



2016 CAD/PAD Technology Roadmap Overview

Mr. John Burchett, CAD/PAD Division, Principal for Safety

2016 CAD/PAD Technology Exchange Workshop

CADPAD@navy.mil

Agenda

- Purpose: to provide a brief overview of the CAD/PAD Technology Roadmap and to familiarize the audience with its key elements
- Team
- Description/Objectives
- History
- Approach
 - Benefits
 - Roadmap Process
 - Roadmap Product
- Highlights
- Schedule
- Conclusion



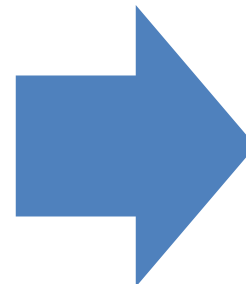
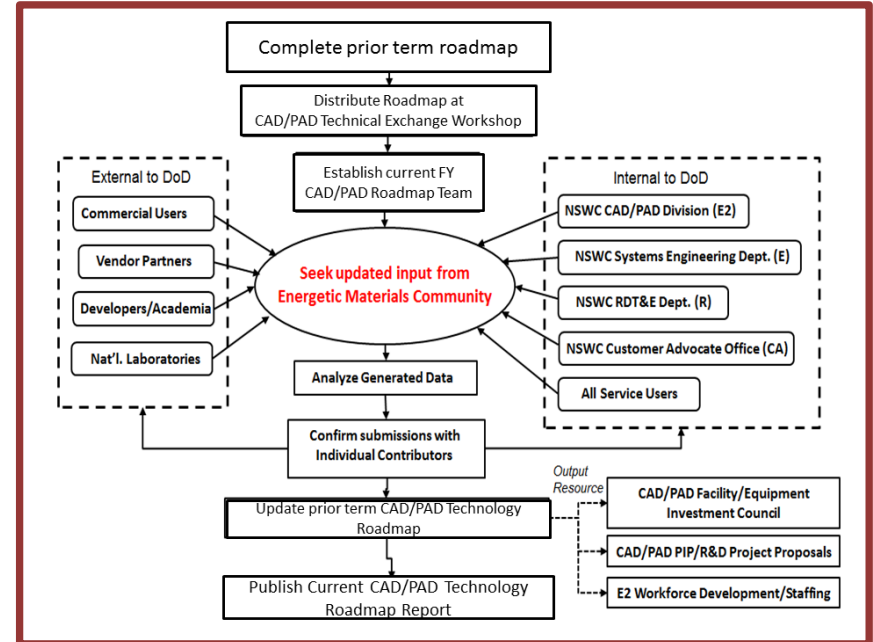
CAD/PAD Technology Roadmap

Objectives of the CAD/PAD Technology Roadmap

- **Tool to facilitate CAD/PAD Joint Program Office strategic decision making and investment direction in support of the implementation of appropriate new technologies:**
 - **Investment into Technology Projects**
 - **Development of workforce expertise and training**
 - **Supporting equipment facilities and/or capabilities**
- **The CAD/PAD Technology Roadmap is a ongoing plan and process aligning new technologies and associated development efforts with near term and long term product area program objectives**

CAD/PAD Technology Roadmap History

- CAD/PAD Program has generated Technology Roadmaps for over 25 years
- In late 2000s CAD/PAD JPO formalized and revised roadmap efforts
 - Structured process
 - Inward/outward looking process
 - Continuous/on-going
 - Report published bi-annually
- Most recent roadmap efforts followed streamlined version of prior year efforts due to funding, travel limitations
- The FY 16 roadmap team has returned to fully established process
 - Interviews
 - Review/Synthesize
 - Publish



