Working Group 4 – Sustainment

Co-Chair: Ms. Amber Dufour
Army Test and Evaluation Center (ATEC), APG, MD.
amber.b.dufour.civ@mail.mil

Co-Chair: MAJ Tammy Czapla
TRADOC Analysis Center (TRAC), Ft. Lee, VA.
tammy.j.czapla.mil@mail.mil

Army Oil Analysis Program Cost Benefit Analysis

[27 Oct 15, 1330-1400, Rm 5]

Amber Ferguson
Army Materiel Systems Analysis Activity
amber.g.ferguson.civ@mail.mil

Keywords: AOAP, Cost Benefit Analysis, Oil Analysis

ABSTRACT: In 2004, DA G-4 directed the closure of several Army Oil Analysis Program (AOAP) labs following the unfunded transfer of the labs from Installation Management Command (IMCOM) to Army Materiel Command (AMC). Due to the reduction in sample processing capacity, Tactical Wheeled Vehicles (TWVs), construction equipment and generators were all dis-enrolled and converted to Lubrication Order directed oil changes. Six alternatives were considered within the study to include: hard time oil changes; AOAP; AMSAA developed oil condition algorithm; portable oil analyzers (two different variants); and privatized oil sampling. The purpose of the CBA was to not only identify the least cost alternative and to compare qualitative aspects of each Course of Action (COA). The original sample set for the study was the Heavy Equipment Transporter. However, a sensitivity was conducted to include the Family of Medium Tactical Vehicles. Initially AOAP was found to be the least cost alternative. Once additional assets were included and qualitative benefits considered, portable analyzers proved to be the favored COA.

Operational AMMPS Microgrid Data Analysis Methods

[27 Oct 15, 1400-1430, Rm 5]

MAJ James Starling
Mission Command Center of Excellence
james.k.starling.mil@mail.mil

Keywords: Advanced Medium Mobile Power Source (AMMPS) Microgrid, Operational Energy, R, Interpolation methods

ABSTRACT: The command post is a vital element of the mission command system. One drawback of brigade modularization has been a gradual increase in the number of generators and fuel consumption of the Command Post. One such solution to reduce the fuel consumption is to use a central power supply system, or Microgrid, in order to reduce the number of generators and to maximize their load efficiency, assisting in the goal to make the command posts more expeditionary. The Microgrid has been evaluated during the past four NIEs at Fort Bliss, TX.

Using the AAMPS Microgrid generator logs containing data from NIE 15.1 and 15.2, our team was able to determine a baseline for operational energy usage of the brigade main CP. This discussion will highlight the methods we used to determine an accurate total kilowatt load across the four unsynchronized log files from the generators. We will also discuss the operational impacts of weather and time of day on the total kilowatt usage. Evaluating the usage of the AAMPS Microgrid at various echelons and more extreme temperatures will help further define the energy requirements for the Command Post in a field environment.

Support to Protected Ground Ambulance (PGA) Requirements Study

[27 Oct 15, 1430-1500, Rm 5]

Mr. Gregory F. Bergeret
TRADOC Analysis Center – Fort Lee
gregory.f.bergeret.civ@mail.mil

MAJ. Tammy J. Czapla
TRADOC Analysis Center – Fort Lee
tammy.j.czapla.mil@mail.mil

Keywords: Ambulance, Protected Ground Ambulance, PGA, Infantry Brigade Combat Team, IBCT, medical evacuation, candidate systems, system risk, and system attributes.

