Sustainment Management System (SMS)
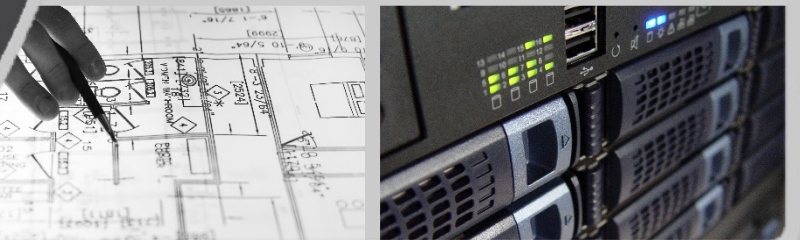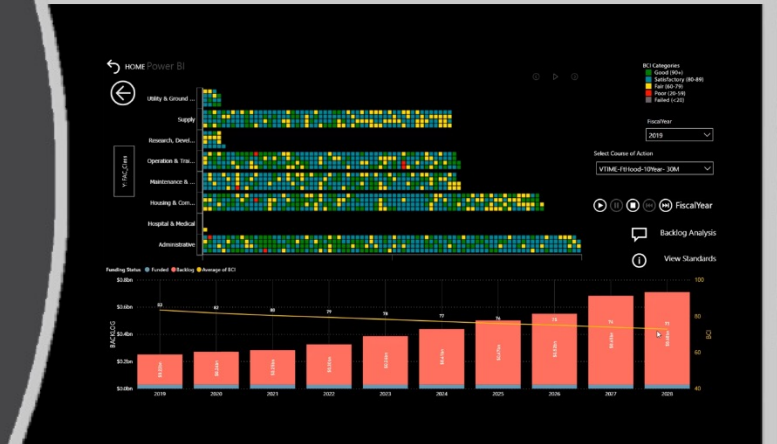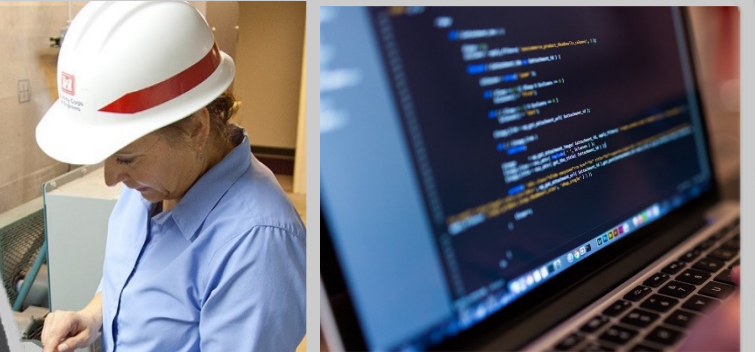
SMS-TCX and ESMS Updates

Prepared by Matthew Walters
Chief, SMS-TCX
USACE-ERDC, Construction Engineering Research Lab
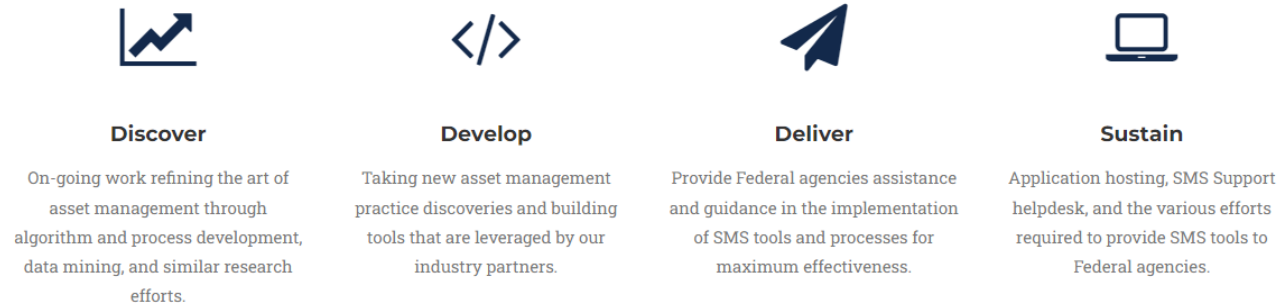
25 JAN 2023

