistance	None	Yes
Propellant	WC-844	SMP-842
Flash Suppressant	No	Yes
De-Coppering Agent	No	Yes
Velocity (@78')	3,113 fps	Increased
Chamber Pressure	58,700 psi	Increased
Penetration	3/8" Mild Steel @ 160m	3/8" Mild Steel @ 350m
Soft Target	Not Specified	Improved Consistency and Range

M855A1

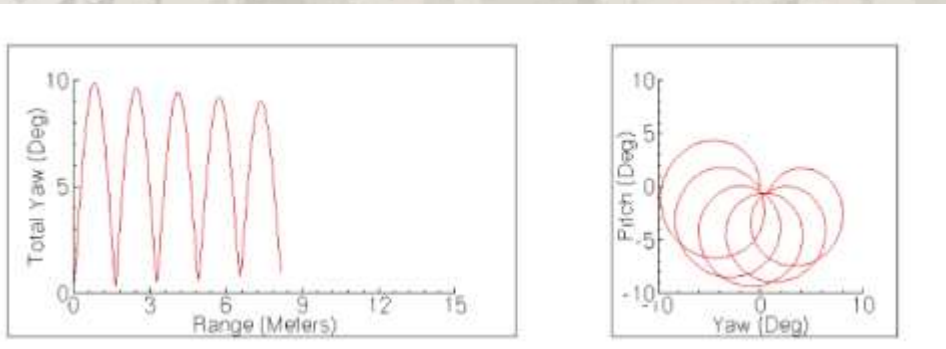


Improved Consistent Effects



The M855A1 does NOT rely on yaw for its effects...

- Unlike M855, the M855A1 is **NOT** yaw dependent
- Regardless of angle of yaw or pitch, the M855A1 provides the same **consistent performance** against soft targets
- This **performance remains consistent** for the Soldier, whether firing in close quarters or long range engagements
- The M855A1 greatly **increases the maximum range** at which a Soldier armed with the M4 or M16 can generate these consistent effects
- Army Research Lab live fire test results against soft targets showed that on average, the **EPR surpassed the 7.62mm ball round**



Yaw and pitch change with range, often providing inconsistent effects for previous ammunition

M855A1 Provides Consistent Performance, each and Every Time!



Comparison of M855A1 and M855



		M855A1	M855
Soft Target	Consistent Effects	G	R
Barriers	Car Window	G	G
	Car Door	G	G
	3/8" Steel	G	Y
	Concrete Masonry Unit	Y	R
	Soft Body Armor (24 layer Kevlar)	G	G
Accuracy	Wind Drift	G	G
	Ranging Error	G	G
	MOA	G	Y
	Dispersion	G	G
	Trajectory Match with M856 (Trace)	G	G
Propellant	Velocity	G	Y
	Temperature Coefficient	Y	Y
	Flash Suppression	G	R

The M855 remains a VERY capable, all purpose round!

