Our Purpose:

The Human Performance Modeling Technical Group is concerned with the development, application, and measure of predictive and reliable, quantitative models of human performance.

In distinction to other approaches to behavioral and cognitive modeling, human performance modeling considers the human, engaged in some goal-directed behavior, in the context of a designed task environment.

-Wayne Gray & Dick Pew

The annual meeting is soon upon us, and the Human Performance Modeling Technical Group has had a great response in the number of submittals for the annual conference. There will be a kick-off talk from Dr. Tom Sheridan, two symposiums, one panel, three lecture sections, and two posters.

This inaugural issue of the newsletter provides a preview of what HFES2005 attendees will experience and what absentees will wish they hadn’t missed. On the following pages you will find a complete schedule of HPM-TG presentations. If you have any suggestions for a better newsletter name, or just general comments, please email Chris Myers (myersc@rpi.edu) with your ideas.
**SYMPOSIA, LECTURES, WORKSHOPS, AND POSTERS**

**HP1: HUMAN PERFORMANCE MODELING TG KICKOFF**
Co-organizers: Robert Feyen & Wayne Gray
Date: Tuesday (9/27)
Time: 10:30 – noon
Location: TBA

**INVITED ADDRESS: A Brief History of Normative Models of Human Behavior**
Invited Speaker: Tom Sheridan
Introduction by Wayne Gray

This is a historical retrospective talk on man/machine models from 1940 to the present day, including control, information, signal detection and decision models. The talk will cite origins, successes and failures of these models and discuss the hard challenges of (1) Occam’s Razor (e.g., problems with rule-based models like SOAR that have arbitrarily many parameters) and (2) the integration of models to characterize today’s complex systems.

**HP2: HUMAN PERFORMANCE MODELS OF PILOT BEHAVIOR**

**PANEL SESSION: Human Performance Models of Pilot Behavior**
Chair: David Foyle
Panel: David C. Foyle [NASA Ames Research Ctr.]
Becky L. Hooey [San Jose State U.]
Michael D. Byrne [Rice U.]
Kevin M. Corker [San Jose State U.]
Stephen Deutsch [BBN Technologies]
Christian Lebiere [Micro Analysis & Design]
Ken Leiden [Micro Analysis & Design]
Christopher D. Wickens [U. of Illinois Institute of Aviation]

Date: Tuesday (9/27)
Time: 3:30 – 5:00 pm
Location: TBA

Five modeling teams from industry and academia were chosen by NASA Ames Research Center to develop human performance models (HPM) of pilots performing taxiway operations and instrument approaches. Each team was permitted to use their HPM tool of choice to develop their human performance models. One representative from each team will serve as a panelist to discuss their team’s approach and findings. In addition, a sixth panelist, who was tasked by NASA to perform a cross-model comparison of the five HPM efforts, is included in the panel discussion to identify key model similarities and differences. Panelists will discuss such topics as how modeling results are influenced by a model’s architecture and structure, the role of the external environment, specific modeling advances, and future directions and challenges for human performance modeling in aviation.
The goal of our research is to quickly and easily develop models that predict astronaut performance in space shuttle operations, but it is difficult to make extrapolations from astronaut training data. A solution is to decompose a complex task into a set of basic operators which are sequenced to create longer chains of behavior. In this modeling project, gaze durations and sequences are predicted and compared to the performance of novice (trained pilots) and expert (astronaut) space shuttle operators. The model makes generally good zero-parameter predictions of gaze durations, but there are notable discrepancies. The gaze sequence of the model is more similar to expert performance than novice performance, but there are differences from both. It appears that with more training, experts develop different gaze sequence strategies than novices due to familiarity with fault messages and procedures. Future modeling efforts should have their gaze sequence strategies based on expert performance.

