DEFENSE LOGISTICS AGENCY

AMERICA' S COMBAT LOGISTICS SUPPORT AGENCY

National Defense Stockpile Analysis and Authorities

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Agenda

- Mission
- Requirements Process
- DLA Strategic Materials Mitigation Authorities
  - Material Acquisition
  - Research & Development
  - Qualification of an Alternative Source of Supply
- Summary

Mission

- DLA Strategic Materials is the operational arm of *The Strategic and Critical Materials Stock Piling Act* ("Stockpiling Act", 50 U.S.C. 98 *et seq.*)

- "It is the purpose of this Act to…

  - ✓ Provide for the acquisition & retention of stocks of certain strategic & critical materials

  - ✓ Encourage conservation and development of such materials within the United States

  - ✓ Decrease and preclude when possible a dangerous and costly dependence by the United States upon foreign or single sources for supplies of such materials in times of National Emergencies

Requirements Process

- 50 U.S.C. 98h-5 establishes National Defense Stockpile requirements parameters:

  Strategic and critical materials necessary for the U.S. to replenish or replace, within three years of the end of the military conflict scenario required under subsection (b), all munitions, combat support items, and weapons systems that would be required after such a military conflict.

- Conflict scenarios are consistent with those used by SECDEF for budgeting and planning purposes.

- DLA-SM relies on Macroeconomic Input-Output and Agent-Based Models to estimate shortfalls.

Supply Chain Responsibilities

Source Material
Ore, crude petroleum, crops or scrap

Concentrate
Oxide, Matte, Etc.

Refined Material
Purified element, alloy or chemical compound

Semi-manufactured product
Specialized performance specs, shape, particle size or crystal structure,

Simple Component
Shaped/formed for final consumption,
Usually incorporates more than 1 element or compound

Assembly
"Shop replaceable" multiple components

Unit
"Line or weapon replaceable"
multiple assemblies

Sub-system

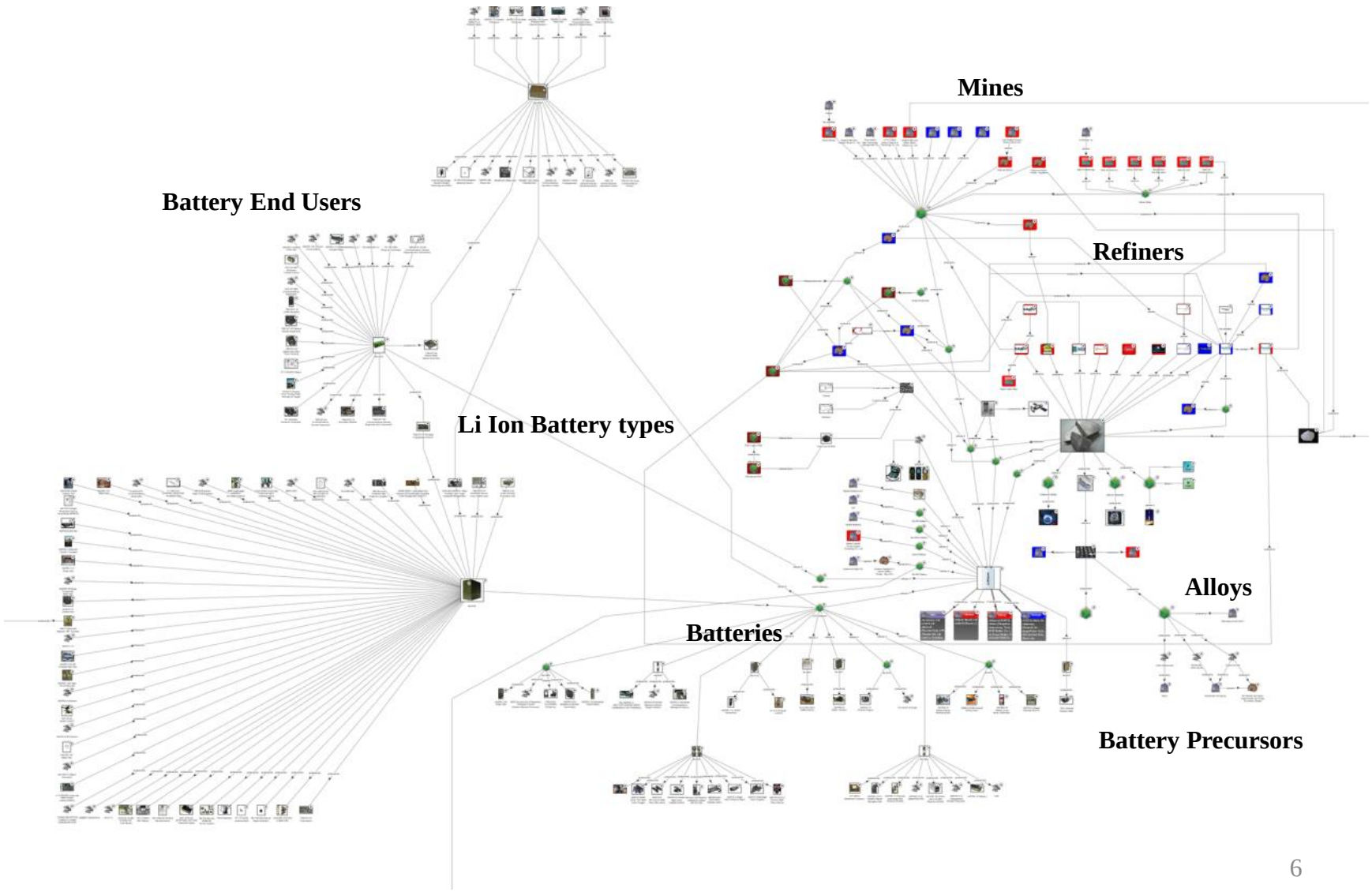
System
Can be used by multiple platforms

