



119th Meeting

INDUSTRIAL COMMITTEE OF AMMUNITION PRODUCERS (ICAP)

13 October 2022
0830-1130 hrs (EST)
Washington, D.C.

Location:

Walter E. Washington Convention Center, Room 204A-B
801 Mount Vernon Place, Washington, D.C. 20001
NDIA POC: Erin Peters

Dress:

Civilian – Business
Military – Duty Uniform

AGENDA



Time	Topic	Responsible Party
0800	Registration	All
0830	Introductions & Opening Remarks	ICAP JPEO JMC ACC DEVCOM-AC
0840	PB23 Outlook & Ukraine Resourcing	JPEO
0900	Ukraine Responsiveness/Lessons Learned	All
0915	Industry Sector Reports	ICAP
1030	Break	
1045	Inflation Impacts on Contracts	All
1100	3D TDP Industry Feedback	ICAP
1110	Round Table Discussion & Wrap Up	All
1130	Adjourn	

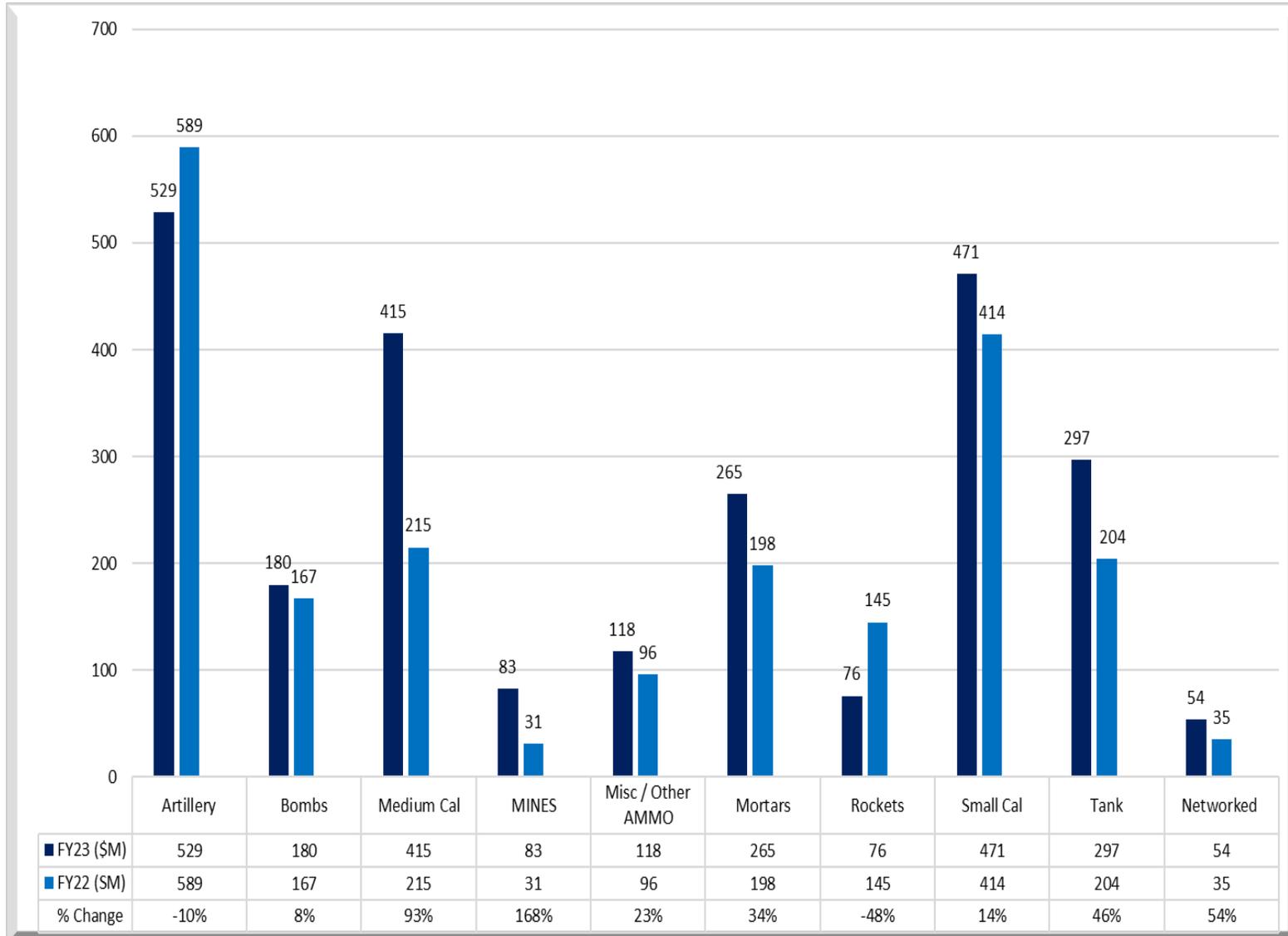


FY23 Budget Outlook

13 Oct 2022



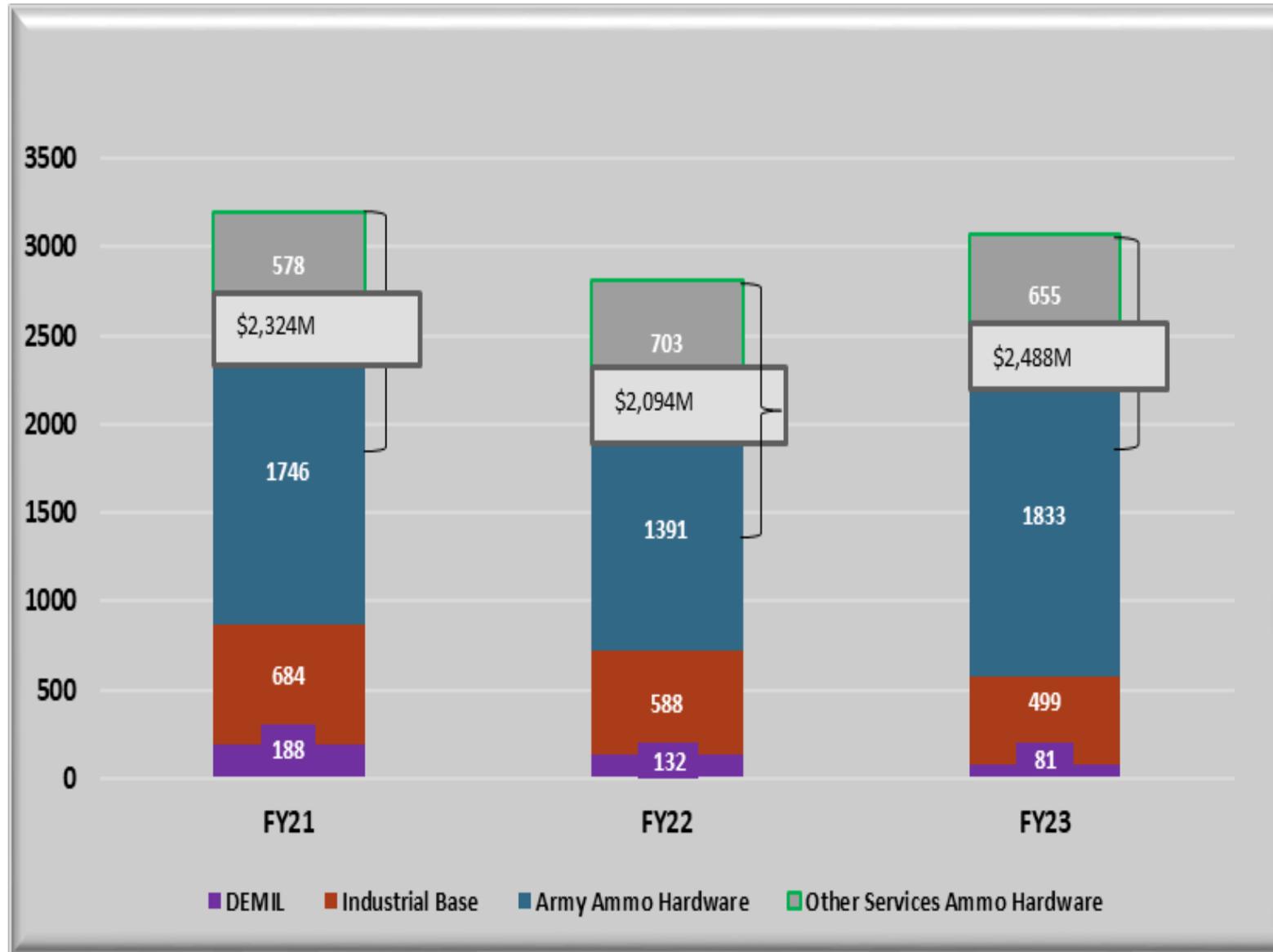
2023 PresBud SMCA Hardware FY22 vs. FY23 Comparison by Ammunition Families (\$ in M)



