



DEPARTMENT OF THE AIR FORCE
WASHINGTON DC

OFFICE OF THE ASSISTANT SECRETARY

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MEMORANDUM FOR DIRECTOR DEFENSE RESEARCH AND ENGINEERING
ATTN: MR. LEMNIOS

FROM: SAF/AQ
1060 Air Force Pentagon
Washington DC 20330-1060

SUBJECT: FY11 Air Force Human Systems Integration (HSI) Management Plan

Our Airmen are our most vital resource and we must ensure their capabilities and limitations are considered and optimally integrated with the hardware and software systems we provide them. The attached FY11 AF HSI Management Plan is an update to our 2009 Plan and documents our progress against that plan. The FY11 Plan represents the evolving Air Force strategy for implementing and managing HSI within the weapons system acquisition life-cycle. Effective HSI implementation directly supports the Secretary's acquisition affordability initiatives.

The Air Force has made significant progress in several areas, including improvements in: Joint HSI collaboration, relevant policy and guidance, Headquarters Air Force integration, support to the capability requirements and systems engineering processes, and improved support to current programs. The basic foundation for comprehensive implementation of a sustainable HSI process supporting the development, acquisition and sustainment of Air Force weapons systems is now in place. The Air Force HSI enterprise is about to deploy an assessment process with metrics to ensure that HSI is comprehensively applied in our programs and addressed in Program Support Reviews and other relevant milestone reviews.

I look forward to sharing our continued progress related to HSI implementation in our programs in the future. If you have any questions or need additional information, please contact my POC, Colonel Larry Kimm, Director, SAF/AQ-AFHSIO, at (703) 681-6300 (DSN 761), larry.kimm@pentagon.af.mil or through HSI.workflow@pentagon.af.mil.

//SIGNED//

MARK D. SHACKELFORD, Lt Gen, USAF
Military Deputy, Office of the Assistant Secretary
of the Air Force (Acquisition)

Attachment:
FY11 AF HSI Management Plan

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United States Air Force

Human Systems Integration

FY11 Management Plan



U.S. AIR FORCE

Air Force Human Systems Integration Office

**Office of the Assistant Secretary of the Air Force for
Acquisition**

Air Force FY11 Human Systems Integration Management Plan

SUBMITTED BY:

See Staff Summary Sheet

LARRY T. KIMM, Col, USAF, BSC

September 2010

Date

APPROVED BY:

See Staff Summary Sheet

MARK D. SHACKELFORD, Lt Gen, USAF
Military Deputy, Office of the Assistant Secretary
of the Air Force (Acquisition)

October 2010

Date

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1.0 Introduction

The United States Air Force invests in the finest systems in the world to provide our Airmen with warfighting capability that is second-to-none. Regardless of the sophistication of AF systems, optimized total systems performance is contingent upon the warfighter's ability to use systems fully and effectively to accomplish the mission. Human Systems Integration (HSI) is one vital link that optimizes the design of systems to achieve total system performance, maximizing human capabilities and accounting for human limitations. HSI provides the integrated approach to considering the human on a par with the hardware and software he/she is expected to operate, maintain and support. This document represents the AF Plan for implementing and managing HSI within the weapons system acquisition life-cycle.

1.1 Background

The Air Force began to establish a comprehensive and sustainable HSI program following an Air Force Scientific Advisory Board Study (AFSAB TR-04-04). Following this report, the Air Force Chief of Staff (CSAF) accepted the AFSAB recommendations and charged the Headquarters Air Force (HAF) to establish an HSI program. The Air Force Surgeon General and the Air Force Materiel Command (AFMC) jointly led an HSI Integrated Process Team (IPT) to bring an implementing construct forward. This construct was approved in 2005 after the Air Force Medical Service (AFMS) presentation to the CSAF and the Assistant Secretary of the Air Force for Acquisition (SAF/AQ). An Air Force HSI Office (AFHSIO) was initially established (CSAF Memo, 07 Aug 07), reporting to the Air Force Vice Chief of Staff (VCSAF). The AFHSIO was transitioned from VCSAF to SAF/AQ, reporting as a named office to the Military Deputy in SAF/AQ, in October 2009. The AFHSIO is now in its fourth year of operation and has made significant progress in addressing the concerns expressed by the AFSAB and in implementing many of their recommendations. This progress includes improvement in Joint HSI collaboration, improving policy and advocacy, integrating participation across the HAF, including HSI within the systems engineering process, effective support to the requirements process, increased support to current programs, and laying the foundation for a comprehensive implementation of a sustainable HSI process within Systems Acquisition. The AFHSIO built a sound and executable HSI strategy which was initially detailed in the 2009 AF HSI Management Plan provided to the Office of the Secretary of Defense (OSD) and incorporated as part of the overarching OSD HSI Management Plan reported to Congress in April 2009.

1.1.1. Synopsis of 2009 AF HSI Management Plan

The 2009 AF HSI Management Plan assigned executive level responsibility for AF HSI to the AFHSIO, along with a chartered HAF-level Board of Advisors (BOA) and Integrated Process Team (IPT). It also outlined responsibilities for the HAF, Operational Major Commands (MAJCOMs), Air Force Materiel Command, and Program Executive Officers (PEOs) / Program Managers (PMs) as outlined in official Air Force policies and

instructions. The plan detailed the vision, mission and purpose of the AF HSI program and outlined goals, objectives, and initiatives to implement it. This framework remains intact and is contained in section 3.3 of this plan. The 2009 plan also detailed specific actionable items with a time line for accomplishment.

1.1.2. Performance against the 2009 Management Plan (See Table 1.0 for a synopsis) AF HSI was successful in accomplishing / implementing a majority of the actionable items in the 2009 Management Plan. The most significant of these include:

- a. Authored and coordinated the inclusion of HSI within policies, instructions and guidance to include AFPD 63-1/20-1, AFI 63-101, AFI 63-1201, AFI 99-103, AFI 10-601, DAG Update, DoDI 5000.02 update, CJCSI 3170.01 update, AFPAM 63-128, AFMC Acquisition & Sustainment Toolkit (ASTK), and the OSD SEP Preparation Guide.
- b. Published / distributed an HSI Requirements Pocket Guide.
- c. Published / distributed a three volume set of HSI in Acquisition Guides.
- d. Completed an AFSO 21 HSI Implementation Workshop and drafted an AFMC HSI Implementation Plan for Command coordination.
- e. Developed a process to support endorsement / assessment process for AF HSI to support the Air Force Requirements Oversight Council (AFROC), the Defense Acquisition Board (DAB) the Air Force Review Board (AFRB), and the milestone review process.
- f. Funded / developed an integrated assessment tool that will provide for collection and display of HSI metrics as they relate to programmatic risk for use by multiple stakeholders.
- g. Integrated HSI participation on High Performance Teams (HPTs) writing JCIDS documents and in reviewing and commenting on all AF and Joint requirements documents.
- h. Maintained senior HAF support to transition the AFHSIO to SAF/AQ.
- i. Trained and deployed HSI analysts to five MAJCOMs to support HSI implementation.
- j. Developed education / training course materials for multiple Defense Acquisition University (DAU) and Air Force Institute of Technology

(AFIT) courses. Gained recognition / acceptance for more inclusions in the near future.

