CAD/PAD Energetic Materials Obsolescence Strategy

Presented to:

CAD/PAD Technical Workshop

Presented by:

Jon Kilikewich
CAD/PAD Obsolescence Engineer
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CAPT Eric C. Correll, USN
Commanding Officer

Mr. Ashley G. Johnson, SES
Technical Director

Headlines

- Material obsolescence is a growing concern across the Department of Defense
- Due to the nature of our products, CAD/PAD often feels the impact of obsolescence earlier than other areas
- There are opportunities for investments and cooperation

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Outline

- Obsolescence drivers
- Strategies for dealing with energetic obsolescence
- Tools developed
- What opportunities are out there?

Obsolescence drivers

- Material availability
  - Supplier goes out of business or decides to stop making material
  - Stockpiles of a material are depleted/deteriorated
  - Raw/precursor ingredients become unavailable

- Regulatory
  - No longer allowed due to environmental or health concerns
  - Regulations across the globe need to be considered (EPA in the U.S., REACH/RoHS in the EU, country by country)
  - Policy directive from DoD expected to call for domestic source for critical materials whenever possible

Obsolescence drivers (cont'd)

- Technical knowledge base depleted
  - Reliance on "tribal knowledge"
  - Processes and personnel unable to adapt to changes in materials
  - Documentation over/under specifies requirements or needs to be updated
- Cost
  - End item customers often averse to price increases
  - Qualification of new materials is costly and time consuming, typically taking 3-5 years

Obsolescence drivers (cont'd)

- Energetics industry, especially CAD/PAD, often makes up a small percentage of the user base for specialty chemicals
  - Larger consumers often drive changes in material properties that produce undesirable results in our applications
  - Subtle changes in production processes, contaminants, size, shape, etc. can cause unexpected effects

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Approach

- New development and design projects structured using the Systems Engineering Technical Review (SETR) Process to address obsolescence as early as the Technology Development phase and are monitored throughout the acquisition process

- Identify potential risks
  - Suppliers go out of business
  - Raw ingredients in the supply chain
  - Proposed environmental restrictions
  - Technical knowledge base depletes
  - Evaluate stockpile health
  - Costs rise unacceptably for continued procurement

- Define risk scope
  - Are multiple items affected?
  - What is the appropriate level of concern?

Approach (cont'd)

- Notify affected parties of changes to risk level
  - Bidirectional feedback
  - Collaborate with DoD and Industry partners to increase awareness
- Identify Mitigations
  - Handled on a case-by-case basis
  - Team with industry when appropriate
  - Options depend on maturity and how much time is available to respond
- CAD/PAD Technology Roadmap helps to identify long term strategy for addressing sustainment issues

