

## DIRECTOR'S CORNER

*Dr. Michael Drillings, Director, MANPRINT*

The most recent news from DoD is the approval of the new DoDI 5000.02, "Operation of the Defense Acquisition System." It was recently signed by Mr. Young, Under Secretary of Defense for Acquisition, Technology & Logistics. I am pleased to report that Human Systems Integration did very well in the revision. The full text can be found on the web at <http://www.dtic.mil/whs/directives/corres/pdf/500002p.pdf>. Here are a few excerpts and my comments follow.

"The purpose of the Engineering and Manufacturing (EMD) Phase, the period between Milestones B and C, is to develop a system or an increment of capability; complete full system integration (technology risk reduction occurs

during Technology Development); ... implement human systems integration (HSI); .... The CDD, Acquisition Strategy, SEP, and Test and Evaluation Master Plan (TEMP) shall guide this effort."

"Optimize operational readiness via: Human-factors engineering to design systems that require minimal manpower; provide effective training; can be operated and maintained by users; and are suitable (habitable and safe with minimal environmental and occupational health hazards) and survivable (for both the crew and equipment)."

HSI is more fully described in "ENCLOSURE 8: HUMAN SYSTEMS INTEGRATION (HSI).

"The PM shall have a plan for HSI in place early in the acquisition

process to optimize total system performance, minimize total ownership costs, and ensure that the system is built to accommodate the characteristics of the user population that will operate, maintain, and support the system. HSI planning shall be summarized in the Acquisition Strategy and SEP and shall address the following:" --a list of the HSI domains follows.

Enclosure 8 is the new version of the former Enclosure 7. The most notable change is that HSI should be part of the Systems Engineering Plan (SEP) and the Acquisition Strategy. The SEP can be particu-



*Dr. Michael Drillings  
Director for MANPRINT*

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## Joint HSI Collaboration and Team Work

*Larry A. Carr, USAF HSI Office*

The House Armed Services Committee (HASC) has always been an advocate for enabling and protecting our military people. The HASC advocated and supported the initial HSI constructs over 20 years ago. OUSD Personnel and Readiness (OUSD/PR) accepted leadership for HSI from its earliest days when its emphasis started with Manpower, Personnel, and Training (MPT). The Army, Navy, and Air Force programs each evolved along different paths with dif-

fering successes along the way. The addition of multiple other HSI domains (Environment, Safety, Occupational Health, Human Factors Engineering, Survivability, and Habitability) gave heightened awareness to the dynamic and costly human integration issues. The "perfect storm" of GAO reports, IG Reports, attention to ownership costs, mandated KPPs in HSI domains, and revitalization of Systems Engineering provided increased focus on HSI as a tool to build systems "right the first time." Multiple communities are con-

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**Director's Corner**

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larly influential. Of course, the challenge that we have now is to influence the guide for preparing the SEP, which we are trying to do through contacts in OSD. If we succeed in this task, HSI will be far more integrated with systems engineering issues than ever before.

Of course, another important part of the regulatory family is the CJCSI 3170.01F, "Joint Capabili-

ties Integration and Development System," which is also being rewritten. All the Services are hoping that we can improve the HSI sections of that regulation.

The changes and potential changes in regulations are encouraging, but I do not want to over-emphasize the role of regulations. At best, they only provide the basis to defend the MANPRINT mission. Even the best regulations will be meaningless without a dedicated and capable

workforce, and a supportive command structure. The real measure of our success will continue to be determined by the successes that we have each day in working with program personnel to first recognize and then help mitigate problems found in the MANPRINT domains.



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*The MANPRINT Newsletter is an official bulletin of the Deputy Chief of Staff, G-1, Department of the Army. The Manpower and Personnel Integration (MANPRINT) 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. MANPRINT encompasses seven key domains: manpower, personnel, training, human factors engineering, system safety, health hazards, and soldier survivability. The focus of MANPRINT 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 MANPRINT 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 MANPRINT Directorate, G-1, under the provisions of AR 25-30 as a functional bulletin.*



## Joint HSI

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verging on “Integration” as the deficient process in most systems acquisitions. The one most overlooked (and costly) ingredient in systems integration has and continues to be the human.

