Technical Report: A Human Systems Integration Perspective for DoD Knowledge Management Practice



May 2024

Office of Systems Engineering and Architecture Office of the Under Secretary of Defense for Research and Engineering Washington, D.C.

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Technical Report: A Human Systems Integration Perspective for DoD Knowledge Management Practice

Office of Systems Engineering and Architecture Office of the Under Secretary of Defense for Research and Engineering 3030 Defense Pentagon Washington, DC 20301 osd-sea@mail.mil | Attn: HSI https:www.cto.mil/sea/hsi

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Principal Deputy Executive Director for Systems Engineering and Architecture Office of the Under Secretary of Defense for Research and Engineering May 2024

A Human Systems Integration Perspective for DoD Knowledge Management Practice Change Record

Date	Change	Rationale

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1.1 Purpose

This report provides recommendations for Department of Defense (DoD) practitioners interested in developing a knowledge management (KM) solution (or service) (KMS) for a discipline, community, or initiative. A KMS is a framework to gather data, tools, and expertise on a subject so the information can be maintained, updated, and shared among the relevant community of users.

As a case study and example, this report uses a KM initiative conducted by the DoD Joint Human Systems Integration (HSI) Working Group (JHSIWG), led by the Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)) office of Systems Engineering and Architecture (SE&A). SE&A is the office of primary responsibility for the HSI discipline in DoD. The JHSIWG began by conducting a Capabilities-Based Assessment (CBA) (i.e., gap analysis) with a resulting CBA Report in 2018. The group then established a KMS that includes an HSI Body of Knowledge (BoK) coupled with Defense Acquisition University (DAU) and All Partners Access Network (APAN) HSI Communities of Practice (CoP). The JHSIWG continues to improve the HSI KMS with new information and tools.

Using the JHSIWG example, this report suggests a series of steps to develop and deliver a KMS in the DoD context. It highlights best practices and lessons learned. This report can be used by DoD or other Federal agency groups to deliver a KMS either at low capital investment or as part of a larger strategy using modern approaches such as artificial intelligence (AI)-enabled capabilities.

1.2 Key Knowledge Management Concepts

1.2.1 Records and Information Management

Key concepts associated with KM include: records and information management (e.g., information gathering, storing, and sharing); incorporating a variety of approaches to build a KM framework, or KMS; using new technologies such as AI; collaborating with the community; a knowledge audit; global boundaries of information; and curation and moderation of data.

Good records management supports mission success, as records are a form of knowledge. In the DoD context, KM is a process to enable the flow of knowledge to enhance shared understanding, learning, and decision making (ADP 6-0 2019). Recently the Department's attention to information management focuses on quickly taking raw data and transforming it into useful

information to support timely decisions. The information may be useful beyond its initial employment and therefore becomes part of DoD records (DepSecDef 2023).

To transform content into an asset, organizations need to develop and implement a framework for KM (Costanza 2022), or a KMS. A KMS is composed of KM-related tools, such as data management system, intranet, groupware, and other technologies associated with the organizational practice of KM (Kuo and Lee 2011). This framework should include people and processes, and combined with a tool or venue, it should provide the necessary direction to individuals, groups, and the entire organization to achieve KM while maintaining organizational compliance and security requirements. A community needs a KM capability framework to enable a common understanding of how to implement a KM initiative.

1.2.2 Guidance in KM Capability Process Development

There is no single approach to developing KM capabilities. Information technologies such as e-mail, repositories, intranet portal, teleconferencing, and the activities of mentoring, collaboration, and training all play a role in transferring knowledge. Forums such as CoPs and centers of excellence (CoEs), and training provide a platform. Users apply knowledge within an organization's developmental processes, rules and directives, routines, and teams (Sandhawalia and Dalcher 2011).

An organization's KM processes should focus on obtaining, sharing, storing, and using knowledge. Shared contexts and common representation can facilitate group problem solving and decision making. A KMS can improve organizational excellence if it is properly implemented and fully understood by users (Matayong and Mahmood 2012; Huang 2020).

A KMS may employ the latest technologies, including AI and cloud-based services, to reduce the administrative burden associated with records management while creating an environment in which DoD records are automatically identified and captured, expertly curated, and systemically governed (Edwards 2023).

A community of interest (CoI) can mature into a CoP, or both may coexist and collaborate on a KMS or BoK. Enterprise-level changes can create stress on a BoK and CoP venue, so the implemented digital solution should be flexible to adjust to those circumstances if it is intended to have longevity with its intended audience.

A proposed KMS should facilitate collaboration among members through a unified KM platform (or venue); improve the findability of stored information and knowledge expertise; and improve sharing of (and learning from) consolidated lessons and experiences (Abbas et al. 2022). In a voluntary use information system (IS) environment, users perceive they have a choice to use the system, and they decide whether or not to continue using it. In contrast, a mandatory system is

one in which users perceive they are organizationally compelled to use the system to keep and perform their jobs or are organizationally bound by policy to use the KMS (Agarwal and Prasad 1997; Brown et al. 2002; Venkatesh and Davis 2000; Brown et al. 2002; Koh et al. 2010).

The American Productivity and Quality Center (APQC) produced an industry-inspired Best Practice (2022) that suggests four steps to put a KM strategy into action:

- 1. Assess the current KM capabilities and maturity of the organization.
- 2. Review and evaluate organizational history relating to prior KM efforts.
- 3. Consider current organizational strategic plans and define those objectives.
- 4. Identify and define critical knowledge in the organization Strategic Planning for Knowledge Management.

1.2.3 Knowledge Audit

A knowledge audit is a comprehensive assessment of an organization's knowledge assets, including its explicit and tacit knowledge, intellectual capital, expertise, and skills. Knowledge audits provide opportunities for organizations to improve their management of knowledge assets, with the goal of enhancing organizational effectiveness and efficiency. By conducting the audit, organizations can raise awareness of knowledge assets as primary factors of production and as critical capital assets in today's knowledge economy. This audit includes identifying and defining assets, making connections of their behavior and properties, and describing how, when, why, and where they are used in business processes to achieve a desired outcome ("Knowledge Management" 2023). Knowledge audits can contribute to a CBA effort.

The knowledge audit should start at the common area of local influence, for example, the collaboration of a CoI and CoP, and then seek to reach the appropriate outward limit of the knowledge domain. For a given topic, the knowledge limit may be global and virtually infinite (Figure 1-1). Seeking the global limit has a diminishing return. The global limit most likely will never be met because of resource and time constraints, even if the KMS is globally targeted.



Figure 1-1. Knowledge Audit as a Forcing Function for KMS Delivery

People are important to successful KM. Although AI can support the knowledge audit or solicitation of knowledge from various sources, the curation and moderation are human judgment tasks in line with the cognitive hierarchy. Knowledge has meaning only in a human context, benefiting humans, not machines; and it is based on an individual's experience, expertise, or insight (Army Field Manual 6-0 2022; ATP 6-01.1. Knowledge Management 2024).

Not all human knowledge has been curated on the Internet, so a community developing a KMS most likely will need a time-phased approach to deliver the content either as a unit or in increments. The community will need to refine the BoK over time, so they will determine when the requirements of a knowledge audit have been met sufficiently to deliver the BoK.

1.3 HSI Methodology for Knowledge Management

For its KM initiative, the JHSIWG started with a CBA conducted among the HSI community. The resulting CBA Report (JHSIWG 2018) presents the research, analysis, and methods for a voluntary, multi-venue approach to developing a complex KMS that was intended to serve end users in government, industry, and academia.

This HSI CBA sought to determine how to connect the right information to the right end user for the intended purpose, in an accessible format, for a streamlined, efficient, and productive experience at a reduced capital investment and sustainment cost. The team determined the following to be key elements for a successful KMS delivery (Figure 1-2):

- 1. Defined purpose to create knowledge management content (KMC) (i.e., a BoK).
- 2. Well-established, threshold requirements (multi-domain, multi-dimensional, and multi-functional).
- 3. Governance structure in place (with multiple working groups chartered at the senior and middle management levels).
- 4. Leadership support for breaking down organizational communication barriers (i.e., informal or formal "open door" policies).
- 5. Defined and bounded "stakeholderships."
- 6. Bounded "universe" (i.e., what constitutes the reach of the "global limit")
- 7. Organizational desire to sustain the KMC.
- 8. Dedicated assets (funding and labor) with regular KMS interactions (i.e., water the KMS "tree" every day) (Figure 1-2).



