Working Group 2 – Future Capabilities

Co-Chair: Mr. John Kleinberg
Army Materiel Systems Analysis Activity (AMSAA), APG, MD.
john.m.kleinberg.civ@mail.mil

Co-Chair: Mr. Robert Horton
TRADOC Analysis Center (TRAC), Ft. Leavenworth, KS.
robert.e.horton28.civ@mail.mil

Army Special Operations Forces (ARSOF) Ground Mobility Study

[27 Oct 15, 1330-1400, Rm 13]

Mr. Joseph Campbell-Walkowicz
TRADOC Analysis Center
joseph.m.campbell-walkowicz.civ@mail.mil

Ms. Amy McGrath
TRADOC Analysis Center
amy.r.mcgrath.civ@mail.mil

Keywords: ARSOF, ARSOF Vision 2022, USASOC

ABSTRACT: Despite the significant development of ground mobility platforms, the recently published Army Special Operations Forces (ARSOF) Vision 2022 describes the current ARSOF mobility fleet as not being properly balanced to meet ARSOF global mission requirements, partially due to the inclusion of too many platforms and high platform sustainment costs. In 2014, the United States Army Special Operations Command asked TRAC to initiate a study to address both the unbalanced fleet issues, as well as to identify ARSOF required capabilities, capability gaps, and solutions to help mitigate ground mobility capability gaps. TRAC conducted a measurement space event, front end analysis, a series of team engagements, and three working groups to identify ARSOF ground mobility capabilities, gaps, and solutions. The team developed vignettes covering six special operations mission sets, including unconventional warfare, foreign internal defense, counter terrorism, stability operations, counter-insurgency, and support to major combat operations. The team used these vignettes to frame the discussion in each of the three ARSOF Ground Mobility Working Groups. Additionally, the team developed a resourcing allocation model that adjusted inventory based on forecasted mission demand requirements to address the USASOC's concerns about an unbalanced fleet. This briefing will cover the methodology employed by the study team to address these study requirements.

Reliability Impacts on the Capability Set: Mission Thread Availability

[27 Oct 15, 1400-1430, Rm 13]

Ms. Karen L. O'Brien
U.S. Army Evaluation Center
karen.l.obrien.civ@mail.mil

Ms. Claire Allen
U.S. Army Materiel Systems Analysis Activity
claire.e.allen4.civ@mail.mil

Keywords: Reliability Analysis, Availability, Systems of Systems, Capability Sets, Modeling and Simulation, Test and Evaluation, NIE

ABSTRACT: The Army's Semi-Annual Network Integration Evaluations (NIE) have provided the Army's Test and Evaluation community opportunities to gain insight into high-level impacts of individual systems' inherent reliability characteristics. While developing the Mission Command Assessment of the Army's Capability Sets (13, 14), the Army Evaluation Center (AEC) partnered with the Army Materiel Systems Analysis Activity (AMSAA) to model reliability impacts through the lens of the mission tasks that the capability sets are designed to enable.

In this analysis, we introduce a new concept: Mission Thread Availability, or the probability that the capability provided by the mission thread will be available to the Soldier at an arbitrary point in time during the mission. By focusing on the reliability of the thread's constituent systems and the redundancy within the systems/network while holding all other impactful variables ideal, we create a theoretical best case scenario for the availability of the mission thread. The presentation will explore the strengths and limitations of the methodology, findings from a sample mission thread, and broader applications.

Campaign Analysis – Hybrid Threat Scenario Development

[27 Oct 15, 1430-1500, Rm 13]

Mr. Kyle Rogers
MAJ Bobby Collier
Center for Army Analysis
kyle.j.rogers2.civ@mail.mil

Keywords: Army Operating Concept, Campaign Analysis, Theater Modeling, Hybrid Threat, Complex Operating Environment, Joint Integrated Contingency Model (JICM),

ABSTRACT: According to TRADOC Pamphlet 525-3-1, the Army Operating Concept (AOC) guides future force development through the identification of first order capabilities that the Army must possess to accomplish missions in support of policy goals and objectives. The AOC anticipates that future battlefields will occur in a Complex Operating Environment (COE) where adversaries will likely consist of hybrid threats. Hybrid threats combine tactics and equipment associated with both conventional and irregular forces to create a unique form of warfare.

