DoD’s Software Acquisition Pathway
Digital Delivery at the Speed of Relevance
*First Annual State of the SWP*

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DoD Senior Lead for Software Acquisition
Acquisition Enablers
USD(A&S)

DAU’s Let’s Talk Agile Series
6 Oct 2021

https://aaf.dau.edu/aaf/software/
Urgency to Modernize DoD Software

15+ SW Provisions
FY18-FY21
USD(A&S) Signed DODI 5000.87 on 2 Oct 2020

Newest AAF Pathway

Enabling DoD to deliver better software faster

Lifetime of growth ahead
29 Programs on Highway 87

Air Force
- AOC-WS
- ADCP
- C2IMER A
- JCC2
- Mod & Sim
- T&G
- UP
- WARPspeed
- WDA Inc 5

Navy
- DCGS-N Inc 2
- MTC2
- NITES Next
- NCSA
- RTSO
- LVC-TE (USMC)

Army
- AIAMD
- RCV
- JCAP
- OWT
- TSS/TMT

DoD
- NBIS
- MED-COP
- EMBM
- Catapult
- DCGS-SOF
- MCS-COP
- SOF DE
- SOMPE
- EDAE

More on-ramping soon...
Growing Number of SWP Programs

- Air Force
- Navy
- Army
- SOCOM
- Other DoD

1QFY21: 9
2QFY21: 17
3QFY21: 22
4QFY21: 29
Diverse Mix of SWP Programs Across DoD

- Air Force: 28%
- Navy: 18%
- Army: 15%
- SOCOM: 12%
- Other DoD: 27%

Diverse Mix of SWP Programs Across DoD
Diverse Mix by Capability Areas

- C4I: 55%
- Cyber: 14%
- Training: 10%
- Embedded: 7%
- Other: 14%
Path Use Within The SWP

- Application: 93%
- Embedded: 7%
Current Phases of SWP Programs

0 Planning Phase

1 Execution Phase

17

12
• **Faster** is possible (deliveries and planning)
• **Hybrid pathway use** (*MCA + SWP; MTA + SWP*) is possible
• **DBS use** is possible

• Accelerate transition using functional equivalence for artifacts and OSD/AE support
  - Go direct to Execution Phase if mature
• Get stakeholder buy-in on new approaches
• **Modernizing requirements, interoperability, cost estimation, T&E for SW**
• Drop old tools / Need to unlearn: No APBs; avoid EVM, KPPs, big docs
• Portfolios: leverage common strategies, platforms, contracts for speed and flexibility

• Demonstrate early success
• **New Templates & Guidance:** Value Assessments, CNS, UA, Estimation, Deployment Frequency, and more
• Metrics: lightest set in the AAF; focused on insights
• Continuous improvement (of SWP and programs)

In April, Kessel Run All Domain Operations Suite (KRADOS) was declared a **minimal viable product (MVP)**, in accordance with the definition outlined in the new DoDI 5000.87. “This is a huge milestone for Kessel Run, ACC and our users...”
Mission Focused

*We enable programs to deliver better software faster*

*Growth mindset: learning while leading*

**Vision:** DoD is a “top 6 market cap” software and innovation “company” armed to win the Great Power Competition

**Mission:** Execute the world’s largest digital transformation to ensure the US dominates in digital capability delivery


Ruthlessly Focused on DoD Unity of Effort to Dominate Digital Product Delivery

Strategic Partnerships to Reform, Streamline, Tailor DoD Environment for Software
JCIDS Ignite: New Software ICD and process aligns SW Requirements with Acquisition

J8 and A&S Partnered to Modernize DoD Software Requirements

Streamlined Content

- No IT Box
- Fewer Review Board Triggers
- No Upfront Cost Data
- Drops 50% of DODAF views
- More NR-KPP Flexibility

Joint Staff Validation

- 110 days
- 40 days

Designed to be Faster – Leaner – More Agile

New JCIDS Manual will be published shortly – will assess 5000.87 Update
T&E Ignite – Aligning T&E with Modern Software acquisition

New Test Strategy Template
> Collaboratively developed with Services, DTE&A, DOT&E
> Supports DSO
> Lightweight & consolidated test data

Building New T&E Guidance
> Focus on using automation and sharing data throughout lifecycle to reduce testing timelines
> Will allow for more dynamic test planning and phasing to match capability delivery

Enabling Modern Interoperability & Cyber
> Embedding cyber and interoperability into continuous test w/ DevSecOps

Supporting Army SW Test Transformation
> Building a policy with Agile and Automation mindset
> Significantly streamlining Test Reporing

