



# *Human Systems Integration (HSI)*

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## **HSI Implementation and Assessment Methodology in Acquisition Programs**



### **NDIA Systems Engineering Conference**

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**Human Systems Integration  
711<sup>th</sup> Human Performance Wing  
Air Force Research Laboratory  
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**U.S. AIR FORCE**



# Overview

- **711<sup>th</sup> Human Systems Integration Directorate is the Air Force's HSI Executive Agent**
- **We can't be everywhere...limited number of HSI practitioners**
- **We need tools in place**
- **Standardization of processes and tools ...to be made available for the HSI community at large in the near future**

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



## Mission

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



# HSI Directorate Focus

- **Four focus areas...**

Pre -  
Acquisition  
Capability  
Support



Req'mts &  
Development  
Planning

Acquisition  
Program  
Support

AF Medical  
Service  
Support



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## ***Organizational Update***

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**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**



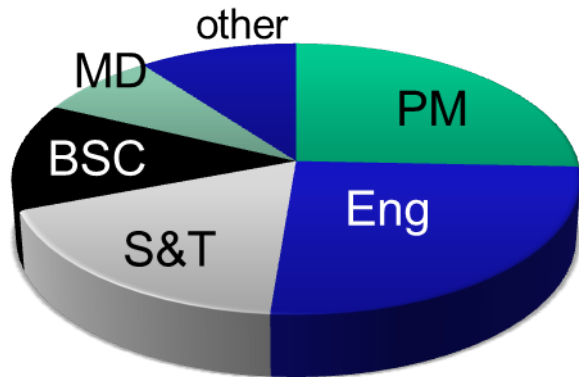
# Center Level Agreement



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



# Experienced HSI Practitioners



Domain/program SMEs



HSI SMEs

Users

**Expertise in all 9 AF HSI domains**

## Notional OODA Loop

### Act

**Follow through on what was decided**

- Perform evaluations
- Provide recommendations
- Participate in Program Office support activities
- Provide feedback on effectiveness of HSI plan
- Exit loop when exit criteria are satisfied

Observe

Orient

Decide

Act

### Decide

**Assess and plan HSI effort**

- Perform initial assessment
- Identify HSI gaps
- Develop / refine HSI strategy / plan
- Plan & prioritize HSI activities
- HSI leadership / technical advisor review work scope
- Roles and responsibilities are determined

### Observe

**Observe “big picture” technical and managerial aspects of program**

- Gather information about stakeholders
- Gather program documentation
- Capture human-centric concerns, risks, and issues
- Clarify and validate HSI assessment needs

### Orient

**Set HSI goals and deliverables**

- Understand organizational structure
- Understand program requirements
- Understand key program events & schedule
- Identify key stakeholders and POCs
- Identify HSI relevant IPTs/WGs
- Understand SE approach





# ***HSI Program Office Support***

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

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



# Developing Assessment Methodologies

Type of HSI Assessment	HSI Directorate Objectives
JCIDS ICD/CDD/CPD Review	Provide the hooks for HSI contract requirements
Initial Coverage Assessment	Identify gaps in coverage and HSI Directorate's plan or role to address those gaps
Initial Baseline Assessment	Establish groundwork for building an HSI Plan
HSI Plan *	Establish foundation for SPO and Contractor to implement and manage HSI
HSI Input into IPTs	Establish relationship with SPO, helping them to understand and accept value of HSI in timely manner
HSI assessment of specific question/situation (often quick-turn acquisition questions)	Provide technically sound response to SPO in a timely manner
HSI assessment of acquisition and engineering documents	Identify gaps in coverage or impact to human and recommend changes/mitigation to address those gaps
HSI Assessment for Tech Reviews *	Document items that should have already been addressed in IPT meetings, etc. Or, provide independent assessment of tech readiness
HSI Assessment for Milestone Review *	Document items addressed in prior tech reviews and update the HSI Plan

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\* Deliverable to PEO level



# HSI Framework Tool

HSIF v. 0.1.8 XML v. 0.0.2

Material Subsystem Analysis | Technology Maturation and Risk Reduction | E&MD: Integrated System Design | E&MD: Capability & Process Demonstration | Production & Deployment | Operations & Support

