ARI Research Note 2006-03

List of U.S. Army Research Institute Research and Technical Publications

Fiscal Year 2005
October 1, 2004 to September 30, 2005
With Author and Subject Index

U.S. Army Research Institute for the Behavioral and Social Sciences
2511 Jefferson Davis Highway, Arlington, Virginia 22202-3926

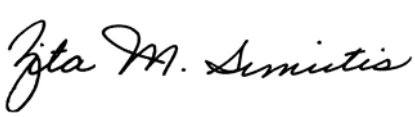
May 2006

Foreword

The means of dissemination of the results of the U.S. Army Research Institute for the Behavioral and Social Sciences' (ARI) research and development/studies and analysis program vary widely depending on the type of work, the subject matter, and the sponsor/proponent. Typically, major findings with immediate policy and procedural implications are briefed to sponsors and proponents in order to enable timely implementation. This is followed up with complete documentation in the form of research and technical publications such as the ones listed here. In many cases, these documents represent the actual item handed off to the sponsor/proponent; this is particularly true of the Research Product category. In other cases, results are published in order to provide a complete record of the work done, and for future reference by researchers doing work in the same or similar areas.

This annotated list for FY 2005 provides an idea of both the depth and scope of the ARI research effort, and is a valuable resource for anyone interested in military psychology from either a scientific or operational perspective.

MICHELLE SAMS
Technical Director



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Introduction

The primary responsibility of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) is to maximize Soldier effectiveness. ARI accomplishes its mission through research and development in the acquisition, training, utilization, and retention of Army personnel. ARI research and products affect every Army mission with a human performance component.

As convenient references for qualified agencies and individuals and sponsors, ARI publishes lists of its technical and research publications. This issue of the publication list describes reports published during the period October 1, 2004, to September 30, 2005. It contains the abstract of each publication and the bibliographic information needed to identify a publication. The abstracts have been written, as far as possible, to describe the principal research findings in non-technical terms; however, technical language is used to communicate efficiently the details of research analysis. Author and subject indexing provide access to individual reports and topics.

ARI Publications

ARI publications are divided into separate, consecutively numbered categories appropriate to their intended audience and function. During fiscal year 2005, the following types of research and technical reports were issued by ARI:

Technical Report (TR). A report of completed research intended primarily for dissemination to researchers.

Research Reports and Technical Reports published by the U.S. Army Research Institute for the Behavioral and Social Sciences are intended for sponsors of research and development (R&D) tasks and for other research and military agencies. Any findings ready for implementation at the time of publication are presented in the last part of the Executive Summary. Upon completion of a major phase of the task, formal recommendations for official action normally are conveyed to appropriate military agencies by briefing or memorandum.

Research Report (RR). A report of completed research intended primarily for dissemination to military managers. Research Reports may deal with policy-related issues but typically do not include specific policy recommendations.

Research Product (RP). A user-oriented report intended to aid Army personnel. Examples are handbooks, manuals, and guidebooks.

Special Report (S). A published report on a topic of special interest or in-house research intended primarily for dissemination to a select audience.

Study Report (SR). A published report briefly documenting studies and analyses.

Study Note (SN). A Study Note may contain or consist of technical text, computer code, diskettes or tapes with software, databases, codebooks or other documentation, raw data, data collection instruments, figures, tables, or any other products that do not concisely convey the import of a project but which must be archived for technical completeness.

Research Note (RN). An interim, or final report typically of limited interest outside of ARI. It is filed with the Defense Technical Information Center (DTIC) but is not printed. Research Notes usually fall into one of the following categories:

- An in-house report that is of limited interest outside of ARI but is considered worth submitting to DTIC to be part of the Department of Defense (DoD) archive of technical documentation.

- An interim contract report that is of limited interest outside of ARI but is considered worth submitting to DTIC to be part of the DoD archive of technical documentation.

- A final contract report that is of limited interest outside of ARI but must be submitted to DTIC in accordance with Department of the Army regulations to close a contract.

- Material related to a Research Report or Technical Report (detailed tables, graphs, charts, sample forms, and sample training and testing materials) published as a Research Note to economize on printing and distribution.

Contractor Report (CR). An interim, or final report by a contractor that meets contractual obligations but is not defined by the other report categories.

ARI Distribution

Initial distribution of these publications is made directly by ARI. Research Reports, Technical Reports, Study Reports, and Research Products are distributed primarily to operational and research facilities and their sponsors in DoD, to other interested Government agencies, and to DTIC; copies of some reports are also sent to libraries participating in the Documents

Expediting Project. Research Notes, Study Notes, and Contractor Reports are filed with DTIC but are not published.

These publications are NOT available from ARI. DoD agencies and contractors can purchase paper copies or microfiche from:

Defense Logistics Agency
Defense Technical Information Center
8725 John J. Kingman Road, Suite 0944
Ft. Belvoir, VA 22060-6218
(703) 767-9030 or DSN 284-9030

Other Government agencies and the general public can obtain unclassified reports from:

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

NOTE: When requesting copies of these reports, use the DTIC accession number (AD - - - - - -) appearing in parentheses following the date of publication of each citation.

Technical Reports

TR 1151
Army Enlisted Personnel Competency Assessment Program Phase I (Volume I): Needs Analysis
Knapp, D.J., and Campbell, R.C. October 2004. (AD A427949)

In the early 1990s, the Department of the Army abandoned its Skill Qualification Test (SQT) program due primarily to maintenance, development, and administration costs. Cancellation of the SQT program left a void in the Army's capabilities for assessing job performance qualification. To meet this need, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) instituted a 3-year program of feasibility research related to development of a Soldier assessment system that is both effective and affordable. The PerformM21 program has two mutually supporting tracks. The first is a needs analysis that will result in design recommendations and identification of issues related to implementation of a competency assessment program. The second track is a demonstration of concept – starting with a prototype core assessment targeted to all Soldiers eligible for promotion to Sergeant, followed by job-specific prototype assessments for several Military Occupational Specialties. Experience with the prototype assessments will influence elaboration of the operational program design recommendations.

The present report describes the needs analysis work and subsequent Army competency assessment program design recommendations as they stand at the end of the first year of the PerformM21 effort. A variety of areas are discussed, including program goals and policies as well as test content, design, development, and administration considerations.

TR 1152
Army Enlisted Personnel Competency Assessment Program Phase I (Volume II): Demonstration Competency Assessment Program Development Report
Campbell, R.C., Keenan, P.A., Moriarty, K.O., & Knapp, D.J. October 2004. (AD A428294)

This report documents and summarizes the activities in developing a prototype test as part of a Demonstration Competency Assessment Program (DCAP) targeted for use as a promotion tool for advancement of Army Soldiers from pay grade E4 to E5. The test consists of four Army wide core content areas: Leadership, Training, Army History and Values, and Basic Soldiering Tasks (Common Tasks). The report outlines the role of the advisory NCO Council (Army Test Program Advisory Team – ATPAT), the development of the test blueprint, and item development and review. It outlines the plans for Phase II: Pilot testing.

TR 1153
Applying Consensus Based Measurement to the Assessment of Emerging Domains
Legree, P.J., Psotka, J., Tremble, T.R Jr., and Bourne, D. January 2005. (AD A430810)

Situational judgment tests have been developed in the fields of Industrial/Organizational and Cognitive Psychology to predict performance and to evaluate theories of cognition. Production of these scales has usually required the opinions of subject matter experts to produce scoring keys or criterion data to compute empirically based standards. A simpler, elegant procedure is considered that allows examinee responses to be scored as deviations from the consensus defined by the response distributions of the examinee sample. This approach is termed "Consensus Based Measurement" and has been applied to validate scales in domains, such as Emotional Intelligence, that lack certified experts and well-specified, objective knowledge. Data are summarized demonstrating substantial convergence between situational judgment test scores computed using expert and examinee based scoring standards for which substantial expert and examinee data are available. The convergence indicates that examinee response distributions may be used to score situational judgment tests when expert responses are not available. Validity data for situational judgment scales that are scored with this approach are summarized.

TR 1154
Interactivity, Communication, and Trust: Further Studies of Leadership in the Electronic Age
Burgoon, J.K., Weisband, S., and Bonito, J. March 2005. (AD A433229)

Successful leadership and team performance are built on a foundation of trust and effective communication between and among leaders and team members. A broad range of new communication technologies, now ubiquitous in today's military, allow leaders and their teams to work remotely from one another. Our current research program, consisting of 11 laboratory and field experiments, seeks to answer the question of how these technologies affect leaders' ability to foster high trust, morale, and performance with their team by testing the *principle of interactivity:* whether messages sent and received are coherently and tightly linked, create coordinated communication, and are marked by involvement, mutuality (sense of connection, receptivity, common ground, mutual understanding), and individuation (clear and detailed knowledge of sender and receiver identities). Proximal, real-time, and multi-sensory message exchange technologies promote interactivity. We have continued to investigate which forms of electronic communication help or hinder interactivity, as well as whether task load—the degree to which a task is cognitively and/or physically effortful and demanding— alters interactivity and trust. Our results offer best communication practices that will help leaders maximize trust when needed, dampen interactivity and trust when skepticism is needed, and prevent unintended negative consequences when using electronic media.

TR 1155
Dismounted Infantry Decision Skills Assessment in the Virtual Training Environment
Gately, M.T., Watts, S.M., Jaxtheimer, J.W., and. Pleban, R.J. March 2005. (AD A432164)

This report was developed under a Small Business Innovation Research Program, Phase II. The Virtual Soldier Skills Assessment (ViSSA) is a software system that operates in a DIS/HLA-based virtual environment. ViSSA can automatically detect significant events in virtual exercises. It also has a logger/playback module to allow to assist the trainer or Observer/Controller (O/C) in highlighting these significant events during the after action review (AAR) The system is designed to assess warfighter skills, decision-making, and situational awareness. Event/Condition/Action rules are designed by experts for consistent assessment against Doctrine. ViSSA can reduce training and assessment costs by minimizing the burden on the O/C and assisting in orchestrating an effective AAR by providing the rapid replay of significant events, summary statistics, and critical decision points during the exercise. Training for urban operation missions is limited by time, cost, and safety factors. Virtual environment technologies like ViSSA have the potential to provide the Army with a training capability to meet these demands to optimize human performance by enhancing Soldier decision-making skills.

