



Digital Twin – Sustainment Mods and Upgrades

Weaving the Digital Fabric

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Overview

- Introduction
- The Challenge
- Proposed Approach
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Introduction

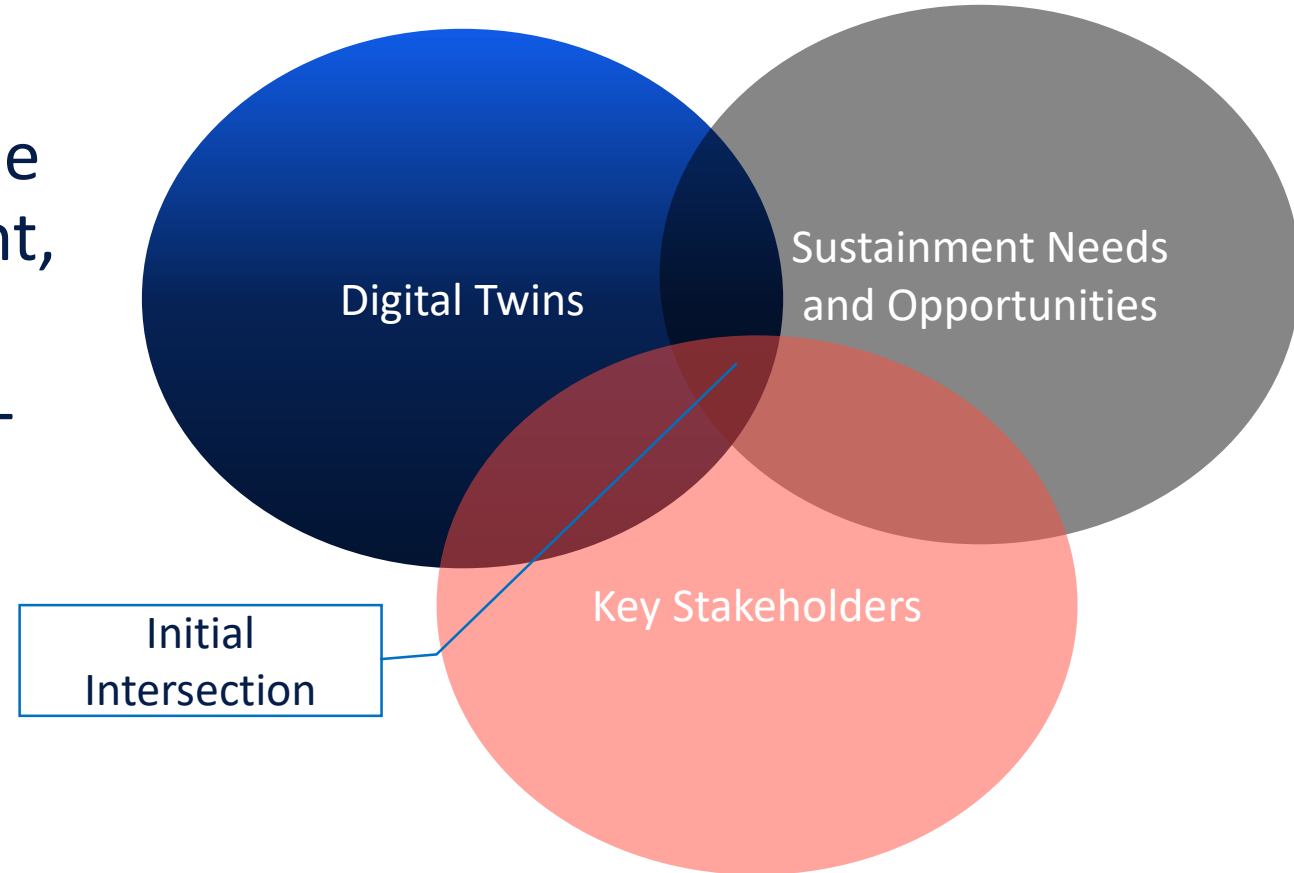
- “Digital Transformation” holds tremendous potential for radically improving and expediting design, acquisition, operations, and sustainment activities throughout the AF
- Lots of ideas, concepts, and buzzwords need to be translated to application
 - Digital twin
 - Authoritative source of truth
 - Integrated digital environment
 - Tech stack
 - Product lifecycle management
 - Data architecture
 - Model-based systems engineering
- Some program offices have already started to apply some aspects of digital transformation – good first steps
- Beyond those first steps, however, lies great untapped potential of applying digital twin to the realm of sustainment, modifications, and upgrades to AF weapons systems