- k. Collaborated with the Joint community in developing core competencies to support subsequent education and training development.
- l. Continued support to Joint HSI Steering Committee and Working Groups and team / sub group leadership on Defense Safety Oversight Council (DSOC) HSI task force.
- m. Maintained collaborative participation with presentations at National Defense Industrial Association (NDIA), Human Factors and Ergonomics Society (HFES), International Council on Systems Engineering (INCOSE), Human Factors Engineering (HFE) Technical Advisory Group (TAG), Aerospace Medical Association (ASMA), and other professional forums.
- n. Increased awareness across numerous AF organizations to include: AF / TE, AF/ A3/5, AF/A2, AF/A9, AF/SG, ACC, AETC, AFMC, AFSOC, AFSPC, and AMC.
- o. Developed review / assessment process to support AFROC and AFRB. AFHSIO Director attends AFROC as an official advisor.
- p. Supported Joint HSI demonstration / display in Pentagon to showcase HSI success stories for Services leadership.
- q. Participated in the Joint Human Systems Integration Symposium (HSIS) and other HSI forums.

1.1.3. Remaining 2009 actionable items to be brought forward:

- a. Continued support for Line of the Air Force (LAF) POM transition.
- b. Support for AFMC implementation plan finalization / initiation.
- c. Completion and testing of assessment template / supporting tools.
- d. Deployment of HSI education and training courses to support HSI implementation.

Table 1.0. Synopsis of Progress Against the FY09 AF HSI Management Plan

Synopsis of Progress Against AF FY09 HSI Management Plan		
AFHSIO Key Tasks	ECD	Status
Air Force HSI Implementation Workshop	FY09-2	Complete
Comprehensive Education and Training Project	FY09-4	Ongoing / in FY10-11 Plan
HSI Assessment and Accountability Processes/Tools	FY09-4	Ongoing / in FY10-11 Plan
HSI Professional Development	FY09-4	Complete / Annual Need
Capability Assessments and Requirements	FY09-1	Complete
Joint and AF HSI Strategy Refinement/ Development	FY09-2	Complete
Industry and Professional Outreach	FY09-3	Complete / Annual Need
Requirements Refinement and Inclusion	FY09-2	Complete
Update Systems Engineering Guidance / Templates	FY09-3	Complete / Annual Need
Tools and Processes Analyses & Recommendations	FY09-4	Ongoing / in FY10-11 Plan
Maintain Senior AF Leadership Support (Resources & Advocacy)	FY09-3	Complete / Annual Need
Begin Training HSI SMEs	FY09-4	Complete
Promote awareness of HSI across spectrum of Leaders, Users (MAJCOMs), Developers, Testers, and Sustainers.	FY09-3	Complete / Annual Need
Develop and Deploy AF HSI Website	FY09-3	Ongoing / in FY10-11 Plan
Conduct annual strategy review and update	FY09-4	Complete
Develop AF HSI Annual Report	FY09-4	Complete

1.2 Purpose

This plan outlines the current strategy and management plan concepts for Air Force HSI. The plan briefly details recent accomplishments and describes planned actions for FY11. It also describes challenges to fully implementing an Air Force HSI program and outlines solutions to meet these challenges.

1.3 Scope

The scope of this Management Plan includes policy, guidance, oversight and direction for Air Force HSI implementation, execution and sustainment as contained in formal Air Force publications (See Table 1.2). It outlines the various roles and responsibilities and a notional organizational construct under development. The plan addresses HSI functions and processes across the requirements/acquisition life cycle and the clear steps to

integrate these within the acquisition framework. It also provides an estimate of resource requirements for a comprehensive Air Force HSI program. It further addresses accountability, assessments, human capital development, and planned activities for the coming year along with detailed support plans.

1.4 Document Revision History

Table 1.1. Document Revision History

Version	Date	Description	Status
1.0	February 2009	United States Air Force Human Systems Integration Management Plan	Superseded
2.0	October 2010	United States Air Force Human Systems Integration Management Plan	Current

1.5 References

Table 1.2. References

Title	Doc. No.	Version	Date
Manual for the Operation of the Joint Capabilities Integration and Development System	JCIDS Manual (formerly CJCSM 3170.01C)	N/A	31 Jul 2009
Joint Capabilities Integration and Development System	CJCSI 3170.01G	Version G	1 Mar 2009
The Defense Acquisition System	DoDD 5000.1	N/A	12 May 2003
Operation of the Defense Acquisition System	DoDI 5000.02	N/A	2 Dec 2008
Capabilities-Based Requirements Development	AFI 10-601	N/A	12 Jul 2010
Capability-Based Planning	AFI 10-604	N/A	10 May 2006
Management of Air Force Training Systems,	AFI 36-2251	N/A	5 Jun 2009
Aerospace Medical Operations	AFI 48-101	N/A	19 Aug 2005
Acquisition and Sustainment Life Cycle Management (Policy)	AFPD 63-1/20-1	N/A	3 Apr 2009
Acquisition and Sustainment Life Cycle Management (Instruction)	AFI 63-101	N/A	17 Apr 2009

Life Cycle Systems Engineering	AFI 63-1201	N/A	23 Jul 2007
Capabilities-Based Test and Evaluation	AFI 99-103	N/A	26 Feb 2008
Report on Human-System Integration in Air Force Weapon Systems Development and Acquisition	AFSAB TR-04-04	Final	July 2004
Defense Acquisition Guidebook	DAG	N/A	December 2008
International Council on Systems Engineering Handbook	INCOSE-TP-2003-002-03.1	3.1	August 2007
National Defense Authorization Act (2008) – HSI Guidance / Tasking	Public Law 110-181 Section 231	N/A	28 Jan 2008
AF HSI Office Strategy	AFHSIO Strategy	N/A	December 2008
Air Force Human Systems Integration Handbook	AF HSI Handbook	N/A	September 2008
Air Force Human Systems Integration Requirements	AF HSI Requirements Pocket Guide, DTIC Report ADA517632	Version 1.0	1 Sep 2009
HSI Memorandum of Agreement (AFHSIO & 711 HPW)	HSI MOA	N/A	December 2008
Human Factors Considerations in Migration of Unmanned Aircraft System Operator Control	UAS Report	N/A	February 2006
Integrated Logistics Assessment Handbook	Integrated Logistics Assessment Handbook	Version 1.0	January 2006
USAF UAV Mishap Epidemiology (1997-2003)	UAV Report / Presentation	N/A	2004 / May 23-25 2004
Human Systems Integration in Acquisition, Management Guide	DTIC Report ADA519018	Version 1.0	1 Aug 2009
Human Systems Integration in Acquisition HSI Domain Guide	DTIC Report ADA519020	Version 1.0	1 Aug 2009
Human Systems Integration in Acquisition, Acquisition Phase Guide	DTIC Report ADA519019	Version 1.0	1 Aug 2009

2.0 Air Force HSI Organization and Responsibilities

2.1 Executive Level

A Board of Advisors (BOA) was chartered and established with membership from HAF organizations to advise the HAF with regard to Air Force HSI. This BOA was established by the VCSAF to address long-term HSI resources, organizational and integration requirements needed to support a more effective mission, as outlined herein. The continuation of this BOA will be consistent with current Air Force policy and reviewed by SAF/AQ on a recurring basis.

The BOA will oversee and help implement and address actions and/or policy necessary to support the AF HSI program in the following general areas as needed:

- (1) Resources necessary for the efficient and effective execution of the HSI processes throughout the Air Force.
- (2) Organizational alignments, interfaces, and responsibilities between organizations and agencies with HSI functions, their respective headquarters, the Secretariat and Air Staff.
- (3) Integration of HSI into Air Force-wide research and development, requirements development, capabilities and acquisition processes; policies, instructions, and guidance for capabilities development, system acquisition, and sustainment of AF systems; enhanced training and testing programs; appropriate marketing strategies for diverse audiences.