TR 1156
Surrogates for Future Force Warrior (FFW) Training Research
Livingston, S.C., Root, J.T., Mast, R.L., and Gilbert, P.A. March 2005. (AD A433353)

This report describes the design, organization, and capabilities of a new U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) Warfighting Experimentation Lab at Fort Benning, Georgia. It was developed to provide the ARI staff with a reach forward ability in training research. As the DoD Training Transformation (T2) gets underway, the Army is now working on its transformation as an ongoing perpetual function. Because of the flux inherent in perpetual transformation, many of its proposed future developments are and will continue to be abstract with varying kinds and amounts of related empirical data. Thus there was a need for the Warfighting Experimentation Lab to provide a flexible simulation environment in which researchers can examine proposed and evolving tactical technologies and innovations. A major design consideration for the ARI facility was to mirror the equipment in the Infantry School's own Simulation Center, using parallel surrogate equipment.

TR 1157
Personnel Turnover and Team Performance
Levine, J.M., Moreland, R.L., Argote, L., and Carley, K.M. March 2005. (AD A433897)

This project was designed to provide information about personnel turnover in work teams. Two tasks (production, decision making) and two methodologies (laboratory experimentation, computer simulation) were employed. Experimental studies using the production task investigated how newcomers affect a team's transactive memory system -- a shared mental model about how task competencies are distributed across members. Experimental studies using the decision-making task investigated conditions under which newcomers can produce innovation by altering the team's task strategy. Simulation studies extended the laboratory work in various ways (e.g., by investigating turnover effects in larger social units and over longer time periods). Results indicated

that providing team members with information about a newcomer's skills prior to turnover eliminated the negative impact of turnover on both transactive memory and team performance. Newcomers who sought to change the team's task strategy were more effective when the team was assigned (rather than chose) its initial strategy and failed (rather than succeeded) prior to newcomers' arrival. Simulation studies showed, among other things, that the value of transactive memory varies as a function of group size and task difficulty. This project demonstrates the utility of multi-method research on personnel turnover and suggests a number of questions for future research.

TR 1158
The interactive effect of feedback sign and task type on motivation and performance
Klugerand, A.N., and Van-Dijk, D. April 2005. (AD A433894)

Providing personnel with feedback is like gambling in the stock exchange: on average, you gain, yet the variance is such that you have a 40% chance of a (performance) loss following feedback (Kluger & DeNisi, 1996). The obvious question is then when feedback leads to gain. A hunch is that the sign (positive or negative) of feedback matters. Yet, the vast literature has no clear specifications regarding when and how feedback sign influences motivation (e.g. Kluger & DeNisi, 1996). This research, following Van-Dijk and Kluger (2004), suggests that feedback sign effects can be explained by self-regulation theory (Higgins, 1997, 1998) which distinguishes between two regulatory foci: prevention versus promotion. They proposed that positive (negative) feedback motivates more under promotion (prevention) focus. Here, we suggest that the nature of the task determines regulatory focus. Prevention-inducing tasks are tasks that require vigilance and cautiousness (e.g. a guarding duty, a safety task), while promotion-inducing tasks are tasks that require openness and creativeness (e.g. planning a battle's strategy, developing a new training program). Consistent with our prediction, the results of two experiments showed that negative feedback is most effective for prevention tasks, while positive feedback is most effective for promotion tasks.

TR 1159
Cohesion in Sports and Organizational Psychology: An Annotated Bibliography and Suggestions for U.S. Army Aviation (1993 to 2003)
Grice, R.L., and Katz, L.C. April 2005. (AD A434528)

Cohesion has long been a core concept in psychology and sociology, and has garnered a great deal of attention by both Organizational and Sports Psychology in the past decade. Although the U.S. Army has increasingly viewed cohesion as a key to the success of combat operations, a comprehensive review of the cohesion literature yielded few studies specifically addressing the construct in military rotary-wing aircrews. The purpose of this review was to examine the Organizational and Sports Psychology bodies of literature from the past decade to identify a set of characteristics associated with cohesive teams that can readily be applied to the Army rotary-wing aviation environment. The primary characteristics gleaned from this research are summarized, and a 4-dimension description of cohesion is presented. Suggestions for building cohesive Army aviation units are offered. In addition, an annotated bibliography of the key studies from which these dimensions emerged is provided.

TR 1160

Optimizing the speed, durability, and transferability of training

Healy, A.F., Kole, J.A., Wohldmann, E.L., Buck-Gengler, C.J., Parker, J.T., and Bourne, L.E. Jr. April 2005. (AD A434564)

Our research program aims to develop principles that optimize simultaneously all three characteristics of training – speed, durability, and transferability of learned knowledge and skills. Such simultaneous optimization would not necessarily optimize any one characteristic alone but would require instead a balanced consideration of all three characteristics. The balance of the characteristics of training is not fixed across tasks or even within a given task but rather can depend on a variety of external factors, such as fatigue and information load, that can change over time. Two studies in our program are summarized to illustrate our work. The first part of this research involves a data entry task, focusing on initiation and execution of response components under fatigue produced by prolonged work. This research demonstrates that prolonged work affects the component cognitive and motoric processes of data entry differentially and at different points in time. The second part of this research involves a duration estimation task which is in some cases coupled with a secondary articulatory suppression task. It focuses on ways to promote transfer of training. This research demonstrates that learning how to estimate durations is highly specific to the conditions of training and critically depends on whether or not a secondary task is required.

TR 1161

Developing effective military leaders: Facilitating the acquisition of experience-based tacit knowledge

Matthew, C.T., Cianciolo, A.T., and Sternberg, R.J. April 2005. (AD A434486)

This investigation tested methods derived from Sternberg's theory of practical intelligence (Sternberg et. al, 2000) that were designed to enhance experience-based (tacit) knowledge in military leadership. Two experimental studies were conducted that built on prior research. The first research effort was a quasi-experiment, in which 101 Army officers participated in theory-based reflection interventions or a no-reflection control. Results showed a strong effect of reflection condition on tacit knowledge post-test scores ($F(3, 91) = 3.743$, $p = .01$). In the second experiment, 235 college students participated in a theory-based reflection intervention or reflection control. Results showed a marginally significant effect of reflection condition on tacit knowledge post-test performance (Hotellings $T(1, 233) = .015$, $p = .06$). This investigation suggests that individual reflection interventions based on cognitive theory may promote experiential learning as measured by domain-specific, practical problem-solving.

TR 1162

Exploring the Interaction of Implicit and Explicit Processes to Facilitate Individual Skill Learning

Sun, R., and Mathews, R.C. May 2005. (AD A435130)

This work advances basic research in the areas of learning and training. One product is a conceptual framework, which addresses the ways explicit and implicit knowledge interact to produce skills. This framework suggests that human performance may be controlled by either a

subconceptual knowledge base (the implicit mode) or application of a symbolic conceptual model (the explicit mode). A computational cognitive architecture, CLARION, significantly different from other existing cognitive architectures, is developed in this work to capture a range of data related to the interaction. It helps us to explain (and eventually to predict) training and learning processes. The results of the experiments support the theory of the interactions of implicit and explicit learning processes during skill acquisition. The outcomes (data, models, and theories) provide a more detailed, clearer and more comprehensive perspective on skill learning.

TR 1163
An Assessment of the Virtual–Integrated MOUT Training System (V-IMTS)
Knerr, B.W, and Lampton, D.R. June 2005. (AD A438315)

This report describes an assessment of the Virtual Integrated Military Operations in Urban Terrain (MOUT) Training System (V-IMTS). V-IMTS was a short-term project to speed the transition to field use of virtual simulation technology that specifically considered the integration of live and virtual training. A deployable shelter containing simulators for an Infantry squad was installed at a live MOUT site. Twenty-seven Soldiers from three squads completed two live scenarios separated by two, three, or six virtual scenarios. They then completed questionnaires to indicate how well they could perform combat activities in the simulators, and the extent of their skill improvement. Higher rated activities included outdoor movement, identification of types of people and tactically significant areas, and individual weapons use. Lower rated activities included maneuver indoors and identifying the source and type of fire. The Soldiers and their platoon leadership believed that they received effective training. Precision movement, capture and transmission of voice communications, and representation of battlefield sounds were identified as the highest priority items for improvement. It was concluded that virtual simulation technology can provide additional practice in urban operations to supplement the use of a live MOUT site. It appears to be best suited for training mission planning, situation assessment, and communication and coordination.

TR 1164
The Influence of Trainee Gaming Experience and Computer Self-Efficacy on Learner Outcomes of Videogame-Based Learning Environments
Orvis, K.A., Orvis K.L., Belanich, J., and Mullin, L.N. June 2005. (AD A437016)

Videogame-based environments are an increasingly popular choice to facilitate training. The purpose of the current research was to investigate the influence of two trainee characteristics, prior videogame experience and computer self-efficacy, on learner outcomes of a videogame-based training environment. In this research, 413 participants played a first-person-perspective videogame that began with a single-player section to introduce game-specific tasks, followed by a multi-player section where participants formed small teams to conduct several collaborative missions. Results indicated that computer self-efficacy and prior videogame experience were predictive of several learner outcomes such that trainees with greater computer self-efficacy and prior videogame experience reported less difficulty using the game interface and greater team cohesion, training satisfaction, and training motivation. Further, a videogame genre-specific effect was demonstrated in that only specific prior game experiences that share similar characteristics with the current training game were significantly predictive of the learner

outcomes. These findings have implications for training game developers and instructors utilizing such games.