US Army Corps of Engineers

ERDC — ENGINEER RESEARCH & DEVELOPMENT CENTER

DISCOVER | DEVELOP | DELIVER

BUILDINGS · **FUELS** · **PAVEMENT** · **RAIL** · **UTILITIES** · **WATER CONTROL** · **WATERFRONT**

SMS PROCESS IN VISUAL FORM

Inventory · Assess · Predict · Work Planning · Forecast

SMS LIFECYCLE

Functional Teams	
SMS TCX	Engineering
Development	Operations

Discover

On-going work refining the art of asset management through algorithm and process development, data mining, and similar research efforts.

Develop

Taking new asset management practice discoveries and building tools that are leveraged by our industry partners.

Deliver

Provide Federal agencies assistance and guidance in the implementation of SMS tools and processes for maximum effectiveness.

Sustain

Application hosting, SMS Support helpdesk, and the various efforts required to provide SMS tools to Federal agencies.

Late 1970s	1980s and 1990s	2000s	2013	2015	Today	Tomorrow
PAVER	**ROOFER, RAILER, and BUILDER**	**BUILDER Adoption & Shore Front**	**OSD Memo DoD SMS Deployed**	**FUELER and Utilities SMS**	**Widespread Adoption**	**ESMS Maturation & Optimization**

U.S. AIR FORCE · U.S.ARMY · dodea · USDA

ERDC ENGINEER RESEARCH & DEVELOPMENT CENTER *DISCOVER | DEVELOP | DELIVER*

SMS Implementation

Department or Agency
- US Army
- US Air Force
- US Navy
- Department of Veterans Affairs
- US Marine Corps
- Defense Logistics Agency
- Defense Health Agency
- National Nuclear Security Administration
- Department of Agriculture
- DoD Education Activity
- Defence Commisary Agency
- Washington Headquarters Service
- Department of Commerce
- US Army Corps of Engineers

Pie chart labels:
- DoD Education Acti... 23.11M
- Defense Health Agency 116.15M
- Defense Logistics ... 138.58M
- US Marine C... 105M
- Departme... 1.34M
- US Navy 456M
- US Air Force 587.62M
- US Army 788.57M

* Quantities are agency *building* portfolio size in square footage, filled portion indicates current progress.
** Not shown - ODNI

1.9B SF (Buildings) Currently Assessed

Total of 2.1B SF Planned

Currently More Than 2x All Office Space in Manhattan

212,631 Buildings
9,308,557 Components
20,445,083 Assessments
5,423,146 Images

SMS Team Updates

- Formalization of the SMS Technical Center of Expertise (TCX) within CERL
- SMS-TCX set up as an individual branch as part of a CERL reorganization
- 35 federal team members (engineering, computer scientists, IT Management, and technicians)
- Formal supervisory team leads for Development (Paul "Paisley" Mahern) and Operations (Arthur White)
- Progress in development of support materials (Updated SMS Website, Learning Management System, and SMS Support site)
- The more we improve, the more we see areas we need to continue improving!

BUILDER Development Since February 2020

Releases:

3.5.5 – April 27th, 2020

3.6.0 – September 10th, 2020

3.6.1 – March 11th, 2021

3.6.2 – September 21st, 2021

3.6.3 – October 18th, 2021

3.6.4 – February 23, 2022

3.6.5 – April 27th, 2022

3.6.6 – September 7th, 2022

3.6.7 – *Planned February 24th, 2023*

ATO:

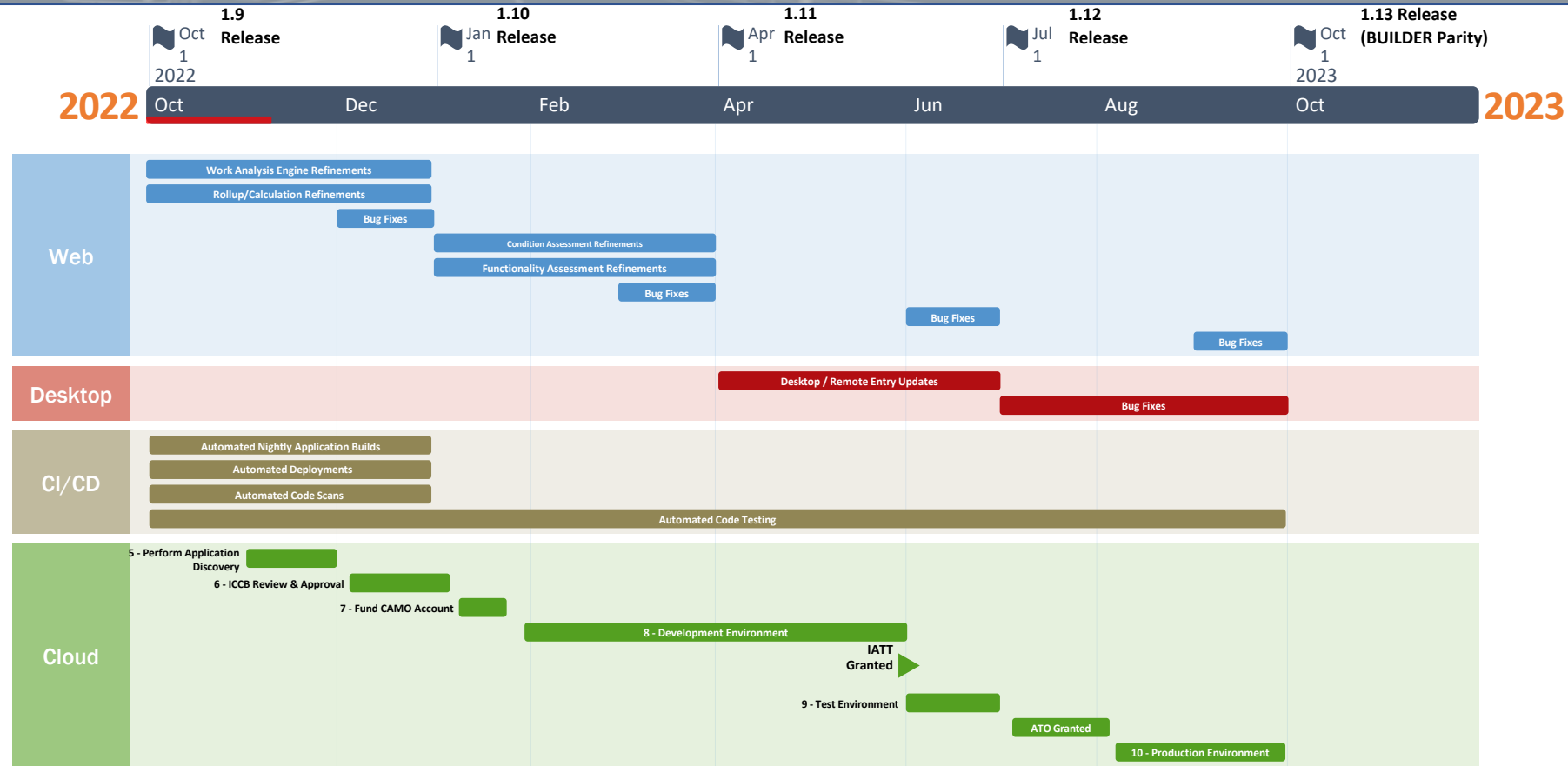Full ATO obtained in early 2021.