Terrain-induced vibration of a moving vehicle adversely affects the ability to quickly and accurately perform in-vehicle pointing tasks by altering the planned fingertip trajectory. The relationship between movement speed and accuracy is a result of the combined use of visual and somatosensory feedbacks which are used to discern movement deviations and make necessary compensatory movements. Participants (N=20) performed three-dimensional rapid pointing tasks under stationary and ride motion conditions to three touchpanel displays. Equations from the ISO 2631-1:1997 vibration standard were used to resolve random 6-DOF ride motion into axial components. Ride motion resulted in 50% larger endpoint variability, which is dependent on the interaction of the principal direction of vehicle acceleration, reach direction, and target size. Reaches orthogonal to the dominant vehicle acceleration exhibited larger endpoint variability, and reaches to the elevated touchpanel resulted in the largest variability across all motion conditions. Principal axes of endpoint ellipses were along and perpendicular to the direction of fingertip movement.
**LECTURE: Modeling the Effectiveness of Tools to Assist Sonar Operators**
Authors: Michael Matthews, Jeff Bos, Jacquelyn M. Crebolder, & Sharon McFadden
Date: Wednesday (9/28)
Time: 8:30 – 10:00 am

The task of building the underwater picture from sonar data is made complex by high volumes of noise and multiple data that arrive from a variety of acoustic sources detected at great distances by modern, sonar equipment. Further, single acoustic sources have a complex spectrum consisting of several base frequency components and related harmonics. The task for operators is to analyse the data to determine if there is a pattern that represents the signature of a known source, thereby leading to identification of a vessel. Since the task can be highly labour intensive automated decision aids may be of value to the operator. This project addresses how to predict and optimise the impact of new technologies in system re-design by using a modelling/simulation approach to operator-system functionality. A sonar analysis process was simulated and the effectiveness of a decision aid evaluated. The improvement in performance predicted by the aid was then validated experimentally.

**LECTURE: A Non-linear Relationship between Controller Workload and Traffic Count.**
Author: Paul Lee
Date: Wednesday (9/28)
Time: 8:30 – 10:00 am

Controller workload has been a focal topic in air traffic management research because it is considered a key limiting factor to capacity increase in air traffic operations. Because workload ratings are subjective and highly prone to individual differences, some researchers have tried to replace workload with more objective metrics, such as aircraft count. A significant caveat in substituting these metrics for workload ratings, however, is that their relationships are non-linear. For example, as the number of aircraft increases linearly, the controller’s perceived workload jumps from low to high at a certain traffic threshold, resulting in a step-function increase in workload with respect to aircraft count. The non-linear relationship between workload and aircraft count has been validated using data collected from recent study on the En Route Free Maneuvering concept element. The implications of non-linearity are discussed in the paper.

**LECTURE: A hybrid agent-control system approach to analyze risky driving behaviors**
Authors: Stacy Lovell & James Melhuish
Date: Wednesday (9/28)
Time: 8:30 – 10:00 am

A large percentage of traffic problems occur due to risky or aggressive behavior by drivers. Aggressive driving, incidents of road rage, and following distance are some of the major concerns surrounding the issue, and are increasing in frequency and severity on America’s roadways. An understanding of risky driving and its impact is required in order to help alleviate factors that contribute to these behaviors. Models of risky or aggressive behaviors of drivers allow us to study these effects and their impacts on highway safety, and can further help to identify levers (implicit and explicit) that influence these behaviors. This paper examines cognitive agent models of human drivers to aid in the understanding of the effects of heterogeneous beliefs of risk, and how that impacts various driving behaviors, and the resulting traffic conditions.
HP4: FROM MODELS TO METHODS TO MODELS: TOOLS AND TECHNIQUES FOR USING, DEVELOPING, AND ANALYZING COGNITIVE HUMAN PERFORMANCE MODELS

Co-organizers: Wayne D. Gray & Christopher W. Myers

Date: Wednesday (9/28)
Time: 1:30 – 3:00 pm
Location: TBA

SYMPOSIUM OVERVIEW:

We bring together four cognitive modelers each of who is engaged in building tools based on or for cognitive human performance modeling. Myers introduces a new statistical technique for testing the similarity of sequential behavior across conditions. This technique offers the promise of solving what Anderson (2002) regarded as the non-determinism problem of modeling behavior at the 100-ms level of analysis. John presents a programming-by-demonstration system that creates keystroke level GOMS models in ACT-R. This approach promises to enable those not trained in cognitive science to build predictive models of human performance. Salvucci’s DISTRACT-R expands on John’s work by providing a proof-of-concept in the domain of in-vehicle devices. Finally, Gray introduces Cognitive Metrics Profiling (CMP) – a model-based approach that produces theory-based estimates of cognitive workload. CMP holds the promise of predicting transient changes in cognitive workload that occur in a dynamic task environment.

LECTURE: Computing the Similarity of Sequential Behavior

Author: Christopher W. Myers
Date: Wednesday (9/28)
Time: 1:30 – 3:00 pm

Current technology provides researchers’ the capability to collect high-density/high-definition data. However, the potential of such capabilities is diminished without the availability of objective analyses. For example, techniques to objectively compare two complete behavioral routines, two subsections within the same routine, or two subsections between two different routines have been elusive. The capability to objectively compare interactive routines of behavior will enable researchers to study the adoption and evolution of such routines. This paper proposes a technique to objectively compare behavioral routines, whether the data are obtained from a human or embodied computational model. This technique offers the promise of solving what Anderson (2002) regarded as the non-determinism problem of modeling behavior at the 100-ms level of behavior. The technique is housed within a software tool for integrating and analyzing fixed-location and movement data collected from eyes and cursors, simultaneously.

LECTURE: Cognitive Metrics Profiling

Author: Wayne D. Gray
Date: Wednesday (9/28)
Time: 1:30 – 3:00 pm

Cognitive metrics profiling promises a new approach to minimizing the cognitive workload of interactive systems. By metering high-fidelity computational cognitive models of embodied cognition, Cognitive Metrics Profiles provide a theory-based prediction of the transient changes in workload demanded by dynamic task environments. Although establishing the reliability and validity of this new
approach will not be trivial, our profiles stand on the shoulders of the ACT-R architecture of cognition. More than 30 yrs of research have gone into the ACT line of theories. Over the last decade, hundreds of researchers have used ACT-R to build and test models of human cognition. Hence, although many of the details of the architecture are certainly incomplete, much of ACT-R is approximately correct. We expect that the predictions of a cognitive metrics profile based on ACT-R will provide a better estimate of cognitive workload than the post-hoc or subjective estimates used in current human factors practice.

**LECTURE: Modeling Tools for Predicting Driver Distraction.**
Author: Dario Salvucci
Date: Wednesday (9/28)
Time: 1:30 – 3:00 pm

In contrast to the vast amount of modeling work focused on desktop user interfaces, recent work has increasingly focused on “off-the-desktop” interfaces, one prime example being in-vehicle interfaces used while driving. This paper highlights four recent approaches to predicting driver distraction from in-vehicle interfaces as secondary tasks: hand-crafted modeling with the full-fledged ACT-R architecture, hand-crafted modeling with the much less complex ACT-Simple framework, modeling-by-demonstration using the new CogTool, and simplified modeling-by-demonstration using the integrated Distract-R system. While all four use an integrated-model approach and a rigorous driver model, each approach illustrates different advantages and disadvantages of simplifying cognitive modeling for purposes of rapid prototyping and evaluation.

**LECTURE: Cognitive Human Performance Modeling by Demonstration.**
Author: Bonnie John
Date: Wednesday (9/28)
Time: 1:30 – 3:00 pm

Although cognitive human performance models have enjoyed a rich history in human-computer interaction, they have yet to make a widespread impact in system design, possibly because they are difficult to construct. We employed user-centered design techniques to develop a new tool that is easier to use than previous methods or tools. CogTool combines a familiar method of prototyping, modeling by demonstration, and the ACT-R cognitive architecture to enable user interface designers to make valid human performance models with little effort.