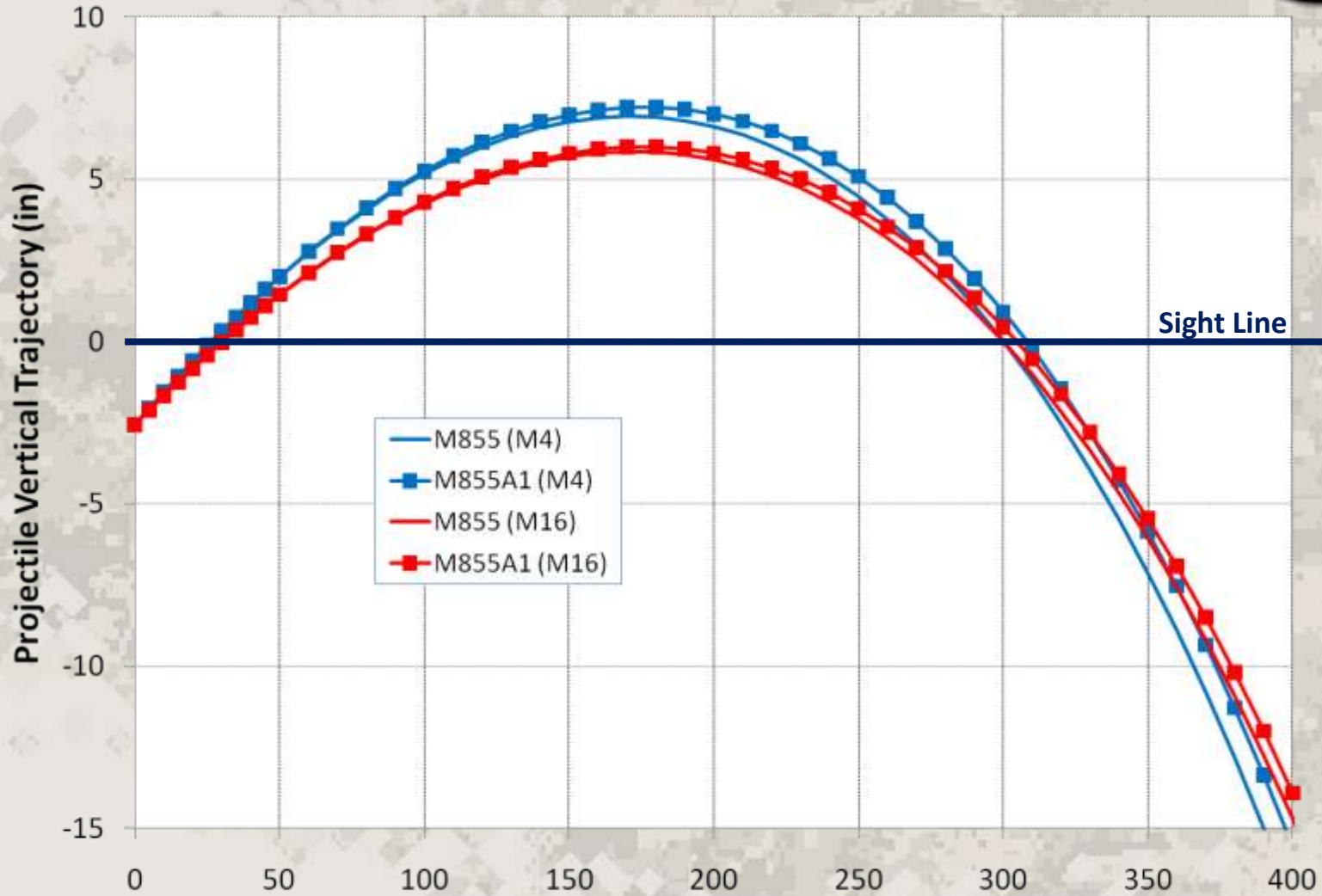


M855A1 Enhanced Performance Round

Chart colors are for comparison only, both rounds meet their respective requirements.



M855 and M855A1 Trajectories



Trajectory Match to the M855



M855A1 EPR

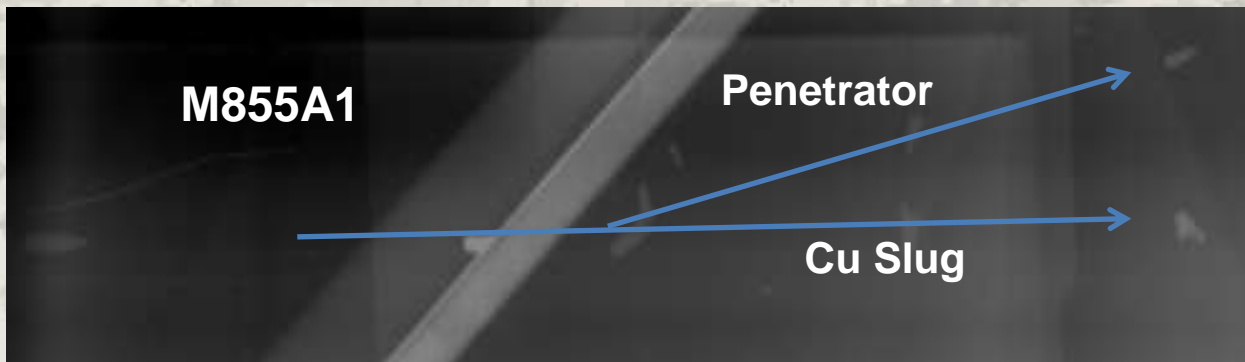
Intermediate Barrier Performance Car Door



Provides Desired Effects Against Targets Behind Intermediate Barriers



Windshield



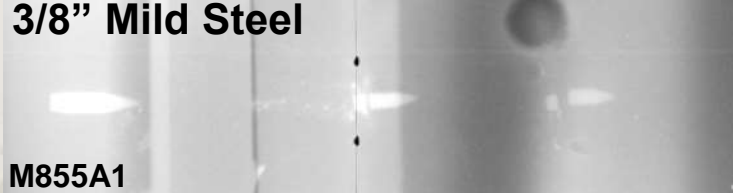
M855A1 Hits the Target Behind Barriers with the Penetrator and/or Slug, increasing the probability of a hit



M855A1 Penetration



3/8" Mild Steel



M855A1

Shot with the M4 @ 385m



M80, 7.62mm
can't penetrate
at these ranges

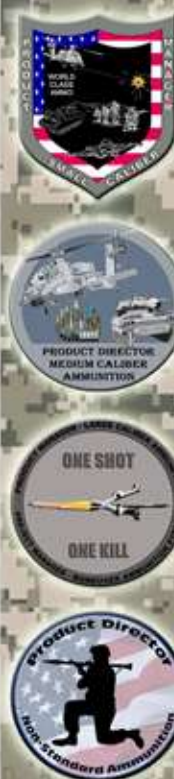
Kevlar Fabric



M855A1

M855A1 was tested out to
1000m and was never stopped.