The Center for Army Analysis continually updates and improves the methods for conducting campaign analysis. This study looks at adapting three models to simulate the hybrid threat scenario: the Combat Sample Generator (COSAGE), Attrition Calculator (ATCAL) and Joint Integrated Contingency Model (JICM). These models were modified and applied to historical hybrid threat scenarios to validate the technique. Once validated, these programs can then be used to model modern and future theater-level warfare.

Utilizing the Load Effects Assessment Program – Army (LEAP-A) to Support Army Experimentation

[27 Oct 15, 1515-1545, Rm 13]

Dr. Cynthia Forgie
United States Army Maneuver Center of Excellence
cynthia.c.forgie.civ@mail.mil

Keywords: Experimentation, Soldier Load, Soldier System Integration

ABSTRACT: Soldier load is one of many factors that impact combat effectiveness. Yet, adequate models that incorporate combat effectiveness parameters and predict human performance effects of Soldier load do not exist. Soldier load goes beyond just weight, it is the combined effect of weight, flexibility, bulk, fit and comfort. While the weight of equipment is easily measured, the effects of Soldier load on individual performance has yet to be determined. To address this shortcoming, a collaborative program of research has been developed to established the Load Effects Assessment Program – Army (LEAP-A), participants include Program Executive Office – Soldier, Product Director Soldier System & Integration (PD SS&I), Natick Soldier Research, Development and Engineering Center (NSRDEC), MCoE, and Army Research Lab.

The LEAP system is a formally recognized, joint, and multinational common equipment assessment platform. Modeled after the Marine Corps LEAP (MC-LEAP), the Army system (LEAP-A) is an instrumented course designed to measure the effects of individual equipment configurations and combat loads on Soldier physical performance. The system is transportable and includes a series of battle field related combat movements, marksmanship, and load handling activities identified by the Marine Corps (and Army) as critical movement and task components of dismounted combat mobility.

During fiscal year 2015, the Maneuver Battle Lab (MBL), PD SS&I, and HRED conducted three events using the LEAP-A. The first event established standardized protocols and a well-defined methodology for employing the system in experimentation. In the second event, the LEAP-A was one of multiple excursions that provided data in support of the Soldier Protection System (SPS) Government Solutions Evaluation in Yuma, Arizona. The third event evaluated the Generation III Improved Outer Tactical Vest (GEN III IOTV) to identify any mobility, comfort or stability issues for the Squad/Team Leader; Rifleman; Grenadier; and Automatic Rifleman. The NSRDEC team is currently conducting one evaluation, using the obstacle portion of the LEAP-A, to assess the reliability and learning effects associated with the course.

The LEAP-A provides a unique ability to measure the effects of changing equipment in a Soldier's load by measuring the effect of the Soldier's burden through multiple combat related tasks that collect data on movement mechanics, time to complete events, physical performance attributes, observed performance, and after action reviews. The LEAP-A is transportable and provides a repeatable evaluation standard for assessing the effects of different combat loads, different integration designs, and various items of equipment in development and procurement. The PD SS&I/MBL is also investigating the possibility of reconfiguring the sequence of LEAP-A obstacles to assess movement and maneuver of an entire fire team. NSRDEC will focus their next assessments on the sensitivity of the tool to varying weight differences (with minimal bulk and stiffness variation) in performance of the overall LEAP-A, and for individual obstacles, where trunk and lower limb neuromechanics will also be assessed. The MBL welcomes the opportunity to share experiences and ideas regarding the LEAP-A as an experimentation venue with the 2015 AORS community.

