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

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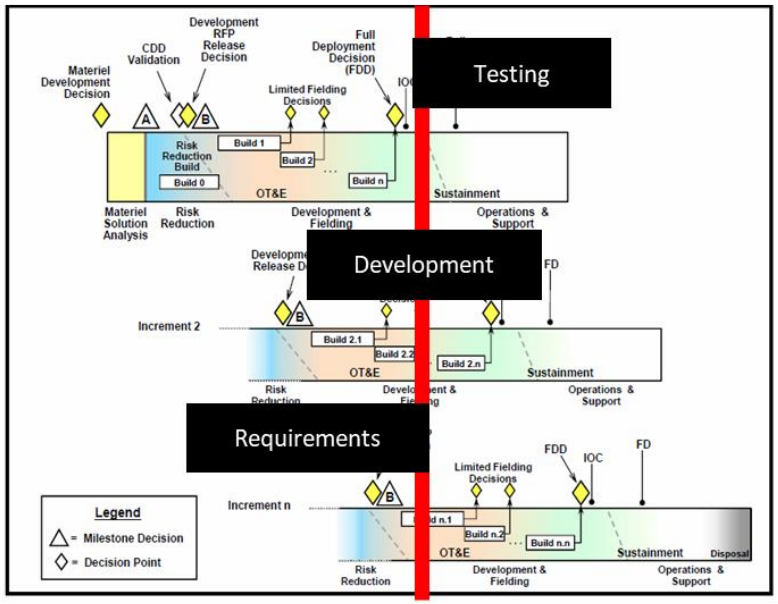
Agenda

- 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

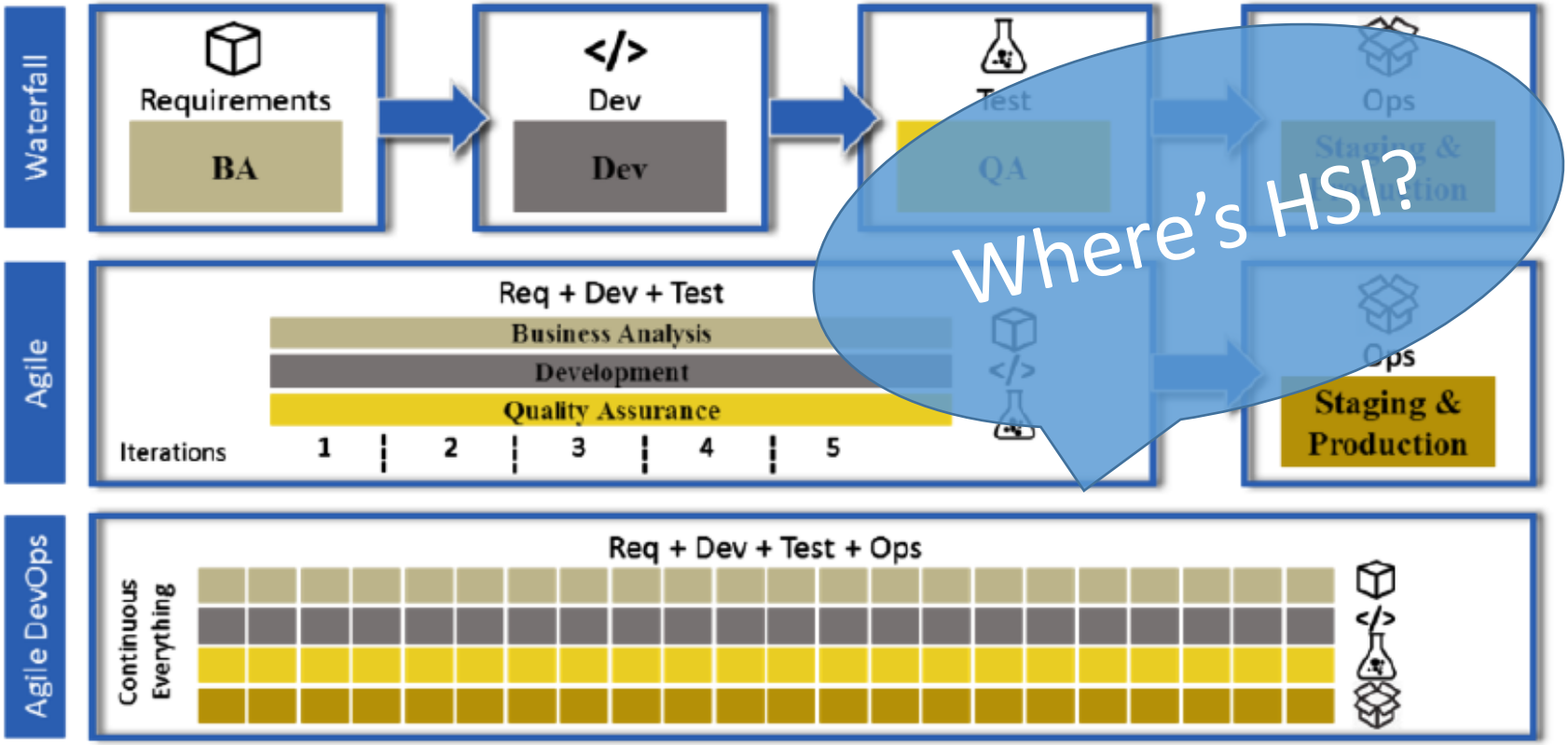
Model 3: Incrementally Fielded Software Intensive Program