**M855A1 WILL Penetrate Some Types of Body Armor Designed to Stop
7.62mm Ball**



M855A1 EPR Hard Target Performance



Results are for M4

Battle Barrier Surrogate (3/8" steel)

M855
M855A1



Concrete Masonry Unit

M855
M855A1



(meters) 0

150

300

450

600

Results are for M16

Battle Barrier Surrogate (3/8" steel)

M855
M855A1



Concrete Masonry Unit

M855
M855A1



(meters) 0

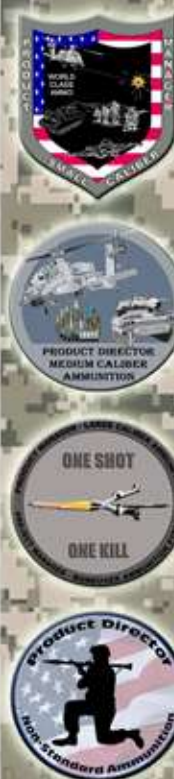
150

300

450

600

M855A1 Significantly Improves Hard Target Performance



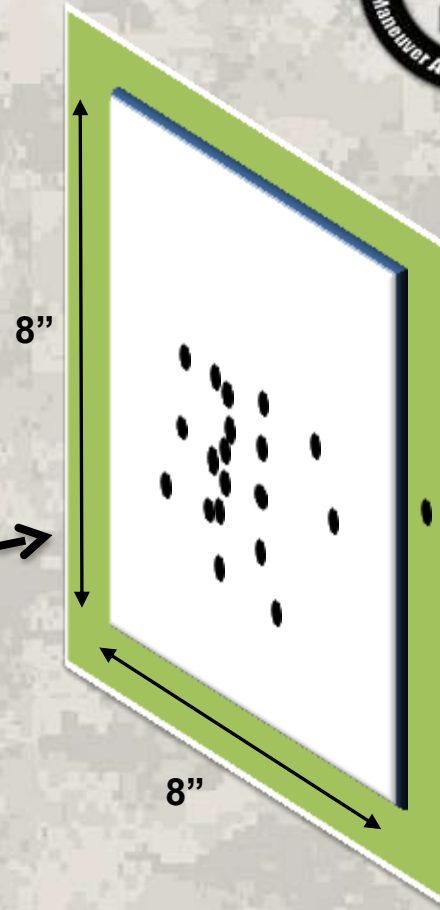
M855A1 EPR Accuracy



Accuracy testing shows that on average, 95% of rounds will hit within an eight by eight inch target at a range of 600 yards

* Accuracy Barrels

600
Yards



While ammunition accuracy is important, Nothing replaces good marksmanship training.

Shot Placement is still the most important factor!



M855A1 Enhanced Performance Round



■ Important Information for Unit Leadership and Soldiers

- Provides Dependable, Consistent effects against soft targets and CQB performance (NO MORE “Thru and Thrus”)
- Significant performance improvements in 5.56mm
 - Soft target performance superior to 7.62mm ball
 - Hard target (steel) performance far better than 7.62mm ball
 - Match-Like accuracy- Extremely accurate
 - Significantly improves performance at extended ranges
 - No weight increase, flash reduced, increased velocity
- Priority of issue: Directly to combat units
- M855A1 is a “Drop-In” solution
- Minimal Training Transfer Difference
- A noticeable gap below the penetrator or “spinning” tips are normal, and do not impede performance in any way...




Rifle Combat Optic (RCO) Adjustments



- Soldiers using the M150 Rifle Combat Optic to engage targets **BEYOND 400 METERS** must apply a correction factor to the optic reticle Bullet Drop Compensator when firing M855A1.
- Soldiers engaging targets while using the Bullet Drop Compensator Values on the left, should correct to the Adjusted Values on the right when using M855A1 EPR.