The HASC provided specific HSI language in the annual Defense Authorizations beginning in 2004 and continuing to the present. Following this heightened attention, both the Navy and the Air Force joined the Army with senior level HSI leadership and oversight in Washington, D.C. Anticipating the need to provide OSD and Congress with an accounting of progress and current status of HSI, the Services proactively started and chartered a Joint HSI Working Group (JHSIWG) in 2005 with OUSD/AT&L, OUSD/PR and ATL - DDRE as chartered members. With increasing Congressional interest in ownership costs of systems and acquisition cost overruns and with commensurate concerns for disabilities, combat injuries, accidents, and systems performances, OSD was asked for a comprehensive report on HSI. The JHSIWG developed and provided that report in 2006 and again in 2008. Reports are available upon request by contacting Beverly Knapp.

With the most mature HSI program, the Army was asked to lead the JHSIWG for the first year. The Navy and Air Force have subsequently led the group for a year and the Army accepted leadership for the second time in August 2008. While the Services have always collaborated on HSI at the working levels at conferences, working groups, and symposia, this collaboration was not previously captured jointly to move HSI collectively forward. Largely as a result of the JHSIWG, the three services co-sponsor a bi-annual Human Systems Integration Symposia that is hosted by the Navy and the services are working very closely together in

*“The one most overlooked (and costly) ingredient in systems integration has and continues to be the human.”*

many areas. The JSHIWG developed and coordinated Joint language insertions for: CJCSI 3170, DoDI 5000.2, and multiple chapters of the Defense Acquisition Handbook. The group also led the development of an entire section on HSI for the International Council on Systems Engineering (INCOSE). The DoD Human Factors Technical Advisory Group, the International Council on Systems Engineering, and the Human Performance Functional Area Working Group are all addressing HSI increasingly in their planning and execution activities.

The HASC has continued to maintain keen interest in HSI and OSD was asked to designate a senior official within the Department to oversee HSI execution within the acquisition process. In 2008 that leadership was placed with OUSD Acquisition, Technology & Logistics (OUSD/ATL) – *(note: OUSD/PR and DDRE are mutually supporting this leadership)*. The mission includes chairing a joint service HSI steering group and advocating HSI program funding at the OSD-level. Congress recently mandated increased OSD HSI participation, leadership, and oversight through a chartered Steering Group and a “Single OSD Responsible Official.” Leadership for HSI was placed with OSD/AT&L in 2008 to more closely align it with Systems Acquisition and Systems Engineering. OSD/PR retains shared responsibilities for policy and guidance.

The JHSIWG is currently engaged with Senior OSD leadership to provide a report to Congress in early 2009 to detail the strategy for Joint and Service Specific HSI resourcing and execution into the future. Other current activities include the development of: HSI training, tools and technology for HSI, web sites, guide books, policy and guidance for HSI, and joint collaboration in requirements and program support.



## Human Systems Integration-Assessment Tool (HSI-AT)

*Kathi MacLeod, 711<sup>th</sup> HPW/HPO*

### INTRODUCTION

HSI issues have come to the forefront in all services. The HSI practitioners of each service evaluate weapon systems to ensure the integration of the following HSI domains: Manpower, Personnel, Training, Human Factors Engineering, Environment, Safety, Occupational Health, Habitability, and Survivability during systems acquisition. These “human-related” domains drive over 65% of the total ownership costs (TOC) of our weapons systems. Ideally, early application of HSI requirements leads to cost avoidance in terms of manpower, personnel, training, and human error. Currently, there is no well-defined, repeatable United States Air Force (USAF) HSI assessment methodology; no single HSI body of knowledge to aid in identifying HSI gaps, determine HSI risks, and perform trade-off analyses at various stages in the life-cycle; and, no well-integrated tool that a practio-

ner can use that will provide all the features and capabilities desired in an HSI assessment tool.