Sources:
 Army 23PresBud (April 2022)
 Other Services SMCA Projections (B&P system)
 *Data excludes Production Base / DEMIL/ FMS

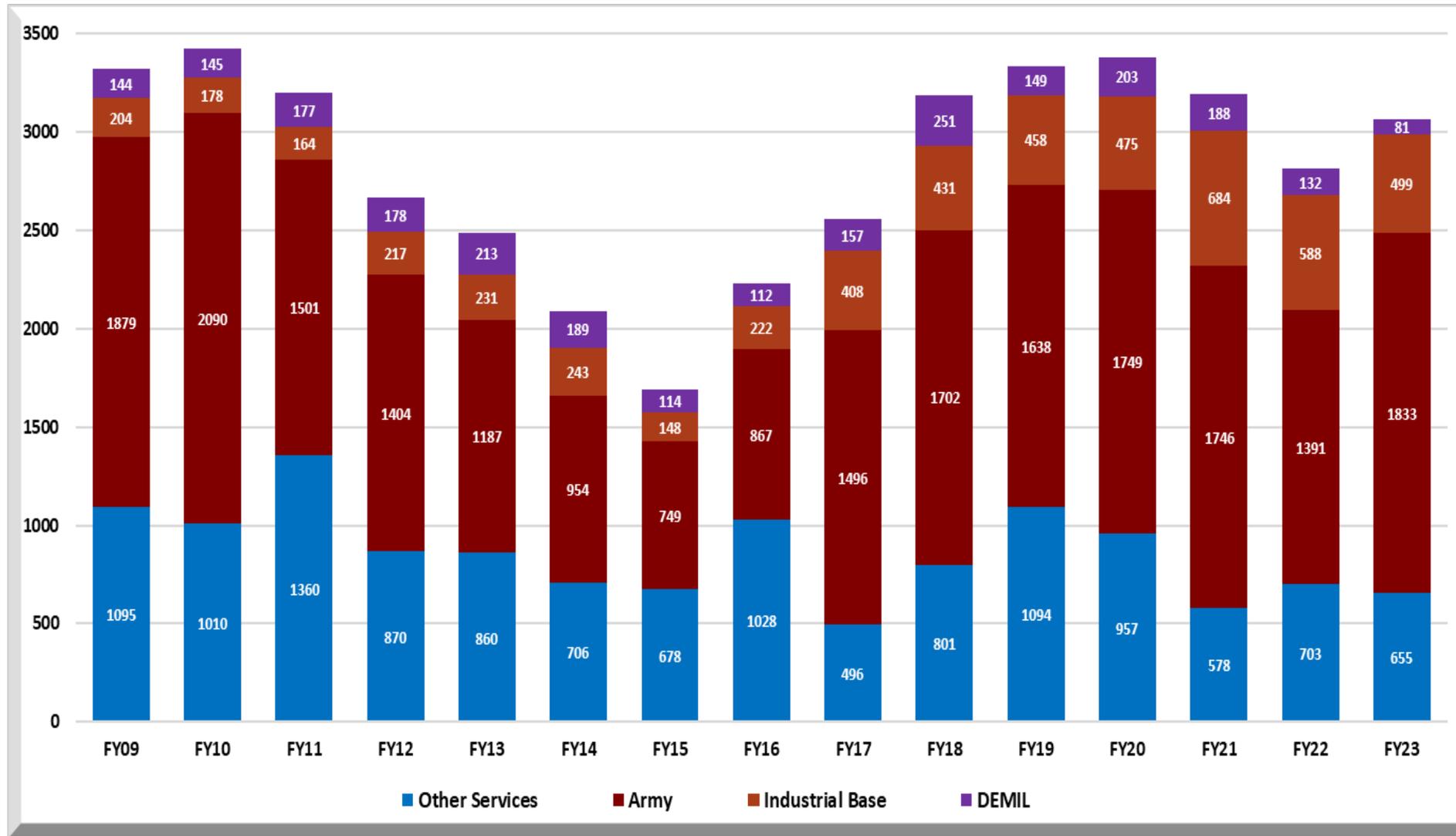


SMCA (\$ in M)





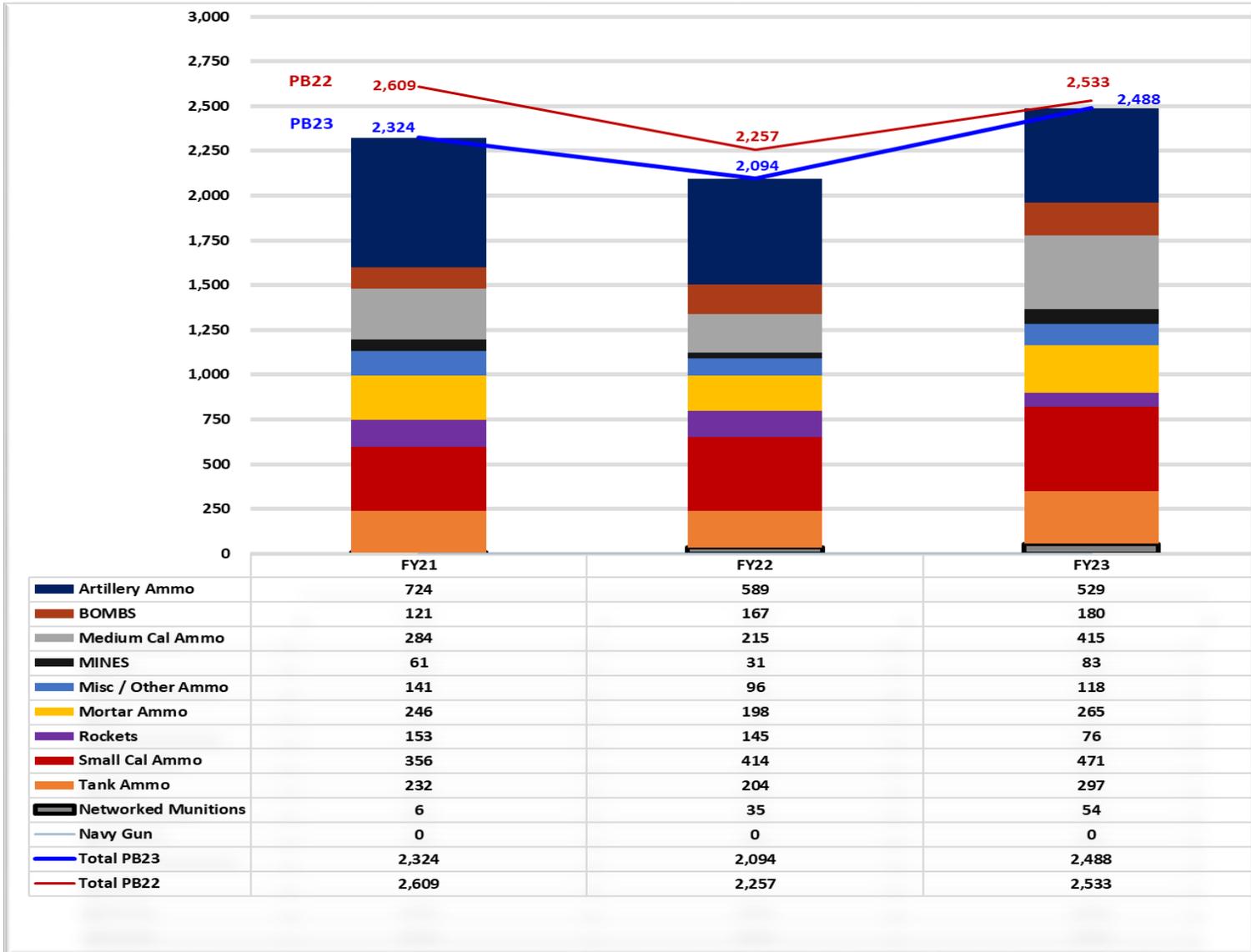
SMCA Fiscal Outlook (FY09-23)



