

Human Systems Integration (HSI) Capabilities-Based Assessment and Acquisition Workforce Resources

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ARMY
human
systems
integration

Agenda

HSI Policy requirements and guidance

Evolution of HSI in the Defense Acquisition System

Capabilities-Based Assessment (CBA) Overview

Acquisition Workforce Resources

Take-Aways



HSI Statute and Policy

- **HASC recommendations FY2017 HASC Report (HR) 4909:**
 - *Continuing top-level HSI leadership* through existing committees, such as the Joint HSI Steering Committee (JHSISC) and Working Groups
 - *Provide a DOD HSI Standard practice* and update existing HSI-related MIL Standards
 - Incorporate additional *HSI learning content into DAU's systems engineering courseware*
 - Provide support to USD(A&S) to *strengthen HSI language in the revamped DOD 5000.02 (as a result of the Adaptive Acquisition Framework transformation of DOD policy)*
- **Public Law No: 116-92, SEC. 902, January 3, 2019:**

"The Secretary of Defense, acting through the Under Secretary of Defense for Acquisition and Sustainment, shall coordinate and **manage human systems integration activities throughout the acquisition programs** of the Department of Defense."
- **DODD 5000.01 Defense Acquisition System (DAS):**

"1.2.p. Human systems integration planning will begin in the early stages of the program life cycle. The goal will be to **optimize total system performance and total ownership costs**, while **ensuring that the system is designed**, operated, and maintained **consistent with mission requirements.**"

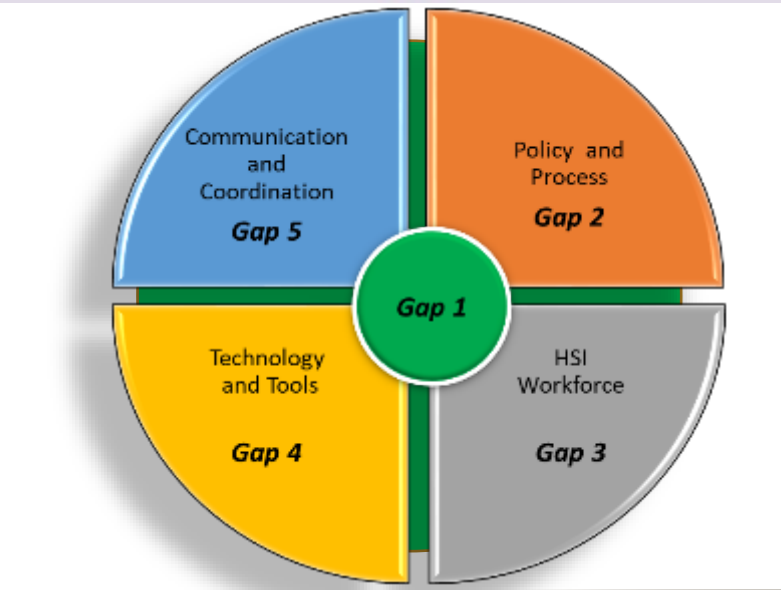
DoDD 5000.01, September 9, 2020

HSI Definition and Goals for Defense System Acquisition

- HSI: The **SE process** and **program management effort** that provides integrated and comprehensive analysis, design, and assessment of requirements, concepts, and resources for HFE, manpower, personnel, training, SOH, FP&S, and habitability.
- These domains are intimately and intricately interrelated and interdependent and must be among the primary drivers of effective, efficient, affordable, and safe system designs.
- HSI **integrates and facilitates trade-offs** among these domains, but does not replace individual domain activities, responsibilities, or reporting channels.
- Sec 3.1.a “The goal is to: (1) **Optimize** total system performance. (2) **Reduce** total ownership costs. (3) Ensure that the system is **designed** to be operated, maintained, and supported while providing users with the ability to effectively complete their mission(s).”
- HSI Impacts:
 - Total System Performance: The end state functionality achieved by a system when including the human with hardware and software components under its intended operational condition(s) to achieve required operational, effectiveness, and suitability, survivability, safety, and affordability.
 - User: Humans who will operate, maintain, train, and support the equipment, system, or facility. Includes “End user” as defined in DoDI 5000.87

Joint HSI Steering Committee

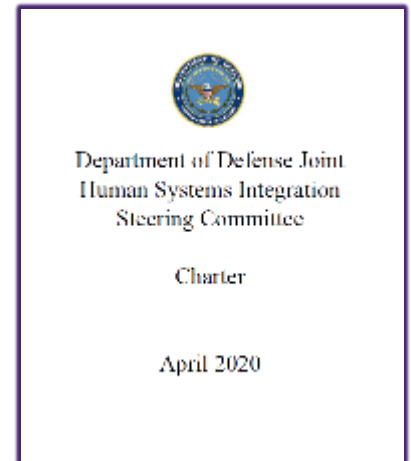
- OSD has **tri-chair** responsibilities in the JHSISC for providing leadership direction for the HSI enterprise across DOD
 - OUSD(R&E) Director, Systems Engineering and Architecture
 - OUSD(R&E)/DCTO(ST&T), Director, Human Systems Dir.
 - OUSD(P&R)/DASD(SOH) Director, Force Safety and Occupational Health
- The JHSISC guides accelerating the delivery of human-systems capabilities, scaling the Department-wide impact of HSI, and synchronizing DoD HSI activities
- The Joint HSI Steering Committee commissioned an HSI Gap Capabilities Based Assessment (CBA) Report in 2018 which identified five (5) lines of effort to enhance HSI maturity and effectiveness



JHSISC Charter Purpose

The JHSISC will serve as a leadership forum to improve the effectiveness and efficiency of the HSI discipline and accomplish these major goals and initiatives:

- **Provide strategic guidance** for development of Department HSI policy and practices;
- **Facilitate communication** between operators and system designers;
- Ensure operator-informed decision-making during the system design process for both software and hardware system components
- Promote the use of HSI to manage life-cycle costs and optimize system performance in military acquisitions;
- **Support HSI enterprise efforts** to implement the findings of the HSI Capabilities-Based Assessment (CBA);
- Request JHSIWG review Joint Staff and Component analyses and interpretations of mishap and combat data to recommend ways to mitigate significant hazards using human systems integration, as applicable;
- Monitor Joint Service HSI requirements and Service investments;
- Provide HSI recommendations to Department stakeholders on matters related to all HSI domains for research and weapon systems programs;
- **Prioritize and recommend HSI research and application** to have multi-Service impact on joint interest acquisition programs; and
- **Monitor and facilitate responses** to senior OSD, Congressional, and other high-level tasks concerning HSI program implementation/execution, successes/challenges, and opportunities for the future





HSI Policy Overview

HSI Policy Introduction – Background

Awareness – is key

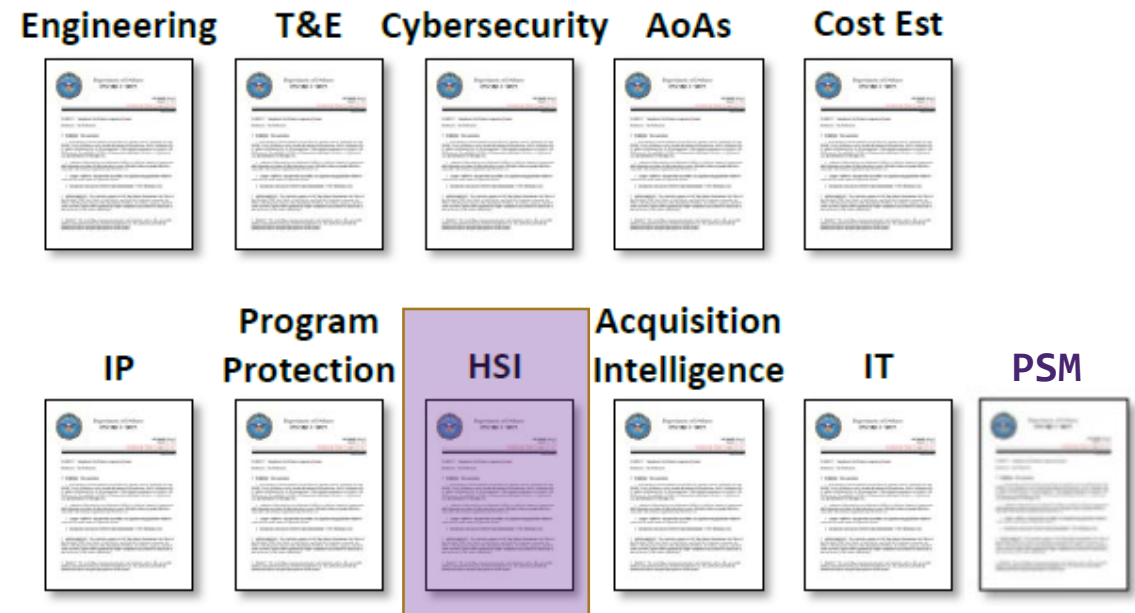
- **Statue** → DoD Directives (DODD) → DoD Instructions (DoDI)
 - DoDD describe / establish policies that govern or regulate operation of the DoD required by law, the Executive Branch or SECDEC
 - DODD 5000.01 “The Defense Acquisition System”**
 - Defines missions, provide authority and assign roles/duties – designed for long-term usage
 - DoDI guide DoD entities on implementation of a policy, plan or action.
 - DODI 5000.02 Adaptive Acquisition Framework & DODI 5000.95 “HSI in Defense Acquisition”**
 - Defines operational standards, assigns responsibilities and outlines specific actions to execute a directive.
 - DoD may issue other docs to supplement DODIs (i.e., Catalogs, Manuals, Handbooks, Regulations and Standards.
 - Service Branch Regulations, PAMs, -- IAW Statues and DOD criteria provide additional specific organizational guidance directives, policies and instructions

Examples: Army Regulation AR-602 “HSI in System Acquisition Process” and PAM 602-2

HSI Policy Introduction

- HSI Policy in this DoDI 5000.95, not only guidance
- At a high level, so that it applies across all of DoD
- Expands upon “Enclosure 7 – HSI” found in previous versions of DoDI 5000.02
- Outlines roles and responsibilities in addition to HSI domain procedures
- Comparable and applicable to standalone DoDI documentation policies for **all** other acquisition functional areas and AAF pathways

