



# JOINT PROGRAM EXECUTIVE OFFICE ARMAMENTS & AMMUNITION



## NDIA Future Force Capabilities Conference

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# Cannon Ammunition Future Force

- Modernization activities are continuing, but **increasing production in critical munitions to rebuild inventories and provide continued support to Ukraine** has become the emerging priority
- Ukraine is challenging assumptions we have long held on **total munition requirements** and **how the industrial base should be scaled**
- How can we more rapidly mobilize throughout the Defense Industrial Base, mitigate supply chain risk, and better posture/scale for future needs?



# PM CAS Family of Products

## ARTILLERY

Concept	Development	Production/Sustainment
<p>Canister Projectile</p> <p>155mm</p>	<p>MOFA II w Next Gen Prox</p> <p>EPIAFS Modernization</p> <p>M82E3 Primer</p> <p>LR-PGK M1171/M1172</p> <p>XM659 Stub Charge</p> <p>XM660 Stub Charge</p> <p>XM655E1 Supercharge</p> <p>XM1208</p> <p>HTK</p> <p>155mm XM11</p> <p>155mm XM1113, XM1210 RAP HE</p> <p><b>C-DAEM</b></p>	<p>105mm M1 HE</p> <p>105mm M314A3 Illum/M1064 IR Illum</p> <p>Projectile Gun Unit 105mm PGU 43/B TP 44/B HE 45/B</p> <p>105mm M1130</p> <p>155mm BONUS</p> <p>M1156 PGK</p> <p>155mm M110A2 SMK</p> <p>155mm M107 HE</p> <p>155mm M485A2 Illum/M1066 IR Illum</p> <p>155mm M549A1 RAP</p> <p>155mm M795 HE</p> <p>M1123IR/M1124 VL</p> <p>M112 2</p> <p>M782 MOFA</p> <p>M762A1 ET</p> <p>Excalibur Inc. 1a/1b M982/M982 A1</p> <p>155mm MACS M232A1/A2/M231</p> <p>M767A1 ET</p> <p>EPIAFS M1155A1</p> <p>Smoke M1121 WP</p> <p>M1155 PIAFS</p>

## MORTARS

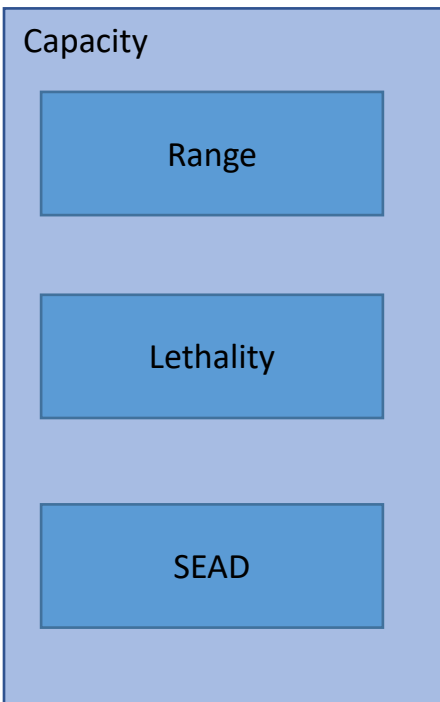
Concept	Development	Production/Sustainment
<p>Turreted Mortar Concept</p> <p>IBMS Concept</p>	<p>M32A2 LHMBC (Nett Warrior)</p> <p>XM395 APMI</p> <p>Lightweight 60 &amp; 81mm Mortar Systems</p> <p>81mm HE IM M821A4</p> <p>M150 MFCs Dismounted</p>	<p>M326 Mortar Stowage Kit</p> <p>M32/M32A1 LHMBC</p> <p>Commanders Interface</p> <p>SINGARS Radio</p> <p>Pointing Devices Software</p> <p>Gunnery/Drivers Display</p> <p>MFCs Software</p> <p>M1064</p> <p>Stryker</p> <p>AMPV</p> <p>M95/M96 MFCs Mounted</p> <p>M224 60mm Mortar</p> <p>M120/M121 120mm Mortar</p> <p>M772</p> <p>M776 MT Fuze</p> <p>MOFM M734A1/M783 Fuze</p> <p>Smoke</p> <p>60mm - M722A1</p> <p>81mm - M819</p> <p>120mm - M829</p> <p>High Explosive</p> <p>60mm - M720A1/M888/M768/M1061</p> <p>81mm - M821A4/M889</p> <p>120mm - M933A1/M934A1</p> <p>IR Illum</p> <p>60mm - M767</p> <p>81mm - M816</p> <p>120mm - M983</p> <p>VL Illum</p> <p>60mm - M721</p> <p>81mm - M853A1</p> <p>120mm - M930</p> <p>Training</p> <p>60mm - M769</p> <p>81mm - M879</p> <p>120mm - M931</p>