### VISION FOR THE 711<sup>TH</sup> HUMAN PERFORMANCE WING/HUMAN PERFORMANCE DIRECTORATE (HPW/HP) HUMAN SYSTEMS INTEGRATION ASSESSMENT TOOL

The 711<sup>th</sup> Human Performance Wing, Human Performance Directorate, Air Force Research Laboratory (AFRL), together with our contracting partner, is spearheading a four-year effort to develop an HSI Assessment Tool (also known as the “HSI-AT”) to assess USAF weapons systems in requirements, acquisition, and sustainment as a method of ensuring that all Air Force warfighting systems are designed, built, operated, and sustained in a manner that optimizes human performance at every warfighter level and at all stages of system maturity in the Department of Defense (DoD) System Life Cycle process. The tool will run on an easy-to-use, interactive web/computer-based system and allow the HSI practitioner ready access to HSI information in order to conduct HSI assessments in an objective, quantifiable manner on a wide variety

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**NATO Human View**

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of weapons systems. It will enable the user to identify gaps; determine risks; help the user develop HSI and safety mitigation strategies; and overall, optimize Total System Performance while mitigating Total Ownership Costs of DoD weapons systems.

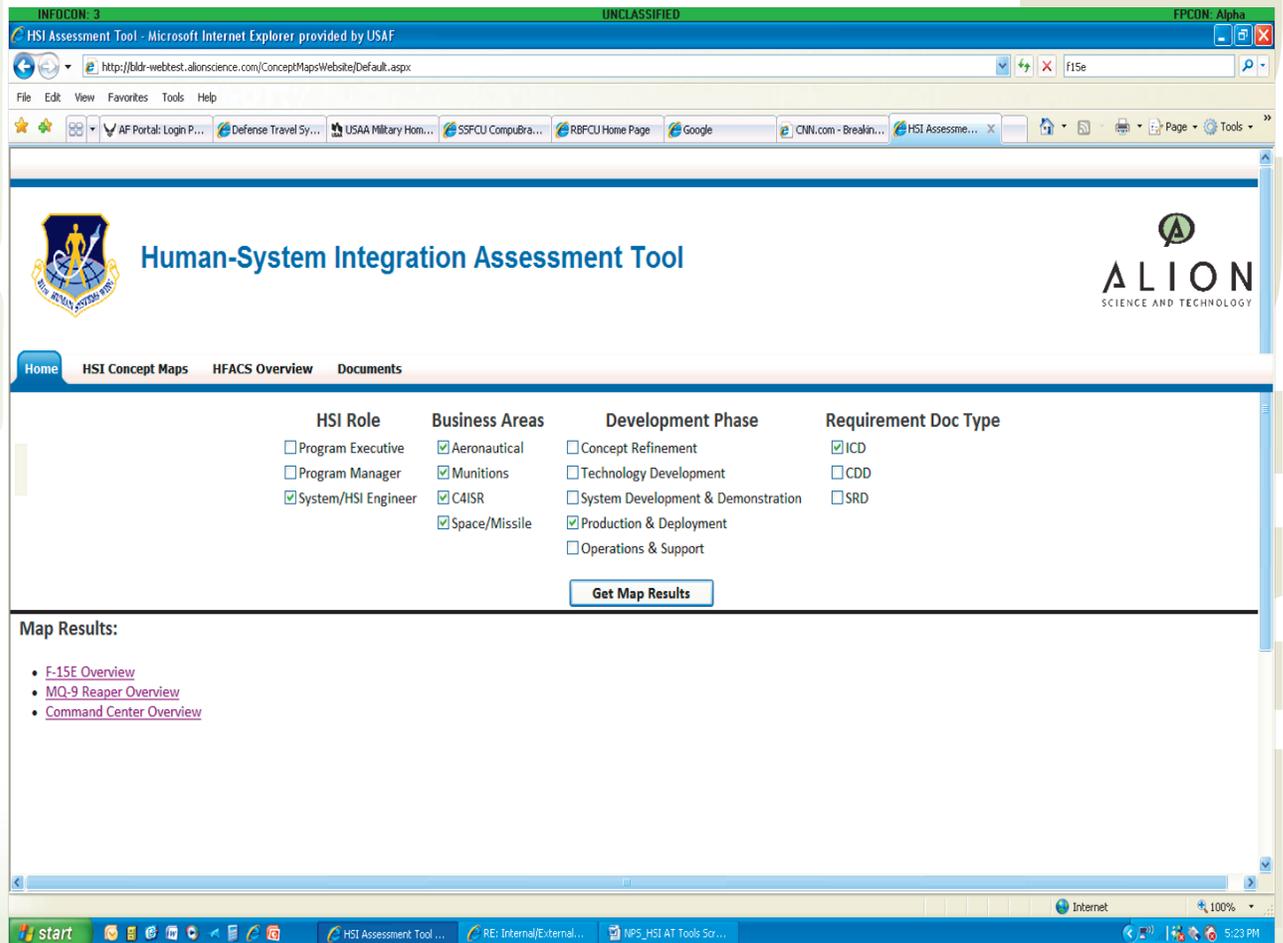
The HSI-AT will lead users through a process that rapidly and systematically identifies HSI domain considerations and assessments that will enhance operator, maintainer, and sustainer performance; operational safety, suitability, and effectiveness; usability and avoidance of occupational health hazards by identifying and then mitigating or eliminating most human causes of weapons systems incidents, mishaps, and accidents.