DODIs for Each Functional Area



Sections of DODI 5000.95

- Sec. 1: General Issuance Information
- Sec. 2: Responsibilities
- Sec. 3: HSI Procedures, including:
 - General (3.1)
 - HSI Planning (3.2)
 - Overall tasking in programs for each of the HSI domains (3.3-3.9)
- Glossary, including standardized acronyms and definitions
- References

16 pages total, compared with 2 pages total for previous “Enclosure 7 - HSI”



“Component capability developer or program manager will...” statements comparison from Enclosure 7 to DoDI 5000.95

Policy Section	DoDI 5000.02 Enclosure 7 (Change 4, 31 Aug 2018)	DoDI 5000.95 (1 Apr 2022)
General (Sec 3.1)	hsj hsj	hsj hsj hsj
HSI Planning (Sec 3.2)	hsj	hsj hsj hsj hsj
HFE domain (Sec 3.3)	hsj	hsj
Personnel domain (Sec 3.4)	hsj hsj	hsj hsj hsj
Habitability domain (Sec 3.5)	hsj	hsj hsj
Manpower domain (Sec 3.6)	hsj hsj	hsj hsj hsj hsj
Training domain (Sec 3.7)	hsj hsj hsj hsj	hsj hsj hsj hsj hsj hsj hsj hsj
SOH domain (Sec 3.8)	hsj	hsj hsj
FP&S domain (Sec 3.9)	hsj	hsj hsj hsj

 = One distinct responsibility statement

DoDI 5000.95 - Early User Engagement

- “2.6. OSD AND DOD COMPONENT HEADS.
 - The OSD and DoD Component heads **ensure that acquisition programs implement an HSI program early in the acquisition process** that continues throughout the program life cycle (e.g., **from the development of requirements to design and production and through the sustainment and retirement phases of all acquisition programs**), in accordance with Section 3 [HSI Responsibilities].
 - **HSI-related and human performance requirements will include feasible metrics that meet user needs** and minimize life-cycle costs.”

NEW LANGUAGE

DODI 5000.95 - SECTION 3: HSI Procedures

3.1. GENERAL. Component capability developer or program manager will:

- “3.1.a. Plan for and implement an HSI program **from initial user requirements through the program life cycle to system disposal**, appropriate to the system’s acquisition pathway.”
- “3.1.b. Perform, document, and manage program and systems **human-centered design considerations and readiness risks through trade-off analyses among the HSI domains**. The trade-off analyses **will ensure human performance data systematically informs and facilitates total system performance** in both materiel and non-materiel solutions during SE activities.”
- “3.1.c. Ensure that **DoD Component HSI subject matter experts (SMEs) and HSI practitioners are engaged with working groups** tasked with the development and review of program documents that:
 - (1) **Manage** HSI planning.
 - (2) **Report** on HSI program and HSI domain level execution to the OSD and DoD Component heads assigned responsibilities in Section 2 throughout the course of the program.
 - (3) **Inform program managers** on acquisition program decisions”

NEW LANGUAGE

DoDI 5000.95 - HSI Planning (Sec 3.2)

hsj

hsj

hsj

- “3.2.a. The program **will** consist of **risk management, engineering, analysis, and human-centered design activities**, in accordance with DoDI 5000.02 and including, but not limited to:
 - (1) An **HSI management plan**, as outlined in Service component HSI-plan guidance
 - (2) The **human engineering design approach** for the operator and maintainer, which may include a human viewpoint architecture description
 - (3) Task analyses
 - (4) Analysis of human error
 - (5) Use of human modelling and simulation
 - (6) **Usability and other user testing** to support and inform human and machine interface analysis under operational conditions
 - (7) HSI risk management...
 - (8) A **training strategy** for leaders, operators, maintainers, and support personnel, as well as developing options to deliver training capabilities for individual and collective conditions”

NEW LANGUAGE

DoDI 5000.95 - HSI Planning (Sec 3.2)

- 3.2.b. Oversight and approval of HSI management plans, programs, and activities will be provided by the appropriate OSD and DoD Component heads in accordance with Section 2 of this issuance.
- 3.2.c. HSI planning and program implementation will focus on the management, coordination, collaboration, integration, and trade-space analysis among the seven HSI domains recognized by the DoD and specified in Paragraphs 3.3. through 3.9.



NEW LANGUAGE



Human Systems Integration (HSI) Domain Primer Sheet

Human Factors Engineering domain



The application of knowledge about human capabilities and limitations to system or equipment design and development to achieve efficient, effective, and safe system performance at minimum cost and manpower, skill, and training demands.

Personnel domain



The human aptitudes (i.e., cognitive, physical, and sensory capabilities); knowledge, skills, abilities; and experience levels needed to properly perform job tasks and required to train, operate, maintain, and sustain materiel and information systems.

Manpower domain



Total number of personnel or positions required to perform specific tasks. Indexed by requirements including jobs lists, slots, or billets characterized by descriptions of the people required to fill them and the number of people required to operate, maintain, train, and support a system.

Habitability domain



The consideration of the characteristics of systems focused on satisfying personnel needs that are dependent upon physical environment, such as berthing and hygiene.

Training domain



The policy, processes and techniques, training aids, devices, simulators and simulations, planning, and provisioning for the training, to include equipment used to train personnel to operate, maintain, and support a system.

Safety & Occupational Health domain



The characteristics of system design that can:

- Minimize the risk of acute or chronic illness, disability, injury or death to the operator or maintainers
- Enhance the human performance and productivity of personnel who operate, maintain, or support the system in the intended operational environment

Force Protection & Survivability domain



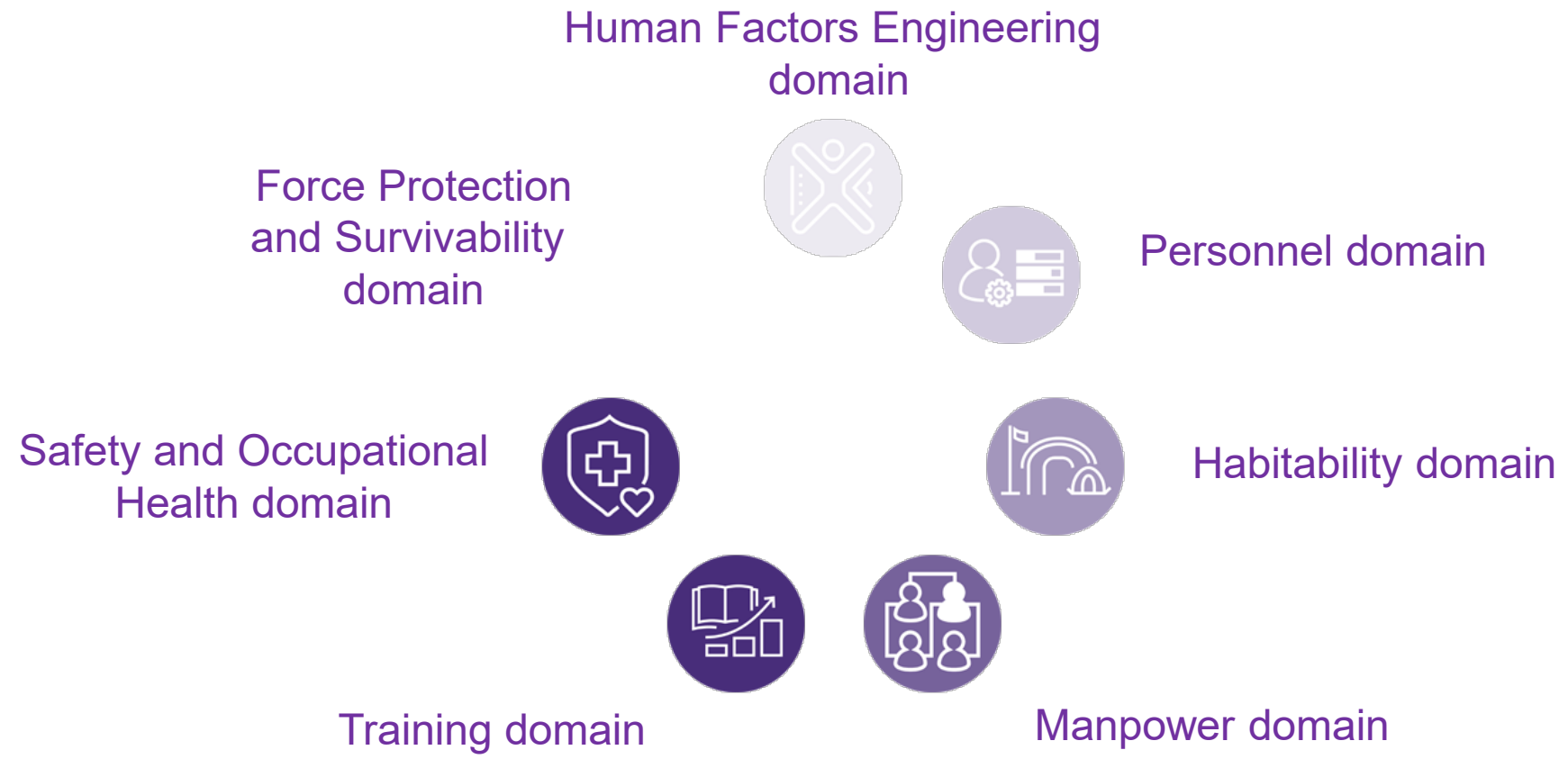
The characteristics of a system that can:

- Reduce fratricide, detectability, and probability of being attacked.
- Minimize system damage and soldier injury.



What are the HSI Domains?

See Back-up for detailed explanation





HSI Guidance and JCIDS

- JCIDS – CDD Update format:
 - Other System Attributes. “Human Systems Integration (HSI) considerations that have a major impact on system effectiveness, suitability, and survivability. The HSI Force Protection and Survivability domain contributes to the Force Protection KPP by defining requirements for personnel force protection and personnel survivability. The HSI Safety and Occupational Health domain contributes to the Force Protection KPP by defining requirements for personnel and system safety. DOTmLPF-P analyses should identify and address HSI.”

