Army HSI Newsletter

Human Systems Integration

INSIDE THIS ISSUE: **Winter 2014-2015**

1	Director's Corner
2	Information
3	Re-designation of MANPRINT
4-5	Adaptive Interfaces
6	The Human Viewpoint
7-8-9	Medical Cost Avoidance Model
10	News and Events

OUR MISSION:

The mission of Army Human Systems Integration (Army HSI), formerly known as Manpower and Personnel Integration (MANPRINT), is to optimize total system performance, reduce life cycle costs, and minimize risk of Soldier loss or injury by ensuring a systematic consideration of the impact of materiel design on Soldiers throughout the system development process.

WELCOME

The Director's Corner

Dr. Michael Drillings
Director
Army HSI

As most of you know, we have changed the name of the MANPRINT program to the Human Systems Integration (HSI) Program. In some ways, I deeply regretted this change. MANPRINT was originated under General Maxwell Thurman who uniquely saw the importance of MANPRINT for the Army. It was a revolution to start such a program and I would claim that it quickly became the largest program of its type. The decision to go with Human Systems Integration was because the term MANPRINT was increasingly not being recognized as the embodiment of the now far more generally used HSI. HSI is the term used by the other Services, DoD and internationally. I supported the change because I was convinced that we had to change with the times and do as much as we could to avoid not being misunderstood.

I am very pleased to report that the first director of the MANPRINT Program, Harold Booher, was honored with the presentation of the "Jack Kraft Innovator Award" by the Human Factors and Ergonomics Society at the recent annual meeting in Chicago.

For me, this was a tremendous pleasure. As the current Director, I can understand how difficult it was to start this program and to overcome the disinclination of the acquisition community. Hal set the standard that succeeding directors have sought to emulate. The presentation, I believe, also recognizes the importance of the program in the history of the Society.

The Joint HSI community held an Open House in the Pentagon in October. All four services had strong representation. It was a tremendous success. A total of 18 Army and DoD GOs and SESs visited the Army area and we had some terrific discussions about the displays and demonstrations that were created by HRED and USAPHC personnel. I do not think I can adequately describe how much these presentations succeed in making my job easier. There is nothing as good as a hands-on demo to show people the real meaning of HSI and how it can improve system performance. Many thanks to the HSIers who gave their time to this fine effort.

There are two substantive areas that I have been working on which address concerns about the future of the Army. One of them is the challenge of emerging Army systems that are increasingly more complex than their predecessors.

These systems are complex because they may provide too much information to their operator with increased ambiguity, they may require more critical thinking, their networking causes more interaction among different systems, and they are increasingly autonomous. On balance, these characteristics will usually make systems more effective, but only when they work properly and when humans can effectively interact with them. I think we see some of the potential problems with complexity emerging at NIE. I have been engaged with telling this story and the implication that improved design and training are needed if we are not to be overwhelmed by these challenges.

The other challenge has emerged more recently and it concerns the goal of reducing medical error in Army facilities. The effort is just getting started, so stay tuned for more news later.

We are in the planning stages of the next HSI Practitioners' Workshop. It will be held at or near APG and we will be focusing on better interacting with the acquisition community located there. We are tentatively scheduled for early October 2015, and will send out additional information soon.

INFORMATION

WE WELCOME YOUR ARTICLES, COMMENTS, AND SUGGESTIONS.
PLEASE SUBMIT FEEDBACK TO:

Army HSI NEWSLETTER
CONTRACTING RESOURCES GROUP, INC.
ATTN: Army HSI PROGRAM
1133 Light Street
Baltimore, MD 21230
emilie.c.menefee.ctr@mail.mil

Army HSI DOMAIN POCs:
MANPOWER, PERSONNEL, TRAINING
HUMAN FACTORS ENGINEERING
Dr. Pam Savage-Knepshield, Army Research Laboratory (ARL),
Human Research & Engineering Directorate (HRED)
ATTN: RDRL-HRM
Aberdeen Proving Ground, MD 21005
COM: 410.278.5916
DSN: 298.5916
Email: pamela.a.savage.-knepshield.civ@mail.mil

