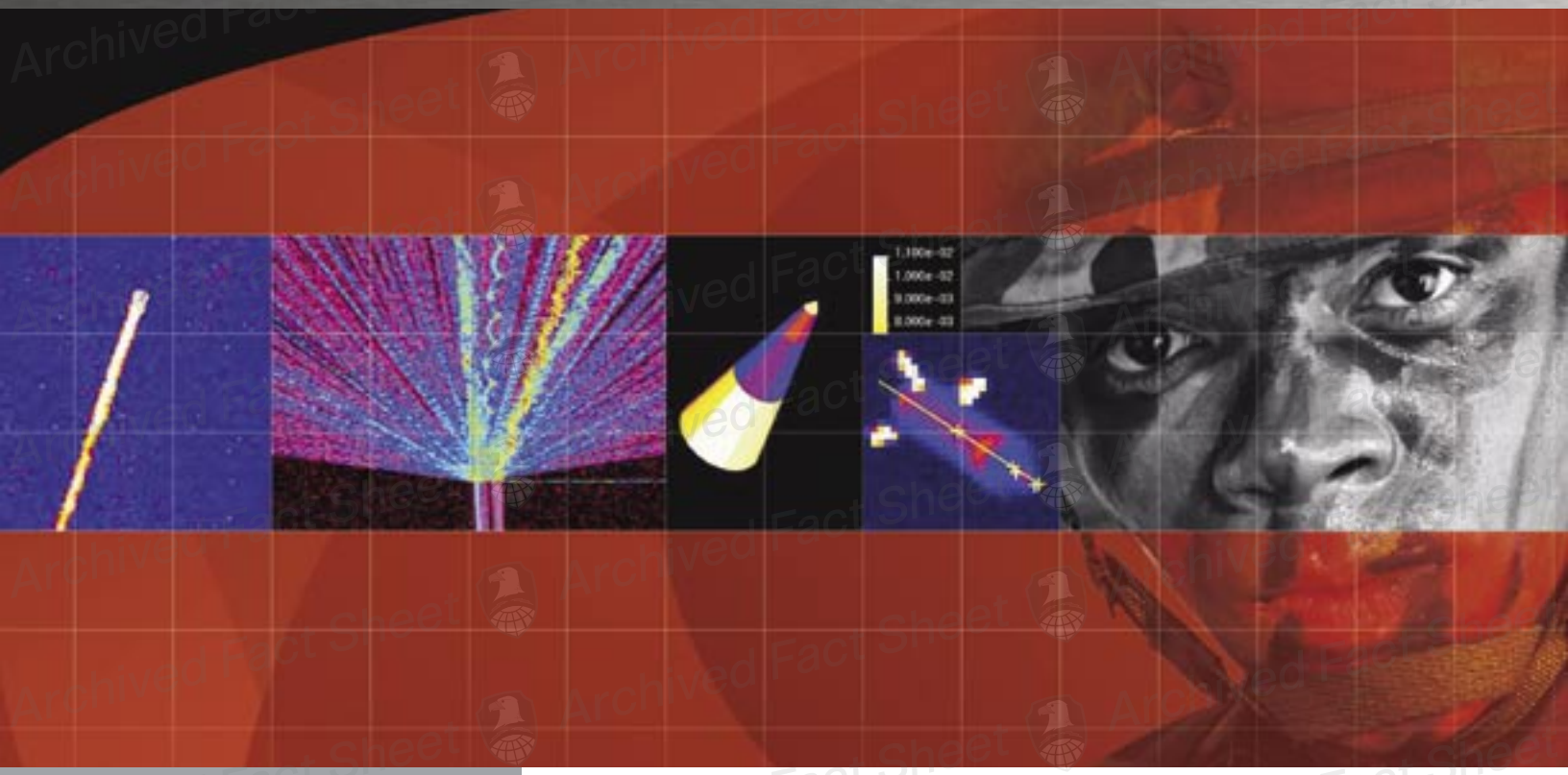
ADAC

Applied Data Analysis Center



Summary

- Identify Optical/Radar threat and environmental phenomenology features that support future advanced algorithms for MDA
- Analyze foreign and domestic field data for exploitation of observed phenomenologies
- Develop physics-based models, tools, and infrastructure to support MDA analyses and modeling
- Provide direct element support in the areas of post-flight characterization analysis, signature modeling, and algorithm concept development

ADAC is the only organization chartered by MDA to perform detailed analyses and exploitation of phenomenologies observed during all flight and ground tests, foreign and domestic.

