Meeting User Needs: Tailoring Human Systems Integration (HSI) for DoD Agile & DevOps

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National Defense Industrial Association
21st Annual System Engineering Conference, Oct 23-25, 2018
Agenda

- Agile & DevOps Overview
- Tailored HSI Processes & Products Recap
- Challenge of Agile DevOps for HSI
- Approach & Use Case Comparison
- Lessons-Learned & Impacts
Agile & DevOps

- Agile software development is an **iterative engineering approach**, delivering small increments of functioning capability on a frequent basis.
- Defense Acquisition **Model 3** (Incrementally Fielded Software Intensive Program) has been adopted by DoD programs.
- A primary benefit of Agile for the HSI community of interest is the importance placed on incorporation of **user feedback** into system design.
- DevOps emphasizes **cross-functional teams** and tight collaboration between developers and operations (integration) to work within technical constraints.
Agile & DevOps, cont.

- Comparison of DoD software development approaches
- No indication of where HSI and user needs fit within the approaches

Source: Defense Science Board (DSB) Task Force on the Design and Acquisition of Software for Defense Systems, 2018
HSI Inputs to Program Stakeholders

- Tailored HSI products provided to program stakeholders for software systems acquisition
HSI in Agile

- HSI user-centered design activities integrated with Agile development
- Aligns User Centered Design with iterative development and test
Tailored HSI Products

- HSI products aligned with program maturity and needs

<table>
<thead>
<tr>
<th>HSI Plan (HSIP)</th>
<th>System Requirements</th>
<th>Personas</th>
<th>User Workflows</th>
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<tr>
<th>User Interface Designs</th>
<th>User Interface Specifications</th>
<th>Quick Reference Guide (QRG)</th>
<th>Wiki</th>
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Challenge

• Limited guidance on how to incorporate HSI into the Agile DevOps construct

• Guidance mentions need for continuous user input
  – Methodology for integrating input not defined

• Both Dev and Ops groups lack understanding of user operational needs

• No shared mental model for entire system or user workflow
Approach

- Incorporate HSI functional competency into existing Agile DevOps structure
- Scope HSI work products in context of team needs
- Align timing of HSI work products to team priorities
Use Case Comparison

- Two Navy C4I software-based programs at Space and Naval Warfare Command (SPAWAR)
- Both programs employ a Scaled Agile Framework (SAFe Agile)
- Structural placement of HSI differs between programs

<table>
<thead>
<tr>
<th>Program A</th>
<th>Program B</th>
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<tr>
<td>ACAT II</td>
<td>ACAT I</td>
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<tr>
<td>Pre Milestone B</td>
<td>Post Milestone B</td>
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<tr>
<td>Current focus on documentation and contract award—no development at this time</td>
<td>Current focus design, development, and test</td>
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Use Case Structural Comparison

Program A

Product Manager

- Team 1
  - Programmatic
  - Test
  - HSI
- Team 2
  - Architecture
  - Engineering
  - Ops

Program B

Product Manager

- Team 1
  - Architecture
  - Dev
  - Test
  - Ops
  - HSI
- Team 2
  - Architecture
  - Dev
  - Test
  - Ops
  - HSI
- Team 3
  - Architecture
  - Dev
  - Test
  - Ops
  - HSI
Program A (pre MS-B): Approach

- HSI centralized in one team with related functional competencies (e.g., logistics, training, and fleet representatives)
- 2-week sprints
- HSI work planned and tracked separately from other functional competencies
- Work focused on PM’s “Top 10” goals
- Sprint demos primary method of coordination and collaboration
- Daily stand-ups for all functional competencies
Program B (post MS-B): Approach

- HSI representation in each cross-functional team
- 4-week sprints
- HSI work planned and tracked in support of dev tasks
- HSI involved in defining Minimum Viable Product (MVP)
- Product manager serves as primary information integrator and facilitates collaboration between teams
- Daily standups only required for engineering functional competencies
Pros

Program A (pre-MS B)
- Focused application of HSI work
- Teaming with the other “user-related” stakeholders better serves needs of users across the system lifecycle
- Scoping and planning HSI work within team capacity is straightforward
- Opportunity to showcase product, its use, and value at end of sprints

Program B (post-MS B)
- Majority of issues resolved within cross-functional teams
- HSI representation in each team increases likelihood that user feedback will be integrated into development
- Teams are scalable as personnel within each functional competency are added
## Cons

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<th>Program A (pre-MS-B)</th>
<th>Program B (post-MS B)</th>
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<td>• Reduced awareness of HSI products and user needs across teams</td>
<td>• Coordination and collaboration between teams dependent on small number of individuals</td>
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<td>• Not all HSI analysis work will directly feed top program priorities</td>
<td>• Difficult to maintain awareness of tasking across teams and need for HSI support</td>
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<td>• Potential overlapping efforts across teams</td>
<td>• Scoping and planning HSI work within team capacity is complicated</td>
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Incorporate HSI as a functional competency within Agile DevOps teams to ensure user needs are incorporated into design, development, and integration.

Determine structural placement of HSI based on:
- Anticipated HSI work products (e.g., design, user research)
- Program maturity
- Size of program

Plan for HSI tasks (e.g., user research, UI design) within and across teams to ensure HSI capacity matches tasking.

Maintain traceability of HSI work products to requirements, user stories, and/or team priorities.

Ensure HSI work products are completed in the context of the “big picture” of user needs.
Impacts

• Incorporating HSI into cross-functional Agile DevOps teams results in:
  – Improved utility and usability of the system
  – Focusing HSI needs where they add most value
  – HSI work products becoming more explicit
  – A shared mental model of user needs
  – Increased integration of user feedback into system development

• Addresses Joint HSI Working Group (JHSIWG) gaps*
  – #1: Institutionalize HSI Body of Knowledge
    • Contributes new best practices
  – #4: Provide and Maintain Tools, Databases, and Processes to Support HSI Analyses Early in Acquisition
    • Provides structure for trade analyses and tool development

*DoD Human Systems Integration (HSI) Gap Analysis (April, 2017)
Questions?
References


