STELLAR TEAM NOBLE MISSION

MDA
Technology Maturation Overview

To: MDA University Innovation Summit (UIS)

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MDA Technology Maturation (DVR)

- **Pursue a broad range of high-risk technologies**
  - **Capitalize on the innovation and creativity of the Nation's small businesses and universities**
  - **Develop and transform cutting edge technologies into actual applications for insertion into the MDS (Missile Defense System)**

- **Technology Maturations' Technical Objectives**
  - **Fund relevant, advanced Research and Development at domestic universities and small businesses**
  - **Exploit breakthroughs in science to offer robust technical improvements to MDS**
  - **Build portfolio of revolutionary technology to support and enhance MDS**
  - **Develop holistic partnerships**
  - **Educate future scientists and engineers**

MDA/DVR – Technology Maturation Program

Investments Increase Technology Readiness Level

Early Technology Developments → Component Technology Assessments / Nanosat Testbed Initiative → Transition

Drivers
- Prioritized Capabilities List
- Achievable Capabilities List
- Future Architecture Roadmap
- Science & Technology Roadmap
- OSD R&E Priorities

Component Technology Development Portfolios
- Advanced Materials
- Propulsion & Controls
- Seeker Technology
- Guidance and Navigation
- Communication

HTIRWC (SDL)

Partners: DARPA, Navy, AF

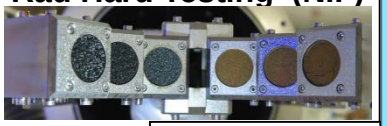
Evaluate seeker window materials for hypersonic applications
Current Focus: MWIR/LWIR Materials
Transition: AB, GM, TH

Adv. Materials - CAM 2.0

Partners: Army, Navy, AF, DARPA

Evaluate TPS materials for hypersonic applications
Current Focus: Low cost Carbon / Carbon
Transition: AB, GM, TH

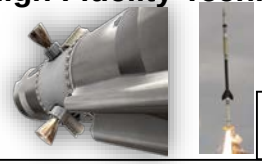
Rad Hard Testing (NIF)



Partner: DOE

Evaluate optical coatings and Substrates for HAENS survivability
Current Focus: Mirror/Coating Combinations
Transition: SS, GM

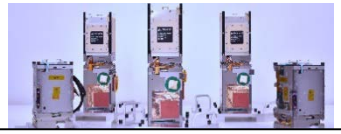
High Fidelity Tech. Demos



Partner: NASA

Execute maturation tests where ground tests are not representative
Current Focus: Propulsion Technology
Transition: SS, AB, GM, TH

NTI Missions



Partners: DARPA, Navy, AF

Execute maturation tests where ground tests & short flight experiments are not in representative environment
Current Focus: RF & Laser Communication Technologies
Transition: SS, GM, BC

Demonstrated technology reduces risks for Spiral Upgrades, Programs of Record, and Prototype maturation decisions

LEGEND:
Adv. - Advanced
AF – Air Force
CAM - Composite Advanced Materials
DOE – Department of Energy
HAENS: High Altitude Exo-Atmospheric Nuclear Survivability
HTIRWC – High Temperature Infrared Window Characterization
NIF – National Ignition Facility
MDS- Missile Defense System
NTI – Nanosat Testbed Initiative
OSD – Office of the Secretary of Defense
R&E – Research and Engineering
SBIR – Small Business Innovation Research
SDL – Space Dynamics Lab
STTR – Small Business Technology Transfer
TPS – Thermal Protection System

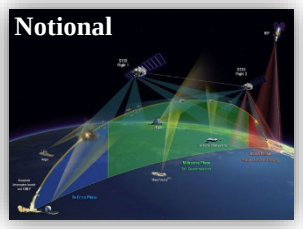
Develop and transform cutting edge technologies into applications for insertion into the MDS