Source – Multiple PresBud Cycles



2023 PresBud SMCA Hardware by Ammunition Families (\$ in M)



Sources:
 Army 23PresBud (April 2022)
 Other Services SMCA Projections (B&P system)
 *Data excludes Production Base / DEMIL/ FMS

Ukraine Responsiveness Lessons Learned



Industrial Committee of Ammunition Producers (ICAP)

Small/Medium Caliber Sector Report

Steve Goldschmidt – Sector Lead

Olin Corporation, Winchester Division

Sector Members and POC's

Company	POC
Olin Corporation, Winchester Division	Steve Goldschmidt
American Ordnance, LLC	Max Kamrath
American Rheinmetall Munitions	Joseph Chan
Amron	Barry Hafer
AMTEC Corporation	John Hill, Steve Slabaugh
ATP	Barney Pultz
BAE Systems	Brian Gathright
Battelle	Russ Hrdy
CTC	Ed Sheehan, Lori Denault, Shawn Rhodes
Galion, LLC	Howard LaCroix
General Dynamics OTS	Richard Martin
Nammo	Terry Russell
Northrop Grumman	Rylan Harris
Sig Sauer	Steve Rose, Jason Imhoff, Jason St. John
UDC, USA	Matt Herring, Jay Bell

Milestones and Notable Events

- **AMTEC**

- 40mm Grenade Ammunition FY22-FY26 Systems Contract Awarded. Work content for multiple members across the Medium Caliber sector

- **BAE**

- Holston Plant Competition continues with a contract extension through Q4 2024 and Radford contract extension through 2026

- **Northrop Grumman**

- Awarded the Extreme Accuracy Grenade Launched Engagement (EAGLE) DOTC contract

- **American Ordnance – IAAAP**

- AO and 10 onsite labor unions agreed to new 3-year CBA on August 20th with no work stoppages or disruptions
- AO continues to support urgent overseas shipments directly from IAAAP, supporting the United States Security Assistance

Milestones and Notable Events

- **Olin Winchester – LCAAP – Just finished DO2 and started DO3**
 - Designing the new 6.8mm Next Generation Squad Weapon (NGSW) production facility
 - On-going equipment installation and development for 1158 Advanced Armor Penetrating (ADVAP)
- **2022 Army Modernization Plan**
 - PDJS spear-heading with support from USG GOCO Contractors to maintain facilities, infrastructure and equipment and also focus on facility, equipment and infrastructure needs for numerous New Product Development Initiatives
- **USG Medium Caliber Industry Day**
 - Conducted at Picatinny on 9-10 August

Issues, Concerns and Recommendations

- **COVID cases continue but have slowed down**
- **2023 Presidential Budget – Need consistent, steady and sustained funding for readiness that focuses on two key items:**
 - Production volumes – Continued difficulty in maintaining a skilled work force due to current labor market. USG can help by supporting contractors wherever possible to prevent reduced deliveries and production line shutdowns that impact readiness
 - PBS/Modernization projects – Maintain and upgrade aging facilities, infrastructure and equipment and also focus these same needs on New Product Development Initiatives
- **The pandemic appears to have fundamentally changed business dynamics impacting FFP Contracts**
 - The ultra-competitive labor market has necessitated wage increases to attract, hire and retain new hires and maintain the artisan workforce
 - Supply Chain costs and lead times are significantly higher than historical norms for raw materials, machine spare parts, tools, operating supplies, packing supplies, transportation, freight, etc.
 - Unprecedented cost increases in raw materials and other inflationary pressures are resulting in small businesses, many of which are sole sources and under multi-year FFP contracts, having to either raise prices considerably or go out of business
 - Contractors are having to absorb price increases to ensure contract performance on FFP and/or Not to Exceed Price for current programs that were done prior to the recent high inflation.

Issues, Concerns and Recommendations

- **Critical Chemical and Raw Material work continues to develop alternate sources and not be reliant on foreign suppliers**
 - Antimony Sulfide
 - Strontium Nitrate
 - Calcium Silicide
- **Cybersecurity**
 - Cost impact on smaller sub tier suppliers and non-traditional vendors
 - Implementation timeline for existing contracts and previous vendors
- **3D TDP SOW Feedback**

Recommendations / Asks



- **Current**

- GOCO contractors communicate, recommend and team with the USG on pathways for inflation adjustments on contracts priced prior to the onset of record inflation

- **Future**

- Based on lessons learned from current inflation issues, discuss ideas that minimize one-sided risk on future FFP contracts

Industrial Committee of Ammunition Producers (ICAP)

Demilitarization Sector Report

Ryan Smith – Sector Lead

Gradient Technology

Sector Members and POC's

Company	POC
Gradient Technology	Ryan Smith / Eric Haehn
Amentum	Rob Rolston
Battelle	Russ Hrdy
Dynasafe	Harley Heaton
El Dorado Engineering	Bob Hayes
Envirosafe Demil	T.J. Ogden
EXPAL USA	Kirk Claborn
Franklin Engineering	Duncan Kimbro
GD-OTS Munitions Services	Justin Millhouse
General Atomic	John Follin
Grymonpre Consulting	Dave Grymonpre
Leidos	Paritosh Dave
Nammo Demil	Andrew Cooper
Safety Management Systems	Bob Ford

Milestones and Notable Events

- **Mar 2022 – Demil Sector Update to ICAP at MES Meeting**
- **Mar/Apr 2022 – Conventional Ammo Demil Contract Awards**
 - CLIN Group 4 (Mortars) Corrective Action Award to GD-OTS
 - CLIN Group 8 (Submunition) Corrective Action Award to GD-OTS and EXPAL
 - CLIN Group 7 (Rocket Motors) Award to EnviroSafe Demil
- **Apr 2022 – 5-yr IDIQ RFP for Demil R&D Submission Completed**
 - PD Demil and DEVCOM Support - 100% Small Business Set Aside
 - No Update on award status or timeframe
- **Aug 2022 – 16” Navy Gun Demil Contract Delivery Order 4 Award**

Issues, Concerns and Recommendations

- **The anticipated Demil Symposium for 2022 was not approved**
 - The Sector hopes that will change in 2023 and is looking for an alternate avenue in the short term for a “State of the Office, Budget, and Capability Gaps” brief from the PD Demil Office in 2022 if possible
- **Cybersecurity planning, CUI designations, and CMMC implementations continue to cause high levels of uncertainty within Demil**
 - Blanket CUI markings on information that isn’t CUI is burdensome for document handling and management of information to Subcontractors
- **COVID-19 responses and requirements at the various GOGO installations continue to complicate contractor access to facilities and access to Government personnel**
 - Testing requirements continue for workers and contractors on bases
 - Travel restrictions to contract activities remain

Industrial Committee of Ammunition Producers (ICAP)

Pyrotechnics Sector Report
Tom Rudy – Sector Lead
Armtec Defense Technologies

Sector Members and POC's

Company	POC
Armtec Defense Technologies	Tom Rudy / Charlie Louden
Action Manufacturing Company	Sean Gibbs
CAPCO Inc.	Bobby Boatwright
Chemring Countermeasures	David Cloak / Chanel Helper
Combined Systems Inc.	Richard Edge
Nammo Defense Systems	Tim Clawitter
Northrop Grumman Defense Systems	Richard Truitt / Dan Nielson
Pacific Scientific Energetic Materials Co	Larry Ostendorf
Pyrotechnic Specialties, Inc.	Davis Karlson
R. Stresau Laboratory, Inc.	Rob Dautermann
Security Signals, Inc.	Susan Lee
Tech Ord	Chris Bulian
Ultra Defense Corp (UDC)	Matt Herring / Jay Bell

Milestones and Notable Events



- **Armtec has a new President: Michele Starrs**

- Ms. Starrs previously served as President and Chief Operating Officer of Valence Surface Technologies, encompassing 10 facilities across the U.S. as the leading provider of critical aerospace conversion coatings. Prior to Valence, Ms. Starrs was with Precision Castparts Corporation where she held the position of Group Vice President over Fluid Fittings with facilities in California, France, China and Mexico.



