



Human Systems Integration (HSI)

HSI Organization and Execution in Acquisition Programs



DAU Acquisition Insight Days

**Human Systems Integration
711th Human Performance Wing
Air Force Research Laboratory
23 June 2015**

U.S. AIR FORCE



Overview

- **711th Human Systems Integration Directorate is the Air Force's HSI Executive Agent**
- **Top Down Look at Our Mission and Scope**
- **We can't be everywhere...limited number of HSI practitioners**
- **Examples of successful products provided to an Acquisition Program**

...we'll be sharing some of these today



Human Systems Integration Directorate ***711 HPW/HP***



Mission

**Optimize warfighter capability
through a human-centric approach
to system development, acquisition
and sustainment**



What is Human Systems Integration?

- 711 HPW/HP provides user centric design SMEs in support of acquisition and airman life cycles
 - Systematic *integration* of nine human-centered domains to optimize total system performance, decrease cost
 - Informs the life cycle decision making process with a human-centered focus

HSI is NOT:

- Another name for human factors eng.
- “Just good Systems Engineering”
- What we’ve always done
- Another stovepipe





What HSI Does

- **How can the HSI process help with delivering affordable warfighter capabilities?**
- **HSI provides greater ability to:**
 - **Increase performance**
 - **Decrease sustainment costs**
 - **Achieve greater availability and reliability**
 - **Improve maintainability**
 - **Reduce rework/modifications**
 - **Reduce safety hazards**
 - **Optimize Manpower, Personnel and Training**



HSI Directorate Focus

- Four focus areas...

Pre -
Acquisition
Capability
Support



Acquisition
Program
Support



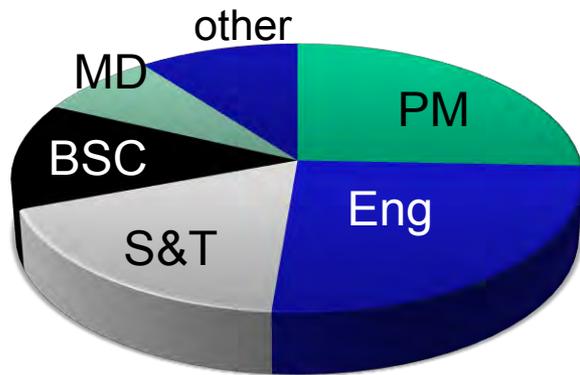
AF Medical
Service
Support



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Experienced HSI Practitioners



Domain/program SMEs



HSI SMEs



Users

Expertise in all 9 AF HSI domains



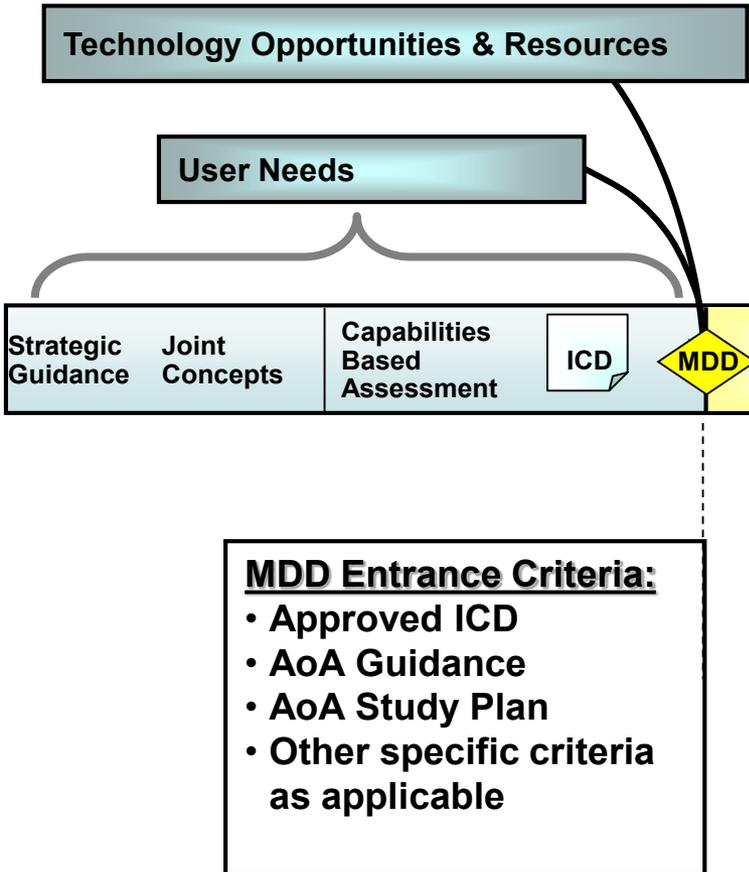
Organizational Update

Expanding hands-on expertise and input throughout the acquisition lifecycle, while:

- **Establishing long-lasting relationships**
 - **MAJCOMs**
 - **AFLCMC and AFRL Center Level Agreement**
- **Training experienced HSI practitioners**
- **Studying and refining HSI processes**
 - **Observe, Orient, Decide, Act approach**
 - **Easy-to-use tools**
- **Developing HSI assessment methodologies**
 - **Program type and phase-dependent**



At the MAJCOMs



- HSI representation at the MAJCOM level – planning and programming

- Inserting HSI in the:

- Capabilities Based Assessment (CBA) process
- Initial Capabilities Document (ICD)
- Analysis of Alternatives (AoA) guidance and study planning process

Roughly 70% of Life Cycle Costs are locked in by MS A

Source: DAU CLR 151 Analysis of Alternatives

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Center Level Agreement



CENTER LEVEL AGREEMENT
BETWEEN THE
AIR FORCE RESEARCH LABORATORY (AFRL)
AND
AIR FORCE LIFE CYCLE MANAGEMENT CENTER (AFLCMC)



HSI Program Office Support

• Perform HSI Assessments	Identify gaps, concerns, trade offs, and risks
• Integrate within SPO	PM, IPT & WG activities: SE, Test, Safety, Logistics, HSI
• Develop HSI Plan	HSI strategy tailored specifically for program
• Develop Requirements	JCIDS level (ICD, CDD, CPD) & SRD
• Develop Contract Language	RFP, SOW, SOO, CDRLs, ...
• Review Program Documents	SEP, IMP/IMS, TEMP, Test plans, LCMP/LCSP, MER, ...
• Participate in Technical and Design Reviews	HSI risk input for design decisions and reviews HSI domain interrelationships and tradeoffs
• Review/ Assess Deliverables	Review of contractor deliverables and test reports
• Participate in Logistics planning	Maintainability, affordability
• Analyze Trade Space	Assess complex HSI domain interrelationships
• Provide Training	Enable SPOs to carry out HSI activities
• Participate in Risk Assessments	Minimize HSI domains from being traded off

HSI Directorate Support to PM and Chief Engineer = Program Risk Reduction



HSI Approach within the Program Offices

HSI Planning: includes Managerial and Technical Aspects of HSI Process

- **Acquisition Program Summary**
- **HSI Process / Strategy Overview**
- **HSI Working Group (WG) and Integrated Product Team (IPT) participation**
- **Target Audience Description**
- **HSI Focus Areas (Transcend Individual Domains)**
- **HSI Domains**
- **Specific HSI Tasks and Activities**
- **Contractual Activities**
- **Risk Identification and Management**



HSI Approach within the Program Offices

HSI Process and Strategy Overview

Strategy is **tailored for the acquisition program**, based on factors including

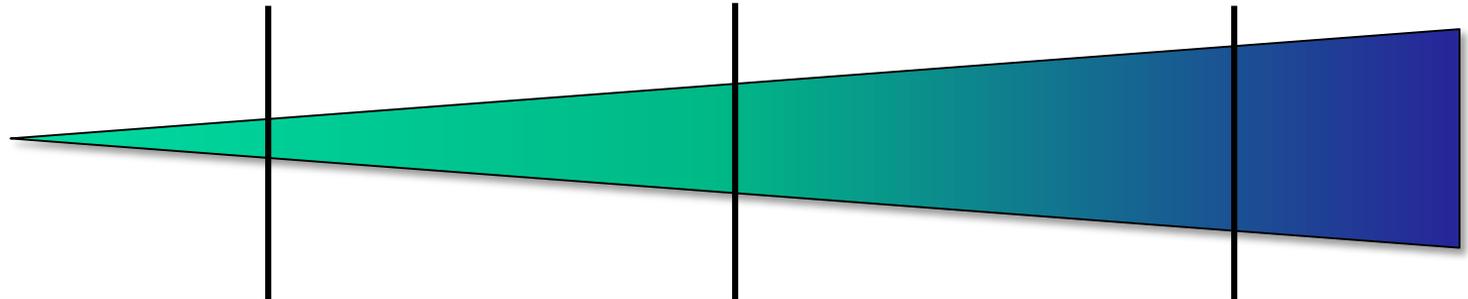
- Program objectives and constraints
- Systems engineering approach
- Results from initial HSI baseline assessment
- Potential impact on user (target audience)
- Long term affordability / supportability of system
- Gaps in planning where HSI or individual domains are not adequately addressed
- Lessons learned
- HSI-related concerns / risk