ABSTRACT: This analysis supports the Combined Arms Support Center (CASCOM) / Sustainment Center of Excellence (SCoE) efforts to identify the best Protected Ground Ambulance (PGA) solution for the Infantry Brigade Combat Team (IBCT). The SCoE Capabilities Needs Analysis (CNA) identified a gap which states that "the Army at division and below lacks the ability to provide uninterrupted ground, lifesaving medical evacuation (and medical treatment on the move) with the same survivability, mobility, and sustainability as the forces supported under unified land operations, including operations in complex or restrictive terrain (e.g., jungle, urban, mountainous) for 100 percent of all urgent category patients within 60 minutes." To address this gap, the Training and Doctrine Command (TRADOC) tasked SCoE to define the PGA requirements, evaluate courses of action, provide recommendations to mitigate the gap in the near-, mid-, and far-terms, and provide a cost assessment of the alternative solutions for the IBCT. The TRADOC Analysis Center (TRAC) supported this study by conducting a Measurement Space workshop to identify required attributes; employed MADM techniques to weight the required attributes of a PGA in conjunction with SCOE, MCOE, and the IPT members; assessed the designated candidate systems' ability to meet the required attributes and the risk associated with each system; and proposed a Rough Order of Magnitude (ROM) cost assessment methodology for the candidate systems. This presentation will highlight the activities we executed in support of SCoE arriving at the recommendations approved by CDR TRADOC for referral to the VCSA.

Optimization of the availability of the French helicopter fleet

[27 Oct 15, 1515-1545, Rm 5]

IETA Vincent LAPOUGE
French procurement agency
Center for Technical-Operational Defense CATOD
vincent.lapouge@intradef.gouv.fr

Keywords: optimization, helicopter, fleet availability, maintenance

ABSTRACT: helicopters have been intensively used in Afghanistan, Libya and now in Mali and Central African Republic. Their availabilities are now critical and sometimes commanders are obliged to delay operations due to shortage of helicopters. The joint staff tasked the Center for Technical-Operational Defense to explore ways to improve helicopters maintenance and their availabilities. CATOD developed a tool in order to have a better understanding of maintenance's leverages that would support the decision making process.
The tool is a macro-enabled MS Office Excel 2010 file, which, via probabilistic laws, assesses helicopter's fleet management. It runs several simulations of a modelization based on data and rules provided by G4. It can be utilized to determine the main leverages of helicopter's availability and how they interact between themselves in order to optimize efforts and resources. It can also be used to determine the effects of new commitments or new rules of engagement. Using so, the joint chief of staff is able to adapt maintenance activities in order to meet operational needs.

The Need for the Total Re-engineering of the US Army Aviation Standard Operating Procedures to Meet the Needs of U.S. Policy Objectives under Force 2025 and Beyond as Influenced by Additive Manufacturing

[27 Oct 15, 1545-1615, Rm 5]

James D. Metzger
CGI, Support Contractor
UH PO, Futures Team
James.d.metzger.ctr@mail.mil

ABSTRACT: Additive Manufacturing (AM) is often referred to as 3D-printing, as well as being described as both the new industrial revolution and/or a disruptive technology. Regardless of one's perception of it as an enabler or distractor, AM will be a total game changer. AM technology is also advancing at an amazing rate and its future potential impacts to society and the US Army (USA) are just now beginning to be realized. However, at this moment, uncertainty on how to proceed is probably the strongest emotion to the point of resulting in mental paralysis.

If US Army embraces this new technology early, even with all of its certainty, it may be the single greatest opportunity to achieve the objectives outlined in TRADOC Pamphlet 525-3-1. The benefits of AM will include, but not limited to major improvements in the acquisition of aviation parts and components. A critical parts list exists for a specific helicopter platform, and it contains over 600 lines of items identified as requiring over 1 year to procure. The list is also estimated as being upwards of 50% of the value of the aircraft. These components are specially engineered to stringent specifications due to their unique requirements, exotic materials and demanding manufacturing processes. They are produced in low quantities resulting in extremely high manufacturing costs and often have procurement times of several years. AM will help provide almost immediate reductions in costs (up to 90%), elimination of minimum purchase quantities and requisite warehousing, elimination of obsolescence and single source procurement risks, improve quality and consistency, as well as reduce the time of procurement.

The Army, as a whole, should begin now evaluating how to reduce the product cycle time from the current 10 years or more to 24 months or less. The easy part will be immediately seeing the benefits of time, quality and performance. The hard part will be integrating these benefits on to aircraft and overcoming people's natural resistance to change.