2.2 Headquarters Air Force

In accordance with the CSAF memo signed in August 2007, the AFHSIO is responsible for providing the leadership focus for developing HSI policy, advocacy, and oversight. The AFHSIO is charged with authoring policy and guidance IAW AFI 33-360, *Publications and Forms Management*, to the various AF organizations. The AFHSIO has coordinated HSI-related policy and guidance with several HAF organizations, particularly SAF/AQX. A newly revised AFI 63-101, *Acquisition and Sustainment Life Cycle Management*, prescribes a number of HSI-related organizational roles and responsibilities.

2.2.1 AF Human Systems Integration Office (AFHSIO)

In accordance with AFI 63-101, the AFHSIO will:

- (1) Facilitate and advocate integration of HSI into the Integrated Life Cycle Management (ILCM) framework and AF policies and guidance to comprehensively implement, assess, and improve HSI.

- (2) Develop and deliver comprehensive HSI education and training, tools, technology and methods to support Program Executive Officers (PEO), Program Managers (PM), Systems Engineers, and others involved in requirements development, acquisition and sustainment.
- (3) Provide expert advice, real-time assistance, and implementation strategies.
- (4) Support the development, communication and implementation of HSI initiatives.
- (5) Oversee and advocate HSI focus in activities regarding systems integration, systems engineering, total system performance and total operating costs.

2.2.2 Air Force HSI Integrated Process Team (IPT)

The AF HSI IPT is established as a service level working group and corporate-level coordination body that crosses functional elements of the Air Force. The IPT supports the AF HSI BOA by reviewing and taking appropriate action on HSI-related issues and concerns. The creation of this IPT reflects the continuing need to ensure that HSI requirements and processes are effectively integrated and embedded throughout the Air Force's capability requirements, force development, modernization and acquisition processes. A continuous assessment by the IPT will help to identify HSI process improvement opportunities. Persistent attention will help ensure HSI requirements play an integral role in all related combat and materiel development efforts across the Air Force.

The composition of the AF HSI IPT includes primary and alternate representatives from the following organizations:

- (1) Undersecretary of the Air Force (SAF/US)
- (2) Assistant Secretary of the Air Force for Acquisition (SAF/AQ)
- (3) Assistant Secretary of the Air Force for Installations, Environment & Logistics (SAF/IE)
- (4) Assistant Secretary of the Air Force for Manpower & Reserve Affairs (SAF/MR)
- (5) Office of the Secretary of the Air Force, Chief of Warfighting Integration and Chief Information Office (SAF/XC)
- (6) Deputy Chief of Staff for Manpower, Personnel & Services (AF/A1)
- (7) Deputy Chief of Staff for Logistics, Installations & Mission Support (AF/A4/7)
- (8) Deputy Chief of Staff for Operations, Plans and Requirements (AF/A3/5)
- (9) Air Force Surgeon General (AF/SG)
- (10) Air Force Chief of Safety (AF/SE)
- (11) Air Force Test and Evaluation (AF/TE)

This IPT will help ensure a strategic framework is maintained for integrating the human throughout the capability and acquisition processes so that human issues continue to be fully considered as part of the total system in the development and/or acquisition of all systems and programs. This IPT will oversee and help implement and address actions and/or policy necessary to support the AFHSIO in the areas of resourcing and execution, organizational alignment, support for the HSI processes across the acquisition and sustainment life-cycle, and assist in prioritization of HSI support.

2.3 Requirements

Air Force Instruction for Capabilities Based Requirements Development (AFI 10-601) requires that Lead Commands, Field Operating Agencies (FOAs) and Direct Reporting Units (DRUs) “*ensure(s) that Air Force Human Systems Integration (HSI) concerns are addressed in all capabilities based development documents.*” To support the development of these capabilities documents, AFI 10-604 assigns to the MAJCOMs the responsibilities to “*author the AF CONOPS documents guiding Air Force operations, when designated as the CONOPS Sponsor; augment AF CONOPS with functional concepts to enhance both the Air Force Capabilities-Based Planning process and related MAJCOM planning processes; produce complementary planning products to enable Air Force-level planning activities; inform Joint capability planning and development activities to facilitate the timely delivery of relevant capabilities to the warfighter; and participate in the Air Force-level review of capabilities.*” This capability-based planning then drives the development and funding of all warfighter capabilities, inclusive of a sound HSI strategy, tailored activity set, and process to address human-centered concerns.

2.4 Science and Technology

The 711th Human Performance Wing (711 HPW) has been organized under the Air Force Research Laboratory (AFRL). The Wing pulls several organizations together to address “human centric” issues within the Air Force. The Human Effectiveness Directorate (711HPW/RH) can provide tools and technology to support HSI within the Air Force. The Wing’s Human Performance Integration Directorate (711 HPW/HP) is a center of expertise for HSI in the Air Force charged, in part, with developing process improvements to facilitate HSI considerations in transitioned technologies. The Air Force School of Aerospace Medicine (USAFSAM) also provides readily accessible expertise in many of the HSI domains to support the advancement and application of research, science, and technology pertaining to the human and HSI.

2.5 Acquisition

The responsibility for integrating HSI considerations into Air Force acquisition programs is assigned to the Air Force Service Acquisition Executive (SAE) for space and non-space programs. SAF/AQ may provide specific HSI-related program direction to Program Executive Officers, Designated Acquisition Officials, Program Managers, and

functional offices that execute or support Air Force acquisition programs. Additionally, AFHSIO may provide HSI-related assistance to Early Systems Engineering (ESE) and Development Planning (DP) efforts.

AFPD 63-1/20-1, *Acquisition and Sustainment Life Cycle Management (Policy)* implements DODI 5000.02 and expands existing AF policy regarding HSI within the Air Force systems engineering process. This policy requires Air Force program managers to have a plan for HSI that addresses all human-related domains across the life cycle of a system and is integrated with broader systems engineering implementation plans. AFI 63-101 further prescribes HSI-related management requirements and directs Air Force PMs to integrate manpower, personnel, training, human factors engineering, safety and occupational health, personnel survivability, environmental, and habitability considerations into the systems engineering process. It requires PMs to identify HSI-related responsibilities in the acquisition strategy, to describe technical and management approaches for meeting HSI requirements, and to define roles and responsibilities for the overlapping domains of safety and occupational health.

2.6 Test and Evaluation

Test and evaluation responsibilities within the Air Force are outlined in AFI 99-103 and are assigned to the Air Force Director of Test and Evaluation (AF/TE). AFMC has responsibility for Developmental Test and Evaluation. The Air Force Operational Test and Evaluation Center (AFOTEC) is the Operational Test Agency for the Air Force. The Air Force Flight Test Center (AFMC/AFFTC) and AFOTEC both have small cadres of HSI personnel to ensure HSI is properly addressed in the development of test strategies and test plans. Paragraph 4.5 outlines specific activities undertaken to strengthen the HSI and T&E relationship in 2009.

2.7 Sustainment

Per the revised AFI 63-101, a number of responsibilities for product support planning and sustainment of Air Force systems and equipment are assigned to SAF/IE and AF/A4/7. These organizations are responsible for ensuring HSI requirements are considered and executed as part of a given system's life cycle product support strategy and equipment sustainment plans. Given the important role these organizations will play in ensuring HSI requirements are executed during the operation and support phase, both of these organizations are members on the AF HSI IPT and BOA.