Designed to be Faster – Leaner – More Agile
Pursuing:
> Delegation
> Streamlined Docs (significantly reducing content)
> Aligned with Modern SW Dev (e.g., WBS levels; reflecting IaaS/DSO pipelines)
> Iterative Estimates
> No Full Funding
> Faster Development and Validation
New Congressional Direction: FY21 NDAA

Section 835 (JES)

Ensure SWP applies to Defense Business Systems

Deliver capabilities NLT 1 Year, yet Drive < 6 Months
DBS Ignite

Building a *new path* for some DBS programs within SWP

<table>
<thead>
<tr>
<th>Path</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Path</td>
<td>Rapid development and deployment of software running on commercial hardware (including modified hardware) and cloud computing platforms.</td>
</tr>
<tr>
<td>Embedded Software Path</td>
<td>Rapid development and insertion of upgrades and improvements for software embedded in weapon systems and other military-unique hardware systems.</td>
</tr>
<tr>
<td>Defense Business System Path</td>
<td>Acquisition of DBS with high levels of configuration, interfaces, workflow development, and/or custom code</td>
</tr>
</tbody>
</table>

Updating guidance and templates for DBS/SWP programs *Coming soon!

Collaborative Partnership to Align/Integrate SWP and DBS
**Emerging Options to Use Both Pathways**

**Option 1:** Execute in the DBS pathway following BCAC and tailor in SWP to incorporate modern software methodologies.

**Option 2:** Execute in the SWP to fully embrace modern software methodologies and tailor to include BCAC steps for compliance.
Software Acquisition Pathway

Planning Phase
- Define Capability Needs
  - Roadmap
  - Develop Strategies
    - Acquisition, Contracts, Test, IP, Cybersecurity, Product Support, etc.
    - Cost Estimate
  - Iterate
  - Strategies
  - Assess Value

Active User Engagements
- User Agreement

Design Architecture
- Development
  - Plan
  - Code
  - Build
  - Test
  - Iteration 1

Software Development Infrastructure, Cybersecurity, and Enterprise Services

https://aaf.dau.edu/aaf/software/
SWP Interplay of Key Elements

CNS
“I need a C2 system for X mission.”
High-level, enduring needs

Product Roadmap
FY FY FY FY FY FY
• Major features planned
• Legacy and peer systems

Program Backlogs
1. Dynamic prioritized user needs for upcoming sprints and releases

Acquisition Strategy
How you plan to deliver needed software capabilities

Develop/Deliver SW
Small, frequent releases

Active User Involvement

Value Assessment
Report card on software delivered and value based on $$ and mission impact

User Agreement
Commitment of users during development and requirements management

Cost Estimate
Rough at start, refined over time with actuals

Program Budget
Evolved based on performance and feedback from initial developments
Minimum Requirement: **Annually but can be more often as appropriate.**

**Potential Scenarios**

### Annual Cycle

1. **MVCR #1**
   - Release #2
   - Release #3
   - Release #4

2. **MVCR #1**
   - Release #2
   - Release #3
   - Release #4

3. **MVCR #1**
   - Release #2
   - Release #3
   - Release #4

**SWP Official Guidance**

Value assessments will be performed at least annually after the software is fielded to determine if the mission improvements or efficiencies realized from the delivered software are timely and worth the current and future investments from the end user perspective.

More frequent VAs are encouraged:

- **Timing of VA**: negotiated between sponsor and PMO; capture in User Agreement
- **PMO gauge frequency** of VAs based on desire by ops sponsor to provide formal feedback
- Programs encouraged to make use of informal feedback to ensure regular user feedback

**Human Centered Design** demands Ops community and PMO to co-create strategies and governance that support effective VAs

Deploy Frequency:
## Information Requirements: TAILOR!

### Balance speed with rigor: Focus on delivering software, not documents

<table>
<thead>
<tr>
<th>Entering the Planning Phase</th>
<th></th>
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<tbody>
<tr>
<td>ADM signed by DA</td>
<td>Draft Capability Needs Statement</td>
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</table>

<table>
<thead>
<tr>
<th>Entering the Execution Phase</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capability Needs Statement</td>
<td>User Agreement</td>
</tr>
<tr>
<td>Acquisition Strategy</td>
<td>Cybersecurity Strategy</td>
</tr>
<tr>
<td>Test Strategy</td>
<td>IP Strategy</td>
</tr>
<tr>
<td>Product Support Strategy</td>
<td>Information Support Plan</td>
</tr>
<tr>
<td>Program Cost Estimate and ICE</td>
<td>CARD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>During the Execution Phase</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>System Architecture</td>
<td>Product Roadmap</td>
</tr>
<tr>
<td>Program Backlogs</td>
<td>Strategy Updates</td>
</tr>
<tr>
<td>CARD/Cost Estimate Updates</td>
<td>Value Assessment</td>
</tr>
<tr>
<td>Metrics and Reporting</td>
<td></td>
</tr>
</tbody>
</table>

See details at: [https://aaf.dau.edu/aaf/software/develop-strategies/](https://aaf.dau.edu/aaf/software/develop-strategies/)
It takes more than *process* and *technology* to achieve DevSecOps.

