AF/A5/7
CAPABILITY DEVELOPMENT GUIDEBOOK

Volume 2I

Software Development

18 August 2022

Air Force Futures, Center 2, Requirements Oversight Team

AF/A5/7DR, Pentagon 5C858

PREFACE

This Guidebook is one in a series of AF/A5/7 developed guidebooks describing the Air Force process for the development, documentation, staffing, and validation of *operational capability requirements* in support of overarching Capability Development efforts, this volume specifically for Software. **This guidebook describes the specific requirements actions and artifacts that support rapid software development efforts via the recently created JCIDS Software ICD pathway AND via the DoDI 5000.87 Software Acquisition Pathway (outside of JCIDS oversight).**

This Guidebook is a "how to" guide for use by all stakeholders participating in the AF requirements process, and in some cases it includes the answer to the questions "why do we have to do it that way," "where is that written" and "where do we find additional information."

There are no restrictions on release or distribution of this guidebook.

NOTE: Although the AF/A5/7 Capability Development Guidebooks are not statutory or regulatory policy in nature, they represent official guidance and standard procedures developed by AF/A5/7D to ensure compliance with and implementation of overarching Requirements and Acquisition policies. Per AF/A5/7 direction and authority under HAF Mission Directive 1-7, to the maximum extent practical all Air Force Sponsors will follow the guidance and procedures described in these guidebooks or coordinate with AF/A5/7D through the AF/A5/7DR (Requirements Oversight Enabling Team) for case-by-case tailoring.

If you have questions regarding specific information within the Volume 2-series Capability Development Guidebook(s), or if you have suggestions for improvements, please contact:

AFGK: Mr. Richard "Bullet" Tobasco, richard.tobasco.2@us.af.mil, DSN 227- / (703) 692-4197

Guidebook OPR: Maj Scott Kellerman, scott.kellerman@us.af.mil, DSN 227- / (703) 614-0768

AF/A5/7DR Portal Page. Additional guidance and information to supplement this Guidebook is located on the Air Force Futures' AF Portal Page:
https://www.my.af.mil/gcss-af/USAF/ep/globalTab.do?channelPageId=s6925EC1352150FB5E044080020E329A9

CHANGE SUMMARY

Change Summary	Date
This document captures updated organizations, roles, responsibilities, DoD and DAF guidance for software requirements and must be reviewed in its entirety. Portions of this guidebook were derived from the **AF/A5R Requirements Guidebook Volume 6 (24 June 2020, Version 1.02)**, which **is rescinded and replaced** by this Capability Development Guidebook Volume 2I.	N/A

TABLE OF CONTENTS

SECTION 1. INTRODUCTION TO SOFTWARE REQUIREMENTS

1.1. Software Development Pathways: Overview and Background

The increasing prevalence of software-based capabilities on the modern and future battlefield has driven recent updates to the processes and authorities the Department of Defense (DoD) uses to define and pursue software solutions. Software is at the heart of nearly every defense system, mission, and emerging technologies (e.g., autonomy, artificial intelligence, and cyber) and numerous recent senior leadership boards (Defense Science Board, Defense Innovation Board, National Security Commission on Artificial Intelligence) have stressed that DoD's current approach to software development is broken and a leading source of risk. The DoD must fix its processes to enable the speed and agility needed to deliver software at the pace of change. Modernizing DoD's software requirements practices is a critical part to modernizing software acquisition and development and the DoD has adopted modern software development practices to include Agile, DevSecOps, and Lean. The Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)) and DoD Chief Information Officer (DoD/CIO) have championed/directed DevSecOps as the preferred approach to DoD software development.

The "IT Box" model for Information Systems (IS), was originally developed to alleviate the documentation intense traditional hardware centric systems processes. While it still exists as an option within the JCIDS manual, it does not allow for maximum efficiency or agility. The Air Force does not recommend pursing the "IT Box" pathway for software solutions. Based on the recommendations from senior leader boards and DoD stakeholder inputs, Congress directed the DoD to establish a new Software Acquisition Pathway in the FY20 NDAA (Public Law 116-92) Section 800. As part of that wider Adaptive Acquisition Framework (outlined in DoD Instruction (DoDI) 5000.02) that resulted from that Public Law, Congress exempted programs using the new software pathway from JCIDS, until a new software requirements process was agreed to by Joint Staff, USD(A&S), and the Services. The USD(A&S) and the Services implemented the Software Acquisition Pathway (captured in DoDI 5000.87) which includes sub-paths for applications and embedded systems. The new policy established a Capability Needs Statement (CNS) as the initial high-level requirements document.

In 2021, Joint Staff (JS) updated the JCIDS Manual to include new software requirements processes and documents to include a Software Initial Capabilities Document (SW-ICD). The SW-ICD is the preferred method for programs that J8 believes has Joint equities, while the programs that do not can use a Capability Needs Statement. In either case, the SW-ICD or CNS are the initial overarching requirements documents for software capabilities. Per Agile and DevSecOps practices, scope and requirements are dynamic and iteratively defined. Beyond these initial documents, dynamic needs are managed via a product roadmap that lays out the planned capabilities over the next few releases and/or years. Programs may also use a series of backlogs to capture lower-level user stories and tactical level needs that are in dynamic prioritized lists for the next iteration, release, and beyond. This process is shown in Figure 1.1 below (see more at https://aaf.dau.edu/aaf/software/define-capability-needs/).