Effective Use of M&S throughout the Acquisition of EOIR Sensors

[27 Oct 15, 1545-1615, Rm 13]

Susan Harkrider
Deputy Director, Modeling and Simulation Division
US Army Night Vision & Electronic Sensors Directorate (NVESD)
Info@nvl.army.mil

Chris May
Simulation Application Branch Chief, Modeling & Simulation Division
US Army Night Vision & Electronic Sensors Directorate
Info@nvl.army.mil

Jonathan Hixson
Chief of the Measurement and Modeling Branch
US Army Night Vision & Electronic Sensors Directorate
Info@nvl.army.mil

Lana McGlynn
McGlynn Consulting Group
lana.mcglynn@gmail.com

Keywords: Future Capabilities, Image Generation, Infrared, Acquisition, Electro-Optics

ABSTRACT: The seamless process developed by the NVESD Modeling and Simulation Division, provides end to end system design, evaluation, testing, and training of EO/IR sensors.

By combining both in-house subject matter expertise and government developed and maintained software and test procedures NVESD ensures that EO/IR sensor developmental and operational testing and evaluation are accurately represented throughout the lifecycle of an EO/IR system. This process allows for both theoretical and actual sensor testing. A sensor can be theoretically designed and modeled using government developed software and then seamlessly input into the wargames for operational analysis.

After theoretical design, prototype sensors can then be measured in a laboratory environment then modeled and into wargames for further evaluation. The measurement process to high fidelity modeling and simulation can then be repeated again and again throughout the entire life cycle of an EO/IR sensor as needed, to include LRIP, Full rate production, and even after Depot Level Maintenance.

This is a prototypical example of how an engineering level model and higher level simulations can share models to mutual benefit. Specific examples to be discussed are use of the process described above in the acquisition and training of the LRAS3 and the Light, Medium, and Heavy Thermal Weapon Sights.

Evaluation of the Impact of Insertion of Automated Convoy Operations (ACO) Technology for Tactical Wheeled Vehicles

[27 Oct 15, 1615-1645, Rm 13]

David Adair
US Army Materiel Systems Analysis Activity
david.j.adair6.civ@mail.mil

Keywords: Modeling, Simulation, Convoy, OneSAF, Vehicles

ABSTRACT: The Army is looking to insert autonomous or semi-autonomous ground vehicles into their tactical vehicle fleet. The level of potential autonomy ranges from the status quo, to leader follower, to fully autonomous platforms. The insertion of this technology will impact vehicle survivability, convoy operations, and logistics support. The operation of autonomous or semi-autonomous vehicles in a threat environment has not previously been evaluated. New tactics, techniques, and procedures (TTPs) need to be developed on how to protect and defend a convoy containing semi or fully autonomous vehicles when they come under attack. Similarly, the TTPs necessary to handle the support and maintenance of these vehicles also need to be defined. AMSAA will use the One Semi-Automated Forces (OneSAF) combat simulation model to develop vignette(s) which use ACO technologies. Subject Matter Experts (SMEs) at the Sustainment Center of Excellence (SCoE) will use these vignettes to determine optimal TTPs to best exploit ACO technologies.

Engineered Resilient Systems: Tools, Data, and Tradespace Methods for Analysis of Alternatives

[28 Oct 15, 0945-1015, Rm 13]

Simon R. Goerger, PhD
Operations Research Analyst
US Army Corps of Engineers
Simon.R.Goerger@usace.army.mil

Owen J. Eslinger, PhD
Program Manager
US Army Corps of Engineers
Owen.J.Eslinger@usace.army.mil

Erwin A. Baylot
Research Analyst
US Army Corps of Engineers
Alex.Baylot@usace.army.mil

Keywords: Advances in OR, Tradespace Analysis, Systems Engineering, Engineered Resilient Systems

ABSTRACT: In a world marked by rapidly changing threats, tactics, missions and technologies, the Institute of Systems Engineering Research (ISER), Engineer Research and Development Center (ERDC), is conducting research in support of the Office of the Assistant Secretary of Defense Research and Engineering (OASD(R&E)) sponsored Engineered Resilient Systems (ERS) program to improve the Department of Defense (DoD) lifecycle acquisition process. ERS focuses on agile and cost-effective design, development, testing, manufacturing, and fielding of trusted, assured, and easily modified systems. Products include engineering concepts, techniques, and design tools. The ERS goal is to achieve the needed transformation of the Defense acquisition with the contribution of systems engineering throughout a system's lifecycle. This presentation addresses the goals of the ERS program, the lessons learned from current research, and tools developed by the ISER and its research partners in support of tradespace analysis for future DoD systems.