Figure 1-2. Ingredients for KMS Growth

Some CoPs within the DAU enterprise were found to have perished as not all ingredients were sufficiently resourced. The HSI case study lessons learned provide methodologies that appear successful to address challenges in KMS development and deployment in the digital environment.

The following sections discuss the JHSIWG team approach to developing a KMS:

- Step 1: Conduct CBA. The JHSIWG assessed its abilities and envisioned an architecture for HSI knowledge sharing and collaboration where "all roads (to information) connect." The team determined the maturity level of the KMC during the HSI CBA (JHSIWG 2018) and conducted research to improve the level of KMC and KMS maturity over 5 years.
- Step 2: Deliver the Analysis of Alternatives (AoA). The JHSIWG evaluated the history of its KM projects and conducted an AoA to inform its KM strategy development.
- Step 3: Establish KM Requirements and Venue(s). The JHSIWG determined the KM requirements and venue(s) parameters to achieve the HSI KMS Vision. Public, private, and segmented venues were selected to interact in the KMS.
- Step 4: Develop the KM Strategy. The JHSIWG delivered the KMC architecture to achieve the KM strategy.
- Step 5: Deploy the KMS. The JHSIWG conducted site builds for the KM deployment and launch. The group identified internal HSI subject matter experts (SMEs) and helped document and maintain the BoK and community member interest.

After delivering the KMS, the JHSIWG considered KM strategic planning needs. The HSI CBA and case study helped shape the strategic priorities for delivering specialty engineering competency to DoD, government, and industry to inform other engineering discipline AoAs.

2 Step 1: Conduct Capabilities-Based Assessment

To support the HSI initiative, the JHSIWG began by conducting a CBA (gap analysis) to assess what resources and tools already existed to support the HSI community and how these resources could be engaged in a collaborative KMS. This section will summarize the CBA process and results. It will discuss the concept of a "goal statement" for the discipline or initiative, with the results of the HSI Case study. In addition, it will discuss the definition of a BoK and reasons to deliver a CoP.

2.1 CBA Process

The JHSIWG commissioned a SME to conduct a literature review, interviews, research, and analysis to conduct the CBA in response to HR 4909 (NDAA FY 2017). The CBA is a methodical review to assess the current ("As-Is") state of a capability or discipline against a future ("To-Be") state and determine the ability or inability to meet or exceed the capability need, resulting in an associated risk until closed or mitigated. The gap may be the result of no existing capability, lack of proficiency or sufficiency in an existing capability solution, or the need to replace an existing capability solution to prevent a future gap. The SME provided recommendations on how to close the gaps to align the HSI discipline to a future state. The result is captured in the CBA report (JHSIWG 2018).

2.2 JHSIWG CBA Results

The JHSIWG HSI CBA study recommended developing an HSI BoK, a digital CoP for storing and sharing critical HSI knowledge sources and reference materials, developing HSI competencies, and finally conducting an acquisition workforce (AWF) capabilities assessment against the competencies to identify gaps. The HSI community determined the development of an HSI BoK was critical to the practice of the HSI discipline, that a CoP would be the mechanism to curate and expand upon the BoK's initial deployment for primary users and secondary stakeholders, and that the HSI BoK was of primary value to the AWF audience.

As a result of the CBA, the JHSIWG recommended the following areas for investment (JHSIWG 2018; HSI CoP 2023):

- ✓ Institutionalize an HSI BoK.
- ✓ Standardize HSI best practices across the Services.
- ✓ Develop career certification and career paths/billets for HSI workforce supported by a persistent training function.
- ✓ Provide and maintain tools, databases, and processes to support HSI analyses early in acquisition.

✓ Implement a professional, coordinated HSI outreach and marketing function.

The HSI case study team proposed a concept of a BoK as the "heart" of a KMS (Figure 2-1). The BoK's four chambers are the four lines of effort (inferring a BoK "Plus," or interactive digital, approach). Each of the lines of effort are required to make the heart exist in a "healthy" state. The bloodstream and capillary action occurs with funding and community members (e.g., KM core team, sponsors, and stakeholders) flowing consistently through the heart.

The CoP is the HSI discipline's "heartbeat." The rhythms may be sporadic or irregular (e.g., community fluctuations or lack of leadership support). More catastrophically, the discipline's KMS may suffer a heart attack (i.e., funding cuts, venue or platform sunset with no transition plan or redundancy measures, lack of sustained interest by the community).



Recommendation: If possible, use a BOK "Plus" approach

Figure 2-1. The Heart of the KMS

The "Heart of the KMS" illustration can translate into four facets for the successful deployment and sustainment of a digital KMS: advocacy, content, curation, and moderation. The HSI case study provides a human-centric perspective of the steps and artifacts for any community to give its KMS a steady and vibrant heartbeat.

2.3 Community's Goal Statement(s)

A community group or discipline can establish a presence with physical artifacts (e.g., newsletters, flyers, posters at key events) and with a digital site on the Internet. Harnessing the power of the Internet to reach a defined customer base takes a well-defined strategy and effort (both labor and funding).

The HSI CBA Goal statement was to conduct outreach through the following: "Create an online hub for the human systems community (government, industry, and academia) to share knowledge for the betterment of the practice." The statement was developed by the CBA sub-WG (a subset of the JHSIWG) to meet the intent of the HSI CBA study.

2.3.1 Establishing versus Curating the Body of Knowledge

A BoK is inherently knowledge artifacts and information content. If a discipline or community already has a BoK, the content part of the recipe is met. Congratulations! Move on to the Curation section (4.1.1). If not, more work will be needed to outline the goals and to create a reason for information and knowledge content to exist for your community.

Create the Content: Establishing the Body of Knowledge (BoK)

The JHSIWG conducted a deliberate effort to develop an HSI BoK. The HSI case study leveraged a literature search and review of DoD, government, and industry and academic authoritative sourcing, and crowd-sourced the review with its CoP. A funding mechanism to leverage to deliver the BoK may be found in Section 7.

Catalyst for Curation: Community of Practice for Sustainment

A team should establish a CoP for the practitioners to be the forcing function of curation by SMEs and fellow practitioners of the HSI discipline. No sustainment strategy is possible without a strong KM core team and volunteer base and/or funding that provides a dedicated workforce against the effort.

2.3.2 Acquisition Workforce Training and Education

While investing in people is important, research shows that another ingredient is needed to bring out a human's best and channel their efforts into results: organizational capital. This concept encompasses training programs, workflows, department and team structures, employee communications, norms, culture, and leadership. When these elements are effective, they can turn a collection of talented individuals into a cohesive team (Madgavkar et al., 2023).

The implementation of a discipline within the acquisition process cannot be successful without practitioners trained and educated in the tools, techniques, approaches, and methods of the discipline. The JHSIWG defined the HSI discipline by specific DAU competency and functional area of need or involvement during early analysis of the KMC to inform the HSI community.

Recommendation: Identify your discipline's level of necessity to leverage any KMC for the purposes of education and training.

3 Step 2: Deliver Analysis of Alternatives

For the HSI initiative, the CBA report (JHSIWG 2018) laid the foundation for the lines of effort to be served by an HSI KMS. Next, the JHSIWG conducted market research and an Analysis of Alternatives (AoA).

The HSI community conducted multiple research projects at the Naval Postgraduate School (NPS) to fulfill an AoA (O'Neil 2021). The following resources capture much of the groundwork leading up to the HSI CoP being launched.

- Human Systems Integration Capstone "*Factors for Creating a Useful and Enduring Human Systems Integration Body of Knowledge*" Naval Postgraduate School, (Rotklein & Tyndall 2019):
 - This capstone examined the literature on knowledge sharing, conducted interviews with practitioners, and produced a list of "Knowledge Sharing Enablers" and "Knowledge Sharing Impediments" to help guide CoP establishment. This capstone also assessed alternatives for hosting an HSI knowledge-sharing site. The enablers and impediments would apply readily to other technical areas, as would the insights on CoP alternatives.
- HSI KM Site Development Update Briefing, Naval Postgraduate School (O'Neil 2021):
 - An architecture diagram allows practitioners to think through the functional flow of the intended site and to use the diagram as a roadmap to build out site sections (instead of using the bounded venue site functionality itself). As a result, multiple venues were determined to be necessary to serve the DoD, other Federal agencies, industry, and academic partners. The venues continue to evolve to connect HSI stakeholders.