HSI Approach within the Program Offices

HSI WG and IPT participation

Levels of collaboration and participation



Participation	Primarily Local SPO	Wider Govt. audience	Govt. and Prime Contractor
Venue	Informal Meetings and discussions	Less discussion, more informal meetings and teleconferences	Formal meetings on regular basis with focused agenda
Charter	None	None or Draft	Signed / approved
Example	Maintainability discussion with HSI POC, Logistics, HFE, and Systems Integration Engineer	Training planning teleconference with HSI POC, Logistics, HFE, Safety, Environment Engineer, Lead Flight Systems Engineer, MAJCOM and user of predecessor system	HSI agenda with HSI POC, Logistics, HFE, Safety, Environment Engineer, Flight Systems Engineer, Avionics Engineer, Systems Integration Engineer, Chief Engineer, Test Manager, Prime Contractor, MAJCOM and user of predecessor system

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HSI Approach within the Program Offices

Target Audience Description

- Operators
- Maintainers
- Support Personnel
- Other people transported or affected by the system





HSI Approach within the Program Offices

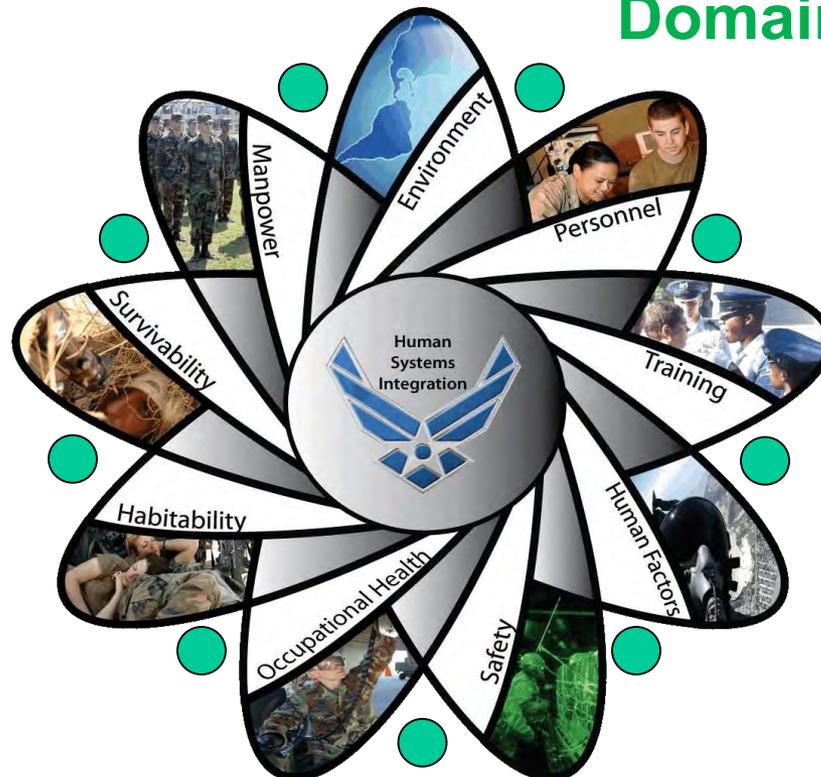
HSI Focus Areas (Transcend Individual Domains)

Example: optimizing maintenance and addressing maintainability for a new system

Early
Consideration
= Affordability

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Domains involved:





HSI Approach within the Program Offices

HSI Focus Areas, continued

Example: optimizing maintenance and addressing maintainability for a new system

HSI planning would address approach, developed in close coordination with Logistics, HFE, Systems Engineer, and others:

- Requirements in Systems Requirements Document
- Studies, models, and evaluations to inform the design
- WG to review trade-space with stakeholders
- Other program activities such as Tech Order demos and test & evaluation to verify results



HSI Approach within the Program Offices

HSI activities and the contract

Example: ACAT I program in early phases of planning for a major upgrade

- Statement of Work language should describe HSI-related tasks to be performed:
- Primary focus can be limited to tasks on those aspects of the system being added or modified due to the upgrade
HSI Plan, Contractor's HSI Efforts
- Include evaluations the team wants the contractor to perform



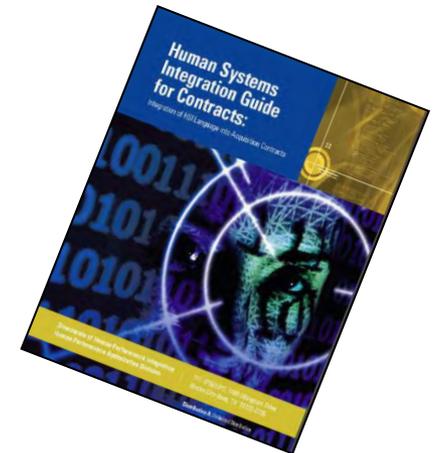
HSI Approach within the Program Offices

HSI activities and the contract

Example: ACAT I program in early phases of planning for a major upgrade

- Depending on the acquisition program, there are a variety of Data Item Descriptors (DID)s to place on contract.
- These include but are not limited to:

Title	DID Number
Human Systems Integration Program Plan	DI-HFAC-81743A
Training Program Structure Document	DI-SESS-81521B/T
Human Engineering Design Approach Document-Operator	DI-HFAC-80746C
Human Engineering Design Approach Document-Maintainer	DI-HFAC-80747B/T
Human Engineering Test Report	DI-HFAC-80744B
Technical Report-Study/Services	DI-MISC-80508B



For example, results from Manpower, Workload, or skills analyses



HSI Approach within the Program Offices

Risk Identification and Management

Within the Program Office, the HSI Practitioner should

Identify and track HSI concerns that may become risks

Notional example of HSI concerns tracking matrix:

System Y Upgrade Program Last Updated: April 10, 2012 by Harry HSI POC

Capability/Component	Components affected, other effects														Notes	Responsibility	Management Plan	Status		
	GPS	FMS	Displays	Controls	MX Management System	Workload	Manpower	Personnel	Training	Human Factors Engineering	Environment	Safety	Occupational Health	Survivability					Habitability	Maintainability
Capability 1				New/modified crew actions	New/modified MX actions	X		X	X			X			X			George Wind HFE	Demonstration, review reports and report on results	April 14 2012 discussed with SMEs and determining likelihood and impact
Capability 2		New/modified crew actions			New/modified MX actions	X			X		X	X					Potential concern with electromagnetic radiation	Joe Jones, ESOH	Assess previous developmental test and compile findings by May 5, 2012	April 18 2012 TDY to discuss with sub contractor



HSI Approach within the Program Offices

Risk Identification and Management

Within the Program Office, the HSI Practitioner should

Identify and track HSI concerns that may become risks

Take action on concerns (e.g., validate, analyze, monitor, eliminate, mitigate)

If concerns become risks...

- Determine the likelihood and consequences of performance, cost, and/or schedule impact of risk
- Bring the HSI risk to the Program Manager's attention along with recommendations for mitigation
- PM is final decision maker whether or not to add to program-level risk management process



Conclusion

- **711th Human Systems Integration Directorate is the AF HSI Executive Agent**
- **HSI Practitioners are active throughout the acquisition lifecycle and user community**
- **HSI Practitioners work to ultimately reduce overall program risk**



Contact Information

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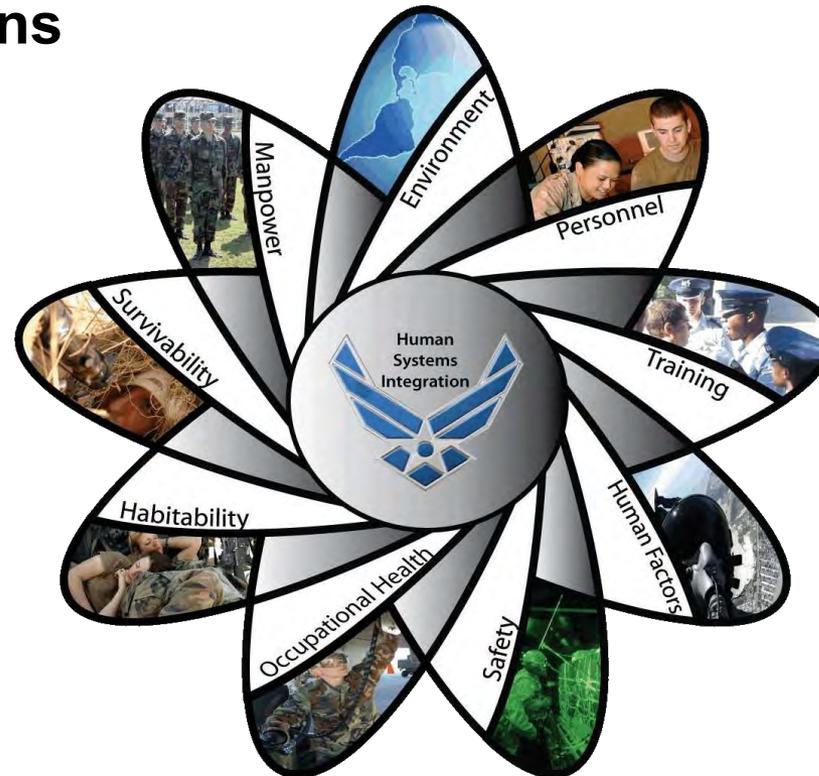


Questions?



HSI Approach within the Program Offices

HSI Domains



DoDI 5000.02, Jan. 7, 2015, Encl. 7, “3. HSI PLANNING. HSI planning and implementation will address: a. Human Factors Engineering, b. Personnel, c. Habitability, d. Manpower, e. Training, f. Safety and Occupational Health, g. Force Protection and Survivability”