Manufacturing of new components or repair of existing parts will no longer have to be done in Continental US (CONUS), at a large depot or at an Original Equipment Manufacturer (OEM) facility, but in theater, as an organic part of a general or direct services operation. An AM facility requires a minimum equipment and space (as small as a personal desk top printer to larger industrial models that would fit easily into a mill van), permitting operations as far forward as other Brigade level logistics operations locate. They will require only minimum support: transportation, raw material powders, electricity and personnel to produce almost anything on demand and in a "just as needed" basis. Critical parts that currently take months to years to procure will soon be capable of being produced by AM and installed by the end user in less than 1 week.

As new additive manufacturing processes (multiple/composite material printing, parallel printing and larger printers, etc.) and new substrate materials (conductive plastics, carbon fibers, biological cells, chemicals, etc.) are developed, advances in electronics, engineering, medicine and chemistry will permit making things with multiple functions (e.g. electronics built in support structure), as well as safer, smaller, stronger, lighter, faster and more efficient.

For example, ideas are currently being promoted within an USA Project Office to use AM to print devices with complex geometries, embedded electronics and other sensors directly into a "smart blade." The purpose of this proposed project is to build an inexpensive and innovative small scale test stand and rotor blades for aerodynamic modeling and prototyping. The intent is for the direct acquisition of dynamic information, to improve monitoring the health of rotor head systems and eventually design a more robust blade. The sensors may also be easily modified and installed directly on any aircraft for minimal cost to promote Condition Based Maintenance.

This example, clearly demonstrates how AM can overcome numerous cost and manufacturing limitations. Creativity will no longer be as constrained by cost, location, geometry, methodology or other production limitations. Single parts once required to be manufactured separately may now be combined as a more reliable single component. This example however, also demonstrates the increased complexity needing means to validate and verify multifunctional components produced by AM.

It is estimated, using current ways of doing business, depending the complexity, it takes 5 – 30 years to integrate a new component into the fleet. It is also estimated that less than 20% of the time required is spent performing the essential Non-Recurring Engineering (NRE) technological functions (design, modeling, prototyping, testing, etc.). The remaining 80% tends to be dealing with the requisite administrative issues such as justifying the project internally and externally, budgeting and colors of money, developing the statement of work, contracting, as well as numerous and often repetitive approvals by external stakeholders. The only logical conclusion considering the new imposed time constrains will be: new and faster ways of doing business will be imperative.

As promising as AM has already proven itself to be, the internal organization, structure and roles of an Aviation Project Office, has made it difficult to promote AM, the promotion new projects, or complete "finished" proof of concept projects. Discussions with both internal and external stakeholders are too often dismissed as: The benefits seem too good to be true; The Army does not currently do business that way; or, that is not the Project Office's responsibility.

The good news is that all the technologies and materials are real, readily available and advancing capabilities rapidly. The bad news, given the USA's current internal ways of doing business, and potential budget constraints, integration of AM into the USA will most probably be a reactive effort and not managed to derive maximum benefit unless the need for change is embraced immediately: structurally, operationally and psychologically, as well as made a top priority at all levels and organizations within the Army.

Data Integration and Visualization for Reliability Evaluation

[27 Oct 15, 1615-1645, Rm 5]

Dr. Daniel Owens
US Army Evaluation Center
daniel.t.owens12.civ@mail.mil

Jonathan Newton
New Mexico State University
jnewton@psl.nmsu.edu

Rudy Velasquez
US Army Research Laboratory
rodolfo.velasquez2.civ@mail.mil

Keywords: Data integration, data visualization, schema

ABSTRACT: The volume and variety of test data available to an evaluator grows with every test event. This data comes in many different forms, from Test Incident Reports to instrumented data to Mission Event Logs to audio and video, and the format of the data delivered to the evaluator is equally varied. We are building a toolset that facilitates the process of integrating the data into a single data structure and visualizing the data geospatially and over time. At the core of the toolset is a Java Script Object Notation (JSON) schema that is generic enough to contain any sort of data that the evaluator is likely to need, combined with context data describing all players and the relationships they share. In order to get data into the schema format we are developing a program that will allow the user to pull data from databases and delimiter-separated files and convert it to the schema format. We are also modifying Sage, an ARL M&S program with geospatial visualization capabilities, to be able to read and process the schema format. The end result is the ability to go from a large set of disparate data to a unified visualization for rapid analysis.