Recommendation: Conduct an AoA. The AoA informs the bounding conditions of the KMS design architecture. A BoK "Plus" approach is a catalyst for this endeavor.

4 Step 3: Establish KM Requirements and Venue Parameters

4.1 KM Requirements

The AoA study resulted in the formulation of the KMS architecture and informed the KM requirements. Activity informed leveraging the top KM enablers and minimizing impacts from the top KM impediments (Figure 4-1).

Big Picture – Enablers and Impediment	S
Successful to Knowledge Managemen	t

Top 10 Knowledge Management Enablers	Top 10 Knowledge Management Impediments
1. Users are motivated via intrinsic and extrinsic reward system (7)	1. Inadequate MGMT support – leaders do not understand system(7)
2. Content Management: fresh, relevant, valuable, and correct; (4)	2. Insufficient resourcing (6)
3. One BOK for questions, answer, ideas, article, and comments (4)	3. No organizational culture for KM (6)
4. Open communication – people feel free to ask for help, advice (4)	4. Wrong KM team – inexperienced, IT-oriented and not familiar with the organization's business (4)
5. Measurable, achievable goals and metrics for KM use (4)	5. Over-reliance on IT; trends as opposed user needs (3)
6. KM aligned with business purpose and strategy (3)	6. Over emphasis on formal learning versus tacit knowledge (3)
7. System is simple and easy to use (4)	7. Lack of responsibility, ownership, and accountability (3)
8. Develop working definition of knowledge & incorporate ideation (3)	8. Burdensome design, inadequate infrastructure (3)
9. Incorporation of KM system into existing workflow and processes (2)	9. Focus on the past and present, not the future (1)
10. Involvement of end user in design of system (1)	10. Communicating by push, vice opt-in (1)

(LCDR Aron Rotklein, LT Christine Tyndall – 2019 NPS Capstone)

Figure 4-1. Enablers and Impediments to Successful KMS

Communities should establish CoP moderators that have the ability to dedicate time and resources to the KMS. In the case of the HSI discipline, the CoP moderators are professionals with full-time jobs, but their participation draws from both work and leisure time. The moderators required some level of expertise to apply judgment to manage content they are familiar with. There seem to be two main use cases for managing content visible to non-members: Curating and Creation.

<u>Curating</u>: Uploading, sharing, or posting links to content with existing distribution statements. In the case of HSI, posting an item served as an endorsement the item was of interest to the HSI community. This curating would include announcements, events, and Wiki posts.

<u>Creation</u>: Creating new content in either a public or private venue. Here, responsibility falls on owners and moderators to ensure content is releasable at the intended distribution level.

Some suggestions the HSI community implemented to foster the site build process include the following:

- Focus live sessions on goal setting, strategy alignment, deconfliction of effort, and updates of mutual interest.
- Once goals have been agreed to, CoP moderators should be empowered to carry out objectives to shape CoP features, functions, pages, etc.
- Moderators should be entrusted with the ability to curate (upload, share, or post links) to any content with existing distribution statements, while keeping other moderators aware.
- Content creation should require mutual review and quality control by other moderators.

4.1.1 Curate

The following resources capture much of the groundwork leading up to the launch of the HSI CoP. There are results here that could be repurposed by communities trying to set up a similar online presence.

"Human Systems Integration Capstone - Features and Functions for an HSI Knowledge Management Sharing Platform." Naval Postgraduate School, (Annabel, LCDR Thomas, and Burton, LT J Taylor 2020)

• This capstone included design and administration of an online survey to determine which potential site features were desired by practitioners and provided an example design approach for one of these site features. The survey could be adopted by any community, as well as the design approach for content sections (Annabel and Thomas, 2020).

"Human Systems Integration Capstone - Case Study Development for HSI Applications." Naval Postgraduate School, (Healy, Chris 2020)

• This capstone reviewed the literature on case studies for knowledge sharing and developed a design pattern for maximizing HSI case study value. A comparison of existing HSI case studies to this pattern is presented, illustrating potential gaps in HSI case study content. Both the pattern and comparison table could be adopted for other technical areas (Healy 2020).

HSI KM Site Development Update (O'Neil 2021).

• Site build preparation details are provided.

4.1.2 Identify the Functionality (Needs versus Wants)

Functionality prioritization will depend on your community's AoA and research (i.e., crowd-sourcing). In the case of the HSI community, the HSI KMC functions prioritized were:

• Functionality (delivered by the time of publication) [function available by the KMS]:

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- Announcements [announcements]
- Repository of artifacts [folder]
- Discussion threads [threads]
- Wiki page [wiki]
- Master calendar [calendar]
- "HSI Rolodex" contacts list (intersect with CBA 5 for connecting members within the APAN venue) [data table]
- "HSI Course catalog" of learning assets [data table]
- "HSI Glossary" list (data table of terms and definitions) [data table]
- "HSI Lessons Learned" list (data table of case studies and success stories, aka
 "Wins") [data table]
- Functionality to explore
 - Chat [chat]
 - Blog [blog]

4.1.3 Moderate

Create Business Rules

Business rules should be established and mature into standard operating procedures and workflows for the KMC.

Create General Mailboxes to Centralize External Messaging

Create email distribution lists and mailboxes for owners and moderators to leverage for reaching your stakeholdership with efficiency.

Create "Bread Crumbs"

To provide access to sources with restricted distribution, publicize general awareness in the public domain, but leave a "bread crumb" to point to the actual artifact in the private community. The bread crumb is an SOP or workflow that describes where to locate an artifact on the private domain but does not circumvent any existing end user requirements to gain permissions to access private domain KMC.

Recommendation: Drop bread crumbs on the public domain to point to the artifacts on the private domain while still meeting artifact protection requirements.

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4.2 Venue Parameters: Public Domain

Public in the context of the cyber domain means the site is Internet-searchable and allows access without a sign-in requirement. The site can provide access to KMC without authenticating an end user's access requirement. Example functions for a public site are documents repository, answers to frequently asked questions, or "how-to" for accessing content and resources or for registering for the site.

4.2.1 Establish DAU Venue Background

Figure 4-2 presents the latest metrics on the registered user base across all DAU CoPs before migration occurred to a new platform in 4th quarter FY 2023. The DAU digital environment used SharePoint 2016 at its foundation. The significance of the trends established showcases few "peaks" across mostly stagnant CoPs. What did these few communities do that drove significant increased membership? Of note, two communities, Joint Rapid Acquisition and Army ESOH, did not have data to report as of April 2023 because (1) no community leader had been identified for quite some time; and (2) the communities were retired and do not have a pre-existing digital footprint after DAU migration was completed in 1st quarter FY 2024. By contrast, the Contracting Officer Representative community hosted numerous "COR café" events to drive increased membership numbers and "thrive."

4. Step 3: Establish KM Requirements and Venue Parameters



Figure 4-2. Historical DAU and APAN CoP Membership (FY21-FY23)

For guidance on how to set up a DAU account, see https://id.dau.edu/. See also the DAU Guide to Establishing Communities 2.1 on dau.edu.

4.2.2 DAU HSI Venue Description

The DAU HSI CoP (https://www.dau.edu/cop/hsi/) serves as the public domain hub for information and inspiration for human systems practitioners and stakeholders across government, industry, and academia. It offers a platform to connect and share knowledge across disciplines and organizations for the purpose of advancing human-centered design. The target audience for this site includes both human systems practitioners and stakeholders from all technical areas concerned with integrating humans and technology effectively. The HSI community's objective is to help practitioners and stakeholders find resources, locate references, discover best practices, identify education opportunities, engage in community events and discussions, and connect with sibling organizations across the community for the advancement of the HSI discipline and practice.

The community followed this process after research was conducted by NPS with a decision by the JHSIWG to proceed with a DAU venue for the public-facing site. The website is maintained and moderated by volunteers from a variety of DoD, government, industry, and academic organizations. Membership is open to all persons eligible for a DAU account.