3.0 Air Force HSI in the Acquisition Life Cycle Process

3.1 Organization

As currently constituted, the formal Air Force HSI management and implementation structure consists of the AFHSIO reporting to SAF/AQ; and 711 HPW/HP reporting through AFRL to AFMC. In addition, HSI is currently supported by "HSI Cells" at five

MAJCOMs (ACC, AETC, AFSOC, AFMC and AMC). Each HSI cell is manned through a Special Program Authorization through the Pilot Physician Program and an AFHSIO-funded contractor equivalent; operational control is through the 711 HPW/HP Directorate. HSI components are also in place at AFOTEC/TSH, the HSI branch of the 773 Test Squadron at the Air Force Flight Test Center (773TS/ENFH), each of the AFMC product centers, and the AFSPC Space and Missile Center (SMC).

The formal Air Force HSI program will continue to mature and efforts are ongoing to better define working relationships, process models, and support mechanisms to ensure HSI is applied comprehensively across the life cycle of Air Force systems. Paragraph 6 of this plan outlines several key tasks for FY11 that will further strengthen the AF HSI process. The May 2009 Air Force HSI implementation workshop was an AFSO 21-sponsored event hosted jointly by AFHSIO and AFMC to bring the “Users” (MAJCOMS), “Developers” (AFMC & AFSPC), and “Testers” (AFOTEC, AFFTC, AEDC and AAC) together to recommend and implement an effective organization and supporting structures and processes for HSI. Outcomes / recommendations from this workshop have been distilled into an AFMC HSI Implementation Plan that is expected to comprehensively guide AFMC execution of HSI across the product, sustainment and test centers.

3.2 Policy and Guidance

With guidance from SAF/AQ and the HAF, the AFHSIO is continuously integrating HSI tenets into all relevant acquisition policies and guidance, as well as those that are specific to the domains of HSI (Manpower, Personnel, Training, Human Factors Engineering, Environment, Safety, Occupational Health, Survivability and Habitability). As an integrating process, HSI cuts across many organizations and communities and must be properly reflected in policy and guidance that is useful and pertinent to them. HSI policy and guidance has been inserted or updated within AFPD 63-1/20-1, AFI 63-101, and AFI 63-1201 (as well as other policies and guidance specified in paragraph 1.1.2.a). The AFHSIO joined with the Army and Navy HSI organizations to assist OUSD (P&R) in authoring specific policy and guidance for HSI in DoDI 5000.02 and Chapter 6 of the Defense Acquisition Guidebook (DAG). The AFHSIO also provided leadership in authoring an HSI appendix for the International Council on Systems Engineering (INCOSE) Handbook (INCOSE-TP-2003-002-3.1). Additional efforts continue in identifying integrating HSI concepts in other relevant policy and guidance documents.

3.3 Air Force HSI Strategy and Initiatives

AF HSI strives toward presenting a single, integrated voice for the human into requirements, acquisition and sustainment processes. Therefore, the AFHSIO is committed to process integration within existing policies and to execution with existing resources and processes wherever possible. The overarching strategy is captured below:

3.3.1 Vision

“Integrate Air Force personnel and technology to ensure total system performance to support Air Force missions at affordable life cycle costs.”

3.3.2 Mission

“Ensure all AF warfighting systems are designed, built, operated, and sustained in a manner that optimizes total systems performance at every warfighter level”

3.3.3 Purpose

“Permanent Air Force cultural & organizational changes – optimize & sustain total systems performance at every warfighter level.”

3.3.4 Objectives

The overarching goal of AF HSI is to optimize warfighter capabilities and sustain readiness. The four main objectives of the AFHSIO program are to:

- (1) **Integrate** Human Systems Integration (HSI) processes into the Integrated Acquisition, Technology and Logistics Life Cycle Management Framework to equip and sustain the warfighter (SAF/US),
- (2) **Institutionalize** HSI as the way of doing business to increase total systems performance and decrease total ownership costs,
- (3) **Sustain** HSI through collaboration with partners in OSD, AF, sister Services, industry and academia, and
- (4) **Improve** HSI processes through metrics, feedback, and lessons learned

3.3.4.1 Supporting Initiatives

The following initiatives support the four AF HSI strategic objectives. Specific supporting tasks for these initiatives are contained in Table 6.1.

- a. Maintain senior OSD and AF leadership support and advocacy for HSI through effective change management and through formal coordination, publication and promulgation of pertinent policy and guidance.
- b. Enable and direct development and maintenance of a comprehensive and effective education and training program / process for HSI.

- c. Enable and direct incorporation of HSI considerations in capabilities based planning.
- d. Develop HSI processes and tools, and coordinate with SAF/AQ to integrate them with systems engineering and product support processes and tools that are used during all phases of the defense acquisition framework and throughout the life cycle of a given system or product.
- e. Support and facilitate comprehensive implementation of the HSI process across AFMC.
- f. Require and guide the inclusion of HSI planning requirements in product Systems Engineering Plans (SEPs).
- g. Develop incentive strategies to ensure industry meets human systems requirements.
- h. Establish forums and processes to capture and communicate successes and lessons learned to improve AF HSI.
- i. Use continuous process improvement strategies to improve HSI across the enterprise.
- j. Maintain presence at specialty / professional meetings and industry days.
- k. Conduct an “HSI marketing campaign” to heighten awareness of HSI within and outside the Air Force.
- l. Recognize and reward HSI excellence.

3.4 HSI Execution and Support

3.4.1 Capability Based Planning and Requirements Development

The Air Force MAJCOMs, FOAs and DRUs are responsible for capability requirements generation to accomplish the Air Force mission. The AFHSIO and 711 HPW/HP have conducted numerous investigative projects in the past two years. These projects confirmed that no comprehensive process exists to ensure the human concerns are properly addressed during Capabilities Based Planning and Requirements Development. The AFHSIO and 711 HPW/HP will work directly with the HAF, the MAJCOMS, FOAs, DRUs, the AFMC Office of Aerospace Studies (OAS) and other shareholders to ensure these gaps are met and HSI concerns are properly and comprehensively addressed in these documents. Additionally, the AFHSIO will ensure that support is prioritized and provided to High Performance Teams (HPTs) and other IPTs developing and integrating requirements throughout the Integrated Life Cycle Management (ILCM) process.

3.4.1.1 Capability Based Analyses

The AFHSIO will work with the HAF, MAJCOMs and other Field Organizations to ensure that the human is comprehensively addressed in the development of CONOPS, Strategy and Doctrine and that Capability Based Assessments (CBA) and Capability Requirements and Risk Assessments (CRRA) are properly supported to facilitate HSI inclusion in all subsequent steps of the life cycle. The AFHSIO and 711 HPW/HP personnel have been trained by AFMC/OAS to support the CBA and Analysis of Alternatives (AoA) processes. For example, the AFHSIO and 711 HPW personnel are engaged with ACC and NAVAIR to support a JSTARS Mission Area AoA. Additionally, AFHSIO provided inputs to many CBAs including: Combating Weapons of Mass Destruction; Threat Reduction (TR); Electronic Warfare (EW); Information Transport; Maritime Domain Awareness; Combat Airman Initiative; Medical Sensor; and National Geospatial Intelligence.