- **Gov’t and contractor program teams with:**
  - New roles / responsibilities
  - New skills (training and recruitment)
  - New behaviors

- **Designing Program Teams & their Interactions to:**
  - Optimize performance of individual teams
  - Scale to teams of teams
  - Accommodate complex consumer / provider relationships
  - Respect Conway’s Law

- **We are augmenting DoD DSO Document Set with an Organizational Playbook for DSO; focus:**
  - **Roles:** What are the roles I need?
  - **Structure:** How do I organize my PMO and teams?
  - **Change Management:** how to lead change process and move from *as-is* to *optimal state*
  - **Status:**
    - 2 MVP plays written on Roles & Responsibilities and Team Structure
    - Ongoing interviews to understand impact in different contexts
    - Additional plays and guides to come

Conway’s Law

“Organizations which design systems ... are constrained to produce designs which are copies of the communications structures of these organizations”

Team Topologies

“If the desired ... architecture does not fit the organizational model, then one of the two will need to change”
Metrics and Reporting

- **Registration (within 60 days of joining SWP)**
  - High level info on program (meta data)

- **Insight Reporting (every 6 months Apr/Oct)**
  - Requirements basis
  - Key dates
  - Cost Estimate
  - Contract Strategy
  - Cyber Resilience
  - Performance Metrics

- **Program Management Metrics (ongoing)**
  - For PMs to assess program health and progress
  - Tailored to each program – share with stakeholders
  - Maximize use of automated tools to track/report

Leanest Reporting within AAF

• Support component policy development / alignment
  - E.g., SAE Delegation Memos, Cost and T&E policies, etc.
• Services & OSD Joint Problem Solving
  - Navy playbooks, guidance, & workshops
  - Army Roadshows
• Early Adopters helping each other / sharing lessons learned
• PM Forums
  - FY22 expanding to PM Forums for SWP family members
• **Outreach:** PEO Roadshows, Targeted Discussions, Coaching
• **Guidance and Playbooks:** Interoperability, DBS, XaaS, Deployment Frequency, APB, EVM, RAI, Metrics, Value Assessment, etc.
• **Vignettes:** Portfolio adoption; MTA-to-SWP transition; MTA + SWP adoption
• **Web:** SWP website, FAQs, welcome kit, COI, templates
• Tailored acquisition processes for modern software development

• No formal milestones – Delegated decision authorities

• Exempt from JCIDS (new streamlined process coming soon)

• Streamlined reviews and documentation – No MDAPs

• Leverage enterprise services and not “rebuilding the SW factory”
Integrated policies, guidance, and resources to navigate the SWP with greater speed and success.

Check Out the Latest SWP Guidance Updates!

Software Acquisition

This pathway is to facilitate rapid and iterative delivery of software capability to the user.

Reference Source: DODI 5000.02 Section 4.2

This 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.

https://aaf.dau.edu/aaf/software/
BACKUP SLIDES
There are an additional 13 programs actively planning to adopt the SWP in the next 6 months. We are providing support to these programs to ensure smooth entry.
Minimum Viable Product (MVP)

An early version of the software to deliver or field basic capabilities to users to evaluate and provide feedback on. Insights from MVPs help shape scope, requirements, and design.

Minimum Viable Capability Release (MVCR)

Initial set of features suitable to be fielded to an operational environment that provides value to the user in a rapid timeline.

https://aaf.dau.edu/aaf/software/design-and-architecture/
SWP Baselines and Progress

SWP programs should NOT baseline cost, schedule, and performance using traditional approaches. APB is NOT required and highly discouraged.

<table>
<thead>
<tr>
<th>Legacy HW Centric Systems</th>
<th>Modern SW Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Define requirements upfront</td>
<td>• Iterative requirements</td>
</tr>
<tr>
<td>• Detailed cost estimates</td>
<td>• Active user engagements</td>
</tr>
<tr>
<td>• Baseline C/S/P in APB</td>
<td>• Iterative cost estimates</td>
</tr>
<tr>
<td>• Measure performance vs APB</td>
<td>• Performance via working SW</td>
</tr>
<tr>
<td>• Track contractor via EVM data</td>
<td>• Annual value assessments</td>
</tr>
<tr>
<td>• Focus on compliance</td>
<td>• Continuous improvement</td>
</tr>
<tr>
<td></td>
<td>• Responsive to changes</td>
</tr>
<tr>
<td></td>
<td>• Focus on users/mission impact</td>
</tr>
</tbody>
</table>