At the time of this publication, DAU is executing a migration to a new platform, which may require a regression analysis be performed for existing communities to assess its presence shifting within DAU. A community that has yet to establish a presence on DAU's platform (i.e., venue) may require a fresh AoA.

4.2.3 Publicly Releasable Information Requirements

Sample KM requirements can apply to both publicly releasable or Controlled Unclassified Information (CUI) venues. Table 4-1 lists a few sample requirements to consider in building a publicly-releasable KMC solution. Modifications would have to be made for a CUI-capable solution. Appendix B provides the full list of sample KM requirements.

Type R= Requirement A= Assumption C = Constraint	Category	Requirement	Clarification
R	Access	Levels of access (e.g., define user groups)	For both CoPs (APAN and DAU), SharePoint manages via 4 defined user groups (owner, moderator, participant, visitor)
R	Collaboration	Open area to store non-CUI files	APAN Telligent and DAU HSI CoP forums
R	Content	Ability for members to checkout documents for editing	Reserved for SharePoint environment only in APAN and DAU
R	Display	Member discussion area (blog)	APAN Telligent and DAU HSI CoP forums
R	Metadata	By user	HSI Contacts list in APAN and DAU HSI CoPs; under development and functionality is currently limited by the platform(s)
R	Platform	DAU CoP SharePoint	BoK and all public release information
R	Cost	Labor only-TBD UFR	Sustainment-level activity, shared responsibility by JHSIWG
A	Workflow	Develop business rules to achieve desired function (by function); i.e., Configuration control management process	Derived requirement, but assumed will exist (has been developed in APAN and DAU HSI CoPs)

Table 4-1. Sample Public Venue KM Requirements

4.3 Venue Parameters: Private domain

Private means "by invitation only" or a hidden, closed community, which requires a KM core team member (i.e., for APAN, an owner) to approve entry of an authenticated user. The Joint Human Systems Integration Steering Committee (JHSISC) and JHSIWG manage the volunteers

and membership to the private venues for each group and the CBA workstream activities through a KM core team of owners and moderators.

4.3.1 All Partners Access Network (APAN) Venue Background

APAN provides two platform options: Verint Telligent (groups) Platform and Microsoft SharePoint (sites) Platform (APAN Background (2021)). These platforms can be public-facing or private; the JHSIWG decided to leverage APAN in a private setting in combination with the DAU site being its public-facing presence.

For more information about APAN, please visit:

- https://community.apan.org/support (Apan.org)
- APAN Overview and Capabilities
 - https://community.apan.org/support/m/info?folderId=9806facf-d42f-4ad5-9665-697589136f7e&parentId=b6d7bae3-b543-45fa-b1d4fa0d3e13c39f&GalleryPostSort=Subject&SortOrder=Ascending
- Support team available for all users
 - Hotline: (808) 472-7855
 - support@mpe.apan.org

4.3.2 APAN HSI Venue Description

APAN continues to serve the need for a CUI repository and protected environment. It uses SharePoint 2019 functionality as of 4th quarter FY 2023. To support the HSI BoK enterprise, science and technology (S&T) products can be uploaded to the DoD HSI BoK and categorized across multiple BoK "dimensions" for sort and filter review by approved participants using the SharePoint metadata functionality.

In the Telligent environment, APAN is solidifying messaging across multiple Service echelons from HSI leadership working groups to its practitioner base. Announcements seem successful in engaging with the stakeholders and industry, publicizing awareness and connecting users to resources in the sibling APAN SharePoint (Secure) environment. All members in the APAN venue receive push notifications, a process that compresses multiple echelons of organizational layers for more effective direct marketing than segmented or "stove-piped" email distribution lists traditionally encompassing smaller organizational structures.

4.3.3 Registration Standard Operating Procedure

Figure 4-3 shows an example of an SOP to help users complete the registration process for the APAN venue.



Figure 4-3. Sample HSI Private Venue Registration Standard Operating Procedure

4.3.4 Controlled Unclassified Information (CUI) Requirements

APAN is maintained under an approved Authorization to Operate (ATO) effective 27 October 2023 Headquarters Air Force (HAF), office of the Administrative Assistant to the Secretary of the Air Force. Portal Information Managers (PIMs) are responsible for oversight of content upload and management and membership control. They are the community owners of all content posted and curated in an APAN site. In APAN, community owners are synonymous with Knowledge Managers or KM Officers.

Approvals are in place for CUI content (i.e., Distribution B-F) in APAN in accordance with DoDI 5200.48 (March 6, 2020), but there are constraints for storing CUI. Regardless of the requirements behind choosing to store CUI on APAN, CUI requests must be approved by the APAN technical director.

For more information to determine whether APAN is a suitable platform for your needs in hosting CUI, and for guidance in how to execute the responsibilities as a PIM, see this resource: https://community.apan.org/support/m/info/262862.

Figure 4-4 shows a process flow to mark CUI in accordance with DoDI 5200.48. Sample data tables are located in the Appendix A.



Figure 4-4. Approved CUI Marking Workflow for Private Venue (APAN)

4.3.5 User Groups

The human element of communication and collaboration is unique to each community, and the trends on APAN have shown communication deteriorates in owner groups of more than five people. For more guidance on choosing the appropriate number of owners for your community, see "Best Practices for Owners: How Many Owners Is Enough?" (Apan.org https://community.apan.org/support/premier/b/weblog/posts/174491)

The CBA sub-WG conducted a mapping exercise to ensure the same type of permissions were accomplished with the same taxonomy of the "user role" between PUBLIC and PRIVATE venues for consistency in application. See Figure 4-5 for the HSI community's mapping between DAU and APAN.

-	Approval req?	DAU Naming Convention	APAN User Role	Sharepoint Permissions	APPROVAL rights	UPLOAD rights	DOWNLOAD rights
	Yes	Owner (Administrator)	Owner (Appropriate CUI levels)	Full	*	*	*
	Yes	Moderator	Moderator (Appropriate CUI levels)	Contribute	*	*	*
	Yes	Participant (Member)	Participant (Appropriate CUI levels)	Contribute No delete		*	*
	Yes	NA	Visitor (Appropriate CUI levels)	Read			*
	No	Visitor (signed-in only) (DIST A only)	NA	Read			*
	No	Unauthenticated (not signed in) (DIST A only)	NA	Read			*

APAN/DAU User groups mapping

UNCLASSIFIED

Figure 4-5. Sample HSI Private/Public Venue User Group Mapping

4.3.6 HSI Digital Community Metrics

The HSI case study team identified the following metrics:

- Number of functions/features
- Mean-time-between upload/download (MTBU/D)
- Number of members
- Number of discussion threads
- Number of communities represented (at least one member of a community or WG)
- Types of members (by role, functional area, expertise category)

4.4 Venue Parameters: Segmentation

Segmented sites, or "pocket" sites, have a key function: deliberate quarantining of information from a specified user group or role. Conversely, it can also be the deliberate protecting or sectioning of information for use only by a specifically defined (or target) user group. APAN,

21 A Human Systems Integration Perspective for DoD Knowledge Management Practice milSuite, Defense Technical Information Center (DTIC) marketplace, Intelink (https://www.intelink.gov/), and MS Teams DoD 365 can achieve this function for DoD if set up and used to achieve the appropriate segmentation intention. An example of segmentation for the DoD are the Information Technology (IT) tenets established for each of the Armed Services and OUSD, which are inherently stove-piped from one another by nature of their IT capabilities and assigned missions. For example, none of the other Services can see the Navy's "Flankspeed" IT tenet upon initial setup unless an external user is added *and* approved by the Navy.

A segmentation site may or may not allow segmentation to be broken. In order to break segmentation, such as widening the user groups that have access, credentials may be approved through additional business processes and rules in order for that external stakeholder to have access; however, it is a conscious decision to use the KMS in this way and should be captured in the KM Strategy.