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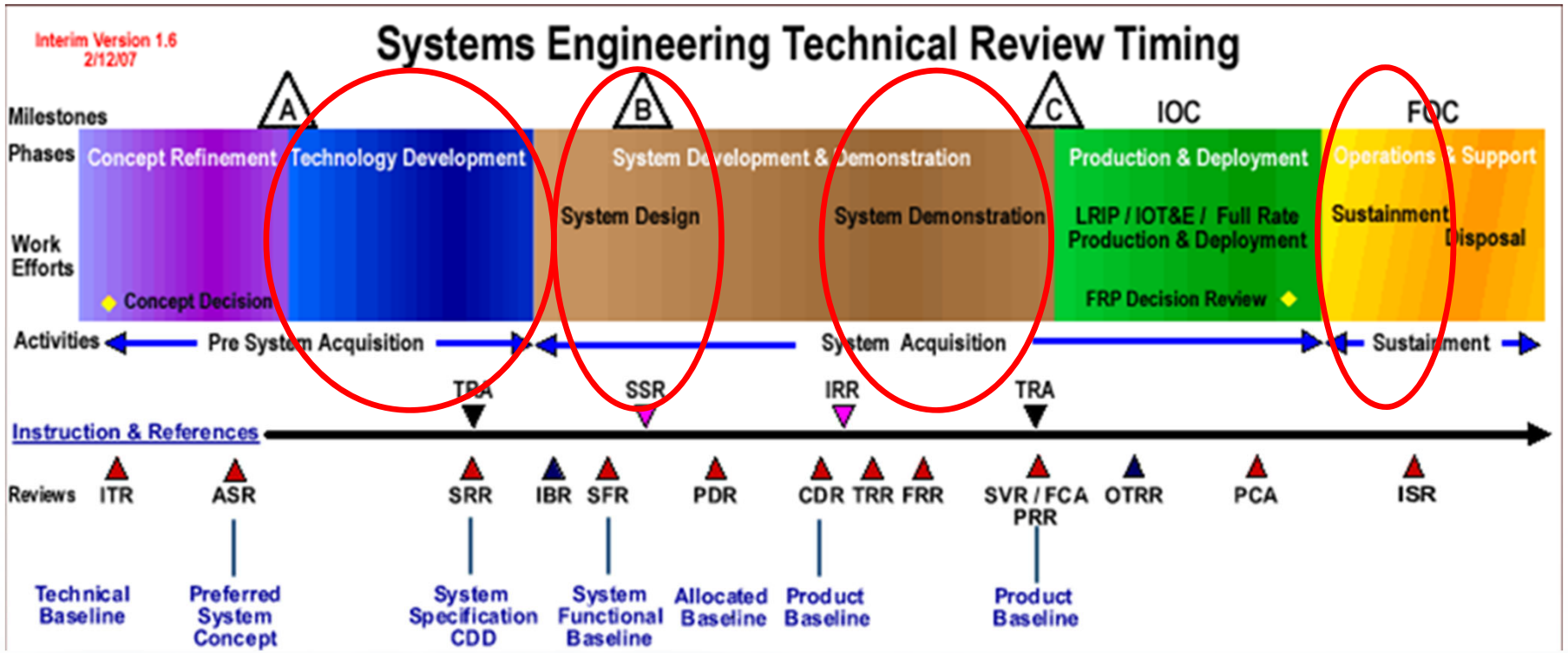
SETR Process



- Technology development
- System Design
- System Demonstration
- Sustainment

Tools

- Several tools to identify, track, rank, and address risks due to material obsolescence issues within CAD/PAD
  - Technology Roadmap
  - Ingredient database
  - Risk registry
  - Feedback from manufacturers, procurement, ordnance assessment
- Critical Energetic Materials Working Group
  - DoD and Industry wide data collection
  - Used to elevate awareness of potential issues to appropriate levels
  - Focuses effort on high risk and widely used materials

Material Examples

- Aluminum powder
  - Working to identify and qualify alternate source to replace domestic source that was closed/relocated outside US
- HTPB polymer
  - Work needed to better define properties that correlate to end item success
  - Seeking second source manufacturer
- Hexanitrostilbene (HNS)
  - Specification needed to be updated to reflect modern test methods
  - Revisions presented to Configuration Control Board, pending approval
- Potassium Nitrate (KNO_3)
  - Successful DoD wide collaborative effort to identify and qualify domestic source when sole OCONUS source closed

Technology Examples

- Alternative oxidizers
  - Replace lead nitrate based propellants
  - Compliment perchlorate based oxidizers with improved performance
- Resonant Acoustic Mixer
  - Evaluate new technologies to augment current capabilities
- Additive Manufacturing
  - Introduce new manufacturing methods to produce novel solutions

Opportunities

- DoD efforts to identify second sources and alternate technologies
  - Funding increases anticipated over next several years
  - Increased collaboration between programs to improve cost effectiveness and reach of efforts
- Policy change coming to direct use of domestic sources of critical energetic materials will likely lead to more investments
- Efforts underway to revise some specifications with modern requirements, test methods
- Feedback, partnering and collaboration is encouraged

Questions?