SMS SUMMIT 2023

SUSTAINMENT MANAGEMENT SYSTEM (SMS) SUMMIT AT THE NATIONAL ACADEMIES OF SCIENCES

Plenary Sessions
Tuesday, Aug 8th, 2023

National Academies of Sciences, Engineering, and Medicine
2101 Constitution Ave NW
Washington DC 20418

U.S. ARMY

US Army Corps of Engineers®



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WELCOME!

SUSTAINMENT MANAGEMENT SYSTEM (SMS)

A FACILITY LIFECYCLE MANAGEMENT TOOL

WHAT IS SMS?



An engineered process for asset lifecycle management; utilizes a collection of web-based software applications.

Produces multi-year condition trends and investment requirements at individual component level

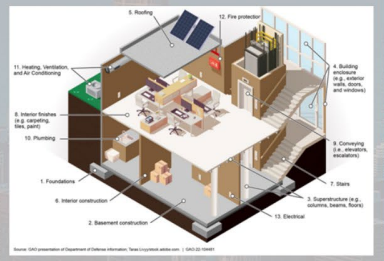
Objectively assess infrastructure, Consistently analyze and prioritize investment requirements, and Forecast investment requirements and consequence/trade-off analysis.

THE SMS PROCESS

Inventory → Assess → Predict → Work Planning → Forecast

COMPONENT INVENTORY

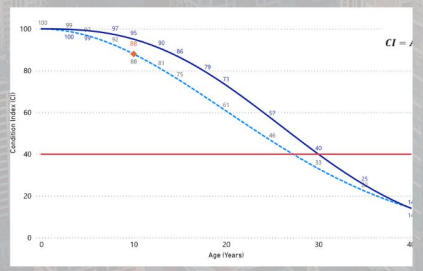
Building components are catalogued within a component inventory to a granular level. Other details captured include Quantity, Unit of Measure, Expected Design Life, Year Installed & more.



CONDITION ASSESSMENT & FORECASTING

Assessments are used to catalog distresses present in a facility to impact condition scores.





Lifecycle degradation curves are used to determine remaining service life of building components to identify work requirements. These curves can be adjusted by alpha- and beta-parameters and inspection data

WORK REQUIREMENTS IDENTIFICATION

Standards
Threshold trigger investments for assets below performance requirements (CI)

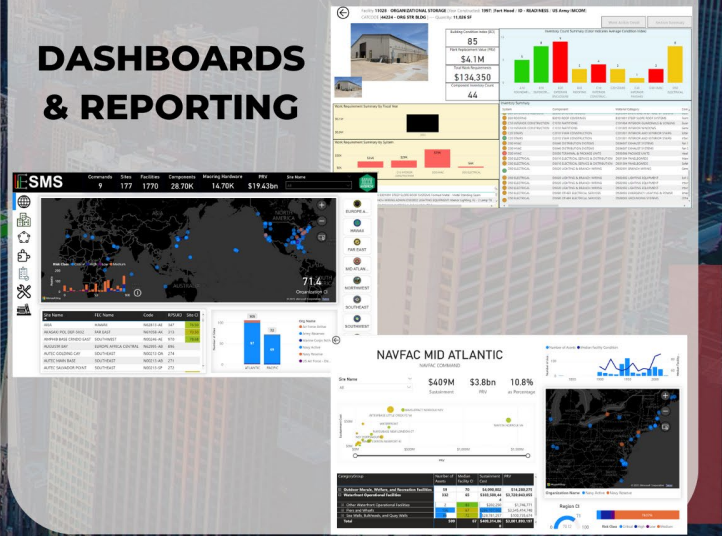
Policies
Rules apply different standards to different assets

Investment Plan
Generate work items for assets failing assigned standards. Costs estimated and ROI optimized

Prioritization
Score each work item according to metrics for risk, impact, financial benefit, etc.

Budget
Identify funding sources and fund work items according to budget rules

DASHBOARDS & REPORTING



TIMELINE

- **Late 1970s** — PAVER
- **1980s and 1990s** — ROOFER, RAILER, and BUILDER
- **2000s** — BUILDER Adoption
- **2013** — OSD Memo DoD SMS Deployed
- **Today** — Widespread Adoption
- **Tomorrow** — ESMS Maturation & Optimization

ERDC

SUMMIT DEDICATION

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Joseph “Joe” Karbarz

1957-2023







Army Veteran and ESMS/Fuels Pioneer

AGENDA REVIEW

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TUESDAY - AUGUST 8TH, 2023

MORNING SESSIONS

8:00 - 8:15 AM	Welcome, Introductions, and Agenda Review
8:15 - 8:35 AM	Mr. Michael McAndrew - Deputy Assistant Secretary of Defense for Construction
8:35 - 9:00 AM	Dr. Andrew Nelson - Director, Construction Engineering Research Laboratory
9:00 - 9:15 AM	BREAK
9:15 - 10:15 AM	Enterprise SMS Status Update and Demonstration
10:15 - 10:30 AM	BREAK
10:30 - 11:30 AM	Enterprise SMS Domain Updates
11:30 - 1:00 PM	LUNCH

AFTERNOON BREAKOUT SESSIONS

MANAGEMENT - NAS AUDITORIUM | ENGINEERING - NAS 120 | DATA ANALYTICS - NAS 125

1:00 - 1:50 PM	**MANAGEMENT 1**	Side-by-Side Comparison of BUILDER & ESMS - *Matthew Walters*
	ENGINEERING 1	Using Project Infrastructure Planning & Execution (PIPE) Application to Drive Decision Making - *Yousseff Abed*
	DATA ANALYTICS 1	Storytelling, Data-Driven Decision Support, Trend Analysis & Use Cases for SMS Data Dashboard Development - *Michael Grussing, Buddy Bartels*
1:50-2:00 - BREAK		
2:00 - 2:50 PM	**MANAGEMENT 2**	Leveraging the MILCON Requirements, Standardization, and Integration (MRSI) Suite for ESMS - *Dan McCue, Jayson Nonat*
	ENGINEERING 2	Deploying BUILDER SMS for Emergency Response- *Bil Hawkins*
	DATA ANALYTICS 2	How ESMS Supports the Army and ERDC's Virtual Testbed for Installation Management Effectiveness (VTIME) - *Buddy Bartels*
2:50-3:00 - BREAK		
3:00 - 3:50 PM	**MANAGEMENT 3**	Capturing & Measuring Facility Functionality: The Other Side of the Performance Equation - *Ryan Smith, Joel Groves, Buddy Bartels*
	ENGINEERING 3	Weather Effects on Lifecycle Deterioration and Equipment Replacement - *Michael Grussing, Brenda Mehnert*
	DATA ANALYTICS 3	Normalized BCI - *Scott Lehmkuhl, Ryan Bredahl*

AGENDA REVIEW

U.S. ARMY

WEDNESDAY - AUGUST 9TH, 2023

MORNING SESSIONS

8:00 - 9:00 AM	Panel: Implementation, Data Sustainment, CMMS Integration, and Standards & Policies - Part 1 - *Julie Krebs, Bil Hawkins, Jon Crittenden, Gary Keller*
9:00 - 9:15 AM	BREAK
9:15 - 10:15 AM	Panel: Continued
10:15 - 10:30 AM	BREAK
10:30 - 11:30 AM	How SMS and Installation GIS Work Together - *David LaBranche*
11:30 - 1:00 PM	LUNCH

AFTERNOON BREAKOUT SESSIONS

MANAGEMENT - NAS AUDITORIUM | ENGINEERING - NAS 120 | DATA ANALYTICS - NAS 125

1:00 - 1:50 PM	**MANAGEMENT 1**	Review of National Academies of Science Engineering and Medicine (NASEM) Recommendations Regarding SMS/BUILDER - *Jack Dempsey, Cameron Oskvig*
	ENGINEERING 1	Data Maintenance Efficiency - *Paul Schowalter*
	DATA ANALYTICS 1	Where FCI Falls Short - *Michelle Mehnert, Joe Arion, and Justin Klein*
1:50-2:00 - BREAK		
2:00 - 2:50 PM	**MANAGEMENT 2**	NAVY Facility Investment Model - *Sandra Dunn, Gopal Narayan*
	ENGINEERING 2	Utilities Domain Breakout
	DATA ANALYTICS 2	SMS-TCX Research Initiatives - Session 1 - *Trevor Betz*
2:50-3:00 - BREAK		
3:00 - 3:50 PM	**MANAGEMENT 3**	SMS-TCX Research Initiatives - Session 2 - *Sam Dulin, Joseph Wittrock, Robert Skudnig*
	ENGINEERING 3	Waterfront Domain Breakout
	DATA ANALYTICS 3	Nothing Scheduled

AGENDA REVIEW

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THURSDAY - AUGUST 10TH, 2023
MORNING SESSIONS

8:00 - 9:00 AM	Moneyball Approach to Facility Investment Analytics - *Buddy Bartels*
9:00 - 9:15 AM	BREAK
9:15 - 10:15 AM	Panel: Advanced and Extended Uses of SMS Data - *Julie Krebs, Jay Tulley, Kelly Olson, Mike Rosenblatt, Gary Keller*
10:15 - 10:30 AM	BREAK
10:30 - 11:20 AM	SMS Look-Ahead: A Collaborative Session on Future Capabilities - Ideas From the ESMS User Community - *Matthew Walters, Michael Grussing*
11:20 - 11:20 AM	CLOSING REMARKS
11:30 - 1:00 PM	LUNCH

AFTERNOON SESSIONS - GOVERNMENT ONLY

MR. MICHAEL MCANDREW

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"Mr. Michael McAndrew, a member of the Senior Executive Service, is the Acting Principal Deputy Assistant Secretary of Defense for Installations (PDASD(I)) focused on Energy, Installations, and the Environment. In this capacity, he serves as the principal advisor to the Assistant Secretary of Defense for Sustainment on all policies and programs pertaining to installations, environment, installation and operational energy, and infrastructure resilience. His portfolio includes installation management, military construction, and utilities and energy management.

Prior to the Acting PDASD(I) role, Mr. Michael McAndrew served as the Deputy Assistant Secretary of Defense for Construction within the Office of the Assistant Secretary of Defense (Sustainment). He provides executive leadership on all matters pertaining to DoD's physical infrastructure, to include development and execution of policies, guidance, and procedures for construction, operations, maintenance and repair of DoD's worldwide facilities to enhance and preserve warfighting capabilities and to provide safe working and living conditions for our military personnel and families. His responsibilities include all matters related to real property maintenance; facility operations; and host-nation programs related to facility construction and management…"
https://www.defense.gov/About/Biographies/Biography/Article/2803892/michael-mcandrew/



DR. ANDREW NELSON

U.S. ARMY

"Dr. Andrew (Andy) Nelson is director of the U.S. Army Engineer Research and Development Center's (ERDC) Construction Engineering Research Laboratory (CERL) in Champaign, Illinois. As the CERL director, he is responsible for the activities of a highly interdisciplinary team of approximately 300 federal and contracted staff conducting research in materials and structures, energy, training lands and heritage, emergency and operational support, warfighter engineering and installation readiness.

…

Dr. Nelson holds a B.A. in Physics from Illinois Wesleyan University and M.S. and Ph.D. degrees in Environmental Engineering from the University of Illinois at Urbana-Champaign. He has received multiple Army Civilian Service Awards including the Meritorious Civilian Service Award and has been recognized with the ERDC R&D Achievement Award and the ERDC Outstanding Team Award, among others. He was received the Association of Environmental Engineering and Science Professors outstanding master's thesis award and was a DoD Science, Mathematics, and Research for Transformation Scholarship recipient in 2009."

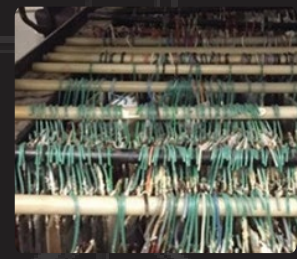
https://www.erdc.usace.army.mil/About/Leadership/Bio-Article-View/Article/2701622/dr-andrew-nelson-sstm/



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Construction
Engineering
Research
Laboratory












Andy Nelson, PhD, SSTM
Director

Sustainment Management System Summit
8-10 August 2023

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USACE Top 10 R&D Priorities

Laying the Foundation for a Bold New Era of R&D

1. Mitigate and Adapt to **Climate Change**
2. Win **Future Wars**
3. Modernize our Nation's **Infrastructure**
4. Support Resilient **Communities**
5. Enable Smart and Resilient **Installations**
6. Ensure **Environmental** Sustainability and Resilience
7. Secure Reliable Installation **Energy**
8. Revolutionize and Accelerate **Decision Making**
9. Improve Cyber and Physical **Security**
10. Protect and Defend the **Arctic**

Priorities are not ranked; numbers are for identification purposes only



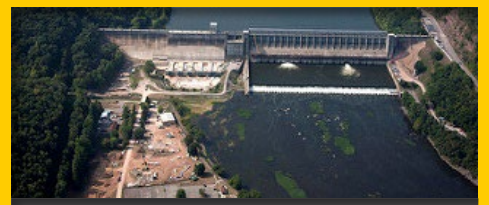
USACE R&D STRATEGY

Scan the QR Code to download a copy of the **USACE R&D Strategy** and other USACE R&D communication products