# Indirect Fires Situation

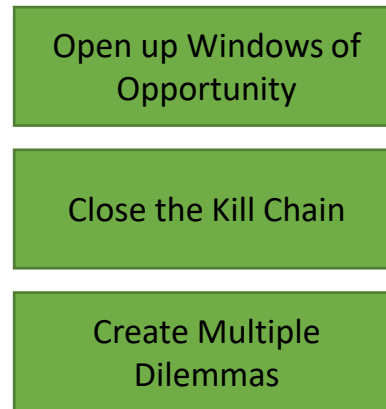
## Cannon Artillery Gaps



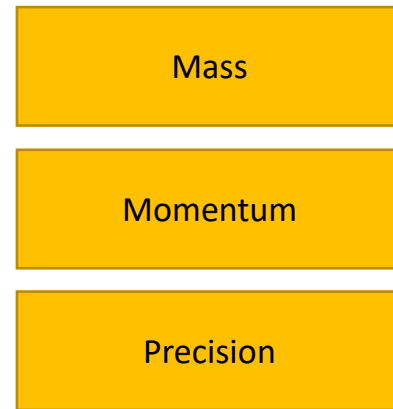
### Traditional Paradigm



### Emerging Paradigm



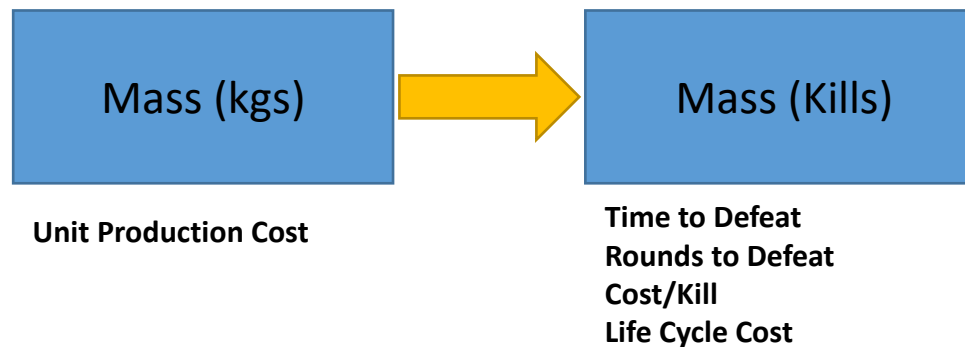
### Enabled Through...





