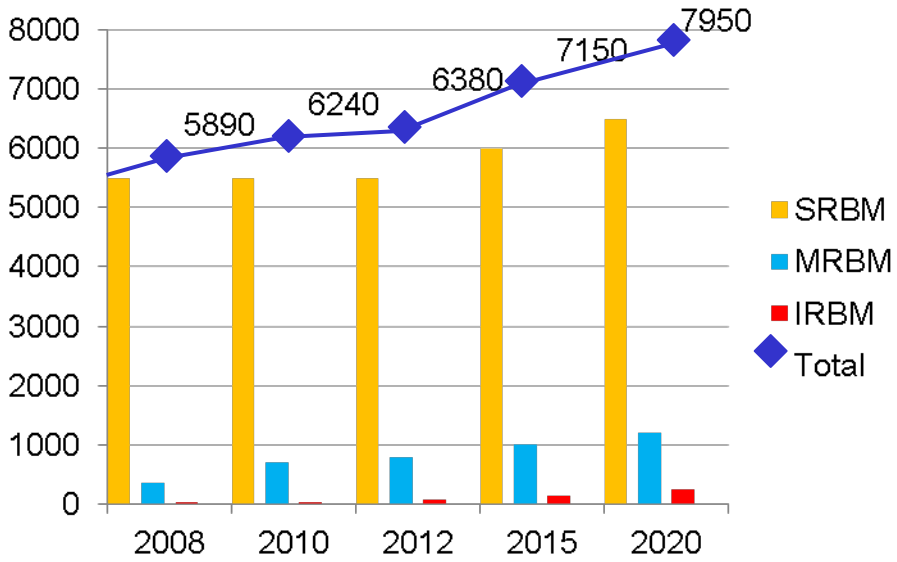
# *Missile Defense Agency*
# *Advanced Research Overview*

# 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



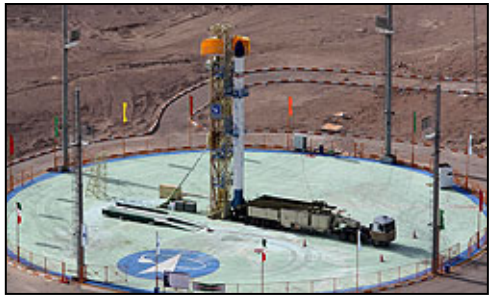

**Theater Ballistic Missile Force Levels**

***Not including U.S., China, Russia or NATO***


***North Korean KN-08 ICBM Launcher on Parade, 2012***


***North Korean Mobile IRBM on Parade, 2010***

***NK Taepo Dong-2 SLV Launch, 2012***



***Iranian Safir SLV on Launch Pad, 2011***

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 2012DNI, Remarks, Worldwide Threat Assessment to the Senate Select Committee on Intelligence, 12 March 2013; Full Update, DIA, Annual Threat Assessment 2008, 2012; MSIC, 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 2013FARS News Agency, Korea Central News Agency, Yonhap News Agency

# The Increasing Ballistic Missile Threat

*Taepo Dong-1 Launch, August 1998*

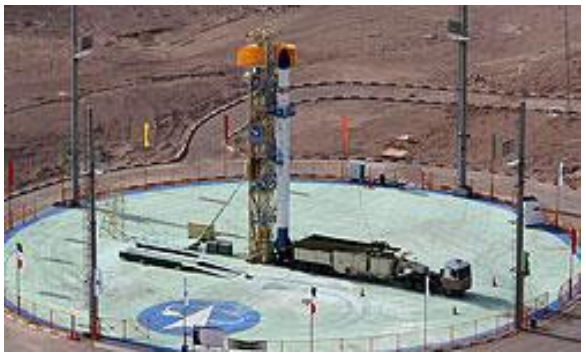
*North Korean Taepo Dong-2 SLV Launch, December 2012*

