



Human Systems Integration Newsletter January 2010

HSI Curriculum Review a Huge Success!

Shortly after the new decade was ushered in, **VADM (ret) Daniel Oliver**, President of NPS, hosted the biennial review of the HSI Program. The formal review was held at NPS on the afternoon of 14 January. Prior to the formal review, NPS faculty presented a detailed update to the sponsor, **Mr. Scott Lutterloh**, SES, N15. By all accounts the review was a huge success!



NAVSEA's Dennis White (right) poses a question during the HSI curriculum update on 13 JAN.

Also present at the update (either live or virtually) were representatives from DoD, NAVSEA, NAVAIR, SPAWAR, US Air Force, US Army, US Coast Guard, and NASA.

The two-day agenda began with several presentations, including: an overview of the HSI program; a discussion of the revised curriculum matrix and educational skill requirements (see pages 3 & 4); a presentation on the current billet structure for Naval Officers with an MS in HSI; and, a description of



Mr. Scott Lutterloh experiences **C3Conflict** firsthand in the HSI Lab

each course in the program. Those in attendance also had a chance to meet with HSI students, tour campus facilities, and hear about HSI research conducted by NPS students and faculty.

At the conclusion of the formal review, Mr. Lutterloh expressed his delight with the progress that had been made since the 2008 curriculum review. Among those present at the formal review were **Dr. Leonard Ferrari**, NPS Provost; **Col Pete Boerlage**, Chief of Staff; **CAPT Janice Wynn**, Dean of Students; **Dr. Doug Moses**, Vice Dean for Academic Affairs; **Dr. Peter Purdue**, GSOIS Dean; and, **Dr. Rob Dell**, OR Department Chair.

As successful as the curriculum review was, there is still more work to be done! The review generated ten action items that will be tackled over the next several months. Here are those action items.

- Identify billets throughout the Navy that can be modified with 4600P and 4600Q sub-specialty codes.
- Submit HSI curriculum matrix changes to NPS Academic Council that reflect modifications recommended by Sponsor.

- Review emphasis on job task analysis, training systems analysis, individual performance, team training, and training KPPs & KSAs, all of which contribute to NTSPs.
- Ensure HSI students are integrated in classes and projects with students from other degree programs.
- Coordinate thesis topics and course projects with Naval Enterprises, COCOMs, and SYSCOMs.
- Investigate use of Government Purchase Card to pay for HSI Certificate Program courses.
- Coordinate with AFIT to increase number of USAF students in HSI resident and DL programs.
- Align DAU HSI content and NPS HSI content.
- Review HSI courses to determine overlap of content and minimize redundancy.
- Develop a mechanism to share relevant student course work with stakeholders.

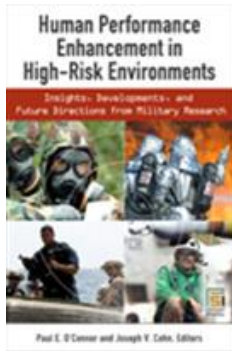


NPS Center for Educational Design, Development, & Distribution (CED3) Director Tom Mastre (left) stands with CED3 members Phil McCullick, Dianna Beardslee, Diane Jones, and Sherrill Meaney. During the review the four CED3 members were awarded HSI coins for their outstanding work on the HSI certificate program courses.

LCDR Paul O'Connor's Book is Published!

HSI Assistant Professor **LCDR Paul O'Connor** and **LCDR Joseph Cohn's** edited book '**Human Performance Enhancement in High-Risk Environments: Insights, Developments, and Future Directions from Military Research**' was published this month.

The book focuses on selection, training, safety, and interface design. The book's 16 chapters are each written by military researchers, emphasizing lessons learned from their own experiences and research, while highlighting the relevance of their findings to other domains in which highly trained personnel operate complex machinery with high consequences of error.



HSI Faculty and Student Publications

Senior Lecturer **Dr. Kip Smith** will be presenting a paper on his research on the influence of cultural diversity on teamwork at the 7th International Conference on Information Systems for Crisis Response and Management in early May. The title of the paper is **Predicting Group Faultlines in Multi-national Crisis Response Teams**.