- DevOps emphasizes **cross-functional teams** and tight collaboration between developers and operations (integration) to work within technical constraints

Agile & DevOps, cont.

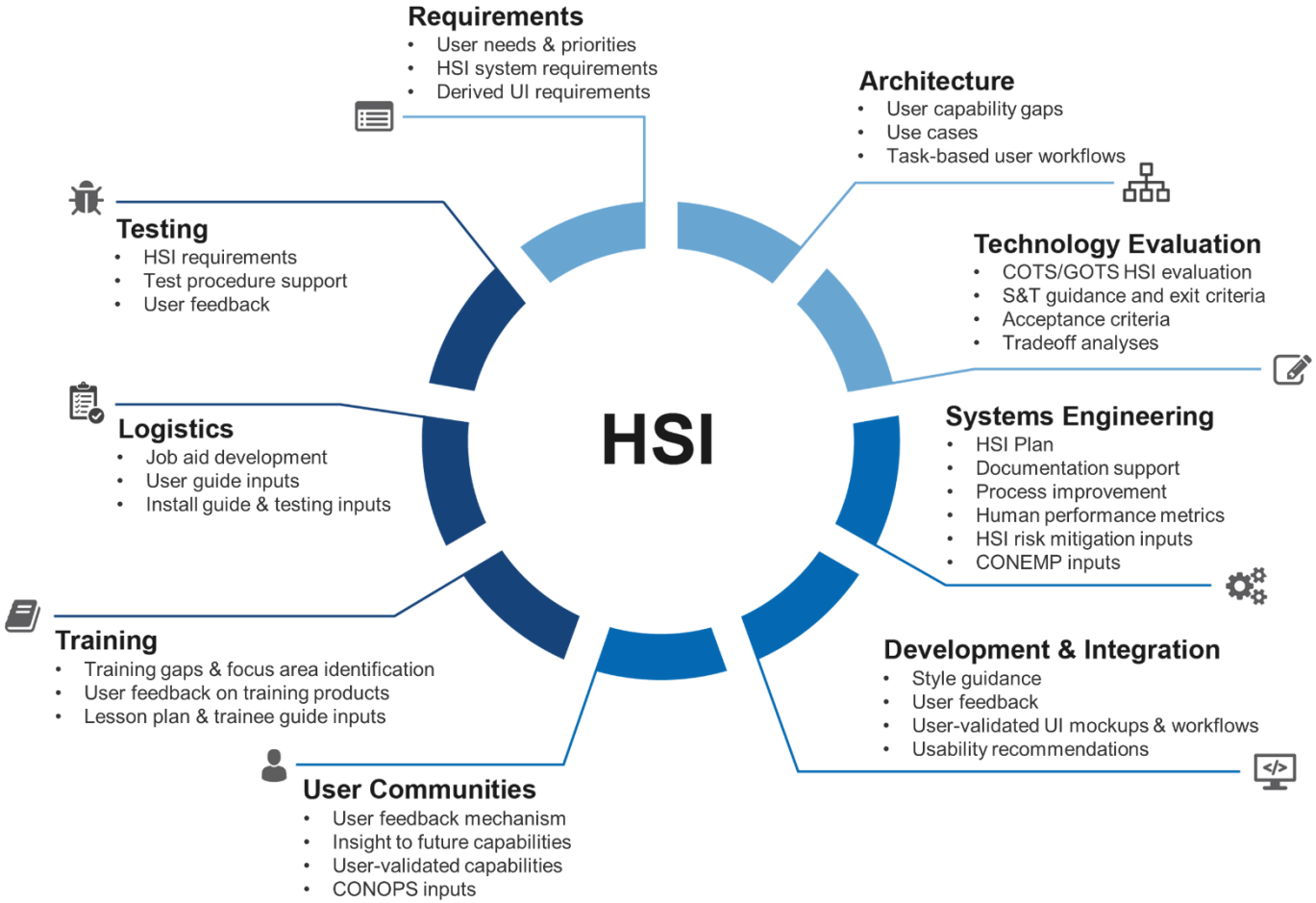
- Comparison of DoD software development approaches
- No indication of where HSI and user needs fit within the approaches



