



2017 NDIA Armament Systems Forum Firing Demonstrations (Session III)

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Agenda



- **Small Caliber Portfolio**
- **7.62mm RDT&E Overview**
 - XM1161 7.62mm One Way Luminescence (OWL)
 - XM1165 Reduced Range Ammunition (RRA)
 - Lightweight (LSCA)
- **.50 Cal All-Purpose Tactical Cartridge (APTC) & RRA Overview**
- **Green Primer Overview**



Small Caliber Ammunition Family



5.56mm

- M199A1 DDI
- M1037 SRТА
- M862 SRТА
- M200 Blank
- M193 Ball
- M855 Ball
- M856A1 Trace
- M995 AP
- M855A1 EPR



9mm

- M882 Ball
- MK243 JHP
- M917 DDI



7.62mm

- M63A1 DDI
- M973 SRТА
- M974 SRТА
- M993 AP
- M62 Trace
- M62A1 Trace
- M80 Ball
- M80A1 EPR
- M82 Blank
- M276 Dim Trace
- M118 Ball
- MK248 Mod 0
- LSCA
- RRA



M249



M2 Browning



M240



Shotshells

- .22 Long Rifle
- 12 Gauge Buckshot
- M1030 Breach



CCMCK

- M1041
- M1071
- M1042



.50 Cal.

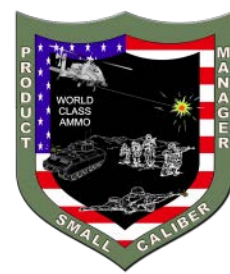
- M1A1 Blank
- M33 Ball
- M17 Trace
- M20 API-T
- M8 API
- M211 API
- MK257 API-DT
- M263 AP
- M962 SLAP-T
- M903 SLAP
- M860 Tracer
- M858 Ball
- M2A1 DDI

RELIABLE - PRECISE - LETHAL

DISTRIBUTION STATEMENT A:
Approved for Public Release; Distribution is unlimited



7.62mm Lightweight Small Caliber Ammunition (LSCA)



Description:

- 7.62mm Lightweight Small Caliber Ammunition (LSCA) is project to replace brass in conventional ammunition cases with the main goal of reducing Soldier and weapon platform load to improve mobility

Top Level Strategy:

- Three phase contract execution to identify Technology, design maturity and downselect in preparation for VT&PVT
- Small Caliber producers will assist Case supplier to design in preparation for scale up Manufacturing and reduced risk through FY18 to down-select to one concept
- Phase II Contract award (Type and vehicle TBD) in 4QFY17

Recent Milestones & Events:

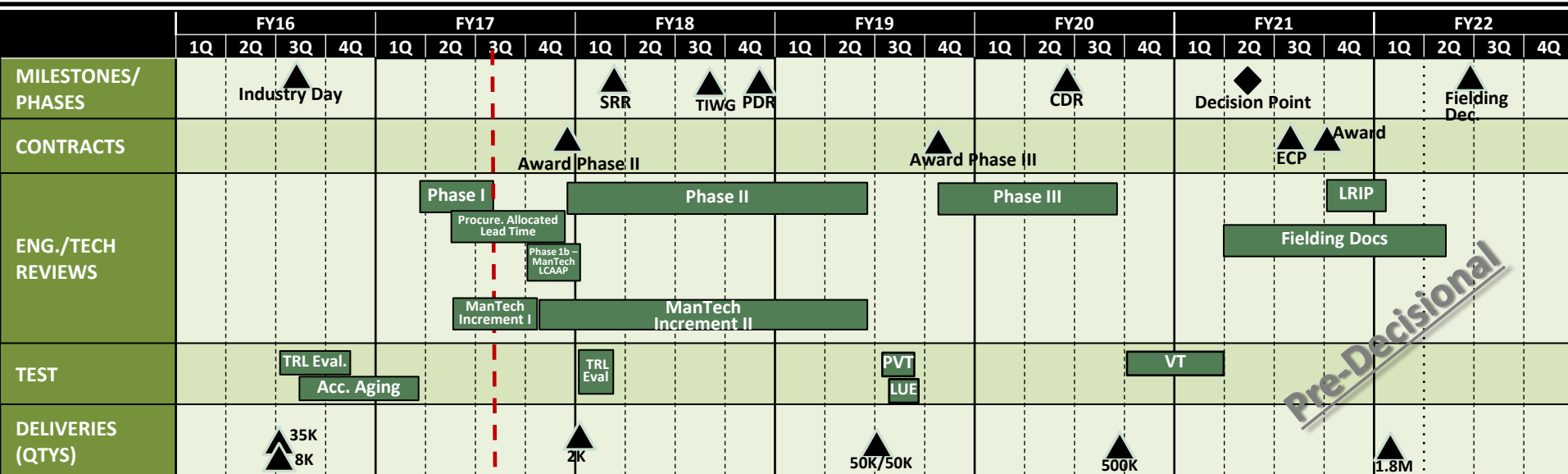
- Prototype Technology Readiness Assessment (TRA) completed at ATC (4QFY16)
- Material Analysis of M80 Polymer Cartridge Case (4QFY16)
- Conducted Phase I Industrial Impact Study final briefing (3QFY17)