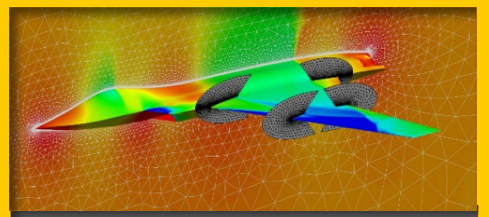
ERDC Delivers Innovative Solutions

ERDC'S Programmatic Approach Backed by Core Competencies for the Army

RESEARCH & DEVELOPMENT AREAS



CIVIL WORKS



ENGINEERED RESILIENT SYSTEMS



GEOSPATIAL RESEARCH AND ENGINEERING



INSTALLATION AND OPERATIONAL ENVIRONMENTS



MILITARY ENGINEERING

CORE COMPETENCIES

SPECIALIZED ERDC KNOWLEDGE THAT ENABLES OUR RESEARCH AND DEVELOPMENT AREAS



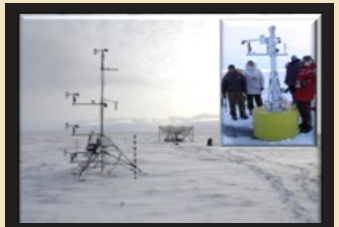
BATTLESPACE
TERRAIN MAPPING AND CHARACTERIZATION



BLAST AND WEAPONS EFFECTS
ON STRUCTURES AND GEO-MATERIALS



CIVIL AND MILITARY ENGINEERING



COLD REGIONS SCIENCE AND ENGINEERING



COASTAL, RIVER AND ENVIRONMENTAL ENGINEERING



COMPUTATIONAL PROTOTYPING OF MILITARY PLATFORMS



MILITARY INSTALLATIONS AND INFRASTRUCTURE

ERDC Overview

Seven Laboratories in Four States

ERDC Headquarters
Vicksburg, Mississippi



Coastal and Hydraulics Laboratory (CHL)



Environmental Laboratory (EL)



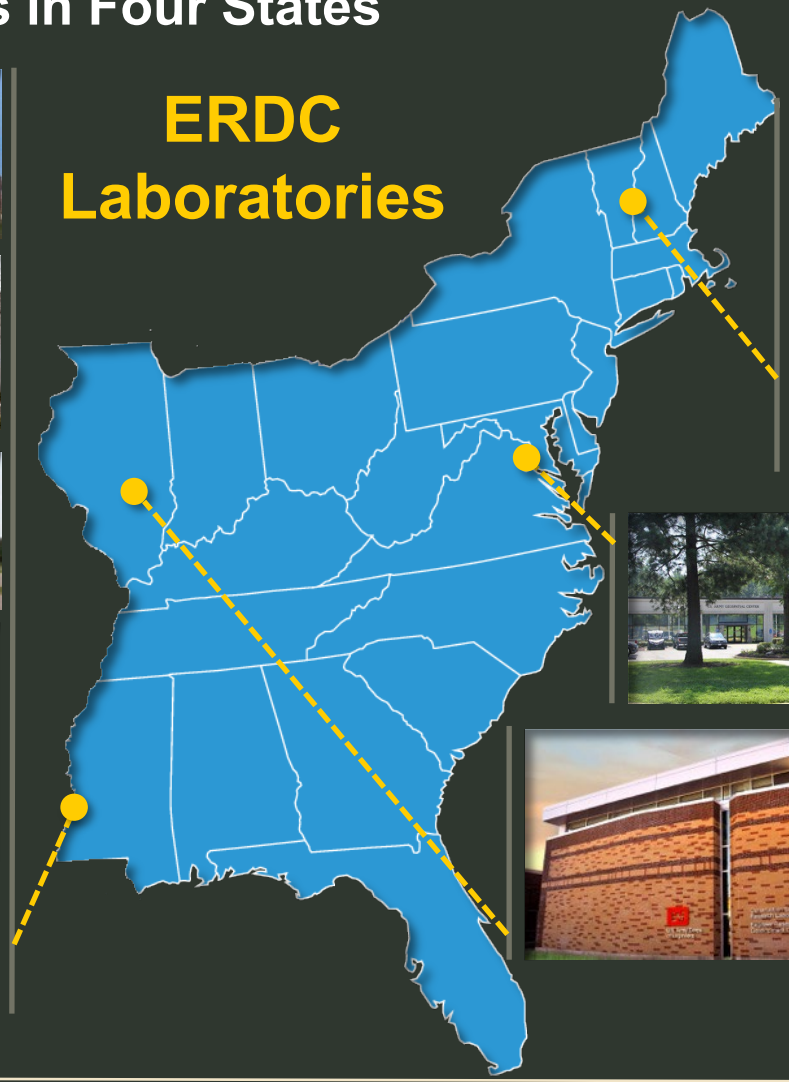
Geotechnical and Structures Laboratory (GSL)



Information Technology Laboratory (ITL)



ERDC Laboratories





Cold Regions Research and Engineering Laboratory (CRREL)
Hanover, New Hampshire



Geospatial Research Laboratory (GRL)
Alexandria, Virginia

Construction Engineering Research Laboratory (CERL)
Champaign, Illinois

Field Offices

Permafrost Tunnel Research Facility
Fox, Alaska

Alaska Research Office
Fairbanks, Alaska

Lewisville Aquatic Ecosystem Research Facility
Lewisville, Texas

Contingency Base Integration Technology Evaluation Center (CBITEC)
Fort Leonard Wood, Missouri

Field Research Facility
Duck, North Carolina

Corbin Field Station
Woodford, Virginia

Extreme Exposure Station
Treat Island, Maine

ERDC International Research Office
London, England

A World-Class Research & Development Organization that Discovers, Develops and Delivers New Ways to Make the World Safer and Better Every Day

CONSTRUCTION ENGINEERING RESEARCH LABORATORY

Mission

We discover, develop, deliver, and sustain trusted engineering and scientific solutions impacting built and natural infrastructure for the warfighter and the Nation.

Vision

We strive to be a world-class research and development partner mobilizing research into practice to make the world safer and better every day.

Infrastructure Science & Engineering

Solutions for durable, resilient, and sustainable Military and Civil Works facilities

Energy & Power
Building Energy Systems
Energy Analysis & Planning
Power & Energy
Water Use Security



Installation Readiness
Advance Compliance
Installation Analytics
Installation Facility Planning
Standards & Systems



Materials & Structures
Innovative Materials
Structural Behavior
Synthetic Bio



Sustainment Management System Technical Center of Expertise (SMS-TCX)

Operational Science & Engineering

Integrated solutions for all phases of installation and contingency basing operations and emergency response



Emergency & Operational Support
Human Domain
Operational Energy
Operational Water



Training Lands & Heritage
Cultural Resources
Military Noise
Threatened & Endangered Species
Training Land Sustainment



Warfighter Engineering
Additive Construction
Contingency Basing
Engineer Robotics

FULL SPECTRUM WORKLOAD

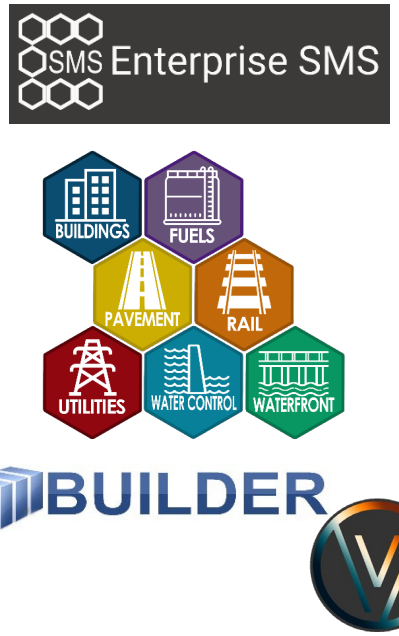
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SUSTAINMENT MANAGEMENT TCX SYSTEM

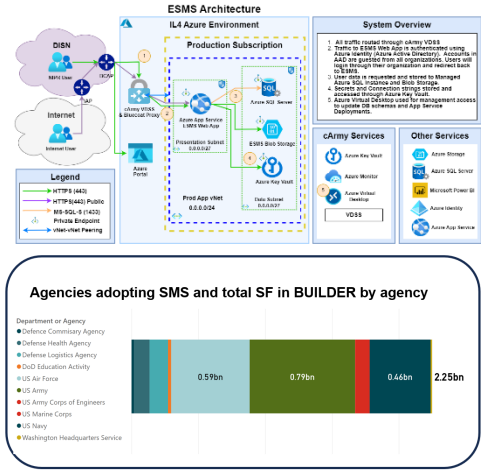
Discover



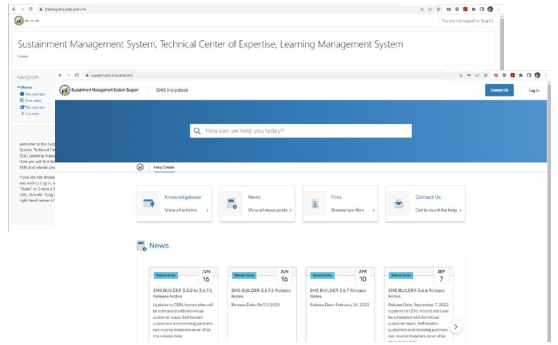
Develop

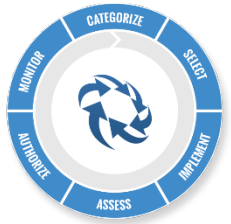


Deliver



Sustain





HISTORICAL AND ENDURING IMPACT OF SMS

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

Government Agencies using SMS

U.S. ARMY · ERDC · U.S. AIR FORCE · AMERICA'S NAVY · DEPARTMENT OF THE NAVY UNITED STATES MARINE CORPS · UNITED STATES COAST GUARD 1790 · DEFENSE LOGISTICS AGENCY · DEFENSE COMMISSARY AGENCY · DEPARTMENT OF STATE UNITED STATES OF AMERICA · DHA Defense Health Agency · USDA · DEPARTMENT OF COMMERCE UNITED STATES OF AMERICA · dodea DEPARTMENT OF DEFENSE EDUCATION ACTIVITY · NNSA National Nuclear Security Administration · DEPARTMENT OF DEFENSE UNITED STATES OF AMERICA

BUILDER Licensing Partners

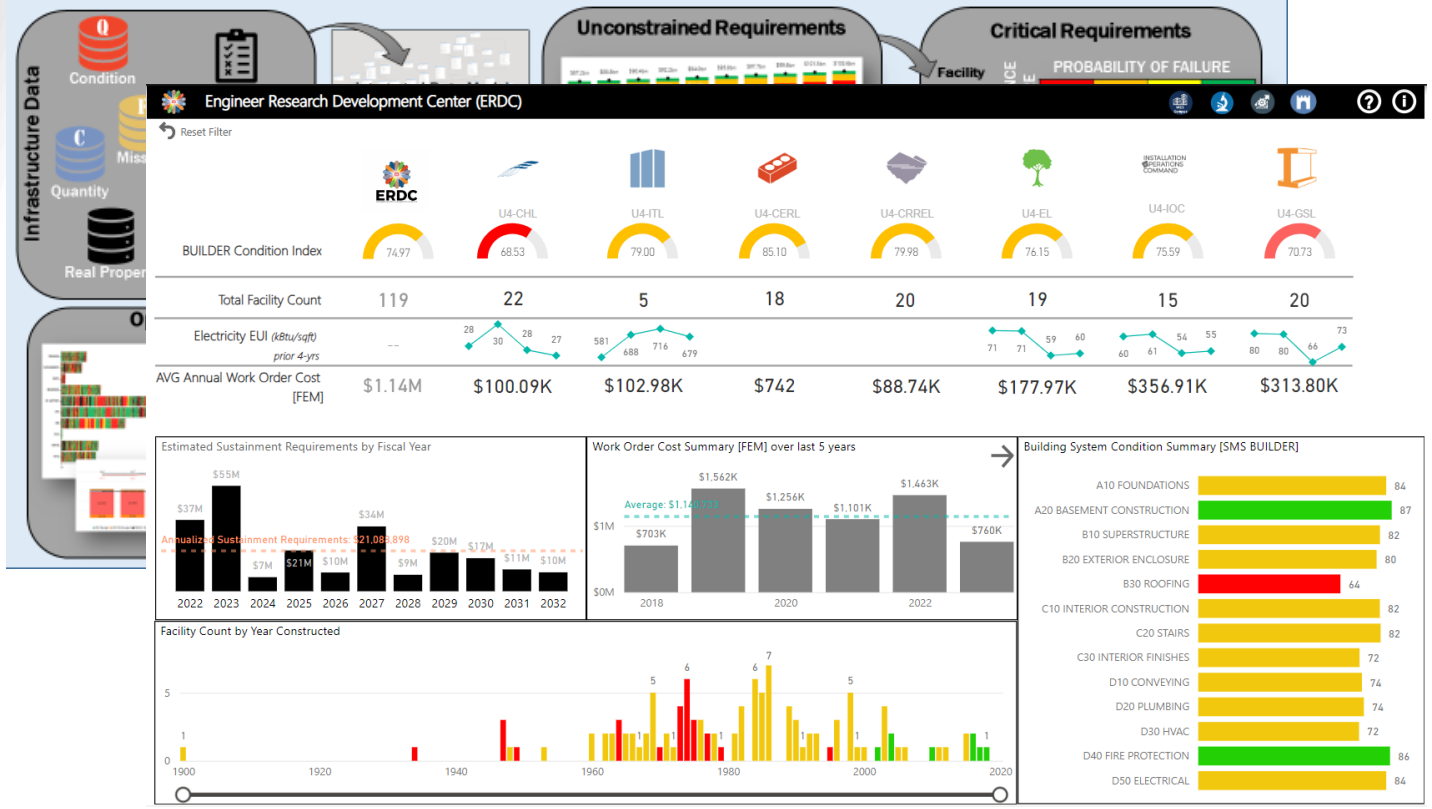
AECOM · ATKINS · CALIBRE · Cardno TEC · DIGON SYSTEMS · fm:systems · GOLDENWOLF · NORTH PACIFIC SUPPORT SERVICES · TETRA TECH

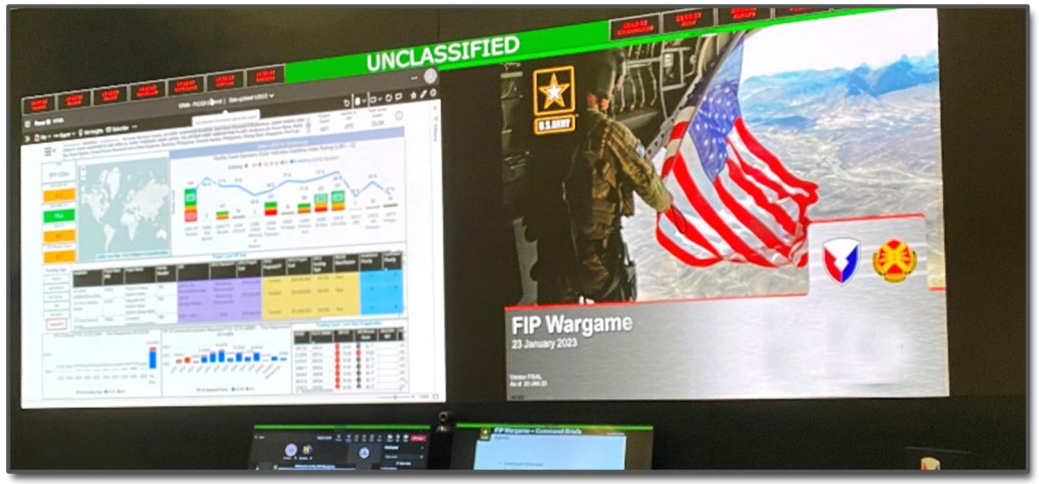
EXPANDED USE OF SMS

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Facility Investment Analytics (FIA25)

FIA is a decision support tool for II-PEG POM planning that helps prioritize FSRM requirements and informs Facility Investment Plan (FIP) development based on critical infrastructure requirements from Army Senior Leaders (ASL) and risk prioritization analysis.