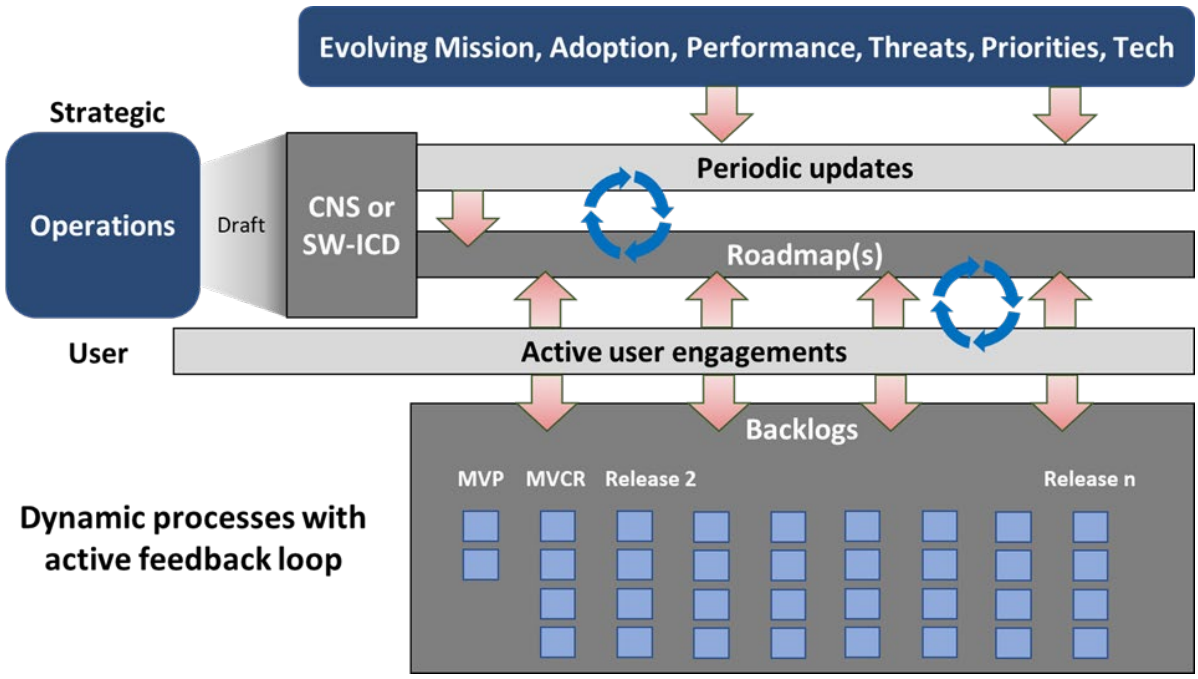

Figure 1.1. Software Requirements Documents Framing a Dynamic & Iterative Process

Although sponsors may prefer a particular software requirements pathway (to minimize oversight and delays, for example), the statutory and regulatory constraints may drive a particular path. Having a clear understanding of any Joint Equities, urgency of need, and tight collaboration between the requirements and acquisition communities is key to setting the right path to follow.

The goal of this Guidebook is to help AF sponsors determine the appropriate software development pathway so that they create the appropriate requirements artifacts the first time. This Guidebook describes the AF's oversight, governance, and implementation of applicable statutory guidance to quickly and efficiently develop suitable requirement documents for software development.

1.2. Identifying the Appropriate Software Requirements Pathway

It is vital for sponsors to pursue the appropriate pathway for their software development effort as soon as possible. If the Joint Staff (JS) Gatekeeper review of a CNS determines that the software requirement has "Joint Equities," then the Sponsor is obligated under the Title 10 authority of the Joint Staff to create a SW-ICD, and use these JCIDS Software pathways with JS staffing, review, and validation. The JCIDS Manual currently lacks a definitive decision framework that guides the Joint Staff Gatekeeper's assessment of "Joint Equities" for software. To address this shortfall, AF software sponsors and developers should submit a Software Equities Summary (SES) to the AF Gatekeeper (AFGK). The AFGK will review the SES and use the following decision framework as an initial test prior to engagement with the Joint Staff. "Joint Equities" may exist if the software requirement meets one or more of the following criteria:

- Redefines or implements additional interoperability standards for data, information, materiel, and services to or from existing and reasonably expected joint systems, units, or forces;
- Completely fulfills or duplicates a declared capability gap of more than one armed force, Defense Agency, or other entity of the Department of Defense;

- Impacts the joint force in other ways such as redefining cybersecurity and/or Net-Ready standards;
- Requires collaborative and/or overlapping development with other software development activities in another armed force, Defense Agency, or other entity of the Department of Defense;
- Additionally, JROC mandate and a limited precedent set to date also indicate that the following software activities will almost certainly be considered to have Joint Equities:
    - Combatant Command-generated software requirements
    - Software requirements involving Nuclear Command, Control & Communications (NC3)
    - Software involved with Joint All-Domain Command & Control (JADC2) efforts (refer to JROCM 074-20)

The goal for all participants in software development is to use the most appropriate requirements pathway from the beginning to avoid any additional and unproductive rework and delays. Sponsors should use this decision framework to self-assess their options and should engage with the AFGK early if they are uncertain. Developing a Software Equities Summary (SES) allow the AFGK and JS Gatekeeper to provide an early assessment of potential Joint Equities.

1.2.1 The Software Equities Summary (SES)

An SES is an informal document created by the software capability sponsor that captures the high-level description of the software context, capability needs, and key interactions. The SES is a tool to enable more informed engagement and early assessment of Joint Equities. Creating this product is a productive exercise for the Sponsor because the elements of a SES are the core components of the eventual software requirements document (a CNS, or SW-ICD). The SES product is not strictly necessary, but it allows for AFGK and Joint Staff Gatekeeper review of the proposed software for Joint Equities, the earliest determination of Software Development Pathway options, and avoids rework later in the process.

The SES should be succinct (1-3 pages) and only needs to contain enough specificity to reveal potential areas of Joint Equity. Format is determined by the sponsor, but key elements of the SES should include: the operational context for the proposed software, the most significant capability requirements and capability gaps that will be addressed, and any potential/known software interactions with data outside of the AF's purview. The use of any DoD Architecture Framework (DoDAF) views in the SES is optional.