Decision-Makers Don't Trust Your Dashboard - Applying contemporary lessons from psychology, graphic design, marketing, and management science to make data achieve its purpose.

[28 Oct 15, 0945-1015, Rm 5]

MAJ Lucas Haravitch
U.S. Army Materiel Systems Analysis Activity (AMSAA)
lucas.j.haravitch.mil@mail.mil

Keywords: Condition Based Maintenance, Data Mining, Data Visualization, Decision Support

ABSTRACT: With uncertainty in their operational and fiscal environments, and ubiquitous "streaming" data, military decision-makers must ask more and better questions and receive quicker and tailored answers in order to win in a complex world. They need the quick and intuitive truth provided by information dashboards. But can decision-makers trust the dashboard? Conversely, can the analyst trust that his dashboard will be interpreted and used correctly?

This research considers a decision-maker not only to be a supervisor who makes organization-level decisions, but also the subordinate whose daily decisions provide the information that feeds the dashboard. The subordinate's decisions are impacted greatly by his trust in the system that captures, analyzes, and presents to his supervisor the data which his actions produce.

As a case study in how trust influences decisions, this research explores the Fleet Insight Toolkit (FIT). AMSAA developed FIT, a dashboard-like environment, to provide near-real-time, visually-based, self-directed, and scalable analytics for ground fleet readiness. The toolkit derives information from many sources, including both Soldier entered and sensor-collected data. FIT communicates relevant Condition Based Maintenance (CBM) data and metrics to vehicle operators, maintainers, unit commanders, Army staff, and everyone in between. FIT provides an accessible example to discover the way dashboard designers and users may interact with their data to inform decisions.

We conclude this research with practical advice to help bu ild trust in your data and analysis for decision-makers at all echelons. We investigate the true purposes of a dashboard and discuss ways to keep it relevant, useful, and honest.

Reliability Impacts on the Capability Set: Mission Thread Availability

[28 Oct 15, 1015-1045, Rm 5]

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.

Innovative Implementation of AWARS to Support Sustainment Operations

[28 Oct 15, 1045-1115, Rm 5]

Reginald L. Cotton
TRADOC Analysis Center
reginald.l.cotton.mil@mail.mil

Randall W. Clements
TRADOC Analysis Center
randall.w.clements2.civ@mail.mil

Keywords: Logistics, Logistics Manager, Support Operations Officer

ABSTRACT: In the ADP, 4.0 logistics is defined as “planning and executing of the movement and support of forces”. The importance of logistics in sustained combat operations is crucial and must be accurately represented in combat simulations. One concept difficult to portray in a combat model is that of proactive logistics which focuses on the future needs of the unit. The Advanced Warfighting Simulation (AWARS) simulation developers and analysts instituted an enhancement which created the logistics manager to mimic this behavior of the support operations section.

The logistics manager will handle all supply requests based on the supported unit’s logistics status report and dispatch sustainment replenishment operations as needed. This capability will give the supporting unit visibility of the current supply levels for all supported units. This enhancement will enable the responsiveness of the supply chain based on a supported unit’s logistics status, the supporting unit supply level, the logistic assets on hands, the priority of support, and the supported unit consumption rates.

This presentation will describe the methodology and the behaviors being replicated by the logistics manager. This focal point for logistical decision making in the unit will more accurately represents how logistics operates in a unit, creates a proactive rather than reactive concept of support, and ensures no logistical shortfalls in the concept of operation.

Beyond Fading Assessment Bars

[28 Oct 15, 1115-1145, Rm 5]

LTC Chris H. Bachmann
21st Theater Sustainment Command
christopher.h.bachmann.mil@mail.mil

Mr. Jeffrey D. Gilbert
21st Theater Sustainment Command
jeffrey.d.gilbert.civ@mail.mil

MAJ Edward M. Masotti
21st Theater Sustainment Command
edward.m.masotti.mil@mail.mil