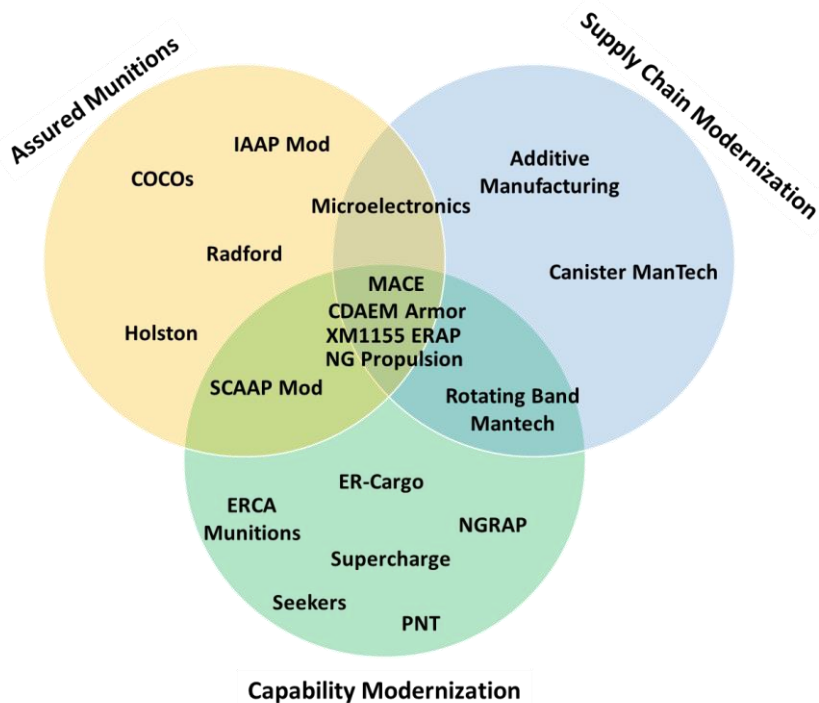
# Fundamental Measures of Artillery Fires

- Traditional Mass in Fires meant large quantities, for long durations, to sustain suppressive, neutralizing and destructive fires
  - 100s of rounds per tube per day
  - High intensity peaks
  - Requires ENORMOUS inventories of munitions on hand, extremely high production capability...or both
- Requires near parody in the quantity of shooters and the effects of conventional fires
  - Reality is we have less shooters
  - DPICM no longer an option for massed area fires
- As ranges are extended – propellant pressures and temperature increase, tubes wear out quicker, and thermal limits on gun tubes are reached more quickly
- Sustaining fires makes the platform a target on the modern battlefield