- *Note: The SES is a draft product and will not be uploaded to Information & Resource Support System (IRSS) or staffed for reviews and approvals. It will only be used for initial determination of Joint Equities by the AF and JS Gatekeepers.*

1.3. Overview of the Software Acquisition Pathway

The Software Acquisition Pathway (SWP) is intended to provide for the efficient and effective acquisition, development, integration, and timely delivery of secure software for the AF (and DoD). It was enacted by Section 800 of Public Law 116-92 and the policy and procedures to develop and field software system capabilities under this pathway are provided in DoD Instruction 5000.87, *Operation of the Software Acquisition Pathway*. Policy and guidance for the SWP is published at https://aaf.dau.edu/aaf/software/. This pathway is for the acquisition and development of software-intensive systems that meet strict criteria.

The software acquisition pathway is designed for software-intensive systems. The pathway objective is to facilitate rapid and iterative delivery of software capability to the user. This pathway integrates modern software development practice such as Agile Software Development, DevSecOps, and Lean Practices. Capitalizing on active user engagement and leveraging enterprise services, working software is rapidly and iteratively delivered to meet the highest priority user needs. Tightly coupled mission-focused government-industry software teams leverage automated tools for development, integration, testing and certification to iteratively deploy software capabilities to the operational environment.

There are two paths within the software acquisition pathway: applications and embedded software. Except where specifically noted, the guidance in this issuance applies to both paths equally.

- **The applications path** provides for rapid development and deployment of software running on commercial hardware, including modified hardware, and cloud computing platforms.
- **The embedded software path** provides for the rapid development, deployment, and insertion of upgrades and improvements to software embedded in weapon systems and other military-unique hardware systems. The system in which the software is embedded could be acquired via other acquisition pathways (e.g., major capability acquisition).

In concert with the requirements document, use of the SWP requires approval from the appropriate Acquisition Decision Authority, typically SAF(AQ) or a Program Executive Officer.

The capability requirements for the Software Acquisition Pathway are captured in a CNS or SW-ICD. They capture the high-level needs and interactions but avoids strictly prescribing or limiting the software solution(s).

User Agreement: A commitment between the sponsor and PM for continuous user involvement and assigned decision making authority in the development and delivery of software capability releases. The CNS/SW-ICD and UA function together to enable modern software development processes and techniques.

- *Refer to **Section 4** of this Guidebook for more detail on CNS and UA content and format. The format and required content for other non-JCIDS documents (including Middle Tier of Acquisition, Capability-Based Assessment (CBA)/study, and Analysis of Alternatives (AoA)/analysis documents) are described in the appropriate AF/A5/7 Capability Development Guidebooks.*
- *Until DoDI 5000.87 was issued, this pathway was often referred to as the "Section 800" Software Acquisition Pathway. That terminology is no longer in use.*

1.3.1. Key Attributes of the Software Acquisition Pathway

Per statute and DoDI 5000.87 programs using the Software Acquisition Pathway will NOT be treated as major defense acquisition programs, even if exceeding thresholds in Section 2430 of Title 10.

Statute and DODI 5000.87 also exempted SWP programs from JCIDS until the Vice Chairman of the Joint Chiefs of Staff, in consultation with Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)) and each service acquisition executive, agreed upon the new approach for software requirements. The new SW-ICD and CNS being codified in the JCIDS Manual is the initial step in this new approach.

This Guidebook (alongside the other Volume 2-series AF/A5/7 Capability Development Guidebooks) provides the latest AF governance and processes to support development and approval of *capability*

requirements for Air Force programs using this software pathway. Air Force *acquisition guidelines* for the implementation of the Software Acquisition Pathway are established in DAFI 63-150, dated 11 August 2021.

- *For ease of use, DAFI 63-150 has been incorporated within a verbatim reprint of the DoDI 5000.87. Defense Acquisition University (DAU) also has training materials outlining DoDI 5000.87 implementation available on their website– refer to the* ***Appendix*** *of this Guidebook for more detail.*

1.3.2. Key Tenets of Agile Software Requirements Development

The key to agile software development is to form a collaborative cross-functional team with focus on involvement from the customer/end-user of the system. Software development necessitates a unique approach that is drastically different from traditional materiel solution development for hardware systems. While hardware development requires "hard requirements" up front to drive the system design and development, software pathways should not. In fact, agile software development necessitates "soft requirements" up front, without the rigid specificity and detailed documentation that is typical within the material solution requirements process.

The focus of all of the software development pathways is on solution development with early delivery of capability, followed by iterative and evolutionary updates for continual improvement to the product based on user needs and continuous feedback. The primary metric is delivery of useable solutions.

- *Agile Development should focus on:*
  - *THE PEOPLE (especially end users) over "The Process" (eliminate non-value added steps)*
  - *SOLUTIONS (i.e. functional products) over "Documentation" (publish just enough…)*
  - *RESPONSIVENESS (adapting to changes) over "Plans and Milestones" (be flexible and fluid)*
  - *Early delivery of useful product(s) with frequent updates and continuous improvements*
  - *Welcoming, even encouraging the evolution of requirements – to avoid obsolescence*

A key to success in software requirements includes a self-forming team of competent participants and stakeholders. The main point of all team activity is to develop mission impactful software, not to spend a bunch of time developing and staffing documentation. The Software Acquisition Pathway's UA is a significant part of expectation management, but sponsor and program managers should avoid strict adherence to traditional "roles and responsibilities" discussions. The entire team needs to work as one toward a shared vision. A project plan or roadmap is useful and necessary, but it must not be seen as a rigid set of milestones or limitations – the metric of success is not simply to lay out a plan and then "stay on track"; the metric is to produce value for the warfighter. Traditional or linear approaches to program plans and roadmaps cannot replace the need for flexibility and adaptability to get things done (which may include abandoning the previous plan). This type of approach requires close and continuous coordination and trust relationships between all of the team members in both the Planning and Execution Phases. Figure 2.1 outlines the key activities and artifacts of the Software Acquisition Pathway described in DoDI 5000.87.