The Applied Data Analysis Center (ADAC) supports the Missile Defense Agency (MDA) in the area of Advanced Technology development, comprised of three closely related analysis programs structured to bridge the gap between data collection and technology insertion: Optical Data Analysis (ODA), Radar Data Analysis (RDA), and Radar Data Exploitation (RDE). Together, these programs identify critical phenomenology from both foreign and domestic flights, ground tests, and laboratory measurements. Understanding the physics behind these observations provides the 'seed corn' for new algorithm concepts and technology insertion. By this, ADAC plays a key role in the MDA spiral technology process and BMDS Block development efforts.

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Technical Center

Overview

The Applied Data Analysis Center (ADAC) is managed by the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command (SMDC/ARSTRAT) Systems Test Support Division for the Missile Defense Agency (MDA). The Optical Data Analysis (ODA) program is co-located with the Missile Defense Data Center (MDDC) and Project Hercules Test Team in Huntsville, Alabama. The Radar Data Analysis (RDA) and Radar Data Exploitation (RDE) programs are located at the Massachusetts Institute of Technology, Lincoln Laboratory (MIT/LL). The ADAC is chartered under the MDA Advanced Technology Directorate (MDA/DV) to perform detailed analyses and exploitation of phenomenologies observed during all flight and ground tests, foreign and domestic, during all phases of flight (boost, midcourse, and reentry). In addition, ADAC provides direct element support activities and MDA special studies.

Benefits for Tomorrow's Defense

One of the goals for MDA is to maintain a strong research and advanced development program focused on continual improvement of the Ballistic Missile Defense System (BMDS). The principle by which MDA will achieve this goal is to implement innovations to optimize cost and performance effectiveness. ADAC provides the "seed-corn" for advanced development of the BMDS through the analysis and exploitation of real data obtained of real scenes with real sensors.

The ADAC program provides a crucial risk reduction role for the BMDS systems engineers, algorithm developers, first-principle modelers, and optical/RF sensor elements by transferring key lessons learned from all domestic and foreign test observations to MDA organizations and Program Elements. Understanding the physics/phenomenon behind these observations during all phases of flight leads to robust technology development in the areas of modeling, algorithm concepts, sensors, and weapon systems. In this role, ADAC is a key participant in the MDA technology development spiral and support for all the BMDS block development efforts.

Technical Concept

ADAC is comprised of three closely related analysis programs structured to bridge the gap between data collection and technology insertion: ODA, RDA, and RDE. ADAC employs an integrated team of subject matter expertise from approximately 11 different employers to provide accurate, relevant, and timely analysis products to the MDA community. There are four analysis product classes within ADAC designed to support advanced technology development; physics-based modeling, phenomenology analysis/lessons, algorithm concepts, and sensor/system trade analysis.

ADAC analysts develop physics-based models used to generate predicted target signatures and metric characteristics to support analysis, simulation, algorithm development/testing, and flight test risk reduction. When possible, models are verified and validated using all available collected data.

Detailed data analysis is performed at the ADAC to characterize data scenes as well as investigate unexpected phenomena and identify the implications to the BMDS elements. A primary focus of the ADAC is multi-sensor, multi-flight analysis comparisons to supplement other products and build a performance data base of knowledge behind the observations.

Algorithm development is not in the ADAC charter under MDA/DV. However, ADAC does provide the data phenomenology and feature analysis in support of Project Hercules; a national effort to develop algorithms and battle management concepts to counter evolving missile threats in challenging environments.

ADAC has initiated, directed, and participated in numerous sensor/system trade studies involving analysis related to: assessing intelligence data and developing requirements for upcoming sensor upgrades, Forward Based Sensor (FBS) impacts, FBS sensor resolution analysis in support of the ideal sensor study, and the utility of visible data for next generation visible sensors.

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