*Missile Launches in Iranian Noble Prophet III Exercise 2009*

*Iranian Ashura 2-stage solid MRBM launch 2012*

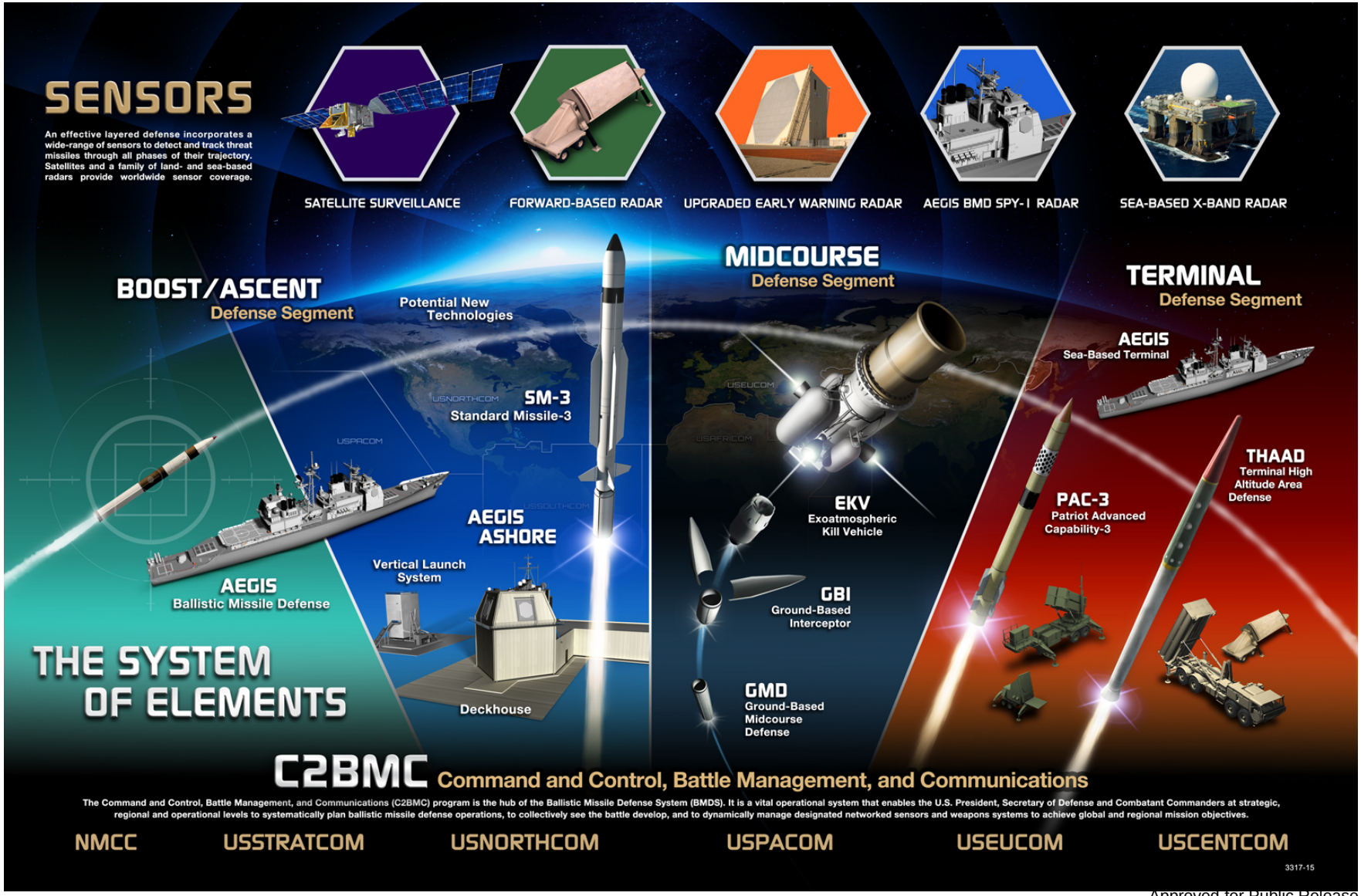

*North Korean Mobile IRBM on Parade, April 2012*


*North Korean KN08 ICBM Launcher on Parade, 2012*



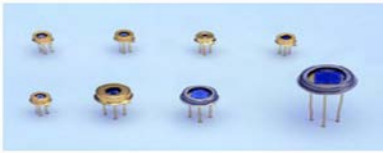
*Iranian Safir SLV on launch pad, 2011*

# Today's Ballistic Missile Defense System

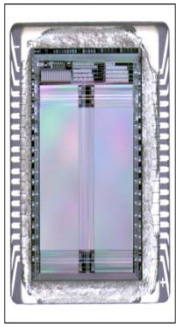


# MDA Small Business Innovation Research (SBIR) / Small Business Technology Transfer Program (STTR) Focus

- **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**



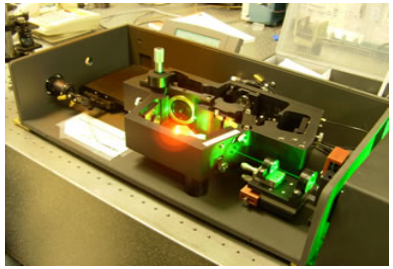
Ultra Sensitive Detector Focal Plane Arrays



Ruggedized Electronics

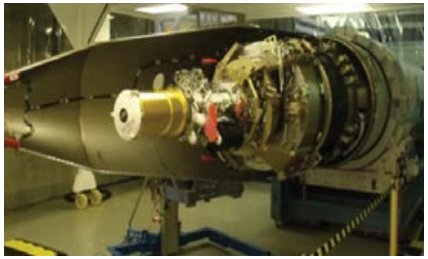
Advanced IMU Technology

Advanced Battery Technology

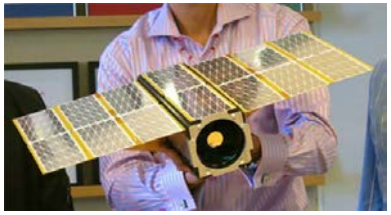


High Energy Laser

Multi Static Radar Technology

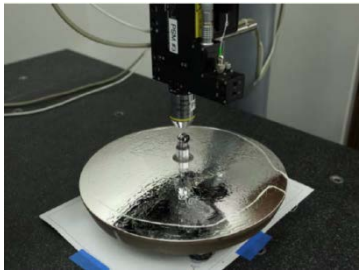


Seeker Technology



Nanosat Technology Demonstrations

Lightweight Composite



Rad-hardened Mirror Technology

# 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

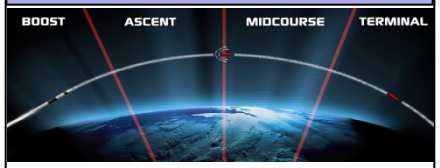
## Directed Energy Technology

- 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

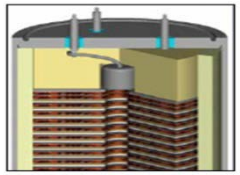



- Expand Digital, Constructive, and HWIL Tools
- Aerospace Vehicle Target Tracking and Discrimination
- Radar Interferometric Processing for EMG
- Radiation Hardened Mirror & Focal Plane Array Technology
- Low Light Short Wave Infrared Focal Plane Arrays
- Innovative Ways to Shorten System Level Simulation Integration Time

# Rapid Innovation Fund (RIF) Program

- **Established under FY11 Defense Authorization Act (Section 1073)**
  - A competitive, merit-based program
  - Accelerate fielding of innovative technologies into military systems
  - Typically, all MDA RIF projects are a SBIR Phase II follow-on
  - Prioritization is given to small business
- **Key Requirements:**
  - Satisfy an operational or national security need
  - Accelerate or enhance military capability
  - Reduce
    - Technical risk
    - Cost: Development, acquisition, sustainment, or lifecycle
  - Improve timeliness and quality of test and evaluation outcome
  - Provide approach for use by an acquisition program
  - Typical award length 24 months
  - Award values up to $3M