- **Kilgore has a new President: Chanel Helper**

- Ms. Helper possesses many years of experience in the aerospace and defense arena, and previously served as the Manufacturing Operations Director at Thales Defense and Security. Prior to Thales, Ms. Helper spent 10 years at Northrop Grumman where she progressed through roles in Engineering, Operations Program Management and Manufacturing Management. She has worked on many platforms from air to ground to maritime for Programs to include; IMBITR, MBITR, BATS-D, TOW-2, Scorpion HMD, SPQ-9B, SEWIP, AWACS, G/ATOR, MESA, Cobra Judy Replacement, E2D, F-35 and F-22.



Milestones and Notable Events

- **John Fronabarger, Senior Staff Chemist at PacSci turned 95 in September!**
- **Alloy Surfaces**
 - Implemented digital X-ray and CT scan capabilities.
- **Kilgore Flares**
 - Begun First Article Testing on their new automated Flare facility.
- **Armtec**
 - Nearing completion of their new MJU-75 Flare production line.
- **Ultra Defense Corp (UDC)**
 - Recently installed a new outdoor firing range in Kingsville, Missouri (up to 20mm now)
 - Matt Herring from UDC spent March – May in Kiev, Ukraine. Good source for lessons learned!

Issues, Concerns and Recommendations

- **Magnesium industrial base security of supply**
 - US Magnesium LLC has capacity for 63,500 metric tons per year of primary magnesium and a variety of chemical products at their 80,000 acre facility 60 miles west of Salt Lake City, Utah, USA
 - Equipment failure shutdown in January 2022 had minimal effect on supply
 - Second shutdown (6+ months) announced in August 2022
 - Looking to off-shore sources



Issues, Concerns and Recommendations

- **Materials cost and availability**
 - Suppliers are:
 - Going out of business (Black Powder!)
 - Backing out of long term agreements and signed purchase orders
 - Increasing prices 2x, 3x+
 - Requiring unreasonable minimum buys
 - Missing delivery schedules due to lack of raw materials and labor
 - Increasing lead times due to volatility at lower levels of the supply chain
 - New source qualification is very challenging
 - Cesium supply a major concern
- **International and domestic U.S. transportation costs and availability**
- **Direct labor and technical scarcity driving up starting wages**
- **Lead times on equipment purchases are increasing 2x+**

Issues, Concerns and Recommendations

- **Current economic environment makes multi-year contracts very risky**
 - Some companies are only accepting single-year FFP awards and requiring economic adjustment reopener clauses for multi-year awards
 - Requests for Equitable Adjustment (REA's) are not guarantees
 - They are at the discretion of the PCO
 - CFR 52.216-4 Economic Price Adjustment is limited to Labor and Material and is capped at 10% of the original unit price
- **Communication and Responsiveness an issue on all sides**
 - Coincided with COVID work from home mandates

Industrial Committee of Ammunition Producers (ICAP)

Propellants and Explosives Sector Report

David Siggers – Sector Lead

Spectra Technologies, LLC

Sector Members and POC's



Company	POC
Spectra Technologies, LLC	David Siggers
BAE Ordnance Systems, Inc.	Steve Perkins
GD-OTS St. Mark's Powder	Robert Pulver
Northrop Grumman Defense Systems	TBA
Southwest Research Institute	TBA
Stressau Laboratory, Inc.	Becki Tyree

Milestones and Notable Events

- BAE HAAP, Improvement in turn time for explosives quotes IF you have a government contract, down to 3-4 weeks
- Greater stability to explosive pricing also improving
- Delivery times still 6-9 months ARO
- Modernization and capacity increases still moving forward, but some delays will be realized, especially those related to nitration

Issues, Concerns and Recommendations

- **IDIQ auctions will diminish the opportunity to modernize lines and improve cost and approaches to AAIE**
 - During acquisition planning, consider demand/volume against multi-source viability
- **Presentation of new initiatives by the JPEO related to energetics improvements and new formulations**
- **Access to the new formulations**

Industrial Committee of Ammunition Producers (ICAP)

Large Caliber / Bombs Sector Report

Craig Aakhus – Sector Lead

Northrop Grumman

Sector Members and POC's



Company	POC
Northrop Grumman	Craig Aakhus / Tim Bush
American Ordnance, LLC	Joe Schilling
American Ordnance, LLC	Roger Cooper
Armtec Defense Technologies	Mike Willey
Day and Zimmerman	Mike Quesenberry
General Dynamics – OTS	Michael Bate
IMT Defense Corporation	Remo Assini

Milestones and Notable Events

- **MPF vehicle down select**
 - 29 June 2022
- **Poland to purchase Abrams Tanks**
 - July 2022
- **USG approves 120mm rounds to Kuwait (\$250M)**
 - September 2022

Issues, Concerns and Recommendations

- **Supply chain**

- Large swings (increases) in raw material prices are impacting our industry
 - Expected pullback of raw material prices has not occurred
 - If sustained, this may drive critical suppliers of key components out of our sector
- Ongoing production contract ceiling pricing vs. some unprecedented sub-contractor price growth
 - Adjustments for unprecedented cost growths and component lead times are requested
 - EPA not included in many existing contracts
- Labor market remains tight
 - The current situation puts surge capacity, restarts and new start up production runs at risk
 - Critical to maintain continuous production to maintain seasoned staff
- Extreme lead times for electronics and other items are forcing production stoppage or slow downs that reduce efficiencies

Issues, Concerns and Recommendations

- **Mobile Protected Firepower fielding details and ammunition requirements**
 - Now that the MPF platform has been selected, will the USG provide guidance on ammunition inventory plans?
 - Can the USG provide quantity requirements and timing?
 - Refurbish inventory vs. New “old” ammunition, conventional vs. advanced ammunition (105mm AMP)?
 - Legacy vs. modern ammunition affects production lines/staffing/planning differently?
- **Industry would like to have a better understanding of the future requirements and timing for development of large caliber direct fire ammunition:**
 - What is the future of 120mm ammunition?
 - Development of new tactical and/or training rounds (i.e. AMP Trainer)?
 - Investment in larger caliber ammunition?
- **Test range availability / priority at USG ranges are impacting development and production programs**
 - Shortages of materials are causing log jams at test ranges (i.e. CO2)
- **Blending impact of United States’ Ukraine support into current production schedules**
 - When will we see contracts?
 - Impact across all commodities?

