MDA SBIR/STTR Industry Day

28-29 July 2010

Manufacturing, Producibility & Field Sustainability Research Area

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MDA/DVP

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Agenda

- MDA/DVP Focus
- Topic Being Published
- Key Issues
- Summary of Topic
- Contact Information
- Questions?

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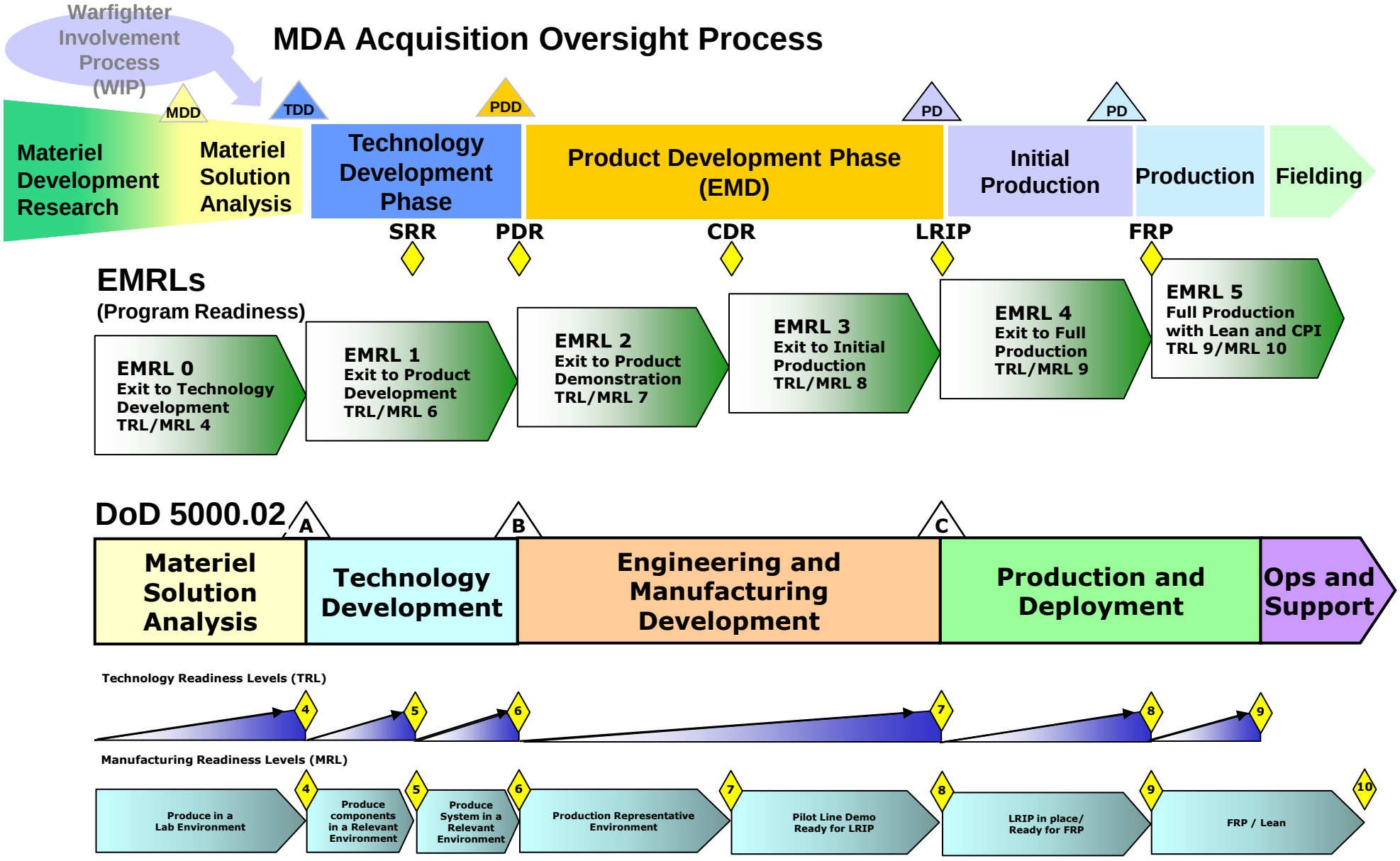
BMDS Technology and Manufacturing Maturity



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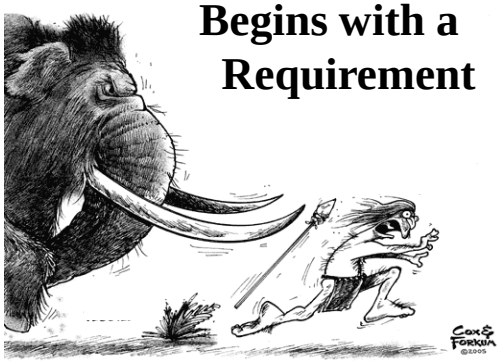
Goal of Manufacturing



Begins with a Requirement

THE GOAL OF MANUFACTURING:

