Missile Defense Agency Update

NDIA Annual Missile Defense Small Business Programs and SBIR/STTR Programs Conference

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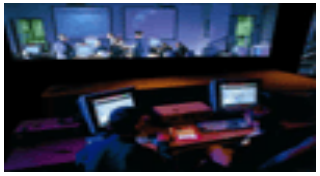
BMDS Scenario Video

Phased Adaptive Approach To Developing And Deploying Missile Defense

Phase I: Deploying Today's Capability (By Dec 2011)

Aegis BMD 3.6.1 with SM-3 IA

AN/TPY-2 (FBM)

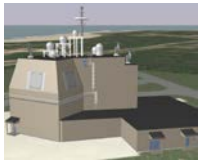


C2BMC AOC Ramstein

ALTBMD Interim Capability

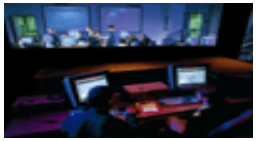
Phase II: Enhancing Medium Range Missile Defense (By 2015)

Aegis BMD 4.0.1/5.0 with SM-3 IB



Aegis Ashore 5.0 with SM-3 IB (one site)

AN/TPY-2 (FBM)



C2BMC Updates

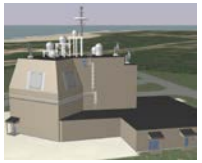
ALTBMD Lower Tier

Potential EPAA Enhancements

THAAD

Phase III: Enhancing Intermediate Range Missile Defense (By 2018)

Aegis BMD 5.1 with SM-3 IIA



Aegis Ashore 5.1 with SM-3 IB/IIA (two sites)

AN/TPY-2 (FBM)

C2BMC Updates

ALTBMD Upper Tier

Potential EPAA Enhancements

THAAD

PTSS

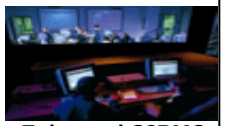
ABIR

Phase IV: Early Intercept of MRBMs, IRBMs, ICBMs (By 2020)

Aegis BMD 5.1 with SM-3 IIA

Aegis Ashore 5.1 with SM-3 IIB (two sites)

AN/TPY-2 (FBM)



Enhanced C2BMC

Potential EPAA Enhancements

THAAD

PTSS

ABIR

Ground-based Midcourse Defense

East Coast IDT

Clear, AK UEWR

Cape Cod UEWR

MDA Surpassed DoD Business Goals in FY11 (U)

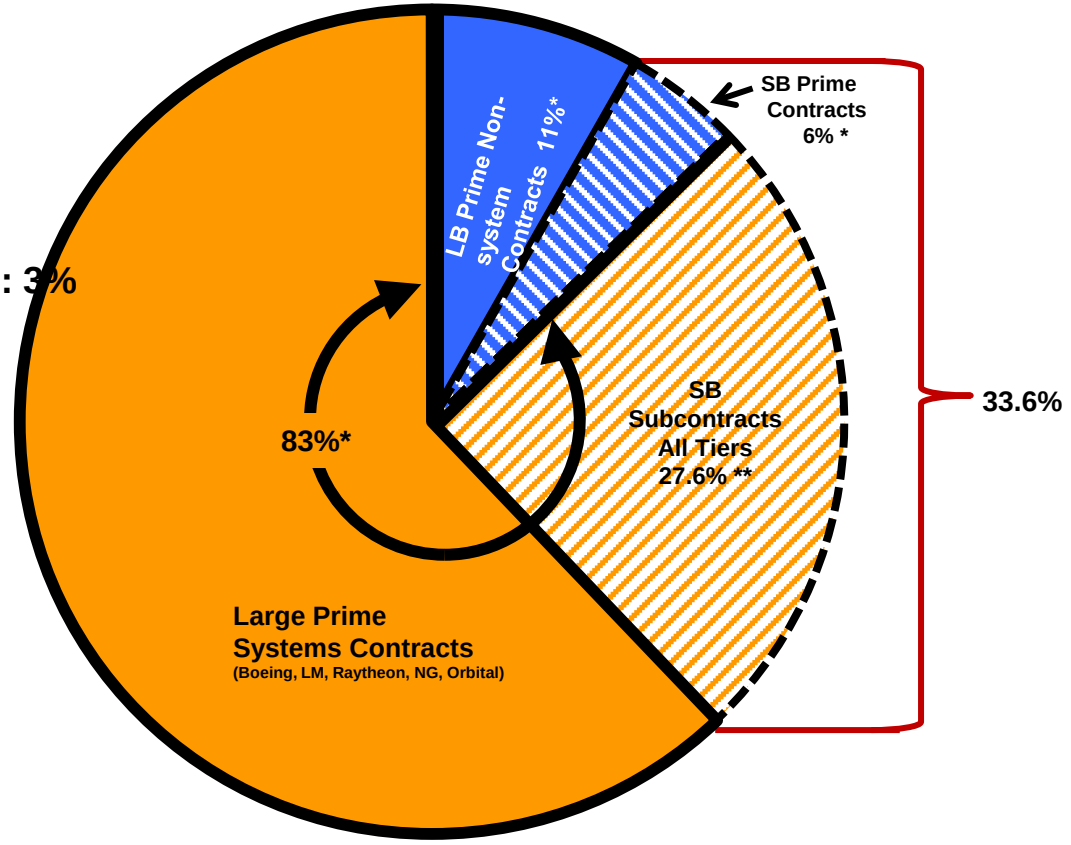
Statutory Small Business Goals for DoD:

- Total Small Business: 23%
- Small Disadvantaged Business: 5%
- Woman-Owned Business: 5%
- Service-Disabled Veteran Owned: 3%
- Historically Underutilized Business Zones: 3%

MDA FY 11 SB Performance

- 33.6% of MDA acquisition dollars flowed to small businesses
  - 6.0%* of MDA acquisition dollars were awarded as prime contracts to small businesses
  - 27.6%** of MDA acquisition dollars were awarded to small businesses as subcontractors

MDA Total Acquisition Dollars*



	Total $'s Awarded	Total $'s Awarded to SB's	Total % to SB's	Total Prime Contact $'s to SB's	Total % to SB's	Total Subcontract $'s to SB's	Total Subcontract % to SB's
FY 11	$5,687,765,976	$1,912,764,802	33.60%	$343,350,413	6.00%	$1,569,414,389	27.60%

BACKUP

What Opportunities are at MDA?

General Small Business Opportunities at MDA

- Subcontracting opportunities with our large system prime contractors
- Advisory and assistance services
- Infrastructure support
- Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) programs

Focused Small Business Opportunities this Year

- UEWR BIT: Total Small Business Set Aside (SBSA)
- Logistics Support (DPL) Currently in RFI/Sources Sought but the intent is to find out available capabilities to see if it can be a total SBSA
- Facilities Support (DPF) was a SBSA that went 8(a) on the GSA LOGWORLD Contract (currently in Source Selection)

Small Businesses are Vital to MDA

Director's "Importance of Small Business to MDA" Memo (06 Apr 12)

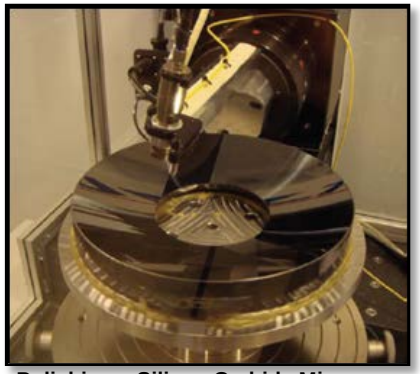
- Reduce single point failures in the supply chain
- Lower program cost through more competition
- Improve capabilities fielded to the Warfighter by using SBIR/STTR technologies

MDA Small Business Goals

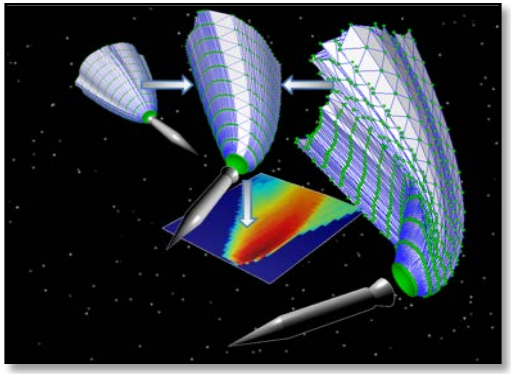
- Grow the small business industrial base supporting the BMDS and Agency
- Increase qualified small business vendors at all tiers of subcontracting
- Improve the quality of the products and services through competition
- Increase technology transfers from the SBIR/STTR programs into BMDS

