

DTIC Current Awareness: October 2002

Baker, M. E. (2002). *Human Factors in Network Centric Warfare*. Naval War College, Newport, RI. (DTIC No. ADA405862)

<http://handle.dtic.mil/100.2/ADA405862>

Abstract: The speed of information transfer in Network Centric Warfare is rapidly out pacing the capability to absorb and act effectively. Numerous problems, such as micro-management and limited endurance have been documented in studies of human interaction in information systems. Many of these problems are the result of limited human cognitive capability in the face of the massive amounts of information provided in NCW. Specifically, the operational level of warfare, commanders are being overwhelmed due to human factors, limitations and tendencies.

Blick, D., Beer, J., Kosnik, W., Troxel, S., Toet, A. (2001). *Laser Glare in the Cockpit: Psychophysical Estimates Versus Model Predictions of Veiling Luminance Distribution*, Report No. AFRL-HE-BR-TR-2002-0164. Air Force Research Lab Human Effectiveness Directorate, Brooks AFB, TX. (DTIC No. ADA406223)

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Abstract: Two methods for estimating the visual effects of light scattered from a laser glare source were compared: (1) a veiling luminance (VL) model that convolves a radiometric scan of the corneal light distribution with a point-spread function to calculate the retinal distribution and; and (2) psychophysically determined equivalent background luminance (EBL). For six subjects, detection thresholds for a 12-arc-min-diameter test spot were measured at 24 points in the glare field (4 quadrants X 6 eccentricities between 0.25 and 8 deg). Measured Weber fractions were used to calculate EBL's for each test point. Output of the VL model matched the EBL data well, but underestimated the EBL at the smallest (0.25 deg) eccentricity and overestimated it at eccentricities from 1 to 4 deg. This model can be a useful predictor of visual decrements in a variety of glare situations.

Durkot, M. J., de Garavilla, L. (2000). *Exercise in the Heat: Effects of an Adenosine Antagonist*, Report No. M99-11. Army Research Institute of Environmental Medicine, Natick, MA. (DTIC No. ADA406583)

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Abstract: The purpose of this experiment was to examine the effects of an adenosine antagonist on cardiovascular, thermoregulatory, and exercise performance in the heat. Two doses (1 mg/kg and 10 mg/kg) of a selective adenosine A1 antagonist (1,3-di-n-propyl-8-4-HYDROXYPHENYLLxanthine) (DHPX) were tested in a rat model of exercise exhaustion, treadmill 11 m/min, 6 incline, in the heat 30 C. Pretreatment with the experimental adenosine antagonist caused a slight improvement $p > 0.05$ in run time (41 +/- 14 vs. 44 +/- 3 mm) at a low dose but reduced performance (41 +/- 14 vs. 29 +/- 3 mm) at a high dose despite elevated plasma lactate (6.41 +/- 0.82 vs. 9.91 +/- 1.0 and 12.42 +/- 1.1 micronmole/L) levels in both dosage groups. At the low dose the antagonist provided a clear benefit in thermoregulation as evidenced by reduced heating rates (0.079 +/- 0.005

vs. 0.050 +/-0.009C/min). Heart rate and blood pressure tended to be preserved in the low dose group also. Blood gases remained closer to normal with either dosage of drug with arterial PO₂ being remarkably preserved after exercise whereas venous PO₂ was not different suggesting increased oxygen delivery and extraction. The results of this investigation indicate that antagonizing the effects of adenosine at a low dose with this agent did improve cardiovascular and thermoregulatory responses but did not provide a substantial overall benefit in exercise performance in the heat.

Fulco, C. S., Friedlander, A. L., Muza, S. R., Rock, P. B., Robinson, S. (2002). *Energy Intake Deficit and Physical Performance at Altitude*. Army Research Institute of Environmental Medicine, Natick, MA. (DTIC No. ADA406578)

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Abstract: Physical performance of sea-level (SL) residents acutely exposed to altitude (ALT) is diminished and may improve somewhat with ALT acclimatization.