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

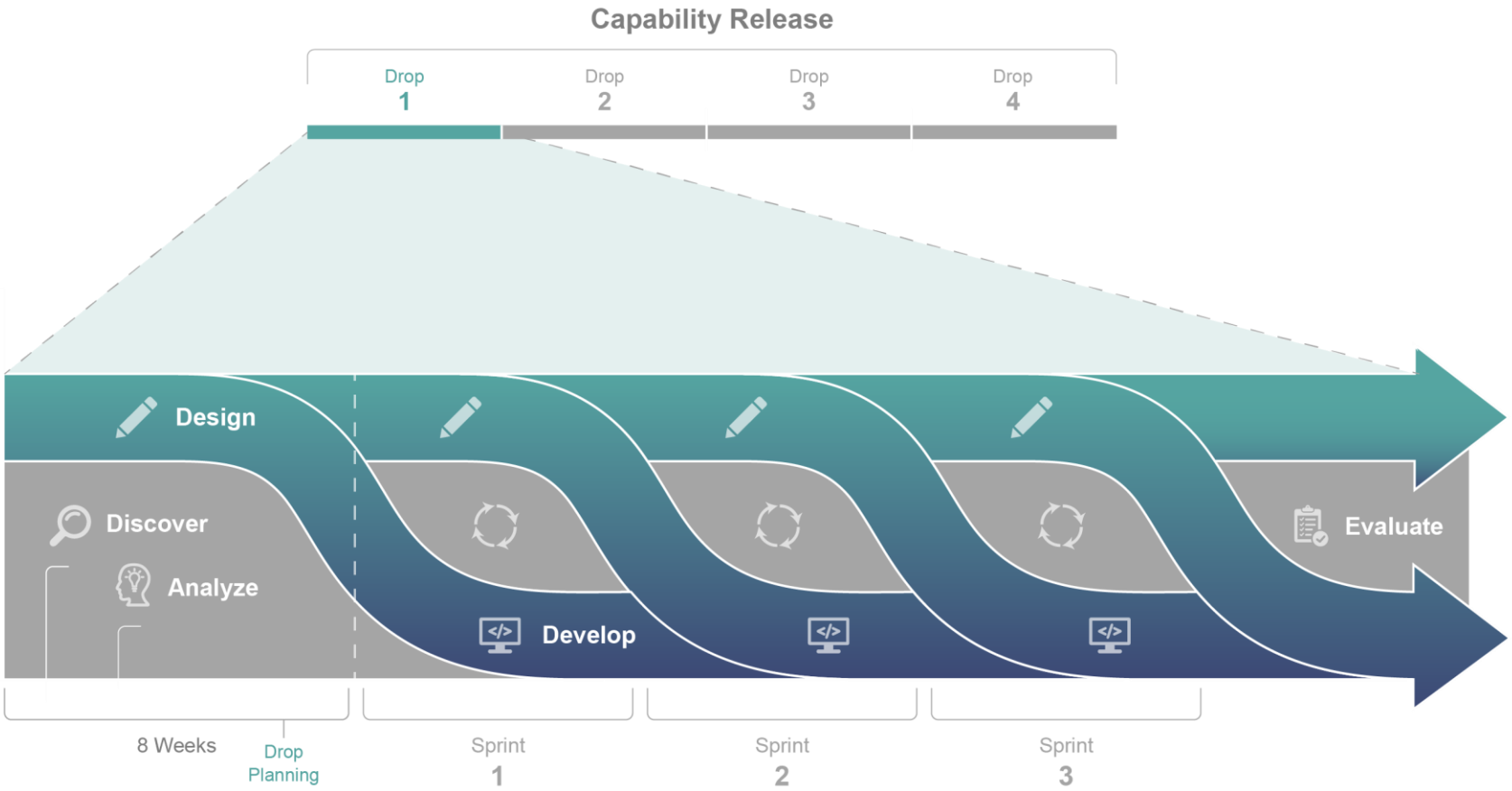
HSI Inputs to Program Stakeholders

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



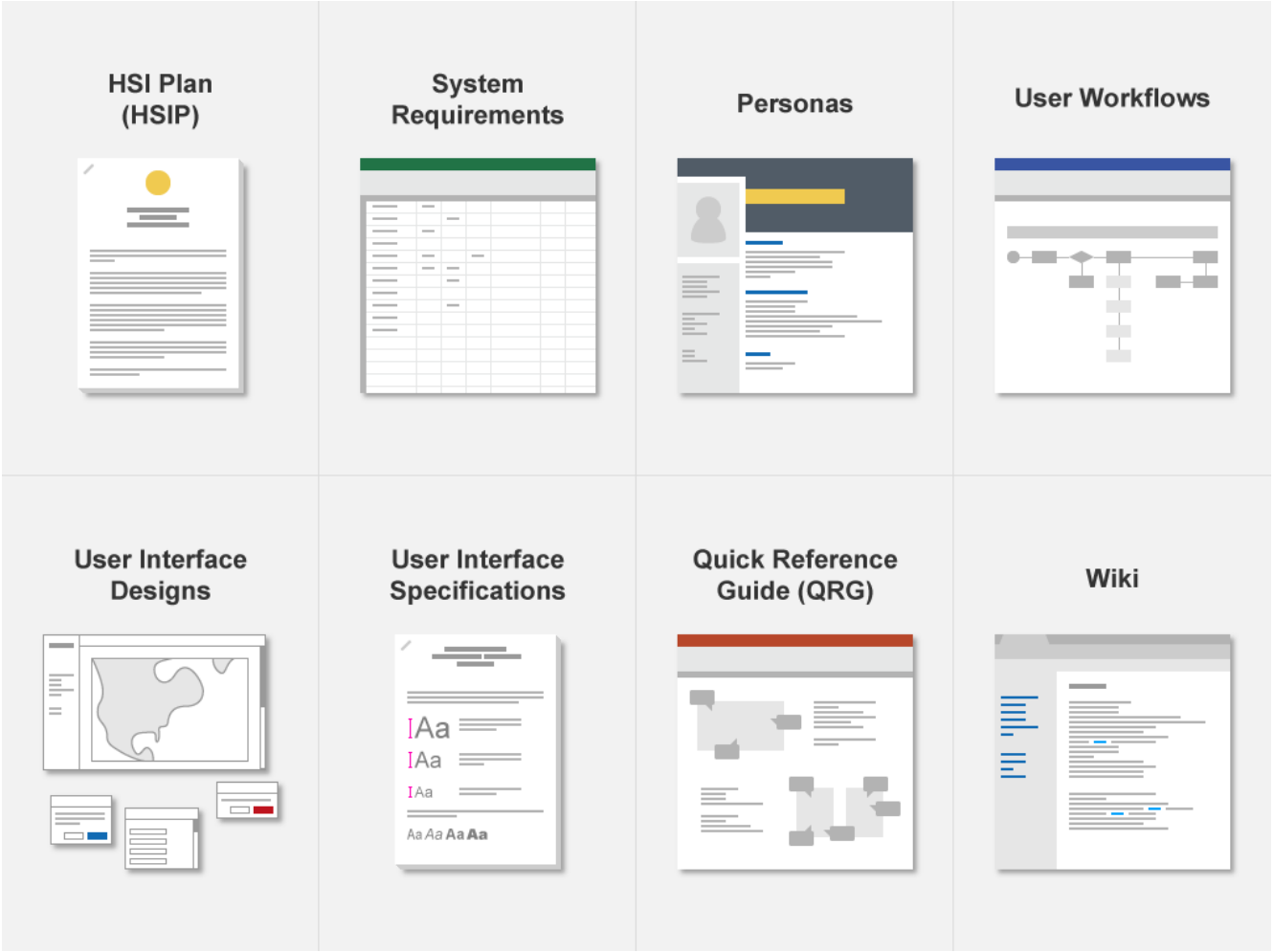