DODI 5000.87 does NOT require an APB
Programs migrating to SWP should sunset their APBs
Value Assessments (VA)

• Rigorous form of modern management and risk mitigation
• Fail fast, fail cheap and dynamically and continuously inform further investments

• In the SWP: PM has new type of “contract” with the DA and Sponsor:
  • iteratively deliver value assessed through a VA

• VA reveals how much impact the SW has on mission from end user’s perspective
  • in short-term (immediate functionality)
  • long-term (designing or refactoring for future capability)
  • and given the funding provided to the SW development effort

• Subjective & objective measures measure overall value achieved for assessment cycle
  • measures identified each assessment cycle using governance process in User Agreement
  • VAs consider more than just the capabilities that are immediately visible to the user

• PM and DA look at investment and outcomes produced and either pivot or persevere.

Faster feedback loop allows build, measure, learn cycles which are inside the OODA loop of a traditional APB process
Value Assessment Notional Excerpt

Objective Assessment:

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Improvement Goal</th>
<th>Mission Effectiveness With New Features</th>
<th>Assessed Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID Range</td>
<td>From 50km to 70km</td>
<td>80km</td>
<td>Exceeded Goal. Can identify targets 30km farther, increased engagement opportunities by x%</td>
</tr>
<tr>
<td>Accuracy</td>
<td>From 60% to 70%</td>
<td>80%</td>
<td>Exceeded Goal. 20% more reports accurate, reduced rate of fratricide by x%</td>
</tr>
<tr>
<td>Operating Time</td>
<td>From 100 hours to 150 hours</td>
<td>150 hours</td>
<td>Met Goal. New software improves power utilization, and increases operating time</td>
</tr>
</tbody>
</table>

Value Assessed: High Value

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Expected Performance</th>
<th>Achieved Performance</th>
<th>Assessed Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment Frequency</td>
<td>6x/yr For Highest Prioritized Features</td>
<td>4x/yr Mostly Highly Prioritized Features</td>
<td>Did Not Meet Goal. The releases delivered however provided important capabilities</td>
</tr>
<tr>
<td>Change Fail Rate</td>
<td>&lt;6%</td>
<td>10%</td>
<td>Did Not Meet Goal. The program still achieved reasonable fail rate levels.</td>
</tr>
</tbody>
</table>

Value Assessed: Moderate Value

Subjective Assessment:

<table>
<thead>
<tr>
<th>Usability Improvements to Critical Functions</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronization of Radar Arrays</td>
<td>The ability to synchronize radar arrays quickly and easily upon system startup was substantially improved. Users reported that the time to conduct the synch was reduced and the synch procedures for executing the synch were easier to accomplish.</td>
</tr>
<tr>
<td>Switching Between Control Modes</td>
<td>The ease in switching between control modes was substantially improved. Users reported that the User Interface to execute this function was more intuitive and required fewer steps than in previous configurations.</td>
</tr>
</tbody>
</table>

| Value Assessed | High Value |

SW Delivery | Key Capabilities | Cost  |
---|---|---|
Release 5 | ID Range and Radar Array Synchronization Improvements | $16M |
Release 6 | Accuracy, Operating Time and Control Mode Switch Improvements | $17.5M |

Funding Expended During Assessment Period: $33.5M

Program Deliveries

During the assessment period, the program office delivered Releases 5 and 6 on the Product Roadmap briefed at the last governance meeting. These releases addressed xx key priorities, added XYZ functionality, addressed 3 critical cyber vulnerabilities, and improved program performance from X to Y. **The costs for each release are captured above**

Value Assessment Rating: High Value

Value Assessment Narrative: program successfully developed and released SW that was timely, provided significant improvements for operational users and was worth the investment. The improvements to ID Range, Accuracy and Operating Time are substantial and will result in more effective military operations. **The usability improvements to the critical functions of synchronizing radar arrays and switching between control modes were substantial. The program does still need to mature its SW dev pipeline to deliver more frequent releases with higher quality code. Overall, the user community is greatly pleased with the value received over the last assessment cycle and recommends continuing to fund this effort at the requested levels.**
$ICE Ignite – Key Challenges

- Compressing SWP Cost Estimating Timelines
  - Need to get SWP programs out of Planning and into Execution Phase ASAP.
  - 210 days for an ICE is a challenging planning factor for SWP programs.

- Reconciling Lifecycle Estimates for SWP Programs when SW is Never Done
  - New Way: deploy SW daily/hourly. Concept of “SW complete” anachronistic
  - Programs need to gain adequate insight to inform the FYDP budgeting window.