3.4.1.2 Capabilities Based Requirements

Air Force requirements guidance (AFI 10-601) support the inclusion of HSI. The AFHSIO and 711 HPW/HP continue to work closely with the MAJCOMs and the Directorate of Operational Capability Requirements (AF/A5R) to provide support for each program in the requirements process. The AFHSIO attends selected Requirements Strategy Reviews (RSR) and participates as a core or support member on HPTs as they prepare requirements documents. Additionally, The AFHSIO has been granted Advisor status at the Air Force Requirements Oversight Council (AFROC) supporting the Joint Requirements Oversight Council (JROC). This role has been included in the recently approved AFROC Charter dated 20 May 2010.

3.4.1.3 Recent Efforts in Capability Based Planning and Requirements Development

The AFHSIO and 711 HPW/HP staff members are now invited to participate in HPTs as support team members. A “Tiger Team” was established to author and validate requirements language applicable to a wide number and type of systems to facilitate HSI improvements for the warfighter. The team results were used by the AFHSIO to develop and publish the HSI Requirements Pocket Guide that has been cleared for public release. This guide is now used by Air Force requirements writers in HPTs, by the Office of Aerospace Studies in AoAs, and across the Joint Services.

The AFHSIO provided inputs to various HAF offices to support policy and guidance development to strengthen requirements and acquisition interfaces. A “lessons learned” project was completed to survey HSI domain owners and Subject Matter Experts (SMEs) to identify gaps and strengthen the HSI processes. A “MAJCOM’s Top 3” project was likewise completed to identify HSI shortfalls as perceived by the operational MAJCOMs. Both of these projects highlighted three areas of concern: 1) the need to strengthen the

requirements for HSI within all capability requirements; 2) lack of specific, focused HSI policy, instructions and guidance; and 3) lack of resources.

To address the MAJCOM's #1 concern, the entire HSI community focused efforts on improving inputs to JCIDS documents as they progress through the requirements process. All HSI personnel who may be involved in requirements development have been trained by a contractor requirements expert, and certified by DAU in the Requirements Management Certification Training (RMCT) program, which is mandated by Congress. Most have also completed AFIT REQ 111.

Analysts from the AFHSIO, 711 HPW/HPO, and MAJCOM HSI cells now participate in development of the analysis products (CBAs and AoAs) and in the HPT process. They also provide comments as Air Force and sister-service JCIDS documents proceed through HAF and MAJCOM staffing.

In the last 18 months, the HSI community has participated in several AoAs, over 30 HPTs, and made comments on over 220 JCIDS programs with a >97% accept rate. This translates into meaningful impacts across all platforms and programs to improve the requirements across all domains, increase total system performance, effect system integration, and reduce total ownership costs.

3.4.2 Acquisition Support

Program Managers are ultimately responsible for implementation and execution of HSI within each program. AFMC and its subordinate units are responsible for organizing, training and equipping the acquisition workforce to perform HSI. In order to support this, 711 HPW/HP was established as the organizational focal point for HSI support within AFMC and to provide expertise to other customers and processes. The AFHSIO and 711 HPW/HP work closely together to ensure comprehensive development and deployment of HSI tools, technology, education and training, and supporting processes to facilitate HSI execution in all systems acquisitions; with the ultimate goal of improving systems effectiveness, designing systems better for operators and maintainers, and reducing life cycle costs.

3.4.2.1 Technology Development

The AFRL's Human Effectiveness Directorate is a key component of the 711th Human Performance Wing. The directorate is composed of a diverse group of scientists and engineers developing technologies specific to the human element of warfighting capability. AFRL and 711 HPW experts will work closely with the HAF, the MAJCOMs and the AFHSIO to develop and sustain a comprehensive portfolio of human-centric research and technology, with AFRL providing SME consultation as needed to ensure a continuous linkage between operational warfighter needs and relevant technology research and development. AFRL also provides support to assess and assist technology

maturity development in various Air Force programs and help to support HSI improvements.

3.4.2.2 Systems Design and Development

HSI is included as a vital process within systems engineering. HSI is most effective when applied early in systems engineering and development planning. Newly published acquisition and sustainment enterprise policies and instructions incorporate HSI language. The Air Force guidance for Life Cycle Systems Engineering (AFI 63-1201) contains an attachment for HSI. This instruction requires that programs *“Implement robust HSI and System Security Engineering (SSE) processes as part of the overall Systems Engineering (SE) effort.”* It also requires that within this implementation, that HSI *“... must be addressed throughout the life cycle, and must be consistently integrated into SE implementation to balance total system performance (hardware, software, and human), OSS&E assurance, survivability, safety, and affordability.”* The AFHSIO and 711 HPW/HP will work with the programs to ensure the development of appropriate plans and structure that includes and facilitates execution of HSI within systems engineering. The OSD Systems Engineering Preparation Guide (addendum 2) now includes HSI as a requirement for inclusion in all acquisition phases. HSI principles are also included in the AFMC Development Planning Guide and AF Concept Characterization and Technical Description (CCTD) Guide.

3.4.2.3 Recent Efforts in Acquisition Support

A Memorandum of Agreement (MOA) between the AFHSIO and 711 HPW/HP defines respective roles and responsibilities for accomplishing Air Force HSI. The Air Force HSI workshop conducted in May 2009 brought together users, developers and testers to define the execution model, processes and organizational structure to move HSI forward within the Air Force. Representatives from the HAF, Operational MAJCOMs, AFMC, Test Centers, and other organizations built a plan that included 18 actionable initiatives used to develop an AFMC HSI Implementation Plan that is in final coordination for deployment across the AF Acquisition enterprise. This Management Plan is coordinated / consistent with the AFMC Plan and will be used to guide its execution. HSI support continues or has been started for many AF and Joint programs including the following: Aircrew Laser Eye Protection (ALEP) Block 2, Integrated Aircrew Ensemble (IAE), Battlefield Air Operations – Human-Machine Interface (BAO-HMI) Kit (Increment I), Modular Aircrew Helmet (MACH), Aircrew Helmet Noise Reduction (AHNR), MQ-1 Predator UAS, MQ-9 Reaper UAS, Aeromedical Evacuation Electronic Health Records, Joint Nuclear Biological, Chemical Reconnaissance System, Advanced Pilot Training, KC-135 Aircraft Extension Program, Presidential Aircraft Recapitalization, KC-X, F-35, F-22, JSTARs, Small Diameter Bomb (SDB), Common Vertical Lift Support Platform (CVLSP), Minuteman Upgrade, Global Hawk, F-16 Nuclear Preflight Controller Interface, Basic Expeditionary Airfield Resources (BEAR), Joint Space Operations Center (JSpOC), Joint Service Aircrew Mask (JSAM), C-130 AMP, C-5M Upgrades, Aircrew Noise Reduction Initiatives, Joint Counter Radio-Controlled Electronic IED

Warfare, and Mode 5 IFF Standard Control Panel. Systems Engineering Plans (SEP) written for Air Force programs are being reviewed for adequacy of HSI. SEP content modification recommendations have been made and continue to be made to clarify and resolve HSI concerns within the Air Force Acquisition processes.