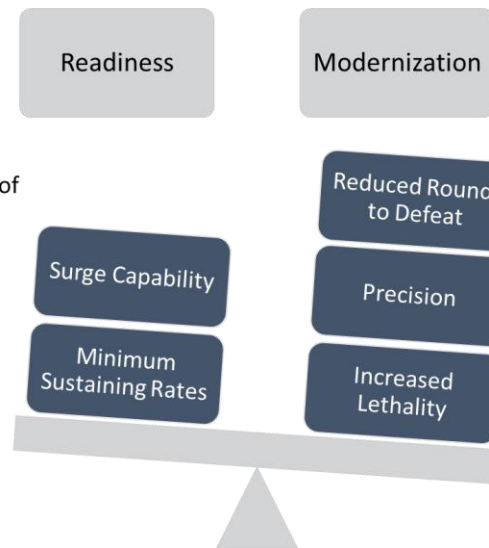




# Balancing Readiness and Modernization



**Readiness:**  
Increase Mass of  
Projectile

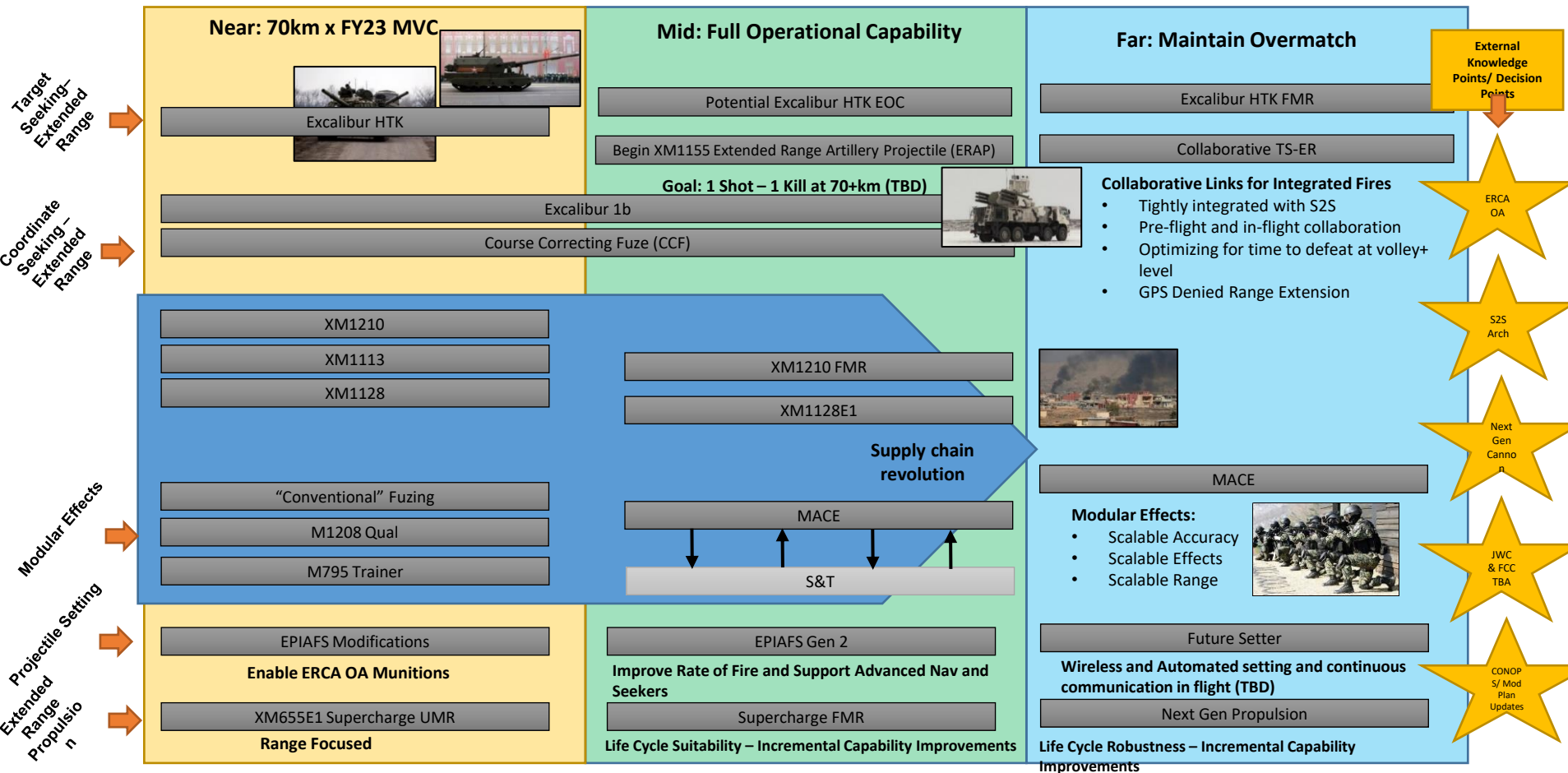


**Supply Chain:** Increase rate at which Mass can be increased or decreased

**Capability:** Decrease Mass required



# Cannon Artillery Ammo Modernization – Preliminary







# Readiness Roadmap

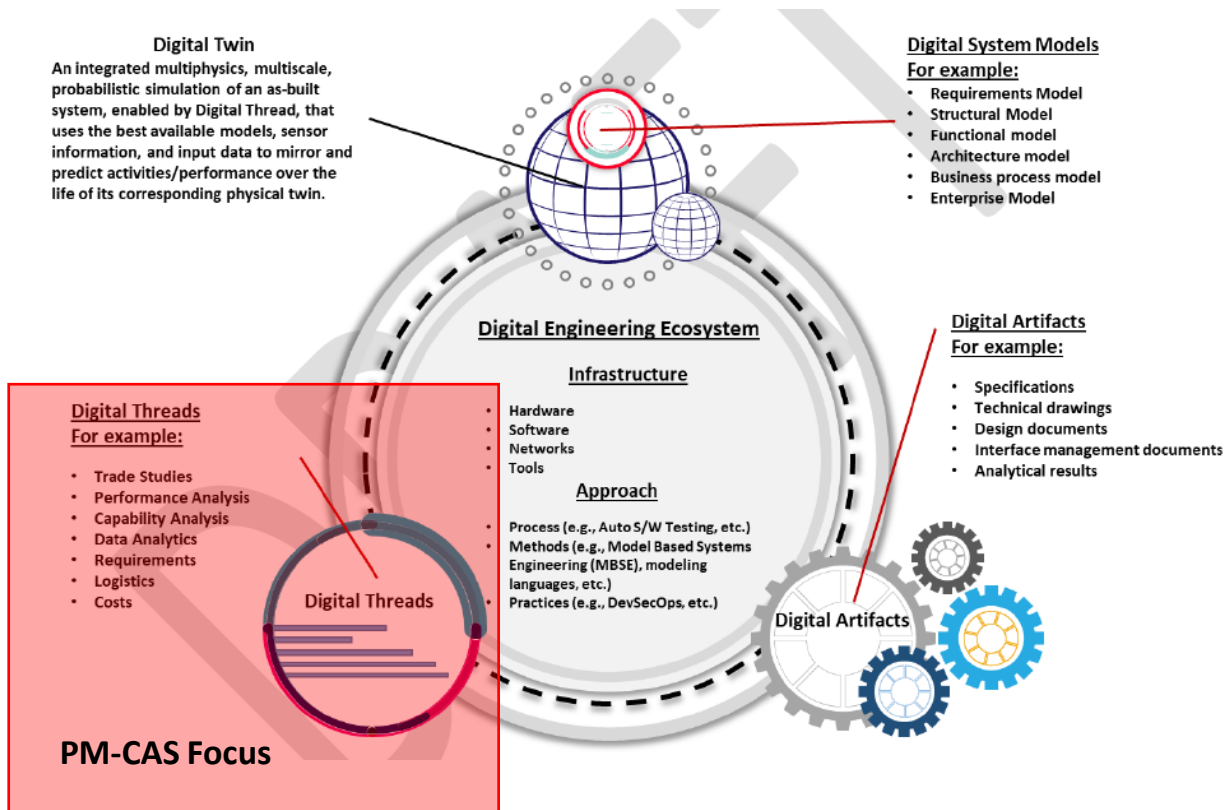
Near	Mid	Far
<ul style="list-style-type: none"><li>• Continue investment in GOCOs</li><li>• Extend facility modernization to other key parts of NTIB</li><li>• Increase production rate of Excalibur and other precision munitions as they come on-line</li><li>• Address obsolescence</li><li>• Improve production control and key parameter management</li></ul>	<ul style="list-style-type: none"><li>• Transition “conventional” munition production to Modular Artillery for Combat Effectiveness (MACE) concept</li><li>• Increase surge capacity for Excalibur and other precision munitions<ul style="list-style-type: none"><li>• Secure supply chains and/or make “life-time” buys</li></ul></li><li>• Improve Ballistics Understanding to enable quicker design cycles</li></ul>	<ul style="list-style-type: none"><li>• Invest in highly effective, collaborative munitions<ul style="list-style-type: none"><li>• Seekers</li><li>• Advanced Cargo Payloads for Area Effects</li></ul></li><li>• Enable Virtual Prototyping</li><li>• Own the Digital Thread and enable diverse and robust supply chains</li></ul>

Increased Knowledge to Increase Agility





# The Ammo Digital Thread



We will not predict the future correctly, but we can predict that Knowledge = Speed and Agility



# Opportunities for Industry

- **Programs**

- Modular Artillery for Combat Effectiveness (MACE)
  - Training Rounds
  - Future Base bleed and Rocket Motor
  - Cargo
  - Right-sized precision
- XM1155 Extended Range Artillery Projectile (ERAP)
- Supercharge FMR and Next Gen Propulsion
- Increased production, second sources, alternate designs

- **Enablers**

- Kill Chain Optimization – to include projectile setting and datalinks
- Flexible Manufacturing Capabilities
- Digital Thread Development
- Secure supply chains
- Second, third...sources



# Summary and Questions

- **Modernization** and **Readiness** do not need to be competing priorities
- Challenge is getting to a future state where these priorities are better aligned, while meeting near term needs
- Plan for Continuous Innovation and Modernization