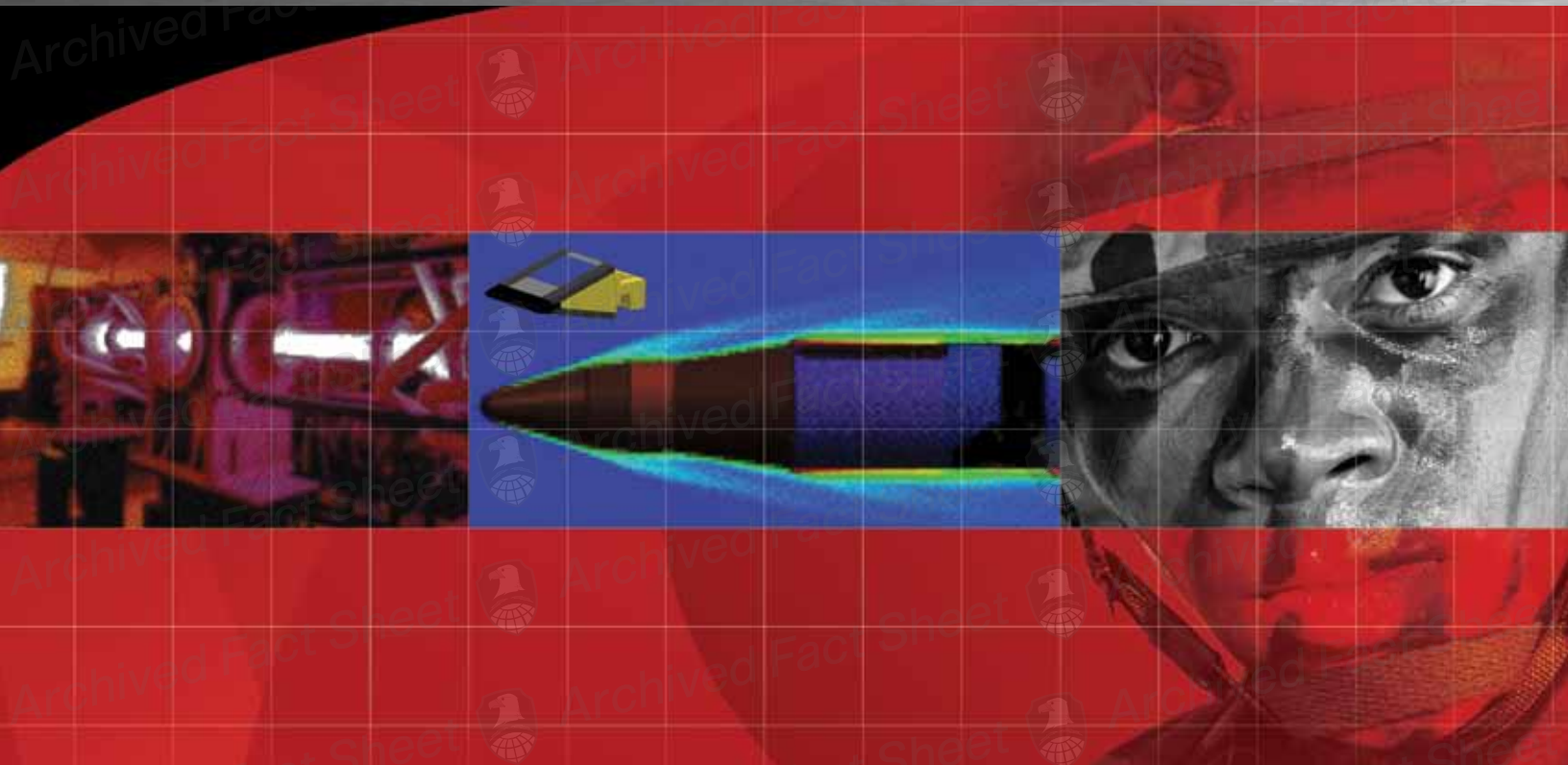




CAM

Composite and Advanced Materials Program



Summary

- Utilize appropriate test facilities for environments
- Utilize appropriate modeling to understand & predict material responses
- Government-funded & government-managed testing
- Leverage SBIR's and other programs for material samples
- Leverage other agency needs & funding
- Conduct/collaborate flight test qualification of candidate materials
- Support technology insertion of MDA/Army SBIR material technologies

Provide material characterization test data to support assessment of candidate thermal protection systems/heat shields, aero thermal structures, and weather erosion resistant materials for missile defense interceptors.