Platform
e.g. B-52, F35, Aegis class destroyer

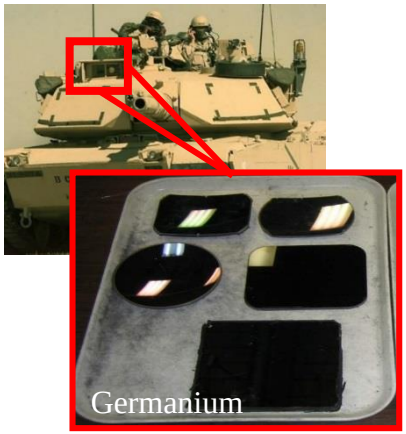
National
Defense
Stockpile
Emergency Preparedness

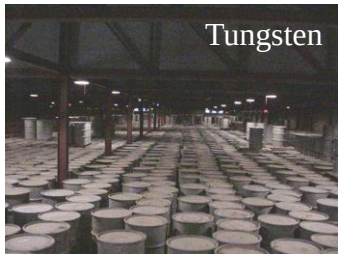
Generic Supply Chain

Sample Supply Chain: Li-Ion Batteries



DLA Strategic Materials Mitigation Authorities





- **Stockpile Acquisition**
  - Acquiring large and small quantities of materials
  - Sizing acquisitions to defense requirements, availability of funds, and commercial stockpiles
  - Managing long-term shelf-life, obsolescence, and environmental liability / remediation
  - Balancing commercial practice against stockpile requirements

- **Research, Development, and Recycling**
  - Simplified Acquisition BAA
    - Point of entry for high-risk R&D, small businesses, and bench-scale work:
      - Mg-Rare Earth alloy recycling
      - Mineral co-product modelling
      - Ge DEMIL and Reclamation
  - SBIR/RIF
    - Collaboration with DLA-R&D and OSD:
      - Rhenium extraction from U.S. copper ores
      - NdFeB magnet recycling

- **Qualifying a 2nd Source**
  - Reducing dangerous / costly dependence on a single or foreign source
  - Assessing "investment" of program office and prime vendors / major subs in deploying a solution
  - Coordinating DLA action with ongoing DMSMS activities in Military Services and OSD
  - Assessing the sustainability of the business case for a second source

Traditional Stockpiling

- Large quantities were, and sometimes still are, required to support the defense industrial base.