The HSI-AT will provide the USAF HSI Program with a tool for a well-defined, consistent, and repeatable HSI assessment process relative to a sys-

tem's life cycle. The HSI-AT will provide the framework for users conducting HSI assessments, and provide a body of knowledge and information upon which to draw. This will encompass not only the effects of warfighter performance on overall system performance, but also the assessment of the effects of combat operations, training operations, and the operation of the system upon the operator, maintainer, and sustainer.

The goal is for a capability that will enable effective and comprehensive system level, systems-of-systems (SoS), and family-of-systems (FoS) assessment in an objective, quantifiable manner. User-levels of the mature HSI-AT are identified as: (1) **Executive** (identified as the Milestone Decision Authority, Air Staff HSI Office, and User Commands) mainly in the form of reports; (2) **Management** (identified as the Program Manager, System Program Office, Performance Enhancement Director-

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NATO Human View

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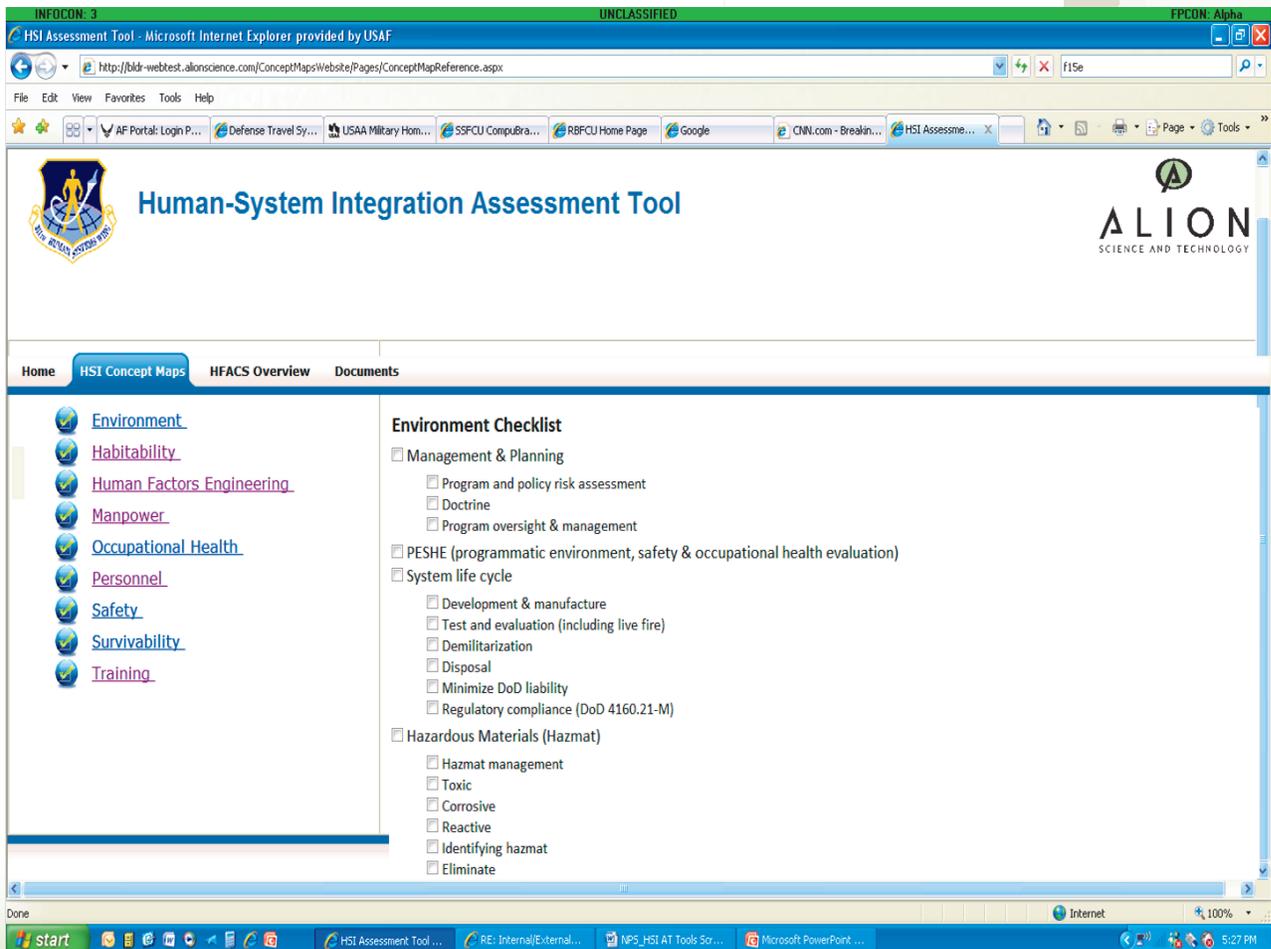
ate, User Commands on fielded systems) mainly in the form of gap and risk assessments and mitigation option documentation; and, (3) **Technical** (identified as the Domain experts, users of fielded systems, HSI subject matter experts, system engineers). Each of these will be the primary operator/practitioner, each representing different levels of detail or program oversight as influenced by the acquisition category (ACAT) program level involved.

**FEATURES AND CAPABILITIES OF THE HUMAN SYSTEMS INTEGRATION ASSESSMENT TOOL**

The mature HSI-AT will ultimately provide the following functions:

- Provide a user-friendly interface that will guide any practitioner, manager, or executive, (regardless of experience level), through a user-tailored process to perform appropriate HSI assessment, analysis and reporting goals
- List activities and functions at the appropriate user level and lifecycle node
- Provide entry and exit criteria for each HSI phase at appropriate activity level
- Aid in performing appropriate user level assessments, checklists, and scorecard reports
- Provide a data repository for reports, documents, checklists, scorecards, and other data compatible with the MindManager file format
- Perform capability gap and risk assessments and tradeoff analyses, generate reports, and aid in the analysis of alternatives (AoA)