Issues, Concerns and Recommendations

- **Energetics**

- Still working to define transition requirements of NC production from the legacy to new production facilities at Radford:
 - What qualification requirements will be expected for each propellant?
 - Who is responsible?
 - Where is funding coming from ?
- Black Powder manufacturing restart / impact on current programs
- High volume production of new IM explosives lag requirements (i.e. PAX-3 for Grenades and AMP)
- Radford PWS costs and adjustment mechanics unclear on many programs. Variable pricing difficult for international sales

- **Increase collaboration and support to develop shared tools between USG and industry to facilitate more production innovation, specifically with modeling and simulation**

- Internal ballistics, energetics, guidance, and lethality models lack sufficient fidelity to achieve design cycles and speed to market demanded by current user expectations
- Joint USG and industry work to improve standard models would benefit all

Issues, Concerns and Recommendations

- **Artillery Production**

- Future supply of TNT from Poland will be impacted by situation in Ukraine. Raw material cost increases and loss of Ukraine TNT factory will increase demand on the Poland factory
- Changes to ship to location of finished M795 being executed to support shipments to Ukraine

- **Artillery Modernization**

- Efforts continue on the design effort in support of the Long Range Precision Artillery Production Facility (LRPAPF)



Industrial Committee of Ammunition Producers (ICAP)

Small Business Sector Report
Jeffrey Brunozi, PhD – Sector Lead
VTMB, LLC

Sector Members and POC's



Company	POC
VTMB, LLC	Jeffrey Brunozi, PhD
Global Ordnance, LLC	Marc Morales
McCormick Stevenson, LLC	Noel McCormick
Modern Industries, LLC	Dennis Sweny
Rand Corpotation	John Fleitz
Savit	Nick Korinis
UDC USA	Jay Bell

Milestones and Notable Events

- **Global Ordnance awarded M107 Contract**
 - PD-SAWS requirement supporting Ukraine
 - 100,000 rounds with first deliveries in Q4
- **UDC received award of M81 igniters**
 - Award from PM-CCS

Issues, Concerns and Recommendations

- **Access to TDPs to support requirements**

- Small business need access to TDPs to ensure capabilities to meet requirements
- Availability at Sources Sought has been restricted for some reason
- M107 metal part TDP as an example:
 - The PCO would not provide, so the challenge to develop a realistic response and also develop supply chain is difficult without full requirement
- Creates uncompetitive situation since many large contractors have TDPs from past work while small businesses may not have had any access

- **Acquisition Timelines Stretching**

- The stretching of acquisition timelines is challenging for small business, especially time to award
- The spending for proposal prep and the proposal is impactful and delays in the order create financial challenges for small business

Issues, Concerns and Recommendations

- **OTA vehicle usage dropping dramatically**

- DOTC has been a great opportunity for small business to provide technology and become involved in defense/munitions programs
- DOTC went from publishing around 400 topics/year two years ago to 20 this year
- Appears that the OTA's are becoming burdened by procurement regulations and the timelines are no longer "quick" but now stretch out to 12 months or more

- **CMMC**

- The requirements are simultaneously complex and ambiguous
- Challenging for many small businesses
 - Want to comply but not always sure about how to meet the requirements
- Creating a small business support for these requirements will be good for both ensuring the requirement for cyber security are met and also understandable and manageable for small business

- **Inflation**

- Inflation is challenging all business and small business in particular
- Challenge in retaining talented resources with escalating labor rates
- Significant challenges in bidding IDIQ contracts
- Need meaningful EPA clauses otherwise the risk is too high for most small businesses to manage and remain competitive

Industrial Committee of Ammunition Producers (ICAP)

Government-Owned Contract-Operated (GOCO) Sector Report

Jason Gaines – Sector Lead

General Dynamics Ordnance and Tactical Systems

Sector Members and POC's



Company	POC
Scranton AAP	Jason Gaines
Hawthorne AD	Rick Nesbitt
Holston AAP	John Swift
Iowa / Milan AAPs	Zach Higginbotham
Lake City AAP	Steve Goldschmidt

Milestones and Notable Events – RFAAP/HSAAP

- **RFAAP**
 - New NC commissioning continues; LRIP product trials beginning in late 4th Quarter / early 2023.
- **HSAAP**
 - Negotiating 1 year extension to current operating contract; extension contract ends 31 December 2024
- **HSAAP**
 - Operating Contract Competition: Final RFP release targeted for late September; proposals due early December; contract award November 2023
- **RFAAP / HSAAP**
 - Anticipating increased demand in support of munitions replenishment resulting from the Ukraine conflict
- **HSAAP**
 - Major modernization projects advancing: G3 and FEM completing water trials; Nitration, Kettle Dry, AAA construction underway; Melt-cast construction completion December 2022; New Wash Facility construction award expected before end of FY22

Milestones and Notable Events – LCAAP

- **Olin Winchester – LCAAP – Just finished DO2 and started DO3**
 - Designing the new 6.8mm Next Generation Squad Weapon (NGSW) production facility
 - On-going transition of XM1158 ADVAP production
- **2022 Army Modernization Plan**
 - PDJS leading the effort with support from USACE and Winchester focused on execution of the 2022 Army Modernization Plan building book of projects to maintain the facility, infrastructure and equipment and also focus on facility, equipment and infrastructure needs for numerous New Product Development Initiatives

Milestones and Notable Events – IAAP

- **Long Range Precision Artillery Production Facility (LRPAPF) design activity continues at IAAP**
 - 30% design complete, funding for 60% and 90% secured and executing
 - Developing design and construction execution plans, focusing on project schedule efficiencies
- **Direct Fire Modernized Campus (DFMC) 15% design charrette funding received – work beginning**
 - Defining product capacity requirements
- **Honored to support urgent shipments of over 45,000 M795 artillery rounds (to date) supporting the United States’ Security Assistance to defend democracy**

Milestones and Notable Events – SCAAP

- **Executing UCAs for design and installation of 155mm XM1128 (75%) and XM1113/XM1128 metal parts production lines (50%)**
 - Full Definitization expected NLT Q4 CY2022
- **Rapidly ramping M795 production in support of Ukraine replenishment efforts**
 - 12-15k / month
- **Significant scrap reductions (>15%), elimination of single point failures (heat treat/shot blast/ hardness test)**
- **DO for 214,000 M795 projectiles**
 - Received in September

Issues, Concerns and Recommendations – RFAAP/HSAAP

- **Inflation risk impacting long term FFP delivery contracts requiring consideration of EPA clauses or other means for contract modifications**
- **Supply Chain lead times remain protracted and costs increases holding post-COVID**
- **Continued reliance on sole and single source suppliers – many being OCONUS**
- **Conflict between short term operating contracts and objectives of retaining skilled workforce, maintaining robust supply chain, completing complex modernization programs, and promoting contractor investment**
- **Visibility and consistency of production volume demands**
 - Promote multi-year requirements contract execution by DoD
- **Need to sustain significant infrastructure funding to maintain / replace aged and or obsolete facilities while maintaining readiness**

Issues, Concerns and Recommendations – LCAAP

- **2023 Presidential Budget – Consistent and sustained funding for readiness that focuses on**
 - Production volumes that maintain a skilled workforce
 - PBS/Modernization projects to maintain aging facilities and equipment and also focus these same needs on New Product Development Initiatives

- **The pandemic appears to have fundamentally changed business dynamics permanently impacting FFP Contracts**
 - Supply Chain costs and lead times are significantly higher than historical norms for raw materials, machine spare parts, tools, operating supplies, packing supplies, freight, etc.
 - The ultra – competitive labor market has necessitated wage increases to attract, hire and retain new hires and maintain the artisan workforce
 - Unprecedented cost increases in raw materials and other inflationary pressures are resulting in small businesses, many of which are sole sources and under multi-year FFP contracts, having to either raise prices considerably or go out of business

Issues, Concerns and Recommendations – IAAP

- **Need to sustain significant infrastructure funding to maintain / replace aged or obsolete facilities while maintaining readiness**
- **Unique PWS requirements that drive cost and impede flexibility at GOCO facilities**
 - ex. security and fire requirements
- **Indemnity vs insurance challenges at GOCO facilities**
- **Inflation risk on long term FFP delivery contracts and approaches for contract modifications and/or EPA clauses**

Issues, Concerns and Recommendations – SCAAP

- **Resolution of corrective maintenance on facility contract still outstanding**
 - Currently utilized CI investment through 2024
- **Follow through on M795 internal cast quality actions is critical to long term success**
- **Greatly improved IPT communication with all stakeholders**
 - (PM CAS, JMC, OTS, DCMA)
- **Request improved prioritization and communication amongst USG stakeholders with respect to SCAAP production**
 - M795 vs. LRPF CFT ERCA metal parts requirements

Industrial Committee of Ammunition Producers (ICAP)

Warheads and Rockets Sector Report

Erik Perrin – Sector Lead

General Dynamics

Sector Members and POC's



Company	POC
General Dynamics	Erik Perrin / Mike Bryce
American Ordnance, LLC	Kevin Hovden
Arrow Tech Associates	Charlie Hillman
L3Harris Fuzing and Ordnance Systems	Mark Mishler
Northrop Grumman	Mike McGregor