MDA Technology Maturation

- **MDA/DVR Technology Maturation utilizes the following research vehicles:**
  - **Small Business Innovation Research / Small Business Technology Transfer (SBIR/STTR) program**
    - 4th largest SBIR/STTR program in the Department of Defense
  - **Office of the Secretary of Defense (OSD) Rapid Innovation Fund (RIF) program**
  - **Broad Agency Announcements (BAA)**

SBIR /STTR Solicitation Process

- **SBIR / STTR program is a four step process**
  - **Phase I: feasibility and concept development**
  - **Phase II: technology and prototype development**
    - Technology may receive one sequential Phase II
  - **Phase II Enhancement: Prototype testing and technology demonstrations and validation**
  - **Phase III: Commercialization and Transition**



(SBIR/STTR Funded)	(SBIR/STTR Funded)	(SBIR/STTR Funded)	(Program Funded)
Phase I	**Phase II**	**Phase II Enhancement**	**Phase III**
Feasibility Study	**Technology Development & Prototype Demonstration**	**Prototype Testing & Evolution Technology Demo & Validation**	**Commercialization Transition**

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 and period of acceptance**
  - **Solicits participation from all offerors capable of satisfying the Governments needs**
  - **Meet full and open competition requirements**
- **Used for the acquisition of basic (6.1) and applied (6.2) research and that part of development (6.3) not related to the development of a specific system or hardware procurement**
- **Used to acquire scientific studies and experimental proof of concepts directed toward to advancing state-of-the-art technologies**
- **Announcement published in www.beta.sam.gov**

Innovation Broad Agency Announcement

- **MDA BAA Announcement for FY21 covers a two-year period April 2, 2021 – April 1, 2023**
- **Open continuously (two-year periods) to private industry, qualified educational institutions, individuals and nonprofit organizations**
- **Contains 13 research topics of interest revised annually**
- **Federally Funded Research and Development Centers (FFRDC) and University Affiliated Research Centers (UARC) are eligible if authorized by their sponsoring contracts and charters**
- **Awards may occur anytime during the two-year BAA period**
- **Contract value not limited**

MDA Contract Clause H-08
Public Release of Information

- **Public Release of Information (H-08) (June 2013)**

  - **Contractor shall coordinate 60 days in advance of release regarding the release of information pertaining to any MDA contract**

  - **Materials may be technical papers, presentations, articles for publication and speeches or mass media material, such as press releases, photographs, fact sheets, advertising, posters, compact discs, videos, etc.**

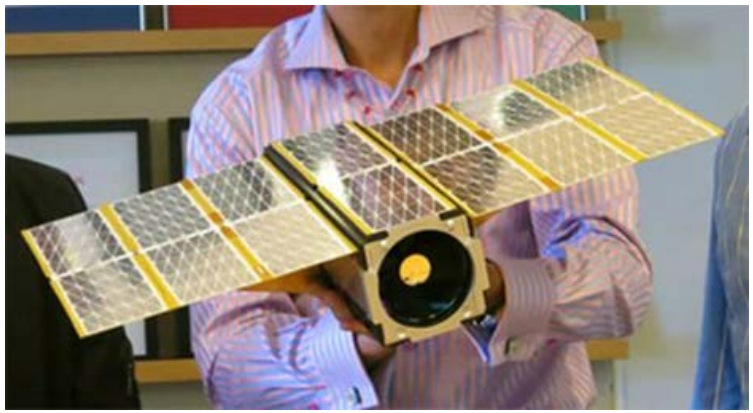
  - **Subcontractor materials shall be submitted through the prime contractor to MDA**