Renewed efforts on broad partner coverage

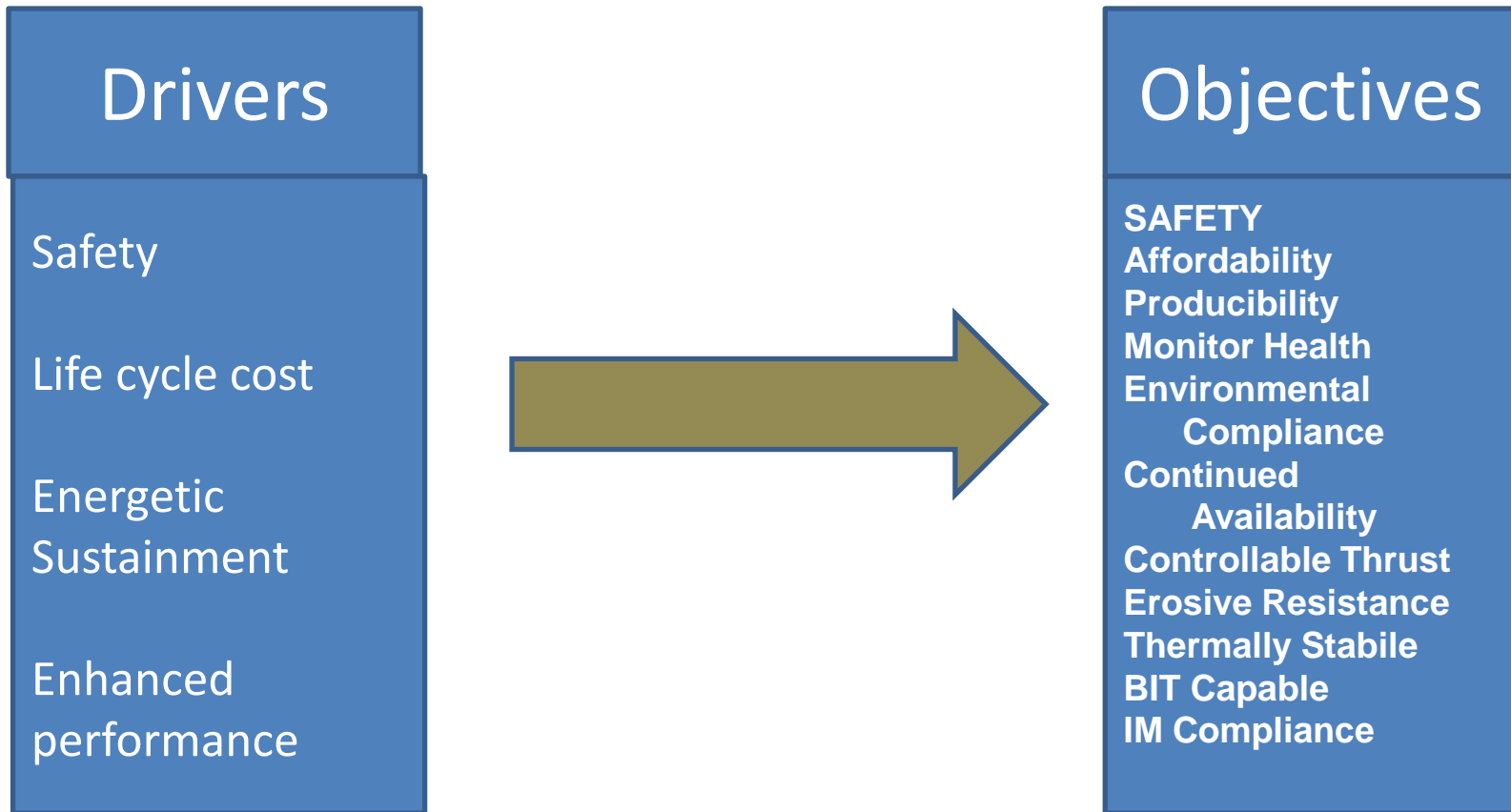
More focus on education within workforce