Issues, Concerns and Recommendations

- **Explosives**
 - Lead times have improved, 6-9 months
 - Pricing continues to be issue with short validity periods
 - Issues continue with getting material for DCS or IRAD efforts
- **Metals Pricing and availability**
 - Availability
 - Lead times continue to grow on specialty items
 - Difficult to get materials for specialty parts, steel and aluminum houses focused on high volume
 - Pricing
 - Material suppliers providing quotes with EPA clauses due volatility of raw chemicals and energy
 - Recommend EPA agreements be considered by USG for long term agreements
- **Black Powder availability**

Issues, Concerns and Recommendations

- **Electronic Component Lead Times**

- Lead times as much as 100 weeks on memory devices (typical is 1 year)
- No stability to supplier commitment dates (move after PO placed)
- Component suppliers expect delivery issues to continue through 1st QTR 2024
- Lead times must be considered in procurements

- **Transportation**

- Issues continue with availability of trucks for product and sample shipments

- **Workforce Challenges**

- Nationwide issue with availability and retention

Industrial Committee of Ammunition Producers (ICAP)

Systems, Sensors, Electronics and Fuzes Sector

Mark Mishler – Sector Lead

L3Harris Fuzing and Ordnance Systems

Sector Members and POC's



Company	POC
L3Harris Fuzing and Ordnance Systems	Mark Mishler / Monica Stoka
Action Manufacturing Company	Sean Gibbs
American Ordnance, LLC	Kevin Hovden
AMTEC Corporation	Todd Anderson
Day and Zimmerman Munitions and Government	Mike Yoh
Kaman Fuzing and Precision Products	Dana Kaplinski
Lockheed Martin Corporation	TBD
Nammo Perry	Tim Clawitter
Northrop Grumman Defense Systems	David Fine
Raytheon Missile Systems	TBD

Milestones and Notable Events

- **Northrop Grumman awarded order for M782 Multi-Option Artillery Fuze (MOFA) for 105 and 155 millimeter artillery shells**
- **Northrop Grumman has delivered over 50,000 Precision Guidance Kits (PGK) for 155mm artillery projectiles with a \$137M modification to its base contract for PGK production with the U.S. Army and U.S. Marine Corps**
- **GMLRS, Stinger and Javelin being highly utilized in Ukraine**

Issues, Concerns and Recommendations

- **Issues**

- Challenging labor market across all job functions (Engineering, Operations, etc.) at both Prime and Suppliers
- Contract award delays due to increased process times causing challenges in ability to procure material to keep factory lines operation
- Lack of consistent funding on weapons causes loss of talent

- **Supply Chain Challenges**

- Significantly increased component lead times (some now as high as 100+) weeks
- Delivery dates moving even after commitment date established (Distributor to OEM relationship)
- RFQ turn times challenging due to ability to receive quotes from suppliers on shortened turned times
- Inflation impacting ability to forecast component pricing
- Ordnance manufacturers are unable to order components from Japanese manufacturers as they refuse to sell, reducing the ability to second source electronic components

15 Minute Break

Inflation Impacts



JOINT PROGRAM EXECUTIVE OFFICE ARMAMENTS & AMMUNITION

Digital Engineering Implementation for JPEO A&A



DISTRIBUTION STATEMENT A. Approved for public release: distribution unlimited, PAO Log # 005-23, 5 Oct 2022.





Why Digital Engineering?

- From Assistant Secretary of the Army (Acquisition, Logistics, and Technology) Policy for the Implementation of Digital Engineering (DE) throughout the ASA(ALT) dated 11 April 2022
 - “Army modernization priority programs will use DE practices to the greatest degree possible. New start programs will also incorporate DE as appropriate for the technology being developed and the resources available. Existing programs should incorporate DE when it makes business sense and supports Army modernization needs.”
- Benefits for JPEO A&A and Partners
 - DE will allow us to make better decisions, more quickly in order to deliver disruptive warfighting capability.



JPEO A&A DE Implementation Strategy

- Will develop plans for implementation strategies that make sense for each individual program based upon business case and practicability
 - Some PM's will focus on manufacturing facility Digital Twin
 - Some PM's will focus on converting 2D TDP to 3D Models
 - Goal is to have all PM's incorporate DE considerations into new contracting actions
- In conjunction with ASA(ALT), Army Futures Command (AFC), DEVCOM, will develop DE Ecosystem to gain value from DE products

ARMAMENTS & AMMUNITION



Benefits and Goals from DE Implementation

- The use of models to inform enterprise and program decision making
 - Data underpins management of programs
- Enduring authoritative sources of truth
 - Everyone using the same current and accurate information
- Technological innovation to improve engineering practice
 - Apply modern tools and techniques where warranted
- Supportive infrastructure and environment to perform, collaborate and communicate
 - Creation of the Digital Engineering Environment to facilitate collaboration
- Workforce and cultural transformation to a Digital Engineering mindset throughout the Life Cycle
 - Shift of mindset to the digital engineering paradigm



Status of DE Implementation at JPEO A&A

- ASA(ALT) and AFC are looking at tools to facilitate Digital Engineering
 - Recent one on one engagements with industry on Digital Engineering tools held in Austin, TX with follow-up planned for early CY23
 - JPEO A&A is an active participant
 - Goal of these engagements is to learn what is the art of the possible
 - This has already fueled discussions to identify where standardization will benefit the enterprise
- JPEO A&A and DEVCOM Armaments Center collaborating in a partnership to create the Armaments Digital Engineering Environment
 - Integrate and make available data across the product life cycle through Digital Engineering threads
 - Common engineering data environment
 - Interoperable with business processes



What this means to Industry Partners

- JPEO A&A wants to leverage Digital Engineering to achieve better management of programs
- In order to achieve this, we need feedback from and commitment from our Industry Partners
- In the near future, JPEO A&A PMs are going to request 3D Model based TDPs in solicitations
 - Foundational to future Digital Engineering effort
 - An evolution of the current language used to request TDPs
 - Need industry to provide feedback when they see this in draft RFPs (e.g. XM919)
- PD JS is laying foundations for a Model Based System Engineering Digital Twin of the ammunition plants
 - Foundation to better assess and manage the Organic Industrial Base



What is in the Draft SOW Language

- Tailorable contract language for programs and projects where technical data is a deliverable, in conjunction with any deliverable hardware products
- Different sections are suggested for either development, Engineer & Manufacturing Development, or production phase contracts
- Standards for 3D data format in accordance with MIL-STD-31000B and Computer Aided Design standards that are tailorable based upon specific program or project requirements
- Includes tailorable standards for other related Technical Data Package elements;
 - Data products such as; packaging information, and quality assurance information
 - Management data products such as: engineering drawing tree or Technical Data Package List

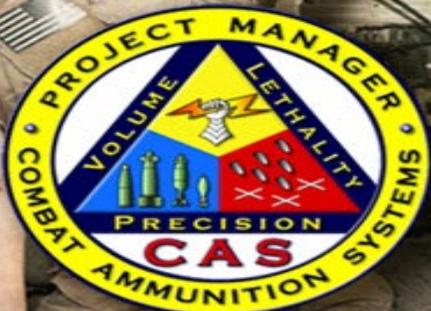
We Need Industry's Feedback to Move Forward Together

PROJECT MANAGER COMBAT AMMUNITION SYSTEMS

ICAP Black Powder

Oct 2022

Final



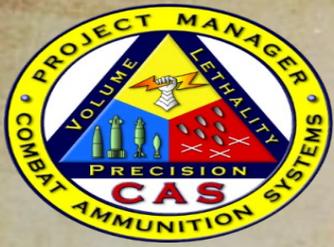
FORGING THE FUTURE OF INDIRECT FIRE



Black Powder Background

- Black Powder Producer GOEX Inc. Shut-Down as a Result of an Explosion in Jun 2021 & Exited the Black Powder Business in Sep 2021, Subsequently Limiting Supply of GOEX Black Powder Across JPEO A&A SMCA Contractors to Satisfy Contractual Requirements
- Partnerships between Gov't & Industry Formed to Identify Production Impacts Across the SMCA Portfolio and Methods to Address the Black Powder Issue, i.e.:
 - ✓ Slowing Down Production to “Stretch” Black Powder Until Alternate Source First Article Acceptance Test (FAAT)/Qualified
 - ✓ Proactively Acquired Black Powder from Alternate Source(s)
 - ✓ Commenced Non-Ballistic Testing IAW BP Mil-Spec (Gov't) & Product Mil-Spec (Industry)
 - ✓ Collectively Generated FAAT/ Qualification Plans