TR 1165
Real Time Decision Alert, Aid and After Action Review System for Combat and Training
Akin, D.S., Green, G.E., Arntz, S.J., and Meliza, L.L. May 2005. (AD A437006)

The System to Help Identify and Empower Leader Decisions (SHIELD) monitors command, control, communication, computers, and intelligence (C4I) data streams to alert leaders to situations requiring their attention (e.g., units violating a boundary). It allows leaders to temporarily dismiss alerts, have an alert go away for the rest of a mission, call up recommended courses of action, and/or call up job aids. It captures user responses to alerts in an interactive after action review (AAR) log file that can be used to host an AAR or the recipient of the alerts. SHIELD was designed to be used at any node within a C4I network while maintaining a small footprint. It has been demonstrated as a stand-alone system, as an application running on Force XXI Battle Command Brigade and Below (FBCB2) and the Command and Control Personal Computer (C2PC) without being integrated with these systems, and as an "injector" integrated with C2PC. Data collected by SHIELD to support AARs can also be used to support research on the placement of alerts within a network. Current efforts are directed towards implementing procedures to collect and analyze AAR logs across nodes to support unit level AARs and situational awareness research.

TR 1166
Cohesion in Military and Aviation Psychology: An Annotated Bibliography and Suggestions for U.S. Army Aviation
Grice, R.L., and Katz, L.C. June 2005. (AD A437003)

Military units rely on cohesive teams for mission success and Soldier safety. Although the U.S. Army has increasingly viewed cohesion as a key to the success of combat operations, a comprehensive review of the cohesion literature yielded few published studies specifically addressing cohesion in military rotary-wing aircrews. The purpose of this review was to examine the cohesion-related literature in military and aviation psychology from the past decade to identify a set of characteristics associated with cohesive teams that can readily be applied to the Army rotary-wing aviation environment. The primary characteristics gleaned from this research are summarized and four qualitative dimensions are suggested that appear to be related to cohesion development. Suggestions for building cohesive Army aviation units are offered. In addition, an annotated bibliography of the key studies from which these dimensions emerged is provided.

TR 1167
Concept Development for Future Domains: A New Method of Knowledge Elicitation
Shadrick, S.B., Lussier, J.W., and Hinkle, R. June 2005. (AD A437257)

During the development of operational concepts for the Future Combat System of Systems' Unit of Employment and Unit of Action it became clear that the Army needed a more effective and efficient method for envisioning the future. A review of existing knowledge elicitation techniques indicated that current methods are not easily applied to the development of future concepts. They do not adequately address the cognitive impact new concepts and

technology have on Soldiers. In addition, existing methods do not thoroughly examine the potential unforeseen impacts the introduction of the new technology will have. The inherent difficulty in envisioning new concepts requires a more systematic approach to elicit knowledge from domain experts. This report reviews existing methods and describes a new method of knowledge elicitation to more effectively support the development of future concepts, evaluate the impact of new technology, and solve difficult problems where information and expertise are dispersed among many individuals.

TR 1168
Development of Experimental Army Enlisted Personnel Selection and Classification Tests and Job Performance Criteria
Knapp, D.J., Sager, C.E., and Tremble, T.R Jr.(Eds.). August 2005. (AD A438314)

U.S. Army leadership recognizes first and foremost the importance of its people – Soldiers – to the effectiveness of transformation to the Future Force. Preparing for this future will affect all aspects of the Soldier management system – selection, job classification, training, and leader development.

This research effort is concerned with Soldier accession and job classification and is titled *New Predictors for Selecting and Assigning Future Force Soldiers (Select21).* The Select21 goal is to ensure the Army acquires Soldiers with the knowledge, skills, and attributes (KSAs) needed for performing the types of tasks envisioned in a transformed Army. The objectives of the project are to (a) identify Future Force job demands and the pre-enlistment KSAs required to meet them, (b) develop measures of job performance and critical KSAs, and (c) validate the experimental predictor (KSA) measures in a concurrent criterion-related validation. This report documents efforts to develop Select21 predictor and criterion measures.

The predictor set includes measures of cognitive ability, temperament, psychomotor skills, values, expectations, and experience. Performance criteria include rating scales to be completed by supervisors and peers, technical knowledge tests, a situational judgment test, and indicators of person-environment fit (e.g., job satisfaction).

TR 1169
Future Soldiers: Analysis of Entry-Level Performance Requirements and their Predictors
Sager, C.E., Russell, T.L., Campbell, R.C., and Ford, L.A. September 2005. (AD A438370)

The transformation into the Future Force will continue to involve changes to missions, systems, and organizational structures. However, U.S. Army leadership recognizes the importance of its Soldiers to the effectiveness of transformation. In this regard, the Army is seeking to ensure transformation through training, leader development, and Soldier systems.

This research effort is titled *New Predictors for Selecting and Assigning Future Army Soldiers (Select21).* Its goal is to make sure that the Army acquires Soldiers with the knowledge, skills, and attributes (KSAs) needed to perform the types of tasks envisioned in a transformed Army. This goal resulted in two objectives (a) develop and validate measures of these critical KSAs and (b) propose the use of these measures in a selection and classification system adapted to

the demands of the 21st century. This report documents the procedures and results of a future-oriented job analysis designed to support the development and evaluation of such measures.

Future-oriented performance requirements developed for this project include those relevant to entry-level Soldiers in (a) all future Army jobs and (b) Military Occupational Specialties (MOS) representative of two future job clusters. Each of 48 KSAs was identified and prioritized in terms of its importance to future performance.

Research Reports

RR 1828
Capabilities of Future Training Support Packages
Burnside, B.L., and Throne, M.H. October 2004. (AD M001725)

A training support package (TSP) integrates all the information and materials needed for the successful conduct of a training exercise or event. As the Army transforms to the Future Force, the concept of a TSP needs to transform to make TSPs more accessible and adaptable. This report identifies and analyzes five key capabilities needed in future TSPs: rapid tailoring or modification, reach, simulated operating environment, performance measurement, and pretests/selection criteria. The analysis is based on results of a survey of designers of future training and a review of key acquisition documents for Future Combat Systems. The result is a broadened view of the capabilities needed in future TSPs.

RR 1829
LEADDATA: An assessment toolkit to measure small unit leader cognitive skills - Phase I
Zaccaro, S.J., Wood, G.M., Chiara, J.J., Salas, E., and Burke, C.S. December 2004. (AD B305239)

This research focused on the development of a cognitive skills assessment battery measuring Army small unit (platoon, squad) leader adaptive thinking and decision-making capabilities. The proposed battery includes a mix of measures, utilizing different assessment strategies that would correspond to different assessment contexts. The methodology used in this effort consisted of (a) a review of the applicable literatures (b) interviews with leaders having significant experience in small unit leadership, and (c) analyses of military case studies and critical incidents of small unit leadership. This research resulted in the identification of several key small unit leader team-based adaptive decision-making processes. The conceptual review also suggested that the proposed assessment battery would need to focus on six cognitive skills: information acquisition skills, sense-making skills, pattern recognition skills, pattern change recognition skills, choice generation skills, and choice evaluation skills. The proposed battery is intended to be readily applicable to a variety of assessment contexts from classroom settings, field training, and simulations, to operational assignments and self-development.

RR 1830
Battle Command Visualization 101: Prototype Embedded Training on Networked Sensors
Lickteig, C.W., Heiden, C.G., and Holden, W.T. Jr. December 2004. (AD A429188)

The anticipated ability of the Future Force to See First requires proactive research to transform the emerging concepts of embedded training and networked sensors into assets. This report documents initial research on an innovative training program to provide small unit commanders the tactical and technical skills needed to exploit networked sensors to meet the See First objective. The research addressed three areas: design of a prototype embedded training program on networked sensors, design of a subset of training exercises for the training program, and development of those exercises in a prototype command and control (C^2) system compatible with virtual simulation. Design and development stressed a structured training approach with progressive simulation-based exercises. A representative subset of 20 exercises were developed

that focused on exploiting an array of networked sensors on unmanned air vehicles (UAVs) to support the commander's critical information requirements. Results provide lessons learned on technology dependent training that will be used to refine and extend the prototype training on employing networked sensors, and that may apply to the Army's ongoing effort to develop embedded training for the Future Force.

RR 1831
Developing Adaptive Proficiency in Special Forces Officers
White, S.S., Mueller-Hanson, R.A., Dorsey, D.W., Pulakos, E.D., Wisecarver, M.M., Deagle, E.A. III, and Mendini, K.G. February 2005. (AD A432443)

Adaptive proficiency is critical for operating in the dynamic Special Forces (SF) mission environment and a recent focus on this requirement has resulted in a greater emphasis on adaptability in current training for SF. This report describes the development of a 3½-day course on adaptability specifically tailored to officers in the SF environment. The course, entitled Officer Adaptive Thinking and Leadership Course (O-ATL), introduces students to the meaning of adaptability in the SF environment, covering the myriad of ways in which SF officers are required to adapt. It focuses particularly on the topics of mental adaptability, interpersonal adaptability, and leading an adaptable team and provides the students with an understanding of each topic's relevance to their SF jobs, as well as tools and strategies for better navigating situations that require these types of adaptability. Recommendations for enhancements of the course and further applications of the course are discussed.

RR 1832
Introduction to and Review of Simulator Sickness Research
Johnson, D.M. April 2005. (AD A434495)

This report reviews, and explains the research literature pertaining to simulator sickness. Simulator sickness is a form of motion sickness. Consequently, motion sickness is reviewed also. Special emphasis is given to simulator-based flight training—especially helicopter flight training. This review includes the sensory basis of the perception of motion, the terminology of motion sickness and simulator sickness, a selected history of these research fields, sickness signs and symptoms, measurement issues, incidence of sickness, residual aftereffects, adaptation to a novel motion environment, susceptibility factors, performance issues, training issues, safety issues, treatment, theory, guidelines for simulator-based flight training, and suggestions for further research. The sensory conflict theory and the postural instability theory are described insofar as they relate both to motion sickness and to simulator sickness. The effect of simulator sickness on training effectiveness, if any, remains a subject for future applied research.

RR 1833
Special Forces Interpersonal Performance Assessment System
Carpenter, T.D., Wisecarver, M.M., Deagle, E.A. III, and Mendini, K.G. April 2005. (AD A434652)

The role of the U.S. Army in the Global War on Terror includes not just war activities but peacekeeping and nation building as well. Soldiers confront complex cultural and political situations that are delicate and unstable. Success in these missions often requires interpersonal

skills, enabling Soldiers to accurately perceive multiple perspectives and interact successfully within other cultures. Despite the fact that these skill areas are of great importance, few resources exist to provide Soldiers with information regarding their strengths and weaknesses in these areas, or to provide developmental training activities that could improve these skills. This report describes the development of a model that can serve as a foundation to develop these skills. An evaluation of the model and the application of the model to develop a training program are discussed.