HEALTH HAZARDS
Dr. Timothy A. Kluchinsky, Jr.
U.S. Army Public Health Command
ATTN: MCHB-IP-OHH, 5158 Blackhawk Road, Bldg. E 1570
Aberdeen Proving Ground, MD 21010-5403
DSN 584-2925, COM 410.436.2925, FAX 410.436.1016
Email: timothy.a.kluchinsky.civ@mail.mil

SOLDIER SURVIVABILITY
Mr. Richard Zigler, U.S. Army Research Laboratory
Survivability/Lethality Analysis Directorate
ATTN: RDRL-SLB-E, Bldg. 328, Room 112A
Aberdeen Proving Ground, MD 21005-5068

SYSTEM SAFETY
DAC Graham Walker, Office of the Chief of Staff, Army Safety Office; ATTN: DACS-SF, Bldg. 1456, Ft. Belvoir, VA 22060-544,
COM 703.697.1322, FAX 703.601.2417,
Email: graham.k.walker.civ@mail.mil

Dr. Mike Cupples, US Army System Safety and Readiness Center; Bldg. 4093, Ft. Rucker, AL 36362,
COM 334.255.3261, FAX 334.255.9478
Email: michael.w.cupples.civ@mail.mil

DIRECTORY OF DESIGN SUPPORT METHODS
Defense Technical Information Center, DTIC-A San Diego, NAS North Island, Box 357011, San Diego, CA 92135-7011
COM 610.545.7384; Email: dticasd@dticam.dtic.mil

POLICY
Department of the Army, G-1, ATTN: DAPE-HSI,
300 Army Pentagon
Washington, DC 20310-0300
DSN: 225-5853

Army HSI CENTRAL CONTACT INFORMATION:

HQDA (DAPE-HSI)
300 Army Pentagon, Washington, DC 20301-0300
COM: 703.695.5848 FAX: 703.695.6997

Dr. Michael Drillings DSN: 225-6761 703-695-6761
Director, Army HSI
Michael.drillings.civ@mail.mil

Dr. Beverly G. Knapp DSN: 225-6817 703-695-6817
Deputy Director, Army HSI
C4ISR & Soldier Systems
Beverly.g.knapp.civ@mail.mil

Mr. L. Taylor Jones III 256-382-4700 ext. 103
Senior Army HSI Analyst
Aviation, Missile, & Space Systems
Lauris.t.jones2.civ@mail.mil

Dr. John D. Warner DSN: 225-5820 703-695-5820
Senior Army HSI Analyst
Protection, Sustainment
& EIS Systems
John.d.warner38.civ@mail.mil

Ms. Joan Murphy DSN: 225-5848 703-695-5848
Executive Assistant
Joan.m.murphy.civ@mail.mil

Re-designation of MANPRINT to Army HSI

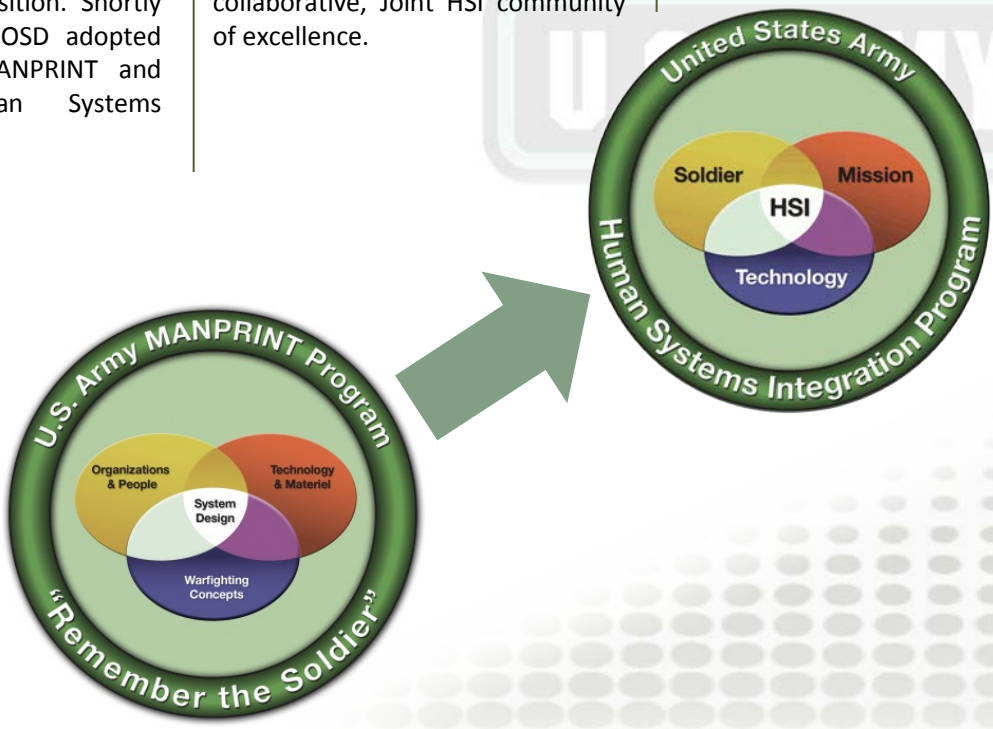
As of November 1, 2014, the Department of the Army G-1 Manpower Personal Integration (MANPRINT) Directorate has been re-designated as the Human Systems Integration (HSI) Directorate. This re-designation will improve our G-1 strategic communications, coordination, and technical efforts by clearly identifying the Directorate as the Army element in the HSI Mission. Army HSI immediately denotes the key role that the G-1 performs in support of putting the human first in system development, design, and deployment.