JCIDS Manual, 31 October 2021

- HSI Guidebook
 - Establishes guidance for incorporating HSI and domain-level activity by practitioners and stakeholders during system acquisition
 - Replaces DAG Chapter 5 Manpower Planning and Human Systems Integration
 - Published 1 May 2022
 - https://ac.cto.mil/wp-content/uploads/2022/06/HSI_Guidebook_May2022-Cleared.pdf



HSI Guidebook – May 2022

Guidebook TOC Section	Section Description
Introduction (Sec 1)	This guidebook addresses Human Systems Integration (HSI) in Department of Defense (DoD) acquisition.
HSI Overview (Sec 2)	HSI in DoD; HSI ROI; Optimizing Total Systems Performance; HSI in the acquisition lifecycle; HSI in risk management.
Integration Role Across HSI Domains (Sec 3)	HSI practitioners are responsible for integrating and facilitating trade-offs among HSI domains, assimilating considerations, and providing recommendations. HSI domains are interrelated and interdependent, such that the HSI practitioner should consider trade-offs among the primary drivers of effective, efficient, affordable, and safe system designs.
HSI Domains (Sec 4)	Describes each HSI Domain and best practices; HSI domains are interrelated; changes in system design or capabilities could improve one HSI domain and adversely affect another.
HSI Tools and Methods (Sec 5)	Introduction, taxonomy description and classification and characteristics of HSI tools and methods
HSI Workforce Advancement (Sec 6)	Implementing HSI within the acquisition process can be successful when members of the workforce are trained and educated in the tools, techniques, approaches, and methods of HSI and have a command of HSI Knowledge, Skills, Abilities and other attributes; Courseware review.
HSI Communities of Practice (Sec 7)	Introduce Joint HSI Steering Committee, Joint HSI Working Group, DAU online venue
Glossary; Acronyms; References	Self-explanatory



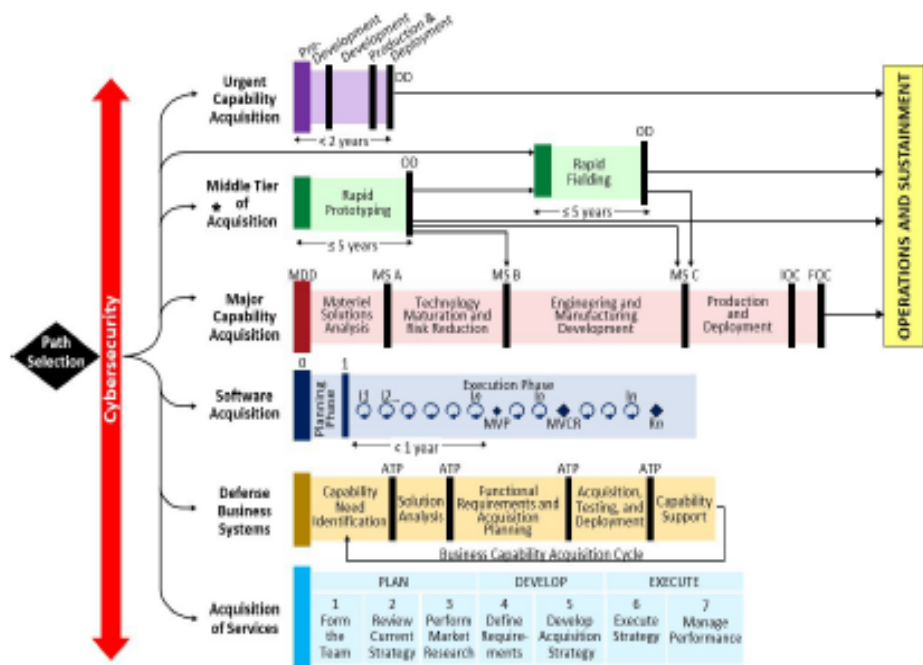
HSI Evolution in the Defense Acquisition System

HSI and Acquisition Policy

Policy

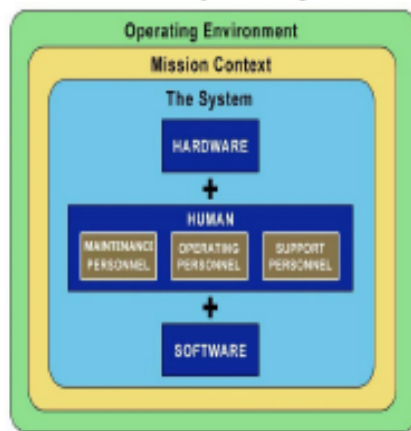
DoDI 5000.02 Adaptive Acquisition Framework (AAF)

HSI applies across the AAF



Each path begins with a HSI Plan

HSI enduring objective for each pathway



Enable system design across all relevant criteria and requirements

Policy driven process

- Underpins strategic and tactical objectives
- Sets path to acquisition solutions



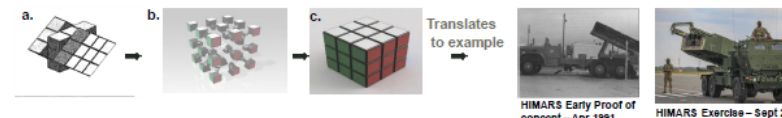
Policy Documents

- DODD 5000.01 - The Defense Acquisition System
- DODI 5000.02 - Operation of the Defense Acquisition System (AAF)
- **DODI 5000.95 - HSI in Defense Acquisition**
- Service / Agency Regulations
- MIL-STDS, Handbooks, and Best Practices, etc.

HSI CONCEPTUAL PROCESS VIEW



HSI - imposes a conceptual "Rubik cube" view of requirements and needs that require coordinated integration and alignment to develop and deliver an approved solution set IAW the AAF and ACAT phases.



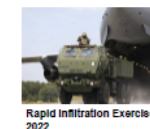
a. HSI solution sets - partial, complete, modular (open-ended) or incremental approaches for systems and services.

- Centered on effective system / human performance characteristics and their risks (operational, maintenance and sustainment).
- Requirements - derived from JCIDs, ONS and JUONS and directed toward a particular WIF or function.

b. Coordination, integration and alignment occurs between the HSI Practitioner, domain SMEs, PEO/PM POCs and team members to engage, integrate, develop, and deliver a capability /system or service

- Continuous alignment and integration of HSI criteria and actions (design / test events)
- Decisions (data driven) made to determine development progression path
- and adjustments to achieve "best option" given identified trade-offs and risks.

c. Iterated feedback data (Soldier Touch Points, interviews, demos, etc.) shape and develop a system's design toward the desired solution set.



Evolution of HSI in the DAS

- DODI 5000.02T transition is effectively complete with delivery of DODI 5000.95: “3.a. This issuance will remain in effect, with content removed as it is cancelled or transitions to a new issuance, as shown in Table 1.”
- DODI 5000.95 prescribes *what* to implement to achieve the DODD 5000.01

Table 1. Relationship of DoDI 5000.02T and New Policy

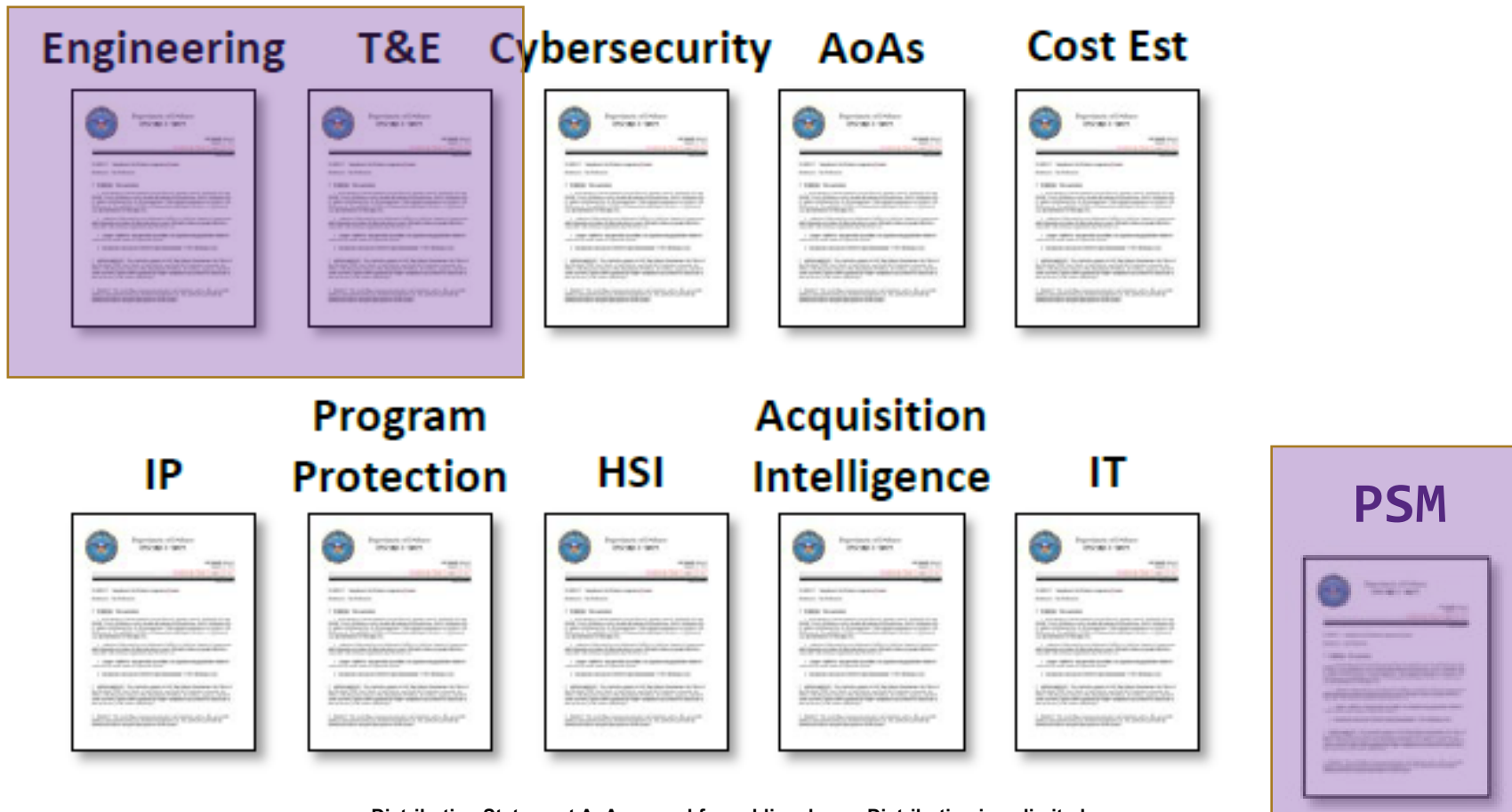
DoDI 5000.02T, Operation of the Defense Acquisition System	Associated New Policy
Core Acquisition Policy (Paragraph 6, Procedures)	DoDI 5000.85, “Major Capability Acquisition”
Enclosure 1. Acquisition Program Categories and Compliance Requirements -- Information Requirements Tables	<ul style="list-style-type: none"> • DoDI 5000.85, “Major Capability Acquisition” • Tables “authorized by DoDI 5000.85...” will be posted on the Adaptive Acquisition Framework website
Enclosure 2. Program Management	<ul style="list-style-type: none"> • DoDI 5000.85, “Major Capability Acquisition” • DoDI 5010.44, “Intellectual Property,” October 16, 2019 has replaced “IP Strategy” (formerly Para 6.a.(4))
Enclosure 3. Systems Engineering	DoDI 5000.88, “Engineering of Defense Systems”
<ul style="list-style-type: none"> • Enclosure 4. Developmental Test and Evaluation (DT&E) • Enclosure 5. Operational and Live Fire Test and Evaluation (OT&E and LFT&E) 	DoDI 5000.89, “Test and Evaluation (T&E)”
Enclosure 6. Life-Cycle Sustainment	DoDI 5000.85, “Major Capability Acquisition”
Enclosure 7. Human Systems Integration (HSI)	DoDI 5000.95, “Human Systems Integration in Defense Acquisition”
Enclosure 8. Affordability Analysis and Investment Constraints	Replaced by direction in §807 of Public Law 114-328