ADVANA
DISCOVER. UNDERSTAND. DECIDE.

WELDER


ERDC/CERL SR-01-23

US Army Corps of Engineers® Engineering Research and Development Center

Operations and Maintenance Engineering Technology

A Method Comparison of Algorithms for Predicting Equipment Condition Ratings in the Enterprise Sustainment Management System using Building Automation System Data

A Case Study at Tyndall AFB and the Engineering Research and Development Center, Version 1.0

Matthew E. Richards, Louis Bartels, PhD., Michael Grussing, PhD., Trevor Betz, Joseph Wittrock, Sam Dulin and Robert Skudnig

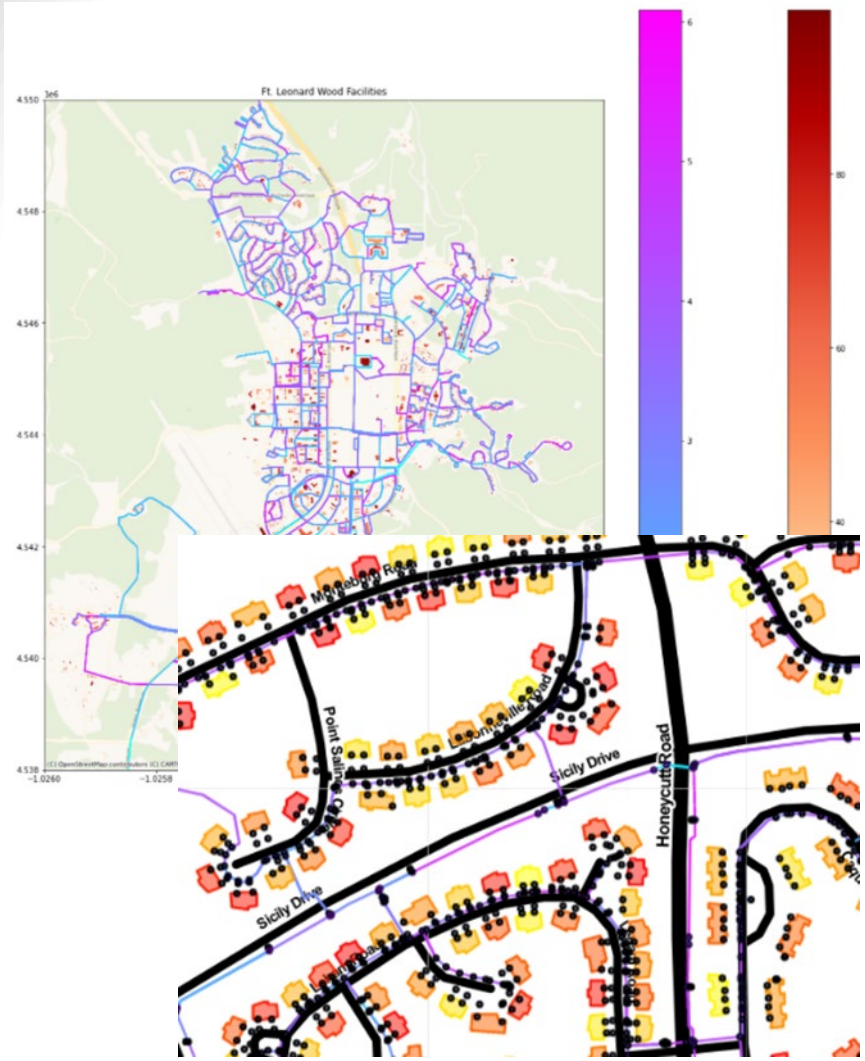
March 2023
Revised April 2023

DRAFT NOT APPROVED FOR PUBLIC RELEASE; distribution is limited to authors.

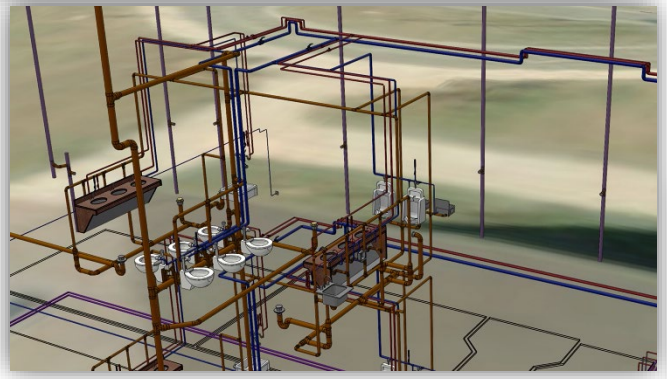
Construction Engineering Research Laboratory

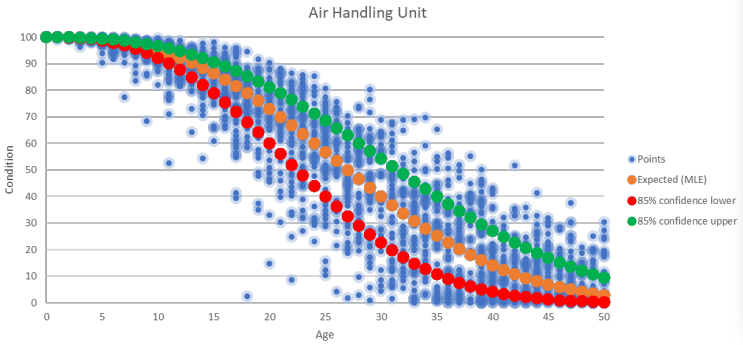
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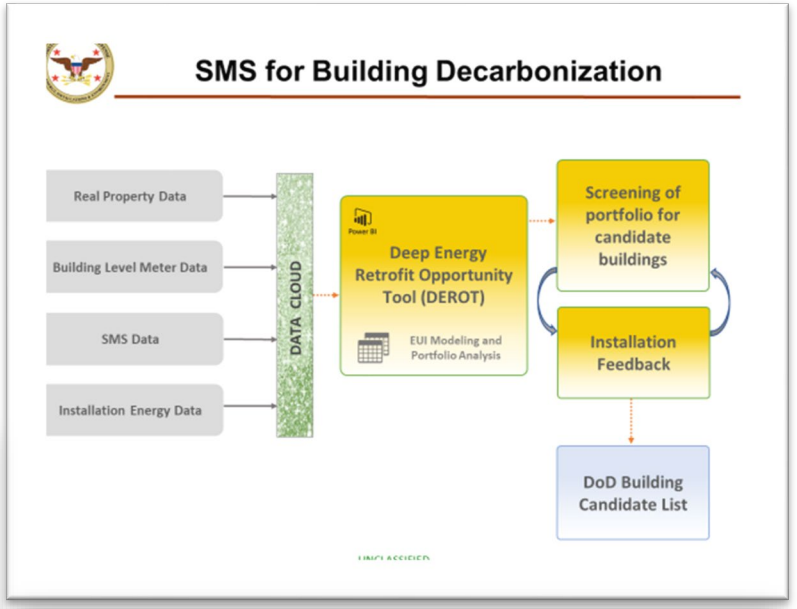
EMERGING OPPORTUNITIES





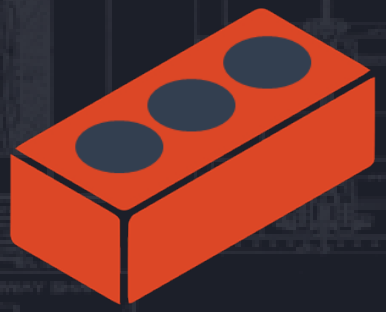








ENGINEER RESEARCH & DEVELOPMENT CENTER



CERL

CONSTRUCTION ENGINEERING RESEARCH LABORATORY

CHAMPAIGN, ILLINOIS

Andy Nelson, PhD, SSTM, CERL Director

Andrew.J.Nelson@usace.army.mil

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ESMS DEVELOPMENT/ENVIRONMENT UPDATE AND DEMO

Matt Walters – SMS-TCX

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ENTERPRISE SMS

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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

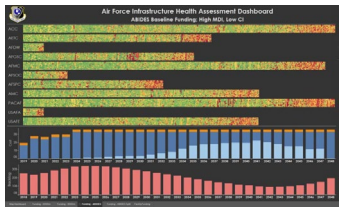
Tech Specs

- **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

SMS Enterprise SMS



2023 Release II:
Predictive Analysis
SMS BUILDER Parity



2025 Release III:
Prescriptive Analysis
Optimization



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CORE FEATURES AT "BUILDER PARITY"

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.

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ESMS FEATURES ACROSS DOMAINS

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

DEVELOPMENT PUSH TO PARITY & PROD

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- User Interface Improvements and Modern UI Overhaul
- Usability Enhancements and Bug Fixes
- Enhancements and Fixes across the ESMS application including Inventory, Assessments and Assessment Templates, Work Analysis Engine, Catalog and Reference Books, Import capabilities, Reporting, Performance Optimization, and more.
- Completion of Software Requirements Specification (SRS)
- Development and Execution of application Test Plans
- .Net Framework upgraded to .Net 6 for Better cloud compatibility, Latest Tools and Libraries, and Platform Agnostic
- Angular 6 upgraded to Angular 14 for Faster Performance, Latest Tools and Libraries, More Secure Dependencies, and Angular Material



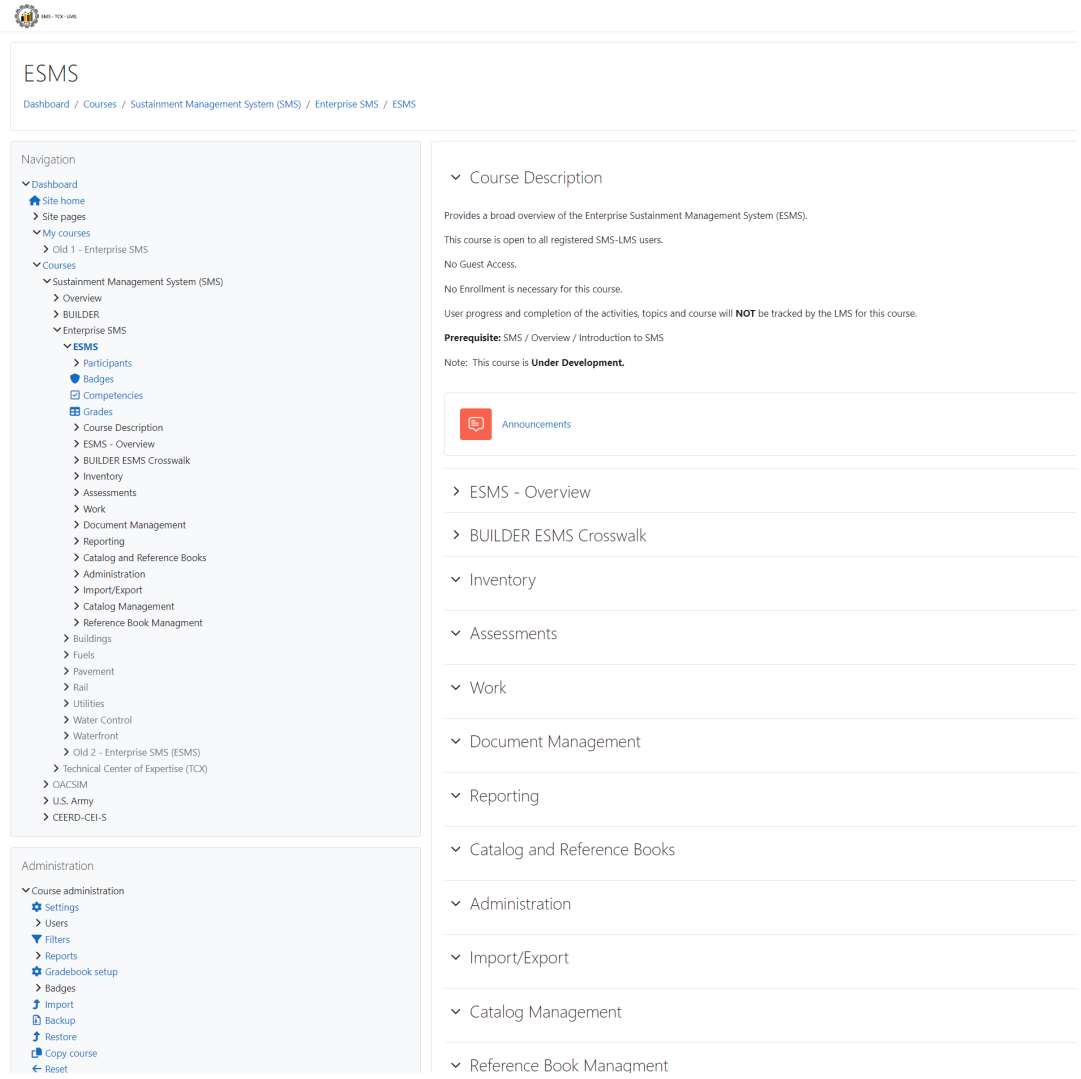




SUPPORT MATERIAL AND MIGRATION

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- Build-out of ESMS Training Videos on SMS Learning Management System site
- Revised New User Procedures integrating with EAMS-A – Streamlined DoD registration
- Making final adjustments to BUILDER to ESMS Import for data migration
- Developing BUILDER Transition Guide to assist agencies in migrating from BUILDER to ESMS (overview/training videos, BUILDER to ESMS crosswalk, permissions, organizational admins, etc.)