Guided Multiple Launch Rocket System Alternative Warhead Modeling and Analysis of Live Fire Test Events

[28 Oct 15, 1015-1045, Rm 13]

Zachary Zoller
Army Materiel Systems Analysis Activity
zachary.p.zoller.civ@mail.mil

Keywords: Analysis, Performance, Rocket, Engagement, Precision, Guided, Area Effects, DPICM, Alternative Warhead, Live Fire, Test and Evaluation

ABSTRACT: The 2008 DoD Cluster Munition policy will ban the use of cluster munitions, creating an area effects capability gap in 2019. Cluster munitions are air-dropped or ground-launched weapons that release a number of smaller submunitions intended to kill enemy personnel or destroy vehicles and/or equipment. The Guided Multiple Launch Rocket System (GMLRS) Alternative Warhead (AW) Program was developed to mitigate the performance gap left by MLRS Dual Purpose Improved Conventional Munition (DPICM) rockets. The Army Test and Evaluation Center (ATEC) tasked the U.S. Army Materiel Systems Analysis Activity (AMSAA) to assess the lethality and effectiveness of the GMLRS-AW rocket to support the live fire test and evaluation of the rocket. To accomplish this, the AMSAA modeling and analysis efforts included effects of air density on lethal fragment pattern, pre- and post-shot effectiveness analysis of the Initial Operational Test (IOT) events, and effectiveness comparison of GMLRS-AW to the M30 GMLRS-DPICM round. AMSAA GMLRS-AW modeling and analysis allowed ATEC to predict live fire test effectiveness results, highlight system capabilities and gaps, and inform engagement Tactics, Techniques, and Procedures (TTPs) in order for the warfighter to more effectively employ the GMLRS-AW rocket. This presentation will describe the methodology covering the effects of air density on fragment patterns, the analytical underpinnings of the pre- and post-shot effectiveness analysis, and the effectiveness comparison between a DPICM round versus the AW rocket.

Quick Turn Analysis Tool support to Long Range Precision Fires (LRPF) Analysis of Alternatives (AoA)

[28 Oct 15, 1045-1115, Rm 13]

Ms. Kirstin Smead
TRADOC Analysis Center
kirstin.d.smead.civ@mail.mil

Keywords: LRPF, sensitivity analysis, mixed-integer goal program, math programming

ABSTRACT: TRAC recently completed the Long Range Precision Fires (LRPF) AoA which assessed operational risks to U.S. forces resulting from the expiration of the existing stockpile of Army Tactical Missile System (ATACMS) and examined alternative capabilities. AoA work included a sensitivity analysis to determine the drivers of formation effectiveness and cost.

The Goal-Programming LRPF Effectiveness Assessment Model (GLEAM) was developed to complement combat modeling results with a capability to explore a wider set of cases and conditions than would be possible with using only combat models. GLEAM is a mixed-integer goal program that used the same scenario, performance data, and operational risk parameters found in the combat models to pair munitions against a set of targets with the ability to rapidly vary operational characteristics. Additionally, GLEAM incorporated key elements from the dynamic targeting process, Friendly and Threat structure and locations, and the attack guidance matrix used in the combat models to provide comparability of results. GLEAM results enabled the study team to confirm formation effectiveness insights generated through combat modeling and gain an appreciation of future missile capability requirements under a broad range of conditions. The GLEAM results were essential to the success of the AoA and addressed key Office of the Secretary of Defense issues.

This presentation will provide details of the problem definition, formulation, development, and implementation of GLEAM in support of the LRPF AoA and application of this capability to supplement future studies.

Modeling and Simulation for Future Capability Integration

[28 Oct 15, 1115-1145, Rm 13]

Beth S. Ward
U.S. Army Research Laboratory (ARL)
beth.s.ward.civ@mail.mil

Keywords: Vulnerability/Lethality, System Capabilities, Future Capability Integration, Modeling and Simulation

ABSTRACT: The acquisition community relies heavily on modeling and simulation (M&S) for operations research analyses as well as test and evaluation for future capability integration.