3.5 Test and Evaluation

HSI is considered before testing begins and throughout test execution. A small cadre of HSI expertise resides in the development test community at the test centers as well as in the operational test community at AFOTEC, to ensure adequate HSI considerations are made in the various test and evaluation (T&E) planning documents and in conducting all mandated / required testing. As HSI processes mature within the Air Force, additional resources may be required to better support the test community. The AF HSI Implementation Workshop and the 2010 HSI / T&E workshops both provided opportunities to examine these potential requirements. The T&E Workshop was designed to specifically inform and link the HSI and T&E communities to explore common challenges, opportunities and initiatives. Recommendations from this workshop are summarized below:

- (1) Improve operational analyses and requirements for HSI – to specifically ensure front-end analyses adequately identify human requirements, limitations and performance issues for test planning – identifying relevant critical operational issues and human performance criteria.
- (2) Improve engineering, management and user awareness of HSI. Specifically, improve HSI specifications, standards and data item descriptions used during design and identify the relevant issues for evaluation with proper measures of effectiveness, performance and suitability.
- (3) Assist the T&E Community with HSI awareness. Specifically, provide trained personnel to assist testers with technical planning for test, provide guidance to the T&E Community, help develop and improve criteria and measurements for HSI applications.
- (4) Improve the capability to evaluate HSI in T&E. Specifically, promote coordination across Joint programs for HSI, help standardize T&E techniques, identify lessons learned relevant to HSI and test, and improve measurement methods and tools.
- (5) Strengthen HSI within the Test and Evaluation Strategy (TES) and the Test and Evaluation Master Plan (TEMP). Specifically, develop template(s) for both the TES and TEMP to guide tailoring of HSI in test planning; strengthen collaboration between the HSI and Test practitioners through the Center Test Authorities (CTAs), and strengthen the verification of HSI relevant requirements in DT&E.

These recommendations are being formalized through policy and guidance to strengthen HSI within the T&E process and the AFHSIO continues to work closely with AF/TE and the test units to ensure pertinent policies and instructions and test planning documents are inclusive of HSI.

3.6 Deployment, Operations and Sustainment

The AFHSIO, in conjunction with the users, program managers, and other stakeholders, will track HSI issues for each system. This will be done primarily through review of deficiency reports, hazard analyses, accident reports, and other products to capture concerns, recommendations, lessons learned and successes. Existing systems, methods and databases will be used to the maximum extent possible. The resulting products will be used to build case studies, improve new requirements, and to support modifications to both materiel and non-materiel solution sets. The AFHSIO and 711th HPW practitioners work closely with MAJCOM HSI teams to ensure Directed Change Requests (DCRs) are inclusive of HSI considerations.

4.0 Air Force HSI Process Integration

4.1 Joint

A Joint HSI Steering Committee at the OUSD(AT&L) level and a Joint HSI Working Group at the Service level, are in place and meeting on a regular basis. The Air Force will continue to actively support and participate in these groups. Of significant importance is the need for improvement of processes and joint development of education, training, tools, technology and systems. In addition to these two groups, the Defense Safety Oversight Council (DSOC) recently added a HSI Task Force. This task force has representation from all three Services and two sub-groups. The AFHSIO provides a representative to this task force and the AFHSIO representative previously chaired the Human Performance Sub Group.

4.2 Headquarters Air Force

The Air Force continues its support of an HSI BoA at the General Officer / SES level and an HSI IPT at the Colonel/GS-15 level to integrate the HAF in support of HSI and the integration of the various domains and processes. These groups will provide the forum to keep the staffs informed and working together to deliver a well coordinated program.

4.3 MAJCOMs (Users)

The Air Force plan for HSI execution includes a small HSI cadre or “cell” at five MAJCOMs to integrate the functional staffs, ensuring human concerns are properly addressed in planning, requirements, and support for systems development, acquisition, test, deployment and sustainment. MAJCOM HSI personnel will be primarily supported

by 711 HPW/HP which serves as a consultation resource and center of expertise. A Human Weapon System Capability Gap Analysis (CAPGAP, AFI 48-101) program provides a method of field assessments for fielded systems and the feedback for improving existing and future systems. The 711 HPW/HP will act as a hub for connecting MAJCOM cells with domain owners and with other AFMC resources to execute HSI in research, development, acquisition, test, and evaluation phases of the life cycle. In conjunction with 711 HPW/HP, the AFHSIO funded and deployed HSI analysts to five of the MAJCOMs (ACC, AMC, AFSOC, AETC, and AFMC) to support these HSI cells. They have made significant contributions to capabilities requirements documents and other analyses – supporting HPTs and JCIDS document reviews. They work closely with the MAJCOM staffs to develop MAJCOM-specific HSI plans to support the AF HSI management plan. As the HSI process matures, a similar arrangement may be developed at the various FOAs and DRUs.

4.4 Developers

711 HPW/HP and AFMC will develop and support sustainable HSI processes to support Air Force programs, with priority to be given to ACAT I, high visibility, and new joint programs. 711 HPW/HP chairs an Air Force HSI Working Group made up of HSI functional representatives from all product, test and sustainment centers, and HSI reps from the MAJCOMs. The new Air Force enterprise instruction for acquisition and sustainment (AFI 63-101) includes specific responsibilities for HSI. In order to accomplish these responsibilities, the AFHSIO will work closely with other stakeholders and shareholders to develop implementing instructions and working agreements / relationships. The AFMC HSI Implementation Plan is expected to guide HSI execution across AFMC and all its Centers as they support the various AF programs. The AFMC Development Planning Guide also contains instruction on how to address HSI issues early in development planning process.

4.5 Test and Evaluation

Developmental and Operational Test communities are both represented at the Air Force HSI Working Group. They recently participated in developing measurable and testable requirements language for HSI considerations in future programs. A joint HSI / TE workshop brought HSI and T&E practitioners to help the two communities identify opportunities to strengthen their relationships and to better understand their respective processes. The results of this workshop are presented in paragraph 3.5 and are being used to guide HSI engagement with Center Test Authorities and participation on Integrated Test Teams (ITT). Each of the test groups will be consulted on a regular basis and the overarching test and evaluation policies and instructions will be inclusive of HSI. As a supporting function to the test community, the AFHSIO and 711 HPW/HP will ensure that all HSI requirements are both measurable and testable.

4.6 Sustainment

SAF/AQ recently revised the overarching acquisition and sustainment program management policy documents to reflect HSI considerations that must be addressed during the operations and sustainment phase. The AFHSIO participated in the revision of these documents, and will remain actively involved as these policies are revised in the future. A number of AF product support and sustainment-related policy directives and instructions are to be revised in the near-future, and the AFHSIO will participate in these policy revision efforts to ensure HSI requirements are incorporated where appropriate.

5.0 Air Force HSI Human Capital Development

As HSI is institutionalized within the Air Force, a comprehensive plan for professional education and training will be formalized for existing and future systems engineers and HSI practitioners who will be responsible for the human element across the system life cycle. For successful implementation of HSI, HSI-trained systems engineers and/or HSI functional practitioners will be needed at MAJCOM capability planning and requirements development offices, and throughout all levels of the AF acquisition and sustainment enterprise, particularly acquisition and sustainment program management offices. The AFHSIO supports SAF/AQX in this effort.

5.1 Background

The AFHSIO has worked closely with SAF/AQR and the Joint HSI community to evaluate existing and planned HSI courses and determine future requirements for Acquisition Corps personnel. Through an Education and Training Baseline Task and a planned comprehensive Education and Training Project, the AFHSIO is working with OSD and the other Services to develop an education and training program for HSI. Notional training plans have been developed with several courses now deployed and others in development.