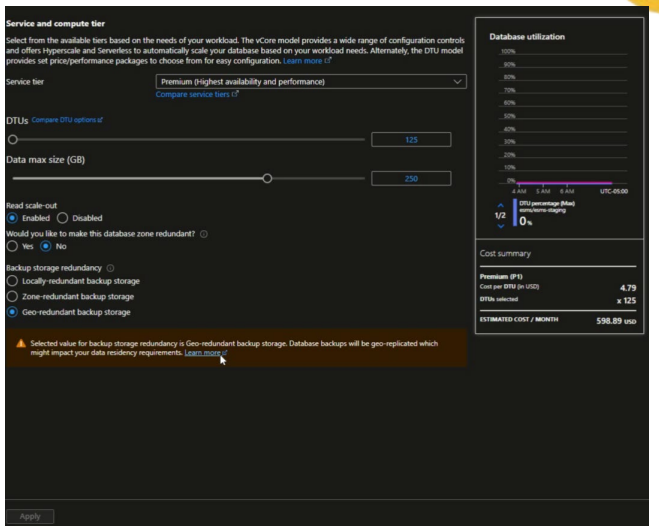
EMBRACING THE CLOUD

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ESMS will be hosted using full PaaS architecture within the cArmy Azure cloud tenant.

- Scalability Comparison
  - Cloud: Select a higher SKU, Click Apply, Done, Less than 15 minutes
  - On-Prem: Research compatible components, Order the parts, Receiving and Processing, Installation (downtime), Unexpected incompatibility, Configuration, Can take weeks or months for completion
- Accreditation Footprint Comparison
  - Cloud: App Dev
  - On-Prem: .Net, IIS, OS , VMware, IE, SQL Server, App Dev
- Cost
  - cArmy Common Resources provided at low or no cost.
  - Cloud infrastructure cheaper to maintain
- Security
  - PaaS Resources offer simple Configuration
  - cArmy Common Services include VDSS stack and Bluecoat Proxy
  - Automatic Patches and Security Updates
- Reliability
  - Azure Cloud resources offer built in geographic redundancy
  - Fast and Easy Deployments

Microsoft Azure



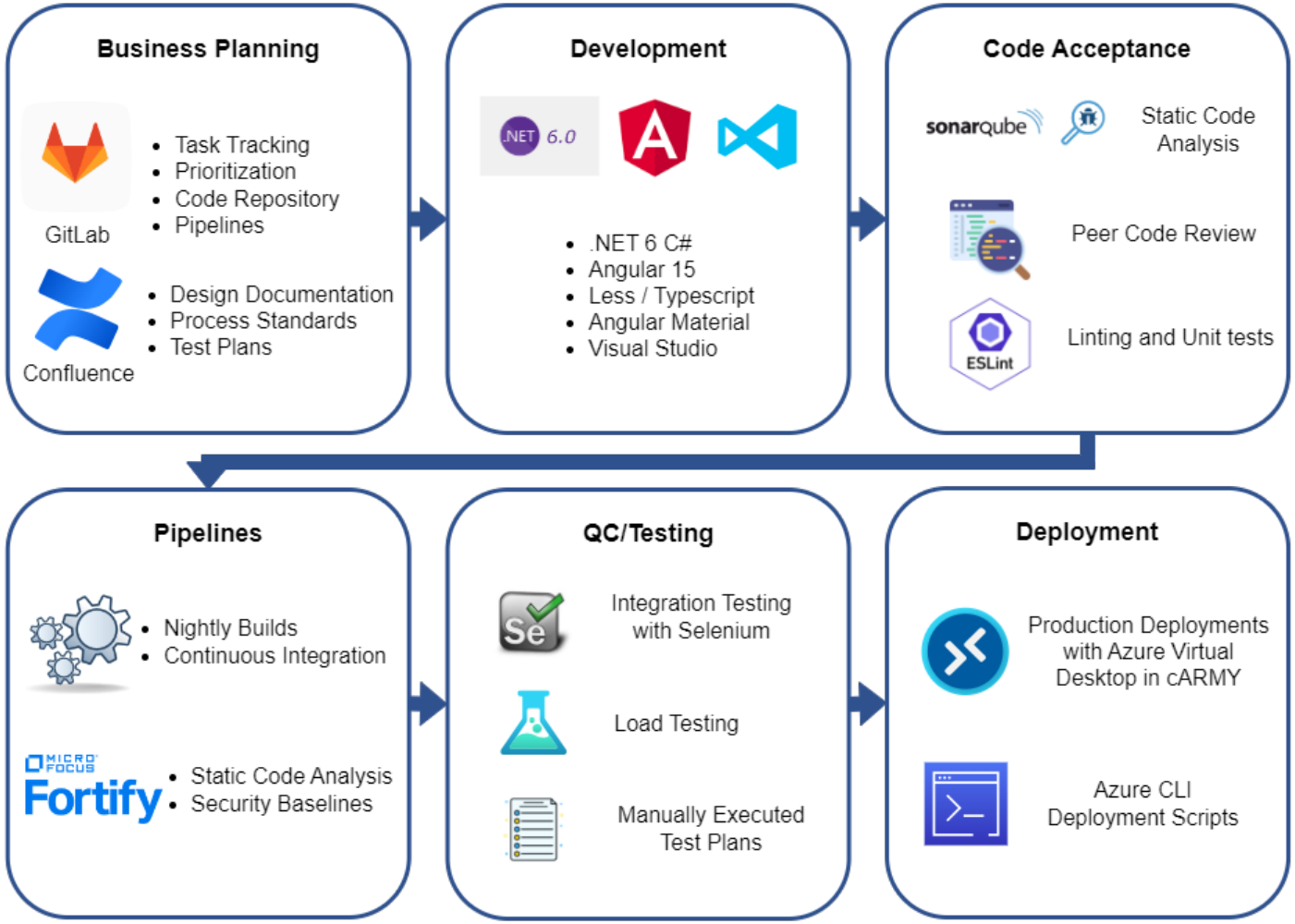
NATIONAL ACADEMIES Sciences Engineering Medicine

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ESMS ATO TIMELINE



ISSUE/REQUEST TO PRODUCTION APP



PRIVATE LICENSING STRATEGY (WIP)

- Similar to BUILDER/ROOFER/PAVER the SMS TCX in conjunction with the ERDC ORTT discussing the path forward for Patent Licensing Agreements (PLA) for ESMS
  - Renewing existing agreements with current PLA holders and outlining the process for prospective PLA holders
  - Provides a mechanism for SMS capabilities to be used outside of the Federal sector
- ERDC ORTT and/or TechLink reaching out to existing PLAs to survey non-federal use of BUILDER/SMS for better awareness outside of the Federal Sector – Initial qualitative responses:
  - Non-Federal customers:
    - Metro Washington Airport Authority
    - Commercial roofing contractor
    - City Governments
  - In the Pipe-line:
    - National Restaurant Chain
    - Regional Healthcare Organization
    - Multi-unit residential
    - Senior Living
    - Developers

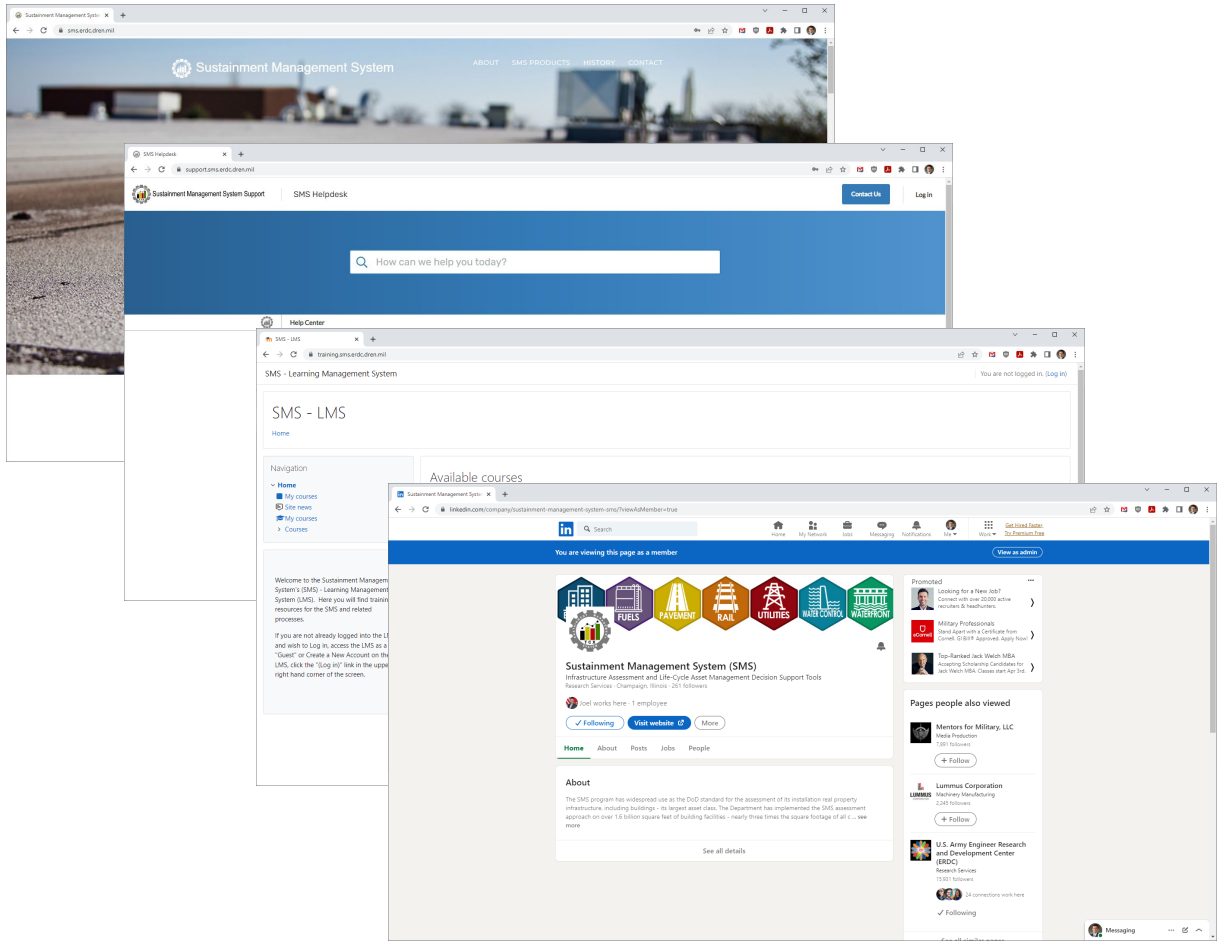
SMS INFORMATION RESOURCES

SMS General Information Website
https://www.sms.erdc.dren.mil/

SMS Support Site
https://support.sms.erdc.dren.mil/

SMS Training Site – Learning Management System
https://training.sms.erdc.dren.mil/

SMS LinkedIn Page
https://www.linkedin.com/company/sustainment-management-system-sms



ESMS DOMAIN UPDATES

SMS-TCX Team Members

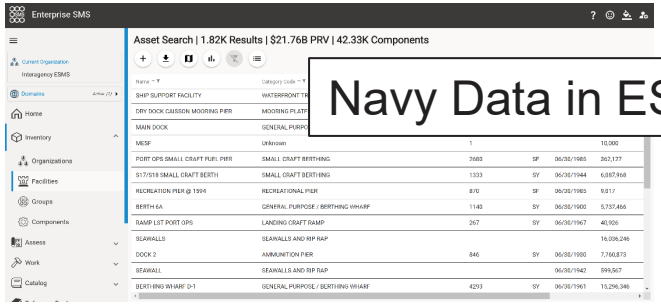
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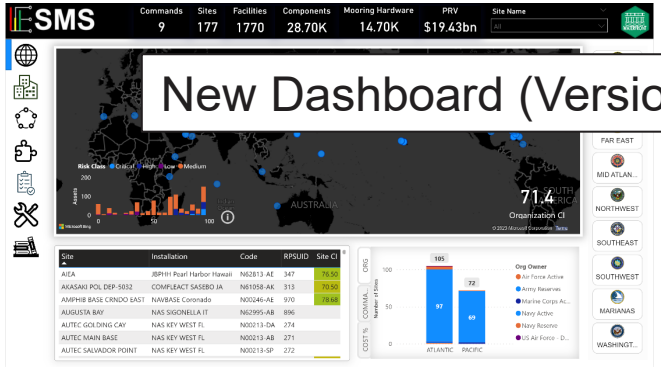
ESMS WATERFRONT

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What have we done to date?