- Streamlining Cost Estimating Artifacts (such as CARDs) for SWP
  - Is our cost guidance optimized for modern software development or SWP?

- Clarifying CAPE delegation of ACAT II-equivalent SWP programs
  - Expectation is that most SWP program ICE’s will be delegated but that is not clear for SWP programs.

- Releasing Full Funding Requirement Constraints
  - Steals inherent SWP flexibility to adapt to different resourcing levels; requirement is non-statutory.

- Modernizing Cost Estimating Approaches to Support Agile SW Development
  - Need help introducing and socializing common approaches for estimating SWP programs, particularly those operating in the Application path, that support agility.

Need A&S, CAPE and Services collaboration to solve these issues
The initial cost estimate needs to be completed prior to entry into the execution phase and must be updated annually.

Cost estimates are tailored for unique aspects of software development.

CAPE ICE currently required for software programs over ACAT II threshold (based on DoDI 5000.73).

Cost estimates consider the content of the CNS, strategies, and enterprise services in planning and integrate the roadmap, backlogs, and cost actuals throughout development phase.

Where applicable, cost and software data reporting, to include software resources data reports, must be submitted.
### Cost Estimating Principles

#### Nature of Agile Development
- Eschew complete definition of work scope up front
- Promote adherence to cost and schedule, flexing scope
- Assume a relatively constant pace of development, based on team steady state output and the number of teams employed
- Short term deliveries provide continual performance feedback to inform future estimates in execution phase
- Consider complexity as well as past performance in iteratively refining cost estimates

#### Cost Estimate Adjustments
- Accept a higher level of abstraction and less detail
- Use an iterative, integrated, and collaborative approach
- Employ capacity driven estimating methods (versus process driven)
- Update regularly, reflecting a balance of known vs unknown
- Use for planning and providing insights on what capability can be accomplished over time
- Cost out in segments aligned to the Product Roadmap
Goal Question Metric Framework Ensures Purpose for all Data Needs

- **Goals**
  - FY20 NDAA Section 800 (f)
  - 5 specific concerns for Report to Congress.

- **Questions**
  - 17 questions developed by OSD necessary to address the 5 goals

- **Measures**
  - 7 categories
  - 52 atomic elements
  - Provide the necessary data to answer the 17 questions

**Reporting Metrics - Pathway 1.2(l):**
Programs using this pathway shall report a minimal set of data to OUSD (A&S) on a semi-annual basis
SWP Reporting – Enable Data Driven Decisions

**SWP Goal:** measuring performance of the SWP

- **MAXIMIZE SWP Insight** to improve it and reduce bureaucracy
- **MINIMIZE the burden on programs**

**Proactive data strategy & collection approach**

- Closely integrated with the AVSG team
- Piloted with AF .87 program
- Service Feedback via SW Policy Alliance
- Focus on trends to understand AAF efficacy
The DoD 4

1. Delivery Speed and Cadence
   - Lead time
   - Deployment frequency

2. Stability & Reliability
   - MTTR
   - Deployment Failure Rate

3. Value / ROI:
   - Value produced (and associated costs) – tailored to mission threads / stakeholders

4. Cyber Resilience
   - Time to detect/resolve cyber event; AVG time to achieve ATO

- Product Performance & Maturity
  - SW maturity/quality (defect backlog; defect resolution time; key -illities);
  - Product performance metrics and quality attributes will be highly contextual

- Scale of Automation and Transformation
  - Across product lines and mission threads: (% of product lines w/ build automation; % of tests cases automated)

E.g., Forms of Value
- Time savings to execute a mission process
- Increased accuracy of a provided solution that drives a mission decision
- Personnel savings to execute a mission
- Increased safety while executing a mission
- Cost savings resulting from a software capability

PEO/PM (needs get more granular)
Context Drives Roles

**Domain Agnostic**
- Chief Software Engineer
- Security Engineer
- UI/UX Designer

**Embedded Systems**
- Lead DevSecOps (DSO) Engineer
- Software Architect
- System Architect

**Cloud-Native**
- Lead DevSecOps (DSO) Engineer
- Cloud Architect
- Data Engineer
- Cloud Architect

**Web-Based**
- Lead DevSecOps (DSO) Engineer
- Software Architect
- Data Engineer
- System Architect

**Mobile/IoT**
- TBD

**Software Engineering Director (VP, SW Engineering)**
FULL Set of Digital Product Delivery Roles

WORK IN-PROGRESS

MORE COMPLETE SET OF SOFTWARE ROLES

Design
- Product Designer (UI/Graphic Designer)
- UX/Service Designer (User Researcher)
- Tech Writer