Additionally, the Department of Defense for Operational Test and Evaluation (DOT&E) requires high resolution system representation in M&S for live-fire test and evaluation (LFT&E) of Title X lethality oversight programs. DOT&E enlisted the Joint Technical Coordinating Group for Missions Effectiveness (JTCG/ME) to leverage their program to benefit the acquisition community M&S requirements. The Army Research Laboratory (ARL) was tasked by the JTCG/ME to lead the Tri-Service effort in developing a capability based criticality analysis process which details the effects of component failure on system capabilities.

This new approach to criticality assessment provides higher resolution entity representation for M&S which can be aligned with basic combat model responses. For COMBATXXI, the use of individual unit action tables could be augmented with target specific vulnerability data to provide more detail on the fly for items of interest in a study. This presentation examines target representation and vulnerability/lethality (V/L) metrics, data usage, and a concept of a MUVES-S2 V/L service for COMBATXXI.

Modeling the Entire Joint Fires Targeting Process in Support of Long Range Precision Fires

[28 Oct 15, 1300-1330, Rm 13]

MAJ Jesse M. Nesbitt
TRADOC Analysis Center
jesse.m.nesbitt.mil@mail.mil

Dr. Bruce Gafner
TRADOC Analysis Center
bruce.w.gafner.civ@mail.mil

Keywords: Key Performance Parameters, AoA, Joint Fires, ATACMS, COMBATXXI

ABSTRACT: The Long Range Precision Fires (LRPF) Analysis of Alternatives (AoA) was initiated by the Office of the Secretary of Defense, Cost Assessment and Program Evaluation in 2013, to examine alternatives that mitigate the capability gap resulting from the loss of capability provided by the Army Tactical Missile System (ATACMS).

The Combined Arms Analysis Tool for the 21st Century (COMBATXXI) is a high resolution combat model used by the TRADOC Analysis Center (TRAC) in the LRPF AoA to explore key missile capabilities in a Joint Task Force scenario. The COMBATXXI scenario modeled the entire Joint fires targeting process and provided means to assess the sensitivity of various LRPF missile designs under challenging conditions (i.e. fleeting targets, extended ranges, Joint fires availability, and countermeasures). Analysis of the COMBATXXI results informed the development of lethality, range, responsiveness, and survivability key performance parameters of future LRPF missile designs.

In support of the LRPF AoA, for the first time COMBATXXI scenarios modeled the entire Joint targeting process and sensor-shooter targeting methodology (past scenarios modeled Brigade Combat Team and lower echelons of combat). This presentation will describe the tasks and challenges of such expanded combat modeling.

Multi-Attribute Decision Making (MADM) used to Rank Order Future Systems

[28 Oct 15, 1330-1400, Rm 13]

Mr. Michael A. McCluskey
Maneuver Support Battle Lab
Capabilities Development and Integration Directorate (CDID)
michael.a.mccluskey9.civ@us.army.mil

Keywords: Multi-Attribute Decision Making (MADM), Decision Analysis, Mathematical Modeling, Future Systems, BEB

ABSTRACT: In 2013, the United States Army Engineer School (USAES) sponsored a series of wargames at Fort Leonard Wood to help develop a moderation plan for explosive hazards defeat. The wargames focused on how the Brigade Engineer Battalion (BEB) and its Echelons Above Brigade (EAB) Enablers can best employ their assets to counter explosive hazards through each phase of a typical campaign plan. A significant portion of the analytical support provided by the ORSA cell to the Decision Makers was a rank ordering by worth of the relevant systems.

Thirty Three (33) systems were assessed during the wargames and were ranked by application of the TRADOC approved Multi-Attribute Decision Making (MADM) methodology. MADM provides for trade-offs among alternatives by viewing the composite value associated with each alternative as the sum of weighted attribute values determined independently. The technique is "compensatory", in that overachievement on one criterion can be offset by underachievement on another criterion (i.e., can tradeoff value between attributes). It is "additive" because the values associated with the attributes can be added together to determine an overall value, when appropriately weighted (once a common scale for values based on the attribute's measured level of attainment has been established). MADM worked especially well because there were so many different objectives and attributes to consider, measured on differing scales, and conflicting with one another such that tradeoffs were necessary. In several cases, it was even necessary to have "double deep" application of the MADM methodology.