Small Business Innovation Research (SBIR)
Small Business Technology Transfer (STTR) Programs

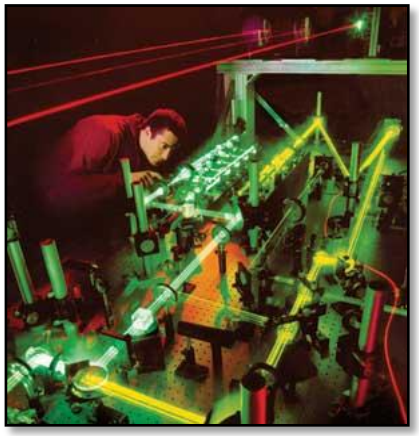
- **$87M program sponsoring research with over 340 small businesses in FY 11**
- **What are the MDA objectives and focus areas?**
  - **Modeling and Simulation**
  - **Directed Energy**
  - **Missile Propulsion**
  - **Structures**
  - **Radar & Infrared Sensors and Phenomenology**
  - **Test Support**



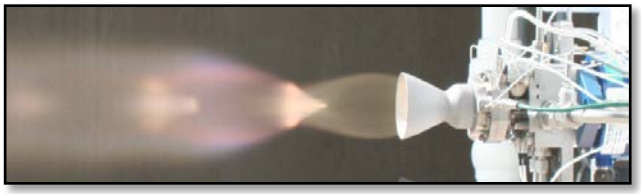
Polishing a Silicon Carbide Mirror
(SM3, STSS, THAAD – Potential Product Improvement)



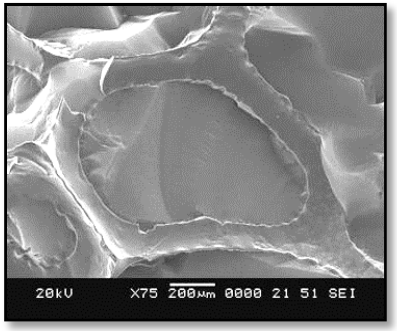
Technique for merging plume models for more accurate scene generation in seeker testing (Modeling and Simulation)



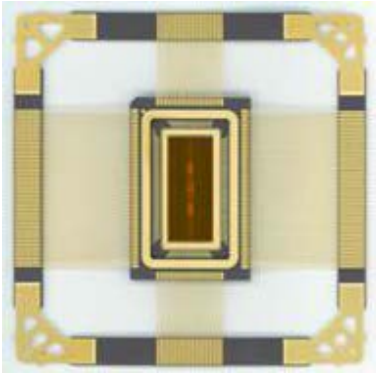
Testing a multiple laser system



Test of integrated valve/injector for bi-propellant thrusters
(THAAD – Potential Product Improvement)



Light-weight insulator material imbedded in metal foam (SM3 IIA Structural Insulator)



Radiation-hardened memory chip
(Potentially for STSS, GMD, THAAD)

Recent Small Business Success Stories

The following slides show success stories of technologies which have transitioned to missile defense systems. These stories represent what can happen with innovations developed through the SBIR/STTR program.

Transitioning SBIR Research:
deciBel Research, Inc.

Upgrading Computer Architecture for Radar

Problem

The single-instance, symmetric multiprocessing (SMP) architecture for radar computing lacks the scalability required for emerging needs. Scalability allows distribution of code to automate tasks—and to add or update radar functions. A lack of scalability hinders efficiency, leading to less than optimal speed and effectiveness for critical radar systems.

Solution

deciBel Research has created a scalable architecture for Raytheon's multitasking algorithms. The approach minimizes workload associated with smaller radar-tracking processing tasks, which can often take as much time to compute as large-scale tasks. The solution, a heterogeneous cluster of processors connected by a high-bandwidth "fabric" or platform, meets MDA's real-time computing requirements.

Key Investments

- **HQ0006-08-C-7913 (SBIR Phase II, 2008, $983,983)**
  Advanced Signal Processing Technologies for BMDS Radars
- **W9113M-07-C-0085 (SBIR Phase I, 2007, $99,770)**
  Advanced Signal Processing Technologies for BMDS Radars

Measure of Success

deciBel, now serving as a systems engineering/technical assistance contractor for MDA, offers its architecture to several prime contractors. The company teamed with Raytheon Integrated Defense Systems to help develop the next-generation computer architecture.