Benefits of the Technology Roadmap

- **Demonstrates to sponsors and other stakeholders that the CAD/PAD Program is proactive and actively forward looking in pursuit and introduction of appropriate new technologies**
- **Assists to align the CAD/PAD technology with our vendor partners with a shared vision of the future CAD/PAD Program**
- **Directly involved with planned changes in the products and processes as legacy platforms are retired from service and new generations of aircraft and weapon systems enter service use with their new CAD/PAD requirements**
- **Provides CAD/PAD senior leadership a basis to make technology investment decisions given limited resources**
 - **Hiring/training people with appropriate skill sets**
 - **Planning new facilities**
 - **Establishing new capabilities and supporting infrastructure improvements**

Technology Roadmap Approach



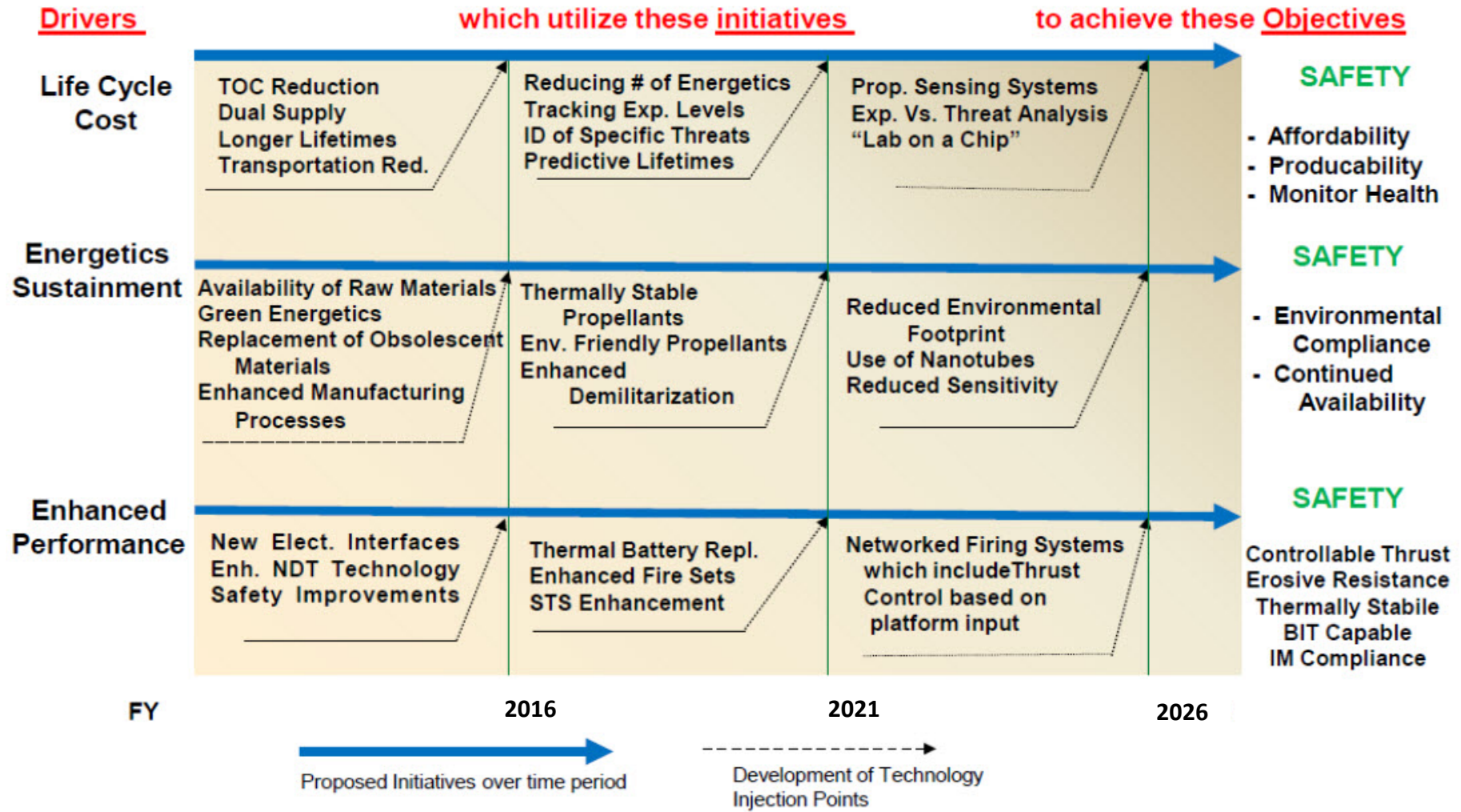
- Roadmap serves as a baseline for future technology development and integration