Full Release Notes: https://support.sms.erdc.dren.mil/news/release-notes

Enterprise Sustainment Management System (ESMS)

- Consolidated platform for facility assessment, performance modeling, investment, and forecasting information for all real property domains
- Aggregates key performance metrics and work needs across entire asset portfolio
- Comprehensive view of mission readiness and operational risks
- Eliminates "stove-piped" legacy systems and information silos

Tech Specs

- **WEB:** Modern Web Application
  - ASP.NET Core 5.0
  - Angular 6
  - Entity Framework Core 5.0
- **DATABASE:** Azure SQL Database
- **FIELD:** Windows Desktop/Tablet Application for Field Input
- **HOSTING:** Cloud-native architecture deployed on Azure Government Infrastructure
- **ACCESS:** Azure Active Directory Integration – Federated DoD Account Access
- **INTEGRATION:** API – Centric Design

Timeline

2022 — **2023**

Milestones:
- **1.9 Release** — Oct 1 2022
- **1.10 Release** — Jan 1
- **1.11 Release** — Apr 1
- **1.12 Release** — Jul 1
- **1.13 Release (BUILDER Parity)** — Oct 1 2023

Month axis: Oct | Dec | Feb | Apr | Jun | Aug | Oct

Web
- Work Analysis Engine Refinements
- Rollup/Calculation Refinements
- Bug Fixes
- Condition Assessment Refinements
- Functionality Assessment Refinements
- Bug Fixes
- Bug Fixes
- Bug Fixes

Desktop
- Desktop / Remote Entry Updates
- Bug Fixes

CI/CD
- Automated Nightly Application Builds
- Automated Deployments
- Automated Code Scans
- Automated Code Testing

Cloud
- 5 - Perform Application Discovery
- 6 - ICCB Review & Approval
- 7 - Fund CAMO Account
- 8 - Development Environment
- IATT Granted
- 9 - Test Environment
- ATO Granted
- 10 - Production Environment

Domains: BUILDINGS, FUELS, PAVEMENT, RAIL, UTILITIES, WATER CONTROL, WATERFRONT

2020 Release I: Descriptive Analysis
Fuels/Utilities IOC
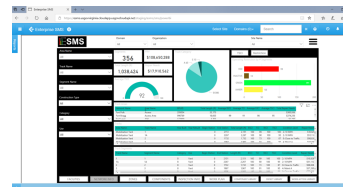
2023 Release II: Predictive Analysis
SMS BUILDER Parity

2025 Release III: Prescriptive Analysis
Optimization

ESMS Infrastructure Highlights

Environment:

- cArmy Azure for all DoD
- Solution TBD for non-DoD Federal
- Private Licensing Gameplan TBD – In discussions with USACE/ERDC Technical Transfer Office
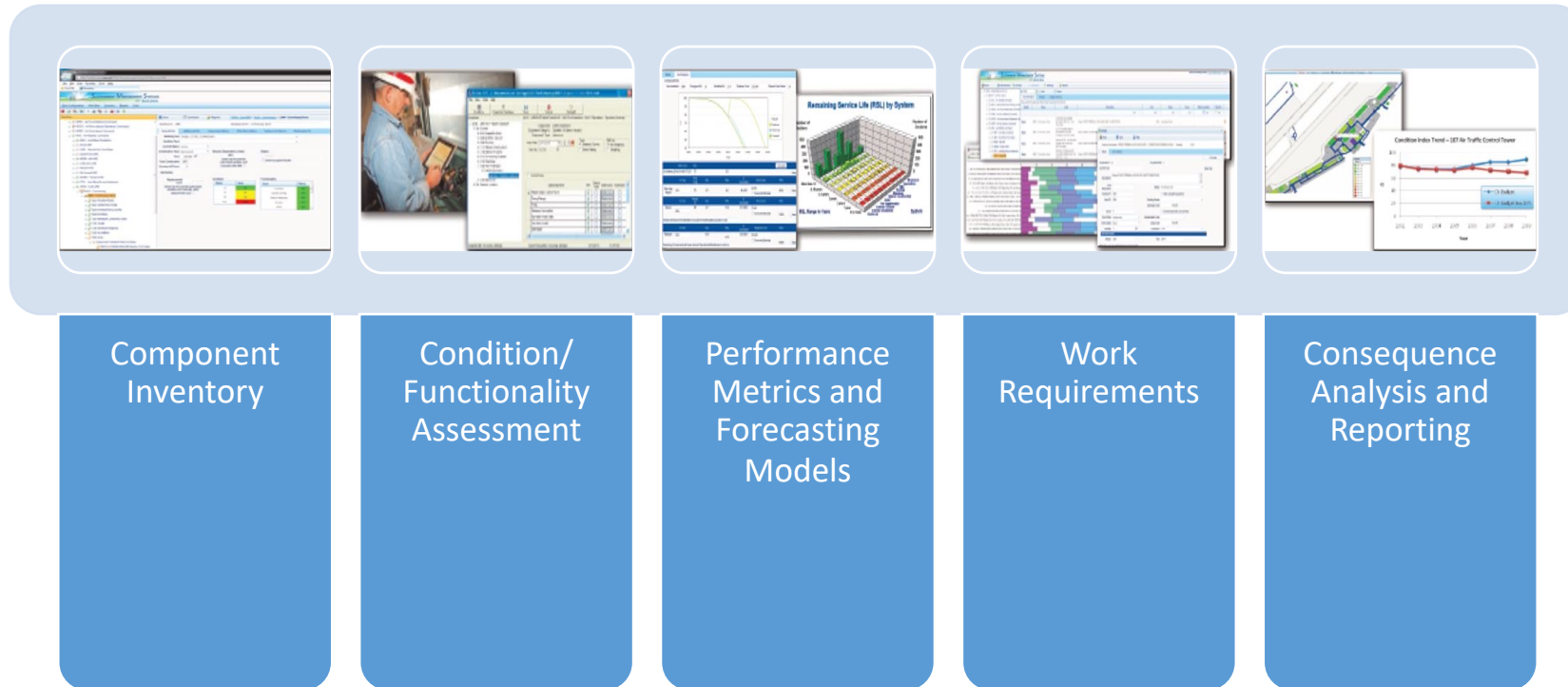- Targeted ATO by end of FY23