4.4.1 Segmented Sites for Internal Coordination

The strongest and most practical need for segmentation is to conduct internal organization coordination. Internal coordination may produce "working paper" drafts and other materials not designed or which have not matured to a state to be shared with external stakeholders. The HSI community has used APAN segmentation strategies to create groups for deliberate lines of effort, such as for each of the five CBA categories, and each of the Armed Services, to bound information sharing with a specific working group and to appropriately section off information between government and industry. Internal communication and collaborations can occur safely because the user group has been specifically defined and by rule the KMS of choice and segmentation, which requires a deliberate act with purpose. If this is a user requirement, a segmentation site might not be the appropriate venue. A breakage of segmentation should not be the normal routine for user group management. Table 4-2 lists the "Pros and Cons" for segmentation sites.

Feature	"Pros"	"Cons"	
Accessibility	Only a specific, targeted user base is captured or eligible	May not afford reachability to the entire customer base	
Channels	No leakage outside the defined user base	Creates stove-piped membership	
Authentication	Ease of pre-approving internal or targeted members	Extra business rules must be applied for authenticating external members (if applicable)	

Table 4-2.	KMS	Segmentation	Feature	Comparison	Table
1 4010 1 2.	INIT	Segmentation	I catul c	Comparison	1 4010

5 Step 4: Develop Knowledge Management Strategy

5.1 Develop the KMS Architecture

Create a vision, including process flows, user groups, and business rules. Start to build a framework that establishes the scaffolding for a data model. While a formal data model is not required, KMS architects and developers are encouraged to start one to achieve incorporating unforeseen, new capability or desired functions in the future. Here are examples of the HSI digital KMS architecture (Figure 5-1) for public-facing (i.e., DAU) and private-facing (i.e., APAN) venues and sample strategy to deliver features (Table 5-1).



Figure 5-1. HSI BOKM Digital KMS Architecture

Table 5-1. KM Strategy of Features

Question	Potential Products/Features	Fulfillment
What are the user roles expected for the BOKM site	Stakeholder Mapping, Personas, User Journey Map	(Stakeholder Map - NPS Capstones) (Personas, User Journey Map)
What business rules will apply to the site?	Initial HSI BOKM Business Rules	(Tiger Team)
What DAU community features are available?	DAU Feature Map/List	(NPS Capstone)
What features are desired by the HSI community?	Interviews or Survey	(NPS Capstone)
How do available and desired features align with KM principles?	Feature-Function Map	(NPS Capstone)
What roles will be needed to maintain the BOKM site?	Initial HSI BOKM Business Rules	(Tiger Team)
Who will volunteer for initial roles?	Volunteer Solicitation	(Tiger Team)
How do we socialize the site?	Announcement	CBA 5 sub-WG

BOKM: Body of Knowledge Management

5.2 Establish Governance and Senior Advocacy

It is necessary to establish and define lines of authority and lines of communication, which help the "roads of information" connect and appropriately elevate artifacts. These roads should be defined beyond the bounds of the defined universe, in the event stakeholders outside the stakeholdership create content worthwhile to include in your universe.

After understanding the full expanse of your universe, next identify the core governance body. Distill the various working groups and committees into the one or two groups most influential in driving your community's cause. This "core" base will be the governing center for your community (Figure 5-2). Ideally, this core group(s) should be chartered. Chartered groups establish an authority within a pre-existing set of stakeholders, creating a foundation to build lines of communication and responsibility.

5. Step 4: Develop Knowledge Management Strategy



Figure 5-2. Identify Core Governance Body(ies) within the "Stakeholdership"

Recommendation: The governance body or bodies should be chartered in order to effect change and apply leadership to the community.

The two core governing bodies for the HSI discipline are the JHSISC and JHSIWG.

5.2.1 Senior Advocacy: Joint Human Systems Integration Steering Committee

Established in October 2015, the JHSISC facilitates execution of the National Defense Strategy priorities by collaborating within the DoD, across government, and with industry, academia, and U.S. allies to strengthen partnerships, highlight critical needs for improving lethality, adapt and deliver technology for improved human performance in DoD missions, and solve problems of urgent operational significance through improved business reform and to meet the modernization priorities.

The JHSISC provides for information exchange and collaboration among Services to ensure efficient use of resources, eliminate redundancy, and facilitate maximum effectiveness in the application of HSI to DoD research and throughout the acquisition programs of the DoD. In July 2018, the JHSISC endorsed the five gaps of the HSI CBA conducted by the JHSIWG. The JHSISC Charter was renewed in April 2023.

Recommendation: Identify and document relationships between and among working groups. The senior-level charter described how to engage with other working groups or communities, in this case, the JHSISC. The charter documented that the JHSISC directs, participates in, interfaces with, and monitors with or between another group, by name. (e.g., the JHSISC directs the JHSIWG).

5.2.2 Governance: Joint Human Systems Integration Working Group

The JHSIWG facilitates communication between operators and system designers to ensure operator-informed decision making during the system design process. The JHSIWG provides recommendations to the JHSISC to set program management standards for HSI processes, data, and products consistent with Service and DoD policies, regulations, and guidelines, to operationalize, integrate, and continuously assess user needs as a means of optimizing total system performance. The JHSIWG continues to work closure strategies for the identified CBA gaps and workstreams (i.e., lines of effort).

The JHSIWG Charter was last approved in October 2020, and is planned for renewal in 2024.

5.3 Create Sub-Working Groups

Create a sub-working group (WG) focused on a specific function, feature, business process or workflow, and venue. For example, the HSI community created three sub-WGs that aligned to the CBA workstream strategy and the JHSIWG governance body: a Configuration Control Board sub-WG dedicated to content moderation, a DAU functionality sub-WG focused on the DAU venue, and an APAN functionality sub-WG focused on the APAN venue.

Figure 5-3 illustrates how the HSI community established its working groups and sub-WGs using APAN for segmented sites and establishing "parent" to "child" relationships.



Figure 5-3. Groups and Sub-WGs for the HSI Discipline Governance

5.4 Define the Taxonomy and Lexicon

The community should determine whether a taxonomy is necessary.

The HSI community conducted research projects at the NPS to fulfill defining and scoping the taxonomy and lexicon for its discipline (see Master of Human Systems Integration Capstone Project "*Standardizing HSI and HSI Domain Definitions*" (Harbison 2021)). Having a starting point in the taxonomy of the discipline will anchor the knowledge audit and will allow for future improvement as communities or organizations shift or migrate or the discipline matures and new or emerging taxonomies develop.

Recommendation: Have the core governance body take action and endorse a set of taxonomy for terms and definitions, including processes or frameworks, for your discipline.

5.5 Create a "Rosetta Stone"

After defining the universe, the community should have a "Rosetta stone" that helps translate the content into the languages of the consumer base (i.e., update and modify the discipline's lexicon). This translation is required if you are spanning multiple communities that have different views or perspectives about the subject KMC. In a simplified case, one "language" would be spoken by the entire universe; therefore, a Rosetta stone would not be required. In a more complex system, more than two languages would have to be translated so concepts transcend across the boundaries of the consumer base, allowing for a coherent storyline to emerge among the content.

In this example, the HSI community has two camps within its universe: those that do human performance research and those that practice the traditional seven domains of HSI. This HSI analysis translation model is used to pivot between and amid human performance and human performance themes bounded within the traditional HSI domains, helping bridge the two schools of thought (i.e., researchers and acquisition professionals). A community or discipline may have a similar need to have its BoK appeal to multiple audiences that use different taxonomies.

Recommendation: Be diligent to consider your S&T/research and development (R&D) community in conjunction with your core audience if you are a cross-cutting discipline. Consider hosting a workshop with the two communities to review taxonomy and definitions in order to build your Rosetta stone.

6 Step 5: Deploy the KMS

6.1 Conduct the Site Build

The HSI case study team developed an Initial Development Plan to outline the KMS approach to deliver the site. See Figure 6-1 for an example.



Source: O'Neil 2021.

Figure 6-1. HSI BOKM Site Initial Development Plan

6.1.1 Conduct Design Sprints

For the HSI case study, design sprints were anchored around a sub-WG of volunteers focusing on one function of the venue. The HSI team prioritized governance approval of the functions to be developed. The group was tasked to provide an implementation strategy to deploy the function.

The activities were approved and governed by the CBA 1 sub-WG. Prioritized functions were assigned a design sprint group, with a 60-90 day sprint cycle for delivery of incremental maturity.

6.1.2 Request Public Release Clearance

Any DoD information intended for release to the public must be reviewed by the Defense Office of Pre-Publication and Security Review (DOPSR) (https://www.esd.whs.mil/DOPSR/).