RR 1834
Reduced Exposure Firing with the Land Warrior System
Dyer, J.L., Salvetti, J.D., Vaughan, A.W., Beal, S.A., Blankenbeckler, Paul, and Dlubac, M. May 2005. (AD A435129)

The Land Warrior (LW) system provides the Soldier a new combat capability – the ability to conduct surveillance and to fire from a reduced exposure posture. The day capability is achieved with the daylight video sight; the night capability with the thermal weapon sight. An experiment was conducted to determine the relative lethality of this capability versus standard direct fire techniques. The LW v1.0 system was used. Soldiers who participated in the experiment represented a cross-section of military occupational specialties. Data were obtained on probability of hit, round dispersion, target acquisition, and Soldier exposure to the enemy. Over all the experimental conditions, marksmanship accuracy was reduced somewhat (18% decrease), but Soldier exposure was decreased by 75% compared to direct fire positions and the absolute amount of exposure was small. A training plan was developed that identified the required skills and incorporated the training lessons learned on techniques and firing exercises that facilitate skill acquisition.

RR 1835
Soldier Perceptions of the Rapid Decision Trainer
Beal, S.A., and Christ, R.E., May 2005. (AD A436993)

This report describes the approach and results of a preliminary evaluation of the Rapid Decision Trainer (RDT), a personal computer-based simulation developed for use by the Infantry Officer Basic Course (IOBC) at Fort Benning, Georgia. The objective of the RDT was to provide each lieutenant with the opportunity to serve as platoon leader while executing a simulated attack mission in preparation for a platoon live-fire exercise. Nineteen lieutenants enrolled in the IOBC were assigned to train with the RDT in one large group. Twenty other lieutenants trained in two-man buddy-teams. After executing the RDT mission, lieutenants in both training conditions participated in an after-action review with a senior instructor. A questionnaire administered to the lieutenants documented their perceptions and opinions of RDT training value, their motivations for training with the RDT, their sense of personal involvement in the simulated mission, and the adequacy of the realism portrayed in the simulation. Following the RDT training, the lieutenants participated in a live-fire exercise. A second questionnaire was administered subsequent to the live-fire exercise after-action review. Regardless of which RDT training condition the lieutenants were in, they endorsed the use of the RDT for the IOBC. They

indicated the RDT had training value, they were motivated and involved during the simulated mission, and the realism of simulated battlefield events and actions was adequate for training. The results highlighted a number of issues that were described and will be investigated in future training research for desktop simulations and game-based technologies.

RR 1836
Developing an Environment for Exploring Distributed Operations: A Wargaming Example
Holden, W.T. Jr., Smith, M.L., Conzelman, C.E., Smith, P.G., Lickteig, C.W., and Sanders,W.R. May 2005. (AD A435131)

Requirements for Future Force operations indicate that planning and wargaming must transition from a collocated, sequential, and staff-centered process to one that is distributed, simultaneous, and commander-centered. The present research developed a course of action analysis (wargaming) environment for exploring the human performance requirements associated with distributed wargaming activities characteristic of Future Force operations. This report describes the design, development, and initial evaluation of the multi-echelon distributed wargaming exercises and simulation tools comprising the wargaming research environment. Key design features of the research environment are identified which serve to rapidly guide command groups through the Action-Reaction-Counteraction wargaming cycle, minimizing the time required to orient participants to the tools, tasks, and background information necessary to wargaming. Four distributed wargaming exercises, including two Horizontal (Staff) and two Vertical (Command) exercises, were conducted with 20 Active Duty Officers – Majors and Captains. Results of the research provide a prototype example of an environment for distributed operations that can support Future Force research and training requirements. The results provide lessons learned for developing a distributed planning environment, including guidelines for the development of structured exercises, requirements for tools that facilitate collaboration, and measures for the assessment of wargaming performance.

RR 1837
Training Requirements of Digital System Operators in a Stryker Brigade Combat Team
Schaab, B.B., Dressel, J. D., and Hayes, P. June 2005. (AD A436992)

Digital technology allows personnel to connect via digital networks rather than face-to-face. Successful information sharing and collaboration in this environment is critical for mission planning and execution. Soldiers operating the U.S. Army's most advanced digital systems responded to questionnaires and interviews to describe: How they were trained to communicate across systems? What types of training were most successful? What were the consequences of successes and failures in communicating across systems? Results from the data collected can be summarized as follows: Most Soldiers had a basic understanding of their digital system, gained through classroom instruction or on-the-job training, but they seek additional field training. Soldiers need to train on their systems to fully understand its capabilities and so that operation becomes automatic. The Soldiers say that the best training is hands-on experience in a variety of exercises. Soldiers want training using the suite of systems that they must operate and communicate with, and it should be done as a single training unit. Soldiers report that planning

and preparation is much faster using their digital systems and these systems make it much safer for troop movement in enemy territory.

RR 1838
Digital C3 Systems: Patterns of Use in an Operational Environment
Barnett, J.S. June 2005. (AD A442663)

This report identifies how Soldiers employ digital C3 systems in the field. A set of questionnaires was administered to 11 Soldiers with operational experience with several digital C3 systems. The questionnaire asked Soldiers to rate over 30 C3-related tasks or functions which can be performed using digital C3 systems. Soldiers rated the tasks as to whether they preferred to perform them using digital or manual means, how frequently they used each task, how hard each task was to learn to use, and how hard each task was to use in the field. Results suggest Soldiers use approximately one-half of digital C3 functions "occasionally" or more often, while the other half of available functions are used rarely. The functions used frequently include classic C3 planning and reporting tasks. Of the more frequently used functions, some were rated as easy to learn or use, and some were rated hard to learn or use. There was a significant negative correlation between frequency of use and difficulty using, suggesting Soldiers did not perform some tasks digitally because they were hard to use.

RR 1839
Flexible Methods for Future Force Concept Development
Gossman, J. R., Mauzy, R.P., Heiden, C.G., Campbell, C.H., Flynn, M.R., Lussier, J.W., and Shadrick, S.B. August 2005. (AD A438191)

One key to the Army's success in transformation will be a solid process for concept development. The Army needs a means to generate, elaborate, refine, describe, test, and validate new concepts relating to doctrine, tactics, techniques, procedures, unit and team organization, job allocation, training, leader development, and other aspects of technology integration. One approach is to construct an environment that transforms the scale in which situations can be presented realistically and to develop, within that environment, a set of tools that can be used to explore selected command group functional performance issues in a methodical fashion. Two tools, a scaled-world tool and a concept-development tool, were designed and developed. In addition, six scaled-world events and 10 concept-development sessions were produced. The scaled-world events and concept-development sessions were formatively evaluated. Based on the evaluation results, it appears that both tools have value for concept identification and concept development. Feedback on both tools was very positive and generally met the project objectives. In addition, future directions for improvements to and use of the synthetic task components are discussed in terms of short-term and long-term requirements and possibilities.

RR 1840
After Action Reviews with the Ground Soldier System
Dyer, J.L., Wampler, R.L., and Blankenbeckler, P.N. September 2005. (AD A438040)

Soldier System (GSS) could serve as after action review (AAR) aids for trainers during force-on-force field exercises. It also examined what specific additional embedded training features could generate enhanced AAR aids and displays. The GSS is a dismounted Soldier system with a wearable computer. The AAR aids examined were based on automated aids used to support simulation training exercises, principles of graphic displays, and input from observer/controllers (OCs) at the Joint Readiness Training Center. Findings showed that the operational capabilities of the GSS could be used to provide aids that support the trainer's discussion of mission planning and preparation, plus some aspects of mission execution. Yet additional embedded AAR capabilities could expand the pool of potential aids, and more closely appropriate those used with simulations. It was also determined that existing automated aids typically do not address mission planning and execution. The OC interviews reinforced the tenet that the trainer is key to a successful AAR dialogue to help the unit understand what happened, why it happened, and what to sustain and improve.

RR 1841
Using Games for Training Dismounted Light Infantry Leaders: Emergent Questions and Lessons Learned
Beal, S.A. September 2005. (AD A438042)

The U.S. Army Infantry School has explored the use of PC- and console-based games for training Infantry leaders. There has been a need to examine the effectiveness of training games and to capture lessons that could help shape the development and use of future games. This report presents emergent questions and lessons learned from evaluations of three games designed to train dismounted light Infantry leaders: Full Spectrum Command, The Rapid Decision Trainer, and Full Spectrum Warrior. Results from the evaluations showed that the most effective training experiences occurred when a game was developed to address specific training objectives and needs. Infantry leaders reported to value training to a greater extent when qualified instructors were present to offer feedback during mission execution and detailed after action reviews following training exercises, as opposed to using the game as a stand-alone trainer. Leaders reported that the use of sophisticated graphics did not impact perceived training value, and that training with games for fun and personal entertainment was less important than learning and practicing leader tasks and skills. Leaders also suggested that the ability to modify games over time was necessary to maintain training relevancy.

Research Products

RP 2005-01
Symposium on PC-based Simulations and Gaming for Military Training
Belanich , J., Mullin, L.N., and Dressel, J. D. October 2004. (AD A430826)

In November 2003, the Advanced Training Methods Research Unit of the U.S. Army Research Institute for the Behavioral and Social Sciences held a two-day symposium on DoD's use of training games. The 50 participants in attendance listened to presentations on the use of games for training purposes from the three military services, academia, and private sector representatives. Each presentation was followed by a discussion on the use of PC-based simulations and games for military training. Topics included the effective use of training games, their integration into courses, barriers to implementation, return on investment, and evaluating training effectiveness. A key finding highlighted in several presentations was that the few training games in use work best when closely monitored by instructors or subject matter experts and are integrated with existing courses and their specific objectives. Another recurring theme was that the more effective training games require developers, subject matter experts, instructors, and evaluators to work together through the entire development process. Participant feedback indicated that the symposium was very timely and filled a continuing need in a growing, rapidly changing community.