- Navy Data in ESMS



- New Dashboard (Version 2.1)
- Prediction Model Version 2.0
  - regression, install date confidence, repair date, better Weibull parameters, etc.

What are we doing in FY24?

Steps to First Constrained 10-YR Forecast

- Update component catalog
- Update facility records with latest RP/new data
- Confirm which assets each agency has responsibility/ownership
- Validate prediction model version 2.0
- Manually update component/system weights
- Develop preliminary repair/replace cost model
- Develop preliminary standards/policies
- Determine best platform for preliminary run
- Present **FIRST CONSTRAINED 10-YR FORECAST** for Navy (**OCT 2024**)
- Constrained forecasts for other agencies to follow in later FYs

Inventory

Assess

Predict

Work Planning

Forecast

WATERFRONT BREAKOUT
Engineering Track: Session 3B
Wednesday, Aug 9 – 3:00 – 3:50 PM

WATERFRONT

Last Updated: 7 AUG 2023
SMS Domain Owner: Smith, Ryan
ryan.e.smith@usace.army.mil

ESMS RAILS

U.S. ARMY

ESMS Rail Infrastructure

ESMS Rail is a railroad track asset management system designed as a decision support tool for evaluating track condition and planning track SRM activities on military, short line, and industrial track networks. ESMS Rail links recorded defects to:

- Operations restrictions and maintenance levels based on governing standards
- Track Structure Condition Index (TSCI) metric relating physical quality and condition
- Local work actions to correct defects

Current State

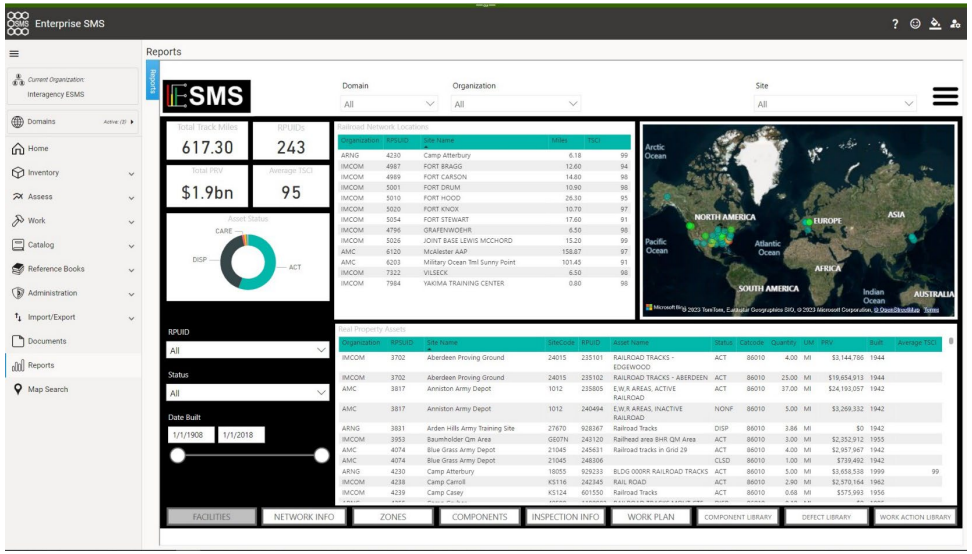
- Interactive dashboards for viewing legacy RAILER information and track analytics
- Network, area, track, & segment information
- Track component inventory
- Inspection defects and repair work items
- Tabular data export to Excel
- Integration of Real Property Information
- Legacy RAILER data imports

Path to FOC

- Expand the user community, including training resources
- Stand up helpdesk
- Develop business intelligence reports to support leadership

FY24 Priorities

1. Data editing capabilities FY24 Q1
2. Performance Metric Calculations FY24 Q2
    - BSCI, TCI, RJCI, and TSCI
3. Ops restrictions identification FY24 Q4
4. Work analysis generation
5. Automated data syncing and paginated report development





Last Updated: 6 AUG 2023

SMS Domain Owners: Johnson, Michael & Smith, Ryan

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ryan.e.smith@usace.army.mil

ESMS RAILS

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RAILER











ESMS PAVEMENTS

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ESMS Pavement Infrastructure

ESMS Pavement is a pavement management system designed as a decision support tool for evaluating pavement condition and planning pavement SRM activities on airfield and roadway pavements. ESMS Pavement:

- Displays Inventory with associated GIS data
- Tracks Pavement Condition Index (PCI) metric relating physical quality and condition
- Displays work history and repair items

Current State

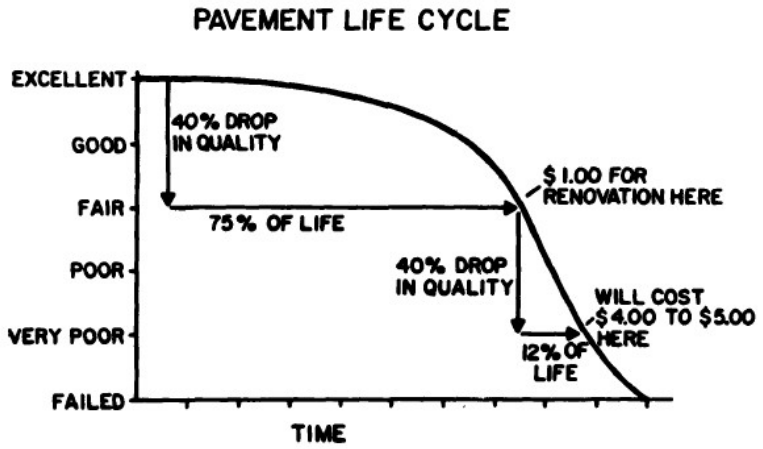
- Interactive dashboards for viewing legacy PAVER information and pavement analytics
- Network, branch, section & sample unit info
- Pavement inventory
- Inspection defects and repair work items
- Tabular data export to Excel
- Integration of Real Property Information
- Legacy PAVER data imports

Path to FOC

- Expand the user community, including training resources
- Stand up helpdesk
- Develop business intelligence reports to support leadership

FY24 Priorities

1. Data editing capabilities FY24 Q1
2. Pavement Condition Index (PCI) Calculations FY24 Q2
3. Work analysis generation FY24 Q4
4. Automated data syncing and paginated report development FY24 Q4
5. Expeditionary capability, PCASE and NATO language integration





PAVEMENT

Last Updated: 6 AUG 2023
SMS Domain Owner: Johnson, Michael
michael.a.johnson@usace.army.mil

ESMS PAVEMENTS

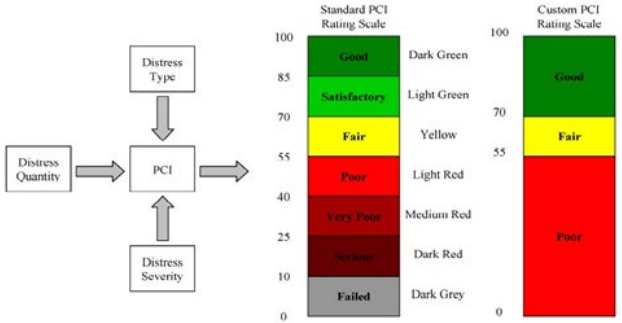
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ESMS UTILITIES - STATUS

- Technical approach uses standard SMS methods
  - Inventory, Assessment, Prediction, Work Planning, Forecasting
  - Configured for linear assets and utilities data sources
    - Water, Electrical, Wastewater, Stormwater, Natural Gas, Thermal, non-DLA Fuels
  - Other assets can be added if requirements are confirmed
- ESMS Utility Data Models
  - Models are being reworked via a structured process by CERL and SDSFIE
  - Process follows a published schedule and is moderated / adjudicated by SDSFIE
  - Includes review and comment by rep's from each DoD service component
  - Final drafts distributed when complete
- Definitions and data structure are being aligned for
  - GIS Features / SMS Components
  - Component Attributes, Units of Measure, Data Field Constraints,
  - Enumerants / Picklists
- Completed Models (or nearly final)
  - Water, Electric, Wastewater, Stormwater
- Models In progress or scheduled for review/alignment
  - Natural Gas, Thermal
  - Non-DLA Fuels (USAF)
  - DLA Fuels



Last Updated: 7 AUG 2023

SMS Domain Owner: Wilson, Clint

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ESMS UTILITIES – NEXT STEPS

- 1Q FY24 - Data models will be loaded into ESMS Utilities Module

- Databases can then be populated from authoritative sources
  - Each Service Component uses a different combination of data sources – RP, GIS, CMMS, Business Systems
    - Build an ESMS import specification for each Service Component
    - Will require collaboration between CERL, SMS SMEs, and Utility SMEs
  - Establish Inventory reports and dashboards for Data QA
  - Expect some data wrangling, troubleshooting, iterating

- Configuration by each Service Component
  - Each instance configured per component requirements
    - Align condition ratings in ESMS with past ratings and data available
    - Perform new condition assessments where needed
    - Standards and policies per their mission requirements (process is similar to BUILDER)

- Future development
  - Functionality assessments
  - Alignment across DoD
  - Aligned condition assessments
  - Improved condition assessment
  - Improved condition forecasting

ESMS WATER CONTROL STRUCTURES

Provides SMS Coverage for

- Dams, Levees, Dikes
- Accounts for the distinctives of WCS RP Assets
  - Construction
  - Sustainment
  - Risk Management
  - Life Cycle
- Operates within Enterprise SMS
- Coordinated with USACE, IMCOM, AFCEC, NAVFAC

Does not conflict with or replace (ER 1110-2-1156) Dam Safety Programs

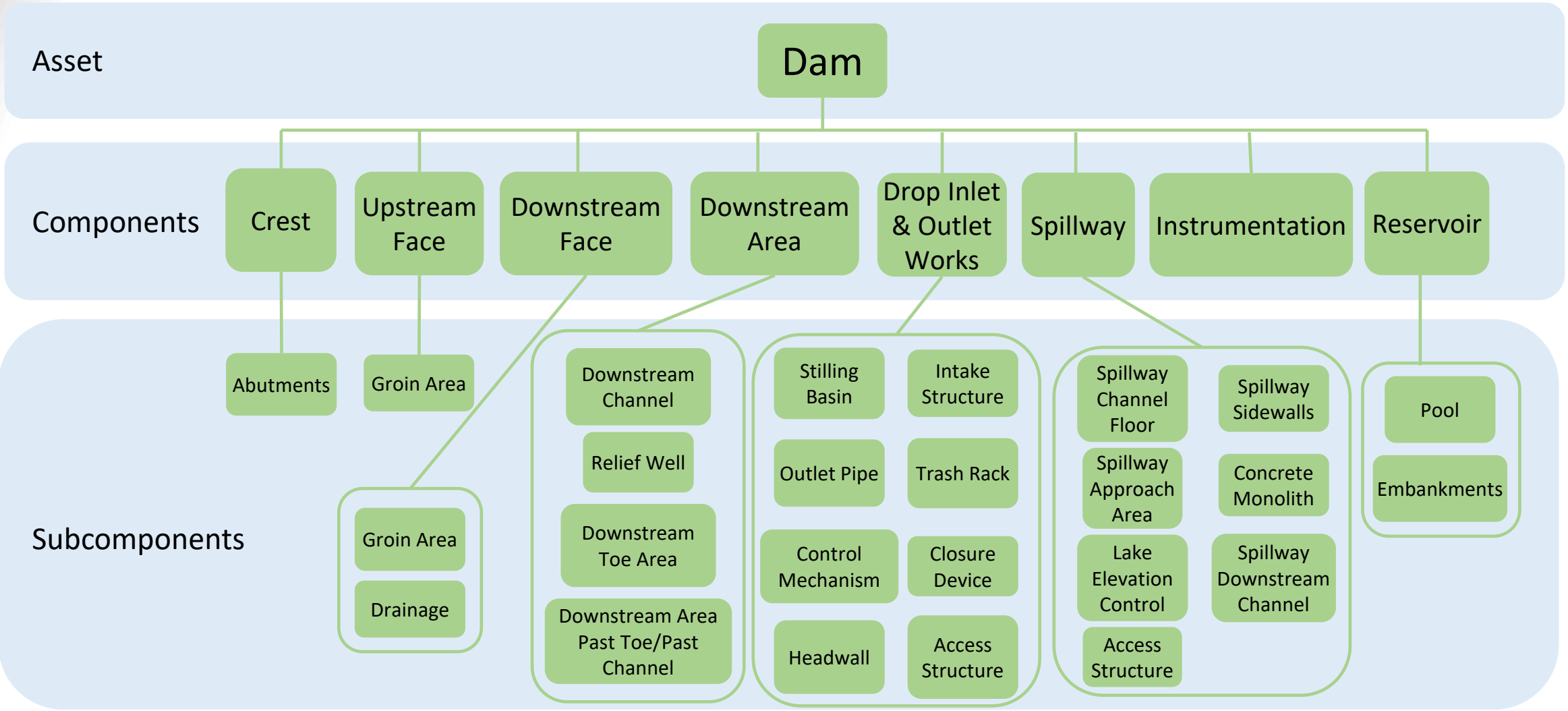
- Condition Index correlates with “likelihood of failure”
- Does not evaluate consequence of failure
  - Would requires a comprehensive evaluation beyond the dam itself
  - Currently beyond the scope of SMS Functionality assessments
- Installations perform Informal inspections every 1 -2 years depending on Policies and local requirements
- USACE Performs Formal inspections approximately every 5 years



Brown Lake Dam, USACE – ERDC, Vicksburg, MS

Last Updated: 7 AUG 2023
SMS Domain Owner: Wilson, Clint
Clint.Wilson@usace.army.mil

ESMS WCS - COMPONENT INVENTORY MODEL



ESMS WCS CONDITION ASSESSMENT FORMS

- One form for each of the 8 components
- The dam components receive condition ratings while subcomponent ratings are optional
- Forms are available in MS Excel or in printable .PDFs
- Data entry into ESMS is manual, but importer is being developed
- Asset (Dam) rating is a distinct entry by the inspection lead. Component ratings are not currently rolled up
- Forms will be made available to installations via IMCOM, NAVFAC, AFCEC POCs. Feedback welcome about informal inspections.