BAA Process

- DLA Strategic Materials operates two BAAs:
  - Basic Research (50 U.S.C. 98g) (BAA-DLASM-2020-01)
  - Qualification of Domestic Sources (50 U.S.C. 98h-6) (*BAA-DLASM-2020-01*)

- **Basic Research** (NTE Simplified Acquisition Threshold, i.e. $250k) is ideal for —
  - High-risk, low Technology/Manufacturing Readiness Level (TRL/MRL) projects
  - Non-traditional defense contractors, academia, and small businesses

- **Qualification of Domestic Sources** (NTE $3M/3 yrs) is intended to —
  - Lower the barrier to entry for material solutions for defense needs
  - Push mature TRL/MRL material solutions into fielded systems (Drop In Replacement)

- Evaluation of each BAA proposal is tailored to the problem material / manufacturing solution is intended to solve

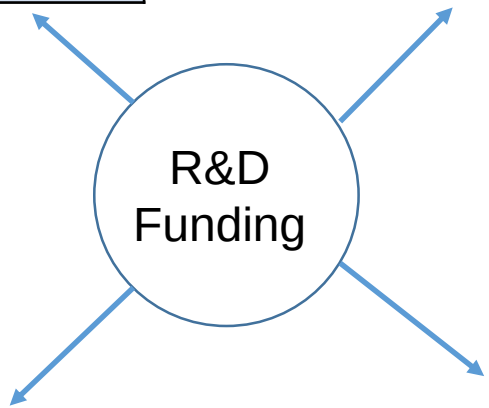
R&D Contract Vehicles

Small Business Innovation Programs (SBIR) & Rapid Innovation Fund (RIF)

Innovation Focus; something new or improved, having marketable potential, including (1) development of new technologies; (2) refinement of existing technologies ; (3) development of new applications for existing technologies

FY 19 Budget	SBIR	STTR	RIF
	$6M DLA/OSD	$0.5M DLA	$9M OSD

BAA – *Simplified Acquisition* – Funding Limit of $250K. Quick turn around of 60 days. Examples: magnesium recycling, co-product modelling study, alternate REs separation techniques



Latest!

BAA – *Domestic Qualification Authority* – Maximum funding Limit of $3 million. Collaborative effort with industry, program office, and the prime supplier of the warfighter

Other initiatives through IPTs, working group, IBAS, emergent BAA, recycling efforts, etc.

Carbon Fibers Qualification Efforts

Domestic Capabilities for Strategic Carbon Fiber Space Structures

- Improve industrial base capabilities
- Reduce the reliance of foreign source
- 20% material cost reduction and 2 month lead time reduction

Full material characterization performed includes: tensile strength and modulus, compression strength and modulus, in plane shear, short beam shear, as well as **prepreg** physicals such as flow, resin content, fiber areal weight, cured ply thickness, and volatile content.

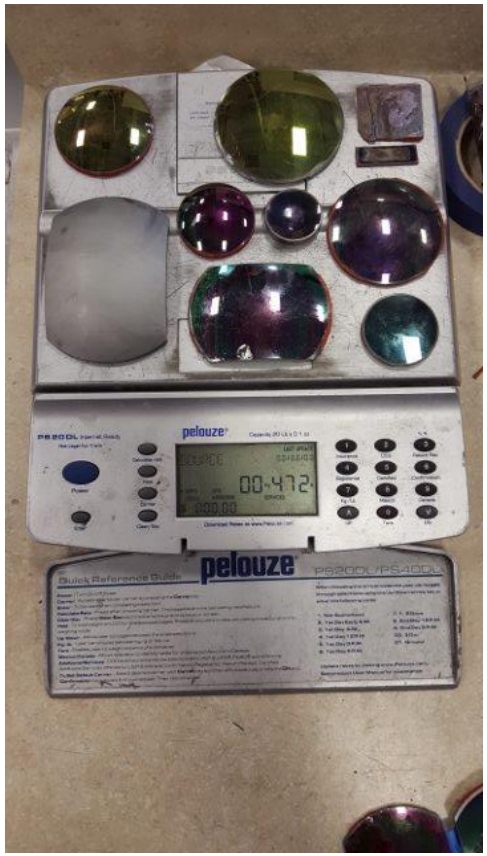
Hexcel HM63/996 Qualification for Electro-optical Imaging Platform
Investment: $638K (FY14)
Partner: Harris