- Deliver Uniform, Defect-Free Product to the Warfighter
  - Consistent Performance
  - Affordable

THE ROLE OF MANUFACTURING:

- Influence the Design Process (Producibility)
- Prepare for Production (Manufacturability)
- Execute the Manufacturing Plan
  - Reflect the Design Intent
  - Ensure Repeatable Processes
  - Focus on Process Improvement

Ends with a Solution

Producibility/ Risk Reduction Investments

Factory Environment

FACTORY FLOOR CHARACTERIZED

PRODUCIBLE DESIGN

Design

TRL 3
MRL 3

Manpower **Machines** **Methods**

Material **Measurement** **Environment**

Product

TRL 9
MRL 8

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Topics:

Manufacturing, Producibility & Field Sustainability

Develop and apply innovative manufacturing processes that improve capabilities, sub-systems and component performance, product quality and reliability, reduce unit costs, reduce cycle time, reduce process variability, and enhance manufacturing yields in these technical areas:

SBIR

- Materials and Life Cycle Sustainability
- Radiation Hardening Manufacturing Technology
- Anti-tamper Technology for Missile Defense
- Ballistic Missile Defense System Advanced Power Storage Devices
- Manufacturing Process Maturation for Propulsion Technology

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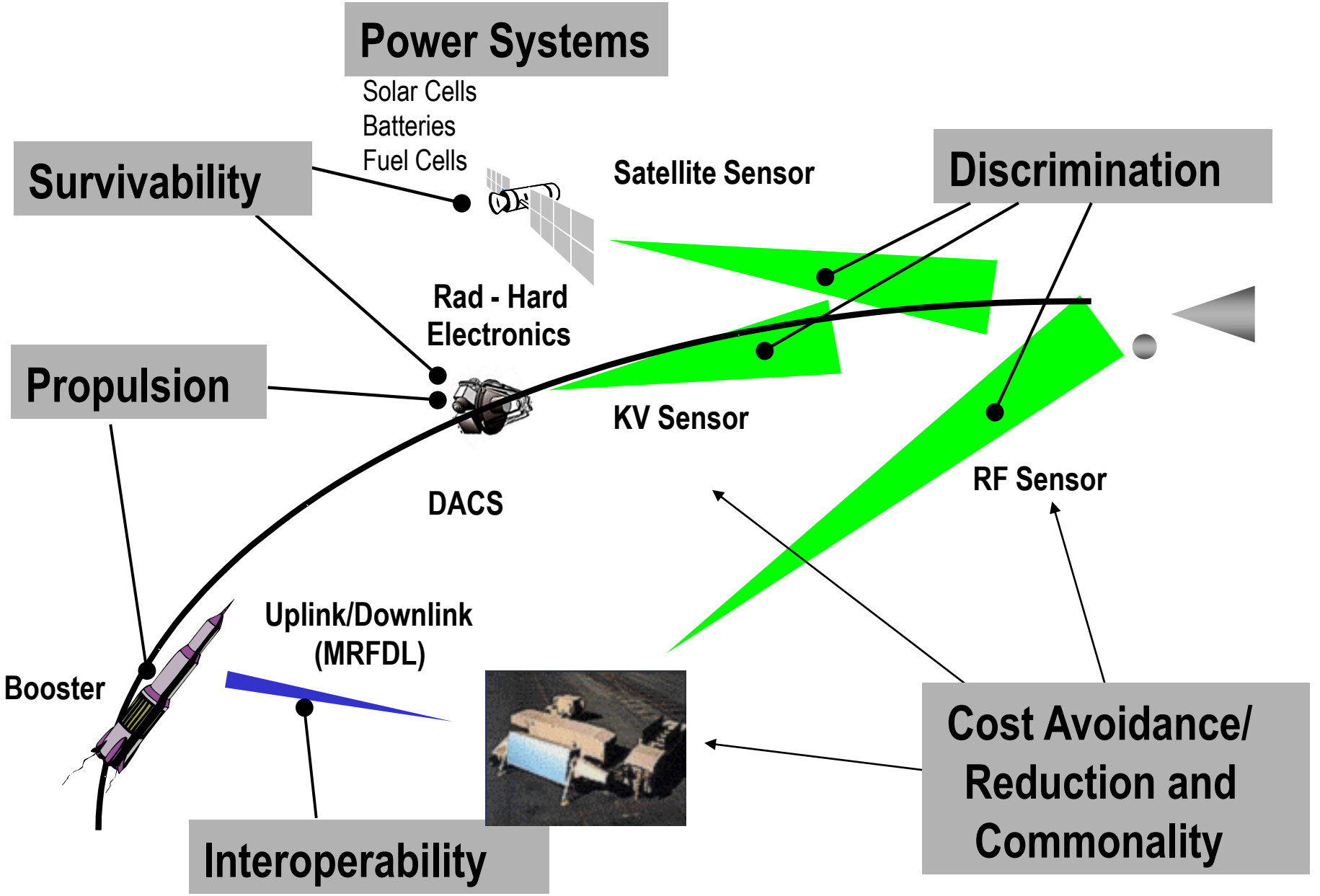
Key Issues