Keywords: Assessment, MOP, Campaign Plan, SharePoint

ABSTRACT: Operational assessment is critical for commanders in both a deployed and garrison environment. While normally reserved for combat and stability operat ons, the 21st Theater Sustainment Command (TSC) is applying formal assessment to the organization's campaign plan. This ongoing effort began in 2012, with a rigorous literature review. We found that assessment is pervasive throughout Joint and Army doctrine. For example, Joint Publications 3-0 and 5-0, former Army Field Manual 5--0 and 3-24, Counterinsurgency, the current Army Doctrine and Training Publication (ADRP) 5-0, and a litany of other doctrinal manuals address operational assessment. Additionally, the Joint Force has expended considerable effort in developing assessment centric manuals such as the Commander's Handbook for Assessment Planning and Execution and more recently, Operation Assessment Multi-Service Tactics, Techniques, and Procedures for Operation Assessment. However, much of the doctrine, along with our higher headquarters, United States Army Europe (USAREUR) and United States European Command (EUCOM), predominately used traditional color graduation methods. Conversely, the literature on Afghanistan assessments showed a push against the "Fading Bars of Color" methods. These methods are very subjective and provide significant ambiguity for the decision maker to direct action. Assessing the mission accomplishment of the 21st TSC, a diverse divisional level command with responsibility across Europe and Africa, is challenging and complex. Therefore, we leveraged methods purported from the Afghanistan Theater in order to develop a combined quantitative and qualitative assessment model that reduced the color bar ambiguity.

The CG approves the campaign plan, objectives, and key tasks each FY based on strategic vision of 21st TSC and its higher headquarters. For FY15, it included supporting Unified Action and the Joint Combined Arms Force, Sustaining Relationships and NATO, Sustainment of the Theater, and Ready and Resiliency of Soldiers, Civilians, Families, and Communities. The assessment model is now on its third year and has proven to be of significant value for the commanding general (CG). It provides him increased operational awareness in order to mission command and allocate resources. The first generation model was static and product intensive relying on Microsoft Word, PowerPoint, and Excel; however, subsequent generations are now dynamic. Action officers can dynamically create and update their measures of performances complete with corrective actions and data linkages. The data is automatically aggregated in SharePoint to produce the quantitative assessment. Senior leaders and SMEs can then input their qualitative evaluations directly in the SharePoint portal supported by the quantitative data. Additionally, the CG, along with any senior leader, can continually review the assessment from their computer terminal. Finally, we formally brief the CG at the mid-point and conclusion of the fiscal year.

Combat Vehicle Aging and Trend Analysis

[28 Oct 15, 1300-1330, Rm 5]

Shanelle Harris
U.S. Army Materiel Systems Analysis Activity
shanelle.m.harris2.civ@mail.mil

Martin Wayne, Ph.D.
U.S. Army Materiel Systems Analysis Activity
martin.r.wayne.civ@mail.mil

Keywords: Aging, Maintenance, Optimization

ABSTRACT: The Army has a large fleet of vehicles to perform military operations. Upon the conclusion of the longest war in American history, with increased operating tempo, harsh terrain, and usage at five to six times over peacetime expectations, refurbishment decisions are more critical than ever before. It was estimated in 2007, that $13 billion annually was needed for the purpose of reset. The Army Reset program has been faced with multiple complex factors with regard to when and where to perform technical inspections, thereby affecting the overall readiness of the equipment. In some cases, the standard Army overhaul reset standards have been used without regard to the experience of the equipment.

This study analyzes the Army's ground-truth data collected during OCONUS and Garrison operations. The approach employs a dynamic regression modeling technique to examine the impacts of aging on the fleet. Various factors that may impact vehicle reliability are included in the model such as unit type, vehicle location, vehicle mileage, and usage rates. The model results provide a deeper understanding of the impacts of the factors on vehicle failures. This information can directly impact the capabilities of the future force, help to optimize the sustainment costs of the Army fleet, and also improve soldier readiness due to improved vehicle availability. The approach will be demonstrated using the Stryker fleet as a case study.

