

SEI Study: Defense Business Systems Testing & Sustainment

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Task Scope

DoD-sponsored, policy-focused study regarding DBS acquisition, testing, and sustainment.

Focus areas:

- Alternative approaches to software sustainment of defense business systems under a continuous process improvement model.
- Opportunities to streamline and integrate Testing & Evaluation into the software lifecycle.

Schedule:

- Start Date August 2017
- Target Completion April 2018

Synergistic Studies & Effort

Software sustainment in DoD weapons systems

- Multi-phase study for OSD(Maintenance Policy & Programs)
- Examining issues of sustainment practice, elements of the “ecosystem,” workforce, etc.

USMC CAC2S case study for DAU

- Funded by DOT&E
- Examines Integrated Testing practices & results

Agile SW Development / Agile SW Management

- SEI research
- Application to DoD acquisition programs

GAO study on DoD software sustainment

These are timely topics that are receiving recent increased attention.

Context:

Software Sustainment – SEI Definition

Orchestrating the processes, practices, technical resources, information, and workforce competencies for systems and software engineering...

....to enable systems to continue operations and also to be enhanced to meet evolving threat and capability needs.



Context: Enterprise Challenges

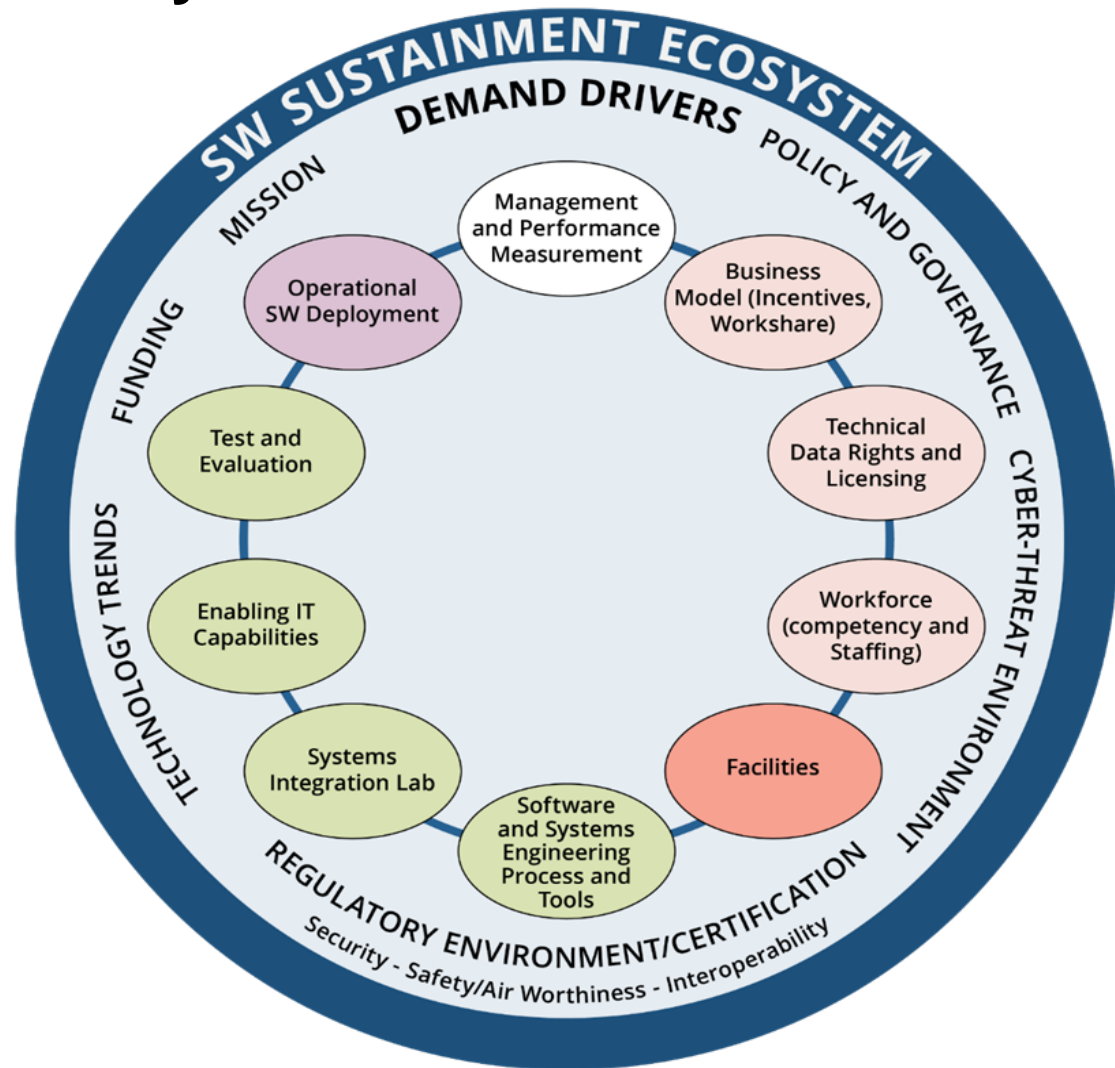
Challenges relate to achieving greater productivity and capability across DoD to address affordability, bow wave of demands, and infrastructure modernization in a dynamic technology environment.