Crest	
Rating	
Observations	
Rating	**Description**
5 - Satisfactory	Assign a value of 5 if any of the following are observed: a. Well-maintained crest, or b. No existing deficiencies noted. c. If a concrete structure, no apparent concrete deficiencies
4 - Fair	Assign a value of 4 if any of the following are observed: a. Small ruts or puddles less than 6 inches deep, b. Small areas of sparse, non-woody vegetation less than 2 feet tall, or c. Woody vegetation (shrubs, bushes, or tress) less than 2 inches in diameter. d. If a concrete structure, spalling or minor surface cracking.
3 - Poor	Assign a value of 3 if any of the following are observed: a. Substantial bare surface areas, b. Crest width less than 32 inches, c. Undulating crest elevation, d. Surface cracks less than 6 inches deep, e. Surface depressions less than 12 inches deep, f. Animal burrows, or g. Woody vegetation between 2 and 8 inches in diameter, h. If concrete structure, significant longitudinal cracking or minor transverse cracking.
2 - Serious	Assign a value of 2 if any of the following are observed: a. Depressions greater than 1-ft depth, b. Evidence of past overtopping, grass lying over in a uniform area, c. Reduced crest width, d. Erosion channels deeper than 6 in, e. Any observed settlement or shifted alignment, or f. Woody vegetation greater than 8 inches in diameter. g. If a concrete structure; hollow sound or cracks with misalignment inclusive of transverse cracks with no misalignment but having potential for significant structural degradation.
1 - Critical	Assign a value of 1 if any of the followings are observed: a. Overtopping of non-designed overflow portions of the dam that cause (or may cause) surface erosion, or b. Loss of surface material on crest that will enable overtopping if reservoir level is raised. c. If a concrete structure, major cracks; misalignment; discontinuities causing leaks, seepage, or stability concerns.
N/A	If the "Crest" component is not applicable to the dam, then mark this "N/A" condition rating.

Crest Subcomponents		
Name	**Rating**	**Observations**
Abutments		

ESMS WCS DEVELOPMENT

Completed

- Coordinate with stakeholders
- Build and align component-level data model with practices of military dam safety community, FEMA, and with SMS
- Distribute draft inspection checklists to POCs and key USACE Districts
- Revise inspection checklists based on feedback and field testing
- Configure inventory and assessment catalog in ESMS staging
- Test and verify the checklists – focus on assessment method and usability
  - Navy – Fall 2022
  - Army – February 2023
  - Air Force – May 2023

Current and Future Actions

- Develop parametric cost modeling (working with USACE CW Cost Estimating MCX)
- Develop engineering data libraries
  - (component costs, work activity costs, service lives)
- Develop work activities and work planning via SMS
- Develop reports within ESMS
- Add coverage of Levees and Dikes

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ESMS FUELS

ESMS Fuels Infrastructure

- Standardized Functional and Operational Assessments
- Facility Condition Indices
- Work Planning and Forecasting
- Predictive Asset Condition and Sustainment Requirements
- Multi-level, Real-Time Stakeholder Engagement
- One-stop Shop for DoD Fuels Infrastructure Management

Current State

- Incorporating ESMS Management Tools to Sunset Internal Databases
- Completing Feature Set to Support DLA Energy SRM
- Active Development of Standardized Project Documentation Templates

Path to FOC

- Expand the user community, including training resources
- Stand up helpdesk
- Develop business intelligence reports to support leadership
- Standardize templates that will lead to support for military construction projects
- Integrate FAM functions
- Integrate Project Tracker functions
- Sunset FAM & Project Tracker

FY23 Priorities

1. Re-Group with Fuels team and new SMS-TCX Domain lead



FUELS

Last Updated: 7 AUG 2023

SMS Domain Owner: Brucker, Rhoda

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ESMS BUILDINGS

ESMS Buildings Infrastructure

- Standardized component inventory for vertical Buildings and Structures
- Condition assessment ratings and Building Condition Index aggregated to the system and site levels
- Facility Functionality Assessments
- Condition/Work predicting, forecasting, and work planning

Current State

- API-based import from BUILDER to ESMS
- Majority of Core features required for BUILDER replacement in place and continuing to be refined ahead of Production release

Path to FOC

- Completion of the BUILDER to ESMS Feature Crosswalk feature development
- Completion of ESMS Buildings domain training module to orient users to the new environment

FY23 Priorities

1. Completion of ESMS Core “BUILDER Parity” features
2. BUILDER to ESMS Migration Guide
3. Identification of migration test/validation sites with each Service/Agency

BUILDINGS

Last Updated: 7 AUG 2023

SMS Domain Owner: Walters, Matthew

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SMS SUMMIT 2023

SUSTAINMENT MANAGEMENT SYSTEM (SMS) SUMMIT AT THE NATIONAL ACADEMIES OF SCIENCES

Plenary Sessions
Wednesday, Aug 9th, 2023

National Academies of Sciences, Engineering, and Medicine
2101 Constitution Ave NW
Washington DC 20418

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US Army Corps of Engineers



PANEL: IMPLEMENTATION, DATA SUSTAINMENT, CMMS INTEGRATION, AND STANDARDS AND POLICIES

Julie Krebs, Bil Hawkins, Jon Crittenden, Gary Keller, and Scott Lehmkuhl

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PANEL DISCUSSION

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Overarching question for each topic area: What have you done to date in this area, lessons learned, recommendations based on your experience, and looking forward what changes in process/approach do you see going forward?

Initial Implementation

On-Going Data Sustainment

CMMS Integration

Standards and Policies

HOW SMS AND INSTALLATION GIS WORK TOGETHER

David LaBranche – ODASD Real Property

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SLIDES ONLY
NO SCRIPT PROVIDED

CLEARED
For Open Publication
Aug 18, 2023
Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

How SMS and Installation GIS Work Together

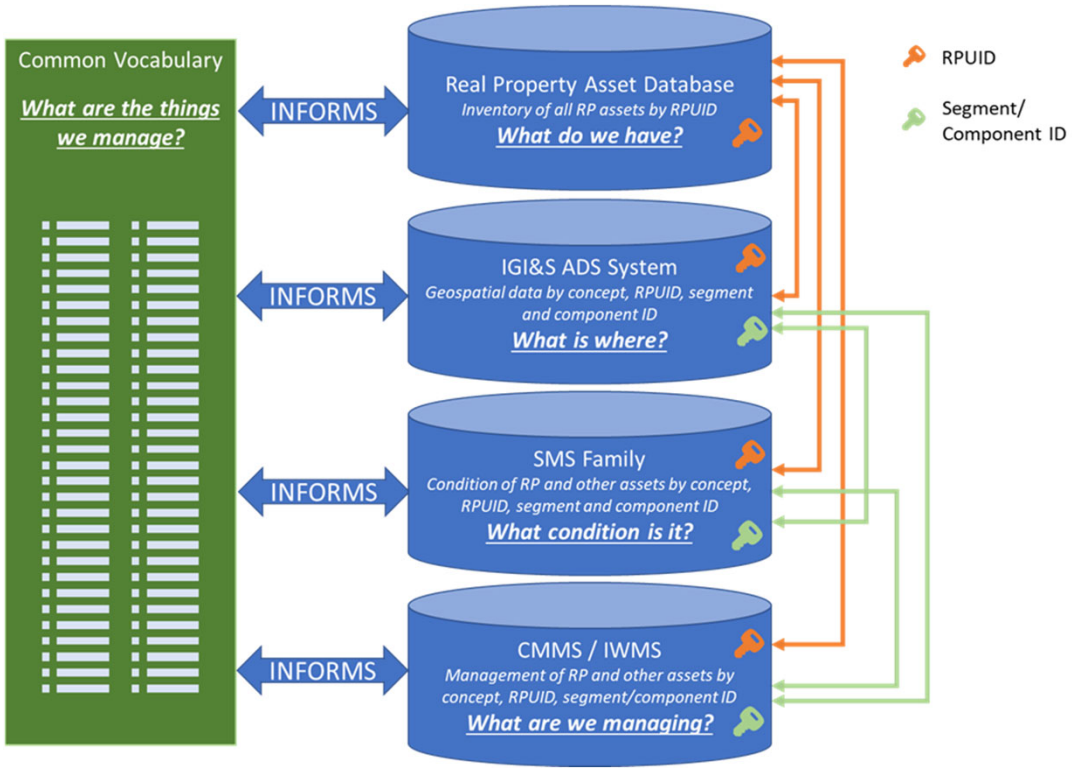
David LaBranche. PE
Geospatial Information Officer (GIO)
OASD(Energy, Installations, & Environment)

August 9, 2023

Facility Management – Source Data Compatibility Conundrum

DoD Installations rely on several systems for facility management:

1. Real Property Inventory (aka Accountable Real Property System (APSR))
2. Installation Geospatial Information & Services (IGI&S) systems
3. Computerized Maintenance Management Systems (CMMS) (e.g. Maximo)
4. Sustainment Management System (SMS)
5. Computer Aided Design (CAD)

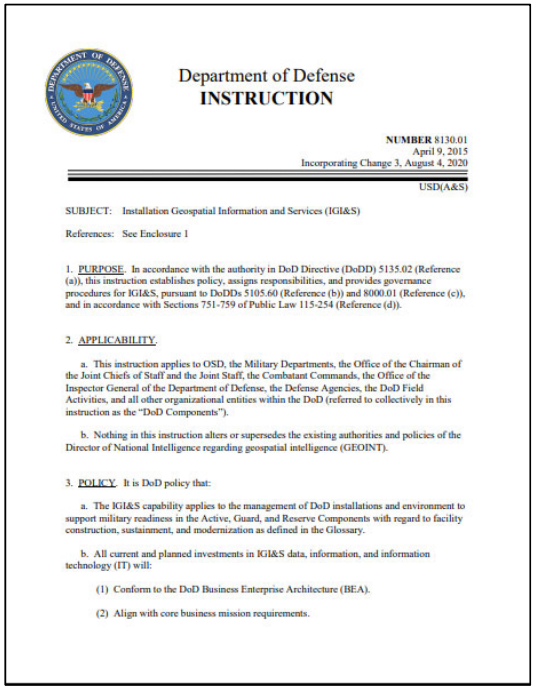


What Are We Supposed to Do?

- DoD Policy and recent guidance issued by the Deputy Secretary of Defense focus on:
  - Joint All Domain Operations – using data for advantage on the battlefield
  - Senior Leader Decision Support – using data to improve DoD management
  - Business Analytics – using data to drive informed decisions at all echelons
- DoD Data Strategy – Guiding Principles:
  - Data is a Strategic Asset
  - Collective Data Stewardship
  - Data Ethics
  - Data Collection
  - Enterprise-Wide Data Access and Availability
  - Data for Artificial Intelligence Training
  - Data Fit for Purpose
  - Design for Compliance

Visible – Accessible – Understandable – Linked – Trustworthy – Interoperable – Secure (VAULTIS)

The Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE)



Department of Defense
INSTRUCTION

NUMBER 8130.01
April 9, 2015
Incorporating Change 3, August 4, 2020
USD(A&S)

SUBJECT: Installation Geospatial Information and Services (IGI&S)

References: See Enclosure 1

1. PURPOSE. In accordance with the authority in DoD Directive (DoDD) 5135.02 (Reference (a)), this instruction establishes policy, assigns responsibilities, and provides governance procedures for IGI&S, pursuant to DoDDs 5105.60 (Reference (b)) and 8000.01 (Reference (c)), and in accordance with Sections 751-759 of Public Law 115-254 (Reference (d)).

2. APPLICABILITY.

a. This instruction applies to OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities within the DoD (referred to collectively in this instruction as the "DoD Components").

b. Nothing in this instruction alters or supersedes the existing authorities and policies of the Director of National Intelligence regarding geospatial intelligence (GEOINT).

3. POLICY. It is DoD policy that:

a. The IGI&S capability applies to the management of DoD installations and environment to support military readiness in the Active, Guard, and Reserve Components with regard to facility construction, sustainment, and modernization as defined in the Glossary.

b. All current and planned investments in IGI&S data, information, and information technology (IT) will:

(1) Conform to the DoD Business Enterprise Architecture (BEA).

(2) Align with core business mission requirements.