**Integrated** (MDD)

**HSI Framework Tool Activity Grid:**

Domain	Activity ID	Description	Phase	Domain	Description	Phase	Domain	Description	Phase
Integrated	MIA_INT_1	Identify system stakeholders and review predecessor documentation.	INT	MIA_INT_2	Coordinate analyses from HSI Domain Leads. Identify communities, IPTs, WGs	INT	MIA_INT_3	Develop HSIP to include resourcing, scheduling and planning. Update HSI risks.	INT
	MIA_INT_4	Compile and tradeoff HSI cost estimates.	INT	MIA_INT_5	Identify any HSI issues and/or risks in preparation for ITR.	INT	MIA_INT_6	Identify any HSI issues and/or risks in preparation for ITR.	INT
HFE	MIA_HFE_1	Analyze legacy systems for HFE risks. Evaluate lessons learned, user workflows.	INT	MIA_HFE_2	Provide HFE inputs to HSIP Focus on workflow changes in requirements documents.	INT	MIA_HFE_3	Develop HFE activity cost estimates for material solutions.	INT
	MIA_HFE_4	Identify any HFE issues and/or risks in preparation for ITR.	INT	MIA_HFE_5	Identify any HFE issues and/or risks in preparation for ITR.	INT	MIA_HFE_6	Identify any HFE issues and/or risks in preparation for ITR.	INT
Manpower	MIA_MAN_1	Identify manning needs, lessons learned, and high drivers from legacy systems.	INT	MIA_MAN_2	Establish Manpower thresholds and objectives. ID initial Manpower requirements.	INT	MIA_MAN_3	Develop Manpower cost estimates for material solutions.	INT
	MIA_MAN_4	Identify any Manpower issues and/or risks in preparation for ITR.	INT	MIA_MAN_5	Identify any Manpower issues and/or risks in preparation for ITR.	INT	MIA_MAN_6	Identify any Manpower issues and/or risks in preparation for ITR.	INT
Personnel	MIA_PER_1	Consider personnel alternatives based on FSA.	INT	MIA_PER_2	Develop personnel cost estimates for material solutions.	INT	MIA_PER_3	Identify any Personnel issues and/or risks in preparation for ITR.	INT
	MIA_PER_4	Identify any Personnel issues and/or risks in preparation for ITR.	INT	MIA_PER_5	Identify any Personnel issues and/or risks in preparation for ITR.	INT	MIA_PER_6	Identify any Personnel issues and/or risks in preparation for ITR.	INT
Training	MIA_TRA_1	Recommend mitigations for Training deficiencies. Assess transfer effectiveness.	INT	MIA_TRA_2	Develop Training cost estimates for material solutions.	INT	MIA_TRA_3	Identify any Training issues and/or risks in preparation for ITR.	INT
	MIA_TRA_4	Identify any Training issues and/or risks in preparation for ITR.	INT	MIA_TRA_5	Identify any Training issues and/or risks in preparation for ITR.	INT	MIA_TRA_6	Identify any Training issues and/or risks in preparation for ITR.	INT
Safety	MIA_SAF_1	Develop System Safety Management Plan, Safety management structure and approach.	INT	MIA_SAF_2	Develop Safety cost estimates for material solutions.	INT	MIA_SAF_3	Identify any Safety issues and/or risks in preparation for ITR.	INT
	MIA_SAF_4	Identify any Safety issues and/or risks in preparation for ITR.	INT	MIA_SAF_5	Identify any Safety issues and/or risks in preparation for ITR.	INT	MIA_SAF_6	Identify any Safety issues and/or risks in preparation for ITR.	INT
Occupational Health	MIA_OOH_1	Analyze legacy system for OH issues, roles and responsibilities.	INT	MIA_OOH_2	Provide inputs to SSMP Review System Threat Assessment.	INT	MIA_OOH_3	Develop OH cost estimates for material solutions.	INT
	MIA_OOH_4	Identify any OH issues and/or risks in preparation for ITR.	INT	MIA_OOH_5	Identify any OH issues and/or risks in preparation for ITR.	INT	MIA_OOH_6	Identify any OH issues and/or risks in preparation for ITR.	INT
Survivability	MIA_SUR_1	Analyze legacy system for Sv issues and lessons learned.	INT	MIA_SUR_2	Identify concept-level Survivability criteria.	INT	MIA_SUR_3	Develop Survivability cost estimates for material solutions.	INT
	MIA_SUR_4	Identify any Survivability issues and/or risks in preparation for ITR.	INT	MIA_SUR_5	Identify any Survivability issues and/or risks in preparation for ITR.	INT	MIA_SUR_6	Identify any Survivability issues and/or risks in preparation for ITR.	INT
Habitability	MIA_HAB_1	Review Habitability criteria and guidance for legacy and related systems.	INT	MIA_HAB_2	Provide Habitability inputs to HSIP Compare against Habitability criteria.	INT	MIA_HAB_3	Develop Habitability cost estimates for material solutions.	INT
	MIA_HAB_4	Identify any Habitability issues and/or risks in preparation for ITR.	INT	MIA_HAB_5	Identify any Habitability issues and/or risks in preparation for ITR.	INT	MIA_HAB_6	Identify any Habitability issues and/or risks in preparation for ITR.	INT

**HSIP Table:**

Phase	Domain	Description
MIA	INT	Develop HSI baseline
MIA	INT	Develop HSIP
MIA	SUR	ID Sv criteria
MIA	HAB	Develop HAB plan
MIA	INT	MIA Prep
TSMR	INT	Establish HSI IPT
TSMR	INT	Phase in COD, SRD
END_C	INT	CDR prep
END_S	INT	Update documentation

**Development Build**

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# How is HSI applied in the AFMS

- Same process, whether applied to acquisitions or medicine
- Identifying HSI touchpoints to support AFMS processes
- Developing HSI methodology and approaches to healthcare management, policy and clinical care
- HSI in AFMS will look different:
  - Core “weapon systems” are health care delivery systems (more people than technology)
  - Not dependent on traditional acquisition framework for primary systems; multiple entry pathways for technology (especially COTS)
  - Decentralized development of systems
  - Practitioners need medical knowledge





## ***Conclusion***

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- **711th Human Systems Integration Directorate is the AF HSI Executive Agent**
- **HSI Practitioners are active throughout the acquisition lifecycle and user community**
- **Developing approaches to healthcare management, policy, and clinical care**
- **Developing tools available to the HSI community**



# Questions?



## ***Contact Information***

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