

## **Correlation, Association and Fusion in Aggregate Combat Simulations**

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Combat simulation models, particularly those that represent combat units in aggregate rather than individual soldiers, tanks, etc., have little if any explicit representation of the representing correlation, association, and fusion of intelligence information.

Original research has been completed to develop a complete representation of the representing correlation, association, and fusion process for aggregated combat simulations. The fusion model previously developed (based on research at the Naval Postgraduate School) assumed that all items would be classified at the same level of recognition / identification. For example, all sensors would report tanks as “T-72 tank,” “T-80 tank,” etc., although misclassification of a T-72 tank as a T-80 was possible. In reality, sensors will report detectable objects at varying levels of classification. A T-72 tank might be reported as a “moving vehicle” by an MTI sensor, as an “armored vehicle” by a low NIIRS IMINT sensor, or a T-72 from a high NIIRS image. All of these differing levels of classification need to be fused together to form a perception of what vehicles (or other objects such as ships, aircraft, etc.) are present and to infer what military units (e.g., tank battalion) might be present.

This presentation will discuss how sensor reports with varying levels of classification and misidentification can be fused, and illustrate how this fusion supports the end-to-end model of ISR planning, collection, processing, and exploitation that drives (modeled) C2 decisions.

This research is being implemented in the US Joint Warfare System (JWARS) model, which is the next generation campaign-level model for US joint analysis. The model is C4ISR-centric by design, and has required this original research to develop suitable algorithms for representing correlation, association, and fusion at the aggregated level of representation.

The presentation will provide a quick overview of the JWARS C4ISR representation, but the focus will be on the research completed on the correlation, association, and fusion of intelligence information, which has applicability to any C4ISR-based simulation.