Transitioning SBIR Research:
Hyper-Therm High Temperature Composites, Inc.

Improving Thrusters for Kill Vehicles

Problem

The weight that metal injectors bring to a rocket assembly adds to the overall weight of the rocket-propelled vehicle. Additionally, the orifices of metal injectors can sometimes become fouled by particulate matter.

Solution

DACS injectors made from a tough foam based on silicon carbide (SiC) have demonstrated increased performance by: improving mixing efficiencies and combustion stability; increasing injector reliability by reducing vulnerability to particulate fouling of orifices; providing manufacturing cost savings by eliminating the need for precision machining of numerous small-diameter orifices; and offering weight savings when compared with comparable metal injectors.

Key Investments

- **HQ0147-09-C-7026 (SBIR Phase II, 2009, $984,684)**
  Flight-Weight Ceramic Composite Rocket Thruster Assembly
- **W9113M-04-C-0037 (SBIR Phase II, 2004, $747,458)**
  SiC Matrix Composite Rocket Thrust Chamber with Integrated SiC Foam Propellant Diffuser/Injector

Measure of Success

Hyper-Therm has produced injectors that have been hot-fire tested by Alliant Techsystems, Inc. The company also had in excess of $8M in post SBIR sales of the resulting products.

Transitioning SBIR Research:
Stottler Henke Associates, Inc.

Problem

Command-and-control routines for missile defense engagements comprise a web of scenarios, duties, decisions, and tasks. Inefficiencies in the engagement-planning process could, in a real-world missile defense scenario, result in missed targets.

Solution

Stottler Henke Associates' planning and resource-allocation application, called Aurora, provides improved engagement-planning capability. The tool relies on a proprietary "intelligent" breakdown of data, including variables covering the distribution of time and labor, to determine the optimal moment for each task, as well as the optimal worker or system for handling each task.

Key Investments

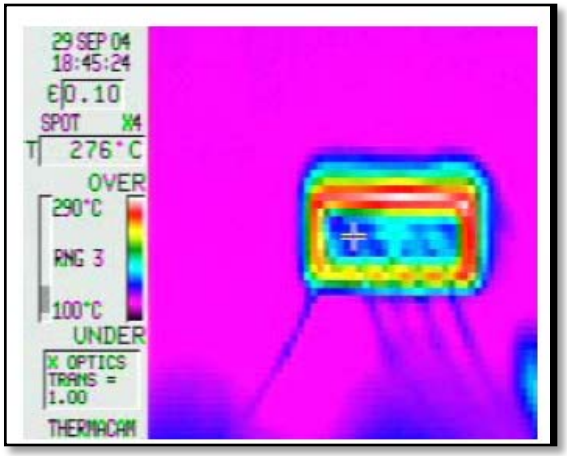
- **W9113M-08-C-0192 (SBIR Phase II, 2008, $499,938)**
  Automated Interceptor to Target Assignment Based on Proven, Advanced Techniques for Planning, Resource Allocation, and Constraint Satisfaction
- **W9113M-07-C-0110 (SBIR Phase I, 2007, $100,000)**
  Automated Interceptor to Target Assignment Based on Proven, Advanced Techniques for Planning, Resource Allocation, and Constraint Satisfaction

Measure of Success

While MDA continues to consider this mature tool for Integration into C2BMC, the tool already is being used by the Air Force, as part of the Air Force Satellite Communications Network. Boeing also has used Aurora as a primary scheduling tool for constructing its 787 passenger jet.

Transitioning STTR Research:
SemiSouth Laboratories - Mississippi State University

- **Mississippi State University (MSU), initially developed unique Silicon Carbide (SiC) device technology through internal R&D**
  - **SiC devices are efficient at operating under heavy load; excellent reliability**
- **MSU partnered with a small business, SemiSouth Laboratories and was awarded 10 MDA STTR contracts ($2.9M)**
- **Contracts contributed to development of MSU Electrical and Computer Engineering Department's High Voltage Laboratory – the largest independent lab of its kind in US**
- **Commercially successful team develops high performance SiC product line including:**
  - **Power semiconductors**
  - **Epitaxial wafers supplied to other manufacturers**
  - **Custom devices and modules**



Thermal Image of a 4H-SiC VJFET