Development/Deployment:

- Continuous Integration / Continuous Delivery (CI/CD) model
- Integrated automated testing, security, and code quality scans
- Manual feature/bug testing in the deployment pipeline
- Code is released to production as it is ready, not waiting on a quarterly release
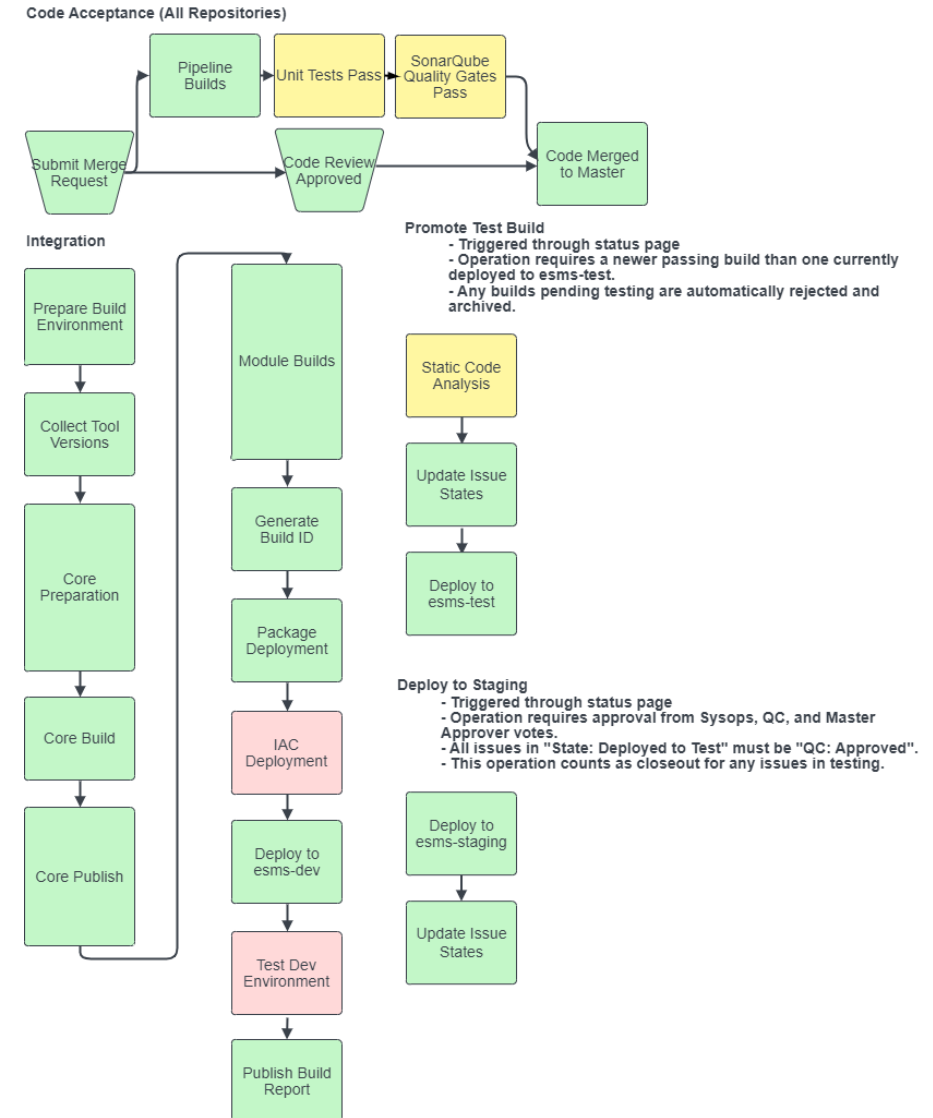
SMS Process Refresher