Future Milestones & Events:

- Conduct Joint Lightweight IPT Review (3QFY17)
- Conduct CRADA TRA testing at ATC (4QFY17)
- Award Phase II contract (4QFY17)

Risk Areas:

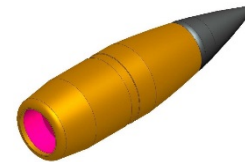
- Temperature Sensitivity (Technical)
- Weapon/Ammo Interface (Technical)
- Proprietary Design and Manufacturing Process (Cost)
- Technology maturity & transition to LCAAP (Schedule)



Pre-Decisional

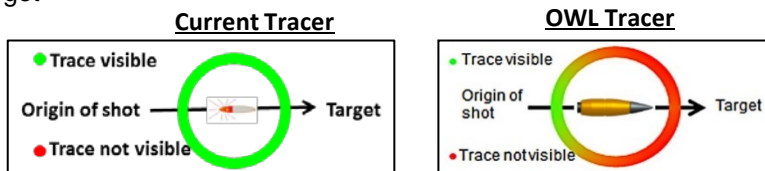


XM1161 7.62mm One Way Luminescence (OWL)



Description:

- Replaces current tracer with OWL that reduces signature to enemy preventing localization of shooter
- Incorporated into EPR base projectile to increase tracer round effects on target



Top Level Strategy:

- DOTC and ARDEC prototype development through TRL 6 Assessment
- ARDEC tech maturation and risk reduction through FY18 to design down-select to one OWL design
- Contract award (type and vehicle TBD) in 2QFY19 for EMD

Recent Milestones & Events

- 1QFY17 MDA Delegation approved
- 2QFY17 MDD

Future Milestones & Events

- 4QFY17 TRL 6 Assessment
- 1QFY19 PDR and Down-Select
- 1QFY19 MS B
- 2QFY19 EMD Contract Award

Risk Areas

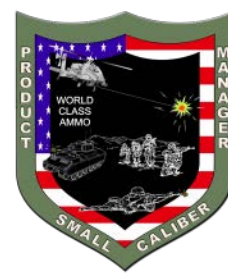
- Meeting maturity for TRL 6 (visibility angle and distance) (Performance)
- Manufacturing design of tracer cavity in M80A1 projectile to minimize ballistic performance deviation from ball round
- (Cost/Technical) Manufacturing process to reduce cost and eliminate steps in tracer cartridge production
- (Technical) Maintaining tracer performance and consistency during manufacturing scale up

	FY17				FY18				FY19				FY20				FY21				FY22				FY23						
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q			
MILESTONES/ PHASES	▲ MDD								▲ MSB											▲ MSC / TCLP				▲ TC-STD / FMR							
CONTRACTS							▲ Draft RFP		▲ RFP	▲ Award				EMD (KTR Facilitization, Machine Prove-out)								▲ LRIP Option						▲ FRP Option			
ENGINEERING/ TECHNICAL REVIEWS	Govt / Ind Concept Development			TMRR (ARDEC Dev of 3 OWL Technologies)				▲ Design Down select							▲ CDR																
TEST	DT			ARDEC Testing				▲ DVT					PPQT UA				PQT LFTE														
DELIVERIES (QTYS)							▲ 12K per Concept					▲ 100K							▲ 500K												

Pre-Decisional



7.62mm, XM1164 Reduced Range Ammunition (RRA)



Description:

- Develop and Type Classify advanced ball and tracer training ammunition that more accurately matches trajectory of 7.62mm service ammunition (M80A1)

Top Level Strategy:

- Develop reduced range ammunition that meets Users training requirements
- USG developed prototypes, working with industry on manufacturing requirements
- Full and open single contractor award for EMD in FY19 following successful PDR
- Initial Operating Capability – 1QFY23 FMR