MANPRINT was established in 1986 by the former VCSA, Gen Max Thurman. The goal of MANPRINT was to address the systematic inattention to human issues within Army systems acquisition. Shortly after its inception, OSD adopted the concept of MANPRINT and named it Human Systems Integration (HSI).

Since then, MANPRINT has successfully worked alongside the other Joint Services to comprehensively inform Army capability developers and acquisition program managers about the criticality of addressing the usability of systems throughout their lifecycle. MANPRINT achievements have strongly influenced the Joint Service HSI Community of Practice, and have resulted in OSD codifying a requirement for HSI within the DoDI 5000 acquisition regulations. As a result, the term MANPRINT as an ARMY HSI identifier is a source of confusion and does not correlate with the Joint Service HSI Community of Practice.

The Army will now focus its HSI efforts to become part of a collaborative, Joint HSI community of excellence.

These efforts will enable Army HSI to be universally recognized by its acquisition, industry, and academic partners. A strong HSI program is a part of the cultural change within the Army centered on how we build, strengthen, maintain, and assess individual performance and unit readiness. The practice of Human Systems Integration is of the highest priority when it comes to equipping our Soldiers to be ready and resilient for operational missions. Our goal is to continue participating in the current initiative to develop a DoD military standard (MIL-STD) for how to apply HSI best practices. This is just one of several Joint HSI efforts that must have a united front, and the re-designation of MANPRINT to HSI will help this process.



A New Approach to Adaptive Interfaces

Jeffrey T. Hansberger, Ph.D.
Army Research Laboratory

One of the challenges faced by the Army is data and information overload. The former Secretary of the Army, Peter Geren, highlighted this point in 2007 when he stated, "We don't want to replace the fog of war with the fog of information overload." This point was echoed in a recent January 16, 2011 New York Times article where Art Kramer, a neuroscientist and director of the Beckman Institute stated, "There is information overload at every level of the military – from the general to the Soldier on the ground." The abundance of information available and presented to the Soldier is one of several evolving characteristics in military operations that Soldiers are experiencing that also includes:

- Greater emphasis on acquisition and communication of knowledge and information (demands are more cognitive in nature)
- Operations are increasingly dynamic (changes happen faster and the need to react faster is important)
- Level of complexity and integration is increasing where small changes can affect other seemingly distant parts (global coordination is important)
- Human and machine actors are becoming more distributed (places greater need for coordination efforts)

This changing operational environment is putting greater demands on the Soldier than ever before and there is a need for continued innovation in the way this information is communicated and Soldier tasks are supported by computer systems and their interfaces. Past efforts to improve human performance with computer systems has typically ignored or viewed the interface and the user as external to the system and not as an integral component of the whole system. One reason for this is the difficulty of considering and designing for such a large amount of diversity and variability among potential users that has been identified in Psychology and Neuropsychology.