BULLET DROP COMPENSATOR VALUE	ADJUSTED M855A1 VALUE
500 METERS	490
600 METERS	612
700 METERS	735
800 METERS	888



7.62 EPR M80A1



M80A1 Program Objective:

- Produce an environmentally friendly and cost effective projectile that maintains current M80 performance in a consistent manner
- M80 currently constitutes LCAAP's 2nd largest demand for lead

Status:

- 18 concepts prototyped and tested
- Bullet Concepts Type and Major Configuration Selected:
- 130 gr. Exposed Steel Penetrator/Reverse Drawn Jacket, Copper Core
- Similar Style as M855A1
- Concept design utilizes LCAAP Infrastructure, i.e. BAMS
- Engineering Continues to Identify Optimum Manufacturing Strategy

Continuing to Provide Improved Capabilities for our Warfighters



Take-A-Ways

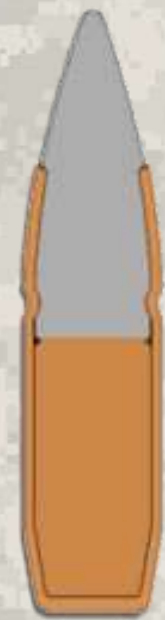
M855A1 Enhanced Performance Round (EPR)

- Represents a significant performance improvement in a 5.56mm bullet
 - Hard target performance (steel) far better than 7.62mm ball
 - Surpassed 7.62mm ball against soft targets
- A true general purpose round optimized to a wide array of targets
- Significantly improved hard target performance at longer distances
- Provides consistent performance against soft targets (Yaw sensitivity)
- Significantly increases range of consistent effects against soft targets
- Lead free projectile
- Planned to replace M855 for the Army
- **Fielding began in summer 2010**





Questions?



5.56mm, M862 (SRTA) Short Range Training Ammunition



From: xxxxxxxxxxxxxxxxxxxxxx
Sent: Friday, August 09, 2013 12:46 AM Coordinated Universal Time
To: USARMY PICA PEO Ammo List MAS WebPoc
Subject: Inquiry from the PM MAS web site

PM MAS/Email

*** This email was generated by the PM MAS web site
(<http://peoammo.army.mil/mas>) ***

To: MAS, usarmy.pica.peo-ammo.list.mas-webpoc@mail.mil
From: xxxxxxxxxxxxxxxxxxxxxx

*I am a rifle Company XO at Fort Bragg. Recently our S3 shop tried to give one of our sister companies SRTA DODIC AA68 for force on force training. One of the NCOs caught the mistake and test fired the round to demonstrate that it was unsafe. **Our S3 shop is still convinced that AA68 is safe to shoot each other with as long as we are wearing PPE. Is this true?** I have yet to be able to find where it says that I can use this. I am accustomed to using AB09 but never AA68 in this capacity...*





5.56mm, M862 (SRTA) AA68 Short Range Training Ammunition



SYSTEM DESCRIPTION: The 5.56mm SRTA provides a realistic restricted range training alternative to M193/M855 service rounds. The 5.56mm SRTA has a maximum range of 250 meters; an effective range of 25 meters (trajectory match and round to round dispersion comparable to the service ammunition) and provides a functional capability when used in the M16 Rifles and M4 Carbines with the M2 Training Bolt. Units are now able to train at nearby locations, accruing savings in terms of fuel, troop support, and billeting while increasing the opportunity to train effectively.



5.56MM SHORT RANGE TRAINING SYSTEM



SYSTEM CHARACTERISTICS:

- Accuracy: Ave. Mean radius 0.34" @ 25m
- **Muzzle Velocity: 4,525 fps; 15 ft. from muzzle**
- Height: 2.03"
- Weight: 108 Grains
- **Hard Plastic Projectile**



Close Combat Mission Capability Kit (CCMCK)



The CCMCK provides Soldiers the ability to fire 5.56mm (linked/unlinked) and 9mm Man-Marking ammunition in their assigned weapons. The less-than-lethal projectiles have a effective range of about 30 meters.