Defense Acquisition System / AAF / JCIDS

- DAS: “1.2.p. Human systems integration planning will begin in the early stages of the program life cycle. The goal will be to **optimize total system performance and total ownership costs**, while **ensuring that the system is designed**, operated, and maintained **consistent with mission requirements**.”
DoDD 5000.01, September 9, 2020
- “Human Systems Integration in Defense Acquisition”
DoDI 5000.95, April 1, 2022
- JCIDS: CDD Format
 - Other System Attributes. “Human Systems Integration (HSI) considerations that have a major impact on system effectiveness, suitability, and survivability. The HSI Force Protection and Survivability domain contributes to the Force Protection KPP by defining requirements for personnel force protection and personnel survivability. The HSI Safety and Occupational Health domain contributes to the Force Protection KPP by defining requirements for personnel and system safety. DOTmLPF-P analyses should identify and address HSI.”
JCIDS Manual, 31 October 2021

HSI Contribution to Functional Policies

DODIs for Each Functional Area



DODI 5000.95 impacts to DODI 5000.88, “ENGINEERING OF DEFENSE SYSTEMS”

- “3.6. SPECIALTY ENGINEERING, d. Human Systems Integration. The **LSE will:**
 - (1) Working for the PM, use **a human-centered design approach** for system definition, design, development, test, and evaluation to optimize human-system performance.
 - (2) **Conduct frequent and iterative end user validation of features and usability** for identifying, communicating, and visualizing user needs under defined operational conditions and expected mission threads.
 - (3) Working for the PM, **ensure human systems integration risks are identified and managed throughout the program’s life-cycle.**”
- “3.4.a.(3) For MDAPs, ACAT II, and ACAT III programs, the **[Systems Engineering Plan] SEP will contain these elements**, unless waived by the SEP approval authority:...(t) **Specialty engineering** and architectural factors...”

DoDI 5000.88, November 18, 2020

DODI 5000.95 impacts to DODI 5000.89, “TEST AND EVALUATION”

- “3.5.d. The **DOT&E requires** testing of cybersecurity during OT&E to include the **representative users** and an operationally representative environment. This may include **hardware; software** (including embedded software and firmware); **operators; maintainers**; operational cyber and network defense; **end users**; network and system administrators; help desk; **training; support documentation; tactics, techniques, and procedures**; cyber threats; and other systems that input or exchange information with the system under test, as applicable.”
- “4.6.b. DBS PMs will **develop a TEMP or other test strategy documentation**. The PM will describe the test strategy and essential elements of the TEMP in the DBS implementation plan. Specific T&E management content requirements in the implementation plan include:...
 - (3) T&E planning will **include mission-oriented developmental T&E with actual operators performing end-to-end scenarios** in a controlled environment to **collect human-system interface data and reduce risk** during operational testing.”
- “4.5.d. To **maximize the benefit of early and automated data collection opportunities**, the PM must collaborate with the T&E interfaces and work through the T&E processes defined for DT&E (see Section 5) and OT&E (see Section 6) to **tailor a plan that will enable the effective and efficient execution of analysis and evaluation**, as well as the determination of test adequacy.
 - (1) Automated testing should be used at the unit level, for application programming interface and integration tests, and **to the maximum extent possible for user acceptance** and to evaluate mission effectiveness.”

DODI 5000.95 impacts to DODI 5000.91, “PRODUCT SUPPORT MANAGEMENT”

• 4.3. THE PSS AND THE LCSP.

- “An LCSP is required for all covered systems and is the principal document establishing the system’s product support planning and sustainment, pursuant to Section 2337 of Title 10, U.S.C. For covered systems, a detailed LCSP will include:

- (2) Performance goals, including:

- (a) Sustainment key performance parameters (KPPs).
- (b) Key system attributes.
- (c) Other appropriate metrics.

HSI is an Other System Attribute and is embedded within Sustainment KPPs (via Training domain, Reliability)

- (7) **Engineering and design considerations**, including DMSMS resilience, that support cost-effective sustainment for the system.

- “The **PSM will collaborate with users, systems engineers, cost analysts, and other stakeholders** to develop risks and assumptions unique to the systems.”

- “(1) The **PSM will work with systems engineers and users** to develop the RAM-C rationale report to **ensure supportability, maintenance, and training are incorporated into the design through early user assessments; and to incorporate user feedback into supportability planning.**

- “i. Demonstrating and Evaluating Performance.

- In support of the PM, **the PSM will work with systems engineers and the testing and user communities to incorporate costs and manpower planning necessary to conduct user supportability related demonstration and evaluation events** into the program test strategy.”

DODI 5000.95 impacts to DODI 5000.91, “PRODUCT SUPPORT MANAGEMENT”

- a. Disposition Analysis.
 - “The PM and the PSM (or LCL) will use operational data, including an assessment of the fielded urgent need capability’s operational utility, as well as **user feedback concerning its performance**, to help inform the disposition official’s recommendation and highlight key risk areas. The **PSM or LCL will identify risks to inform any follow-on procurement and product support performance metrics to incentivize future improvements in the capability’s design** to achieve A_o and control costs should it transition to a PoR.”
 - “(3) **The PSM will further influence design through coordination with users to assess models or physical prototypes, to ensure maintainability and usability within an operational environment.** The PSM will provide user feedback, along with system and operational data, to systems engineers to support the development of modeling tools to improve the prototype’s design.”
 - “(4) User Assessment Planning. In support of the PM, the PSM will coordinate with the lead software developer **to identify and pre-plan for user participation in product support-related user assessments of the software technical manual, source codes, training materials, and supportability.**”

HSI is involved in all sustainment activities involving the end user!

DoDI 5000.91, November 4, 2021



CBA Worksteam Overview

JHSIWG: Moving Forward

BLUF – How do we execute and enable effective HSI objectives across an amalgamation of bureaucratic processes driven by policy, law and differential factors that require integration to support intrinsically different organizations with different missions, goals, processes and procedures?

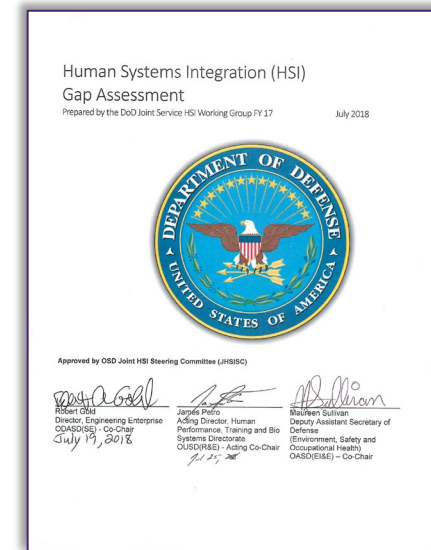
A lengthy way to say “its complicated” – both the question and solution set

- Enablers – JHSIWG members under JHSISC and OUSD R&E guidance
 - Membership encompass DoD and Federal agencies – with industry and academia participation
 - Cross-pollination / collaborative actions are critical (top to bottom, and lateral across all entities)
 - Informed Advocates and Champions at all levels

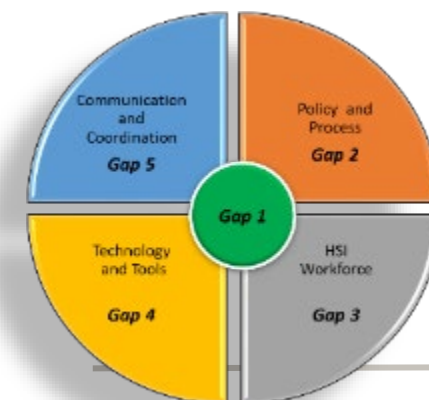
- Strategy – Apply and sustain a coordinated framework “building block” model
 - Identify top HSI gaps and deficiencies, i.e., Lines of Efforts, for focused activity – *** CBA report (2018)**
 - Set a rigid foundation (overarching criteria) with adaptable layers – ***Policy, Directives, and Standards**
 - Work in concert and aligned with DoD and NDS priorities – ***Critical Technologies and Innovations**
 - Continuous Outreach and Marketing – ***ROI and impact**

- Driver – Capabilities Based Assessment (CBA) Report and identified five (5) lines of efforts to enhance HSI maturity and effectiveness:

* Moving Target



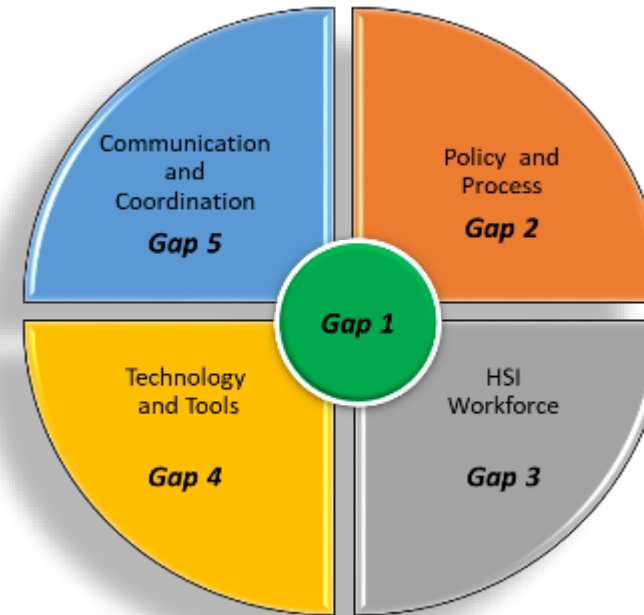
Capabilities-Based Assessment (CBA) report - Apr 4, 2018



Capabilities Based Assessment Overview

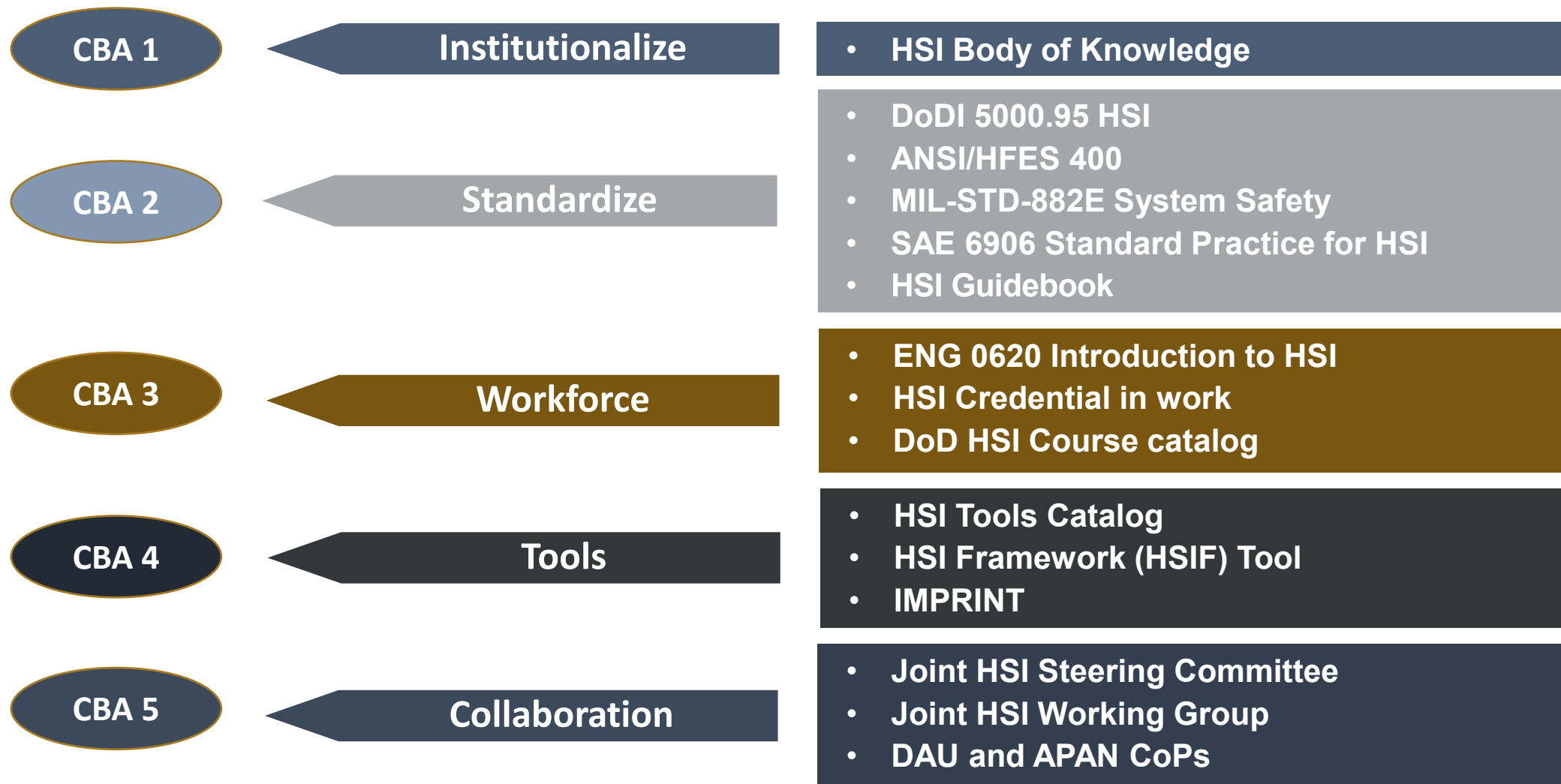
The Joint HSI Steering Committee commissioned in 2018 an HSI Gap Capabilities Based Assessment (CBA) Report and identified five (5) lines of efforts to enhance HSI maturity and effectiveness:

- CBA 1: Institutionalize an HSI Body of Knowledge
- CBA 2: Standardize HSI Best Practices across the Services
- CBA 3: Develop Career Certification and Career Paths/Billets for HSI Workforce Supported by a Persistent Training Function
- CBA 4: Provide and Maintain Tools, Databases, and Processes to Support HSI Analyses Early in Acquisition
- CBA 5: Implement a Professional, Coordinated HSI Outreach and Marketing Function



Capabilities-Based Assessment (CBA) report - Apr 4, 2018

Capabilities Based Assessments – Closing Gap Efforts



CBA 1 Workstream Overview

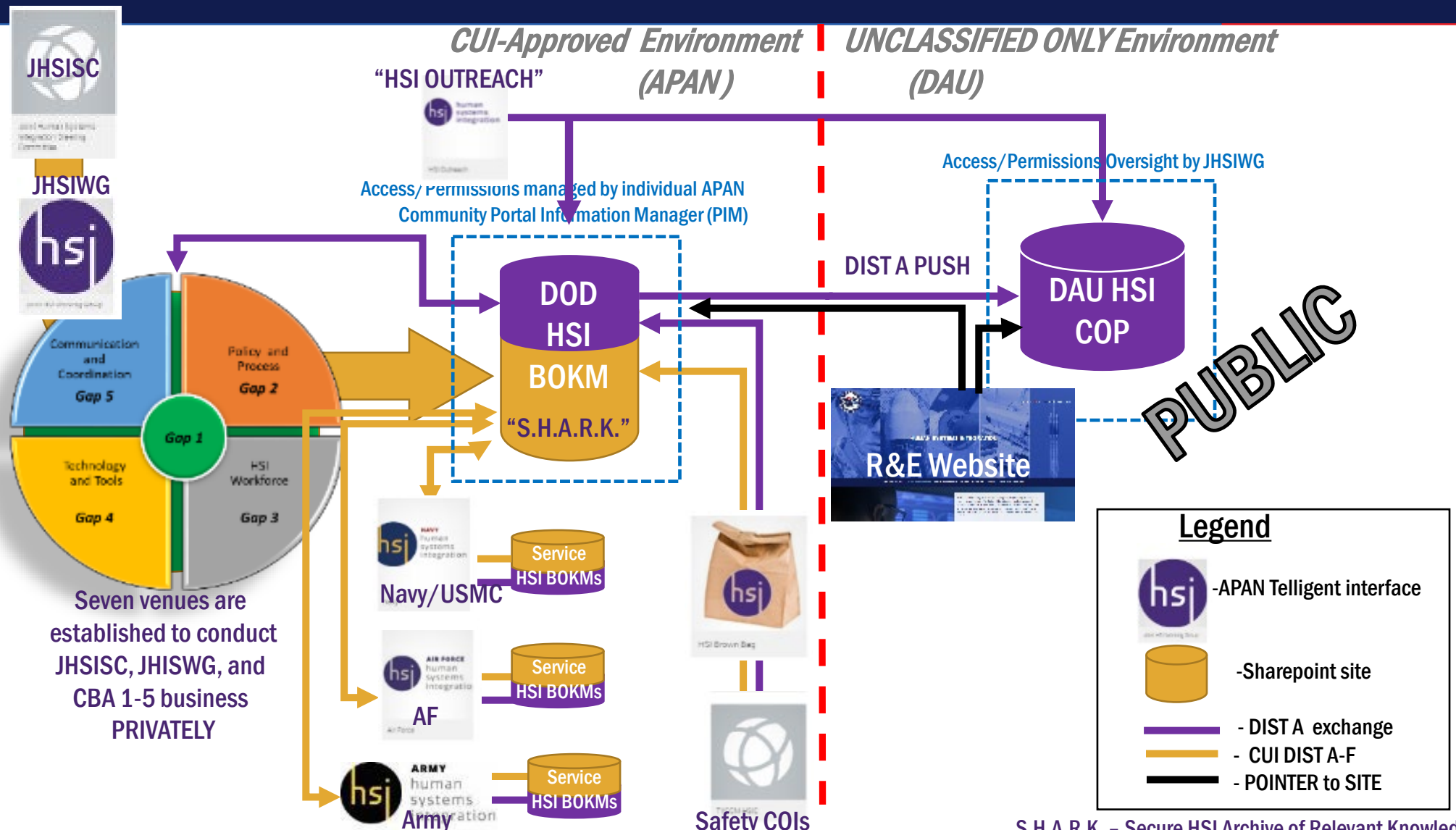
- **Goal 1:** Recommend that the JHSIWG lead an effort to fill the HSI Body of Knowledge gap and treat it as a **living repository**, with regularly planned and executed updates to **knowledge areas, terms, activities and associated references and publications**
- Leveraging existing research from NPS Capstone projects to define architecture, KM business rules, and governance protocols
 - Accomplishing Design Sprints to deliver functionality in 2021
- Continue building HSI BOK across HSI framework dimensions in APAN and DAU HSI COPs
 - Requires Service Leadership and SME involvement
 - Requires identifying Content Owners, Moderators, Contributors established across multiple organizations
 - Requires workload investment by mission-funded and volunteer corps to sustain the level of effort
- Make contact with communities to **collect and categorize knowledge products** within established digital environments (tie to CBA 5)