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6.1.3 Mark CUI According to DoD Guidelines

CUI exists only in the private domain and is not eligible for public release review unless the government owner of the information determines the designation should change, in which case the CUI marking must be removed before the item is submitted for public release review.

All CUI artifacts must be labeled in accordance with that CUI venue's standard operating procedures. See https://www.dodcui.mil/. In the case of the HSI KMC, see Appendix B.

6.1.4 Create Help Guides for Users

Develop a Help Guide to direct and inform users to use the KMS.

6.2 Define the "Universe"

Your community's universe should be defined and bounded. Document the expanse of the community's reach.

There are doers, contributors, managers, stakeholders, and spheres of influence that monitor activity. At a minimum, your community's universe should contain and identify the doers, managers, and contributors and relationships between those groups (i.e., "stakeholderships"). Those on the periphery of the universe should be defined so they can monitor and participate, but they bring unique requirements to the DoD mission. Organizations from industry or Federal partners and academic sectors should be considered.

As an example for the HSI discipline, the core of the doers is the JHSIWG (Figure 6-2). The JHSIWG consists of owners, managers, and participants. The owners have ultimate responsibility for all KMC. The owners establish the governance, develop all business rules and workflows, and define the digital space. The managers help the owners moderate content and determine approvals for individuals to access the KMC. They are also "Trusted Agents." The contributors are participants that occasionally upload or contribute content but do not have oversight or authorizing responsibility for content.

6. Step 5: Deploy the KMS



Figure 6-2. Defining the Community Universe

6.2.1 Connect with Established Entities

Create shortcuts with established KM sites or repositories that augment your mission need. This function can be achieved by establishing a "Related websites" section.

Recommendation: Define each group's scope. Groups should try to reach a consensus about scope and should respect one another's expertise. Identify the "Doers."

6.2.2 Create a Connection for AWF Education

If AWF education and training is a core element of the KM mission, foster a connection with DAU. DAU manages many aspects of a discipline's relevance to the AWF. For HSI, this relevance involves developing the HSI competency within the core DAU competencies and understanding the level of HSI education to the AWF within existing and evolving DAU course content.

Your discipline should include representation by a DAU organization responsible for managing training and education assets, such as course modules, available to the AWF. If you are building and curating a BoK relevant to the AWF, create a connection with this organization to ensure your discipline's equities are represented by a DAU entity who can promote your discipline's BoK and possibly review your BoK to ensure it aligns with existing coursework. The HSI discipline established a connection with DAU by building and delivering a CoP on the DAU platform. More information is in Section 4.2.

Recommendation: Include a DAU liaison in your core governance body for representing your discipline's equities. The liaison will provide inroads to the DAU organization for both content review and development for education (e.g., DAU learning asset managers) and with the knowledge management functional team (e.g., DAU community managers).

6.2.3 Create a Connection with Science and Research

The HSI discipline had a deliberate element of S&T research to advance the discipline and achieve the JHSISC goals and purpose. Much of the S&T content was known to be CUI; therefore, the HSI community established a presence using APAN for achieving knowledge sharing in the CUI (private) domain in order to meet all its identified user needs in accordance with its HSI BoK dimensions (see Section 4.3).

Another DoD resource is the Defense Technical Information Center (DTIC). DTIC serves the DoD as a repository of government-funded scientific, technical, engineering and business-related information. For more information, visit: https://discover.dtic.mil.

Recommendation: Be diligent to consider your S&T/R&D *community in conjunction with your analysis if you are a cross-cutting discipline.*

6.2.4 Define Reporting Channels

Success can be measured by the extensiveness of reach within your defined universe (i.e., the representation of the member base is commensurate with your intended communication envelope) and by reciprocal levels of activity and involvement by the member base to contribute content. Success can also be measured by the number and types of interactions defined and captured in the stakeholderships. The funneling of governance and reporting back to the nucleus is paramount.

Recommendation: Any non-chartered group has no requirement to be affiliated with your Universe analysis. If an identified group is influential in your space, encourage the group to get chartered. Chartering affords an expectation for leadership approval to apply workforce assets to actively participate and conduct a specified mission.

6.3 Branding

It is not always necessary to create a brand to communicate effectively. The decision should be undertaken carefully to avoid expending resources unnecessarily and to avoid conflicting with broader DoD and OUSD(R&E) policy and brands.

The HSI community invested in marketing strategies in 2018 to develop a brand strategy. OUSD(R&E) requires its offices to submit branding and logo proposals to its PAO. Within the parameters of OUSD(R&E) guidance, groups may want to consider proposing a branding strategy for their discipline or concept.

Develop a strategic communication plan in accordance with your KMS architecture.

6.4 Metrics

Typically to check the health of a KMC, ask "When was the last web post dated?"

Anything over a year means the KMS is approaching or has met its end of life.

- Number of functions
- Mean-time-between upload/download (MTBU/D)
- Number of members
- Number of discussion threads
- Number of communities represented (at least one member of that community participating)
- Types of members (by role, functional area, expertise category)
- Percentage of communities represented within the universe
- Number and type of stakeholderships
- Nature of the interactions (e.g., Persistent, ad hoc, incidental)
- Defined, expected interactions
- Number and quality of actual interactions
- Expected versus actual outcomes from the interactions captured (i.e., evaluating the actual behaviors against the intent of the stakeholderships)

7 **Resource Allocations**

Dedicated and funded assets (e.g., labor) of the organization are essential to expedite development and succeed in curating and moderating content in sustainment.

The HSI community implemented Defense Acquisition Workforce Development Account (DAWDA) funds to accomplish development of the HSI BoK and delivery of the BoK and its CoP to the AWF. DAWDA permits the Department to recruit and hire, develop and train, and retain its AWF (see OUSD(A&S) Human Capital Initiatives website, https://www.hci.mil/what-we-do/DAWDA.html).

Appendix A: Platform/Venue Comparison across Requirements

	DAU- Drupal	DoD 365 MS TEAMS	APAN-Telligent	APAN-SharePoint	Mil-Suite
Ability to invite members including .gov, .com, .org, and .edu	Y	N	Y	Y	N
Levels of access (e.g., Restricted area for certain groups, R&M Service Leads, Special Projects, Internal OUSD)	N	Y	3	customizable	Y
Access by DoD, NASA, MDA, DoD Industry, Academia, FFRDC	Y	Y(1)	Y	Y	Y(1)
Restricted area to store CUI files (e.g., Program specific best practices and lessons learned)	N	Y	Y	Y	Y
Restricted area to store CUI files BY User group (via SharePoint permissions)	N	U	Ν	Y	U
Open (i.e. Unrestricted) area to store non-CUI files	Y	Ν	Depends	Y	Ν
Ability for members to checkout documents for editing	Y	Y	Ν	Y	Y
Ability for members to upload files in areas they are provided access	Y(1)	Y	Y	Y	Y
Ability for members to view and edit documents online	Y(2)	Y	View only	View and edit	Y
Member discussion area (blog)	Y	Y-channels	Y	Y	Y-channels
Calendar feature	Ν	Y	Y	Y	Y
Ability to assign Roles	Y	Ν	Y	Υ	Ν
Ability to assign Stakeholder Types	TBD	U	Υ	Y	U
Capacity (number of members)	N	U	unlimited	unlimited	U
File Size Limitations*	Y	U	~1 TB	~1 TB	U
Certification Requirements	CAC or DAU Login	CAC for DOD-use	username/pswd	username/pswd	CAC
Supported Browsers	Chrome, Edge	Chrome, Edge, Firefox	Chrome, Edge, Firefox	Chrome, Edge, Firefox	U

Table A-1. Platform/Venue Comparison across Requirements

1 - If provided access, limited. 2 - View only, download required to edit. * - Requires a request for extensive file storage requirements, say, above 100GB. Y = Yes. N = No. U = Unknown