CCMCK Characteristics

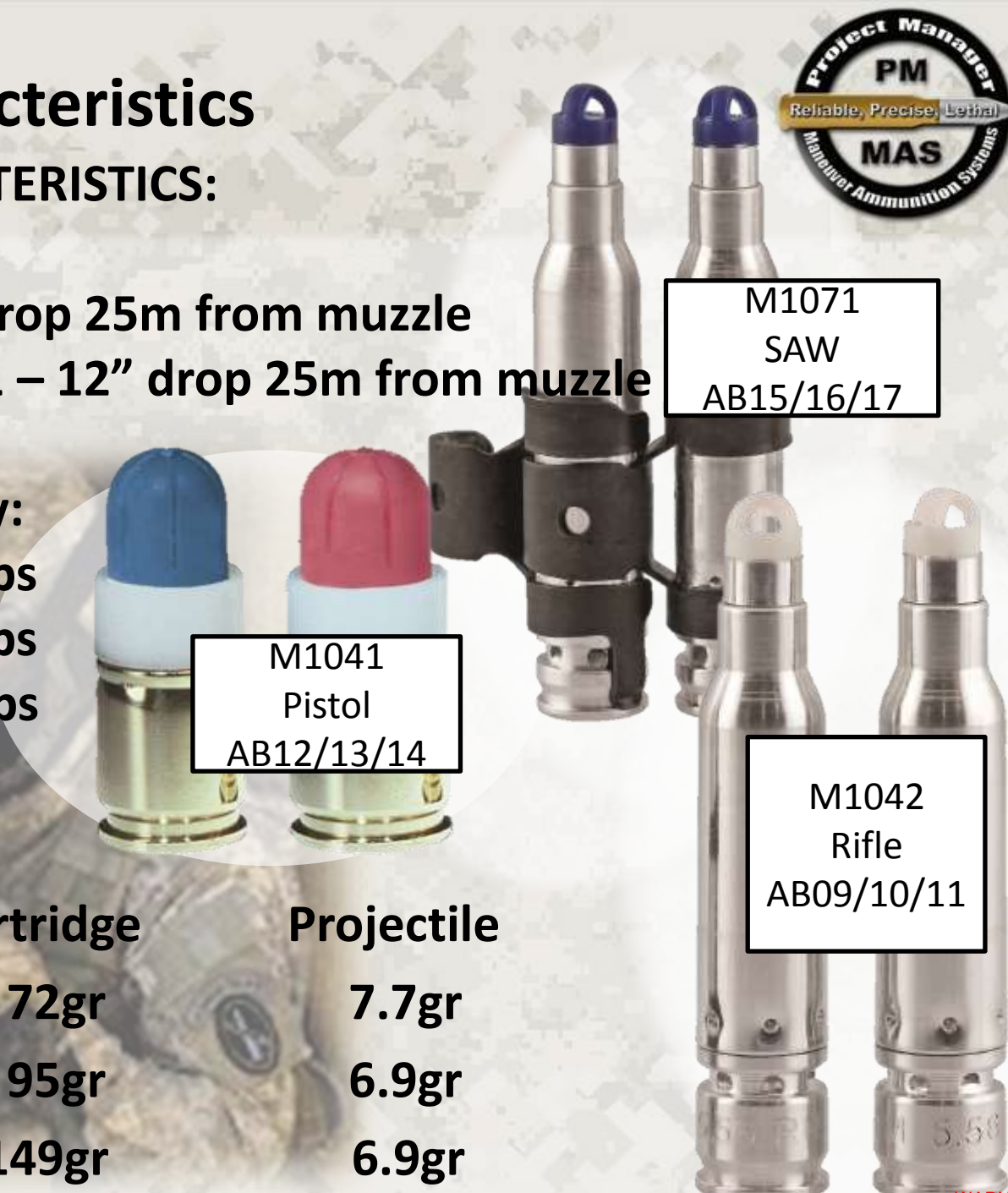
SYSTEM CHARACTERISTICS:

- Accuracy:
 M1041 – 12” drop 25m from muzzle
 M1042/M1071 – 12” drop 25m from muzzle

- Muzzle Velocity:
 M1041 – 575 fps
 M1042 – 450 fps
 M1071 - 440 fps

- Weight:

	Cartridge	Projectile
M1041	72gr	7.7gr
M1042	95gr	6.9gr
M1071	149gr	6.9gr



Close Combat Mission Capability Kit (M4/M16/M249/M9/M11)



Conversion Kits



M4/M16



M249



M9/M11



Grenade, Rifle Entry Munition, **M100**

DODIC: GG12



PRIME CONTRACTOR:

Rafael Manor Div. Haifa, Israel

SYSTEM DESCRIPTION: Grenade Rifle Entry Munition (GREM) is a lightweight, muzzle launched breaching munition fired from M16 series Rifles or M4 series Carbines using standard M855 or M856 ammunition. It is fired at a distance of 15 to 40 meters, arming at approximately 15 meters, to breach locked doors or windows with minimal hazard to operator. Length is approx. 30" with dia. of about 4", overall weight is slightly more than one pound and is propelled by service ammo. Overpressure of explosion will cause breaching of either a wood or metal skin exterior doors. Grenade Rifle Entry Munition provides friendly forces the necessary capability to gain access into sealed buildings during urban operations from a safe distance, without risk to enemy fire.

SYSTEM CHARACTERISTICS:

- Rifle Grenade Fired From M16 Rifle or M4 Carbine
- Breaches Wood or Metal Skin Exterior Doors
- 15-40m Range Allows Breaching of Exterior Doors Without Risk to Operator

CAPABILITIES:

- Defeats Exterior Doors and Windows at a Distance of 15-40 Meters

SPECIAL FEATURES:

- 120 Gram PBXN-109 Charged Warhead
- Bullet Trap
- 95% Probability of Breaching Doors With two Rounds



CAUTION: The 1.5 lb Tactical Recoil Pad must be installed on the M4 carbine
IOT fire the M100 GREM Round.