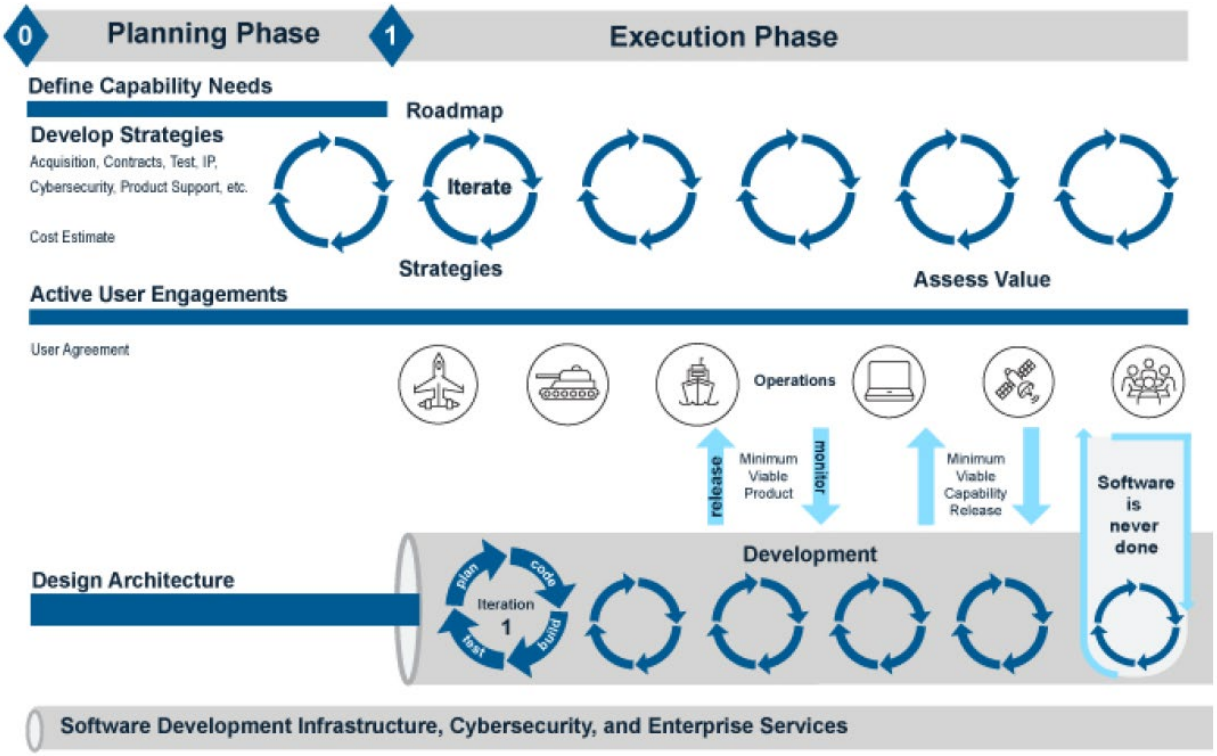

Figure 1.2. The Software Acquisition Pathway

1.4. Overview of the Software Pathway and Software-ICD

The purpose of a SW-ICD is to facilitate efficient and timely software development efforts using an expedited process. The SW-ICD is designed to enable modern software development practices and rapidly deliver mission impactful software. A SW-ICD is not appropriate for hardware development efforts or capturing capability requirements that span a broad scope of hardware, software, and/or DOTmLPF-P efforts. A detailed summary of the SW-ICD document and how it articulates capability requirements, associated gaps, and solution recommendations for JCIDS processing, review, and validation is captured in the JCIDS Manual within Annex A to Appendix B to Enclosure B.

- *Format and required content for all JCIDS Documents are described in the JCIDS Manual. For JCIDS documents designated by the Joint Staff Gatekeeper as "JCB Interest" or "JROC Interest", the document must strictly comply with JCIDS Manual format and content guidance. For JCIDS documents designated as "Joint Information", validation of these requirements is made by the HAF and Sponsors should strive to comply with JCIDS format to the max extent practical, but strict compliance is not mandatory. The focus should be to make sure the documents capture the appropriate information at the necessary level of detail to support the AF's decision making and stakeholder coordination.*

A validated SW-ICD is an entrance criterion for the Materiel Development Decision (MDD) and entry into the Materiel Solution Analysis Phase of acquisition. The validation of a requirement document does not expire unless specifically withdrawn by the validation authority or the document sponsor. Each SW-ICD will be reviewed by the Joint Staff periodically as described by the JCIDS Manual (see also Paragraph 2.7

of this guidebook). Additionally, any changes to the strategic guidance, operational plans, Service and Joint concepts, Concepts of Operation (CONOPs), or other guidance justifying the validation of the original capability requirement document may invalidate the SW-ICD (until revalidated by the appropriate authority).

Software capability requirements that are determined to have "Joint Equities" by the Joint Staff ***must*** utilize the SW-ICD format and validation procedures outlined in the JCIDS Manual. Following AF review and validation, the SW-ICD will be staffed and validated by the Joint Staff using their expedited process.

Software acquisition from a validated SW-ICD is governed by the overarching acquisition policies and management principles of the defense acquisition system (DAS) as described in DoD Directive 5000.01 and DoD Instruction (DoDI) 5000.02. Acquisition governance is outside the scope of this Guidebook, but requirement sponsors should be aware and familiar with the limitations of the acquisition system being pursued.

	Capability Needs Statement (CNS)	Software Initial Capabilities Document (SW-ICD)
Applicability	Software development	Software development that Joint Staff determines has Joint equities.
Approval	Service requirements board or other Service process	Service approval with expedited Joint Staff validation (≤ 40 days); JCB biennial reviews
Key Sections	Ops context/threat summary; capabilities needed; performance attributes; interoperability; req mgmt	Ops context; threat summary; capability requirements and gaps/overlaps; interoperability; final recommendations
DODAF Views	Not required	8 views required
Page Count	5-10 pages	< 10 pages

Figure 1.3. Software Requirements Documents - Similarities & Differences Overview

SECTION 2. AF REQUIREMENTS PROCESSES FOR SOFTWARE DEVELOPMENT

2.1. Requirements Process Overview

The processes to establish software requirements are intended to be streamlined to support a rapid, agile and iterative capability development and fielding process based on early engagement between the Sponsor, the Program Manager or Program Office and the Warfighter/End User. The Requirements Sponsor acts on behalf of the interests of the Warfighter/End User.