Network Integration Evaluation (NIE) Soldier Feedback Assessment

[28 Oct 15, 1400-1430, Rm 13]

Ms. Elizabeth Albany
TRADOC Analysis Center
elizabeth.m.albany.civ@mail.mil

MAJ Morris K. Estep
TRADOC Analysis Center
morris.k.estep.mil@mail.mil

Keywords: Soldier feedback in operational context, survey, operational effectiveness

ABSTRACT: For the past 7 years, the Network Integration Evaluation (NIE), has served as a venue to test systems in support of the Mission Command Network 2020 Strategy. Because this network will ultimately be utilized by Soldiers in theater, Soldier feedback is the most critical source of information on system performance and operational usefulness during these events. Soldiers' preferences for particular systems require a reliable, objective method for data collection and analysis across multiple events, quantified in an analytically rigorous manner. The Soldier Feedback Assessment (SFA) methodology provides a comprehensive, consistent approach to garnering and analyzing Soldier feedback.

The SFA employs a four-component approach for assessing each system. Observer analysts (OA) record detailed doctrine, organization, training, materiel, leadership, personnel, facilities, and policy (DOTmLPF-P) implications as well as field observations on Soldier-system and system-system interactions. Focus groups are also conducted for each system, eliciting feedback from key leaders on the operational context of those Soldier-system interactions. Lastly, a comprehensive Soldier feedback survey captures data on Soldier demographics and system-specific feedback using the Labeled Affective Magnitude Scale (LAMS), a nine-point, modified Likert Scale, for each system that Soldiers interact with during the events. The SFA has been used in the last two consecutive iterations of NIE, garnering positive feedback from operational commanders and providing sound analysis in the formal reports.

Proximity-fuzed Stinger Missile Effectiveness Study

[28 Oct 15, 1445-1515, Rm 13]

Mr. Kim R. Frounfelker
US Army Materiel Systems Analysis Activity
kim.r.frounfelker.civ@mail.mil

Ms. Adriene W. Pilcher
US Army Materiel systems Analysis Activity
adriene.w.pilcher.civ@mail.mil

Keywords: Stinger missile, proximity fuze, lethality, UAS, AJEM

ABSTRACT: The U.S. Army Project Manager (PM) for Cruise Missile Defense Systems (CMDS) initiated the Stinger Service Life Extension Program (SLEP) to retrofit Stinger Block I Air Defense Missiles with updated hardware and a new proximity fuze to be more effective when engaging unmanned aerial systems (UAS). The aging Stinger effectiveness model does not address lethality of a warhead detonating in the vicinity of the target. Consequently, the PM CMDS requested the U.S. Army Materiel Systems Analysis Activity (AMSAA) conduct an analysis using the Advanced Joint Effectiveness Model (AJEM) to determine how effectively a Stinger missile with a proximity fuze and externally detonating warhead defeats a small tactical UAS. This briefing describes the analytical approach and methods, simulation input variables, run matrix, engagement conditions, limitations and assumptions, output parameters, and notional results from AMSAA's analyses.

Schedule Data Modeling & Validation for Acquisition Decisions

[28 Oct 15, 1515-1545, Rm 13]

Mr. John Nierwinski
US Army Materiel Systems Analysis Activity (AMSAA)
john.s.nierwinski.civ@us.army.mil

Keywords: Acquisition, Probability, Hypothesis Testing, Schedule Risk Assessment, Decision Making, Validation

ABSTRACT: A top priority for the U.S. Army is to make informed decisions regarding acquisition programs that will best serve the Warfighter. Providing an accurate and precise schedule risk assessment for a set of alternatives is a key input to the decision making process. The Weapon System Acquisition Reform Act of 2009 is driving more analysis to support the Analysis of Alternative (AoA). AMSAA conducts independent schedule risk assessments to support AoAs and other major Army acquisition studies.