A structured process for collecting, synthesizing, and organizing information about civil infrastructure and facility assets to support decisions pertaining to their sustainment over their lifecycle

Component Inventory	Condition/ Functionality Assessment	Performance Metrics and Forecasting Models	Work Requirements	Consequence Analysis and Reporting

Core ESMS Features at 2023 "BUILDER Parity" Milestone

Feature	Description
Organizations	Multi-organizational management within ESMS.
Security/Teams	User Management, Custom User Role Creation/Management, Permissions Assignment, and Team development and permission assignment.
User Preferences	User contact information, default application loading settings, Desktop Sync Settings, view Organizational and Team memberships, and Permission/Role assignments.
Catalog Management	In-app administrative capability of creating new component definitions, associated attributes, assessment templates, and more.
Notifications	Check in on progress of background running processes, Workflow updates, and application updates since last login.
Reports	PowerBI integration within ESMS to create dashboard visualizations as well as paginated reports (BUILDER Custom Reports style).
GIS Map View	Visualize and navigate Facilities/Components using GIS map view where GIS data is available/imported in ESMS.
Documents	Photos, documents, maps, etc. can be uploaded and tagged to Facilities, Components, Assessments.
Import	Import from GIS, BUILDER, RAILER, PAVER E70, and more.
Exports	Create and manage export configurations to serve up ESMS data for external systems.
API Dev Portal	API Definitions and sample code for developers working on Systems integration and third-party app.

Core ESMS Features at 2023 "BUILDER Parity" Milestone

	Inventory	Assessments**	Predict	Work Planning	Forecasting
Fuels	✓	✓		✓	
Utilities	✓*	✓*	✓	✓	✓
Buildings	✓	✓	✓	✓	✓
Rails	✓*	✓*		✓	
Water Control	✓	✓			
Waterfront	✓	✓			
Pavements	✓*	✓*			