5.2 Human Capital Development Philosophy

To support the deployment of capable HSI practitioners, the Air Force will concentrate on the education and training of selected personnel at each location or node in the organizations that play key roles in the acquisition and sustainment life cycle. The goal is to develop the appropriate level of HSI practitioners and experts across a number of categories of personnel to support different organizations in contributing to the development and sustainment of Air Force systems. Within the Defense Acquisition Workforce, the categories or career fields initially identified include: Systems Planning, Research, Development and Engineering (SPRDE); Life Cycle Logistics; Test and Evaluation; and Program Management. Education and training in HSI will also include domain specific training and be tailored to the target audience based on the level of expertise demanded and the skill sets required for the positions and career tracks that trainees are intended to fill.

In order to efficiently support development of the different career fields and skill levels within each, the Air Force is working with the other Services through the Joint HSI Working Group to continually identify essential HSI additions to existing Defense Acquisition University courses taken within certification standards and Core Plus courses. A DAU Continuous Learning Module for *Awareness of HSI* was deployed in June 2010 (CLE 062).

5.3 Education and Training Requirements

Examination of job descriptions for those responsible for the human element in systems acquisition identified several tiers of knowledge necessary to execute HSI. HSI awareness training is appropriate for the greater number of acquisition professionals and many HSI participants across other Air Force communities (e.g., MAJCOMs, HAF, Test, Sustainment, etc.).

In addition to HSI awareness training, Program Managers in a System Program Office should receive training on management-level HSI. Chief Engineers or Chief Systems Engineers in a Program Office are responsible for the integration of HSI across the acquisition life cycle and should receive appropriate training.

Medical professionals (e.g., physicians, physiologists, bioenvironmental engineers, etc.) constitute another career category that will contribute to systems' acquisition as they bring human performance concerns to the table. These career professionals will also require HSI training, perhaps in a set of courses tailored to their unique backgrounds.

The final classification identified for professional education, development and training is the HSI SME. These individuals will have differing levels of knowledge in one or more of the HSI domains. An HSI SME will require a wide range of knowledge and skills in all nine domains, as well as knowledge of domain tools, modeling, simulation and tradeoffs. At this time, the four-course HSI certificate program at the Naval Postgraduate School is the single best compilation of HSI education in either a military or commercial education institution to prepare this HSI SME group.

In order to reach as many acquisition professionals as possible, the AFHSIO and DAU identified a number of courses where HSI content is currently resident and / or where it is appropriate to add or update content. These courses include ACQ 101, SYS 101, SYS 202, TST 102, LOG 101, and LOG 200. The AFHSIO is supporting reviews and updates to these courses and is authoring an HSI case study of the F-22 for inclusion into PMT 401, the Program Manager's Course.

Three new courses are in development and programming with AFIT's School of Logistics (AFIT/LS). These include SYS 160, an Introduction to HSI; SYS 261, an asynchronous course which focuses on HSI in the Requirements Process, and SYS 260 which will be a 2.5-day classroom course providing an in-depth education into the inputs

and outputs, activities and products for HSI and supporting human-centered domains across the acquisition life cycle. SYS 260 intends to use two HSI case studies based on the Predator and C-17 systems. SYS 260 will also use a game-based exercise that will demonstrate the interdependencies of the HSI domain tradeoffs and their outcomes on system performance and total ownership costs. (NOTE: specific course numbers may change before fielding).

6.0 Air Force HSI FY10-11 Key Tasks

The AFHSIO Strategic Plan outlines four objectives for the effective and measurable inclusion of human systems integration in the integrated framework, across the entire life cycle of the system. These objectives are (1) **integrate** HSI into requirements and the acquisition framework, (2) **institutionalize** HSI within the Air Force culture and business model, (3) **sustain** HSI efforts within the Air Force, and (4) **improve** HSI through metrics, lessons learned programs, and other feedback mechanisms.

6.1 Overarching tasks

The AFHSIO has a number of tasks currently underway that support all four Strategic Plan objectives with the following strategic aims: (1) assist Combatant Commanders, Air Force leadership and Support Commands in determining how best to implement OSD and Air Force guidance to more effectively support programs and acquisition products throughout the life cycle; (2) create an Air Force-wide assessment and accountability process for HSI verification and validation; (3) ensure personnel are trained and deployed to support HSI within analyses, requirements, acquisition, sustainment, and education and training processes; and (4) maintain and enhance AF HSI professionalism, consistency, functional area connectivity, and create a Joint HSI professional venue for participating organizations.

The AFHSIO and the strategic objectives it supports are shown in Table 6.1. AFHSIO below:

Table 6.1. AFHSIO FY10-11 Key Tasks

Task #	HSI Objectives Supported	FY10-11 Key Tasks	ECD
1	Sustain	Maintain Senior AF Leadership Support (Resources & Advocacy)	Ongoing
2	All	Recruit & Train new AFHSIO Leadership / Staff (DHP & LAF Resources)	FY11-2
	All	Shepherd Implementation Plan Activation /	FY11-2

		Resourcing of HSI at AFMC	
	All	Facilitate movement / reconstitution of 711th HPW/HP at WPAFB	FY11-4
	Integrate / Sustain	Advise new AFMC engineering “home offices” to include support for HSI	FY11-2
	Integrate / Sustain	Promote awareness of HSI across the spectrum of Leaders, Users (MAJCOMs), Developers, Testers, and Sustainers	Ongoing
3	All	Develop HSI Assessment and Accountability Processes/Tools – Finalize	FY11-1
4	All	Support / Lead HSI Professional Development	FY11-4
5	Integrate / Institutionalize	Improve / continue Capability Assessments and Requirements Support	Ongoing
6	Integrate	Continue Joint and AF HSI Strategy Refinement / Development	Ongoing
7	Integrate	Conduct Industry and Professional Outreach	Ongoing
8	All	Education and Training Course Deployment	FY11-4
9	Institutionalize	Update Systems Engineering Guidance / Templates for AF and OSD	Ongoing
10	Institutionalize	Develop improved tools and processes for HSI	Ongoing
11	Integrate / Sustain	Leverage BOA, IPT and WG for wider deployment of HSI and efficient use of resources	Ongoing
	All	Identify HSI POCs for every Center, PEO and Program	Ongoing
12	Sustain	Advocate and implement development of HSI IPTs and WGs at MAJCOMs, PEOs, Centers, and Programs	FY11-2
13	Sustain	Begin Training HSI SMEs	FY11-1
	Improve	Baseline existing HSI in all AF Programs -	FY11-4

		Identify programs for HSI support prioritization / deploy support	
	Improve	Utilize and update lessons learned and deficiencies reports for HSI application	FY11-4
15	Improve	Develop and Deploy AF HSI Website	Done
16	Improve	Conduct annual strategy review and update	FY11-4
17	Improve	Develop AF HSI Annual Report	FY11-4

7.0 Air Force HSI Resource Requirements

Efforts are underway in the Air Force to identify existing expertise and quantify additional resource requirements to execute a comprehensive HSI program. Adequate sustained financial and manpower resources are essential to continued progress and success. The Air Force will develop resource requirements and program the resources necessary to ensure HSI consultation and program support tools and technology development, studies and analyses, education and training development and deployment, and other support functions for HSI management, oversight, implementation and execution are accomplished. Current resource constraints make this especially challenging.

As of October 2010, the AFHSIO is now staffed and operating with eight HSI personnel. There are currently 31 personnel in 711 HPW/HP dedicated to working Human Performance and Human Systems Integration. This organization will be the AFMC center of expertise for the human. This organization currently has components at Wright Patterson AFB, Ohio and Brooks City Base in San Antonio, TX. All components of 711 HPW/HP will be located at Wright-Patterson AFB at the beginning of FY12 as a result of the BRAC closure of Brooks City-Base. Some additional manpower and personnel resources exist within the various HAF organizations, at the MAJCOM staffs, at AFMC product, test and logistics centers, and within the various program offices. These resources are generally working in HSI domain specific areas (Manpower, Personnel, Training, Environment, Safety, Occupational Health, Human Factors Engineering, Survivability, and Habitability). They can be aligned with the emerging HSI process to accomplish HSI in an integrated manner.