Technology Interest Areas

- **Interceptor Technology**
  - Guidance, navigation, and control
  - Batteries and power systems
  - Advanced materials
    - High temperature
    - Lightweight
  - Seeker technology
  - Radiation hardened technology
  - Deployment systems
  - Low SWaP Inertial Measurement Units
  - Lightweight composites
  - Propulsion and control technologies
    - Improved specific impulse
- **Command and Control, Battle Management, and Communications (C2BMC)**
  - Advanced tracking and discrimination algorithms
  - Command and control algorithms
  - Low latency and secure communications
  - Battlespace management
  - Data fusion
  - Warfighter training
  - Joint track management
  - Combat identification
  - Network management
  - AI/MI
- **Modeling and Simulation**
  - Lethality
  - Battlespace environments
  - Engagement
  - Aerothermal environments
  - Technology investment evaluation
  - Test verification
- **MDS Testing**
  - Affordable targets
  - Scene generation
  - HWIL
  - Rapid analysis software toolkits
  - Predictive analysis and modeling
  - Range safety
- **Sensors**
  - EO/IR and radar
    - Track and receive modules
    - FPAs
  - Signal and data processing algorithms
  - Radiation hardened technology
  - Telescopes and antennas
  - Windows and radomes

NanoSat Testbed Initiative

- **Uses small, low cost satellites to demonstrate MDS technology in a space environment**
  - **Directly applicable to MDS kill vehicles, space sensors, and space weapons**
  - **Takes advantage of emerging small satellite technology, launch capacity, and automated operations for missile defense – many partnering opportunities available**
  - **Demonstrations integrate with existing MDA space operations center and Electro Optical / Infrared testbed (EO/IR)**



Sub-Orbital Flight Experiments

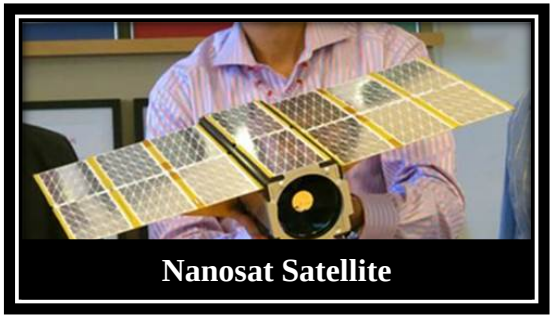
- **Demonstrates SBIR/STTR developed technologies in an operational environment**
  - Raises Technology Readiness Level (TRL) to level 6
  - Impartial demonstration
  - Can be used by small businesses as justification for insertion into programs of record
  - Provides risk mitigation activities for key components of MDA architecture (Divert Attitude Control Systems, Batteries, Sensors, Inertial Measurement Units)
  - Can be iterated on regular basis
  - Allows experimentation at a lower cost level than a flight test

Hypersonic Defense Mission

- **Defines weapon concepts and investments in key technology to enable a broad set of solutions including kinetic and non-kinetic means across left and right of launch**
  - **Focus on development of weapon concepts through competitive development**
  - **Concepts and identified technology component risk reduction will formulate the trade space across cost, risk, and performance to inform the requirements development process**
- **Develop technology to increase sensor capability**
  - **Execute sensor technology demonstrations to inform the development strategy**
  - **Invest in larger focal plane arrays, clutter mitigation algorithms, low size, weight, and power, high speed processing**
  - **Develop advanced seeker window materials and modeling techniques**

Recent SBIR / RIF / BAA Sponsored Research Accomplishments

- **Inaugurated a nanosat testbed program to demonstrate notional Kill Vehicle communication architecture**
- **Executed structural test series to validate SBIR developed lightweight composites**
- **Near Net Shape Manufacturing Non-Eroding, Thin Walled, Tungsten**
- **Completed radiation testing on hardened mirrors**
- **Developed high-speed test instrumentation**


Nanosat Satellite


Rad-hardened Mirror


Unitary Nosecone


Thin Walled Tungsten

For More Information

www.mda.mil

- Missile Defense News, Images, Videos, Fact Sheets
- BMDS Overview, BMD Basics
- MDA Business Opportunities (https://www.mda.mil/business/advanced_research.html)
- DoD SBIR/STTR website: https://sbir.defensebusiness.org
- SBA SBIR/STTR website: https://www.sbir.gov

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