Hexcel HM63/R17 Qualification for 702SP Satellite Platform Investment:
$710K (FY16)
Partner: Boeing

New Domestic Materials for Commercial, Defense and National Security programs – space platform applications

Recovery of Strategic Materials

- Recovery/recycling authority granted in 2014 National Defense Authorization Act.
- Creation of domestic supply rather than landfilling.
- First program: established a joint project with Army: Recover germanium from excess night vision equipment.
- Recovered germanium will offset stockpile requirements.
- Any excess could be sold to generate revenue to offset recovery costs (pending legislative authority).
- Exploring expansion of similar opportunities.



Qualification for Alternatives to Carbonizable Rayon

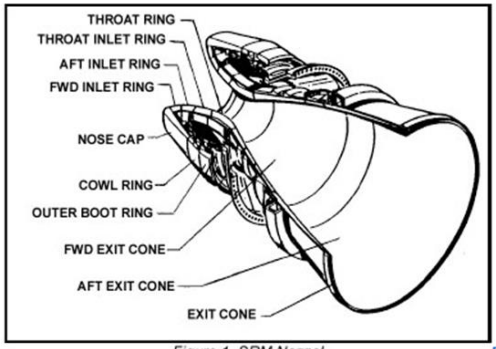


Figure 1. SRM Nozzel

PROJECT DETAILS

Investment: $1.9M FY20-FY21
Strategic Focus Area (SFA): Material substitute to relieve a single point off failure in supply chain, dependence upon unreliable foreign sources of supply, or replacement of a legacy/obsolete material
Customer: Solid Rocket Motor end users

SCOPE

- Scale up production of domestic PAN fibers and prepregs
- Verify PAN-based carbon phenolics meet room temperature acceptance requirements
- Evaluate process ability of domestic PAN fiber phenolic prepregs for solid rocket motor applications
- Incorporate material into a strategic-class solid rocket motor

PURPOSE

- Most phenolic ablatives used in solid rocket motor nozzle assemblies and other high temperature applications like carbon/carbon, use a rayon fiber precursor that is woven into a fabric, carbonized, and then coated with a phenolic resin
- Rayon suitable for aerospace applications is strongly affected by the commercial textile market and supply disruptions have resulted in numerous expensive requalification efforts
- The purpose of this project is to characterize and demonstrate in a strategic-class application an all domestic PAN-based carbon phenolic ablative

WAY FORWARD

- Project kick-off October 2019

North American Source for Antimony Trisulfide

PROJECT DETAILS

Investment: $510K FY20-FY21
Strategic Focus Area (SFA): Restore and stabilize strategic and critical materials supply chains that have been compromised by decreased or abandoned domestic mining and refining activities
Customer: CCDC-AC and PEO-Ammo

SCOPE

- Select and test samples from stibnite mine in Mexico
- Ship ore to mill to make 60% - 70% stibnite concentrate
- Ship concentrate to smelter in Montana to make finished antimony sulfide
- Show that antimony trisulfide meets military specification

PURPOSE

- Antimony sulfide is a critical constituent in munitions managed by the Department of Defense
- Certify that the domestic antimony trisulfide meets the military specification and gives performance equivalent to the currently used sole source Chinese material
- This project will enable CCDC-AC and PEO-Ammo to accurately plan the scope of qualification testing in load plant produced items to validate the use of domestic antimony sulfide

WAY FORWARD

- The project kick-off of the Integrated Product Team took place at Picatinny Arsenal in October 2019
- Monthly status telecoms will start in November 2019 with Integrated Product Team

Summary

- The Stockpiling Act (50 U.S.C. 98 *et seq.*) establishes the National Defense Stockpile program and its operations

- DLA Strategic Materials determines requirements based on the execution of and replenishment after a National Emergency

- DLA Strategic Materials deploys multiple options to meet requirements:
  - Stockpile Acquisition
  - Low-cost / high-risk Research & Development
  - Qualification of a Second Source of Supply