

Graduate Thesis Topics

Study of Total Army Rotation Initiatives (STARI)

U.S. ARMY

Center for
Army
Analysis

- **Problem Statement:** How do repeated operational deployments affect the Army?
- **EXSUM:** Projections for future rotational Posture of Engagement (POE) vary from 6 to 9 Brigade Combat Teams (BCT) continuously deployed. Various policy alternatives and force structure options affect soldiers and units. Policy alternatives include rotation rule, Unit Manning initiatives, reserve component use, and force structure mix. Using a simulation package, the student will create discrete event simulation(s) for Army brigade / battalion rotations based on unit type to include potential substitutions. The model will account for variable rotation rule depending on component of forces and policy being analyzed. The project will model events including rotations for up to 30 operations such as theater rotations, CTC rotations, potential Unit Manning requirements, Transformation, and other requirements
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- CAA POC: MAJ Farnsler, (703) 806-5356, DSN 656-5356
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- Data status
 - On hand
- Expected results: 120-180 Days

MOUT Analysis

- **Problem Statement:** The purpose of the Dupuy historical study was to assist US Army planners in accurately representing Military Operations on Urbanized Terrain (MOUT) in current combat models and simulations. This historical research work needs to be augmented with a statistical and graphical analysis.
- **EXSUM:** The Dupuy Institute conducted a study of historical battles, titled MEASURING THE EFFECTS OF COMBAT IN CITIES PHASES I & II. While the historical research is of world-class caliber, the statistical and graphical analysis of the results is lacking. A far greater amount of information lies within the number presented by the Dupuy Institute, awaiting more rigorous analysis.
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- **CAA POC** Dr. Karsten Engelmann, (703) 806-5532, DSN 656-5532
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- **Data status**
 - On hand: Data needs to be obtained from the Dupuy Institute...this should not be a problem as it is government owned.
- Time frame of needed results: Time frame not critical

VV&A of Agent Based Models

- **Problem Statement:** How does one verify, validate, and accredit an agent based model?
- **EXSUM:** Agent based modeling is gaining popularity in the academic, commercial, and now the military community. Their strength and weakness, however, is their ability to model intangible features and to be highly sensitive to initial conditions. Furthermore, small mistakes in the code of an agent can be magnified greatly once hundreds or thousands of agents are instantiated. The VV&A of these models is paramount for their adoption and use within the military community. However, to date, no one has determined the proper way to VV&A these types of models.
- Sponsor: Center for Army Analysis
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- Summer 2004

Developing an Analyst Toolkit

- **Problem Statement:** A standard ORSA toolkit is necessary in support of FA-49s in operational assignments as well as community wide.
- **EXSUM:** FA-49 officers serve in a variety of ways from positions on Army Corps and Division Staffs to weapon systems analysts at TRAC. These analysts need a standard toolkit to support effects assessment, Measures of Effectiveness (MOE) and Measures of Performance (MOP) type analysis, and other types of analysis. The research would assess and validate tools and software packages utilized by the Army's primary Analytical agencies, such as CAA, TRAC, and G8 as well as operational requirements. Based on a side by comparison all available resources, recommend a standard toolkit to be reinforced at all levels of OR education and used by the ORSA community.
- Sponsor: CAA
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- Data needs to be collected from the various agencies.
- Summer 04 would be ideal, but later is also appropriate.

MTOF DSS Integration

- **Problem:** How can the Mission Task Organized Force (MTOF) Decision Support System under design be integrated into the Defense, Modeling & Simulation Office (DMSO) Operations Other Than War (OOTW) Toolkit?
- **EXSUM:** The concept of this project is to develop a systems integration plan that would address the MTOF DSS (CAA tool under development with a contractor) and the DMSO Operations Other Than War Toolkit. This effort would generate the systems' architecture links between CAA's MTOF DSS concept and DMSO's Toolkit. Work could potentially involve object oriented modeling, database design, and the systems engineering topics such as requirements definition.
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- Data status
 - Under development
- Next 6-12 months

- **Problem:** Develop a methodology for animating the interactions of weapon systems and targets based on Lethal Areas.
- **EXSUM:** Determine factors that influence Lethal Area intersecting with a target and provide a visual representation and animation of a randomly shaped lethal areas. Animate movement using 3D graphics, VRML or similar technologies. Project will produce a small dynamic data store repository to show data values when lethal area intersects with target area.
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- CAA POC
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- Data status
 - Some sample representative information will be provided. The student will be using mostly randomly generated data for simulation.
- Summer of 2004 results should be presented