RP 2005-02
Train-the-Trainer Package for the Full Spectrum Warrior Game
Centric, J.H., Beal, S.A., and Christ, R.E. October 2004. (AD A428443)

The U.S. Army and its Program Executive Office - Simulations, Training & Instrumentation (PEO-STRI) tasked the Institute for Creative Technologies (ICT) at the University of Southern California to develop training games that would allow the Army to begin exploiting the expertise of the commercial games developers and the entertainment industry. Full Spectrum Warrior (FSW), built for use with Microsoft's X-Box game console system, was developed to provide Infantry squad leaders with the opportunity to practice making tactical decisions and executing the troop-leading procedures that are required for urban operations. The U.S. Army Research Institute for the Behavioral and Social Sciences, Infantry Forces Research Unit (IFRU) at Fort Benning, Georgia, was asked to help in evaluating the training effectiveness of FSW. During the process of evaluation, the IFRU teamed with Northrop Grumman Mission Systems to create this Train-the-Trainer package that would help Army trainers learn to play FSW, help them teach their Soldiers how to play and learn tactical decision-making skills while playing the game, and provide information for after-action reviews.

RP 2005-03
Future-Focused Training Exercises with Alternative Coaching Conditions
Kiser, R.D., Childs, J.M., Leibrecht, B.C., and Lockaby, K.J. January 2005. (AD M001752)

As it transforms to the Future Force, the Army faces challenges in conducting effective training for network-centric, distributed operations. This product presents the results of a research effort to advance the methodology for training companies and platoons, particularly in

regard to the provision of coaching, in the future training environment. It primarily describes a prototype training support package designed for vignette exercises. It also discusses key training management issues for distributed exercises using digital collaborative capabilities. Finally, the product includes an experimentation concept developed to support research on Future Force coaching conditions. The product establishes a foundation for investigating key dimensions of future training programs, with emphasis on coaching and feedback conditions.

RP 2005-04
Future Job Clusters
Human Resources Research Organization. February 2005. (AD A432029)

Transformation of the U.S. Army into the Future Force involves changes to missions, systems, and organizational structures. To realize the full potential of transformation, the Army must have the means to select and to assign high quality individuals who, as first-term Soldiers, can meet the training and operational demands emerging with transformation to the Future Force.

This report is part of a series of research product reports that provide to potential users information on products resulting from a project titled *New Predictors for Selecting and Assigning Future Army Soldiers (Select21).* The goal of Select21 is to (a) develop and validate new performance predictor measures and (b) propose use of the most promising measures as a foundation for an entry-level selection and classification system adapted to the demands of the 21st century.

The present report describes 16 clusters of jobs that were constructed to cover the domain of Army jobs in the period 2015-2020 and to provide a framework for the Select21 research. The clusters were constructed for research purposes from future-oriented job information, and they are not advanced as a new structure for classification of Army jobs. Regardless, the clusters provide a potentially useful approach for considering the occupational functions of future Soldiers.

RP 2005-05
Future Army-Wide Soldier Performance Requirements
Human Resources Research Organization. March 2005. (AD A432475)

Transformation of the U.S. Army into the Future Force involves changes to missions, systems, and organizational structures. To realize the full potential of transformation, the Army must have the means to select and to assign high quality individuals who, as first-term Soldiers, can meet the training and operational demands emerging with transformation to the Future Force.

This report is part of a series of research product reports that provide potential users information on products resulting from a project titled *New Predictors for Selecting and Assigning Future Army Soldiers (Select21).* The goal of Select21 is to (a) develop and validate new performance predictor measures and (b) propose use of the most promising measures as a foundation for an entry-level selection and classification system adapted to the demands of the 21st century.

The present report describes the predicted job performance requirements of all future entry-level Army jobs, regardless of Military Occupational Specialty. These future performance requirements are characterized in three complementary ways: first, in terms of future anticipated conditions (e.g., increased pace); second, in terms of performance dimensions (e.g., communication, teamwork); and third, in terms of the specific tasks Soldiers need to be able to perform.

RP 2005-06
Joint-Focused Command/Staff Training Vignettes for the Future Force
Wilson, B.E., Leibrecht, B.C., and Karrasch, A.I. May 2005. (AD M001822)

The Army's transformation to the Future Force calls for innovative training methodologies to build high-performing distributed teams. Mobile command/staff teams in the Future Force Unit of Action (UA) will collaborate virtually by means of advanced battle command technologies. They will perform as members of Joint and multinational forces. The research vignettes presented in this product stem from efforts to explore training approaches for the distributed environment of the future. The basic set of short-duration battle staff exercises is designed to facilitate experimentation with Future Force concepts, doctrine, and procedures. The training support package includes a scenario with tactical materials plus guides for the staff participants and support personnel. The performance measures and feedback strategies are geared to the virtual collaborative environment. The product presents lessons learned for conducting distributed exercises with a UA battle staff. The products of the research establish a forward-thinking toolkit for investigating issues, approaches, and methods focused on training in the future operational environment.

RP 2005-07
Select21 Soldier Job Performance Measurement Tools
Human Resources Research Organization. August 2005. (AD A442664)

Transformation of the U.S. Army into the Future Force involves changes to missions, systems, and organizational structures. To realize the full potential of transformation, the Army must have the means to select and to assign high quality individuals who, as first-term Soldiers, can meet the training and operational demands emerging with transformation to the Future Force.

This report is part of a series of research product reports that provide to potential users information on products resulting from a project titled *New Predictors for Selecting and Assigning Future Army Soldiers (Select21).* The goal of Select21 is to (a) develop and validate new performance predictor measures and (b) propose use of the most promising measures as a foundation for an entry-level selection and classification system adapted to the demands of the 21st century.

This report describes the tools that will be used to measure the job performance and organizational "fit" of Soldiers participating in the Select21 research. Soldiers' scores on these performance measures will be linked to their scores on experimental pre-enlistment tests to determine how well the pre-enlistment tests might forecast future job performance.

RP 2005-08
AH-64A Back Up Control System (BUCS) Familiarization Training: Instructor Pilot's Guide for the AH-64 Simulator
Couch, M., and Johnson, D.M. August 2005. (AD A438309)

The AH-64A Apache helicopter contains an emergency fly-by-wire flight control system, called BUCS, that exists to back-up the mechanical flight control system in the event that this primary system becomes damaged or malfunctions. Aviators must be trained in the operation of this back up control system. This BUCS familiarization training must take place in a simulator, since it is too dangerous and expensive to be performed in the aircraft. The ARI STRATA research simulator was enlisted to provide the platform for this training, as no other simulator in the Army inventory was capable, at the time, of simulating the full range of BUCS flight procedures. ARI created a model BUCS training course. From January 2001 through January 2005, ARI provided simulator-based familiarization training to 978 AH-64A Army aviators. The current research report provides the program of instruction used to train these aviators. This method of instruction can be used with any AH-64A flight simulator that fully represents BUCS. It can be modified to support training of the AH-64D Longbow Apache. This experimental BUCS familiarization training course ended on 31 March 2005.

RP 2005-09
A Training Technology Evaluation Tool
Livingston, S.C., Dyer, J.L., and Swinson, D. September 2005. (AD A438043)

A Training Technology Evaluation Tool was developed to help procurers and developers of training technologies to make informed decisions and to improve the overall effectiveness of training technologies. The tool provides estimates of training technology effectiveness, based on expert ratings. The overall ratings reflect the initial performance of the Soldiers to be trained on the tasks covered by the training technology, task and subtask characteristics, learning difficulty, residual performance deficits after using the technology, physical and functional similarities to the operational environment/equipment, and training transfer. The questions in the tool are presented via an Excel program, whereby all mathematical calculations are automated and transparent to the user. The tool can be used at any stage of training technology design and implementation.

Special Reports

S 61
Planning for the Future: Progress Toward an NCO Competency Assessment Program
Campbell, R.C., Heffner, T.S., and Knapp, D.J. November 2005. (AD A444464)

In the early 1990s, the Department of the Army abandoned its Skill Qualification Test (SQT) program due primarily to maintenance, development, and administration costs. This left a void in the Army's capabilities for assessing job performance qualification. To meet this need, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) instituted a 3-year program of feasibility research related to development of a Soldier assessment system that is both effective and affordable. The PerformM21 program has two mutually supporting tracks. The first focuses on the design of a testing program and identification of issues related to its implementation. The second track is a demonstration of concept – starting with a prototype core assessment targeted to all Soldiers eligible for promotion to Sergeant, followed by job-specific prototype assessments for several Military Occupational Specialties (MOS). This report describes the PerformM21 feasibility research program, which is now at the end of the second year of its 3-year plan.

S 62
U.S. Army Research Institute Program in Basic Research FY 2004
Research and Advanced Concepts Office August 2005. (AD A443858)

This document provides a listing and brief synopsis of ongoing and recently completed research efforts. Project listings are organized into the three aforementioned research objectives. It is important to note, however, that basic research is but one of many programs for which RACO has responsibility. Other programs in RACO include:

- Small Business Innovative Research (SBIR) Program,
- Small Business Technology Transfer (STTR) Program,
- International Behavioral Science and Technology Watch,
- Graduate student apprenticeship program - Consortium Research Fellows Program – with the Consortium of Metropolitan Washington Universities,
- Outreach efforts to Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs), and
- Research support in behavioral science for the U.S. Military Academy.

S 63
Distance Learning: A Way of Life-Long Learning
Belanich, J., Moses, F.L., and Orvis, K.L. September 2005. (AD A440146)

The instructional approach of distance learning (DL) has many benefits but has yet to reach its full potential. This report critically examines how new DL technologies and methodologies are increasing instructional opportunities. These improvements are presented as an extension of an instructional evolution beginning with Aristotle tutoring Alexander the Great, progressing through the mass education method of the industrial revolution, and continuing

today with DL and individualized instruction. Summaries of ARI's research highlight progress in three areas: 1) making instruction more applicable to real-world tasks; 2) making instruction more engaging; and 3) providing improved availability and support from instructors without overloading them. The report concludes by presenting a framework for developing more effective DL with a look at the promise of future benefits.