Researchers have shown at the neural level that no two people's brains store the same information in the same way or in the same place. The individual differences field within Psychology has identified dozens of variables that people reliably differ across including motivation, intelligence, verbal & spatial abilities, and cognitive styles. The challenge of enhancing a Soldier's individual cognitive strengths and compensate for their individual weaknesses should be one that is embraced and not ignored by researchers, system designers, and software developers.

Continued on page 5…

Adaptive Interfaces

Adaptive user interfaces have been one approach to address the user diversity and individual differences design challenge. Adaptive interfaces change their displays and available actions based on the interpreted user's goals and past actions. There has been some success with adaptive interfaces but there are considerable costs associated with them as well. One of the primary disadvantages of these systems is that the interface is constantly changing, which impedes learning with repeated use of the system, especially when the adaptive interface is not accurate in its changes. Adaptive interfaces also place an extra cognitive burden on the user to understand the behaviors and operations of the system in addition to adding complexity to an already complex information environment for the Soldier.

Interface design and human computer interaction research have to go further than adapting to just an individual's prior actions. Research has shown that when systems are designed for the individual strengths and preferences of the user like a person's specific verbal and spatial skills, performance increases. Differences in expertise have also shown significant differences in how people approach a domain problem, how they problem solve and how they perceive information in that domain. An approach is needed that goes beyond today's adaptive interfaces and is tailored to individual skills and expertise, yet doesn't provide the complexity and instability that current adaptive interfaces create. Such a tailored interface could be a very powerful tool to help the Soldier battle the increasing amount of complexity in their information and technological environment.

The Army Research Laboratory is collaborating with the University of Alabama at Huntsville at the Manned/Unmanned Collaborative Systems Integration Laboratory to create a cognitively tailored interface (CTI) for Unmanned Aerial Vehicles (UAVs) that tailors itself to the individual cognitive styles and preferences of each operator. This interface design is intended to improve upon existing adaptive interfaces by going beyond adaptation to the individual's prior actions and tailoring the interface to how each user perceives, processes, and filters information without the added complexity of current adaptive interfaces. The experimental interface along with a corresponding UAV simulation to collect mission performance, workload, and situation awareness is currently under development by ARL. Experimentation efforts to iteratively test the impact of the CTI based on different cognitive attributes is planned for 2015 at the Manned/Unmanned Collaborative Systems Integration Laboratory.

Where Are the People?

The Human Viewpoint Approach for Architecting and Acquisition

Dr. Holly A. H. Handley and Dr. Beverly G. Knapp

The U.S. Department of Defense Architecture Framework (DoDAF) provides a standard framework for transforming systems concepts into a consistent set of products containing the elements and relationships required to represent a complex operational system. However, without a human perspective, the current DoDAF does not account for the human performance aspects needed to calculate the human contribution to system effectiveness and cost. The Human Viewpoint gives systems engineers additional tools to integrate human considerations into systems development by facilitating identification and collection of human-focused data. It provides a way to include Human Systems Integration (HSI) constructs into mainstream acquisition and systems engineering processes by promoting early, frequent coordination of analysis efforts by both the systems engineering and HSI communities.

This article reviews the Human Viewpoint and then presents a current methodology for identifying and capturing data in the Human Viewpoint models. The relationship between the Human Viewpoint and Human Systems Integration (HSI) is then identified, and support for using the Human Viewpoint in the acquisition process is provided. Finally, an example of how the Human Viewpoint can be used to capture appropriate human system data to support systems design decisions is described.

"The consideration of human issues can enhance overall systems performance by ensuring efficient and effective use of human resources within the system, ultimately reducing the overall cost of a system" (Knapp & Smillie, 2010).

Dr. Handley

Dr. Knapp

To read the full article, please use the following link:

http://www.dau.mil/publications/DefenseARJ/ARJ/ARJ71/ARJ-71_Handley.pdf

Medical Cost Avoidance Model Demonstrates Value of Prevention

Jane Gervasoni,
Public Affairs Office
U.S. Army Public Health Command

The U.S. Army Public Health Command agrees with Ben Franklin that "an ounce of prevention is worth a pound of cure." This is especially true when it comes to preventing disease, injury and disability to active-duty Soldiers.

