Missile Defense Agency
Advanced Research Overview
The Increasing Ballistic Missile Threat

- Increasing theater threat capabilities
  - Accuracy & Range
  - North Korea developing new IRBM

- Developing ICBM threat
  - North Korea developing KN-08 ICBM
  - Iran may be technically capable of flight-testing an ICBM by 2015
  - Space Launch Vehicles (SLV) could serve as a test beds for ICBM technologies

- Challenging Missile Defense
  - Maneuver / Salvo firings / Countermeasures

Sources: NASIC, Ballistic and Cruise Missile Threat, 2009; DIA, Iran’s Military Power, Statement before the Senate Armed Services Committee, 14 APR 10; Annual Report on Military Power of Iran, April 2012; MISC, e-mail, RE: Unclassified Force Level Numbers, 6 April 2012; DNI, Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, Covering 1 JAN to 31 DEC 2011; NSA-FCS5, e-mail, KN08 Classification, 20 Jan 2013

Approved for Public Release 15-MDA-8319 (21 July 15)
Today’s Ballistic Missile Defense System

**SENSORS**
An effective layered defense incorporates a wide range of sensors to detect and track threat missiles through all phases of their trajectory. Satellites and a family of land- and sea-based radars provide worldwide sensor coverage.

**BOOST/ASCENT**
Defense Segment

- Potential New Technologies
- SM-3 Standard Missile-3
- AEGIS Ashore
- Vertical Launch System

**MIDCOURSE**
Defense Segment

- EKV Exoatmospheric Kill Vehicle
- GBI Ground-Based Interceptor
- GMD Ground-Based Midcourse Defense

**TERMINAL**
Defense Segment

- AEGIS Sea-Based Terminal
- PAC-3 Patriot Advanced Capability-3
- THAAD Terminal High Altitude Area Defense

**THE SYSTEM OF ELEMENTS**

- **C2BMC**
  - Command and Control, Battle Management, and Communications

- **NMCC**
- **USSTRATCOM**
- **USNORTHCOM**
- **USPACOM**
- **USEUCOM**
- **USCENTCOM**
## Representative Technology Topics

### Space and Sensor Technology
- Advanced Cognition Processing and Algorithms for Improved Identification
- System Communications
- Command and Control Human-to Machine Interface
- Improved Track Accuracy for Missile Engagements
- Open Framework Planner with Embedded Training
- Improvements in Spacecraft Manufacturing Efficiency
- Innovative Antenna Arrays Enabling Continuous Interceptor Communications

### Directed Energy Technology
- Power Sources and Thermal Management for High Energy Lasers
- High Power Optical Fibers
- Quick Recovery High Energy Diodes
- Ultra low SWaP Diode Pump Modules
- Large Stroke, High Spatial Bandwidth, Deformable Mirrors
- Light Weight, Dampened Optical Benches
- Optics & Coatings for Alkali Environments

### Interceptor Technology
- Interceptor Thermal Protection Systems
- Lethality Enhancements
- Multi-Object Payload Deployment
- Advanced Reserve Battery Technologies
- MENS IMU Solutions for Missile Defense Applications
- Lithium Oxyhalide Battery Separator Material
- High Temperature Material Manufacturing Improvements

### Future BMDS Concept Development
- Expand Digital, Constructive, and HWIL Tools
- Aerospace Vehicle Target Tracking and Discrimination
- Radar Interferometric Processing for EMG
- Radiation Hardened Mirror & Focal Plane Array Technology
- Low Light Short Wave Infrared Focal Plane Arrays
- Innovative Ways to Shorten System Level Simulation Integration Time
MDA Small Business Innovation Research (SBIR) / Small Business Technology Transfer Program (STTR) Focus

• **Pursue a broad range of high-risk technologies**
  - To search out revolutionary technologies
  - Transform new technologies into actual applications for insertion into the BMDS
  - Benefit from commercialization

• **Technology insertion into the BMDS is critical**

• **4th largest program in the Department of Defense**

- Advanced Battery Technology
- High Energy Laser
- Seeker Technology
- Nanosat Technology Demonstrations
- Ultrasonic Detector Focal Plane Arrays
- Ultra Sensitive Detector Focal Plane Arrays
- Multi Static Radar Technology
- Lightweight Composite
- Ruggedized Electronics
- Advanced IMU Technology
- Rad-hardened Mirror Technology

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SBIR / STTR Phase I Overview

• Proposals:
  - Twenty pages
  - Three criteria:
    • Technical merit, feasibility of the concept and approach
    • Qualifications of team
    • Commercialization/Transition potential and approach
  - Must identify all foreign nationals and level of involvement
  - Most recent SBIR and STTR topics and awards are available on the DoD SBIR / STTR website (http://www.dodsbir.net)

• Contracts:
  - Topics typically Export Control restricted
  - Unclassified
  - Currently $125,000 (no options); 7 Months
SBIR / STTR Phase II Overview

• All Phase I awardees under a particular solicitation are allowed to submit a proposal for Phase II award

• Phase II proposals:
  - Accepted only during announced open period
  - Announcement on web page with email notification to current Phase I awardees
  - Two-year award to further concept development to the prototype stage
  - Submitted for an amount not to exceed $1,000,000
  - MDA may later consider enhancing Phase II contract funding depending on BMDS relevance and program needs
Commercialization and Transition Office Initiatives

- Encourage transition of SBIR and STTR projects into the BMDS
  - Facilitates transition planning
  - Oversees all Phase III projects
  - Coordinates with primes and program offices
  - Conducts workshops and industry days
  - Recommends Phase II projects for enhanced funding
Suggested Resources
For More Information

www.mda.mil

• Missile Defense News, Images, Videos, Fact Sheets
• BMDS Overview, BMD Basics
• MDA Business Opportunities (http://www.mda.mil/business/advanced_research.html)

To Contact MDA

• SBIR / STTR  256-955-2020 sbirsttr@mda.mil
• University / BAA  256-450-3800 Advanced Research@mda.mil
• Commercialization  256-450-5343 SBIR-PhaseIII@mda.mil