Study Reports

SR 2005-01
Evaluation of Alternative Aptitude Area (AA) Composites and Job Families for Army Classification
Diaz, T., Ingerick, M., and Lightfoot, M.A. December 2004. (AD A430041)

Effective January 2002, the Army adopted a set of nine AA composites based on empirically estimated weights for a seven subtest ASVAB battery. With support from the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), Zeidner, Johnson, and colleagues developed these composites as part of a proposed two-tiered classification system. This change was motivated by a program of research funded by ARI and conducted by Zeidner, Johnson, and others demonstrating that the proposed system could significantly improve the overall classification and assignment of Army personnel to entry-level jobs.

The current study aimed to independently evaluate the efficacy of the proposed AA composites, and corresponding job families, to meet the Army's classification objectives. More specifically, the present study tested the stability and differential validity of the proposed AA composites and accompanying job families, particularly the 17 and 150 relative to the 9 AAs, and their practical effects on classification efficiency, as measured by mean predicted performance (MPP). For both scientific and practical reasons, the findings suggest the continued operational use of the nine (standardized) AA composites based on the empirically estimated weights developed by Zeidner and colleagues.

SR 2005-02
A Model of Reenlistment Behavior: Estimates of the Effects of Army's Selective Reenlistment Bonus on Retention by Occupation
Hogan, P.F., Espinosa, J., Mackin, P.C., and Greenston, P.M. June 2005. (ADA437363)

A logit model was applied to estimate the effect of selective reenlistment bonuses (SRBs) on the retention rates of Army Soldiers. The model was estimated separately by occupational group and by first (zone A), second (zone B) and third term (zone C) reenlistment decisions. An "annualized cost of leaving" (ACOL) variable was constructed to estimate the net financial returns to reenlisting in the Army compared to leaving for the civilian sector. The model was estimated using data on actual reenlistments from the period FY1990 through FY2000.

The effects of SRBs on reenlistments at Zones A, B, and C were estimated at three levels of occupational aggregation—all Army, CMF, and MOS. After out-of-sample testing, we re-specified and re-estimated the model. In general, the results for Zone A at all levels of occupational aggregation indicate that reenlistment bonuses have a positive and statistically significant effect on Zone A reenlistments. The magnitude of the effect varied by occupation, but a one-level increase in SRB at Zone A typically increases the reenlistment rate by three to seven percentage points, depending upon the occupation. The results for Zone B are also solid at both the CMF and MOS levels. Results for Zone C, where reenlistment rates are typically very high, were reasonably solid but not as good as the Zone A and B results. We were unable to obtain positive, statistically significant ACOL parameter estimates for a small number of

occupation groups. Statistically significant effects for demographic control variables and labor market conditions were also obtained.

SR 2005-03
Summative Evaluation of Helicopter Gunnery Training
Sharkey, T. J., Stewart, J.E. II, and Salinas, A.Y. July 2005. (AD B311648)

This report is a summative evaluation of current Army helicopter gunnery training. Information was collected via a review of literature, interviews with SMEs, and a survey of active duty Army helicopter gunners. Summaries of the collection efforts are presented. The literature review identified materials that deal with helicopter aerial gunnery from the public and non-public sources. Virtually no information quantifying the effects of changes in training, including allocation of training resources and use of synthetic training, were found. A web-based survey was developed to collect information on training resources allotted to individual gunners, and to obtain their assessment of the effectiveness of the training they received. Survey was administered to active duty Army helicopter gunners; 170 valid responses were received. The survey instrument was designed with the flexibility to allow its administration to helicopter gunners from other service branches. Results indicate that training is adequate in terms of the mechanics of gunnery. Gunners know how to operate systems and weapons. However, results also show that training is inadequate in terms of developing and sustaining proficiency in the use of weapons in combat. Particular training problems were reported in high energy and collective engagements. Respondents also expressed shortcomings of simulation and its employment.

SR 2005-04
Sergeants as Drill Sergeants: Returning Sergeants to Drill Sergeant Duty
Klein, G., Salter, M., Gates, J.W., Sullivan, R., Kinnison, H., Lappin, M., and Graham, S.E. July 2005. (AD A437700)

The intent of this Study was to provide senior Army leadership with information to support a decision as to whether the Army should readmit Sergeants (E-5) to Drill Sergeant duty. Surveys, interviews, and analyses of performance in Drill Sergeant School and Initial Entry Training units consistently indicated that Sergeants (E-5) could perform successfully as Drill Sergeants. The graduation rates from Drill Sergeant School were equivalent for Sergeants (E-5) and Staff Sergeants. Supervisor ratings of Drill Sergeant performance in Initial Entry Training units found the Staff Sergeant (SSG) Drill Sergeants to be rated only slightly higher than the Sergeant (E-5) Drill Sergeants which was expected. Overall SGT (E-5) Drill Sergeant performance was rated "high." In addition, the SGT (E-5) Drill Sergeants were rated both "high" and equivalent to the SSG Drill Sergeants in a number of areas to include: respect for the trainees, ability to manage stress and handle volatile situations, and various gender integrated training issues. The interim results were provided to TRADOC DCSOPS&T in Nov 2004. Subsequently, the Commander, TRADOC, recommended to the Chief of Staff of the Army that a change be made to Army policy. In Feb 2005, the CSA directed that Sergeants be reinstated to Drill Sergeant duty.

Study Notes

SN 2005-01
Examining Training Eligibility Standards: Four Case Studies
Williams, E.S., and Greenston, P. M. October 2004. (AD A427358)

The objective of the study was to examine the feasibility of putting the determination of MOS training eligibility standards (i.e., AA composite cutoff score levels) on firmer empirical footing. The key to establishing defensible cutoff levels is the estimation of empirical relationships between student training performance and AA composite scores. Accordingly, the authors estimated training performance relationships and utilized the estimated parameters to examine the impact upon training performance of changes in training eligibility standards, with the aim of identifying defensible standards.

The authors specified and estimated binary logistic models based on course-level pass / fail data and regression models using overall student average data for four MOS. These criteria or dependent variables were estimated as functions of AA governing composites and Soldier demographic variables. The authors found moderate correlations between student performance and AA composites, and relatively modest explanatory power of the estimated logistic and OLS regression models.

The four MOS also illustrated the difficulties of the intended exploration. Advanced Individual Training (AIT) is closely managed; with the data available it is not always possible to distinguish the better from the poorer students. In particular, it is difficult to accurately distinguish between failure to complete training due to academic versus non-academic reasons; there is not much variation in student training performance scores; and there would appear to be a lot of ongoing student remediation.

SN 2005-02
Results and Recommendations from a Survey of Army Deserters and Leaders
Ramsberger, P. F., and Bell, D. B. December 2004. (AD A429371)

In 2001, the Army experienced over 4,500 cases of enlisted Soldier desertion, a rate more than double that of a decade prior. The Army G-1 requested that the U.S. Army Research Institute for the Behavioral and Social Sciences undertake a study to obtain a better understanding of why Soldiers desert and what can be done to prevent it. Accordingly, over 400 deserters who were returned to military control were surveyed about why they took unauthorized leave and how it could have been avoided. A sample of 241 Army supervisors completed a survey in which they provided information about a specific case of desertion with which they were familiar, as well as general opinions regarding AWOL and desertion. Among the findings were that most deserters leave without giving the move much consideration, many do not seek assistance before taking this step, and only about one quarter leave with no intention of returning. Deserters felt that receiving more information about Army life prior to entry and allowing more family contact may have prevented them from taking this step. Supervisors indicated that better screening of recruits and increasing the punishment for going AWOL may have helped prevent the desertions with which they were familiar.

SN 2005-03
A Strategy to Produce Realistic, Cost-Effective Measures of Job Performance
Rosenthal, D., Sager, C. E., and Knapp, D. J. January 2005. (AD A429413)

For most military occupational specialties (MOS), the Army lacks objective measures to assess the ability of Soldiers to perform the technical components of their jobs. The objective of this effort was to develop a methodology to produce realistic and cost-effective measures. Our team identified 11 viable types of assessment methods. Included were computer-based tests and simulations designed to create an engaging, virtual representation of an MOS. Participants in a clustering workshop used this list, descriptions of MOS, and other materials, to identify seven groups of MOS. Common to all MOS in a group was their suitability for assessment using a specific type of assessment. Our team developed a two-phased strategy for collecting job analysis information for each group. We provided strategies to reduce the costs of developing and implementing assessment methods. Finally, we developed tools to quantify the level of realism in measures. This effort demonstrates that MOS can be grouped into a few clusters for which the same type of assessment method can be used. Following our methodology, it should be possible to create a standard, streamlined approach to job analysis, test design, and test development for each group.

SN 2005-04
Army Selective Reenlistment Bonus Management System: Functional and User Documentation
Mackin, P.C. and O'Brien, K. June 2005. (AD A438308)

As part of a larger research project examining the behavioral effects of changes in selective reenlistment bonus (SRB) levels on reenlistments, ARI designed and developed a modeling system that permits users to project changes in the number of SRB takers and in program cost for alternative SRB plans.

This report provides a functional description of the system's underlying algorithms and also includes user documentation for the two system components – the web-based Army SRB Model and the Data Utility.

Research Notes

RN 2005-01
The Virtual Observer/Controller (VOC): Automated Intelligent Coaching in Dismounted Warrior Simulations
Banta, H. G., Troillet, D.B., Heffernan, N.T., Plamondon, B., and. Beal, S.A. December 2004. (AD A429445)

This report describes the efforts and results of examining the feasibility of creating a Virtual Observer/Controller (VOC) to observe and critique Soldiers' performance as they are engaged in simulated small-unit, dismounted infantry training using the Soldier Visualization System (SVS) at Fort Benning, Georgia. The successful integration of these two technologies will mean that the training value of the simulation-based exercises will not be completely dependent on the military expertise of a human observer/controller. Investigating the development of the VOC required several major efforts: (a) identifying the Soldier behaviors that merit performance evaluations; (b) developing situation triggers in the context of a training scenario that stimulate the Soldier behaviors we wish to observe and to evaluate; (c) determining how to detect those behaviors in an automated fashion, and; (d) developing instructional strategies that can adequately respond to both individual actions and small-unit collective behaviors.