- *This Guidebook is not intended to replace or substitute for the DAF acquisition policies and procedures as described in DAFI 63-150 and DoDI 5000.87. Sponsors must read these instructions and consult with Acquisition Professionals to obtain an appropriate understanding of these pathways. This Guidebook only describes the AF's requirements creation and validation processes to support utilization of either pathway.*

2.2. Integration into an Approved Capability Development Plan or Requirements Roadmap

All agile software development efforts must be incorporated within a Capability Development Plan (CDP) or Requirements Roadmap (RR) that identifies the effort's timing and linkages to related and dependent capabilities. Approval of the CDP/RR by the AF/A5/7D (as described in AF/A5/7 Capability Development Guidebook Volumes 2A and 2B) serves to 1) ensure the proposed effort aligns with overarching AF strategy, capability development guidance and resourcing plans, 2) determine what capability analysis and/or documentation exists (or needs to be developed) in order to support proceeding to the appropriate software development effort , and 3) identify affiliated capability development efforts and key stakeholders.

- The Sponsor and the AF/A5/7 Subject Matter Expert (SME) must engage together with the appropriate Acquisition Program Office, SAF/AQX, SAF/FMB, AF/A8P, and AF/A8X to determine the timing and scale of resources required for the software effort.

- The Sponsor and the AF/A5/7 SME must also engage with SAF/AQR, SAF/AQX, and other relevant acquisition stakeholders to build consensus on the appropriate software acquisition pathway. It is essential to develop a shared understanding of potential "Joint Equities" and how the JS determination may affect the desired software acquisition pathway/documentation.

- The Sponsor and AF/A5/7 SME will coordinate with AF/A5DR to solicit assessments of "Joint Equities" by the Joint Staff (AF/A5/7DR is the POC for coordination of these assessments with JS/J8).

2.3. AF Solution Pathway Review (SPR)

[The overall SPR process is described in AF/A5/7 Capability Development Guidebook Volume 2A].

At the appropriate time (described within the approved CDP or RR) the Requirement Sponsor and A5/7 SME, in collaboration with key stakeholders, completes and submits a SPR Worksheet via IRSS for AFGK review and approval. SPR coordination occurs prior to convening a document writing team for document development. SPR coordination should closely follow with the Sponsor's coordination of their Software Equities Summary (SES) with the AF and JS Gatekeepers (refer to paragraph 1.4.1.), if applicable.

Formal HAF-level approval (via the SPR) is required prior to a Sponsor convening the document writing team or conducting any substantive document development activity. For software especially, this step is vital to avoid wasted time and energy and is the purpose of the SES. Sponsors should not begin development of any requirements document until the SPR Worksheet (and associated document strategy) has been reviewed and approved by the AFGK, in consultation with SAF/AQX, AF/A8X, and HQ AFMC/A5R.

- *Note: Written approval (via formal Acquisition Decision Memorandum) from SAF/AQ (or the designated Acquisition Decision Authority, if delegated) is required in order to utilize the Software Acquisition Pathway and associated acquisition authorities.*

- *Note: A Joint Staff assessment of no "Joint Equities" is required to pursue the Software Acquisition Pathway and create the associated CNS and UA artifacts. Until a CNS document is staffed to the JS, the best way to obtain an early assessment of "Joint Equities" is to provide the SES to the AFGK for preliminary review.*

The SPR Worksheet will be reviewed and discussed at the AFGK-led SPR event. Sponsors need to be prepared to discuss key questions and document writing team preparation/participation, to include the following:

- Ensure entry criteria (prerequisites) are met as described above (especially the "Joint Equities" review by Joint Staff)

- Proposed nomenclature; document title should reflect the particular solution/system approach

- Specific gaps and mission needs which are to be addressed by the effort – any related gaps that are outside the scope of the effort?

- Timeframe when the solution needs to be fielded – will the capability be deployed to an operational environment within 1-year from the time when funds will be/have been obligated?

- Cost estimates (as applicable) and funding strategy with respect to available funding sources

- Potential interdependencies with other AF or joint systems/solutions or other enablers

- Key stakeholders -- including end user/warfighter and reps who will be involved with this effort. Is a User Agreement being drafted also?

- Proposed document writing team membership (names and organization represented), location, dates and format (live or virtual), including any issues/concerns with support, security, etc.

- Training, Requirements Management Certification Training, and experience level of Team Leaders and/or Acquisition POC(s)

- Proposed Plan of Actions & Milestones (POAM) for completion of the document and software development

- Timeframe/date when the Sponsor expects to submit the document for initial staffing

- Projected follow-on requirements oversight/reviews and interaction with stakeholders from the Joint Staff, other Services, Combatant Commands, and OSD (if required by SW-ICD)

- Specific recommendations for proposed document format and architectural artifacts (especially if potential for "Joint Equities" determination exists)

2.4. Document Development, Staffing and Validation

Following AFGK approval of the SPR Worksheet, the MAJCOM/Agency Sponsor convenes the document writing team to develop the appropriate software requirements document (SW-ICD, or CNS). If the software requirements document to be written is a CNS, both formal approval by the acquisition decision authority (or USD(A&S)) to use the Software Acquisition Pathway *and* a determination by the AFGK/Joint Staff of no "Joint Equities" are necessary before a document writing team can be convened.

- *Note: Refer to **Section 3** of this Guidebook for detail on format and content of the CNS and a suggested outline for the UA. Refer to the JCIDS Manual for the SW-ICD format and required DoDAF artifacts.*

- *Note: The determination of "no Joint Equities" does not preclude the use of the JCIDS documentation instead of the CNS format. An AF-only SW-ICD will be staffed and validated using the same process as a CNS (both must be accompanied by a draft or final UA). Regardless of the requirement document format that is used, the content must satisfy the needs of the responsible Program Office.*

Following development of the appropriate draft requirements document, and upon approval by the MAJCOM/Agency Director of Requirements (or higher), the sponsor submits the software requirements documents to AF/A5/7DR via IRSS for entry into staffing.