The Challenge

- Reconcile varying concepts of “Digital Twin” to practical application in the realms of sustainment, to include modifications and upgrades
 - “Digital Twin” (DT) means many things to many stakeholders
 - “Sustainment” means many things to many stakeholders
 - Many visions and dreams about DT changing the way we sustain our systems
 - Need a small set of innovative, applicable, scalable “Minimum Viable Prototype” (MVP) projects to map DT concepts to key day-to-day sustainment activities

Proposed Approach

- Define valuable, viable, and workable initial intersection of DT, Sustainment, and Key Stakeholders
- Start small, learn quickly, scale fast – “wash, rinse, repeat...”
- Start weaving “digital fabric” from “digital threads”

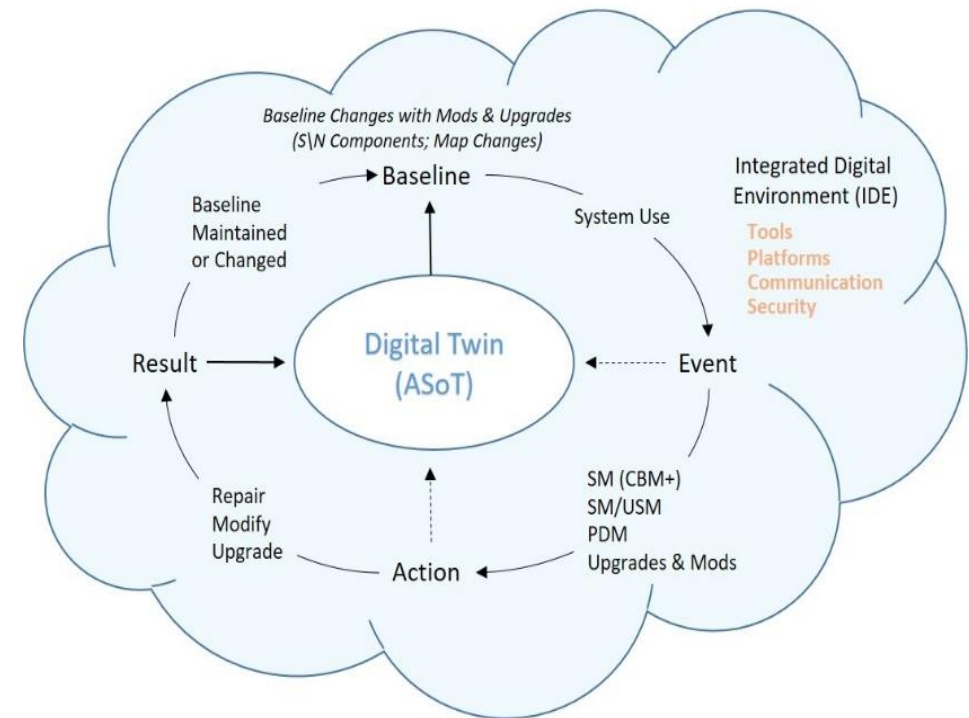


Proposed Solution/Scope

Establish a set of minimum viable prototype (MVP) applications of digital twin to:

- (1) Predictive Maintenance (Mx), leveraging Condition-Based Mx Plus (CBM+)
- (2) Field-level unscheduled and scheduled Mx (USM/SM) activities resulting from routine flight operations and sortie generation
- (3) Scheduled programmed depot Mx (PDM) activities
- (4) Planned upgrades and modifications

Establishing and Ensuring Digital Twin Relevance For Sustainment, Modifications, and Upgrades



Objectives

- **Define fundamental processes** needed to keep digital twins current and viable authoritative sources of truth (ASoT) throughout object lifecycle as shaped by Mx, modifications, and upgrades
- **Define and establish MVP data architecture(s)** required to maintain digital twins
- **Define and establish MVP integrated digital environment(s) (IDE)**, to include software tools and platform, to support the fundamental processes from Objective 1 and consistent with the data architecture(s) from Objective 2
- **Apply and adapt MVPs and processes** from Objectives 1-3 to any or all of the proposed solution scenarios (CBM+, USM/SM, PDM, and upgrades/modifications).
- **Draft roadmap(s) for scaling MVPs to platform/enterprise levels**, as appropriate, to realize potential of digital twin application to sustainment, modification, and upgrade activities.

Technical Approach

- Two-Phased Approach
 - Minimize risk and leverage learnings among the application cases
 - Apply to each of the 4 proposed MVP applications
 - MBSE approach will be taken throughout
- Phase I: Design, Test, Verify, Validate Concept & Model
- Phase II: Build MVP Ecosystem, Data Architecture, Process & Implement Learning Loop

Next Steps

- Identify key stakeholders for initiatives
- Technical Interchange Meeting – November 2022
- Develop and shape initiatives
- Launch pilot facility – by end of 2022
- Secure funding
- Execute

- Interested?
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