As budgets shrink, it is more important than ever to demonstrate the health impacts of new military equipment or modifications to current equipment, but this requires objective data to make informed decisions. The USAPHC Health Hazard Assessment Program has developed the Medical Cost-Avoidance Model—a series of tools that can help demonstrate the cost of failing to prevent adverse health consequences.
The HHA Program addresses the potential effects of materiel systems health hazards on the personnel who operate and maintain the systems. As part of the program's assessments, the USAPHC is using this new, data-driven tool.

"The Medical Cost-Avoidance Model can estimate avoidable acquisition–life cycle medical costs resulting from the elimination or control of health hazards," explained Cindy Smith, industrial hygienist with the HHA Program. "It relates the medical cost factors that are attributed to health hazards to better justify methods of their elimination or control."

"Mitigating health hazards early in the acquisition process is usually less costly than waiting until later in the process," explained Timothy Kluchinsky Jr., HHA Program manager. "Having a return-on-investment tool available to justify and prioritize mitigation strategies allows materiel developers to make more informed decisions on the materiel being designed."
Health hazards are often inherent in Army materiel and may cause injury or illness at any point in the acquisition life cycle, according to Kluchinsky. If injuries occur, medical treatment costs pose a considerable financial burden to military and veteran healthcare systems, and the resulting lost time degrades productivity and unit readiness.

"Various health hazard types including chemical and biological substances, acoustic and radiation energy, vibration, shock, trauma, and temperature extremes can be evaluated using this model," said Kluchinsky, who holds a doctorate in public health. "The Medical Cost Avoidance Model gives commanders and project management offices a risk-based severity and probability tool designed to estimate the return on investment associated with incorporating mitigation recommendations published in health hazard assessment reports."

"USAPHC health hazard experts assess new or improved materiel by evaluating: types of hazards that exist; injuries or illnesses likely to result from the hazards; level of risk for each hazard; and corrective actions needed to eliminate or control the hazards," explained Smith. "Our health hazard experts report this information to the materiel program management offices responsible for the development and life cycle management of the materiel system."

Continued on page 8…

USAPHC
U.S. ARMY PUBLIC HEALTH COMMAND

As part of their assessment, the HHA Program uses the MCAM to predict future health hazard costs based on data from the Military Health System and the Veterans Benefits Administration.

"The primary MCAM function is its ability to estimate total system-related medical and lost-time costs, using the cost factors of lost time, disability and fatality. The MCAM provides a return-on- investment model that is a way of comparing profit or loss to the amount invested," said Smith.
Materiel program management offices can also use the MCAM output to establish health hazard abatement priorities prior to materiel fielding, and to assess the potential impact on military readiness.

"A single engineering change may eliminate hazard costs across the entire fleet or equipment type. The benefit would be a reduction in lost time and medical-related costs," according to Smith. "Exposure to the causes of injury and disease can trigger a series of possible events: clinic visits, hospitalization, lost time, disability and fatality."

Working with the Army Ergonomics Program on the safe patient-handling initiative Smith used the MCAM and information on the frequency of musculoskeletal disorders suffered by active-duty healthcare providers when manually moving patients to compile the total medical cost of these injuries and compared them to the cost of installing various types of equipment to assist in moving patients.

"The MCAM output demonstrated that there was a significantly lower cost to install safe patient-handling equipment than to pay the medical, disability and lost-time costs associated with not installing the equipment," said Smith. "Using the analysis provided by the MCAM, it was determined that it would be 18 times less expensive to install new equipment than to pay the estimated medical and lost-time costs associated with not installing the equipment."

This ability to project return-on-investment can be a vital tool to acquisition managers according to Kluchinsky.

"The MCAM tool is available on the USAPHC public Web site," said Kluchinsky. "It provides hazard analysis and predicts medical and lost-time costs based on actual Army medical records.

"The MCAM provides the means to optimize and articulate the return on investment (avoidable medical, lost-time, disability, and fatality costs) important to occupational health, preventive medicine, and safety-related investment decision making," he said.