- DoD continues to focus on HW aging and depot infrastructure for better alignment to achieve greater productivity, but for SW.....
 - Large SW engineering and technology infrastructure not well understood
 - Need for consistent approach to measure enterprise performance
 - Continued investment to keep pace with technology
- ***Limited information to enable DoD visibility/management of SW as an enterprise asset to inform corporate decisions***
 - ***PEO/PM centric model inhibits corporate enterprise perspective***
 - ***SW inventory/demographics and on-going analysis need more focus***
 - ***Need to link SW sustainment cost/\$ to delivered capability***



Context: SEI SW Sustainment Ecosystem

- Four **infrastructure** elements:
Basic, fundamental resources necessary for the sustainment activities
- Three **knowledge and expertise** elements: Skill sets, the government organic workforce, access to necessary technical information needed to deliver and deploy the capabilities for the warfighter
- Three ungrouped elements:
 - Facilities
 - Operational SW Deployment
 - Mgmt / Performance Measurement



* "DoD Software Sustainment Study Phase I: DoD's Software Sustainment Ecosystem." Special Report CMU/SEI-2016-SR-035.

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DBS Study: Methodology

- Series of interviews with key stakeholders from Services & 4th Estate.
- Some organizations included or scheduled so far:

AFOTEC

DAU

DLA

AF PEO BES

DT&E

AF PEO C3I&N

DOD CIO

USN PEO EIS

OSD(SE)

- Leveraging SW Sustainment Ecosystem model as “rough approximation” to facilitate stakeholder conversations re current sustainment strategy.



Example Study Focus Questions

- How does your Service **organize and assign responsibility and authority** for DBS acquisition?
- What are the **principal challenges** to DoD being consistently successful in the acquisition of DBSs? What do stakeholders see as the **root causes** of performance problems and the critical factors for success across the enterprise?
- To what extent do DBS stakeholders **plan for DBS sustainment** during system acquisition and execute sustainment strategies for the life cycle?
- How do you **plan and execute DT&E and OT&E**? Do you have any experience with weapon system T&E and if so, what are the differences? What are some systemic testing issues and challenges to achieving an integrated T&E strategy?
- Do you employ **Agile and DevOps**-based methods?
 - If not, why not?
 - If so, how are they working? How do you evaluate the performance and value of these practices? What factors enable and inhibit the application of these practices?
- What are the principal challenges in **establishing the infrastructure** (processes, practices, tools, and workforce, including engineering) to plan and manage DBS acquisition and sustainment?



Themes Emerging from Interviews (1/2)

The following are *provisional* themes from the work to date – subject to update as more perspectives are solicited.

- **General challenges**
 - Color-of-money issues are a practical constraint (although impact hard to quantify)
 - Sustainment not a driving consideration in lifecycle planning / funding
 - DBS acq includes IT infrastructure, but in practice not a major consideration
 - Application of RMF and integration with ATO
- **Need for Business Process Re-engineering (BPR)**
 - Without adequate BPR, IT acquisition can start with sub-optimal reqts
 - Strongly affects make-vs-buy decision
 - Infrequent new starts => few opportunities to build competence
 - BPR must be engineering-centric
 - PEO/PM held accountable for acq performance but does not control functional business process



Themes Emerging from Interviews (2/2)

The following are *provisional* themes from the work to date – subject to update as more perspectives are solicited.

- **Agile / DevOps**
 - Significant gaps in workforce competencies
 - Must be built on automated and robust SE process and practices
 - Demand flexibility not well supported by funding regimen
 - Difficulties in involving intended users
 - Resource (\$, workforce) constraints point to need to triage which programs can best benefit
- **Integrated Testing**
 - Benefits result when planned from beginning vs. late opportunity to reduce DT cost
 - Potential misperceptions as to benefit – Major benefit lies in standing up one operationally representative test environment for OT & “mission-like” DT
 - No proven practices for developing T&E plans in Agile/DevOps model



Discussion / Summary

We have been seeing increased recognition of the importance of software to the DoD – multiple trends coming together.

- Cost / affordability concerns arising from current practice.
- SW sustainment as continuous engineering, driving new capabilities.
- A recognition that many current policies do not map well to software's unique properties.
- Potentially, a willingness to grapple with software more at the DoD enterprise level.

We look forward to your feedback:

- Themes we should be investigating
- Exemplar programs



Contact Info

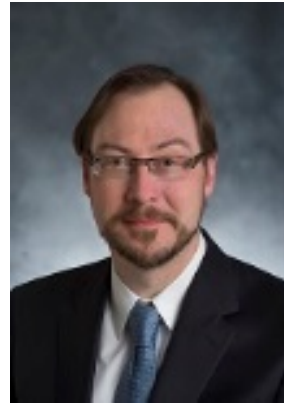
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