DoD HSI Body of Knowledge Management (BOKM) Digital Architecture

PRIVATE

*FY24+ Goal:
Add HFE TAG
and S&T COIs
as data
sources*



PUBLIC



HSI Standardization – CBA 2 Policy and Guidance (P&G)

- HSI Policy – DODI 5000.95
 - Establishes policy for HSI by Component and Capability Developers during system acquisition IAW DOD 5000.01
 - Replaces DOD 5000.02 Enclosure 7
 - <https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/500095p.PDF?ver=C1L4ZM9Wi4Qa4p7JP7EPtA%3D%3D>
- HSI Guidebook
 - Establishes guidance for incorporating HSI and domain-level activity by practitioners and stakeholders during system acquisition
 - Replaces DAG Chapter 5 Manpower Planning and Human Systems Integration
 - Published 1 May 2022
 - https://ac.cto.mil/wp-content/uploads/2022/06/HSI_Guidebook_May2022-Cleared.pdf
- SAE 6906 – Standard Practice for HSI
- MIL-STD-882E – Standard Practice for System Safety
 - R&E SE&A Specialty Engineering System Safety Lead is co-chairing the Defense Standardization Program chartered Joint System Safety Standards Working Group (JSSSWG). POAM developed



HSI Workforce Development – CBA 3

- **An HSI Credential has been approved for development** by the Engineering Technical Management (ETM) Functional Area Working Group as part of the ETM competency– Feb 2022
 - JHSIWG CBA 3 Sub-WG will begin analysis and planning for the tasks and learning objectives that defines how the AWF can earn foundational, intermediate, and advanced competency for HSI across all DAU competencies
- Deployed DAU ENG 0620 “Introduction to Human Systems Integration” course
 - DAU course for HSI formerly CLE 062 (now ENG 062) is live.
 - To access your course, please click on: Launch Training < https://id.dau.edu/app/dau_virtualcampus_1/exk5bw8t33Hj4e8mo297/sso/saml?RelayState=%252fdeeplink%252fLaunchTraining.aspx%253flaunchLo%253dee4f85a2-5ef4-48e3-b4b4-67f4f1320f42
- DoD HSI Course Catalog – updates delivered in 2QFY23 via APAN



HSI Tools Activities – CBA 4

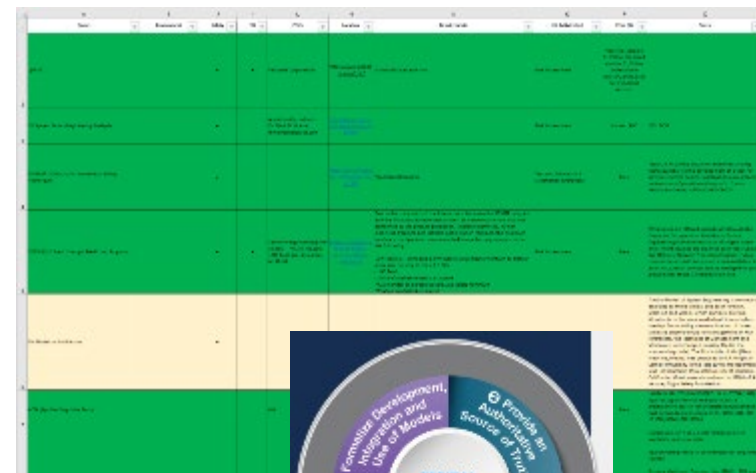
• Tool Development

- **Human Systems Integration Framework (HSIF) Tool refresh w/ CBA 1**
 - HSIF Activities Review to develop core methods
 - Identify HSI activities by Functional areas/roles and level of involvement
 - Updated References, products, and activities aligned to the AAF
- **Model-Based HSI and Human Representative for Digital Engineering sub-WG** (planning for October JHSIWG)
- Demonstration of HSI Tools, Techniques, Approaches and Methods at JHSIWG meetings and events when possible;

• Tool Maintenance

- Sub-group to **manage HSI tools catalog**; update to DAU –Identify members
- **Identify funding sources to maintain tools**
 - Executed UFR for IMPRINT updates –FY23

*Have an HSI-related tool to offer or review existing Tools Catalog?
Please contact the CBA 4 team: osd.mc-alex.ousd-r-e.mbx.hsi-cba4@mail.mil*



HSI TTAMs Catalog List

Item	Description	HSI Objectives	IT Resources	Approved	Testing	HSI	Security
AUTOCOR	Autocor is a cognitive support tool that uses a rule-based approach to assist in the analysis of delivery methods.	Autocor Autocor Com Autocor	Autocor Autocor Autocor	Autocor	Autocor	Autocor	Autocor
Autocor	Autocor is a cognitive support tool that uses a rule-based approach to assist in the analysis of delivery methods.	Autocor Autocor Com Autocor	Autocor Autocor Autocor	Autocor	Autocor	Autocor	Autocor



HSI Framework tool Status

- Access interest or questions?
 - Email: osd.mc-alex.ousd-r-e.mbx.hsi-cba4@mail.mil



<https://hsif.nps.edu/>

HSI Framework Tool - Dashboard

Dashboard: [Contractor] [Search]

HSI Framework Models

- NEW PROJECT
- IMPORT PROJECT
- Recent
- HSI Framework Models
- My Projects
- Shared With Me
- Favorites
- Deleted

Acquisition Pathways:

- LCA Pathway 1
- Software Acquisition Pathway 4
- Defense Business Systems Pathway 5
- MTA Pathway 2
- MCA Pathway 3
- Acquisition of Services Pathway 6

All Acquisition Pathways are AVAILABLE!

HSI Outreach Activities – CBA 5

- HSI Outreach-Goal 1: Ensure a single, consistent message is delivered, case studies and results are institutionalized, and value is captured and communicated regularly**
 - Promulgate** HSI Acquisition Services strategy for **consistent HSI message** across Acquisition leadership and functional areas
 - Keeping abreast of industry initiatives and events, conferences
 - Schedule events on the Joint HSI calendar (APAN)
 - Summary of past events and reporting into JHSIWG from other communities (i.e., HFES, HFE TAG, NDIA, etc)
- Identify the HSI Universe-Goal 2: Define and map the “HSI Universe” of stakeholders that is responsible or contributes to the HSI Enterprise**
 - Encourage JHSIWG membership** throughout the DoD for HSI practitioners
 - Understand stakeholders and contributors to the HSI enterprise and **define reporting channels**
 - Provide practitioners contacts for Service level working groups, JHSIWG, and CBA Leads/Volunteers within service, and connect to Industry partners for related efforts
 - Provide access** to APAN and DAU venues

The collage includes the following elements:

- HSI Domains:** Human Factors Engineering, Personnel, Habitability, Manpower, Training, Safety and Occupational Health, Force Protection and Survivability.
- Brand Guidelines:** A poster for HSI human systems integration featuring a photo of soldiers.
- Military Branches:** A vertical list of HSI logos for Air Force, Army, Coast Guard, Marine Corps, Navy, NASA, and DHS.
- Stakeholder Map:** A complex organizational chart showing the Joint HSI Steering Committee (JHSIWG) at the center, with various sub-groups like SEEG, USMC, AFMOC, and others. It also shows connections to Congress, the Joint Working Group, and various service-level groups.
- Text:** The slogan "early. often. for the warfighter." and a red callout box: "Add Safety-related Communities that inform HSI levels of effort".

Email: osd.mc-alex.ousd-r-e.mbx.hsi-cba5@mail.mil

Outreach Take-Aways

- Grow the Service participation and volunteers for CBA HSI Outreach:
 - Email: OUSD R-E Mailbox HSI-CBA5 osd.mc-alex.ousd-r-e.mbx.hsi-cba5@mail.mil
- General mailbox for your Service is available to access HSI support:
 - Army email address: osd.mc-alex.ousd-r-e.mbx.hsi-usarmy@mail.mil
 - Army DEVCOM HSI: usarmy.apg.devcom.mbx.hq-hsi@mail.mil
- Direct HSI Leadership and Practitioners to access HSI discipline resources at:
 - OUSD(R&E) websites
 - OUSD(R&E) ED SE&A: <https://cto.mil/sea/hsi/>
 - OUSD(R&E) DCTO(ST&T)— Human Systems Directorate: <https://rt.cto.mil/ddre-rt/dd-rtl/hsd/>
 - DAU HSI COP
 - <https://www.dau.edu/cop/hsi/Pages/Default.aspx>
 - APAN DoD HSI Sharepoint site* (SHARK)
 - <https://wss.apan.org/osd/HSI-BOKM/>
 - **Requires access approval by government leadership*

Take Aways

HSI optimizes human performance outcomes and improves total system performance

HSI practices have a foundation in statute and current policy

Capability Developers and Program Managers have responsibilities to resource HSI requirements

Joint HSI Steering Committee oversight of the CBA efforts is improving HSI

User engagement during requirements generation can ensure system and capability is designed, operated, and maintained consistent with mission requirements

Acquisition Workforce education resources are available for S&T stakeholders, functional area leads and the HSI practitioner

Joint HSI WG CBA activities are progressing and instill HSI in activities for appropriate HSI considerations in all defense acquisition system phases

POCs

Mr. Jeffrey Thomas

Mr Napoleon Gaither



ARMY
human
systems
integration



ARMY
human
systems
integration

BACKUP



Questions for the HSI Office of Primary Responsibility?