Security
- CISO
- SCA
- Security Engineer

Technical
- Software Engineer
- Software/Cloud Architect
- Infrastructure/Platform Engineer
- DSO Engineer/SRE

Data
- Data Analyst
- Data Scientist
- Data Engineer
- AI/ML Engineer / Researcher

Product & Delivery
- Business Analyst
- Product Manager
- Delivery Manager
- Test Manager
- Test Engineer

IT Ops
- To Be Developed
- T&E
- QA Test Analyst

AO | CSO | PEO | Mission Owner | Sponsor | Warfighter/User

Additional Roles:
- UX/Service Designer (User Researcher)
- Tech Writer
- Business Analyst
- Product Manager
- Delivery Manager
- Test Manager
- Test Engineer
- QA Test Analyst

Program Manager | Financial Manager | Cost Analyst | COR | KO | HR | Product Support Manager | Intel/Threat Analyst
• An enterprise and ecosystem perspective:
  • aligns our business and tech capabilities/functions w/ DoD’s codified strategy for modern SW delivery (DevSecOps)

• DSO supports entire mission thread.

• FOGO/SES Leadership must understand that realizing DSO benefits requires
  • coordination and mutually supporting efforts from mission owners, requirements generators, the acquisition corps, and resource advocates...

• The benefits of DevSecOps are well known but it cannot simply be “bolted on” to existing program structures.

DoD Stakeholders recognize that fundamental structural, governance, and process changes – and new ways of collaborating – are needed.

This applies to requirements, cybersecurity, responsible AI, and more. What are better approaches to identify Joint equities early, ensure security and interoperability, and drive capability portfolio management?
Factors to Consider

**Amount of Customization**
- Low
- High

**Government Ability to Contribute Code**
- Low
- High

**Extent of Business Process Reengineering**
- Initial
- Continuous

**Expected Deployment Frequency**
- Infrequent
- Frequent

**Level of Requirements Responsiveness**
- Low
- High
Congress and DoD Drive Software Reforms

Recent NDAAs
- FY18 Sect 873/874 Agile Pilots
- FY20 Sec 800 Software Acquisition
- FY20 Sec 862 Software Training
- FY20 Sec 230 Digital Careers

Leadership Direction
- Gen Hyten: Insert speed, take risk
- Ms. Lord: Software runs through all our programs
- Dr. Roper: Change software daily
Directed DoD to create two software acquisition pathways

Applications and Embedded Systems

• Software programs shall **not** be treated as an MDAP

• **Exempt** from JCIDS (unless VCJCS, A&S, SAEs agree on new process)

• **Streamline** SW requirements, budget, acquisition processes

• Demonstrate viability and effectiveness of capabilities for operational use within **one year** after funds first obligated

Key Elements of SW Acquisition Pathway

- Modern SW development practices
- Human-centered design
- Active, committed user engagement
- Enterprise services/platforms
- Rapid and iterative deliveries
- Gov’t-industry software teams
- Automated tools

Source: DODI 5000.02 Section 4.2
Planning Phase

Focuses on understanding the users’ and systems’ needs and planning the approach to deliver capabilities to meet those needs

Key Artifacts

- Capability Needs Statement
- User Agreement
- Program Strategies
  - Acquisition Strategy
  - Contracting Strategy + IP Strategy
  - Test Strategy + Cybersecurity Strategy
  - Product Support Strategy
- Cost Estimate

https://aaf.dau.edu/aaf/software/planning-phase/
Execution Phase – Key Activities

- Product Roadmap
- Program Backlogs
- Active User Engagements
- Develop, Deliver Software
- Track Metrics
- Value Assessments

Continuous improvement to maximize mission impact.

https://aaf.dau.edu/aaf/software/execution/
Capabilities Needs Statement (CNS)

A high-level capture of need with enough information to define the software solution space and consider the threat environment.

- Sponsor and Requirements Manager ID
- operational software capabilities needed
- Draft CNS to start the Software Pathway
- Refine during Planning Phase and approve prior to entry into Execution Phase

A&S Acquisition Enablers shop collaborating with Components to encourage adoption of flexible and streamlined requirement processes for the SWP.

Clear Understanding of What is Needed

https://aaf.dau.edu/aaf/software/user-engagement/

Draft CNS Template
Evolving Mission, Adoption, Performance, Threats, Priorities, Tech

Periodic updates

Roadmap

Active soldier engagements

Backlogs

Dynamic processes with active feedback loop

MVP  MVCR  Release 2  Release n

Draft
User Agreement

Agreement between the operational and acquisition communities to ensure active user involvement and informed decision making.