Recent Milestones & Events

- RRA Feasibility Study (FY15)
- TRA4 (1QFY17)

Future Milestones & Events

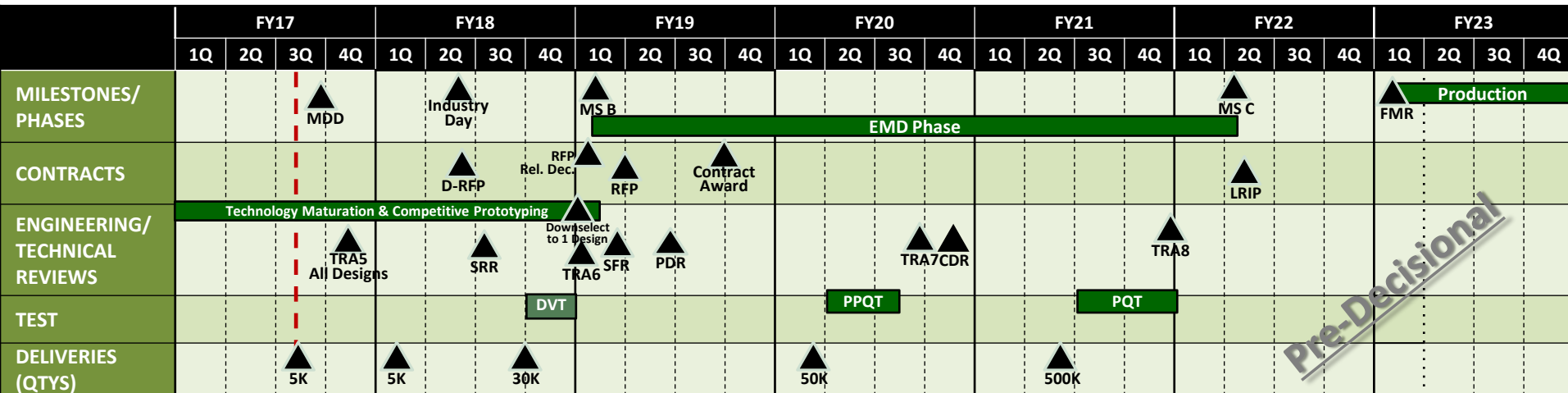
- MDD (2QFY17)
- TRA5 (4QFY17)
- MS B (1QFY19)



Prototype Concept

Risk Areas

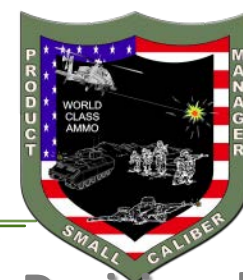
- Technology Maturity in S&T (Schedule)
- Max range (Performance)
- Trajectory Match to combat round (Performance)
- Affordability (Cost)



Pre-Decisional



.50 Caliber RDTE Schedule Overview



Pre-Decisional

	2017		2018				2019				2020				2021				2022				2023				
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
.50 CAL RRA						◆																					
.50 CAL APTC									◆																		



Increase Lethality / Lighten Warfighter Load / Enhance Warfighter Survivability

All Purpose Tactical Cartridge (APTC)

- KSA 1 Lethality – APTC: Classified Annex
- KSA 3. Accuracy .50 Cal APTC: .50 caliber APTC must be accurate enough to hit an area target in a 5-7 round burst at 1500m with probability of hit (P/h) of 50% (T) or 2400m with a probability of hit (P/h) of 50% (O)
- Includes OWL & LSCA

ARDEC Concept at TRL3

Improve Warfighter Training

Reduced Range Training Ammo

- KSA 1 Effects-RRA: Maximum range of RRA should not exceed 3,600m (T) or 2,400m (O)
- KSA 3. Accuracy-RRA: RRA must be accurate enough to hit single “E Type” silhouettes representing area target at 900m with 50% probability of hit (T) or at 1500m with 50% probability(O)
- Includes OWL & LSCA

Industry Concept at TRL9; USMC effort to improve performance that will meet or exceed ARMY Threshold requirements



- ◆ MDD
- ◆ PDR
- ◆ MS-B
- ◆ CDR
- ◆ MS-C



Small Caliber Ammunition Green Primer Path Forward



	2016				2017				2018				2019				2020				2021				2022			
	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q		
MIC Green Primer																												
7.62mm RRA																												
5.56mm M862 SRTA																												
5.56mm / 9mm CCMCK																												
5.56mm M1037 SRTA																												



M1037 Short Range Training Ammunition (SRTA)