Technology Roadmap Approach

Drivers	Initiatives			Objectives
Safety Life cycle cost Energetic Sustainment Enhanced performance	2 year	5 year	10 year	SAFETY Affordability Producibility Monitor Health Environmental Compliance Continued Availability Controllable Thrust Erosive Resistance Thermally Stable BIT Capable IM Compliance

CAD/PAD Technology Roadmap





CAD/PAD Technology Roadmap

Roadmap Highlights:

- **The CAD/PAD Technology Roadmap team is working with other teams established to support Energetic Sustainment**
 - **OSD “Critical Energetic Materials Team”**
 - **CAD/PAD Obsolescence Team**
- **Under the “Life Cycle Cost” Driver – the propellant sensing initiative is a technology that is rapidly evolving and could be introduced into CAD/PAD applications over the near- and mid-term. Advancements in this technology area could accelerate all the initiatives listed under the Far-term “Cost” Driver.**
- **Several CAD/PAD Technology Roadmap recommended projects are presenting at 2016 CAD/PAD Technology Exchange Workshop**
- **CAD/PAD funded project receives NAVSEA Commander’s Award for Innovation for work supporting electronic time delays**



CAD/PAD Technology Roadmap

Roadmap Highlights (cont.):

- Additive Manufacturing technology is continuing to evolve at a very rapid rate

Plastics – “3D Printing” or “Stereolithography” or “Additive Manufacturing” has become routine and the technology is readily available (desktop versions). This technology has proven beneficial to numerous industries for many differing applications.