Kelly, R., and Masquelier, B. L. (1996). *Integrated Technical Information for the Air Logistics Centers (ITI-ALC)*, Report No. TR-2002-0059. Systems Research and Applications Corporation, Beavercreek, OH. (DTIC No. ADA406621)

<http://handle.dtic.mil/100.2/ADA406621>

Abstract: The objective of the Integrated Technical Information for the Air Logistics Centers (ITI-ALC) program was to improve the efficiency and effectiveness of the Air Force's depot maintenance process, with specific emphasis on Programmed Depot Maintenance (PDM) operations and with a limited look at component repair. This was accomplished by streamlining the process and developing an ITI-ALC integrated systems concept implementable with technologies that will automate the streamlined process to standardize, integrate, and make information easily accessible to the ALC personnel through a single entry source. This integration of information included interfacing with many independent sources of information such as engineering drawings, maintenance plans, manufacturing specifications, technical orders, and dynamic diagnostics. When implemented, the results of the ITI-ALC program will reduce flow days, improve quality, reduce operating costs, and improve mechanic performance. The ITI-ALC program was accomplished through the application of a structured, user-focused methodology that supported the effective collection, integration, and analysis of the user information. The approach produced effective and practical business process improvement (BPI) concepts for the streamlined PDM process and the requirements for the supporting ITI-ALC system. This report describes the methodology that was applied to successfully satisfy the requirements of the ITI-ALC program along with possible recommendations and/or lessons learned during the performance of the ITI-ALC program.

Mansheim, J. M., Sutton, R., Quill, L., Faas, P., Masquelier, B. L. (1998). *Integrated Technical Information for the Air Logistics Centers (ITI-ALC), Phase 2*, Report No. TR-2002-0112. Lockheed Martin Information Systems, Orlando FL. (DTIC No. ADA406643)

<http://handle.dtic.mil/100.2/ADA406643>

Abstract: The objective of the Integrated Technical Information for the Air Logistics Center (ITI-ALC) research is to improve the effectiveness and efficiency of depot aircraft maintenance by designing, developing, and demonstrating technology to improve, standardize, integrate, and make more accessible at the job, maintenance technical and management information. This document summarizes the activities and results of the ITI-ALC Phase II Research and Development program. Information is presented on the user-centered development process, the prototypes prepared, the personnel involved, and the facility resources that supported this research and development effort. A description is provided of the design and development of the following proof-of-concept prototype tools: Engineering Assistance/Collaboration prototype tool and Evaluation and Inventory Inspection prototype tool. Information is also presented on the training administered to participants for prototype evaluation, the instruments and methods used to collect user feedback, the user feedback data collected, and the resulting conclusions and recommendations based on this user feedback.

Nindl, B. C., Leone, C. D., Tharion, W., Johnson, R. F., Castellani, J., Patton, J. F. (2002). *Physical Performance Responses During 72 h of Military Operational Stress, Report No. M02-21*. Army Medical Research and Materiel Command, Fort Detrick, MD. (DTIC No. ADA406576)

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Abstract: To characterize the impact of prolonged work, underfeeding, and sleep deprivation (i.e., sustained operations; SUSOPS) on physical and occupational related performance during military operational stress. Methods: Ten male soldiers were tested on days 1 (D1), 3 (D3), and 4 (D4) of a control and an experimental week that included prolonged physical work (total daily energy expenditure 4,500kcal/day), underfeeding (-1,600kcal/day), and sleep deprivation (-2h/day).

Schwerin, M. J. (2002). *The Impact of Morale, Welfare, and Recreation (MWR) Programs on Aviator Retention, Report No. NPRST-AB-02-1*. Navy Personnel Research Studies And Technology, Millington TN. (DTIC No. ADA406297)

<http://handle.dtic.mil/100.2/ADA406297>

Abstract: In the U.S. Navy, there are two main bases where fighter squadrons are based Naval Air Station (NAS) Oceana and NAS Lemoore. A belief widely held by those familiar with life at NAS Lemoore is that the paucity of local leisure and recreation opportunities is affecting QOL among those stationed at NAS Lemoore. The objective of this study was to compare QOL and the impact of MWR programs on retention among officers and enlisted in the aviation community at both. A second focus of this study examined the impact of the MWR golf program on retention at NAS Lemoore and NAS Oceana. NAS Oceana was selected as the comparison base for this study because it had a similar mission with the same broad range of recreation programs/services with the exception of an on-base golf course (NAS Lemoore does not have an on-base golf course whereas NAS Oceana does). Results generally support the notion that there is a significant relationship between life need satisfaction and organizational outcomes (i.e., global QOL, job performance, organizational commitment, and retention plans). Results also indicate that satisfaction with MWR Programs appeared more consistently related to global QOL and organizational commitment than retention plans. When asked directly, most respondents from both bases reported that MWR programs had neither a positive nor negative effect on retention plans.