* SDSFIE is mandated per DoD Instruction 8130.01, Installation Geospatial Information and Services, Change 3 issued 4 August, 2020

- A family of geospatial data standards
  - Models
  - Specifications
  - Procedures/Workflows
  - Online tools
- Purpose & Scope: To structure commonly used data and products for GIS mapping of DoD Installations and USACE Civil Works infrastructure - make geospatial data and services visible, accessible, understandable, trusted, and interoperable across the DoD

SDSFIE Family of Standards

SDSFIE-Portrayal (P)

States how each layer should be displayed on the map

Installation
RoadCenterline
Building

SDSFIE-Vector (V)

Uniquely defines and names sets of geospatial features, e.g.,

Building Footprints
Installation Boundary
Road Centerlines



Fort Buchanan

SDSFIE-Metadata (M)

Metadata describes what is in the dataset; how it was produced; who did the work; when, & why

SDSFIE-Quality (Q)

Specifies how the dataset should be produced, maintained, and assessed and checked for quality

SDSFIE-Raster (R)

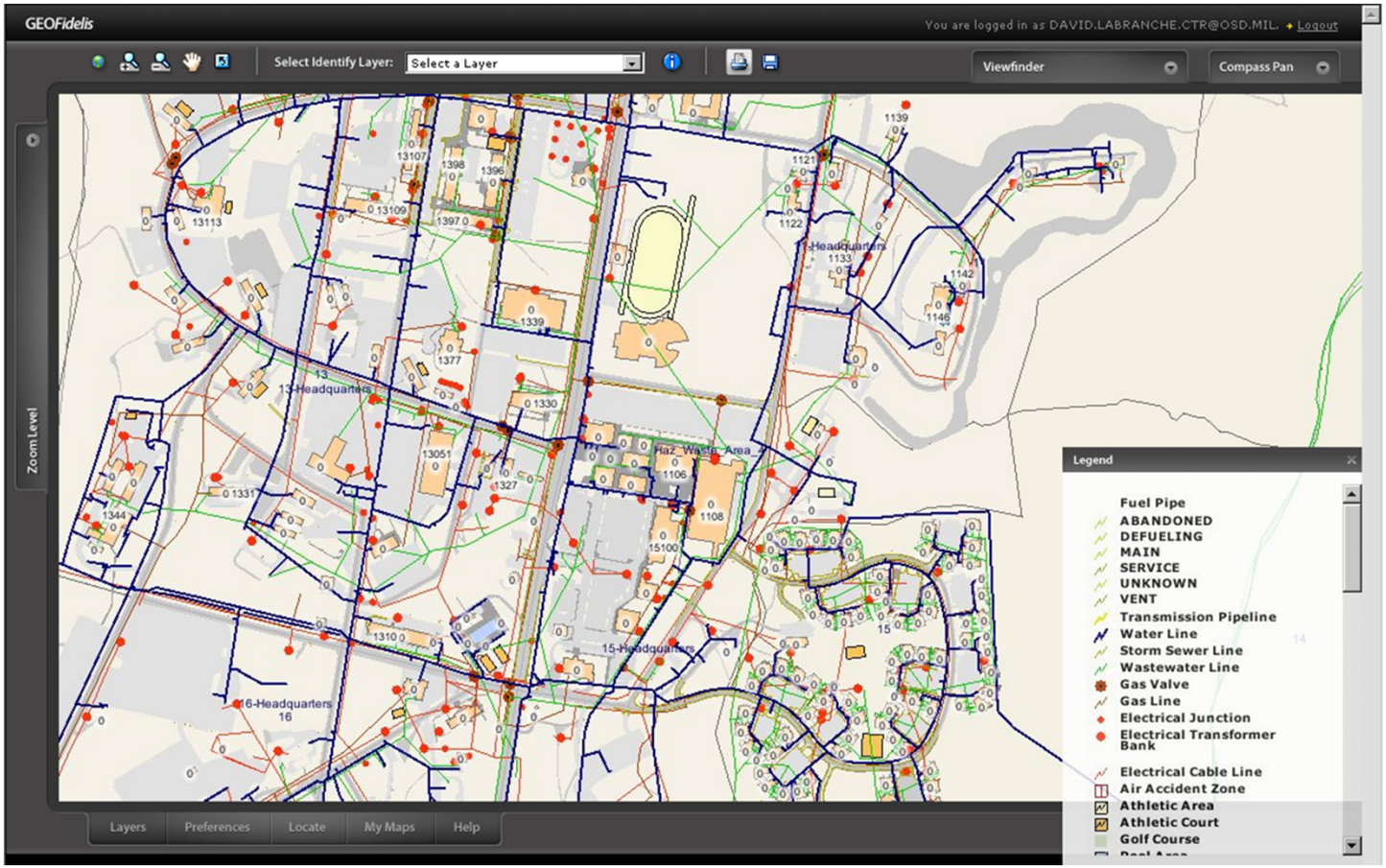
Provides guidance and best practices for acquiring and using raster data, e.g., satellite and *aerial imagery* and elevation

The SDSFIE Vector Standard:
"Points, Lines, Polygons"

- SDSFIE Vector (SDSFIE-V)
  - A "dictionary" of 287 geospatial feature types (aka map layers) commonly used in DoD for performing installation management, energy management, environmental restoration, natural and cultural resource management, test and training range operations, and civil works construction/maintenance/operations
- Functional Themes of SDSFIE-V data:

Airfields	Common & Cross-Functional	ENV Common & Cross-Functional	Planning
Cemetery Operations	Environmental Compliance	Military Ranges and Training	Real Property (Buildings, Structures, Land)
Civil Works	Cultural Resources	Natural Resources	Recreation
Environmental Clean Up	Emergency Services	Public Works (Communications, Electrical, Gas, Other, POL, Stormwater, Wastewater, Water)	Transportation

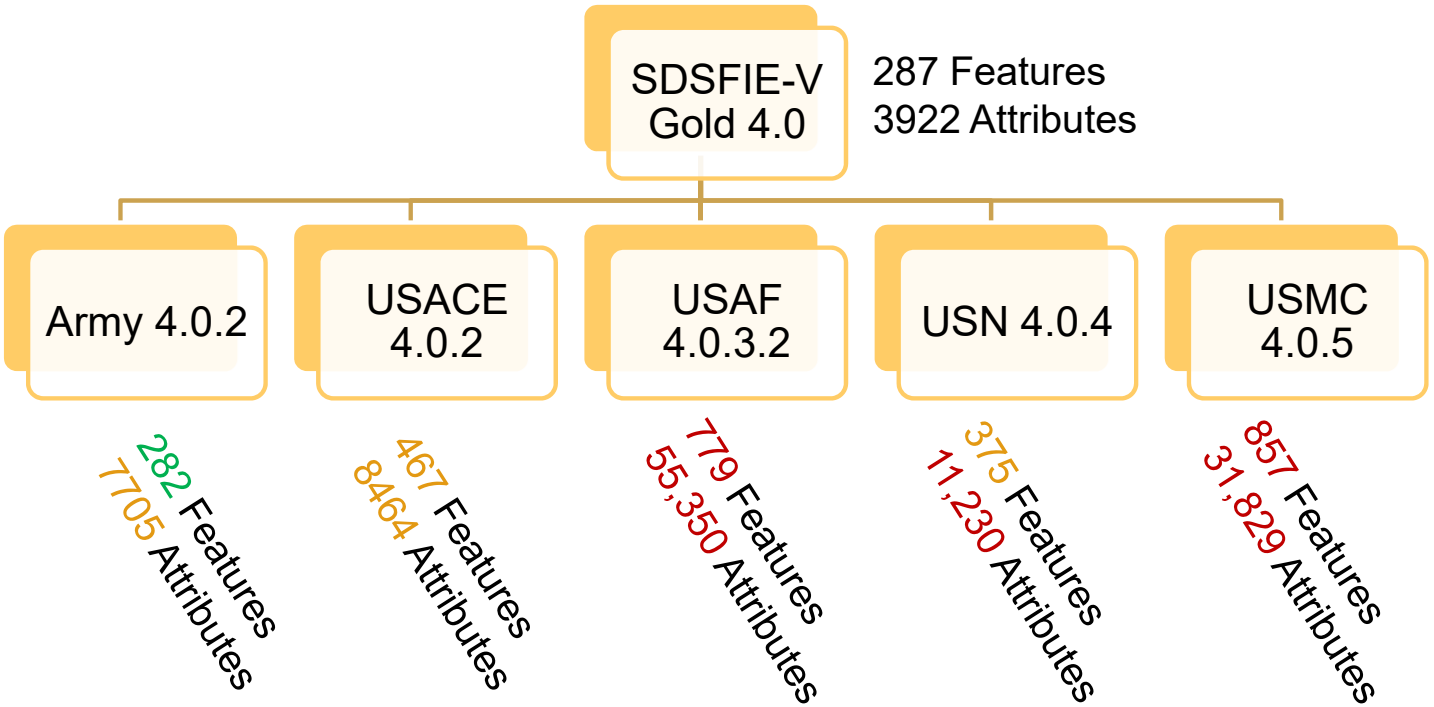
“What Does SDSFIE-V Data Look Like?”
Utilities Management Feature Types (example)



Recent History of SMS-SDSFIE Coordination

- 2009-2011: Component users of PAVER, RAILER, etc. brought forth various SMS concepts into SDSFIE Gold 3.0
  - Pavement section/branch
  - Rail track/segment
- 2014-2017: As part of SDSFIE-V Gold 4.0 development, the SDSFIE support team aligned with PAVER
  - Pavement section and branch types and other elements
  - Pavement linear structure area and pavement sample unit area
- 2020-2021: USAF and USMC brought forth many Utilities changes based on working with Utilities SMS SMEs (incorporated into SDSFIE-V Gold 4.0.3 and SDSFIE-V Gold 4.0.5)
- 2021: Worked with PAVER SMEs to further harmonize Pavement Section feature type, and RAILER SMEs to harmonize Rail-related feature types
- 2022: POL-related elements harmonized in coordination with FUELER SMEs

DoD Components' Implementation of SDSFIE-V 4.0



Facilitating interoperability is the key goal of SDSFIE-V

SDSFIE-V Utilities Overview

SDSFIE 4.0.5 Gold Corrigendum	Component Adaptations	Number of Utilities Entities	Number of Detailed Utility Concepts - Subclassed Entities
26 utilities entities with 512+ "type" enumerants (43 entities when Minor & Major changes are included)	Air Force (4.0.3.2)	429	329
	Army (4.0.2)	82	66
	Navy (4.0.4)	200	168
	USACE (4.0.2.1)	29	N/A
	USMC (4.0.5)	561	519

- Utilities are broken into networks (corresponding SMS utilities bolded):
  - Alternative Energy
  - Communications
  - Compressed Gas
  - **Electrical**
  - **Gas/Natural Gas**
  - **Petroleum, Oil, and Lubricants (POL)***
  - **Stormwater**
  - **Thermal**
  - **Wastewater**
  - **Water**

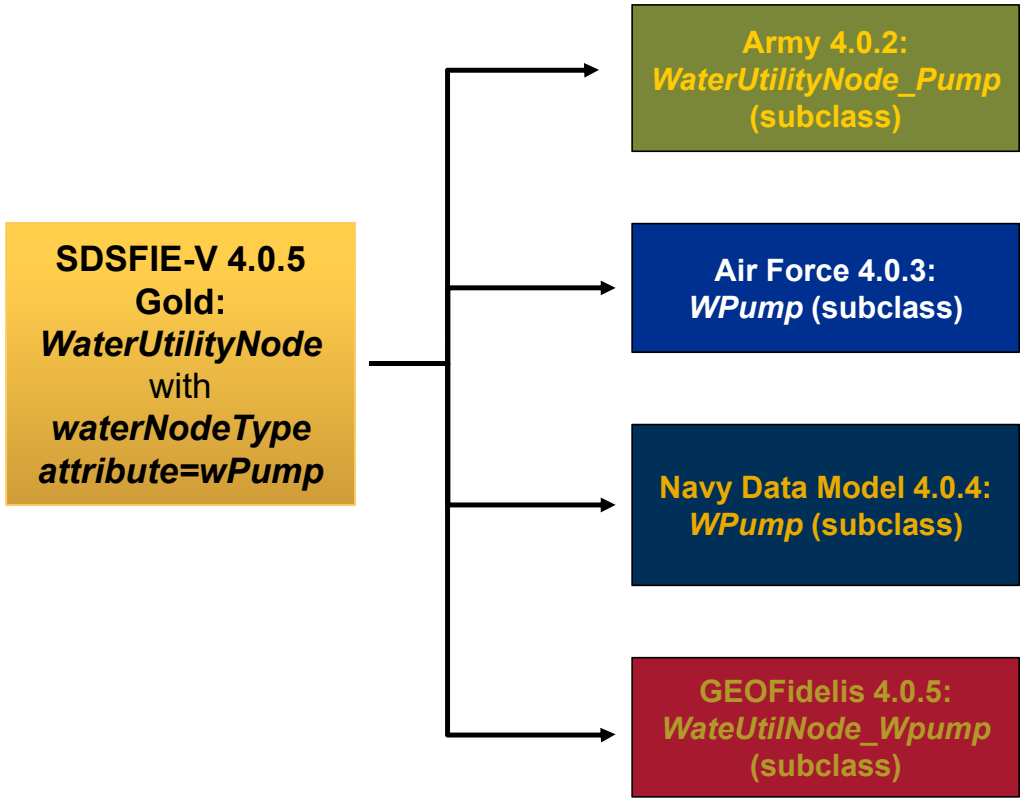
*FUELER SMS

SDSFIE-V: Utilities Data Overview

- Components are empowered to create “Adaptations” of the SDSFIE-V Gold model, including extending, modifying, and profiling (removing) model elements
- Most of the additional entities cited in the previous table are extensions (additions) that match concepts in the “type” domain lists of the Gold utility entities (see next slide)
- Some Gold utilities entities/services have been removed (or minimized) in Component Adaptations
  - E.g. the Compressed Gas utility network is not included in the Army Adaptation. The POL utility network is minimal in the Navy Adaptation (only a few concepts are maintained, external linked tables are used instead)

Visible – Accessible – Understandable – Linked – Trustworthy – Interoperable – Secure (VAULTIS)

Utilities Adaptation Example



- Components use the waterNodeType attribute as the basis to split out subclasses
- Components vary in naming conventions, but it is the same "pump" concept that rolls up into the WaterUtilityNode Gold feature type
- Components may also extend additional attributes/enumerants that may not be rolled up into Gold

SDSFIE 4.0.5 Gold with all Major and Minor Changes

Entity: *WaterUtilityNode*

WaterUtilityNode (Water Utility Node)

Definition:
The location of a feature in a water distribution network, particularly an asset that participates in the conveyance of water, but is not a pipeline.