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**NATO Human View**

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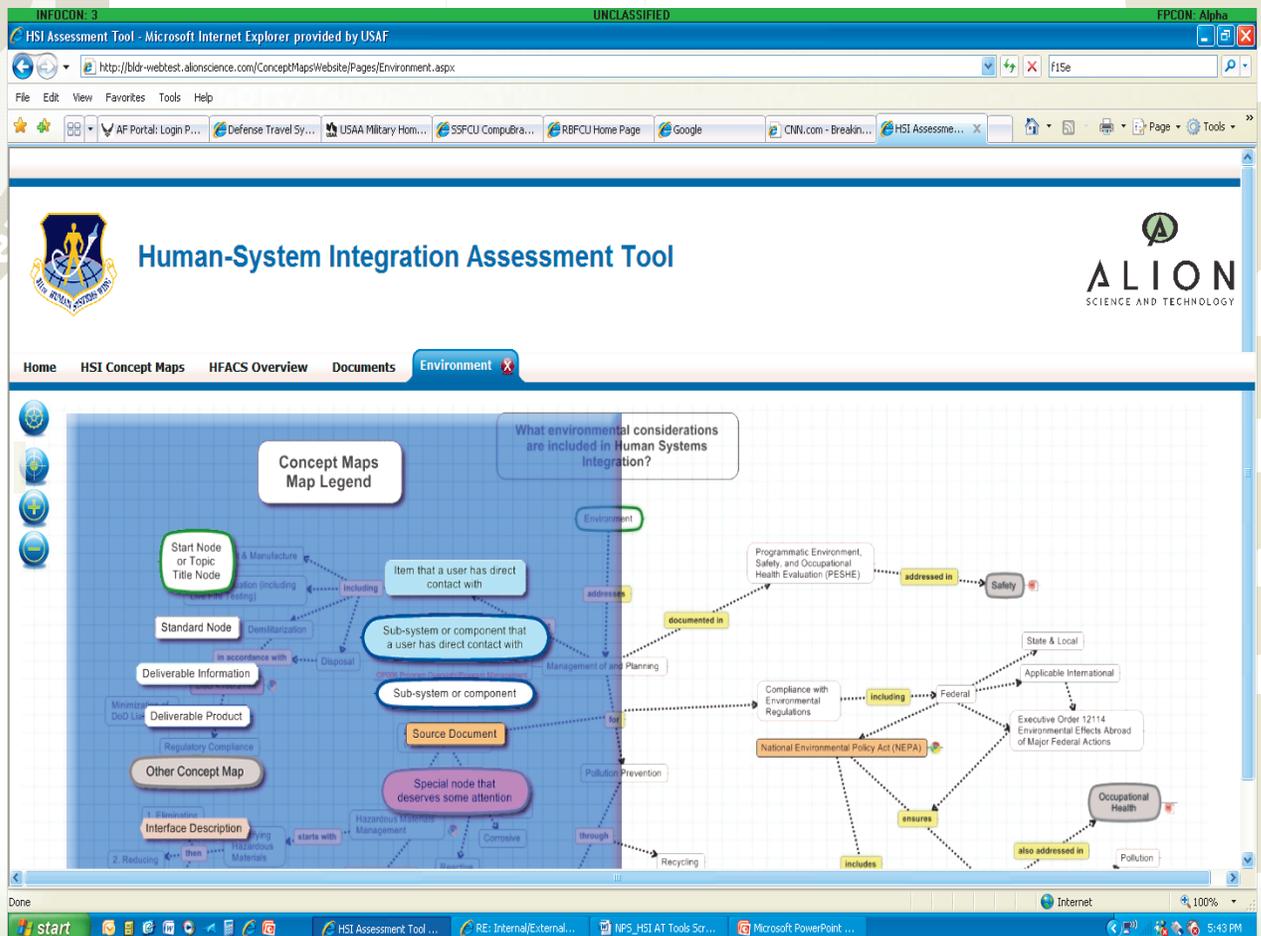
- Guide, recommend, and provide access to HSI assessment tools at the appropriate user level
- Based on analytically determined HSI gaps, derive and specify tailored mitigation alternatives and options consistent with both life-cycle stage and system/subsystem type
- Store the HSI body of knowledge to prevent loss of information, and duplication of information and efforts
- Provide the ability to be updated by HSI practitioners to improve the tool (open architecture)
- Provide configuration management functions for project documentation:
  - Internal to the HSI-AT for information input, produced or stored in HSI-AT
  - External to the HSI-AT for revision control (spirals) on HSI-AT software development