The central claim of the paper is that the faultline metaphor explains and predicts whether and where a small group is likely to split apart or to cohere. Faultlines exist wherever there is diversity. When faultlines become active - and only when they become active - they

form barriers to team cohesion and impediments to team performance.

The paper presents a faultline analysis of a diverse multinational team of crisis response professionals that participated in a NATO field exercise. The analysis successfully predicts the faultlines that formed during the exercise and prescribes a mitigating role for information systems.

Ph.D. Candidate Panagiotis Matsangas, **Professor Michael McCauley**, and **Associate Professor Fotis Papoulias** recently presented a paper at the Maritime Systems and Technology (MAST) Conference in Stockholm, Sweden. The paper was entitled **Human Performance Standards for Ship Motion: a Review and a Preliminary Gap Analysis**.

The research focused on assessing the current state of existing standards regarding ship motion and motion sickness, sopite syndrome, manual material handling, motion induced interruptions, health and sleep effects. Core analysis was based on 24 standards, guidelines or directives, after reviewing 49 publications of possible interest. Gap analysis revealed that existing standards have significant gaps in coverage regarding human performance.

The major gaps include material handling on moving platforms, the constraint definition of task interruptions, aspects of motion sickness (definition, related symptoms, and effects, and the nauseogenic motion space), and the lack of standards to cover sleep, fatigue, and sopite syndrome. Furthermore, there is a lack of coverage regarding the operational consequences of the aforementioned human performance aspects on safety and system performance.

Given the strong effect of the human element to overall system operational performance, it is important to identify these gaps so that research can focus on them. In-

creased automation capabilities will not be sufficient to overcome inadequate human performance capabilities that can result from low manning levels combined with deleterious ship motion effects.

HSI Certificate Program Update

The new year got off to a fast start with advances in our academic offerings! **Dr. Nita Miller** started teaching OA3413 – Tools, Tradeoffs and Processes for HSI! This is the third of four courses in the HSI Certificate Program. Like the other three courses in the Certificate Program, this course is offered both in residence and via distance learning (DL).

This course builds on knowledge students acquired during the first two courses. Those courses covered the **'Why and What of HSI'** (Course 1) and the **'Who and Where of HSI'** (Course 2). This course is the **'How of HSI'** and focuses on the multitude of Tools, Techniques, Approaches and Methods (TTAMs) available to conduct HSI within the context of the DoD Acquisition Framework. The students examine various TTAMs to see how they can impact acquisition documents and phases of the DA Framework, exploring how HSI practitioners can influence these key activities and decisions in the Acquisition process.

Due to time constraints, the course does not cover every TTAM—or even have the time to explore any activity in great depth. But we hope this overview will whet the students' appetites to learn more about TTAMs that could be considered in the practice of HSI.

*Best Wishes to Everyone
for 2010!*

New Course Matrix for Master of Science in Human Systems Integration as of January 2010

Refresher (Summer)	JPME	MA1113(4-0) Single Variable Calculus I	MA1114(4-0) Single Variable Calculus II with Matrix Algebra	GB3012 (3-0) Communications for Managers	
Quarter 1 (Fall)	OA3411 (3-0) Introduction to HSI	OS3111 (3-1) Probability & Statistics for HSI & MOVES	OA3401 (3-1) Human Factors in System Design	MN3331(5-1) Systems Acquisition & Program Management	
Quarter 2 (Winter)	OA3402 (3-1) Research Methods for Perf Assessment	OS3113 (4-2) Statistics & Design of Experiments	MV4002 (4-1) Simulation and Training	JPME	
Quarter 3 (Spring)	OA3412 (3-0) HSI in the DoD Acquisition Lifecycle	OS3112 (4-1) Data Analysis for HSI & MOVES	OA4407 (3-1) Anthropometry & Biomechanics	SE3100 (3-2) Fundamentals of Systems Engineering	
Quarter 4 (Summer)	OA4603 (4-0) Test & Evaluation	OA4109 (4-2) Survey Research Methods	OA4406 (3-1) Survivability, Habitability, Environ Safety, and Occupational Health	SI3400 (3-2) Fundamentals of Engineering Project Management	
Quarter 5 (Fall)	OA3413 (3-1) HSI Tools, Tradeoffs, and Processes	MN4115 (4-0) Foundations of Education & Learning in DoD Organizations	OA4401 (4-0) Individual Perf. Sens, Perc, & Cognition	SE3302 (3-2) System Suitability	JPME (if Refresher Quarter not taken and any course not validated)
Quarter 6 (Winter)	OS4701 (4-0) Techniques in Manpower Modeling	OA4702 (4-0) Cost Estimation	OA4408 (3-1) Team Performance & Decision Making	SE3303 (3-2) System Assessment	
Quarter 7 (Spring)	MN3111 (4-0) Analysis of Human Resource Management	JPME	OA0810(0-8) Thesis Research	OA0810(0-8) Thesis Research	
Quarter 8 (Summer)	OA4414 (4-0) HSI Capstone Seminar	JPME	OA0810(0-8) Thesis Research	OA0810(0-8) Thesis Research	