Appendix B: Venue KM Requirements

 Table B-2. Sample Venue KM Requirements

Type R= Requirement A= Assumption C = Constraint	Category	Requirement	Clarification
R	Access	Levels of access (e.g., define user groups)	For both CoPs (APAN and DAU), SharePoint manages via 4 defined user groups (owner, moderator, participant, visitor)
R	Access	Access by DoD, Federal partners (DHS, NASA), MDA, DoD Industry, Academia, FFRDC	For both CoPs (APAN and DAU), SharePoint manages via user groups
R	Collaboration	Restricted area to store CUI files	in APAN HSI BOKM only (SharePoint)
R	Collaboration	Open area to store non-CUI files	APAN Telligent and DAU HSI CoP forums
R	Content	Ability for members to checkout documents for editing	Reserved for SharePoint environment only in APAN and DAU
R	Content	Ability for members to upload files in areas they are provided access	Public release only on DAU CoP, CUI on TBD Platform
R	Display	Ability for members to view and edit documents online	2 functions here; 'view' and 'edit', achieved through SharePoint permissions via user group for APAN and DAU HSI CoP
R	Display	Member discussion area (blog)	APAN Telligent and DAU HSI CoP forums
R	Metadata	by dimension	See HSI BoK dimensions for a full list (includes Role)

Type R= Requirement A= Assumption C = Constraint	Category	Requirement	Clarification
R	Metadata	by user	HSI Contacts list in APAN and DAU HSI CoPs; under development and functionality is currently limited by the platform(s)
R	Platform	DAU CoP SharePoint	BoK and all public release information
R	Cost	Labor only-TBD UFR	sustainment-level activity, shared responsibility by JHSIWG
R	Access	Ability to invite members including .gov, .com, .org, and .edu	Achieved via APAN and DAU CoPs
R	Access	Contribution permissions	For both CoPs (APAN and DAU), SharePoint manages via user groups
R	Access	No CAC required to login	Achieved via APAN and DAU CoPs
R	Access	Publicly releasable level/type	One level (aka, DISTRIBUTION A)
R	Metadata	Roles	Ability to assign owner, moderator, participant, visitor)
R	Metadata	Stakeholder Types	Ability to search by R&M Engineers, Product Support, Systems Engineers; HSI calls this "program function lane"
R	Display	Customized view	Leverage SharePoint view to customize by data field presentation
R	Access	No. of levels of access	4 required user groups to reach all intended audience members

Type R= Requirement A= Assumption C = Constraint	Category	Requirement	Clarification
R	workflow	ability for a user to tailor contribute content	existing or customized solution in APAN HSI BOKM is under development
R	access	Basic search, the user will type a query in a textbox and click on "Search" button. (i.e, alphanumeric field)	existing in APAN (Telligent) and DAU HSI CoPs; the entry is searched as a case insensitive substring.
R	Access	In advanced search, the user will be able to narrow the search by one or more attributes (date, feedback level of poster/responder, etc.) that are available to choose from. In addition, the user can also make combinations of the chosen attributes by choosing AND, OR, or NOT.	existing in APAN (SharePoint) and DAU HSI CoPs, the entry is searched as a case insensitive substring.
R	Access	All system functions shall be accessible ## minutes of first action taken to access system function.	NA
R	Platform	System shall be able to accommodate at least 50% of the HSI community members on the site at the same time	NA
R	Platform	System shall incorporate an incentive system to give users credit for posts, responses, and answers in order to incentivize fresh content additions to the site. This should involve user participation tracking and a notification system to notify users of credits	existing in APAN and DAU HSI CoPs

Type R= Requirement A= Assumption C = Constraint	Category	Requirement	Clarification
R	Platform	System shall have a forum capability to enable users to ask questions to a community of HSI SMEs	existing in APAN and DAU HSI CoPs
R	Platform	Postings, questions, and responses shall be visible to all users to avoid duplicate efforts and to allow others to learn from meaningful exchanges	existing in APAN and DAU HSI CoPs, administrative settings for notifications/email digest settings
R	Platform	System shall incorporate moderator and gatekeeper functionality to monitor, edit and/or delete data.	Moderator will enforces site business rules and ensure content is appropriate
A	workflow	Develop business rules to achieve desired function (by function); i.e., Configuration control management process	derived requirement, but assumed will exist (has been developed in APAN and DAU HSI CoPs)
R	Platform	System shall be accessible from government and non- government networks.	existing in APAN and DAU HSI CoPs
R	Platform	Authentication should be simple and only require a username and basic 6 character password.	existing in APAN and DAU HSI CoPs
R	Platform	There shall be maximum of 4 steps to submit a document or post to the site. 1) log-in, 2)select "upload document" button, 3) choose doc from user hard drive, 4) select "submit" button.	True for UNCLASS upload; additional data fields may be required to accomplish more extensive filtering capability (trade-off with number of data fields (aka the HSI BoK "Dimensions"))

Type R= Requirement A= Assumption C = Constraint	Category	Requirement	Clarification
R	platform	System needs a content manager or multiple content managers that are dedicated, responsible, and accountable for maintaining content; positions should not be collateral duties, but rather full-time jobs.	2 moderators per Service/agency to manage/curate HSI content
R	platform	System must allow for collaborative efforts while minimizing redundancy; direct linkage to level of transparency within the system.	
R	platform	System must be aligned to the Acquisition Lifecycle and not a stand alone HSI database.	BoK must have a data field addressing "acquisition phase"
R	platform	System must be adequately resourced, including up-front & lifecycle costs	
	platform	System should provide for tacit knowledge capture/exchange: idea forum, lessons learned, best practices, 'ask the expert', drafts for review, and document library	tailored areas to achieve specified functions offered; achieved with use of chat room or email query to a moderator
R	platform	Leadership must promote use of the system	JHSISC/JHSIWG top-down endorsement
R	platform	System needs to be simple, easy to use, easily searchable and have limited information cost	existing in APAN and DAU HSI CoPs

Type R= Requirement A= Assumption C = Constraint	Category	Requirement	Clarification
R	platform	System must organize information by applicable topic for the user, either by Al or content manager	applicable topic has been defined by the community as the HSI BoK dimensions; Can be a human (i.e., manual) function (threshold) or preferably accomplished automatically (objective).
R	content	Ability to create a list	existing in APAN HSI CoP
R	content	ability to enter calendar events	existing in APAN and DAU HSI CoPs
R	Platform	provides a calendar feature	existing in APAN and DAU HSI CoPs
С	content	Capacity	inherited from platform
С	platform	File Size Limitations	inherited from platform
С	Platform	Supported Browsers	inherited from platform
R	Platform	Public searchable (found by web-browser search, Google, Microsoft Edge, Firefox); minimum requirement is Google, and populates in the top 5 hits	DAU HSI CoP

Glossary

accountability: Setting tangible milestones and measures (APQC 2022).

architecture: The structure of components, their relationships, and the principles and guidelines governing their design and evolution over time.

architecture data: Facts, characteristics, and concepts that define the structure of a system and the interrelationships between its parts and its environment. The data is created in a manner suitable for communication, interpretation, or processing by humans or by automatic means. For complex systems, a framework of conventions, principles, and practices is used for organizing and presenting the architecture data within a specific domain of application or community of stakeholders.

artifact: IAW CJCSI 5212.01: "Documentation that supports the compliance or non-compliance with a security control in eMASS. Artifacts can be documents, diagrams, Visio charts, spreadsheets, etc." Products (e.g., documents, diagrams, presentations or briefings, charts, spreadsheets, processes or work flows) manifesting as physical or electronic.

authoritative source of truth: (1) The central reference point for models and data across the life cycle. Provides traceability as the system of interest evolves, capturing historical knowledge, and connecting configuration-controlled versions of the models and data. (DoDI 5000.97); (2) A trusted and reliable source of information that can be used to verify the accuracy of facts, data, and other information.

body of knowledge: A set of concepts, terms, and activities that make up a professional domain, as defined by the relevant learned society or professional association (Wikipedia).

BoK "Plus" Approach: A set of concepts, terms, and activities pertaining to a discipline as identified by a community of practice and includes an interactive environment for stakeholders (e.g., specified pathways, user roles, etc.) to use digital means to navigate pathways of content within an enterprise or on a program.

