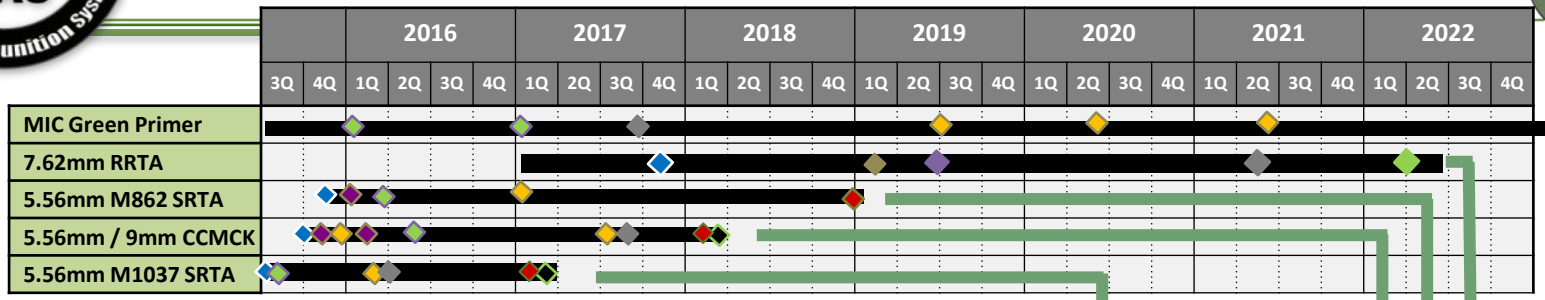
USG Green Primer

Small Caliber Ammunition

Objectives

- **Primary Objective: Remove lead from Primers**
  - Government owned primer mix (MIC)
  - Evaluating commercial lead free primers
- **Secondary Objective: Automate Primer Manufacturing**
  - Studied Rheology study of multiple primer mix types
  - Evaluated causes of quality defects
  - Developing prototype automated primer manufacturing line at ARDEC

Small Caliber Ammunition Green Primer Path Forward



M1037 Short Range Training Ammunition (SRTA)

- Evaluated 5.56mm SRTA cartridges with green primers
- Selected and qualified green 5.56mm SRTA M1037 cartridge – ECP Completed
- Benefits the 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

MDD
PDR
MS-B
MS-C

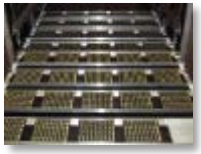
Short Range Training Ammunition

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

Reduced Range Training Ammo (RRTA)

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

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



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
- Provide equal ballistics performance as lead styphnate primers

Metastable Interstitial Composites (MIC)

- MIC provides the opportunity to eliminate lead and automate primer manufacturing process
  - MIC technology has been previously demonstrated in Small Caliber 5.56mm, Medium Caliber 30mm, 25mm, and 20mm, and Grenades M67 primers successfully
    - Recent M855A1, M80A1, and M33 testing successful
  - Tailorable to gas generation and sensitivity requirements
  - Manufacturing process has historically been a technical challenge
    - Uncertainty in nano-aluminum use and availability for formulation
    - Slurry mix during manufacturing provides safer manufacturing process
    - Cost reduction through reduction in manual labor
- Pilot line being built at ARDEC
  - Designed to be scalable to full rate production
  - Will be available to industry partners
  - Mixing, drying, and sealant studies ensure consistent mix throughout process
  - Improved quality through reduction in variability
- **Base Formulation**

Ingredient	Weight %
Nano aluminum (fuel)	10 - 30%
Bismuth trioxide (oxidizer)	70 - 90%
Ammonium dihydrogen-phosphate (stabilizer)	0.25 – 3.0 %
Methylcellulose (binder)	1.0-5.0 %
Explosive (sensitizer/ gas generator)	1-30%

- Evaluating commercial lead free primers for MIL-PRF and as risk mitigator for MIL-DTL products

Contact

Anthony Hawthorne
US ARMY
Small Caliber Munitions
Production Branch Chief (Acting)
Commercial: (973) 724-4143
Email: anthony.l.hawthorne2.civ@mail.mil