Educational Skill Requirements For 4600P (HSI) Sub-Specialty Code (January 2010)

The goal of this curriculum is to educate Naval Officers of the United States Navy in Human Systems Integration. The delivery method is an in-resident course at the Naval Postgraduate School. Human Systems Integration (HSI) acknowledges that the human is a critical component in any complex system. It is an interdisciplinary approach that makes explicit the underlying tradeoffs across the HSI domains, and other engineering disciplines, logistics, acquisition, and T&E, optimizing total system performance while minimizing total ownership costs. The graduate of this program will possess the skills necessary to function as a practitioner in HSI.

- 1. HSI DOMAIN KNOWLEDGE:** Graduates will possess a thorough background in all HSI domains: Human Factors Engineering, Manpower, Personnel, Training, Environment, Safety, and Occupational Health, Survivability, and Habitability. Graduates will understand the basis for the decisions made by individual domain specialists and will be familiar with the primary approaches and techniques used by each of the HSI domains.
- 2. ANALYTICAL TECHNIQUES:** Graduates will be able to perform tradeoff analysis across domains and other engineering disciplines, logistics, acquisition, and T&E, and to conduct empirical analysis within the domains of human systems integration. They will be able to apply, at the right place and at the right time, these analytical methods and tools in both field and laboratory settings within the context of the defense acquisition process.
- 3. MODELING and SIMULATION:** Graduates will be able to apply Modeling and Simulation (M&S) techniques to explore HSI domain tradeoffs and tradeoffs within other engineering disciplines, logistics, acquisition, and T&E. They will demonstrate the ability to apply M&S techniques within and across the HSI domains to facilitate the development, T&E, operations, and sustainment of military systems.
- 4. HUMAN PERFORMANCE:** HSI maintains that the human is a critical component in any complex system. Graduates will understand the basis of both individual and team performance in military settings including human information processing, perception, cognition, decision making, and motor control. Graduates will understand current theory and practice in assessing cognitive factors that affect human performance such as attention, memory, situation awareness, stress, fatigue, and motivation. Graduates will understand current scientific knowledge of factors affecting human performance and human error.
- 5. SYSTEMS APPROACH:** Graduates will comprehend the principles and practices of the fields of PM, SE, and logistics, and T&E as related to the DoD Acquisition Lifecycle. Knowledge of HSI influences on PM, SE, and logistics, and T&E will enable graduates to positively influence the DoD Acquisition Lifecycle at appropriate times and in the right manner.
- 6. IMPLEMENTING HSI TRADEOFFS:** Graduates will learn techniques to develop domain level trades, trades within other engineering disciplines, logistics, acquisition, and T&E, impacts, and risk assessments, and the ability to negotiate and communicate to both technical and non-technical audiences. Graduates will understand the political, organizational, social, and economic issues associated with integrating human-machine systems into organizational cultures and environments.
- 7. JOINT PROFESSIONAL MILITARY EDUCATION:** Students will be encouraged to complete the Joint Professional Military Education (JPME) program. This sequence of courses develops an understanding of warfighting within the context of operational art. Topics include: national military capabilities and command structure, joint and service doctrine, joint planning and execution, and joint multinational forces and integration at the operational level of war. JPME includes coursework in wargaming designed to develop an appreciation of the art of war.