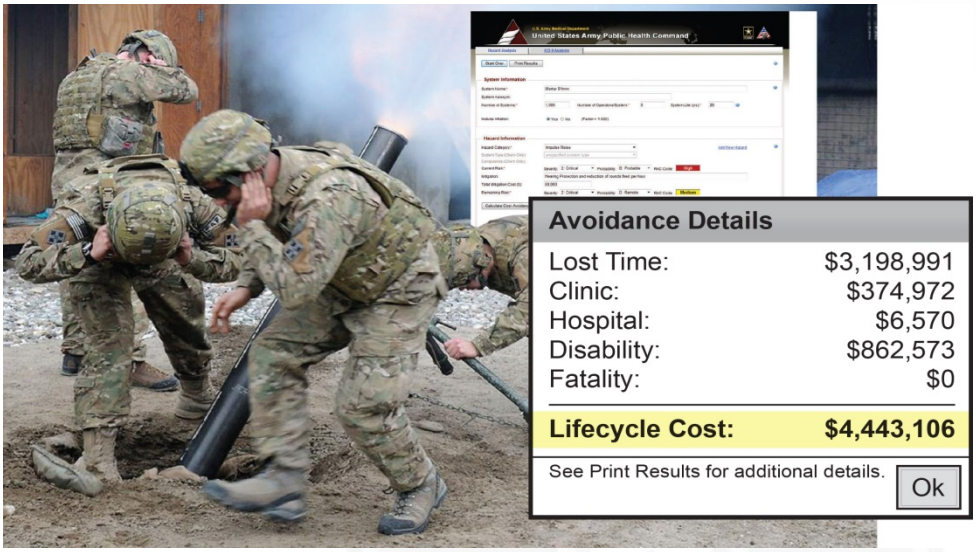
The Medical Cost Avoidance Model is available at: https://usaphcapps.amedd.army.mil/mcam

Continued on page 9…

USAPHC
U.S. ARMY PUBLIC HEALTH COMMAND

Medical Cost Avoidance Model

The U.S. Army Public Health Command focuses on promoting health and preventing disease, injury and disability in Soldiers and military retirees, their families and Army civilian employees. As well, the USAPHC is responsible for effective execution of full-spectrum veterinary services throughout the DOD.



The Medical Cost Avoidance Model demonstrated the cost avoidance in medical treatment, loss time, and disability by implementing recommendations to reduce a Soldier's exposure to health hazards such as impulse noise. The MCAM estimated total medical cost avoidance $4,443,106 by lowering the risk of impulse noise hazard to a mortar team over the lifecycle of the 81mm mortar (20 years) from a High to a Medium Risk. (U.S. Army photo by Staff Sgt. Gary A. Witte, 300th Mobile Public Affairs Detachment)

USAPHC
U.S. ARMY PUBLIC HEALTH COMMAND

Army HSI PRACTITIONER'S COURSE		
Time	**Location**	**Point of Contact**
9:30-12:00	Huntsville, AL	Ms. Kelly Hopkins, Army HSI Education Administrator khopkins@alionscience.com
**Classes will be held on select Tuesdays throughout each month in 2015.*		

Joint HSI Pentagon Exhibit

TBD, 2015
Washington, DC

Practitioner's Workshop

October, 2015
Aberdeen Proving Ground, MD

DAU Course CLE 062, Human Systems Integration:

Now listed as a 'Core Plus' certification course for

SPRDE-SE level II:

https://dap.dau.mil/career/sys/Pages/Certification2.aspx

SPRDE-PSE level I:

https://dap.dau.mil/career/pgm/Pages/Certification.aspx

Over 500 military, government, and industry professionals have completed the course in less than one year.
Enroll now at: http://www.dau.mil/default.aspx

The Army HSI Website has been updated to reflect the Directorate name change:

http://www.armyg1.army.mil/HSI/

The Army HSI Newsletter is an official bulletin of the Deputy Chief of Staff, G-1, Department of the Army. The Army Human Systems Integration (HSI) Program (AR 602-2) is a comprehensive management and technical initiative to enhance human performance and reliability during weapons system and equipment design, development, and production. Army HSI encompasses seven key domains: manpower, personnel, training, human factors engineering, system safety, health hazards, and soldier survivability. The focus of Army HSI is to integrate technology, people, and force structure to meet mission objectives under all environmental conditions at the lowest possible life-cycle cost. Information contained in this bulletin covers policies, procedures, and other items of interest concerning the HSI Program. Statements and opinions expressed are not necessarily those of the Department of the Army. This bulletin is prepared twice yearly under contract for the HSI Directorate, G-1, under the provisions of AR 25-30 as a functional bulletin.