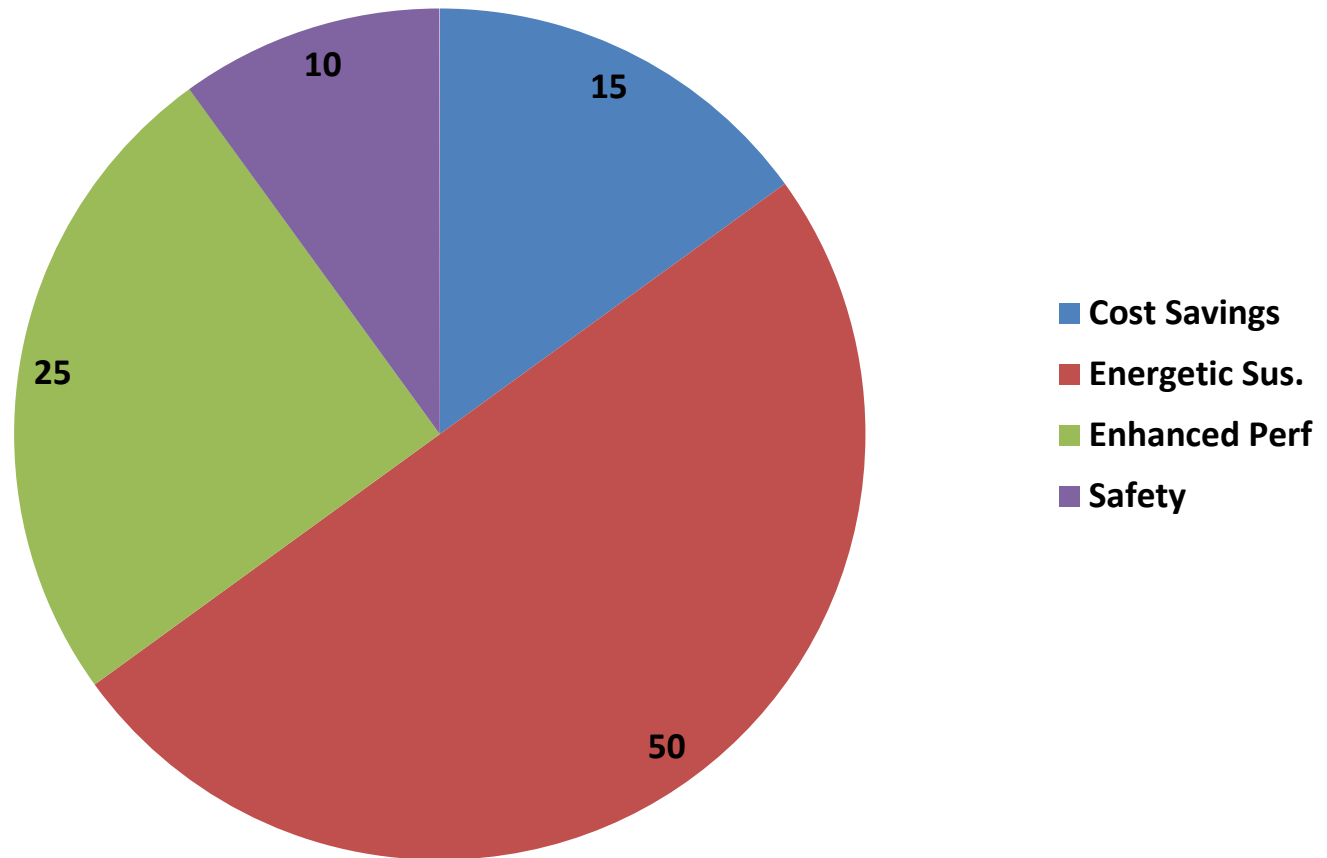
Metals – The science of creating metal components utilizing additive manufacturing technology has yet to be fully demonstrated when tightly controlled tolerances are required. The additive manufacturing industry continues to develop the capability to produce more tightly toleranced components and, within 5 years or less, this capability could be exhibited.

Energetic Materials – The science of creating energetic materials, utilizing additive manufacturing technology, has achieved some initial successes. The U.S. DoD is supporting several initiatives to develop this capability beyond the laboratory stage. Availability of the energetic materials and their associated costs are the drivers for these on-going initiatives.



Technology Roadmap Project Funding

E24 Technology Development Roadmap related funding %





Schedule

- The CAD/PAD Technology Roadmap team is active and is currently conducting interviews

Interviews Completed	1 JUL 2016
Review Collected Data	JUL .. SEP 2016
Draft Report	SEP/OCT 2016
Publish Report	NOV 2016



Conclusions

- The CAD/PAD Technology Roadmap process continues in FY16 and maintains a similar overall approach as utilized in previous efforts AND reinvigorated several processes
- The CAD/PAD JPO continues to support both the OSD and the CAD/PAD obsolescence teams in addition to supporting a variety of additive manufacturing programs, projects, and initiatives.
- Continues to present the CAD/PAD Technology Roadmap to all interested parties – NSWC IHEODTD activities and vendor partners. This presentation can be conducted either in person or by any other appropriate means (telecon, VTC, etc.). The primary objective of these discussions is to inform the community that the CAD/PAD Roadmap is an active project and all are encouraged to participate in future Roadmap efforts.
- Continue to support Conferences/Symposia as appropriate. At a minimum, review the new technical papers and presentations offered at Conferences/Symposia that the CAD/PAD team had previously attended. Support new initiatives, such as technical sessions on energetic materials and CAD/PAD components at future venues and forums.
 - NDIA Insensitive Munitions and Energetic Material Symposium
 - International Nitrocellulose Symposium
 - AIAA Propulsion & Energy Symposium
 - JANNAF (multiple)

Thank You for participating in
CAD/PAD Technology
Roadmap Project

CADPAD@navy.mil

BACKUP