- AF/A5/7DR, in consultation with the AF/A5/7 SME, conducts initial AFGK checks to determine if the CNS, or SW-ICD is ready to enter into AF staffing.

- While the CNS is the only Software Acquisition Pathway requirement document that requires HAF validation, the CNS and UA are complementary documents and all CNS will be staffed together with a UA (whether in draft or final/approved form). The UA document itself is exempt from comments/comment adjudication during the staffing process. UA approval authority is shared between the Program Manager and the Sponsor (as the user rep) and does not require HAF review.

- A staffing and review period will be tailored to the specific efforts and will be conducted utilizing standard IRSS tasking procedures on SIPRNET.

- AF/A5/7DR will also forward the SW-ICD, or CNS to the J8 Gatekeeper for Joint Staff awareness and final assessment of Joint Equities. Should Joint Staff determine that Joint Equities do exist within the final AF-approved document, the Sponsor is obligated to pursue the SW-ICD pathway within JCIDS. If the Joint Staff declare that Joint Equities do not exist, the Sponsor may proceed with the Software Acquisition Pathway.

Comment Resolution. Following the tailored staffing period, the Sponsor completes comment adjudication and any internal MAJCOM/Agency review process, then submits a final version of the document via IRSS for HAF review and validation staffing.

Validation and Approval. Working with the AF/A5/7 SME, AF/A5DR prepares the staff package for review by the designated AF Requirements Decision Authority. Following validation and approval of the SW-ICD,

or CNS by the appropriate Requirements Decision Authority, AF/A5DR uploads the final version of the approved document along with the decision memo to IRSS and forwards a copy directly to SAF/AQX.

- *Note: The CNS may be approved with the understanding that the draft UA that accompanies it may still be in coordination. Staffing, review, and validation of the CNS must be accompanied by the most recent version of the UA, even if the UA is still pending final approval.*

C

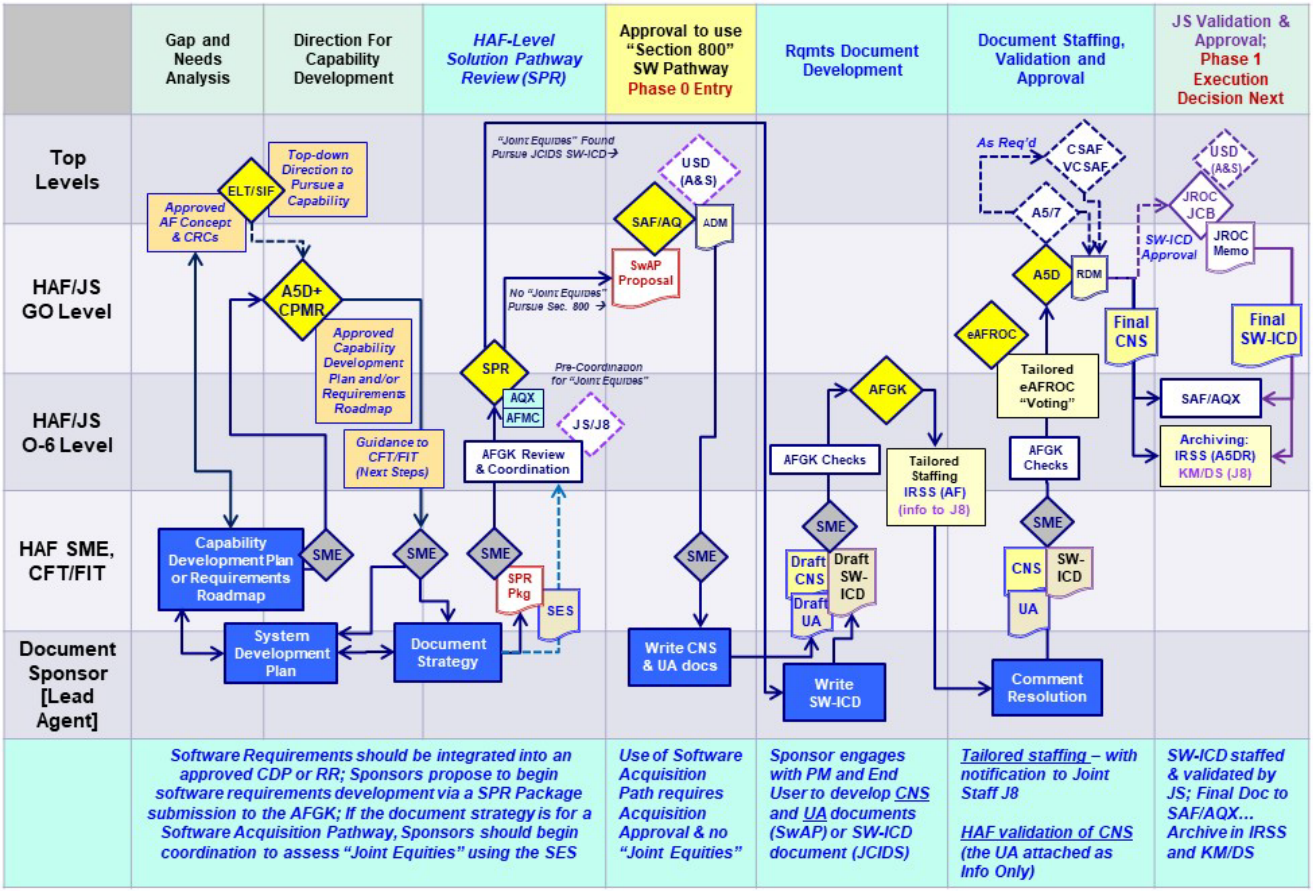

Figure 2.2. Process Map for Software Requirements Document Development

2.5. Value Assessments (Software Acquisition Pathway only)

For Software Acquisition Pathway efforts the sponsor, in coordination with the program office, performs a Value Assessment at least annually. More frequent Value Assessments are encouraged, if practical, to coincide with software development events (releases, milestones, etc.). The Value Assessment is an outcome-based assessment of mission improvements and efficiencies realized from the delivered software capabilities, and a determination of whether the outcomes have been worth the investment. The sponsor/user community performs the value assessment from the warfighter's perspective, not from a software developer's/program manager's perspective. The intent of the Value Assessment is to determine what needs to change, stop, or continue within the program's targets and scope. It's also an opportunity to assess if the threat and/or environment has significantly changed and is reducing the software's value to the warfighter. The Sponsor will submit a summary of the Annual Value Assessment results and recommendations to the program office, AF/A5/7D, AF/A5/7DR, AF/A5/7DY-OAS, and