Grenade, Rifle Entry Munition

Target Practice (TP), M101

DODIC: GG11



PRIME CONTRACTOR:

Rafael Manor Div., Haifa, Israel

SYSTEM DESCRIPTION: Grenade Rifle Entry Munitions, Target Practice is a lightweight muzzle launched training round fired from M16 Rifle or M4 Carbine using M195 Grenade Ctg. It is fired at a distance of 15-40 meters, arming at approx 15 meters, to fire at locked doors. Round consists of two components: Inert Grenade body (no HE) and standoff rod. Overall length is approx 30" with diameter of about 4" Overall weight is slightly more than one pound. When assembled the round slides over barrel of rifle and is propelled by M195 Grenade Ctg

SYSTEM CHARACTERISTICS:

- GREM Target Practice Round Fired From M16 Rifle or M4 Carbine Using M195 Ctg.
- Provides Operator Proper Training on how to aim and Fire M100 GREM Round

CAPABILITIES:

Round has Same Projectile Characteristics and Provide Operator Real Training on Aiming and Hitting Door Target. Round is Reusable Minimum of 5 Times

SPECIAL FEATURES:

- Target Practice Round has Same Physical Characteristics as M100 Live Round and is Inert and Safe to Operate for Training
- Uses M195 Grenade Ctg. To be Supplied With M101
- Round is Provided With 5 Spare Stand-off Rods and can be Reused a Minimum of 5 Times

CAUTION: A 5.2 LB Training Recoil Pad SC-26, **MUST** be installed on the M4 Carbine IOT fire the M101 GREM-TP Round

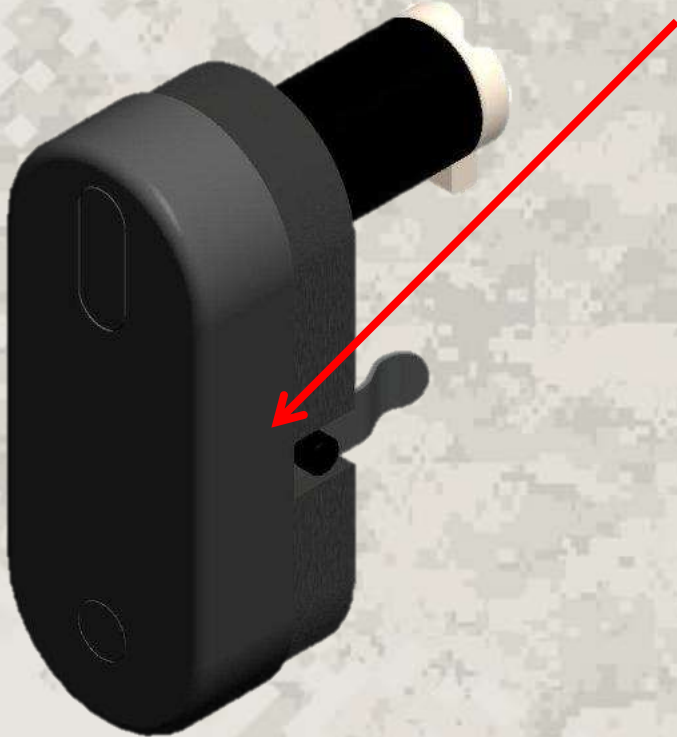


GREM Recoil Pads

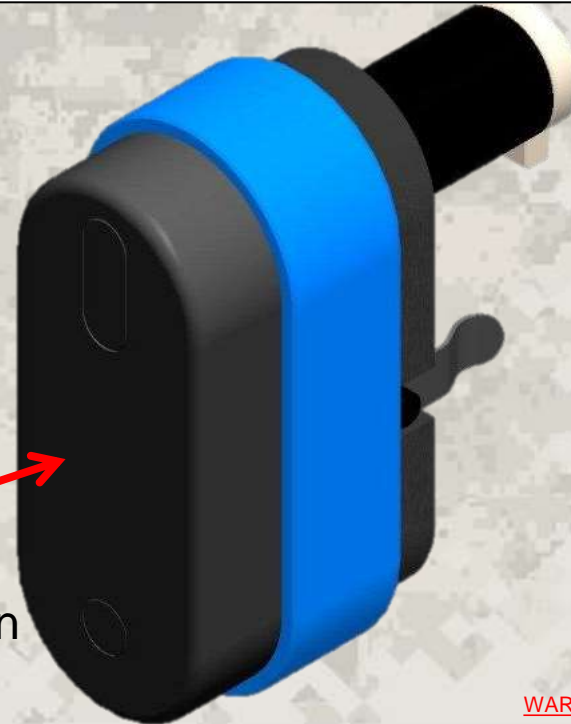


**Recoil Firing Pad for the
GREM M100**

The 1.5 lb. Tactical Recoil Pad must be installed on the M4 carbine IOT fire the M100 GREM Round