AMSAA developed a schedule data modeling approach (SOMA) for building predictive probability distributions by selecting or adjusting historical data for a given phase or event (e.g. Milestone B to C). These distributions are used in the schedule risk assessments, where risk ratings, and probability statements are concluded. The accuracy of these distributions are assessed using a schedule validation hypothesis testing algorithm (SVHTA) based on p-value and power testing.

This presentation focuses on the methodology development of SOMA & SVHTA, as well as the results & conclusions from applying eight completed historical programs to SOMA & SVHT A. AMSAA is currently applying SOMA to their schedule risk assessments.

System Performance Risk Methodology

[28 Oct 15, 1545-1615, Rm 13]

Mr. Timothy Biscoe
US Army Materiel Systems Analysis Activity (AMSAA)
timothy.e.biscoe.civ@us.army.mil

Mr. Ken Duvall
US Army Materiel Systems Analysis Activity (AMSAA)
kenneth.a.duvall.civ@mail.mil

Mr. Todd Henry
US Army Materiel Systems Analysis Activity (AMSAA)
todd.m.henry.civ@mail.mil

Keywords: Risk, Acquisition, AoA, Performance

ABSTRACT: AMSAA has developed methodologies for conducting independent risk assessments for Army acquisition studies. The Weapon Systems Acquisition Reform Act (WSARA) of 2009 is driving more analysis to support the Analysis of Alternatives (AoA), of which risk assessments and trade-offs are key elements. In response to a need conveyed by senior leaders to address unrealistic performance expectations, AMSAA developed a system performance risk assessment methodology that assesses the risk that an alternative will not achieve its proposed performance.

Prior to the development of this methodology, there was a strong assumption within AoA performance evaluations and cost, schedule and technical risk assessments that a system will meet its proposed performance. The performance risk methodology is designed to measure the likelihood of not meeting a proposed performance metric and the expected consequences of failing to meet the metric in terms of the operational impact. This presentation will include an overview of performance risk methodology. Key topics of discussion will include a notional application of the methodology to an AoA and performance risk linkages to schedule risk.

Integrated Risk Modeling for Acquisition Programs (IRMAP) Notional Analysis of Alternatives (AoA) Case Study Application

[28 Oct 15, 1615-1645, Rm 13]

Mr. Ken Duvall
US Army Materiel Systems Analysis Activity (AMSAA)
kenneth.a.duvall.civ@mail.mil

Mr. John Nierwinski
US Army Materiel Systems Analysis Activity (AMSAA)
john.s.nierwinski.civ@mail.mil

Keywords: Risk, Acquisition, AoA, Performance, Schedule, Cost, AoA

ABSTRACT: The Weapon Systems Acquisition Reform Act (WSARA) of 2009 mandated, at a minimum, that Analysis of Alternative (AoA) study guidance includes full consideration of possible trade-offs among cost, schedule, and performance objectives for each alternative considered. For this reason, the AMSAA Risk Team developed an integrated risk modeling methodology for trade space analysis in weapons system acquisition.

The intention of trade space modeling is not to provide recommendations for a particular system over others. Rather, it is a decision-support methodology that informs decision makers of the effect of tradeoffs both within and between weapons systems prior to production. The methodology is not intended to be a replacement for the detailed assessments of the technical, schedule, or cost risk. It is complementary to these products, with the objective of providing estimates of the tradeoffs in potential outcomes in each dimension (performance, schedule, and cost), either between or within systems.

This presentation will provide an overview of the integrated risk modeling methodology and will demonstrate its capability through a case study using a notional AoA. Integrated cost and schedule risk ratings as well as joint probability statements will be shown. In addition, the brief will provide a framework for displaying the three-dimensional problem (cost, schedule, and performance) in a simple and effective manner.