SAF/AQX. AF/A5/7DR will attach these assessments and products to the original document record in IRSS. The summary should contain the following information:

- Summary of original capability fielding goals/objectives (met, partially met, or not met).
- Summary of capability fielded to the end user, including assessment of the ability of the warfighter to address the validated gaps. Include any findings not directly related to the original gap(s).
- Analysis of the software's operational value by the warfighter with recommendations for further development, modifications, or culmination.
- Recommendation may be to update or create a new CNS to replace the existing CNS. If the new document makes significant changes to the scope or needs, particularly if the recommendations or the current operational environment may affect the determination of "Joint Equities," the AFGK must be consulted to determine if another SPR, re-staffing, and revalidation are necessary. At the discretion of the AFGK, proposed CNS updates that are minor should not require re-staffing and revalidation.

AF/A5/7D will review the Value Assessment results and, in coordination with the affected AF/A5/7 SME, AF/A5/7DR and SAF/AQX, will make an assessment for continuation of software capability development efforts consistent with the affected CDP/RR, CNS, and force design guidance.

- *Note: There is no requirement for an annual SPR to "revalidate" the CNS. However, another SPR will be initiated if a Value Assessment, the AF/A5/7D-led Capability Portfolio Management Review (CPMR), or any acquisition-led review of the software program assesses that another SPR is warranted.*
- *Note: While an SPR may not be required, a periodic review of the CNS is an integral and required part of the Value Assessment process and will be accomplished each time.*

2.6. Periodic Functional Capability Board (FCB) Review of Software Programs (SW-ICD only)

All JCIDS software programs with a validated SW-ICD are obligated to update the Lead FCB on progress and compliance at one year following SW-ICD validation and then biennially after. As described by the JCIDS Manual in Annex A to Appendix B to Enclosure B, the update will permit the Lead FCB to make appropriate recommendations for action and a determination if the program details should be reviewed at the JROC or JCB.

SECTION 3. SOFTWARE ACQUISITION PATHWAY REQUIREMENT DOCUMENT FORMATS

3.1. Capability Needs Statement (CNS)

Purpose: Per Defense Acquisition policy, the purpose of the CNS is to identify mission deficiencies, required enhancements to existing operational capabilities (systems), features, interoperability needs, legacy interfaces, and other attributes required for new software-intensive systems or sub-systems or upgrades to existing systems or sub-systems.

The CNS is a high-level capture of need that provides enough information to define the software solution space, considering the overall threat environment.

The CNS is meant to be a flexible product, periodically updated to reflect the actual baseline as necessary. The approval authority for changes and updates to the CNS is determined by the HAF-level Requirements Decision Authority, and will be detailed in the validation memo for the CNS.

Below is the recommended format for the CNS. Sponsors may include whatever DODAF views they consider to be useful, though there is not a requirement for any in the CNS.

Cover Page:

[Classification]

Capability Need Statement

To Support Software Acquisition Pathway Activity

for

[Program Title]

Document revision number: [version xx]

As of: [Date]

Acquisition Decision Authority: [Office/Title]

Requirements Decision Authority: [Office/Title]

Primary and secondary POCs for the document sponsor. [Include name, title/rank, phone and both NIPRNET and SIPRNET email addresses.]

Primary and secondary POCs for the acquisition program office. [Include name, title/rank, phone and both NIPRNET and SIPRNET email addresses.]

- **Validation Page: placeholder for decision memo**

  While in draft, a placeholder page will be included, with a statement of: “This document (include revision numbering) has not yet been validated and shall not be considered an authoritative

source for the content herein. This document may be considered authoritative only when this page is replaced by a signed validation memorandum from the appropriate validation authority."

Once validated by the validation authority, the placeholder page will be replaced by the signed memorandum indicating validation of the document.

- **Executive Summary:**

  Sponsor's explanation of why this effort is a candidate for the Software Acquisition Pathway.

  Briefly discuss the schedule to achieve an operational capability and a description and definition of what the successful demonstration of this new software solution will look like.

- **Stakeholders and Goal(s) for the System:**

  Identify the key stakeholders and end users of the system, and their roles/authorities regarding key decisions, systems fielding, operations, support and sustainment, etc.

  Summarize the high level goals and scope or focus of the development effort (what are the expected or necessary outcomes for this effort?)

- **Document Body:**

  Section 1: Operational Context, Scope and Anticipated Threats.

  Provide a summary of the operational context and scope of the effort or challenge to be addressed, explaining how the capability solution will contribute to the missions and activities of the Air Force or meet an identified operational challenge within the context of the anticipated threat environment.

  Describe the timeframe under consideration and the overall operational risk and priority.

  Cite the latest Defense Intelligence Agency (DIA) or Service-approved threat products used.

  Section 2: Capability Requirements and Gaps/Opportunities.

  The purpose of this section is to identify and explain the high-level mission needs/capability requirements and associated gaps, challenges or opportunities to be addressed by the proposed solution(s) and to outline the results of related analyses or studies conducted to determine the mission needs/required capabilities and gaps or opportunities and derive the required system-level performance attributes.

  Section 3: Required Features/Functions and Constraints.

  The purpose of this section is to outline the high-level features, mission tasks, or goals for the project that are necessary to address the capability requirements, gaps or opportunities or which are otherwise critical or essential to achieve mission goals and objectives.

  Avoid over specification or inclusion of system level technical specifications.