**Recoil Firing Pad (SC-26)
for the GREM-TP
M101**



The 5.2 lb. Training Recoil Pad must be installed on the M4 carbine IOT fire the M101 GREM Round



DDI- IPT Results

Consistent color coding for SAA DDI (Silver)

- 9mm, 5.56mm, 7.62mm, and .50 Cal DDI Ammunition
- Nickel plate existing fluted DDI
- Flute existing 50 Cal DDI
- *9mm will not be fluted, cartridge case too short
- Nickel plating (Silver color) much different look from live ammunition
- Exchange old DDI for new DDI at turn-in
- Add new section to MILL STD 709C for Small Caliber
- Create poster boards on color coding
- Create GTA handbook for SAA
- Create GTA for new DDI



Drilled Dummy Inert (DDI) Ammo

TCM-ABCT Recommendations



- Units should conduct inventories to identify available and serviceable training dummy rounds in all Rifle/Armor companies and Scout platoons
- Units need to order quantities necessary to support unit GST and Gunnery Table (GTI) requirements outlined in TC 3-20.21.1
- BSTB Ammunition Managers can order DDI through the BCT Ammo Tech and TAAMIS to support the TADSS requirements outlined for training in APP. B, DA PAM 350-38.

The POC for DDI is MAJ Lovelady debbie.c.lovelady2.mil@mail.mil



40mm LV Ammunition Improvements



- **Cartridge requirements will capture existing capabilities and allow for product improvement:**
 - M433 HEDP
 - Improved lethality
 - Illumination and smoke
 - Currently there are no planned improvements
 - Longer burn times may be desired

- **Ammunition improvements will include a wide range of capabilities:**
 - **Increased Range Anti-personnel**
 - Increased lethality
 - Increased engagement ranges
 - Improved accuracy
 - Counter defilade
 - **Door Breaching**
 - Gain access to an existing entry point
 - Limit collateral damage and unintended injuries to personnel



40mm LV Ammunition Improvements (Cont.)



- **Short-Range Anti-Personnel**
 - Urban/Restrictive Terrain
 - Close Quarter Combat
- **Extended Range**
 - Terminal Guided/Precision delivery
 - Larger warhead/mission package
- **Marking and Tagging**
 - Tracking vehicles/personnel
 - Enabling air strikes
- **Information Collection**
 - Intelligence gathering
 - Improved real-time SA



M320 GL



Note: Some improved performance and increased capabilities may only be achieved with longer cartridges used in the M320 GL.

40mm Training Cartridges



- Both the 40mm Training Cartridge HV and LV have been approved by HQDA, Dec 2011

– *New Training Cartridges will replace:*

- M781 (M203 and M320 GLs)



M781

- M918 and the M918/M385A1 Mixed Belt (Mk-19 GMG)



M918



M385A1

- PM-MAS will begin the Engineering and Development Phase

- Fielding dates TBD



40mm Training Cartridge Capabilities



- **The key capabilities of the new training cartridges are:**
 - **Non Dud Producing.**
 - **The cartridge projectile must not contain any materials which would result in an UXO hazard and require EOD to render safe or disposal procedures.**
 - **This capability allows greater mobility (fire and maneuver) within the target area for Soldiers and platforms.**
 - **Impact Signature.**
 - **The cartridge must provide an impact signature that is visible during the day and at night with the unaided eye and while using current night vision devices (NVDs).**
 - **This capability allows Soldiers to train while using their assigned night vision devices in both day and night situations.**





Warfighter Ammunition Information Program

- Provides Ammunition Capabilities Information Briefings and Support to the Warfighter, Units, and Leadership at **NO COST** to the unit
- Subjects Include Direct Fire Lethality, Small, Medium Caliber/Cannon, and Large Caliber Ammunition
- POC - Mr. Kevin P. O'Connor, WAIP Team Leader
PM-Maneuver Ammunition Systems
Contractor/ SAIC
Mobil: 706- 593- 4575
kevin.p.o'connor@saic.com or kevin.p.oconnor@us.army.mil

- The unit is only responsible for classroom coordination, a projector, and most importantly the audience...