**HP5: CURRENT R&D IN HUMAN PERFORMANCE MODELING**
Chairs: Esa Rantanen & Changxu Wu
Date: Thursday (9/29)
Time: 10:30 – noon
Location: TBA

**LECTURE: Non-intrusive measurement of workload in real-time.**
Authors: Markus Guhe, Wenhui Liao, Zhiwei Zhu, Qiang Ji, Wayne D. Gray, & Michael J. Schoelles
Date: Thursday (9/29)
Time: 10:30 – noon
We present a new method to measure workload that offers several advantages. First, it uses non-intrusive means: cameras and a mouse. Second, the workload is measured in real-time. Third, the setup is comparably cheap: the cameras and sensors are off-the-shelf components. Fourth, we go beyond measuring performance and demonstrate that just using such measures does not suffice to measure workload. Fifth, by using a Bayesian Network to assess the workload from the various manifesting measures the model adapts itself to the individual user as well as to a particular task.

**LECTURE:** Validation of Predictive Workload Component of the Multimodal Information Design Support (MIDS) System

Authors: Kelly Hale, Leah Reeves, Par Axelsson, & Kay M. Stanney

Date: Thursday (9/29)

Time: 10:30 – noon

Operators in military C4ISR environments are required to rapidly assess and respond to critical events accurately while monitoring ongoing operations. In order to assist in designing complex display systems to support C4ISR operators, it is critical to understand when and why information displayed exceeds human capacity. Common metrics for evaluating operator overload are subjective report, which rely on self-reporting techniques (e.g., NASA/TLX, SART). A new design tool, the Multimodal Information Design Support (MIDS) system, predicts times of operator overload and offers multimodal design guidelines to streamline cognitive processing, thus alleviating times of operator workload and optimizing situation awareness. This paper empirically validates MIDS’ predictive power in determining situations which may cause operator overload by comparing MIDS output to subjective reports of workload and SA during C4ISR operations. Future studies will validate MIDS’ design capabilities through redesign and evaluation of performance, workload and SA on the optimized C4ISR task environment.

**LECTURE:** Counting on ACT-R to Represent Time

Authors: Daniel Cassenti & Andrew L. Reifers

Date: Thursday (9/29)

Time: 10:30 – noon

Temporal issues consistently factor into decisions, yet surprisingly few research studies have explored how to model temporal cognition. We developed an Adaptive Control of Thought – Rational (ACT-R, e.g., Anderson & Lebiere, 1998) model to help account for how people estimate time, one of many issues in temporal cognition. According to the model, people adjust the lengths of words through abbreviation or extension and produce the words at a rate in tune with the rate of environmental events. This procedure allows an individual to synchronize with regular intervals of time in the environment and produce just-in-time responses to events. This type of approach incorporates a behavioral aspect to time estimation and an ACT-R model of temporal cognition that requires no changes to the architecture of ACT-R.

**LECTURE:** A Conceptual Framework for Dynamic Prioritization in Multiple-Task Scenarios

Authors: Guoxi Zhang & Robert G. Feyen

Date: Thursday (9/29)

Time: 10:30 – noon

Prioritizing tasks appropriately is particularly critical when performing multiple tasks concurrently. Although necessary to achieve goals or avoid serious consequences, prioritization has not received much
attention in the research literature, especially with respect to modeling human performance. A conceptual framework that integrates several motivational theories, empirical studies, and findings from neuroscience is proposed to guide future research of dynamic prioritization in multiple-task scenarios. Rooted in control theory, the proposed framework illustrates the processes involved in prioritizing tasks and explicitly shows the important factors affecting the prioritization process so that empirical studies can be integrated into the framework and future studies can be easily suggested. By illustrating the information flow in the processes and corresponding structures responsible for prioritization, the framework may facilitate the development of robust computational models of task prioritization.