8.0 Air Force HSI Maturity Metrics

The Air Force HSI program is in the formative process. Since its inception great strides have been made to define meaningful metrics for the program. Performance metrics for HSI will be developed to correlate between HSI activities and their contribution to achieving or exceeding total mission performance or on total life cycle cost savings of a

system. HSI metrics must be derived from existing data collection sources, but the collection and reporting of these metrics are constrained by certain assumptions:

8.1 HSI Metrics Assumptions:

8.1.1 Use existing databases and metrics to extent possible (SE and program/system metrics).

8.1.2 Define HSI activities across system life cycle, measuring level of effort and cost.

8.1.3 Trace and measure an HSI “thread” through acquisition lifecycle; human-centered requirement traceable from analysis phase through to system disposal.

8.1.4 Express the correlation between HSI activities and mission performance, as well as total life cycle cost (total ownership cost).

8.1.5 Determine if HSI is being done as described in the policy and guidance documents.

9.0 Air Force HSI Assessment Process

The AFHSIO and 711 HPW/HP concentrated their first three years efforts on defining policy, instructions and processes to implement a comprehensive and sustainable AF HSI program. An assessment process for HSI is vitally important in the accomplishment of this objective and is now in the final stages of development. The 2009 Implementation Workshop helped inform this process and AFHSIO funded the development of a formal “Status Board” tool to account for and assess all Air Force programs. The development of this assessment process included review and evaluation of existing AF and Joint databases and processes. The intent is to develop and field a system interoperable with existing acquisition databases and could import key information that was already being collected. The tool / process will be tested in support of upcoming Program Support Reviews (PSRs) in support of SAF/AQ. Prior assessments have been focused on evaluating new requirements documents, systems engineering plans, policies and instructions for inclusion of HSI or HSI domain-specific language. Additional work has been done in building case studies and in conducting reviews of education and training courses, tools and technology and existing acquisition processes for HSI relevance and opportunities for improvement. Results from these efforts were used to support the Air Force AFSO 21 Air Force HSI Implementation Workshop and are now reflected in the AFMC HSI Implementation Plan. From a conceptual standpoint, this assessment process will be an ongoing process which occurs in the normal course of doing business in support of milestone decisions. Routine reviews of programs within the existing requirements, acquisition, engineering, test and sustainment processes should reveal the adequacy of the HSI efforts. HSI practitioners should be assisting and assessing on a continual basis and providing inputs and recommendations to reduce human risks and improve both the systems and the processes. Formal reporting should be through the already established reviews with seamless inclusion of HSI where appropriate.

10.0 Air Force Supporting Detailed Plans (available upon request)

- 10.1 The AFHSIO Strategy & Operations Plan
- 10.2 Joint HSI Steering Committee and Working Group charters
- 10.3 AF IPT and BOA charters
- 10.4 Draft AFMC Implementation Plan
- 10.5 MOA between 711 HPW and the AFHSIO

ACRONYMS

Appendix 1. Acronyms

AAC	Air Armament Center
ACAT	Acquisition Category
AEDC	Arnold Engineering Development Center
AF	Air Force
A1	Deputy Chief of Staff, Manpower, Personnel & Services
A3/5	Deputy Chief of Staff, Operations, Plans and Requirements
A4/7	Deputy Chief of Staff, Logistics, Installations & Mission Support
AF/A5R	Directorate of Operational Capability Requirements
AFFTC	Air Force Flight Test Center
AFIT	Air Force Institute of Technology
AFMC	Air Force Materiel Command
AFOTEC	Air Force Operational Test and Evaluation Center
AFPD	Air Force Policy Directive
AFRB	Air Force Review Board
AFRL	Air Force Research Laboratory
AFROC	Air Force Requirements Oversight Council
AFSAB	Air Force Scientific Advisory Board
AFSC	Air Force Safety Center
AF/SE	Air Force Chief of Safety

AF/SG	Air Force Surgeon General
AF/TE	Air Force Test and Evaluation
ALEP	Aircrew Laser Eye Protection
AoA	Analysis of Alternatives
APT	Advanced Pilot Trainer
BAO	Battlefield Air Operations
BOA	Board of Advisors
BRAC	Base Realignment and Closure
CAPGAP	Capability Gap
CBA	Capability Based Assessment
CBP	Capability Based Planning
CCD	Concept Capability Document
CDD	Capability Development Document
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CJCSM	Chairman of the Joint Chiefs of Staff Manual
CLM	Continuous Learning Module
CMMI	Capability Maturity Measurement Index
CONOPs	Concept of Operations
CORONA	Air Force 4-Star General Meeting
CPD	Capability Production Document
CRRA	Capability Review and Risk Assessment
CSAF	Air Force Chief of Staff

CSE	Center for Systems Engineering
DAB	Defense Acquisition Board
DAG	Defense Acquisition Guidebook
DAU	Defense Acquisition University
DCR	DOTMLPF Change Recommendation
DOD	Department of Defense
DODD	Department of Defense Directive
DODI	Department of Defense Instruction
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership and Education,
E&T	Education and Training
HASC	House Armed Services Committee
HPT	High Performance Team
HPW	Human Performance Wing
HSI	Human Systems Integration
HSIP	Human Systems Integration Plan
IAC	Information Analysis Center
IAT&L	Integrated Acquisition, Technology and Logistics
ICD	Initial Capabilities Document
IED	Improvised Explosive Device
IPT	Integrated Process (or Product) Team
ILCM	Integrated Life Cycle Management
ILCMP	Integrated Life Cycle Management Plan

INCOSE	International Council on Systems Engineering
JCIDS	Joint Capabilities Integration Development System
JROC	Joint Requirements Oversight Council
MAJCOM	Major Command
LAF	Line of the Air Force
MPT	Manpower, Personnel and Training
NDAA	National Defense Authorization Act
OSD	Office of Secretary of Defense
OTA	Operational Test Agency
USD(AT&L)	Office of the Under Secretary of Defense for Acquisition, Technology and Logistics
OUSD(P&R)	Office of the Under Secretary of Defense for Personnel and Readiness
PE	Program Element
PEM	Program Element Monitor
PEO	Program Executive Officer
PM	Program Manager
POM	Program Objective Memorandum
PSR	Program Support Review
RPA	Remotely Piloted Aircraft
SECAF	Secretary of the Air Force
SAF/AQ	Assistant Secretary of the Air Force for Acquisition
SAF/IE	Assistant Secretary of the Air Force for Installations, Environment and Logistics

SAF/MR	Assistant Secretary of the Air Force for Manpower and Reserve Affairs
SAF/US	Under Secretary of the Air Force
SAF/CIO A6	Chief of Warfighting Integration & Chief Information Officer
SEP	Systems Engineering Plan
SME	Subject Matter Expert
SSE	System Security Engineering
S&T	Science and Technology
TR	Technical Report
T&E	Test and Evaluation
UAS	Unmanned Aerial System(s)
UAV	Unmanned Aerial Vehicle
USAFSAM	United States Air Force School of Aerospace Medicine
VCSAF	Air Force Vice Chief of Staff