For Additional Information:

PM-MAS Contacts

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Project Manager- Maneuver Ammunition Systems

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LTC Philip Clark

Product Manager- Small Caliber Ammunition

973-724-1521/ DSN 880-1521

Mr. Chris Seacord

Product Manager- Medium Caliber/Cannon

Ammunition

973-724-2090/DSN 880- 2090

<http://peoammo.army.mil/mas>

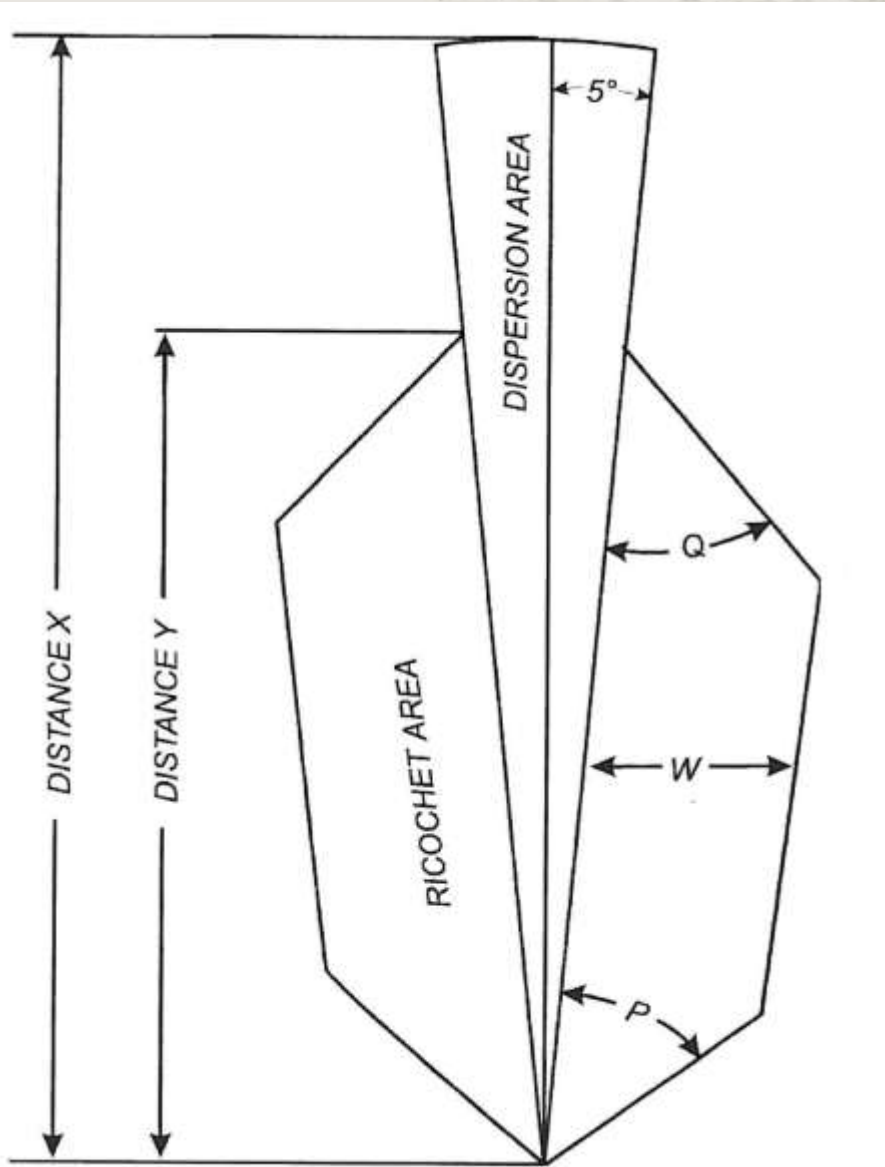




BACK-UP



M855A1 Surface Danger Zone



M855A1 SDZ is larger than the existing M855:

- M855A1 has higher velocity and BC IOT achieve optimal terminal performance (better than 7.62mm).
- M855A1 Distance X is 3,521 (84 meter difference).

Note: Drawing not to scale



5.56mm M855A1 LFS

SDZ Parameters



Altitude (ft)	Impact media	Distance X ¹ (m)	Distance Y (m)	Ricochet Angle P ² (deg)	Ricochet Angle Q (deg)	Area W ³ (m)	Maximum Ricochet Vertical Hazard (m)	Maximum Ordinate ⁴ (m)
0	Armor Plate	3521	3050	45	14	360	272	1040
	Earth	3521	3100	60	15	400	295	1040
1000	Armor Plate	3630	3150	45	14	370	280	1066
	Earth	3630	3200	60	15	420	305	1066
2000	Armor Plate	3743	3250	45	14	390	288	1093
	Earth	3743	3300	60	15	430	314	1093
3000	Armor Plate	3859	3350	45	14	400	297	1120
	Earth	3859	3400	60	15	440	324	1120
4000	Armor Plate	3980	3450	45	14	420	306	1149
	Earth	3980	3500	60	15	450	334	1149
5000	Armor Plate	4105	3550	45	14	430	315	1178
	Earth	4105	3600	60	15	460	344	1178
6000	Armor Plate	4234	3650	45	14	440	324	1208
	Earth	4234	3700	60	15	470	354	1208
7000	Armor Plate	4369	3750	45	14	450	333	1239
	Earth	4369	3800	60	15	490	365	1239