ESMS Demo Video
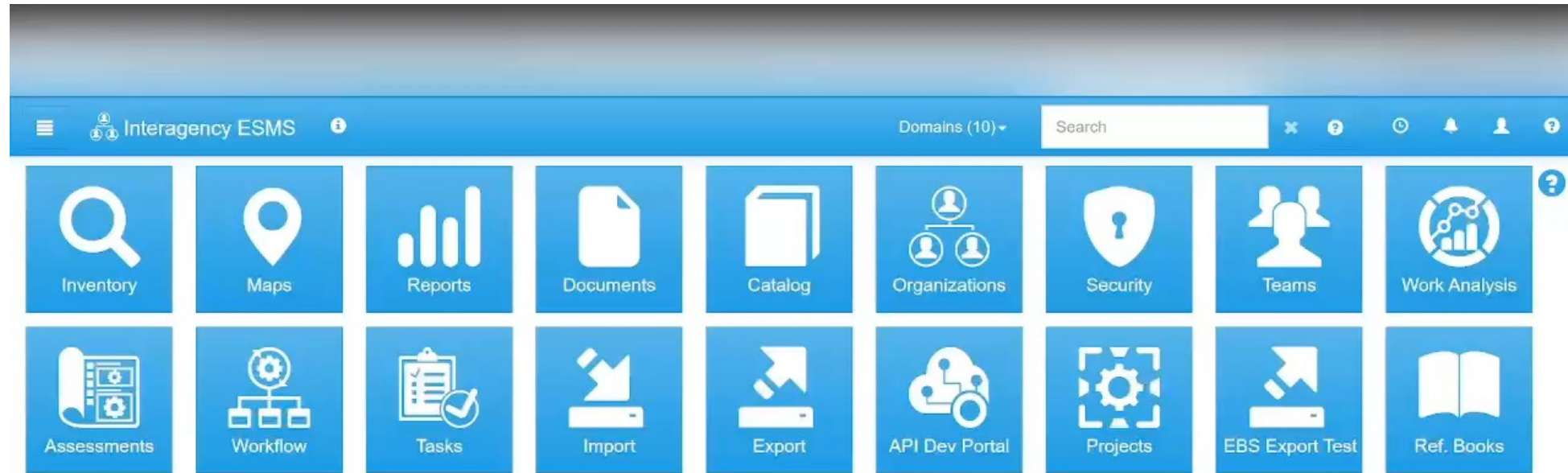
Where We're Going

- BUILDER Feature Parity in ESMS and ATO – End FY23

- Full Engineering Data Model build-out for newest SMS domains

- Facility Sustainment Model with SMS

- Facility Investment Optimization (Wave III)

- Collaboration with CERL Energy Branch and other DoD/Federal Partners on ESMS and Facility Related Control Systems (FRCS)

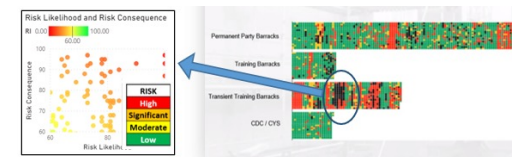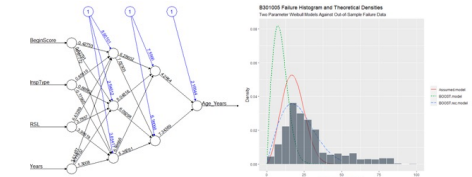- Multi-Service collaboration on CMMS integration with ESMS
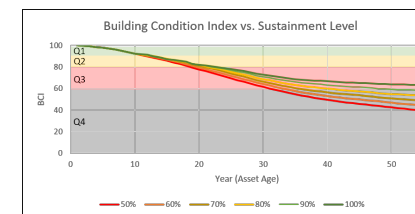
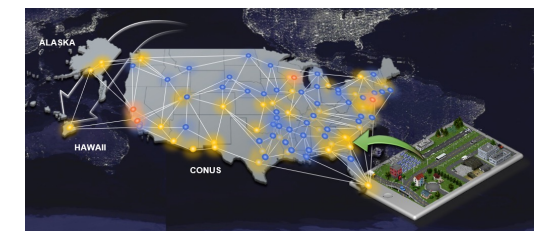**ESMS**
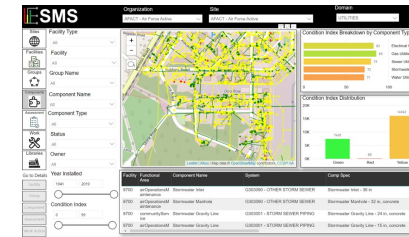
New Modules

Risk Prioritization

Data Analytics

Sustainment Modeling

Integration

Questions?