**CURRENT EFFORT**

We are currently in Phase II of the development phase of the HSI-AT. During the Phase I effort, concept map representations of three USAF weapons systems (F-15E Strike Eagle; MQ-9 Reaper; and the Global Operations Center (GOC)) and all nine HSI domains were generated and linked to tailored HSI tools and processes. The concept maps provide a graphical representation of information sources and issues for a domain expert to consider when conducting an HSI assessment. The domain concept maps have also been linked to the DoD Human Factors Analysis and Classification System (DoD HFACS) nanocodes that allow the practitioner to consider possible accident mishap hazards during the assessment process.

The first version of the HSI-AT prototype is currently being refined and runs on Microsoft Silverlight, which is already part of the DoD's MS suite of software. The prototype will eventually be up-

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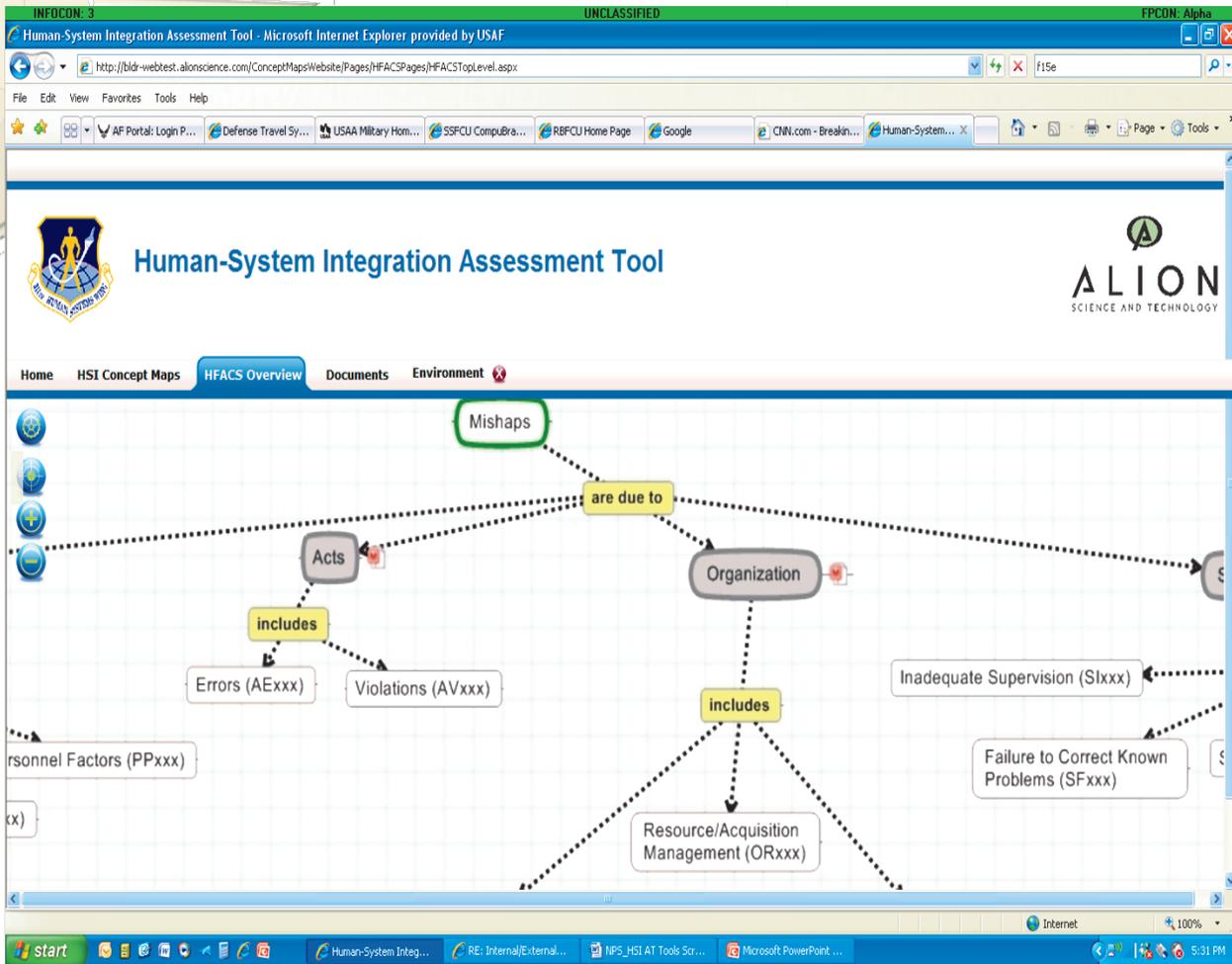