- Ensure proper resourcing of user involvement to support development
- Commit to active user involvement throughout design and development during planning phase
- Signed by sponsor, PMO prior to entry into Execution Phase

Establish Strong Ties to Users from Start

https://aaf.dau.edu/aaf/software/user-engagement/
"DevSecOps is the preferred software practice for DoD to deliver at speed of relevance" – DoD CIO, USD(A&S)
DevSecOps Maturity
Very Difficult to Adopt – Requires time - $

Continuous ATO (cATO) enables bug and security fixes in minutes instead of months to years and provides rapid deployment of critical capabilities to the war fighter at the speed of relevance.

Shift Cybersecurity Left
DevOps
Continuous Integration
Agile, Microservices, Test Driven Development
Iterative with Hybrid or SOA Monolithic Architectures
Monolithic Architecture, Manual Processes

End to end cycle time – Design to Delivery

Difficult
High
Low

Continuous ATO (cATO)
DevSecOps
Continuous Monitoring
Telemetry Capture
Service Mesh
Secure Containers

DevSecOps Maturity

Significant investment of time, effort and tools are required to achieve high DevSecOps maturity

Adoption Challenge

Brady Stark Smith
Triangle of DSO Success
Secure Software & Cyber Security Plan

- The Sec in DevSecOps is baked into the planning, architecture and design, and embedded throughout the entire process.
- DevSecOps shifts Cybersecurity to the left; true risk managed process.
- Cybersecurity risk is continuously scanned, evaluated & monitored – yields accessible, automated artifacts enabling continuous ATO.
Instead of a single monolithic contract for software solution

Portfolio of contracts of using *Modular Contracting*

### Example Modular Contracting Strategy

<table>
<thead>
<tr>
<th>Services/Tools</th>
<th>Contract Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agile S/W Dev Team(s) (Services)</td>
<td>FAR 8.4, FAR 12, FAR 13.5, FAR 16.5</td>
</tr>
<tr>
<td>Microservice Solutions (Tools)</td>
<td>FAR 8.4, FAR 12, FAR 13.5, FAR 16.5</td>
</tr>
<tr>
<td>DevSecOps-aaS (Manage CI/CD Pipeline)</td>
<td>FAR 8.4, FAR 12, FAR 13.5, FAR 16.5</td>
</tr>
<tr>
<td>Platform-aaS (CI/CD Pipeline)</td>
<td>FAR 16.5, BOAs (i.e., Platform One)</td>
</tr>
<tr>
<td>Infrastructure-aaS (Cloud solution)</td>
<td>FAR 16.5 (i.e., Cloud One, AWS GovCloud)</td>
</tr>
</tbody>
</table>

Agile Software Dev Contracts

(may have separate contracts for each dev team)

**Objective:** Support small, frequent releases, respond to change, consider programmatic risks, and program scope/objectives
**Congress Actively Driving DoD on Software Modernization**

### NDAAs

#### FY18
- **Sec872** – Defense Innovation Board analysis of software acquisition regulations
- **Sec891** – Training on Agile or iterative development methods
- **Sec873** – Pilot program to use Agile or iterative development methods...
- **Sec874** – Software development pilot program using Agile best practices

#### FY19
- **Sec868** – Implementation of recommendations of the final report of the Defense Science Board on the design and acquisition of software...
- **Sec869** – Implementation of pilot program to use Agile or iterative development methods...
- **Sec860** – Authority for continuous integration and delivery of software applications and upgrades to embedded systems
- **Sec230** – Talent management of digital expertise and software professionals

#### FY20
- **Sec862** – Software development, software acquisition training and management programs
- **Sec830** – Digital Engineering capability to automate testing and evaluation

#### FY21
- **Sec835** – Balancing security and innovation in software development and acquisition
- **Sec. 838** – GAO report on implementation of software acquisition reforms.
- **Sec. 812** – Inclusion of software in Government performance of acquisition functions.
- **Sec 834** – Pilot program on the use of consumption-based solutions to address software-intensive warfighting capability.
- **Sec255** – Department-wide software science and technology strategy
Strengthening DoD Software Acquisition

**Better**
- High Mission Value
- Cyber Secure
- Enable Efficiencies

**Faster**
- Lead Time – Need to Delivery
- Frequency of Releases
- Rapid Response to Operations/Cyber

**Culture**
Human-centered design, speed of delivery, and continuous improvement

**Policy**
OSD, Joint Staff, and Service policies to provide flexible structure for modern software

**Process**
Streamline and transform cost, requirements, T&E, cyber, and sustainment for software

**Guidance**
Provide how-to insights and resources to shape program strategies and execution

**Tools**
Leverage software factories, DevSecOps pipelines, enterprise platforms, services

**Training**
Transform software training for DoD’s acquisition and operational workforces
Adaptive Acquisition Framework

A set of acquisition pathways to enable the workforce to tailor strategies to deliver better solutions faster.