Using Serious Games to Enhance Recognition of Combatants Training for Electro Optic and Infrared (EO/IR) Sensors

[29 Oct 15, 0945-1015, Rm 13]

Susan Harkrider
Deputy Director, Modeling and Simulation Division
US Army Night Vision & Electronic Sensors Directorate (NVESD)
Info@nvl.army.mil

Brian Holmes
Vice President, Orlando Operations
The AEgis Technologies Group, Inc.
bholmes@aegistg.com

Lana McGlynn
Senior Operations Research Analyst
McGlynn Consulting Group
Lana.McGlynn@gmail.com

Keywords: Future Capabilities, Recognition of Combatants, Reconnaissance, Surveillance, Targeting and Acquisition, Combat ID, Game-Based Training, Modeling and Simulation

ABSTRACT: The Night Vision Electronic Sensors Directorate (NVESD) and AEgis Technologies is designing and developing a customized game-based training solution that is being integrated with NVESD's Recognition of Combatants (ROC RSTA) Interactive Multimedia Instruction (IMI) training programs for use in recognition of combatants using Electro Optic and Infrared (EO/IR) sensors.

The scope of this effort includes modifying the core functionality of Combat ID, an interactive, on-the-move training game developed by AEgis, and integrating it with the NVESD Recognition of Combatants - Vehicle (ROC-V) and ROC Reconnaissance, Surveillance, Targeting and Acquisition (ROC RSTA) Training Programs.

The game-based training solution enables soldiers to view vehicles as they would in real-world missions and include intelligent tutoring, enhanced character behaviors, and efficient use of terrain databases. The training shall focus on surveillance and reconnaissance skills as well as combat identification of humans to determine threat levels in order to avoid civilian casualties and collateral damages. The customized training architecture shall provide performance feedback, select appropriate instructional strategies and tailor learning content to focus on the individual needs of the user. The game was incorporated into the ROC-RSTA training package and is available for use.

This paper will describe the development effort, user evaluations at the NVESD perception lab, and plans for the future including training effectiveness and performance measures.

Innovative Implementation of AWARS to Support the Army LRPF Study

[29 Oct 15, 1015-1045, Rm 13]

Ms. Laurie Hable
TRADOC Analysis Center
laurie.k.hable.civ@mail.mil

MAJ Larry Tomaziefski
TRADOC Analysis Center
lawrence.a.tomaziefski.mil@mail.mil

Keywords: LRPF, ATACMS, IADS, Multi-service Attack, ATO

ABSTRACT: The Long Range Precision Fires (LRPF) Analysis of Alternatives examined potential materiel solutions to replace the Army Tactical Missile System (ATACMS) as well as the implications of not replacing ATACMS. The U.S. ArmyTraining and Doctrine Command (TRADOC) Analysis Center (TRAC) used the Advanced Warfighting Simulation (AWARS), a unit-level combat simulation representing land warfare from brigade combat team to joint task force levels, to capture the effects of the operational environment on implementation of ATACMS and joint force LRPF alternatives. The LRPF study team identified range, lethality, and responsiveness as discriminating missile performance attributes and phase II operations as the most suitable operational environment for examination of these attributes.
This presentation describes the enhancements to the functional area representation and model methodologies within AWARS used to support a phase II operation for the LRPF study. It demonstrates how AWARS continues to be relevant by adapting and evolving to support analysis of current and future operations not typically examined using AWARS.

Testing Survivability through Radical Mobility

[29 Oct 15, 1045-1115, Rm 13]

Jeffrey A. Acheson
Army Materiel Systems Analysis Activity
jeffrey.a.acheson.civ@mail.mil

Keywords: Survivability, Mobility, Probability of Hit

ABSTRACT: US Military vehicles have been growing both larger and heavier to accommodate the heavier armor and greater systems redundancy necessary to meet survivability requirements. But the negative consequence of this progression is more difficulty transporting systems to the combat theater and reduced ground mobility when they arrive. An alternative to this progression of heavier vehicles is a “radical mobility” a system which uses integrated threat sensing along with high maneuverability, acceleration, and speed to offset the need for armor.

To examine this DARPA concept, AMSAA built a spreadsheet tool to study the relative effectiveness of radical mobility concepts against common small arms threats like assault rifles and machineguns. AMSAA examined the effect of an automated acceleration response to threats and higher sustained vehicle speeds over terrain. AMSAA also examined the effectiveness of potential adversary responses such as the use of curtain fire.