- Evaluated 5.56mm SRTA cartridges with green primers
- Selected and qualifying green 5.56mm SRTA M1037 cartridge – Ongoing DVT and EMQB
- Benefits soldiers' safety and is environmentally friendly



M1042/M1071/M1041 Close Combat Mission Capability Kit (CCMCK)

- SOCOM is evaluating and qualifying lead free 5.56mm/9mm CCMCK ammunition
- Limited User Demo to include air sampling/toxic fume evaluation at Fort Bragg
- PM MAS will process ECP and modify contract with new lead free NSN/DODIC once qualified



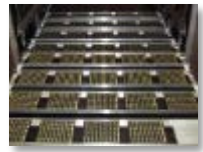
Short Range Training Ammunition

- SOCOM evaluating lead free 5.56mm M862 SRTA that meets performance requirements of M862 SRTA specification (NAMMO) - No Army contract
- 7.62mm SRTA(GD-OTS) currently no effort due to no planned Army buys, only other Services



Reduced Range Ammo (RRA)

- Evaluate & Implement either commercial or MIC primer through PPQT/PQT



Metastable Intermolecular Composite (MIC)

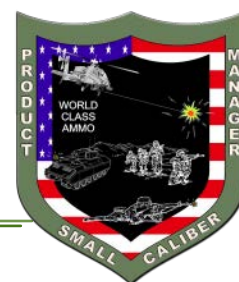
- Remove lead from all small caliber ammunition primers
- Develop automated Pilot primer manufacturing process from mixing to packaging
- Upscale pilot process for LCAAP and industry (Risk)
- Provide equal ballistics performance as lead styphnate primers (Risk)

- ◆ MDD
- ◆ PDR
- ◆ MS-B
- ◆ CDR
- ◆ MS-C

- ◆ Program Start
- ◆ Contract Award
- ◆ Design Evaluation
- ◆ EMQB
- ◆ Demo
- ◆ ECP/Mod/Production
- ◆ First Deliverables



Small Caliber DOTC Opportunities



AMM-18-01	Prototype projectile and cartridge configurations .50 Caliber and below	<p>...evolutionary technological improvements for prototype projectile and cartridge configurations. These configurations represent calibers of .50 caliber and below (including .50 Caliber, .45 Caliber, .38 Caliber, .300 Caliber, 9mm, 7.62mm, and 5.56mm). This program seeks to leverage and develop Non-Developmental Items (NDI), Commercial Off The Shelf (COTS) solutions, and new technology concepts and prototypes that increase range, improve accuracy, reduce weight, reduce cost, or improve health effects for soldiers.</p> <p>Design, development and prototyping efforts can be on any and all components of ammunition or their associated function. Proposed solutions can also include characterization of existing US Army ammunition capability, as it relates to projecting future improvement and prototype development opportunities.</p>
AMM-18-02	Tools, gauges and fixtures	<p>...development of prototype tools, gauges and fixtures to support the manufacture and inspection of small caliber ammunition and weapon systems. Calibers of interest include but are not limited to 5.56mm, 7.62mm and Cal 50. Goals of this initiative include prototypes that: 1) reduce size, weight, and complexity of assembly; 2) reduce time and cost of inspection; 3) improve measurement precision and reliability and 4) create a new measurement capability.</p>
AMM-18-03	Tungsten carbide components	<p>...assess ability of contractors to fabricate prototype precision tungsten carbide components with tight tolerances and complex geometries.</p>
AMM-18-04	7.62mm ammunition with lightweight metal cartridge cases	<p>...development of a lightweight metal cartridge case for the 7.62mm caliber ammunition cartridge, which shall provide a minimum 10% overall cartridge weight saving.</p>
AMM-18-05	Reports, bullets, cartridge cases, test procedures, energetic compositions, and cost models	<p>...development and evaluation of prototype solutions to enhance performance, affordability, and environmental effects in small caliber ammunition...alternative components, subcomponents, ancillary components, energetics, and testing materials... materials and technology to reduce cartridge effects on the environment and environmental effects on the cartridge such as: corrosion prevention, removal of lead in ammunition systems, solvent-less waterproofing, and mercury replacement.</p>
AMM-18-06	XM1161 small caliber tracer cartridges	<p>...development, improvement and manufacture of XM1161 One Way Luminescence (OWL) tracer cartridge. Capabilities of respondents should have ability to complete small scale prototyping with ability to scale tracer line to future full qualification quantities (3,000 cartridges / month to 60,000 cartridges / month)...</p>

Enhanced White Papers Due in BIDS by 16 MAY 17