Gov't & Industry Partnership is Key to
Successful Execution Of Black Powder Source Change



GOEX Incident (18 June 2021) + Progress (26 Sep 2022)



Corning Mill Contained
600lbs of Black Powder
when Explosion
Occurred



Shaker Table



Hydraulic Control House



Support Structure for Shaker Table,
Rollers, and Elevators



Black Powder Activities

Government

- Acquisition of Black Powder Inventory from Hodgdon-GOEX – Complete
- Gov't Provided Approval to Pursue Foreign Sourced Black Powder – Complete
- Foreign Black Powder Testing (Material Comparison) – On-Going/Oct 2022
- Black Powder Specification Update (MIL-P-223) – 18-mos from Start
- Qualification of Foreign Black Powder Source(s) Across SMCA Portfolio – On-Going/NLT 2024

Industry

- First Article Testing of Foreign Black Powder Source(s) by Gov't Contractors – On-Going 2022/2023
- Estes Energetics led Reconstitution of GOEX Camp Minden Facility – 2023
 - ✓ Novation of Cage Code and Contracts – Seamless Transition from Hodgdon Powder to Estes Energetics – Complete
 - ✓ Obtain the Necessary Explosive Safety Site Operating Approvals & Federal/State Permitting (transfer of Permits between operators allowed in some instances) – On-Going
 - ✓ Reconstitute Corning Mill Operation & Reestablish Mil-Spec/Commercial Black Powder Production – On-Going



GOEX Black Powder Inventory

- Current Gov't Inventory of GOEX Mil-Spec Black Powder Produced Prior to the Corning Mill Explosion:
 - ✓ Class 2 – 618 lbs
 - ✓ Class 3 – 9,600 lbs
 - ✓ Class 6 – 1,225 lbs
 - ✓ No Inventory of Classes 1, 4, 5, 7 & 8 Available
- Contractors are to Provide an Allocation Request w/Supporting Justification of Need In Order to Obtain Black Powder from the Gov't Inventory to Support Current Contractual Requirements. Requests are to be Submitted through the Respective Gov't Contracting Officer.
 - ✓ Gov't will Assess Contractor Requests as follows:
 - Urgency will be Determined Based on the Run-Out Date (of Respective Contractor) and Prioritized Against the Overall Impact to the JPEO SMCA
 - Managed by JPEO A&A



Foreign Sourced Black Powder Testing

- Gov't Testing of Foreign Black Powder Source – Expected Completion Oct 2022*. Testing against:
 - ✓ Mil-Std Characterization – Analysis of Constituents, Granulation, etc.
 - ✓ Performance – Quickness & Force Measurement, Heat of Explosion, etc.
 - ✓ Safety – Storage and Thermal Stability, Material Compatibility, Impact and Friction Sensitivity, etc.
- Contractor Testing of Foreign Black Powder Source(s) for Affected SMCA JPEO Items
 - ✓ Overarching Document for Testing Requirements is the Military Specification
 - ✓ Proposed Test Plan Requires Coordination w/Gov't
 - Allows for Tailoring as Necessary – Avoids Unnecessary Testing
 - ✓ Program/Item Testing at Sub-Component/Component/End Item Levels
 - Will be Defined per Application via FAT/Qualification/Ballistic Plans
 - Prime/Sub-Contractors Need to Lean Forward w/Proposed Solution(s)
 - Varied Schedules & Level of Effort
 - Potential to Leverage Gov't Test Data (when available)
 - ✓ Upon FAT Approval For Components/Sub-Components, a RFV may be Required to Support Production Prior to Qualification Completion

*Storage Stability: Long-Term Storage (12-
mos)
Slated to Complete in May 2023



Black Powder Testing - Picatinny

Certification to Mil-P-223D

- ✓ Potassium Nitrate %
- ✓ Sulfur %
- ✓ Charcoal %
- ✓ Moisture Content
- ✓ Ash Content
- ✓ Specific Gravity (Mercury Pycnometer)
- ✓ Specific Gravity (Helium Pycnometer)
- ✓ Apparent Density
- ✓ Granulation
- ✓ Gritty or Fibrous Particles
- ✓ Glaze Finish
- ✓ pH

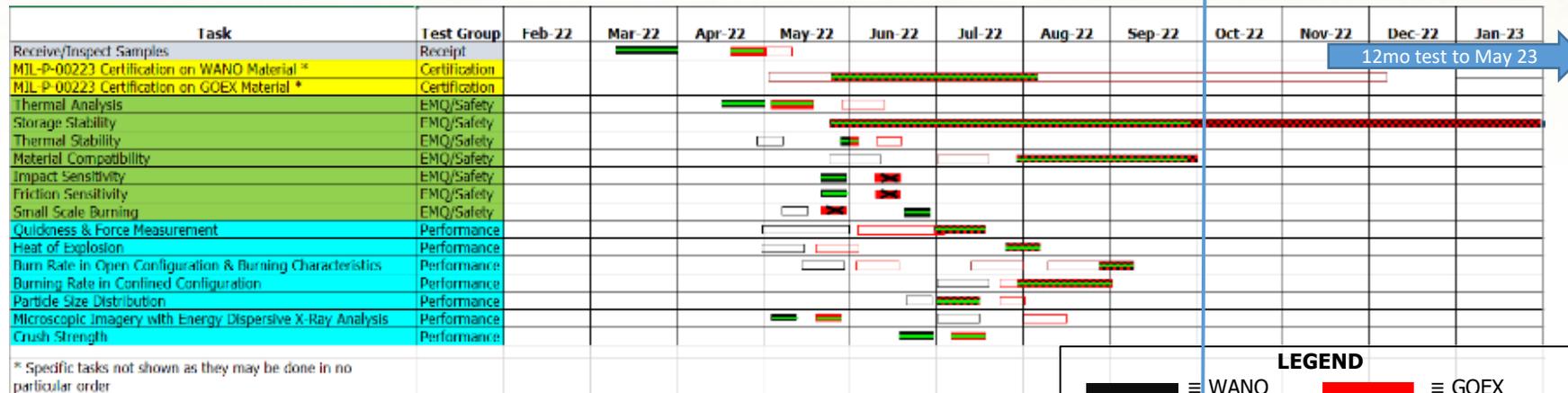
EMQ & Safety

- ✓ Thermal Analysis
- Storage Stability
- ✓ Thermal Stability
- Material Compatibility
- ✓ Impact Sensitivity
- ✓ Friction Sensitivity
- ✓ Small Scale Burning

- ✓ Test Complete
- Test Ongoing
- Test Not Started

Performance Testing

- ✓ Quickness & Force Measurement
- ✓ Heat of Explosion
- ✓ Burn Rate in Open Configuration & Burning Characteristics
- ✓ Burning Rate in Confined Configuration
- ✓ Particle Size Distribution
- ✓ Microscopic Imagery
- ✓ Crush Strength



Update as of 28 Sep 2022

LEGEND

- █ WANO
- █ GOEX
- █ Progress (inside block)
- █ Simultaneous
- Slip/Slack/Move



Black Powder Testing – Picatinny cont.