### NATO Human View

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loaded to the AF HSI Community of Practice (CoP) website to enable us to receive feedback from users and HSI practitioners across all Services that will be incorporated in successive evolutionary developments.

For additional HSI information, please visit the 711<sup>th</sup> HSI website at: <http://www.wpafb.af.mil/afrl/711hpw/hpi.asp>.



**HSI Assessment Tool**

ALION SCIENCE AND TECHNOLOGY

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**HSI Domain Concept Maps**

- [Environment](#)
- [Habitability](#)
- [Human Factors Engineering](#)
- [Manpower](#)
- [Occupational Health](#)
- [Personnel](#)
- [Safety](#)
- [Survivability](#)
- [Training](#)

**Environment Checklist**

- Management & Planning
  - Program and policy risk assessment
  - Doctrine
  - Program oversight & management
- PESHE (programmatic environment, safety & occupational health evaluation)
- System life cycle
  - Development & manufacture
  - Test and evaluation (including live fire)
  - Demilitarization
  - Disposal
  - Minimize DoD liability
  - Regulatory compliance (DoD 4160.21-M)
- Hazardous Materials (Hazmat)
  - Hazmat management
  - Toxic
  - Corrosive
  - Reactive
  - Identifying hazmat
  - Eliminate

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Technology & Materiel

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The Soldier

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## MANPRINT TRAINING

### MANPRINT APPLICATIONS COURSE

Class	Start Date	End Date	Deadline	Location	POC
2009-704	03 Mar 2009	05 Mar 2009	16 Jan 2009	Fort Bragg, NC	Pat Wilson COM (804) 765-4373, DSN 539-4373
2009-705	31 Mar 2009	02 Apr 2009	13 Feb 2009	Fort Rucker, AL	Pat Wilson COM (804) 765-4373, DSN 539-4373
2009-702	05 May 2009	07 May 2009	27 Mar 2009	Fort Bliss, TX	Pat Wilson COM (804) 765-4373, DSN 539-4373

### MANPRINT FAMILIARIZATION COURSE

Date	Time	Location	POC
Jan 22	9:30-12:00	Huntsville, AL	Kelly Hopkins, Alion Science & Technology khopkins@alionscience.com
Feb 12	9:30-12:00	Huntsville, AL	Kelly Hopkins, Alion Science & Technology khopkins@alionscience.com
Mar 12	9:30-12:00	Huntsville, AL	Kelly Hopkins, Alion Science & Technology khopkins@alionscience.com

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Comments



## UPCOMING EVENTS

### AUSA Winter Symposium & Exposition

25-27 February 2009

Fort Lauderdale, FL

[www.ausea.org](http://www.ausea.org)

### Human Systems Integration Symposium

17-19 March 2009

Annapolis, MD

[www.navalengineers.org](http://www.navalengineers.org)

### Army Aviation Association of America Annual Convention

3-6 May 2009

Nashville, TN

[www.quad-a.org](http://www.quad-a.org)

### Space and Missile Defense Exposition

11-14 August 2009

Huntsville, AL

[www.smdconf.org](http://www.smdconf.org)

### AUSA Annual Meeting & Exposition

5-7 October 2009

Washington, DC

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