HSI in Agile

- 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



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

Program A

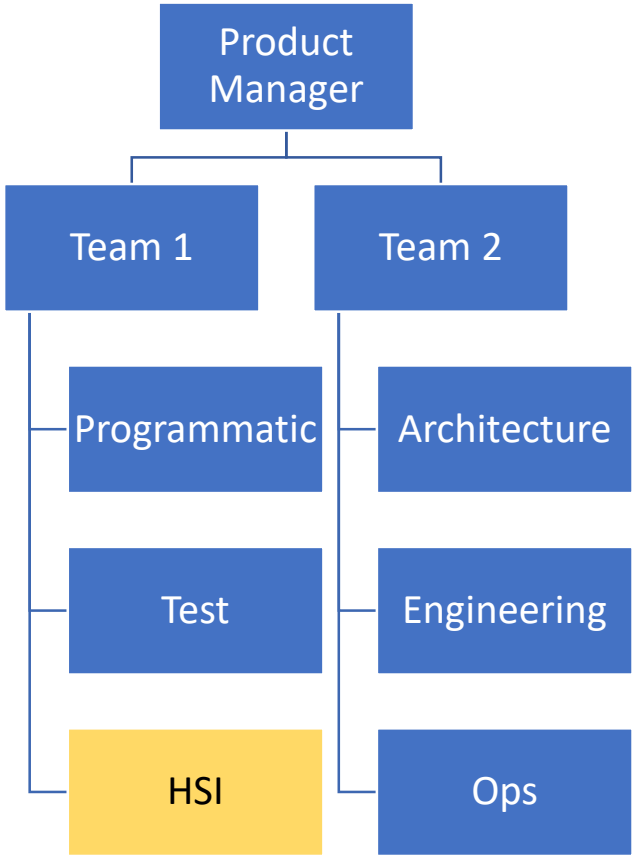
- ACAT II
- Pre Milestone B