Christopher DeLuca – OUSD(R&E) ED SE&A

Director, Specialty Engineering

Mitchell Woods - OUSD(R&E) ED SE&A, Specialty Engineering

Human Systems Integration Lead / Joint HSI Steering Committee Executive Secretary

(Contractor, HII-TSD (Alion Science))



osd.pentagon.ousd-re.mbx.communications@mail.mil

Please place "HSI" in the header of the inquiry for proper routing



HSI Body of Knowledge (1 of 3) – 2022 updates

DOD and Functional Policies, Guidance

DoD Directive (DoDD) 5000.01, The Defense Acquisition System (2020)

Department of Defense Directive (DoDD) 1100.4, Guidance for Manpower Management (2005)

DoD Instruction (DoDI) 5000.02, Operation of the Adaptive Acquisition Framework (2020)

~~DoD Instruction (DoDI) 5000.02T, Operation of the Defense Acquisition System (2020) -->~~

- DoD Instruction 5000.95, Human Systems Integration (HSI) in Defense Acquisition (2022)
- DoD Instruction 5000.88, Engineering of Defense Systems (2021)
- DoD Instruction 5000.91, Product Support Management (2021)
- DoD Instruction 5000.89, Test and Evaluation (2020)
- DoD Instruction 5000.73, Cost Analysis Guidance and Procedures (2020)

~~Defense Acquisition Guidebook (DAG) (2018) -->~~ HSI Guidebook (2022)

Office of the Deputy Assistant Secretary of Defense for Systems Engineering Systems Engineering Plan (SEP) Outline V4.0 (2021)

Human Systems Integration (HSI) in the Systems Engineering Plan (SEP) and the Life Cycle Management Plan (LCMP): Technical Report (2010)

Department of Defense Technical Architecture Framework for Information Management, Volume 8: DoD Human Computer Interface Style Guide. Vers. 3 (1996)

United States Department Of Defense Manual for the Operation of the Joint Capabilities Integration and Development System (JCIDS manual) (2021).

*Denotes updates



HSI Body of Knowledge (2 of 3) – 2022 updates

Standards and Handbooks

Society of Automotive Engineers (SAE) Systems Management Standard: SAE 6906 Standard Practice for Human Systems Integration (2019)

MIL-STD 1472H, Human Engineering Design Criteria for Military Systems, Equipment, and Facilities (2020)

MIL-STD-46855A, Human Engineering Requirements for Military Systems, Equipment, and Facilities (2011)

MIL-STD-1474E, Department of Defense Design Criteria Standard: Noise Limits (2015/ Notice 1, 2020)

MIL-STD-882E Department of Defense Standard Practice System Safety (SSPS) (2012)

MIL-HDBK 29612-1A, DoD Handbook Training Part 1: Guidance For Acquisition Of Training Data Products And Services (1999)

MIL-HDBK 29612-2A, DoD Handbook Training Part 2: Instructional Systems Development (1999)

DoD HDBK 743A: Military Handbook - Anthropometry of U.S. Military Personnel (1991)

DID-HSI Program Plan (HSIPP, 2011)

DI-HFAC-81742A, Data Item Description: Human Engineering Program Plan (HEPP) (2012)

DI-HFAC-80746C, Data Item Description: Human Engineering Design Approach Document - Operator (HEDAD-O) (2012; Notice 1, 2017)

DI-HFAC-80747C, Data Item Description: Human Engineering Design Approach Document - Maintainer (HEDAD-M) (2016).

DI-HFAC-80734B, Data Item Description: Human Engineering Test Plan (HETP) (1998)

*Denotes updates



HSI Body of Knowledge (3 of 3) – 2022 Updates

Service Regulations

Army Regulation (AR) 602-2: Human Systems Integration in the System Acquisition Process (2015)

Army Pamphlet (AP) 602-2, Guide for Human Systems Integration in the Acquisition Process (2018)

United States Air Force Human Systems Integration Handbook (2009)

USAF Human Systems Integration Requirements Pocket Guide (2009)

OPNAVINST 1000.16L Navy Total Force Manpower Policies and Procedures (2015)

OPNAV Instruction (OPNAVINST) 9640.1C, Shipboard Habitability Program (2019)

NAVSEAINST 3900.8A Human Systems Integration (HSI) Policy in Acquisition and Modernization (2005)

NAVSEASYS COM T9640-AC-DSP-010/HAB, Rev.1, Shipboard Habitability Design Criteria and Practices Manual (Surface Ships) for New Ship Designs and Modernization (2016)

Federal Partner references

Federal Aviation Administration (FAA) Human Factors Design Standards (HFDS) HF-STD-001B (2016)

Department of Homeland Security Human Systems Integration (HSI) Best Practice 1: HSI Planning (2012)

NASA/SP-2015-3709 Human Systems Integration (HSI) Practitioner's Guide (2015)

Department of Homeland Security Human Systems Integration (HSI) Best Practice 16: Personnel and Training Requirements (2012)

National Aeronautics and Space Administration (NASA) NASA-STD-3001, NASA Spaceflight Human-System Standard Volume 2: Human Factors, Habitability, and Environmental Health (2019)

Textbooks, Academic

Handbook of Human-Systems Integration (Booher, H. (Ed.), 2003).

Shore et al., Personnel Selection: A Primer from: APA HSI Handbook (2015)

APA Handbook of Human Systems Integration (Boehm-Davis, Durso, and Lee (Eds.), 2015)

*Denotes updates



Human Factors Engineering Domain

Human Factors Engineering Domain



The application of knowledge about human capabilities and limitations to system or equipment design and development to achieve efficient, effective, and safe system performance at minimum cost and manpower, skill, and training demands.



DoDI 5000.95 – Human Factors Engineering domain

“3.3. HUMAN FACTORS ENGINEERING (HFE) DOMAIN.

a. The DoD **Component capability developer or program manager** will, in conjunction with DoD **Component HSI SMEs and HSI practitioners**, **implement HFE principles to ensure that system design considerations are compatible with the users’ capabilities and limitations.** System design considerations include, but are not limited to:

- (1) Design and layout of work environment(s)
- (2) User and human-machine interfaces (hardware and software)
- (3) Design for the maintainer and operator
- (4) Automation
- (5) Maintainability and accessibility.

b. System designs will minimize or eliminate system characteristics that require:

- (1) Excessive cognitive, physical, and sensory skills.
- (2) Workload-intensive tasks that may result in:
 - (a) Extensive training;
 - (b) Mission-critical errors;
 - (c) Reliability failures;
 - (d) Excessive or avoidable maintenance impacts on readiness;
 - (e) Safety or health hazards.



NEW LANGUAGE



Personnel Domain

Personnel Domain



The human aptitudes (i.e., cognitive, physical, and sensory capabilities); knowledge, skills, abilities; and experience levels needed to properly perform job tasks and required to train, operate, maintain, and sustain materiel and information systems.

DoDI 5000.95 – Personnel Domain

“3.4.a. The DoD Component capability developer or program manager will:

hsj (1) In conjunction with DoD Component **HSI SMEs and HSI practitioners**:

(a) **Identify the knowledge, skills, abilities, and other characteristics** to determine the personnel population of the system.

(b) Define characteristics of target military occupational specialties (MOSs).

(c) **Define the human performance characteristics** of the user population based on the system description.

(2) Consider personnel availability (e.g., recruiting, retention, promotion, and assignment to tasks) and cognitive and physical characteristics and capabilities of intended users during system design to ensure that the target user population is best prepared to operate, maintain, and sustain materiel and systems.

hsj (3) Consult with appropriate personnel to **mitigate readiness, personnel tempo, and funding risks** and issues for those programs that:

(a) Have skill requirements that exceed the knowledge, skills, abilities, and other characteristics of current MOSs and civilian career fields; or (b) Require additional skill indicators or hard-to-fill MOSs or civilian career occupations.

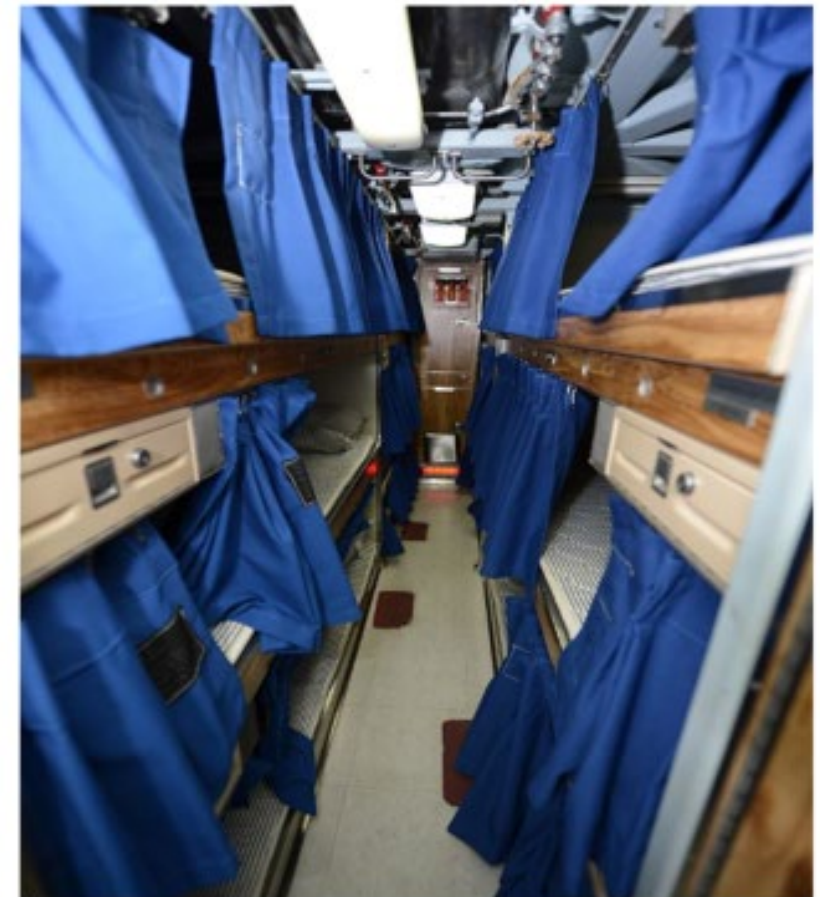
NEW LANGUAGE



Habitability Domain

Habitability Domain

The consideration of the characteristics of systems focused on satisfying personnel needs that are dependent upon physical environment, such as berthing and hygiene.