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Materials and Life Cycle Sustainability

- **Enhance the performance, producibility and sustainability of missile body structures and components for implementation into Ballistic Missile Defense systems through utilization of novel materials and processes.**

- **Areas of interest:**
  - Aerostructures and radomes to minimize internal temperature and airframe integrity
  - Ceramic matrix composites and involute composites with operating ranges of 2500-6000F
  - Enhanced characterization environments using analytical methods to determine survivability via higher fidelity ground testing for weather conditions
  - Improved ground and flight testing methodologies to support system performance assessments

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Radiation Hardening Manufacturing Technology

- **Increase the radiation hardness/survivability of electronics components through innovative approaches in design, materials, signal processing algorithms, advanced production processes and capabilities, and/or novel approaches in combining these factors for BMDS systems.**

- **Areas of Interest:**
  - Innovative concepts that use radiation-hardening by process, by design, by architecture or a combination of these approaches
  - Approach that will allow systems to endure and operate reliably in BMDS mission environments (radiation, shock, vibration, thermal, etc) without increasing weight or decreasing performance
  - Advanced designs, advanced materials, and production processes and capabilities
  - Innovations that are minimally invasive, producible and can be inserted into all missile defense systems

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Anti-Tamper Technology for Missile Defense

- **Develop a means to protect against Side Channel Attacks (SCAs) on Field-Programmable Gate Array (FPGA) devices for the protection of Critical Program Information (CPI) against exploitation.**
    - SCAs are attacks based upon the physical implementation of a cryptosystem, rather than from brute force or theoretical weaknesses in the algorithms

- **Areas of interest:**
  - Example SCAs to be addressed include; timing information, power consumption, electromagnetic/sound leaks and fault injection
  - Concept and methodology should be applicable to COTS and military hardware
  - Protection of CPI without introducing additional risk, cost or weight to the weapon platform and its mission
  - Covertness of the application, personnel and mission safety, low (or no) power requirement and seamless integration in the BMDS weapon platform

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Ballistic Missile Defense System
Innovative Power Storage Devices

- **Improve the quality, reliability and producibility of batteries and related power sources through innovative ideas applied in creative ways to accommodate unique, existing and future MDA system, subsystem and component requirements.**

- **Areas of interest:**
  - Innovative software-based tools to aid manufacturers with battery design and production monitoring
  - Innovations that reduce nonrecurring engineering costs, shorten lead times, and produce lighter, safer, and less expensive cells and batteries
  - New and/or improved reserve battery manufacturing techniques for missile applications
  - Improved manufacturing techniques and development of reliable, lower cost manufacturing processes for aerospace-grade Li-ion batteries
  - Rechargeable Li-ion and other types of cells that are suitable for use in missiles at moderate power levels and high energy levels

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Manufacturing Process Maturation for Propulsion Technology

- **Producibility and cost reduction improvements for low-cost, high-performance materials and components. Reliable performance in both lower and upper boost phases, as well as end game, requires innovative, mature, and reduced-cost manufacturing processes. Applications of interest include solid boost motors as well as solid and liquid propellant divert and attitude control systems.**

- **Areas of Interest:**
  - Low voltage, high power density, high performance actuators for 5 to 2000 lbf applications
  - Innovative technologies to miniaturize the pressure regulator to reduce packaging weight and volume while increasing the regulated pressure tolerance to approximately 100 psi
  - Ablation-resistant components utilizing advanced materials such as liners, nozzles, and hot gas path components. New materials which pyrolyze to form dense, adherent, and low thermal diffusivity char layers
  - Define and identify concepts for IM technology improvements and new technologies for SRMs

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MDA/DVP Expectations

What MDA/DVP Wants To See In SBIR Responses:

- Demonstration Of New And Innovative Process Technologies That:
  - Reduce Cost
  - Reduce Manufacturing Cycle Time
  - Improve Performance
  - Improve Reliability
- Technology Roadmaps For Implementing Promising Manufacturing Technology Processes Into Current Or Future Supply Chain
- Plans For Near Term Insertion Into BMD Element Systems, Subsystems, Or Components

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Questions

- Questions after August 15, 2010 need to be submitted through the SBIR/STTR Interactive Topic Information System (SITIS) http://www.dodsbir.net/sitis/
- For reasons of competitive fairness, direct communication between proposers and topic authors is not allowed starting August 16, when DoD begins accepting proposals for this solicitation.
- However, proposers may still submit written questions about solicitation topics in which the questioner and respondent remain anonymous and all questions and answers are posted electronically for general viewing until the solicitation closes.
- All proposers are advised to monitor SITIS (10.3 Q&A) during the solicitation period for questions and answers, and other significant information, relevant to the SBIR 10.3 topic under which they are proposing.

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BACKUP

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Contact Information

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