LECTURE: Characterization of Changes in Electrophysiological Activity in an Operational Environment
Authors: Natalia Mazaeva & Michael Dorneich
Date: Thursday (9/29)
Time: 10:30 – noon

The purpose of this study is to characterize differences in EEG collected under stationary conditions and that collected in mobile settings. EEG activity has not been evaluated in operational settings due to difficulties associated with processing of EEG in real-world settings such as real-time removal of artifacts, operational environments, and possible differences in EEG frequency associated with mobility. Utilization of EEG measures of cognitive activity in dynamic environments demands the use of real-time algorithms of signal decontamination and characterization of specific components of EEG activity. In this study, EEG was collected and filtered in real-time in a set of controlled stationary scenarios and similar mobile scenarios in order to characterize differences in EEG power, electrode locations, and individual differences under mobility while participants performed tasks of variable difficulty. Results illustrate that systematic differences in EEG spectral power and/or specific areas of the brain might be associated with mobility.

HP6: NOVEL APPLICATIONS OF SIMULATION TECHNOLOGY IN THE U.S. ARMY
Co-organizers: Tonia S. Heffner & Jennifer L. Solberg
Date: Thursday (9/29)
Time: 1:30 – 3:00 pm
Location: TBA

SYMPOSIUM OVERVIEW:
In this practitioner-oriented symposium, we describe several Army-sponsored projects that use simulation as a platform for conducting applied human factors research. In the first presentation, we describe how off-the-shelf video games can be used to train teamwork skills. Emphasis will focus on broad lessons learned from a massive multi-player training environment. In the second presentation, we describe how low-cost, PC-based simulators can be used to select soldiers who possess the necessary competencies to function effectively in the Future Force. Emphasis will focus on balancing scientific rigor with practical and legal constraints. In the third presentation, we describe a platform for comparing different communication and personnel architectures within Joint Urban Operations. Emphasis will focus on maximizing multiple criterion measures, such as time on task, decision quality, and workload. After all the presentations have finished, the chairs will provide summary comments. They will also facilitate an interactive question-and-answer session.
**LECTURE: Using Low-Fidelity, PC-Based Simulations to Select First Term Army Soldiers: Scientific, Practical, and Legal Considerations**

Authors: Jeff Beaubien, Elliot E. Entin, Kathleen P. Hess, & John Jarrett  
Date: Thursday (9/29)  
Time: 1:30 – 3:00 pm  

In this presentation, we describe a multi-year research project that explores the use of low-fidelity, PC-based simulations for selecting first term Army soldiers based on their profile of critical soldiering competencies such as adaptability, emotional stability, and multi-tasking. Throughout the presentation, we highlight the many scientific, practical, and legal considerations that must be addressed when developing personnel selection systems. These considerations – many of which appear prominently in the industrial psychology literature – have largely been ignored by the human factors community. As a result, this presentation serves two purposes. First, it documents the results of a specific Army-sponsored research project. Second, it serves as a primer for human factors professionals who wish to develop tools for selecting job candidates. Emphasis is placed on describing broad lessons learned, so that researchers can generalize beyond the two specific simulation platforms described here.

**LECTURE: Human Performance Modeling for Command, Control, and Communication**

Authors: Jeff Hansberger & Beverly D. Barnette  
Date: Thursday (9/29)  
Time: 1:30 – 3:00 pm  

The challenges facing the military due to adversaries, new battlegrounds, and ever-changing technology requires innovative, fast, and efficient means to conduct and support research. The Army Research Laboratory has developed a modeling environment, C3TRACE (Command, Control, and Communication – Techniques for Reliable Assessment of Concept Execution), that aids in the evaluation of different personnel architectures and information technology on system and human performance. This modeling environment, which was originally designed to address tactical command issues, has been applied to a higher level organizational command and control environment within the Joint Forces Command. Specifically, it was applied to an urban operations exercise to evaluate the effect of various personnel structures and communication means on awareness, flow of information, and decision-making.