RN 2005-02
Digital C3 Systems: Potential for Sharing Lessons Learned Across Services
Barnett, J.S. December 2004. (AD A429414)

This research project investigated digital command, control, and communications (C3) systems of the U.S. military services to find information which could be used to help integrate U.S. Army digital C3 systems into digital units. The first part of the project identified key elements of U.S. Army digital systems and used these elements to identify similar systems in the U.S. Navy, U.S. Air Force, U.S. Marine Corps, and civilian services such as police, fire or emergency services. Once similarities were identified, the next step was to collect information on lessons learned, best practices, training, and research which would be relevant to U.S. Army digital systems. The results found that few digital C3 were similar to U.S. Army systems, and most are still under development. The only systems which had close similarities with U.S. Army digital systems were tactical-level systems used by the U.S. Marine Corps. Consequently, agreements have been made to share research and development products between the U.S. Army and the U.S. Marine Corps.

RN 2005-03
List of U.S. Army Research Institute Research and Technical Publications
U.S. Army Research Institute for the Behavioral and Social Sciences (ARI). April 2005. (AD A424163)

The means of dissemination of the results of ARI's research and development/studies and analysis program vary widely depending on the type of work, the subject matter, and the sponsor/proponent. Typically, major findings with immediate policy and procedural

implications are briefed to sponsors and proponents in order to enable timely implementation. This is followed up with complete documentation in the form of research and technical publications such as the ones listed here. In many cases, these documents represent the actual item handed off to the sponsor/proponent; this is particularly true of the Research Product category. In other cases, results are published in order to provide a complete record of the work done, and for future reference by researchers doing work in the same or similar areas.

This annotated list for FY04 provides an idea of both the depth and scope of the ARI research effort, and is a valuable resource for anyone interested in military psychology from either a scientific or operational perspective.

RN 2005-04
Preparing and Submitting Scientific and Technical Manuscripts and Other Documents for Publication. ARI Publication Policy.
U.S. Army Research Institute for the Behavioral and Social Sciences. June 2005.
(AD A443857)

The purpose of this regulation is to define responsibilities and provide procedures for archiving technical and research documents and the submission of technical manuscripts for publication.

This guidance applies to ARI and contractor personnel who produce and submit technical documents for publication or archiving by ARI. It is based on the former ARI Regulation 70-3 and incorporates all subsequent supplementary materials, guidance, and procedure and policy changes.

Additional Reports Submitted by Contractors which are not listed in Other Categories

CR 2005-01
Best practices in sexual harassment policy and assessment
Alexander, P.C., Alexander, E.R., and Warner, S. February 2005. (AD A430154)

A recent study reviewed how private-sector corporations deal with human relations, specifically with sexual harassment. The study conducted a telephone interview in late 1999 with a sample of Fortune 500 Corporations asking them about their sexual harassment policies, the strategies they used to communicate these policies, the training they used for their employees, and how they evaluated whether their policies were effective.

Based on the study findings, organizations with the best programs for prevention of sexual harassment had effective human relations strategies in which policies and training on sexual harassment were embedded into the broader training programs aimed at work productivity, building effective teams, and establishing a positive working environment.

CR 2005-02
Fielded Agent-Based Geo-Analysis Network (FAGAN)
Burleson, H. L., Woodley, R.S., and Agarwal, S. April 2005. (AD A434524)

Traditional military command & control (C2) usually evokes images of operators in command centers. We consider mounted or dismounted Soldier going from points A to B in interconnected, information rich battlefield. This is C2 on a different scale. While the digital battlefield provides a tremendous amount of information to gain a tactical advantage, there are challenges to meet. The challenge is to sift through this information and identify critical information to help plan or re-plan the mission. The team of 21st Century Systems, Inc. and University of Missouri - Rolla is developing an agent-based decision-aiding system and technologies to train and assist the Soldier through that challenge. Our research examines planning and interactive terrain analysis incorporating spatial and temporal terrain details and dynamically changing intelligence information through battlefield networks. When given the mission intent, the system will be able to provide dynamic guidance for interactive terrain analysis and mission planning. Our system will be for the Soldier of the future trained in virtual, scenario-based simulation environments. Rather than developing specialized training environments, the emphasis of our system is embedded training of the Soldier so that the training interface is created around the Soldier's actual combat vehicle and systems.

CR 2005-03
Intelligent Terrain Analysis and Tactical Support System (ITATSS) for Unmanned Ground Vehicles
Jones, R. M., Arkin, R., and Sidki, N. April 2005. (AD A434526)

The objective of this work is to design a dynamic intelligent terrain analysis and tactical support system (ITATSS). The system will enable unmanned combat and support vehicles to achieve significant new levels of autonomy, mobility, rapid response, coordination and

effectiveness, while simultaneously enriching human−robot interaction, expanding tactical capabilities, and reducing human workload. ITATSS integrates work in intelligent agent architectures for decision support, low-level feature processing, for analyzing terrain and situational features, and robot sensorimotor interfaces. There are currently mature existing tools that handle these capabilities separately, but ITATSS will integrate them into a single architecture. One advantage of such an integrated architecture is that it will help make all of the digital aids familiar and useful to human operators.

This report provides a document to guide the design, development, and evaluation of ITATSS. This should serve as a solid design document for any future efforts to build applications in this area. As part of the design, we have identified a large number of requirements on system components, and any system designed for this application area should meet these requirements.

CR 2005-04
Terrain Analysis for Human-Robot Interaction (TAH−RI): Enabling Terrain Understanding to Improve Tactical Behavior
Hicinbothom, J., Murphy, R., Riddle, D., and Graves, K. April 2005. (AD A434525)

Terrain has a big impact on how battlefield situations unfold primarily because of its effects on observability, mobility, and restriction of fields of fire. As armed forces of the information age come within each other's sensor coverage, information about them is rapidly conveyed to their opponents. Terrain imposes constraints and opens opportunities for the creative use of Battlefield Operating Systems (BOS) and the capabilities and limitations of available troops, vehicles, systems, and materiel. Thus, understanding terrain, and its tactical import is essential for a force to succeed in its missions. Future Force Warrior (FFW) and Future Combat Systems (FCS) initiatives are developing advanced functional capabilities to aid Soldiers in operations to control and hold ground. Adding robotic vehicles, sensors, and weapons creates a planning and coordination challenge for commanders, and highlights the need for autonomous robotic systems that effectively "understand" the tactical import of terrain and integrate that understanding into their situation awareness and behavior-generation processes. TAH-RI is reusable component software providing means of increasing readiness of Soldiers (e.g., in training and performance support systems) to integrate terrain understanding into battlefield decision-making processes, and means of enabling more autonomy in robots through terrain understanding for tactical behavior generation.

CR 2005-05
Applying Technology to Train Visualization Skills
Nanda, S. June 2005. (AD A435030)

Training visualization skills, such as terrain appreciation, is generally difficult and inefficient in the real world with natural representations or in a classroom with analog representations. Field training requires physical relocation of trainees to multiple sites and is constrained by the terrain types and features at the physical sites available. Classroom training is traditionally based on analog methods with inflexible formats (e.g., graphics and pictures) that afford little control over viewing perspective, environmental conditions, or comparison with map representations. In contrast, the application of digital methods to train and enhance visualization skills may overcome many of these training limitations. This Phase I effort addressed three objectives: identify a set of key visualization skills required by warfighters, develop core

technologies for training those visualization skills, and develop digital training methods based on the core technologies. In particular, the training approach dynamically varies digital terrain representations to match real world perspectives and attempts to foster cognitive engagement by providing trainees direct control over the matching process (e.g., morphing between 2-imensional and 3-dimensional terrain perspectives).

CR 2005-06
Meta-Information Visualization to Enhance the Common Operational Picture (MIVEC): Final Report
Pfautz, J., Bisantz, A., Fouse, A., Roth, E., Fichtl, T., and Zacharias, G. August 2005. (AD A311185)

Report developed under a Small Business Technology Transfer Research Program contract for the topic A04-T002. Decision-making in modern military environments is increasingly dependent on information analysis and synthesis. The decision-maker must integrate mission goals with domain knowledge gained from previous experience and incoming information using specific cognitive processing skills. However, even with the advent of new technologies for integrating and displaying this information, warfighters are highly reliant on their ability to mentally visualize the relationships among the received and known information to form an accurate representation of the battlespace. The ability to reason about both spatial and temporal information as well as associated qualifiers of this information, or meta-information, is critical to a warfighter's battlespace awareness, but this ability is not explicitly addressed in current training systems. To address the need for better training of these skills, the effort designed a system to train meta-information visualization skills. The research began with a cognitive analysis of warfighter decision-making in a realistic scenario to identify complexities in spatio-temporal battlespace awareness. The effort next developed prototype software for creating augmented displays that address these complexities as part of a training process. Finally, the research developed a methodology for evaluating the approach to training.

CR 2005-07
Multi-tasking assessment for personnel selection and development
Fischer S.C., and Mautone, P.D. August 2005. (AD A437535)

Multi-tasking (MT) is prevalent in many work environments. While there are often negative consequences of MT, such as increased error, stress, and turnover, some individuals thrive in MT environments. An assessment tool that predicts performance in different MT environments would be invaluable for personnel selection and assignment. A central purpose of the present research was to investigate variations that exist among MT environments in order to form a better understanding of the demands placed on workers in these different environments. From a review of MT-related literature, and interviews with experts from different Military Occupational Specialties (MOS), we distilled individual differences and environmental variables that affect performance in different MT environments. Based on this research, we created a model of MT environments that varies along three main dimensions: type of MT required (decision-making, information-monitoring, and task-flow management), intensity of MT, and consequences of failure. The model was then used to guide the development of a measurement approach which assesses both MT environments and individuals' ability to perform well in those environments. The purpose, scope, and framework of

this comprehensive Multi-Tasking Assessment System are described in the report, as well as a description of additional research necessary for the development of the system.

CR 2005-08
Adaptive Instructional Systems (AIS)
Skipper, D.J., Delugach, H., and Evans, D. September 2005. (AD A380430)

Adaptive Instructional Systems are those systems which guide the students instruction based on the student's performance and current abilities. This report describes an Adaptive Instructional System designed on using Conceptual Graphs to maintain an internal concept of both the student and the instructor. The graphs are shown as being capable of monitoring and guiding the instruction adaptively.

