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Integration

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Agenda



- **Research Area Scope & Objectives**
- **List of Technology Areas**
- **Topic Overview**
- **Questions**



Integration Scope & Objectives



The Integration research area funds hardware and software related innovations that enhance system performance through the integration of BMDS assets. Technology areas include:

- **Hit Assessment / Kill Assessment / Weapons Typing**
- **Automated Battle Management / Planning Aids**
- **Track Correlation / Sensor Netting**



Hit Assessment / Kill Assessment / Weapons Typing

Debris Assessment For Post Intercept Weapons Typing



Objective

This effort seeks to use debris cloud formation and projected fallout areas via potential ground-, sea-, air-, and space-based sensors to provide information to the policy makers for accurate consequence prediction and management.

- Investigate techniques for weapons type assessment using airborne debris data from multiple spectrally diverse sensors.
- Fuse both RF and EO/IR algorithms and, where appropriate, analyze success of fused solutions.

Key Points

- Develop techniques, features, and measurements to evaluate the multi-spectral phenomenology associated with intercepted objects, as well as sensor data associated with debris fallout and recovery.
- Develop techniques for assessing debris and quantifying confidence in assessment as a function of time, including RF, EO/IR, and air-sampling sensors

Development Plan

Phase I

Demonstrate the ability to integrate spectrally diverse sensor data and formulate hypotheses about weapon types based on an understanding of the theoretical basis and various real-world assumptions of sensor capabilities.

Phase II

Further develop the technology to enable a relevant demonstration of weapons typing and explore the parameter sensitivity of the technique as well as demonstrate the capability to integrate multiple components in a way that is suitable for application at the BMDS' C2BMC level.



Automated Battle Management / Planning Aids

Automated Battle Management / Planning Aids



Objective

To maximize the potential performance enhancement of a layered defensive system, the ability of assignment algorithms and decision theories must maximize the potential performance of new weapon systems and of the associated battle management and fire control systems.

- Develop advanced, innovative, robust, real-time algorithms and software that support coordinated, layered missile defense through the use of optimized interceptor to target assignments

Key Points

- Battle managers allocate weapon systems and interceptors to threat events
- Fire control determines how best to employ interceptors, given the probability of multiple objects per event
- Initiatives should include means for enabling the system to explain the rationale behind computations to the war-fighter clearly in a stressful, time sensitive-environment.

Development Plan

Phase I

Develop the mathematical basis for and provide a demonstration of advanced allocation methods that will enable robust engagement planning for various weapon systems, battle managers and fire controls with different capabilities.

Phase II

Develop/ update Phase I accomplishments to provide a demonstration of the technology in a realistic environment using realistic data, to include realistic processing speeds in complex scenarios.



Track Correlation / Sensor Netting

Track Correlation / Sensor Netting



Objective

To provide a single integrated picture of the battle to the combatant commander and to battle management algorithms, it is necessary to correlate (associate) tracks and / or detections from optical sensors with the tracks or detections from radar sensors

- Develop advanced, innovative, robust, real-time algorithms and software for the integration of passive or active electro-optical sensor tracks or detections with radar generated tracks or detections

Key Points

- The Ballistic Missile Defense System utilizes optical and radar sensors for detection, tracking and identification of threat objects
- Proposed advances should provide robust, reliable capabilities to correctly correlate reports from three or more sources (two sensors with the existing system track, or identify when reports represent new tracks)
- Ideal solutions would support either centralized or distributed instantiations

Development Plan

Phase I

Develop the mathematical basis for and provide a demonstration of track correlation / sensor netting concepts using simulated data

Phase II

Develop / update the technology based upon Phase 1 to provide a demonstration of the technology in a realistic environment using realistic data, to include realistic processing speeds in complex scenarios



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