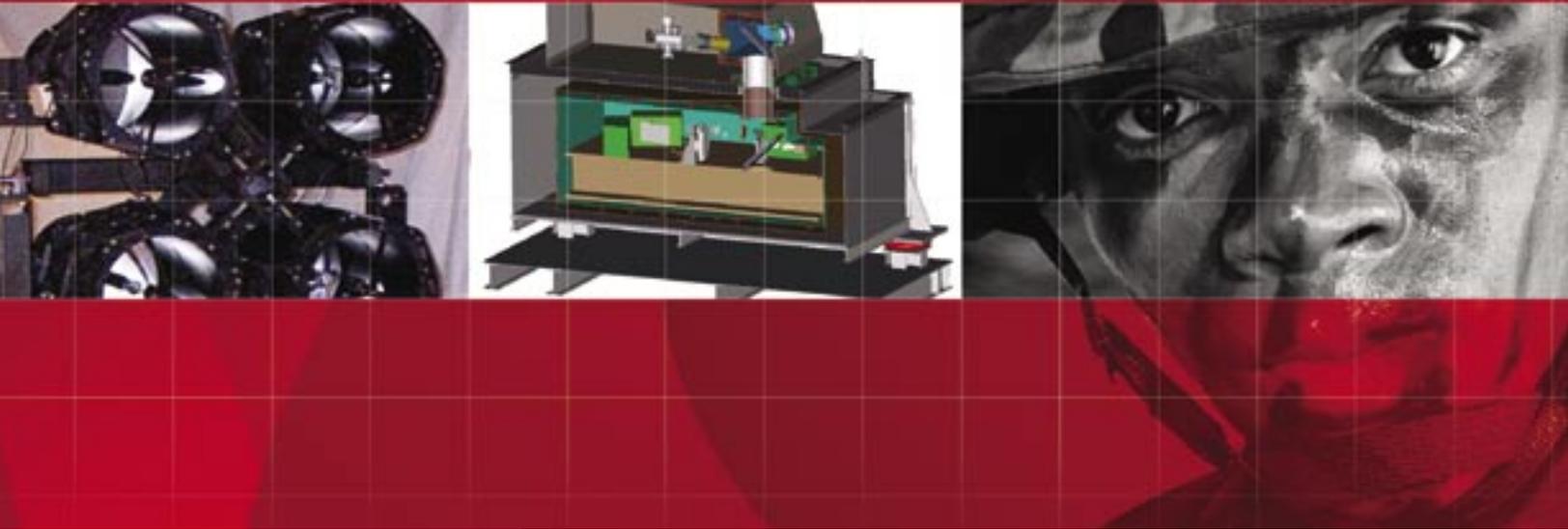




Survivability

Ensuring Space and Missile Defense Operations in Hostile Environments



Summary

- Develop and demonstrate radiation-hardened electronics and optics
- Support nuclear test facility enhancements
- Develop innovative solutions for identifying radiological contamination on the battlefield
- Maintain and upgrade computer modeling capability of intercept debris distribution
- Support MDA acquisition programs and the user agencies

SMDC Survivability pursuits will ensure the nation's space and missile defense systems will operate effectively when called upon to engage a nuclear threat.

The Survivability Program enhances the future force by maintaining a balance between technology development and acquisition support, responding to space and missile defense system challenges now and in the future. The program leverages past experience in above ground and underground nuclear testing to develop and demonstrate radiation hardened technologies. As the required performance and complexity of missile defense technologies increases, test facilities and computer simulations must also be enhanced to support developmental and operational testing. Continued interface with ongoing Missile Defense Agency (MDA) programs and the user community is critical to ensure survivability requirements are considered and planned for early in the acquisition process.

Overview

The Survivability Program ensures that space and missile defense systems can survive and operate in hostile battlefield conditions including nuclear, chemical, conventional blast and fragmentation, electromagnetic, and natural environments.

All phases of acquisition are supported with activities ranging from requirement allocation to concurrent survivability engineering and hardware validation. A series of hostile environment models and simulations are maintained which ensure that cost-effective, balanced survivability solutions are obtained. Direct acquisition support is provided to the Missile Defense Agency (MDA), the U.S. Army Program Executive Office for Air, Space, and Missile Defense, and the U.S. Army Aviation and Missile Command.

The Survivability Program also pursues survivability technology research and development. Survivability Technology programs support multiple services, including MDA and leverage some of the most advanced research facilities in the world. Benefits for Tomorrow's Defense

In cooperation with MDA, the Survivability Program supports missile defense program managers' efforts to assure their systems operate in hostile environments, including weapons of mass destruction. Close coordination with the Ground-based Mid-course Defense (GMD) program and the user and U.S. Northern Command (NORTHCOM), allows the definition of specific test requirements and the necessary nuclear test capabilities required at the Department of Defense (DoD) major test ranges.

Recently, training was provided to the Multiple Kill Vehicle (MKV) technology program to ensure nuclear hardness is considered early in the design stage of this critical GMD subsystem.

Technical Concept

As a working member of the DoD Radiation Hardened Oversight Council (RHOC) and partnering with commercial sector manufacturers, government labs, and other government agencies; the High Performance Microelectronics program has developed key methodologies to ensure the availability of state-of-the-art hardened linear, digital, and nonvolatile electronics. Current efforts include development of high resolution A/D converters, ultra-low power A/D converters and a hardened EEPROM. The current Hardened Infrared Optical Cryo-component program laid

the foundation for understanding the physical processes of radiation effects in thin film interference filters, as well as providing an extensive database of effects observed in optical components in LWIR sensor subsystems.

The Kinetic Impact Debris Distribution (KIDD) model simulates fragment sizes, velocities, and sensor signatures of debris resulting from a kinetic intercept, including nuclear warheads. Continued upgrades of the code are under way to expand the applicable threat set, engagement types, and seeker technologies.

The Eagle Eyes program, conducted by the University of Southern Mississippi, is researching nuclear material detection of fissile material at greatly extended ranges. Future applications include battlefield assessments and port and border protection for the Department of Homeland Security.

Through a coordinated effort with the Defense Threat Reduction Agency (DTRA), the Air Force and the Decade Radiation Test Facility enhancements at the Arnold Engineering Development Center provide the unique opportunity to test missile and space systems in multiple nuclear environments. The Survivability Program is using past expertise in above ground and underground testing to design and manufacture the test chamber which places the article under test in its operational environment, and interfaces with the radiation producing machines. The chamber will be flexible enough to allow numerous systems and subsystems to be tested without chamber redesign. Interface with hardware-in-the-loop simulations is accommodated.

The Survivability Program maintains a balance between technology development and acquisition support, responding to space and missile defense system challenges now and in the future.



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