- Current focus on documentation and contract award—no development at this time

Program B

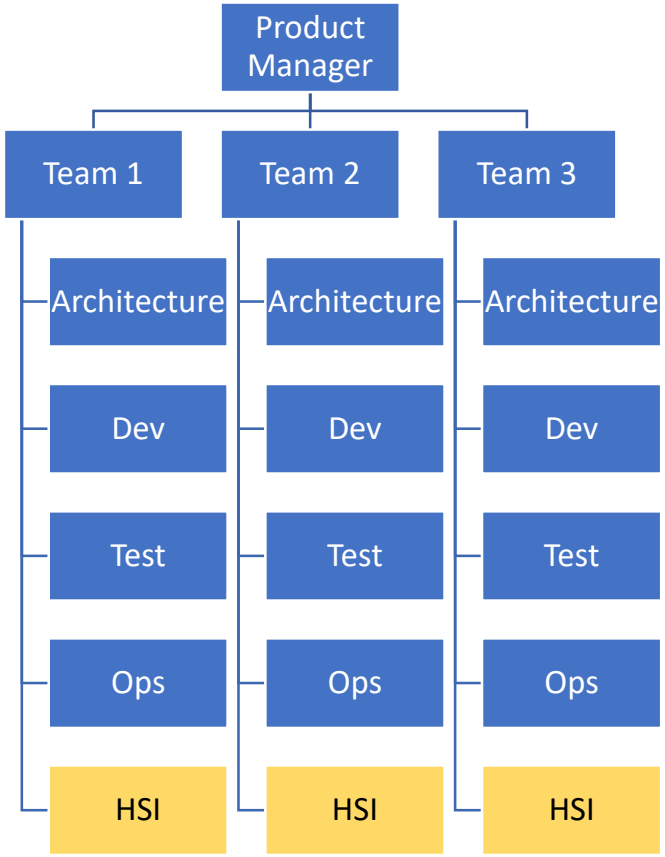
- ACAT I
- Post Milestone B
- Current focus design, development, and test