DoDI 5000.95 – Habitability Domain

“3.5. The DoD Component capability developer or program manager will, in conjunction with DoD Component **HSI SMEs and HSI practitioners**:

 a. **Establish:**

- (1) **Requirements for the physical environment** (e.g., adequate space and temperature control).
- (2) As appropriate, **requirements for personnel services** (e.g., medical and mess) **and living conditions** (e.g., berthing and personal hygiene) that have: (a) A direct impact on meeting or sustaining human performance; or (b) An adverse impact on quality of life and morale such that the warfighter capability, recruitment, or retention is degraded.

 b. **Consider the cybersecurity requirements for systems supporting living and working environments or conditions that have a direct impact on operational performance**, in accordance with DoDI 8500.01.

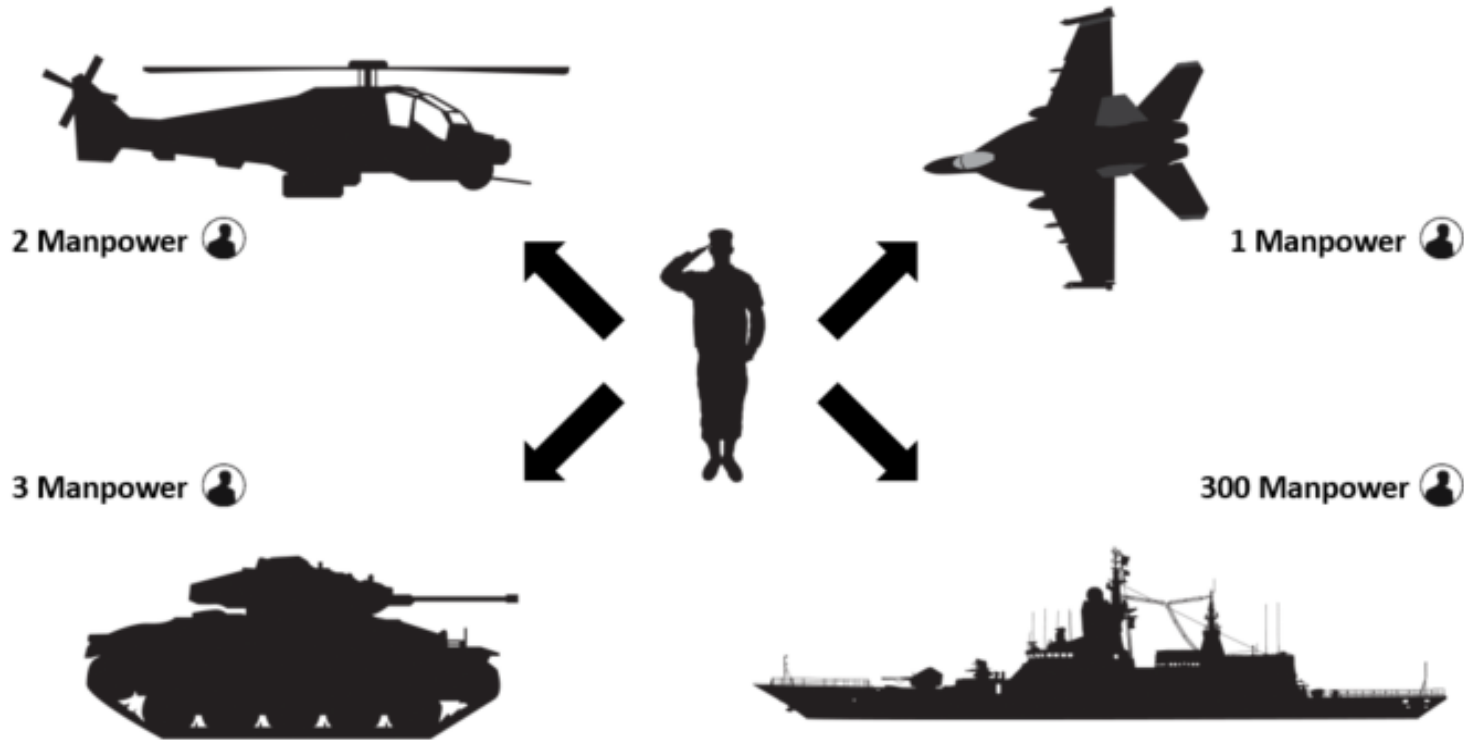
NEW LANGUAGE



Manpower Domain

Total number of personnel or positions required to perform specific tasks. Indexed by requirements including jobs lists, slots, or billets characterized by descriptions of the people required to fill them and the number of people required to operate, maintain, train, and support a system.

Manpower Domain





DoDI 5000.95 – Manpower Domain

hsj

“3.6.a. The DoD Component capability developer or program manager **will**, as a part of HSI, in conjunction with DoD Component **HSI SMEs and HSI practitioners, contribute to efforts to minimize program support costs by addressing manpower affordability early in the acquisition process.**

hsj

Additionally, the military and civilian manpower resources will be programmed in accordance with validated manpower requirements. **Civilians will be managed solely on the basis of workload and fiscal year funding, in accordance with:**

hsj

- (1) Section 129a of Title 10, United States Code.
- (2) DoDD 1100.4.

hsj

b. In advance of contracting for operational support services, the **acquisition program manager will**, in conjunction with the designated DoD Component manpower authority, determine the most efficient and cost-effective manpower mix of military, civilian, or contract personnel.

NEW LANGUAGE



Training Domain

Training Domain



The policy, processes and techniques, training aids, devices, simulators and simulations, planning, and provisioning for the training, to include equipment used to train personnel to operate, maintain, and support a system.





DoDI 5000.95 – Training Domain

“3.7.a. In conjunction with DoD Component **HSI SMEs and HSI practitioners**, the **Component capability developer or program manager** will:

- hsj** - (1) **Develop options** for individual, collective, and joint training for operators, maintenance, and support personnel.
- hsj** - (2) Where appropriate, **base training decisions on training effectiveness evaluations**, which can be integrated with other test(s) and evaluation(s).
- hsj** - (3) **Execute training system plans** that consider the use of new learning techniques, simulation technology, embedded training, distributed learning, and instrumentation systems to provide the best training content delivery mechanism based on point-of-need and audience requirement.

NEW LANGUAGE



DoDI 5000.95 – Training Domain

- **3.7.b.** When and where cost-effective and practical, use simulation-supported embedded training. The training systems will fully support and mirror the interoperability of the operational system, in accordance with DoDD 1322.18.
- **3.7.c.** Consider training in analysis of alternatives study when developing criteria for the study.
- **3.7.d.** Training capabilities and requirements supporting major acquisition programs will be prioritized and fielded on par and concurrently with operational requirements, ensuring that the training community utilizes the most current simulated capability.
- **3.7.e.** Systems operating in a joint environment will field training capabilities that replicate the joint environment. Training capability networked with other program training capability will be developed at an interoperability level necessary to support completion of joint tasks.
- **3.7.f.** The major tasks identified in the job task analysis, training device document coordinating paper, and training plans will support a comprehensive analysis with special emphasis on options that:
 - (1) Enhance user capabilities.
 - (2) Maintain skill proficiencies.
 - (3) Reduce individual and collective training costs.

NEW LANGUAGE



Safety & Occupational Health (SOH) Domain

Safety and Occupational Health (SOH) Domain



The characteristics of system design that can:

- Minimize the risk of acute or chronic illness, disability, injury or death to the operator or maintainers.
- Enhance the job human performance and productivity of personnel who operate, maintain, or support the system in the intended operational environment.



DoDI 5000.95 – Safety & Occupational Health (SOH) Domain

hsi

“3.8.a. The **DoD Component capability developer or program manager, in conjunction with DoD Component HSI SMEs and HSI practitioners, will** ensure that appropriate human SOH requirements are integrated across disciplines and into SE.

hsi

b. The **SOH domain SMEs will collaborate with the system safety SMEs to recommend system design characteristics** and provide for operations, maintenance, and support procedures that can:

(1) **Minimize the risks** of: (a) Death. (b) Acute or chronic illness, disability, or injury, including traumatic brain injury to users. (c) Damage or loss of equipment or property.

(2) **In conjunction with the other domain leads, enhance human job performance and productivity of the personnel** who operate, maintain, or support the system **in the intended operational environment(s).**

NEW LANGUAGE



Force Protection & Survivability Domain (FP&S)

Force Protection and Survivability Domain (FP&S)



- The characteristics of a system that can:
- Reduce fratricide, detectability, and probability of being attacked.
 - Minimize system damage and soldier injury.



DoDI 5000.95 – Force Protection & Survivability Domain

“3.9.a. The DoD **Component capability developer or program manager will, in conjunction with DoD Component HSI SMEs and HSI practitioners:**

hsi (1) **Design systems, equipment, and facilities to mitigate or reduce** the effects of threats that impact a user’s ability to complete the mission by: (a) Minimizing human impairment from direct threat events or accidents (e.g., toxic releases, ballistic threats, electro-magnetic pulse) and deliberate or accidental cyber events (e.g., denial of service, natural or man-made disruptions in network infrastructure and services during mission execution). (b) **Avoiding or withstanding man-made harmful or hostile environments** (e.g., chemical, biological, and nuclear threats).

hsi (2) **Evaluate and reduce susceptibility and probability of personnel being attacked** by mitigating fratricide and detectability through system and facility design.

hsi b. Design consideration will:

(1) Include primary and secondary effects from these events.

(2) Consider any special equipment necessary for: (a) **Personnel** survivability. (b) **Emergency** egress.

NEW LANGUAGE



APAN HSI BOKM Standard Operating Procedure (SOP)

1. Reset your APAN accounts and/or submit a trouble ticket at <https://community.apan.org/support/p/contact>
2. Login to APAN at www.apan.org
3. Access and login to the following: <https://wss.apan.org/osd/HSI-BOKM/default.aspx>
 - a. Provide name, position title, email, APAN username
 - b. Provide supervisor name/email
 - c. Provide justification to be admitted
 - d. Provide affiliated working group or community (primary, alternate)
4. Once approved, access the “HSI Contacts” list (ie, HSI Rolodex):
 - a. <https://wss.apan.org/osd/HSI-BOKM/Lists/HSI%20Contacts/Public%20Contacts.aspx>
 - b. Complete all fields with as much detail as possible for benefit of the community
5. Eligible to access content within permissions parameters

“SHARK”