Vehicle Subsystem Reliability Estimation Using Physics-based Modeling and Simulation

[28 Oct 15, 1330-1400, Rm 5]

Michael Pohland
U.S. Army Materiel Systems Analysis Activity
michael.f.pohland.civ@mail.mil

Peter Fazio
U.S. Army Materiel Systems Analysis Activity
peter.j.fazio8.civ@mail.mil

Keywords: Reliability, Stress-Strength, Modeling

ABSTRACT: Reliability of tactical wheeled vehicles plays a critical role in the decision making process for the management of an efficient, modern and cost effective Army vehicle fleet. Reliability estimates have been classically based upon sample data collection of fielded vehicles and test data collected from reliability testing. Many gaps in the reliability data exist for vehicles when insufficient field data is collected and no test data are available. These data gaps have been attempted to be filled by making assumptions about system similarity and by use of simple formulas based upon changes in vehicle weight. Reliability estimation based upon the physical attributes of stress and strength and employing modeling and simulation adds a high degree of scientific rigor to the process of estimating vehicle and vehicle sub-system reliability.

This reliability estimation technique uses a new approach based upon field data collection and physics-based modeling. The process begins with developing a system level block diagram. Failure data is obtained for a vehicle with similar subsystems and the failure rate calculated for each subsystem. A terrain profile is created that reflects actual field usage and a dynamics model is run to generate a stress profile for the subsystems. The subsystem strength is generated by calculating the probability of failure for a mission, fj and then using that as input into the inverse of the cumulative distribution function (cdf) of the stress profile. The dynamics model is modified to reflect changes in the system, such as weight, equipment and mission profile. A new subsystem stress profile is generated. Then the subsystem strength is used as input to the new stress profile cdf to generate the Pnew· The Pnew is used to estimate the new subsystem failure rate and is summed with the other subsystem failure rates to create a new system reliability estimate.

Unambiguous Terrain Database Requirements Capture and Tracking with Google Earth Pro™

[28 Oct 15, 1400-1430, Rm 5]

Thomas Kehr
U.S. Army PEO STRI
thomas.w.kehr.civ@mail.mil

James 'Trey' Godwin
U.S. Army PEO STRI
james.b.godwin2.ctr@mail.mil

Keywords: Synthetic environment, terrain database, environmental representation, google earth

ABSTRACT: The desire to make an increasing number of military training and simulation systems interoperable is a very real challenge faced by the modeling and simulation community. Synthetic environment correlation, a necessary element of interoperability, poses unique challenges when considering performance requirements of low-fidelity legacy systems and those of next generation Gaming systems. In order to facilitate correlation, performance tradeoffs must often be made in each system, to include terrain database content, size, and fidelity, for each respective output terrain format. In the past, the Synthetic Environment Core (SE Core) program used a singular text-based document to track all terrain requirements for a given terrain database generation effort. These requirements included, required terrain output formats, required feature content for each of these formats, and the geographical extents of each. As the number of required terrain output formats grew, this requirements document became overly complicated and time consuming to create, track, and review by all stakeholders.

As an answer to this burdensome document process, the SE Core program implemented a graphical solution in the form of a Google Earth Pro™ KML geographic data file. Utilizing multiple file structures, vector overlay colors, graphical symbols, and embedded comment fields, SE Core was able to create a more robust requirements tracking document that could be easily shared between and interpreted by the capability manager, materiel developer, and contractor representatives. Additionally, the wide availability of the Google Earth™ application allowed this document to be easily reviewed by terrain database End Users and confederated system programs in order to provide graphical and unambiguous requirements feedback.

Frenemies: Reimagining Communication Between The Warfighter And The Logistician

[28 Oct 15, 1445-1515, Rm 5]

Ms. Shana Smith
Ms. Sandra Hatch
Center for Army Analysis
shana.m.smith.civ@mail.mil
Sandra.w.hatch.civ@mail.mil

Keywords: Logistics, Supply Chain, Supply Eco-Systems

ABSTRACT: In 1969 General Carter Bowie Magruder, a senior Army logistician compiled a list of reoccurring logistics problems he had seen throughout his 27 years of service (WWI, WWII, Korea and Vietnam). General Magruder identified problems that still exist today and forecasted problems that would occur during future logistics support to a large scale conflict. Some of the problems that he identified as ‘unsolvable’, however, have been resolved by today’s commercial markets with emerging communication capabilities. By comparing and contrasting these reoccurring military logistics problems with emerging competitive logistics strategies in commercial markets, there are ample opportunities to restructure the communication channels between the warfighter and the logistician.