**LECTURE: The Use of Massive Multi-Player Gaming Technology for Military Training: A Preliminary Evaluation**

Authors: Shawn Weil, Talib Hussain, Tad Brunye, Jason Sidman, & Lisa L. Spahr  
Date: Thursday (9/29)  
Time: 1:30 – 3:00 pm  

The purpose of DARWARS is to provide continuously-available, on-demand, mission-level training to soldiers at all echelons. When complete, DARWARS will allow multiple teams of soldiers to interact with one another – and with synthetic agents – when training for a variety of combat-related missions. Currently, the most pressing challenges in the DARWARS program involve assessing trainees’ teamwork-related skills and providing process-based feedback for improving subsequent performance. In this paper, we describe how Massive Multi-Player Commercial Games (MMPCGs) can be used to train teamwork skills such as leadership and information exchange. Data collected from a field experiment of 40 Army soldiers confirms that MMPCGs are an acceptable, low-cost platform for training teamwork skills in distributed
environments. Moreover, observer ratings of teamwork behaviors were positively correlated with teamwork outcomes. Finally, we provide practice-oriented guidelines for using MMPCGs as a training tool.

**HP7: LESSONS LEARNED AND THE FUTURE OF HUMAN PERFORMANCE MODELING**

Chair: Vincent Duffy  
Date: Thursday (9/29)  
Time: 1:30 – 3:00 pm  
Location: TBA

**LECTURE: Human Performance Modeling in the Army: A Long and Winding Road**  
Authors: Laurel Allender, Sue Archer, Troy D. Kelley, & John Lockett  
Date: Thursday (9/29)  
Time: 1:30 – 3:00 pm

The history of human performance modeling (HPM) in the U.S. Army is described, the early influences and technological events that made it possible. Highlights of significant milestones are presented, including HPMs that were influential in changing system design. The latest challenges in cognitive modeling, advanced decision making, stressors, and the particular challenges of distributed and linked simulations are discussed as well as using methods from neuroscience for validation of some HPMs.

**LECTURE: Critical Features in Human Motion Simulation for Ergonomic Analysis**  
Authors: Matthew Reed, Julian Faraway, & Don B. Chaffin  
Date: Thursday (9/29)  
Time: 1:30 – 3:00 pm

Digital human figure models (DHM) are increasingly the tools of choice for assessments of the physical ergonomics of products and workplaces. Software representations of users and workers are used to visualize people performing tasks of interest. Analyses have usually focused on clearance and reach in static postures, not because the actual tasks are static, but rather because DHM have lacked robust, accurate motion simulation capability. Research is underway at many institutions to develop improved motion simulation methods, drawing on a wide variety of methodologies from fields such as computer graphics, kinesiology, motor control, and robotics. Experience in the Human Motion Simulation Laboratory at the University of Michigan suggests that conventional metrics of accuracy for posture and movement prediction do not adequately capture the aspects of human movement that are most important for ergonomic analysis. This paper identifies and justifies a set of these critical features.
LECTURE: Time-Based Modeling of Human Performance
Authors: Esa Rantanen & Brian R. Levinthal
Date: Thursday (9/29)
Time: 1:30 – 3:00 pm

This paper examines a probabilistic approach to modeling human performance. Instead of focusing on mean performance (e.g., response times or times required), the distributions of these are examined as well as how the effects of taskload might be reflected on these distributions. From such data, probabilities of given levels of performance can be derived. This approach can be used to develop methods of measurement that expand the analyses beyond those of the mean (e.g., t-tests, ANOVA). Results from two experiments, one abstract, the other realistic, are presented in terms of timely performance on required tasks. As taskload increased, the participants were less likely to act on the experimental tasks at an earliest opportunity than under low taskload conditions, resulting in increase of “too late” errors. Measurement of taskload and performance in temporal terms also allowed for bracketing and making inferences about mental workload, which is not directly measurable.