CR 2005-09
An Intelligent Tutoring System Approach to Adaptive Instructional Systems
Ong J., and Ramachandran, S. September 2005. (AD A437533)

Report developed under a Small Business Innovation Research Program 99.2 contract for topic OSD-99-04. Training programs provide students with deliberately selected learning experiences, so they can acquire and retain knowledge and skills. Intelligent Tutoring Systems (ITSs) are computer-based training systems that mimic human instructors to provide automated, one-on-one instruction. Most ITSs developed so far have applied a limited set of strategies for adapting instruction to differences among individual students. During this Phase I SBIR project, we developed a generic model of adaptive instructional systems that is designed to be broadly applicable across a wide range of training domains. We then applied this generic model as a framework for describing how AIS capabilities could be added to the Intelligent Flight Trainer (IFT), a helicopter training simulator deployed at Ft. Rucker, Alabama. Finally, we developed a limited, proof-of-concept software prototype to illustrate elements of this model. The generic AIS model appears plausible, feasible, and useful, and the software prototype provides additional encouragement.

CR 2005-10
Skill Training Using Adaptive Technology: A Better Way to Hover
Sharkey, T.J., Ciavarelli, A.P., and Asbury, C.N. September 2005. (AD A437537)

This report describes the work performed by Monterey Technologies, Inc. under a Phase 1 Small Business Innovation Research (SBIR) contract. The goal of the work was to determine the feasibility of developing and implementing an automated, adaptive hover training controller based on human performance models and novel feedback techniques for Student Pilots (SP) in Initial Entry Rotary Wing (IERW) training. A review of the relevant literature was performed. Based on this review, an approach where a training prescription is made for each student state and skill level is recommended. This review has implications for the state of adaptive prescriptions for training psychomotor tasks relative to training of cognitive skills. The recommended training system includes descriptions and functions for several elements of the training system and the recommended software models. These models are to be developed using commercially available software designed to support a particular type of AI approach most

suitable for this application. Software packages are reviewed and a suite of products appropriate for use in this application is recommended.

CR 2005-11
Adaptive Instructional Systems
Cybernet Systems Corporation. September 2005. (AD A438093)

This report was developed under SBIR contract for Topic OSD99-004. This report describes the Phase I activities conducted for the Army Research Institute (ARI) at Cybernet Systems Corporation during the period of January 24th, 2000 to July 24th, 2000, under the "Adaptive Instructional Systems" contract DASW01-00-M-4088. These activities focused on four major areas:

1. Develop a Helicopter Flight Model for the Model-Based Reasoning Diagnostic Engine (MBRDE),
2. Integrate the Model-Based Reasoning Diagnostic Engine into the OpenSkies Virtual Environment Training System,
3. Enhance the OpenSkies Virtual Environment Training System to Focus the Student's Effort in Deficient Areas, and
4. Demonstrate Adaptive Training by Creating a Scenario for Hovering a Helicopter in OpenSkies,

This research demonstrated that an Army adaptive instructional system can be effectively developed and implemented.

Index of ARI Publications

Abbreviations

TR	Technical Report	SR	Study Report
RR	Research Report	SN	Study Note
RP	Research Product	RN	Research Note
S	Special Report	CR	Contractor Report*

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* These are reports submitted by contractors which are not listed in other categories

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Lampton, Cohn, Endsley, Freeman, and Gately. (2004, November/December). *New metrics of situation awareness for dismounted Infantry squad.* Paper presented at the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando, FL.

Lickteig, C. W., Sanders, W. R., Durlach, P. J., & Lussier, J. W. (2004, November). *Measurement of human performance for future combat systems (FCS) command and control (C^2)* Paper presented at the 24th Annual Army Science Conference, Orlando, FL.

Meliza, L.L., Lockaby, K.J., Perrault, A.M., (2004, November/December). *Digital systems and battle staff integration: Collective training feedback*. Paper was presented at the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando, FL.

Morey, J.C. and Katz, Lawrence C. (2004, November/December). *Evaluation of distance learning, delivery of aircrew coordination training.* Paper presented at the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando, FL.

Orvis, K. L., Belanich, J., Mullin, L., & Orvis, K. A. (2004, November). *Are students ready to E-Learn? The influence of experience with PC-based game environments on motivation.* Paper presented at the E-Learn World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education Conference, Washington, DC.

Pettitt, B.L., Durlach, P.J., and Donangelo, A.(2004, November/December). *Training development for multicell and dismount command and control – a learning experience.* Paper presented at the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando, FL.

Psotka , J. & Legree, P. (2005, May). *Assessing traditional versus consensus based assessment (CBA) on leadership with the BOLDS data from the U.S. Military Academy-West Point.* Paper presented at the 41st Session of the International Association of Military Psychologists in Washington DC.

Sager, C.E. (2005, April). *Assessing person-environment fit for selection*. Symposium presented at the 20th Annual Conference of the Society for Industrial/Organizational Psychology (SIOP), Los Angeles, CA.

Salo, M., & Siebold, G. L. (2005, March). *The adjustment of basic trainees in the Finnish Defence Forces.* Paper presented at the Session on the Sociology of War, Peace and Institutions I at the 75th Annual Meeting of the Eastern Sociological Society, Washington, DC.

Salo, M., & Siebold, G. L. (2005, April). *Initial-training adjustment over time in the Finnish Defence Forces*. Paper presented at the 68th Annual Meeting of the Southern Sociological Society, Charlotte, NC.

Salo, M. & Siebold, G. L (2005, August). *Perceived cohesion during initial training in the Finnish Defence Forces.* Paper presented at the 100th Annual Meeting of the American Sociological Association: Philadelphia, PA.

Singer, M.J., Kring, J., and Hamilton, R. (2004, December). *Training in virtual environments: instructional features effectiveness.* Paper presented at the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC).

Solberg, J. (2005). *Novel applications of simulation technology in the U.S. Army*. Paper presented at the Annual Meeting of Human Factors and Ergonomics Society, Orlando, FL.

Swanson, R. & Gordon, A. (2005, March) *Automated commonsense reasoning about human memory.* Paper presented at 2005 AAAI Spring Symposium on Metacognitive Computing, Stanford, CA.

Thurston, C., Cope, D., Martin, G.A., Neumann, J., and Durlach, P. (2004 November/ December). *Intuitive robotic interfaces for unmanned aerial vehicles*. Paper presented at the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando, FL.

Watola, D. and Kozlowski, S. Leader Competencies for developing adaptive teams. (2005, April). In D. Day & S. Halpin (Co-Chairs), *Leader Development Theory and Research in the United States Army*. Symposium conducted at the 20th Annual Conference of the Society for Industrial and Organizational Psychology (SIOP), Los Angeles, CA.

White, L.A., Young, M.C., Heggestad, E.D., Stark, S., Drasgow, F., and Piskator, G. (2004, December*). Development of a non-high school diploma graduate pre-enlistment screening model to enhance the Future Force*. Paper presented at the 24th Army Science Conference, Orlando, FL.

Young, M.C., and Kubisiak, C. (2005, June). *Military attrition management interventions: An ongoing review*. Paper presented to the U.S. Army Accessions Command's Accessions Research Consortium, Louisville, KY.

FY 2005 Poster Sessions

Boyce, L., Streeter, L., Lochbaum, K., Lavoie, N. & Psotka, J. (2005, August). *Technology as a tool for leadership development,* Poster presented at the Annual Conference of the American Psychology Association (APA), Washington, DC..

Boyce, L.A., & Wisecarver, M.M. (2005, August). *Leadership self-development: Examining Army officer self-development performance.* Poster presented at the Annual Meeting of the American Psychological Association, Washington, D.C.

Cracraft, M.L., Langkamer, K., & Thompson, J.A. (2005, April). *Understanding peer ratings of performance: Applying the social relations model.* Poster session presented at the 20th Annual Conference of the Society for Industrial/Organizational Psychology (SIOP), Los Angeles, CA.

Katz, L.C. & Grubb, G. (2004, November/December). *Evaluating distance learning, delivery effects on mission safety and performance*. Poster session presented at the 2004 Interservice/Industry Training, Simulation and Education Conference, Orlando, FL.

Mark, J. D. (2005, April). *Applying micro worlds to investigate OCB influences oneEfficacy development.* Poster session presented at the 20th Annual Conference of the Society for Industrial/Organizational Psychology (SIOP), Los Angeles, CA.

Neumann, J.L. & Durlach, P.J. (2005, October). *Evaluation of a touch-screen based operator control interface for training and remote piloting of a simulated micro-unmanned aerial vehicle.* Poster presented at the49th Annual Meeting of the Human Factors and Ergonomics Society, Orlando, FL.

Psotka, J., Legree, P. J., Sherwood, T., Bartone, P., Lavoie, N., and Matthew, C. (2005, March). *Relationships among tacit knowledge and transformational leadership and consensus based assessment (CBA) Scoring: The BTFL - MLQ and TKML - PLQ compared.* Poster presented at the American Psychological Association, Division 19 Mid-Year Meeting, Washington, DC.

Schaab, B., Dressel, J., and Sabol, M. (2005, May). *Gender differences in computer-based gaming*. Poster session presented by at the 17th Annual Convention of the American Psychological Society, Los Angeles, CA.

Young, M.C., Connell, P., Tuttle, M., Lentz, Elizabeth, and Kubisiak, Chris (2005, August). *Military attrition management interventions: An ongoing review*. Poster presented at the Naval Service Training Command's Accessions Training Research and Best Practices Symposium, Lincolnshire, IL.

Zbylut, M. L., & Ward, J. N. (2004, December). *Developing interpersonal abilities with interactive vignettes.* Poster session presented at the 24th Annual Army Science Conference, Orlando, FL.

Zbylut, M.L., Ward, J.N., & Mark., J.D. (2005, April) *Constructivism in training: A comparison of two interactive training tools.* Poster session presented at the 20th Annual Conference of the Society for Industrial/Organizational Psychologists (SIOP), Los Angeles, CA.