**Insulator Material for Propulsion Systems**

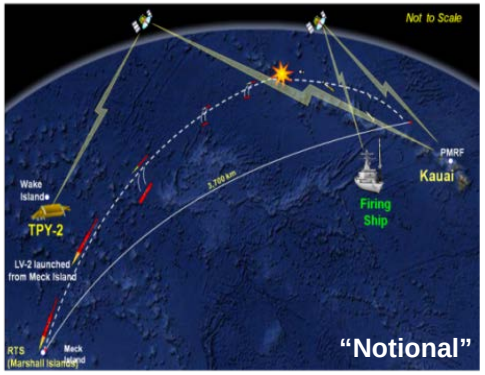


**Advanced Insulation for Thermal Batteries**

**Lightweight Thermal Protection System**

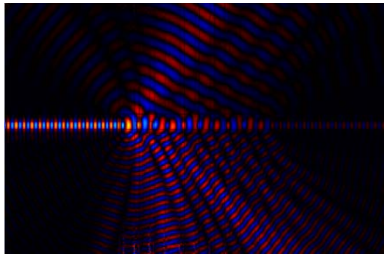
# University Engagement

- **Technical Objectives**
  - Fund relevant, advanced research and development at domestic universities and academic institutions
  - Exploit breakthroughs in science to offer robust technical improvements to BMDS
  - Build portfolio of revolutionary technology to support and enhance BMDS
  - Develop holistic partnerships
  - Educate future scientists and engineers

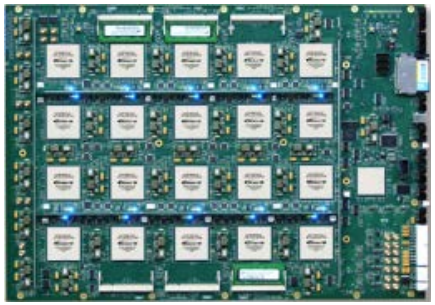



**Data Fusion and Tracking Algorithms**

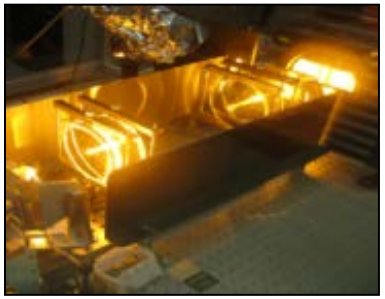
**Advanced Command and Control Algorithms**



**Optical Signal Processor Technology**



**Field Programmable Gate Array Technology**



**High Energy Laser Technology**

**Propulsion Technology**

# BAA Programs

- **Missile Defense Science & Technology Advanced Research**
  - Open continuously for proposals from universities
    - Broad Agency Announcement (http://www.fbo.gov)
  - Research topics revised annually
  - MDA is seeking strategic alliances with universities
  - Two year base period with one year option
    - Base period $400,000
    - Option year $200,000
- **Advanced Technology Innovation Broad Agency Announcement**
  - Open continuously to university and commercial vendors
  - Contract value not limited
  - Link: http://www.mda.mil/business/advanced_research.html

# What is a Broad Agency Announcement (BAA)

- **A competitive research and development contracting approach in the form of a general agency announcement:**
  - Identifies areas of research interest
  - Includes criteria for selecting proposals
  - Solicits participation from all offers capable of satisfying the Government need
- **Primary objective is to encourage participation by science and technology firms and educational institutions in meeting general research and development goals for innovative ideas and approaches**
- **Meet full and open competition requirements "The Competition in Contracting Act of 1984"**
- **Evaluates proposals based on peer or scientific reviews against individual merits rather than against each other**

# BAA: Source Selection

- **MDA receives white paper**
- **Evaluation team evaluates and makes recommendations for award based on a peer or scientific review process IAW with FAR 35.016(d) and (e)**
- **Technical evaluator(s) uses criteria IAW the BAA to score white paper**
  - Technical merit
  - Capabilities
  - Management
- **BAA Selection Official makes selections based on the evaluation criteria IAW the BAA, MDA funding and technology priorities**

# 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)
- DoD SBIR/STTR website: https://sbir.defensebusiness.org
- SBA SBIR/STTR website: https://www.sbir.gov

## 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