https://aaf.dau.edu/

AAF Tenets

- Simplify Acquisition Policy
- Tailor Acquisition Approaches
- Empower Program Managers
- Conduct Data Driven Analysis
- Actively Manage Risk
- Emphasize Sustainment
Contracting Cone

- Spectrum of FAR and Non-FAR strategies
- Common applications, pros/cons, comparison, resources
- Filters strategies to explore for SW Dev, IT Services, IT HW, etc.

https://aaf.dau.edu/contracting-cone/
Active User Engagements

Critical to the success of software development to ensure delivered software address their priority needs

• Understand their needs and operational environment
• Solicit their feedback on MVPs, designs, developments
Key Elements of Acquisition Strategy

- Summary of Capability Need
- Acquisition Approach
- Cybersecurity Strategy (Annex of Program Protection Plan)
- Technical Decisions
- Program Roadmap
- Risk Management
- Contract Strategy
- Cost Estimate and Funding
- Test and Evaluation Strategy
- Product Support Strategy
- Metrics
- Program Staffing and Resourcing

Some of these sections may be standalone documents and simply summarized in the acquisition strategy

https://aaf.dau.edu/aaf/software/program-management/
Strategy Development in SW Pathway

0 Planning Phase

Develop strategies and required artifacts for the DA to approve the program to begin Execution Phase.

Explicitly NOT a traditional acquisition milestone with dozens of major documents required.

1 Execution Phase

Continuous improvement of strategies based on user feedback, team and system performance, shifting priorities, integrating best practices, etc.

Program documentation should be constrained to what is needed to effectively manage the program.

https://aaf.dau.edu/aaf/software/program-management/
Develop and Deliver Software

Development

plan

code

test

build

Operations

release

monitor

Software Development Infrastructure, Cybersecurity, and Enterprise Services

• Small, frequent releases
• Tailored software team’s practices (Agile, DevSecOps)
• Heavily integrated, automated testing, cybersecurity
• Leverage enterprise services, DevSecOps pipelines
Key Players in Software Acquisition Pathway

Integrated Teams Across Operations and Acquisition; Government and Vendors; All Functions and Levels
Law Requires Timely Deliveries

- Demonstrate the viability and effectiveness of capabilities for operational use not later than one year after the date on which funds are first obligated to develop the new software.

- New capabilities shall be continuously updated and delivered at least annually to iteratively meet requirements.

- For Embedded Software this annual update timeline applies after initial operational acceptance.

FY20 NDAA Section 800
SWP Customer Service Reminder

- Support quick reviews of key SWP documentation
- Consults to parse through a particular approach or address a specific program issue
- Present to different groups (basic 101 level to more specific targeted topics)
- Advocate for support across OSD functionals or with Component leadership
Updates to SWP Website

- **Homepage** – Added video, briefing, news, references
- **Metrics and Reporting** – Registration, Insight Reporting
- **Develop Strategies** – Clarified info req, mgmt baselines
- **Design and Ent Services** – DSO videos and references
- **MVP/Deployment** – Added deployment frequency

In Queue
- ADM guidance and templates
- Software NDAA provisions FY16-21
- Why the SWP and Transitioning to SWP
- Interoperability guidance
- Ignite Summaries and FAQs
- Insights from Agile pilots + fundamentals
- Updated SWP guidance and templates

**SWP Traffic Last 12 Months**
- 46,000 page views
- Top pages:
  - SWP home
  - MVP
  - Planning Phase
  - Define Capability Needs
  - Develop Strategies
  - Metrics

[https://aaf.dau.edu/aaf/software](https://aaf.dau.edu/aaf/software)
Core Fusion Cell between OSD and Services; grow into **deadly-effective network**; achieve **more together than alone**

- More Connections = More Collective Problem-Solving
- More Connections = More Critical Feedback

**Why you?**
- You are empowered and Front Line for ACQ community
- You are closest to problem

**What will we do?**
- Enable successful SWP execution & longevity
- Focus on solving pain points/problems
- Prioritize & attack enterprise backlog of .87 impediments
- Ask USD and SAE as needed for top cover & empowerment

**Competitive advantage of an alliance / network?**
- Connecting key influencers to co-develop smarter, bureaucracy-busting guidance & decision support for MAJCOMs and PEO
- Rapid info-flow unhampered by bureaucracy and silos

Fusion Cells rapidly acquire, interpret, and distribute actionable information to acquisition units and personnel closest to the problem. We turn raw data into effective action as quickly as possible.