LECTURE: Psychologically Plausible Cognitive Models for Simulating Interactive Human Behaviors
Authors: Michael Bernard, Patrick Xavier, Paul Wolfenbarger, Derek Hart, Russel Waymire, Matthew Glickman, & Mark Gardner
Date: Thursday (9/29)
Time: 1:30 – 3:00 pm

The intent of Sandia National Laboratories’ Human Interactions (HI) project is to demonstrate initial virtual human interaction modeling capability. To accomplish this, we have begun the process of simulating human behavior in a manner that produces life-like characteristics and movement, as well as creating the framework for models that are based on the most current experimental research in cognition, perception, physiology, and cognitive modeling. Currently the simulated human models can sense each other, react to each other, and move about in a simulated 3D environment. A preliminary action generation or motor-level cognition model, which transforms abstract actions generated by high-level cognition to actions that can be carried out by a simulated physical human model, has also been developed. Our work has yielded models of perceptual, spatial, and motor functioning and memory that will be embedded in upgrades to the cognitive framework.

LECTURE: Human Performance Modeling: An Argument for an Operations-Based Approach
Author: Robert Feyen
Date: Thursday (9/29)
Time: 1:30 – 3:00 pm

Although the current group of human performance modeling tools has contributed to important advances in this area, this paper argues that there are three important elements of human performance for which a model should account, but none currently do. Through the use of analogies to human information processing, these three elements - transformation, management, and structure - and their importance are discussed with indications for future research directions in human performance modeling.
POSTERS

POS3: *A Method for Developing Teamwork Training and Assessment in a Multiplayer Game*

Authors: Craig Haimson, David Diller, & Laura Kusumoto

Date: Thursday (9/29)

Time: 8:30 – noon

Location: TBA

Massively multi-player games (MMPGs) have the potential to enable training at a level of participation, intensity, and fidelity previously unrealized. As a first step towards the implementation of automated performance measurement technology for MMPGs, we explored an approach to developing training and assessment of team performance during urban infantry operations simulated within the Asymmetric Warfare Team Training Technology (AW-VTT) under development by Forterra Systems and RDECOM. Our method entailed (1) mapping a theoretical framework to established Army doctrine, (2) mapping doctrinal descriptions to specific activities within a simple yet operationally-valid scenario, and (3) developing rule-based descriptions of these activities and formally representing them within finite state networks to validate their consistency and completeness. We then enacted the scenario within AW-VTT to demonstrate the environment’s capability for simulating the behaviors required for assessment of teamwork in this scenario. We describe this approach and discuss lessons learned.

POS2: *A Platoon Level Model of Communication Flow and the Effects on Soldier*

Authors: Jennifer Swoboda, Patricia Kilduff, & Joshua Katz

Date: Thursday (9/29)

Time: 8:30 – noon

Location: TBA

The Future Combat System (FCS) initiative is at the center of the Army’s Future Force Vision. To predict how proposed systems and displays will impact situational understanding and, thereby, decision making, the U.S. Army Research Laboratory Human Research and Engineering Directorate (ARL HRED) used the tool, Command, Control, and Communication: Techniques for Reliable Assessment of Concept Execution (C3TRACE). C3TRACE is a modeling environment in which one can develop multiple concept models quickly and efficiently, minimizing the need for multiple human-in-the-loop experiments. Among the performance measures tracked are operator utilization, completed versus dropped messages, and the probability of making a “good” decision, that is,. C3TRACE was used to develop a model of a Future Combat System (FCS) platoon equipment concept – wrist-mounted displays for the dismounted positions and laptop-type displays for the mounted positions. This paper discusses the effects of display device communication processing on Soldier performance in mounted vs. dismounted positions.
CURRENT HPM-TG OFFICERS & OFFICER ELECTIONS

Wayne D. Gray  
Position: Founder & Acting Chair.  

Vince G. Duffy  
Position: Program Chair-elect.  
Affiliation: Purdue University School of Industrial Engineering

Robert G. Feyen  
Position: Program Chair.  
Affiliation: Purdue University School of Industrial Engineering.

Christopher W. Myers  
Positions: Newsletter Editor, Webmaster, & Listserv Coordinator.  