The Composites and Advanced Materials (CAM) Program is managed and conducted by the U.S Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (SMDC/ARSTRAT) Technical Center (TC) and the U.S. Army Aviation and Missile Research Development and Engineering Center (AMRDEC). This program was created to evaluate developmental high-temperature materials for missile interceptor systems and provide a means of experimentally verifying thermal and structural performance of material technologies developed under Small Business Innovative Research (SBIR) contracts within the Missile Defense Agency (MDA), as well as the Department of Defense (DoD). This provides the Government a means of identifying and verifying material technology applicability to meet the various missile systems needs and technology gaps.

Composite and Advanced Materials Program

Background

The Composites and Advanced Materials (CAM) Program has been established to evaluate developmental material systems for next generation missiles and missile interceptors. These interceptors require novel material technologies due to the significantly increased velocities and resulting aerothermal environments and possible weather encounter. Airframe components such as radomes, shrouds, heatshields, and control surface leading edges experience the worst case environments and require specific attention. CAM's mission is directed toward aerothermal performance characterization, materials characterization and weather encounter survivability of material systems developed through various funding avenues such as government R&D, Small Business Innovation Research (SBIR), and Small business Technology Transfer (STTR) programs. The systematic process initiated through the CAM mission is designed to assist the insertion of these material technologies into missile systems. The members on the Composites and Advanced Materials (CAM) Program have been conducting TPS development since the 1960s and have been conducting extensive leveraging and collaboration efforts within the government, private industry, and academia.

Objective

The Composites and Advanced Materials Program is a joint effort between SMDC, MDA and the AMRDEC. Advanced materials are a key driver in achieving the requirements for the next generation of missile defense applications. The purpose of this program is to have government-managed and government-conducted testing to evaluate new advanced materials for missile defense and tactical missile applications. The effort has focused predominately in three main areas: heatshield materials, radomes, and weather effects on these materials at hypersonic velocities. The program takes into account all aspects of the development of advanced materials including requirements definition, analysis, ground and flight testing, and fabrication. An online materials database is also being developed under this program to pull together all the test data, including the test conditions, into one searchable database for design engineers.

Payoff

- Provide high performance material technologies to support enhanced Army/Navy/MDA missile system requirements
- Provide material selection data for government and MDA system contactors

Accomplishments

- CAM has developed the MDA/DEP Material Database tool with initial data population including the CAM 2004-2008 efforts, NASA Thermo Protection System Material (TPS) Database, National Space and Missile Materials Symposium Proceedings, Tri-Service Sponsored Symposium on Advancements in Heatshield Technology Proceedings, and the DoD ElectroMagnetic Windows Symposium Proceedings.
- CAM has designed and fabricated a government-owned water-cooled wedge test fixture for use in high enthalpy arc heaters such as Arnold Engineer Development Center and NASA Ames Research Center.
- CAM Team has added significant value to Interceptor programs
 - SBIR collaborations for efficient analysis
 - MDA DEP management fully recognizes CAM contribution and has provided continued support
- TPS characterization for flight experiments
 - Thermal testing
 - Aeroheating characterization
 - Model development
- Support contractors with ground test designs, test and evaluation fixtures, and execution
- Weather specification development and impact testing of candidate flight materials
- MDA/USASMDC/ ARSTRAT, and Army research and development funds are being devoted to understanding the physics of particle demise in support of missile systems

CAM has become recognized as a government program with significant capabilities to support government as well as contractors in the area of aerothermal, weather encounter, thermal protection systems, composites technology, radomes and infrared windows and domes.



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