Capabilities-Based Assessment: a methodical review to assess the current ("As-Is") state of a capability or discipline against a future ("To-Be) state and determine the ability or inability to meet or exceed a capability requirement, resulting in an associated risk until closed or mitigated. The gap may be the result of no existing capability, lack of proficiency or sufficiency in an existing capability solution, or the need to replace an existing capability solution to prevent a future gap. (also "gap assessment").

child (site): A website that is the subordinate of another website in a hierarchy. Any website, except the central website, is a child website of another website. A site can be both a child site and a parent site (Glosbe).

community of practice: A group of people who "share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wikipedia).

community of interest: A collaborative group of users that must exchange information in pursuit of its shared goals, interests, missions, or business processes (DoDI 3110.05, 2018).

competency: An observable, measurable pattern of knowledge, skills, abilities, behaviors, and other characteristics that an individual needs to perform work roles or occupational functions successfully (DoDI 1400.25-V250).

competency-based management: A systematic approach to developing, evaluating, and aligning employee competencies with mission and job requirements throughout the DoD life-cycle talent management framework.

Controlled Unclassified Information: Unclassified information to which access or distribution limitations have been applied in accordance with national laws, policies, and regulations of the originating country. It includes U.S. information that is determined to be exempt from public disclosure in accordance with DoD Directives 5230.25 and 5400.7 (references (r) and (s)) or that is subject to export controls in accordance with the ITAR (reference (f)) or the EAR (reference (t)) (DoDI 8582.01).

digital: Expressed as series of the digits 0 and 1 (i.e.. Binary code); relating to, using, or storing data or information in the form of digital signals; involving or relating to the use of computer technology (Oxford dictionary, 2023); of, relating to, or using devices constructed or working by the methods or principles of electronics (Merriam-Webster 2023).

features: A service or distinguishing characteristic of a software item (e.g., performance, portability, or functionality) that fulfills a stakeholder need and includes benefit and acceptance criteria within one release (DoDI 5000.87).

framework: A basic conceptional structure (as of ideas) (Merriam-Webster 2023).

goal: Observable and measurable end results that guide actions (APQC 2022).

governance: The action or manner of governing; the act or process of overseeing the control and direction of something (Merriam-Webster).

governance body: A chartered Working group of two or more organizations to enact oversight with authority (see Sponsor).

Joint Human Systems Integration Steering Committee (JHSISC): The Senior-level governance body for the HSI discipline for Department of Defense, operating IAW DoDD 5137.02.

Joint Human Systems Integration Working Group (JHSIWG): The chartered, operating arm of the JHSISC to execute the mission of the JHSISC.

knowledge management audit: a methodical examination and review of a knowledge resource.

knowledge management core team: Individuals who are or will be responsible for implementing KM activities (APQC 2022).

knowledge management/information technology (KM/IT): A holistic KM approach and perspective not fueled by a technical solution; is the collection of methods relating to creating, sharing, using and managing the knowledge and information of an organization (Girard and Girard 2015).

knowledge management content (KMC): Artifacts curated as in a body of knowledge or community of practice.

knowledge management "pull" strategy: a KM strategy that involves individuals making knowledge requests of experts associated with a particular subject on an ad hoc basis (pull strategy) (https://en.wikipedia.org/wiki/Knowledge_management -> Strategies).

knowledge management "push" strategy: One strategy to KM involves actively managing knowledge (push strategy). In such an instance, individuals strive to explicitly encode their knowledge into a shared knowledge repository, such as a database, as well as retrieving knowledge they need that other individuals have provided (codification) (https://en.wikipedia.org/wiki/Knowledge_management -> Strategies).

knowledge management solution (KMS): The collected delivery of KMC and venue(s) to implement the KM strategy.

lesson learned (acquisition): A proven experience of value in the conduct of future programs. It is normally a conclusion drawn from evaluation of feedback information or from analysis of the performance resulting from technical and management functional activities. A lesson learned is usually recorded and eventually incorporated, where applicable, in regulations, technical manuals, specifications, standards, or handbooks (MIL HDBK 1908).

Glossary

lexicon: A book containing an alphabetical arrangement of the words in a language and their definitions: dictionary (Merriam-Webster 2023).

outreach: The extent or length of reaching out (Oxford); Communication and Coordination (intra- and inter-) (JHSIWG CBA 5, 2018).

parent (site): A site that has one or more child sites (Glosbe).

priorities: Specific action plans that help achieve the strategic objective (APQC 2022).

quality: an intelligible feature by which a thing may be identified (Merriam-Webster 2023).

segmentation: The process of separating your targets into sections for businesses and customers; A strategy that allows you to identify and connect with your core audience. (Indeed.com) In KM, the deliberate choice in purpose of a specific, target customer-base or audience to deliver a KM venue (SYN: segmented site, isolated site, "Pocket" site).

site: Colloquial usage of "Website" (Oxford dictionary).

sponsors: Senior leaders who support KM and help it align with business priorities (APQC, 2022); The individual (or group) that holds the authority and advocates for needed end user capabilities and associated resource commitments (DoDI 5000.87).

stakeholders: An individual, group, or organization that may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio (Project Management Body of Knowledge (PMBoK 6th edition).

stakeholdership: In the context of KMS, the intersections and interactions of the participating groups within the "universe."

strategic objective: A statement of what the organization chooses to accomplish (APQC 2022).

strategy: Processes and methods that help achieve one or more goals (APQC 2022).

subject matter expert: A person with bona fide expert knowledge about what it takes to do a particular job. (OPM.gov); individuals who are responsible for the organization's critical knowledge (APQC 2022).

taxonomy: The classification, categorization, or grouping of similar items or things (e.g., competencies) (DoDI 1400.25-V250).

universe: The encompassing area considered for the KMS for the identified sponsors, communities and stakeholders to interact.

44 A Human Systems Integration Perspective for DoD Knowledge Management Practice **user (also "end user"):** Those (individuals) who will ultimately use the software solution. Users convey operational concepts, requirements, and needs, participate in continuous testing activities, and provide feedback on developed capabilities (DoDI 5000.87).

user groups: A classification for individuals that represent the different user types that might use the KMS, defining permissions and rights for access and business rules of interaction (also "personas").

venue: The combination of a place or opportunity for communicating ideas and information consisting of 3 elements: 1) platform – a constructed and delivered IT solution; 2) location – the area or (electronic, cyber, physical) space occupied by or intended for something; 3) purpose – designed with intent (Merriam-Webster, 2023) (Modified).

website: A set of related web pages located under a single domain name, typically produced by a single person or organization. (Oxford dictionary); A website (also written as web site) is a collection of web pages and related content that is identified by a common domain name and published on at least one web server (Wikipedia). In the context of KM, the latter definition provides detail for a venue's location (i.e., a common domain name) and platform (i.e., the server).

Acronyms

AI	Artificial Intelligence
AoA	Analysis of Alternatives
APAN	All Partners Access Network
ATO	Authorization to Operate
AWF	Acquisition Workforce
ВоК	Body of Knowledge
CAC	Controlled Access Card
CBA	Capabilities-Based Assessment
CoE	Center of Excellence
CoI	Community of Interest
CoP	Community of Practice
CUI	Controlled Unclassified Information
DAU	Defense Acquisition University
DAWDA	Defense Acquisition Workforce Development Account
DIST	Distribution Statement
DoD	Department of Defense
DTIC	Defense Technical Information Center
FOIA	Freedom of Information Act
HCI	Human Capital Initiatives
HSI	Human Systems Integration
IT	Information Technology
JHSISC	Joint Human Systems Integration Steering Committee
JHSIWG	Joint Human Systems Integration Working Group
KM	Knowledge Management
KMC	Knowledge Management Content
KMS	Knowledge Management Solution (or Service)
NA	Not Applicable
NDAA	National Defense Authorization Act

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Acronyms

NPS	Naval Postgraduate School
OUSD(A&S)	Office of the Under Secretary of Defense for Acquisition and Sustainment
OUSD(R&E)	Office of the Under Secretary of Defense for Research and Engineering
PAO	Public Affairs Office
PIM	Portal Information Manager
R&D	Research and Development
R&E	Research and Engineering
ROI	Return on Investment
S&T	Science and Technology
SE&A	Systems Engineering and Architectures
SME	Subject Matter Expert
UFR	Unfunded Requirement

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Office of the Under Secretary of Defense for Research and Engineering 3030 Defense Pentagon Washington, DC 20301 osd-sea@mail.mil | Attn: HSI https:www.cto.mil/sea/hsi

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