Given the communication tools available to the Army in WWII, it was impossible for rear-echelon logisticians to directly ask the front-line units what they needed. Current communication capabilities allow multi-dimensional communication. Not only can a single individual communicate simultaneously with multiple entities (one to many), but multiple entities can communicate effectively at the same time (many to many). Today’s commercial entities have demonstrated successful use cases for this new form of communication and have turned the aggregation of communication into a useful product. In recent history, companies across multiple markets have re-imagined their logistics strategies to take advantage of emergent supply chain theory and new technology. In doing so, they have changed their supply chains from a necessity to a tactical advantage. The opportunities today’s communication abilities provide the military, could reshape how we communicate with and support the Warfighter. We as a community have the opportunity to ask ourselves, “How can we turn multi-dimensional communication between Warfighters and Logisticians into a military advantage?”

Managing ATEC Enterprise Test and Evaluation Data: Standardizing Reliability and Maintainability Data Collection and Archival

[28 Oct 15, 1515-1545, Rm 5]

Carol Vesier, Ph.D.
US Army Evaluation Center, Army Test and Evaluation Command
Carol.l.vesier.civ@mail.mil

Paul Zimmer
US Army Operational Test Command, Army Test and Evaluation Command
paul.j.zimmer.civ@mail.mil

Christopher Schultz
Aberdeen Test Center, Army Test and Evaluation Command
christopher.j.schultz22.civ@mail.mil

Irene Johnson, Keith Adkins and Kristina Diaz
US Army Evaluation Center, Army Test and Evaluation Command

Eugene Flory, Nanci Anderson, Jane Byrd, Sandra Laywell, Catherine Miller, Terri Labeth, Steven McKee
Operational Test Command, Army Test and Evaluation Command

David Frank, Sue Knopp
Aberdeen Test Center, Army Test and Evaluation Command

Keywords: Change Management, Test and Evaluation, RAM

ABSTRACT: In support of the Army Test and Evaluation Command (ATEC) strategic plan to improve Enterprise Test and Evaluation Data Management, ATEC is standardizing Reliability and Maintainability (RAM) data collection and archival. This standardization effort encompasses all Army programs, both technical and operational tests. The goal of the standardization is to ensure that RAM data is discoverable, accessible, and utilizable to increase the usability of reliability data within the Army analytical community. To meet this goal, it was not sufficient to just select a tool, development of the associated work processes and enablers was required. Emerging results from the three beta tests provide insight into how the transition to standard RAM Tool was managed.

Developing Component Test Plans to Achieve Bridge Test Efficiencies

[28 Oct 15, 1545-1615, Rm 5]

Adam Hull
U.S. Army Materiel Systems Analysis Activity
adam.d.hull.civ@mail.mil

Martin R. Wayne, Ph.D.
U.S. Army Materiel Systems Analysis Activity
martin.r.wayne.civ@mail.mil

Keywords: Reliability, Test planning

ABSTRACT: The LOC-B bridging system is to enter testing in 2015 using the Trilateral Design and Test Code for Bridging and Gap-Crossing Equipment for the necessary number of cycles of test crossings for the complete bridge to withstand in order to demonstrate sufficient reliability. Given the expense of testing hundreds of thousands of crossings, the project office explored component testing options, which are commonly used by industry for bridge reliability determination. AMSAA was asked to derive an alternative test structure to replicate the same level of reliability obtained by following the Trilateral Code. This required that both component life distributions and the test on these components be derived from a system reliability model.

Statistical analysis allowed AMSAA to verify the trilateral code and model how the test plan it describes achieves the required confidence and exceedance. After applying a distribution transformation, the properties of extreme value distributions were applied to decompose system variability into component variability. Physics modeling was performed to confirm the values of the parameters within the component models. Using the life distribution of the components, their variability and physical models, fixed length tests were generated at the component level. These component tests will offer the same confidence as the system-level test when combined with a smaller volume of full-system testing for verification. By testing components, there is the potential for not only time and cost savings, but also for increasing total bridge reliability. This model framework can be used for other bridge programs and potentially other systems that consist of a collection of identical subsystems.