- Mil-Spec Testing – Looks at the Chemical Constituents/Traits of Black Powder Against the Mil-Spec
 - ✓ Primary Focus of this Test is to Assess the Burn Rate
 - ✓ Test Data Not Comparable to Legacy BP was Validated Via Closed Bomb Testing and Deemed Acceptable for Use
 - ✓ If Required, Further Verification/Validation can be Obtained through Performance Testing
- EMQ & Safety Testing – Determines if the Material is Safe for Use
 - ✓ All Testing Performed Supports Use in JPEO A&A SMCA Items w/out Restriction/Limitation
 - ✓ EMQB Issued Supportability Statement which will be Provided through Contracting
- Performance Testing – Assesses how the BP will Perform in the Application
 - ✓ Requires Verification/Validation through Testing in the Respective Application IAW the Product Spec
 - Ballistic FAAT/Qualification will Confirm “No Impact” to Performance Requirements

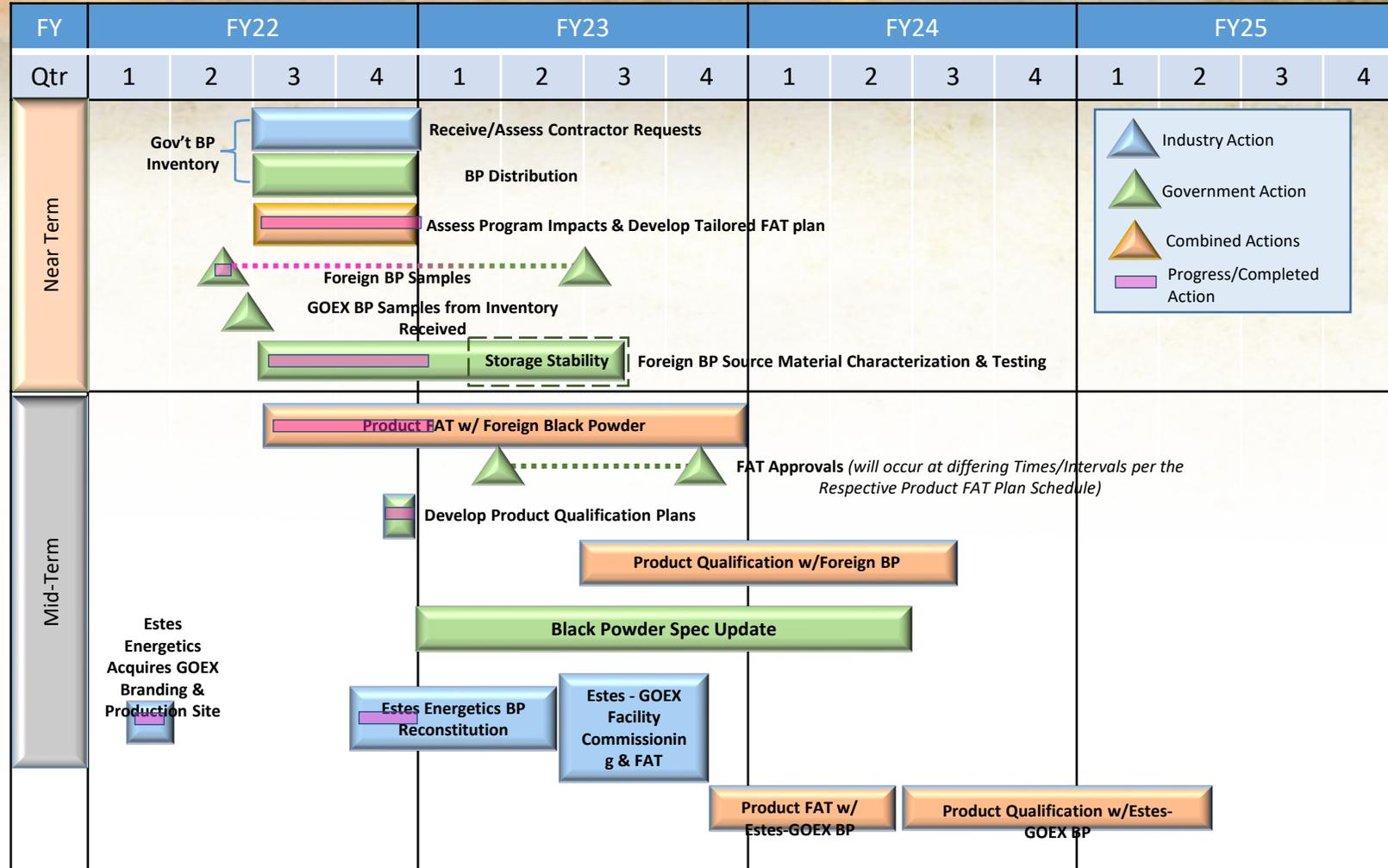


Key Takeaways from Picatinny Testing

- Black Powder Burn Rate is Affected by:
 - ✓ Raw Material i.e. Charcoal, Sulfur, Potassium Nitrate
 - Charcoal serves as the “Fuel” for BP – Specific Traits Directly Linked to Wood Source/Type and its Density/Porosity
 - Sulfur is used in BP as a Burn Rate Modifier – Too Much Slows Down Burn Rate; Too Little Sulfur Increases Burn Rate
 - Potassium Nitrate is the Oxidizing Agent that Keeps Combustion Going and Lowers Ignition Temperature – Too much Burns Too Hot/Fast, Too Little Burns Slower/Cooler
 - ✓ Graphite (Outside Coating) Affects both the Burn Rate and Pressability – Too Much Slows Down Burn Rate and Impacts Pressing since Graphite Affects BP Mechanical Strength (Issues w/getting BP to successfully/properly press into pellet form w/out breaking up/pulverizing)
 - ✓ Moisture Level Affects BP Burning Characteristics – Too Much Moisture Results in Poor Burning Characteristics; Too Little Moisture will Increase Risk of Electrostatic Discharge as well as Brittleness when Pressing
 - ✓ Particle Size Distributions IAW Mil-Spec Class Sizes is a Key to Controlling the Desired Burn Rate for the Intended Application
- Water pH (Processing Agent used during production) Affects Overall BP pH and Resultant Corrosive Properties – Acidic Water (Low pH) Lowers Final BP pH; Basic Water (High pH) Increases Final BP pH
 - Desired Level – Neutral pH (6-8)
 - Acidic BP will cause Corrosion Issues with Non-Stainless Metals
- Density Affects Loadability (Fixed Volume) & Energetic Outputs (Burn Rates, Peak Pressures/Rise Time) – Too High/More Dense Decreases Loadable BP Amount Decreasing Energetic Output; Too Low/Less Dense Increases Loadable BP Amount Increasing Energetic Outputs



Plan of Action & Milestones (as of 5 Oct 2022)





Summary

- Government and Industry Partnership is Key for Continued Production of Munitions Requiring Black Powder
 - ✓ Industry Leaned Forward to Minimize Impacts to Production
 - Slowed Down Production Rates as Necessary to Avoid Shut-Down
 - Purchased Foreign BP to Support Product FAAT
 - Performed Preliminary Non-Ballistic Testing IAW Product Specs
 - ✓ Some SMCA Applications have already Successfully Transitioned to Foreign BP (Handheld Signals, M115A2 Simulator)
- Government Testing has Demonstrated that Foreign Black Powder is Safe for Use in DoD Applications
- Product Verification/Validation is Required to Ensure Conformance w/Item Performance Requirements

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Back-Up Slides



Energetics Material Qualification Board (EMQB)

- All Energetics go through EMQB Qualification Testing prior to Fielding
- Anticipated EMQB Supportability Statement of Foreign BP for US Army End Items Usage. Basis of Supportability is Derived from Review of UK DOSG's AOP-7 Testing and "In Service" Evidence using Foreign BP Materials.
 - ✓ EMQB is Requiring Additional Safety Tests (UK AOP 7 test methodology gaps) which is Covered in the DEVCOM AC Test Series
 - ✓ Encouraging PM to Perform Component and End Item Testing to Verify Spec Qualification Requirements
- Required Safety Testing (covered under DEVCOM test plan)
 - ✓ Thermal Analysis
 - ✓ Storage Stability
 - ✓ Thermal Stability
 - ✓ Material Compatibility
 - ✓ Impact Sensitivity
 - ✓ Friction Sensitivity
 - ✓ Small Scale Burning

Round Table

Closing Remarks/Adjourn