  Highlight any legal, regulatory or other constraints or compliance items.

Section 4: Interoperability & Supportability

The purpose of this section is to specify how the individual system will operate within the Joint environment, including any physical or net-ready interoperability effects on joint or allied operations. Include factors that impact both the Air Force internally as well as outside agencies and programs.

Identify any necessary interoperability or interfaces with legacy systems

Include any requirements for intelligence supportability.

Include information or attributes for modular open system approach (MOSA) or exportability that may impact future decisions about development, fielding, follow-on production, joint training, etc.

Outline non-materiel (DOTMLPF-P) changes that need to be made in order to successfully implement fielding of the residual capability in an operational environment. Address both a) changes that enable implementation, operations and support of the system and b) changes that must be made to support integration of the system with other fielded capabilities.

Section 5: Resourcing and Schedule

The purpose of this section is to identify the overall resourcing plan and schedule of activities to provide the capability solution and highlight any challenges or risks to the planned timelines.

Highlight any challenges that may impact the feasibility of meeting the timelines or providing a usable capability within the timeline.

- **Glossary – Terms and Definitions**

  Highlight any unique terms, definitions, acronyms or other references.

3.2. User Agreement (UA).

Purpose: Per Defense Acquisition policy and instruction, the purpose of the UA is to capture a commitment between the PM office, the Sponsor and the end user(s) of the system.

The UA is an agreement between the operational and acquisition communities to gain commitment to continuous user involvement and assign decision-making authority in the development and delivery of software capability releases, as well as operational tradeoffs among software features, cadence (of deliveries), and management of the requirements backlog. The UA will ensure proper resourcing of operational user involvement, which should occur as frequently as necessary to support the development process.

The UA is meant to be a flexible product, periodically updated, and UA approval authority is shared between the Program Manager and the Sponsor (as the user rep). HAF-level review and approval of the UA is not required, however the most current UA will be shared with the HAF for record keeping purposes.

There is no required format for the UA, and the detail and sufficiency of the document is at the discretion of the operational and acquisition community participants/signatories. The Defense Acquisition University (DAU) has published a detailed UA template as an example on their website (https://aaf.dau.edu/aaf/software/user-agreement/). A less elaborate outline of an example UA with the core recommended information is shown below:

- **Cover Page:**

[Classification]

User Agreement (UA)

for

[Program Title]

Document revision number: [version xx]

As of: [Date]

Program Manager: [Program Office Signatory and Office Symbol]

Requirements Sponsor: [User Rep Signatory and Office Symbol]

Primary and secondary POCs for the document sponsor. [Include name, title/rank, phone and both NIPRNET and SIPRNET email addresses.]

Primary and secondary POCs for the acquisition program office. [Include name, title/rank, phone and both NIPRNET and SIPRNET email addresses.]

- **Document Body:**

- **Section 1 – User Involvement:**
    - Agreement between the operational and acquisition communities to gain commitment to continuous user involvement
    - Explanation of the plan to ensure proper resourcing of operational user involvement, which should occur as frequently as necessary to support the development process.
- **Section 2 – Decision Making Authority:**
    - Assignment of decision-making authority in:
        - Development and delivery of software capability releases,
        - Operational tradeoffs among software features,
        - Cadence (of deliveries),
        - Management of the requirements backlog.

APPENDIX – REFERENCES, RESOURCES, AND SUPPORTING INFORMATION

References

HAF MD 1-7, *Deputy Chief of Staff Air Force Futures (AF/A5/7)*

AFI 10-601, *Operational Capability Requirements*

DoDI 5000.87, *OPERATION OF THE SOFTWARE ACQUISITION PATHWAY* (02 October 2020)

DAFI 63-150, Operation of the Software Acquisition Pathway (11 August 2021)

DoDD 5000.01, The Defense Acquisition System (9 September 2020)

DoDI 5000.02, Operation of the Adaptive Acquisition Framework (23 January 2022)

Useful Resources

JCIDS Manual (requires CAC for access): **https://www.intelink.gov/wiki/JCIDS Manual**

DoD Directives and Instructions: **https://www.defense.gov/Resources/Forms-Directives-Instructions/**

Defense Acquisition University's Software Acquisition website: **https://aaf.dau.edu/aaf/software/**

Joint Federated Assurance Center (JFAC) website: **https://jfac.navy.mil/JFAC/**

AF/A5/7 Capability Development Guidebook Library (*AF Portal access)*: **https://www.my.af.mil/gcss-af/USAF/ep/globalTab.do?channelPageId=s6925EC1352150FB5E044080020E329A9**

Software Requirements Process Abbreviations and Acronyms

ADM—Acquisition Decision Memorandum
AFGK—Air Force Gatekeeper
CDP – Capability Development Plan
CFT – Cross Functional Team
CNS – Capability Needs Statement
CPMR – Capability Portfolio Management Review
DA—(Acquisition) Decision Authority
DoDAF – DoD Architecture Framework
DOTMLPF-P – Doctrine, Organizations, Training, Materiel, Leadership & Education, Personnel, Facilities and Policy *(see Vol 2A)*
eAFROC – electronic Air Force Requirements Oversight Council
ELT – Executive Leadership Team
FIT – Functional Integration team
FOC –Full Operational Capability
IOC—Initial Operational Capability
IRSS—Information & Resource Support System
JCB – Joint Capabilities Board
JCIDS—Joint Capabilities Integration & Development System
JROC – Joint Requirements Oversight Council
JROCM – JROC Memorandum
KM/DS—Knowledge Management/Decision Support
MVCR – Minimum Viable Capability Release
MVP – Minimum Viable Product
OAS—Office of Aerospace Studies (AF/A5/7DY)
PM—Program Manager
RDM – Requirements Decision Memorandum
RR – Requirements Roadmap
SDP – System Development Plan
SES—Software Equities Summary
SIF – Strategic Integration Forum
SME—Subject Matter Expert
SPR – Solution Pathway Review

SwAP – Software Acquisition Pathway
SW-ICD—Software Initial Capabilities Document
UA – User Agreement