Sonna, L. A., Angel, K. C., Sharp, M. A., Knapik, J. J., Patton, J. F. (2001). *The Prevalence of Exercise-Induced Bronchospasm Among US Army Recruits and Its Effects on Physical Performance, Report No. M/00-33*. Army Research Institute of Environmental Medicine, Natick, MA. (DTIC No. ADA406569)

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Abstract: To measure the prevalence of exercise-induced bronchospasm (EIB) and to determine its effect on the physical performance response to training in otherwise healthy young adults.

Therrien, S. S. (2002). *A Bayesian Model to Incorporate Human Factors in Commanders' Decision Making*. Naval Postgraduate School, Monterey, CA. (DTIC No. ADA406204)

<http://handle.dtic.mil/100.2/ADA406204>

Abstract: In the near future, commanders and their respective staffs will interact with subordinate and opposing forces whose physical and cognitive behaviors are represented in software and simulation. This paper presents a model of the human factors and environmental variables that influence stress and risk assessment. These variables contribute to situational awareness, which is a force protection issue. Leaders integrate information from various sources. These sources range from observations, training, orders, and reports. The leaders use this knowledge with doctrine and tactics to develop an understanding of the situation. This paper describes a Bayesian network model of the variables associated with risk assessment and stress in combat scenarios. The level of situational awareness is determined by what the commander knows about the unit and the surrounding conditions. This model lends structure to the environment and enables a probabilistic interpretation of risk and stress levels. This model is applicable to various combat scenarios ranging from brief engagements to sustained operations.

Thien, R. E. (2002). *Realistic Airspace Simulation Through the Use of Visual and Aural Cues*. Naval Postgraduate School, Monterey CA. (DTIC No. ADA406033)

<http://handle.dtic.mil/100.2/ADA406033>

Abstract: The increase in air traffic volume within the National Airspace System has prompted the Federal Aviation Administration to explore more efficient methods of conducting Air Traffic Control. Toward this end, a project to develop Simultaneous Non-Interfering (SNI) Routes for rotary wing aircraft has been undertaken. In order to develop these routes with an appropriate level of safety, the ability of a rotary wing pilot to fly an assigned path with the aid of Global Positioning System navigational equipment must be evaluated. This evaluation must be conducted initially in a simulated environment. So as to record the most accurate human performance data possible, the simulated airspace must be as close to reality as possible. The goal of this thesis is to accurately simulate the airspace for use in the development of SNI routes. In order to create a realistic simulated flying environment the performance and visual presentation of other air traffic was made to perform as they do in the real world. In addition, the radio transmissions heard by the simulator pilot were designed with both timeliness and accuracy with regard to the air

traffic scenario. Through the use of these visual and aural cues, a realistic airspace simulation was created.

Williamson, A. T. (2002). *Analyzing the Effects of Network Centric Warfare on Warfighter Empowerment*. Naval Postgraduate School, Monterey CA. (DTIC No. ADA405963)

<http://handle.dtic.mil/100.2/ADA405963>

Abstract: NCW is a conceptual warfighting paradigm that seeks to exploit the advantages of information technologies to develop information superiority, leading to battlefield awareness and later escalating to battlefield dominance during future military operations. While military forces are currently experimenting within the framework of this new concept, efforts are being made to harness the opportunities made available by implementing network-centric concepts to increased operational efficiency and enhance combat power effectiveness so that optimal desired results may be achieved. However, the modern Marine Corps is comfortable and quite successful implementing its current, subordinate empowering doctrine of Maneuver Warfare, which emphasis the human behavioral aspects of warfare over technology implementation. The issue, then, is: how will Marine Corps warfighting performance be affected by changes in doctrine driven by advances in and the implementation of technology. This thesis seeks to answer this question through exploratory research of theoretical concepts on organizational performance, an examination of current and future warfighting concepts, and an assessment of the practicality of successfully implementing future warfighting concepts based upon the principles of a theoretical framework. Recommendations are provided for creation of a metro that will adequately assess the performance of empowered warfighters in a Network Centric Warfare environment.