Use Case Structural Comparison

Program A

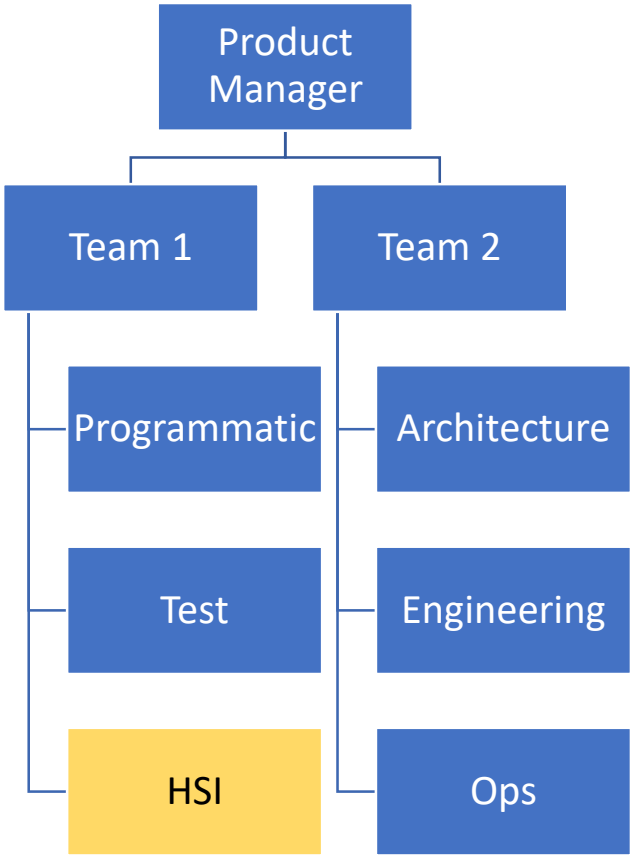


Program B



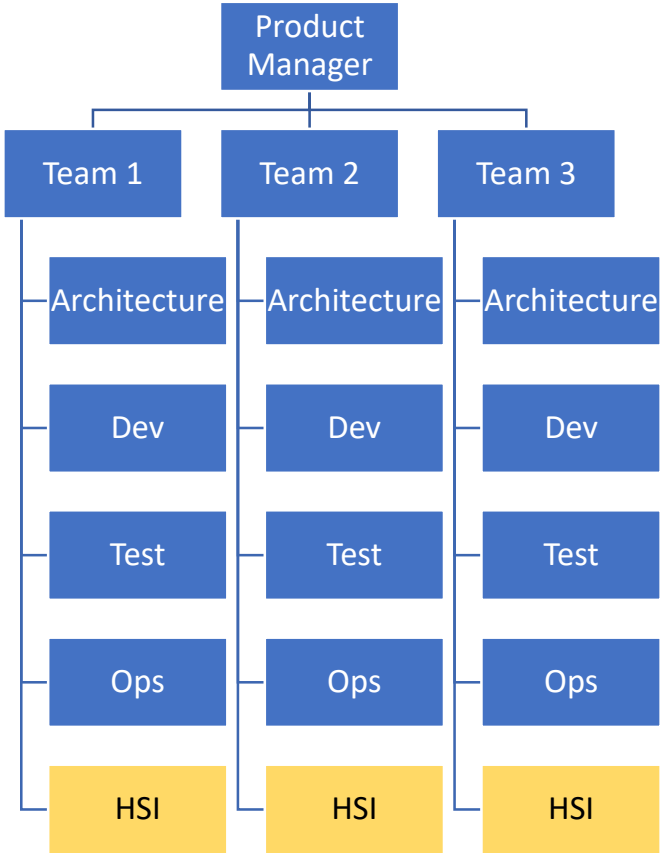
Program A (pre MS-B): Approach

- 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

Program A (pre-MS-B)

- Reduced awareness of HSI products and user needs across teams
- Not all HSI analysis work will directly feed top program priorities
- Potential overlapping efforts across teams

Program B (post-MS B)

- Coordination and collaboration between teams dependent on small number of individuals
- Difficult to maintain awareness of tasking across teams and need for HSI support
- Scoping and planning HSI work within team capacity is complicated

Lessons-Learned

- 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?

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