Attributes

Symbols	Model Name
	featureDescription
	featureName
	installationId
	mediaId
	metadataId
	operationalStatus
	ownerName
	rpInterest
	rpnid
	rpsuid
	rpuid
	sdsId
	waterNetworkSubType
	waterNodeType
	waterUtilityNodeIdpk

Enumerants (Domains)

Alias Name
Flushing Station, Water
Water Air Gap
Backflow Prevention Device, Water
Control Valve, Water
Fire Hydrant, Water
Fitting, Water
Hydrant, Water
Meter, Water
Pressure Reducing Station, Water
Production Structure, Water
Pump Station, Water
Pump, Water
Relief Valve, Water
Source, Water
Storage Structure, Water
System Valve, Water
To Be Determined

SDSFIE 4.0.2 Gold *Army Adaptation*

Entities

PW Water (11 Items)

- UtilityFeature_WaterManhole
- WaterUtilityNode
- WaterUtilityNode_Fitting
- WaterUtilityNode_Hydrant
- WaterUtilityNode_Meter
- WaterUtilityNode_PRS
- WaterUtilityNode_Pump
- WaterUtilityNode_Tank
- WaterUtilityNode_TreatmentPlnt
- WaterUtilityNode_Valve
- WaterUtilitySegment

Attributes

SDSFIE 4.0.2 Gold Army Adaptation

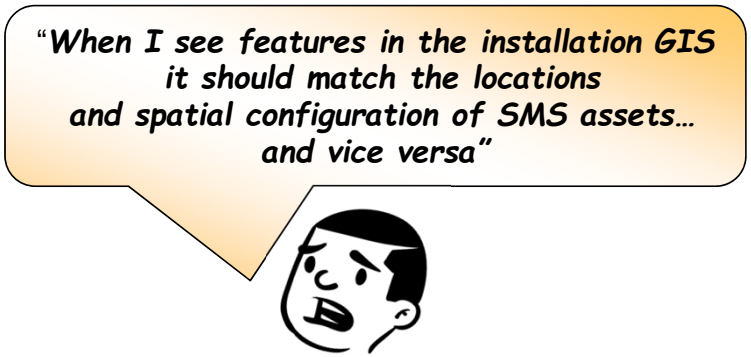
WaterUtilityNode_Pump

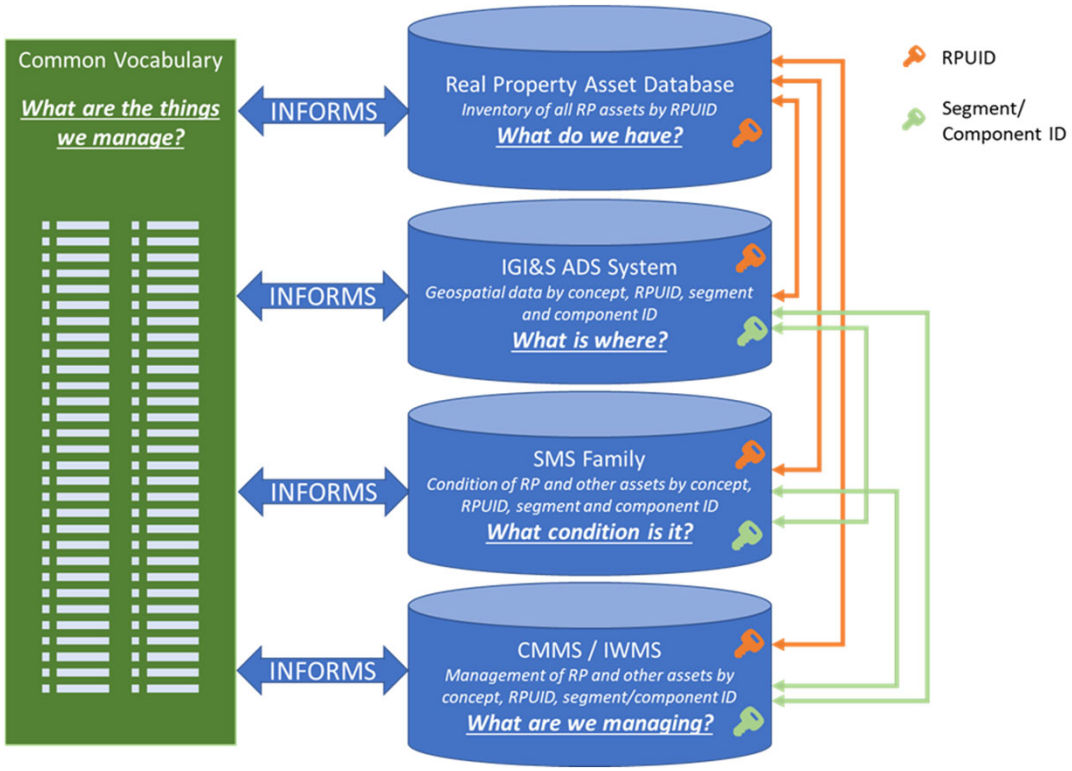
Attributes

Symbols	Model Name
	actualInsideDiameter
	coordinateX
	coordinateY
	equipDatePutInService
	facilityNumber
	featureDescription
	featureHeight
	featureHeightUom
	featureName
	flowRate
	horsepower
	installationId
	mediaId
	metadataId
	operationalStatus
	ownerName
	projectId
	pumpHead
	pumpHeadUom
	rpaPredomCurrentUseCatCode
	rpInterest
	rpnid
	rpsuid
	rpuid
	sdsId
	waterNetworkSubType
	waterNodeType
	waterPumpType
	waterUtilityNodeIdpk
	zone

Getting to Interoperability – "Apples to Apples"

- For the last 18 months, the SDSFIE and eSMS teams have worked closely together to harmonize the standards
  - Used Components' SME input
  - Data modeling is now integrated
  - Agreement on terminology (name, description, attributes, etc.)
  - Establishing rules that allow "sub-parts" (segments or nodes) to be mapped between systems





Summary

- DoD Policy and the Data Strategy require us to act
  - Treat data as a Strategic Asset
  - Senior Leader Decision Support – use data to improve DoD management
  - Business Analytics – use data to drive informed decisions at all echelons
- The current coordination between eSMS and SDSFIE development teams is paying significant dividends
- A coordinated governance effort across the Department will assure:
  - Interoperability of data between installation systems – “apples to apples”
  - Reduced data collection costs
  - Reduced system operation costs
  - Increased decision advantage and trustworthy results
- Policy & Guidance gap remains for sustaining this interoperability over time

SMS SUMMIT 2023

SUSTAINMENT MANAGEMENT SYSTEM (SMS) SUMMIT AT THE NATIONAL ACADEMIES OF SCIENCES

Plenary Sessions
Thursday, Aug 10th, 2023

National Academies of Sciences, Engineering, and Medicine
2101 Constitution Ave NW
Washington DC 20418

U.S. ARMY

US Army Corps of Engineers®



MONEYBALL APPROACH TO FACILITY INVESTMENT ANALYTICS

Buddy Bartels – SMS-TCX

U.S. ARMY

US Army Corps of Engineers®


1st
SMS
A MONEYBALL APPROACH TO FACILITY INVESTMENT
Sustainment Management System (SMS) – Technical Center of Expertise (TCX)

SMS FED ROSTER

1st

SMS PERSONNEL NAMES REMOVED

WHAT IS MONEYBALL?

2nd

- Traditional Scouting Theory:
  Physical Ability and **Batting Average (BA)**
- Moneyball Theory – Simplistic Form:

1. **Does the player get on base? (OBP)**

$$\text{OBP} = \frac{(\text{Hits}+\textbf{Walks}+\textbf{Hit by Pitch})}{(\text{At Bats}+\textbf{Walks}+\textbf{Hit by Pitch}+\text{Sacrifice Flies})}$$

2. **Can the player hit? (SLG)**

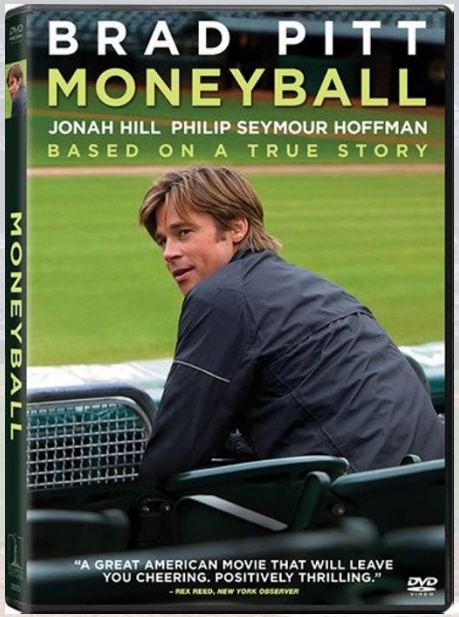
$$\text{SLG} = (1\text{B} + 2\text{Bx}2 + 3\text{Bx}3 + \text{HRx}4) \,/\, \text{AB}$$

3. **Predict the Runs Scored (RS) for the whole Season**

$$\text{RS} = -804.63 + 2737.77(\text{Team OBP}) + 1584.91(\text{Team SLG})$$

4. **Predict Win Percentage for the Season**

$$\text{Win Percentage} = \frac{\text{Runs Scored}^2}{\text{Runs Scored}^2 + \text{Runs Allowed}^2}$$



The Book → *Lewis, Michael. Moneyball. WW Norton, 2004.*
The Movie → *Miller, Bennett. Moneyball. Columbia Pictures, 2011.*

THE COLLECTIVE WISDOM OF BASEBALL INSIDERS OVER THE PAST CENTURY IS OUTDATED, SUBJECTIVE, AND FLAWED

WHAT DOES THIS HAVE TO DO WITH FACILITIES?

2nd

MONEYBALL IS THE APPLICATION OF ADVANCED ANALYTICS TO ANY DOMAIN IN ORDER TO IMPROVE OUTCOMES

- Traditional Facility Investment "Scouting" Theory:
  - Subjective development of MILCON and R&M projects
  - Reactive sustainment
  - DoD FCI is the equivalent to the old school batting average metric

- Moneyball Approach To Facility Investment:
  - Data-driven development of projects
  - Predictive Sustainment
  - Scenario Optimization, New Metrics and Algorithms

ARE YOU READY FOR A BUNCH OF BASEBALL ANALOGIES?



dun dun dun dun dun,
dun dun dun dun dun,
dun dun dun dun dun,

doot doot doot doot to doot

CHARGE!

MLB PAYROLL VS DOD FACILITIES SUSTAINMENT

3rd

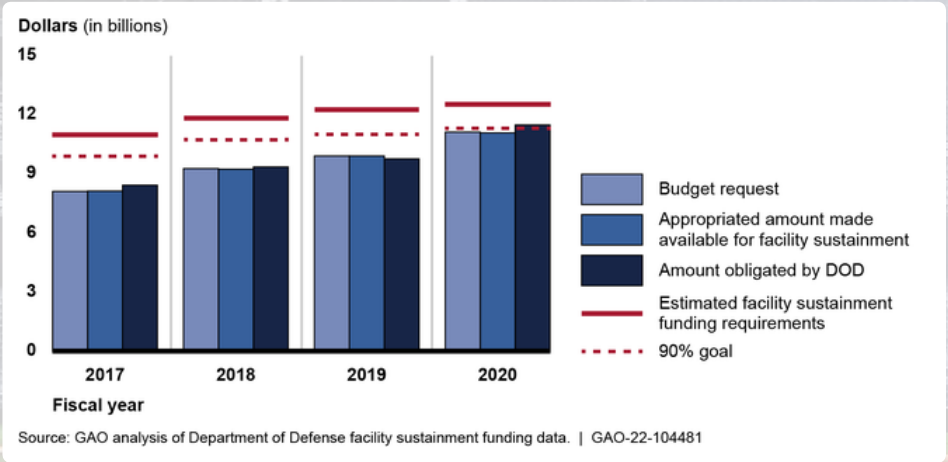
Team	2023 Payroll
New York Mets	$344,663,493
New York Yankees	$278,424,563
San Diego Padres	$245,795,243
Philadelphia Phillies	$243,442,258
Los Angeles Dodgers	$224,935,134
Los Angeles Angels	$212,228,094
Toronto Blue Jays	$210,315,449
Atlanta Braves	$202,518,743
Texas Rangers	$196,804,974
Houston Astros	$190,417,233
San Francisco Giants	$182,682,984
Chicago White Sox	$182,518,046
Chicago Cubs	$182,387,846
Boston Red Sox	$177,505,730
Colorado Rockies	$176,564,668
St. Louis Cardinals	$160,880,184
Minnesota Twins	$153,240,480
Seattle Mariners	$138,574,974
Detroit Tigers	$121,403,890
Milwaukee Brewers	$117,381,260
Arizona Diamondbacks	$115,489,125
Miami Marlins	$95,643,731
Washington Nationals	$92,957,211
Kansas City Royals	$92,507,210
Cleveland Guardians	$90,048,177
Cincinnati Reds	$87,626,301
Pittsburgh Pirates	$74,699,113
Tampa Bay Rays	$73,866,101
Baltimore Orioles	$64,998,499
Oakland Athletics	$57,572,419
Total	**$4.8B**

Ref: https://www.spotrac.com/mlb/payroll

2017

$1.3T*
Plant Replacement Value

$137B*
Deferred Maintenance Backlog



2020

2023

$13.7B†
FY23 Facilities Sustainment Model *Requirements* (100%)

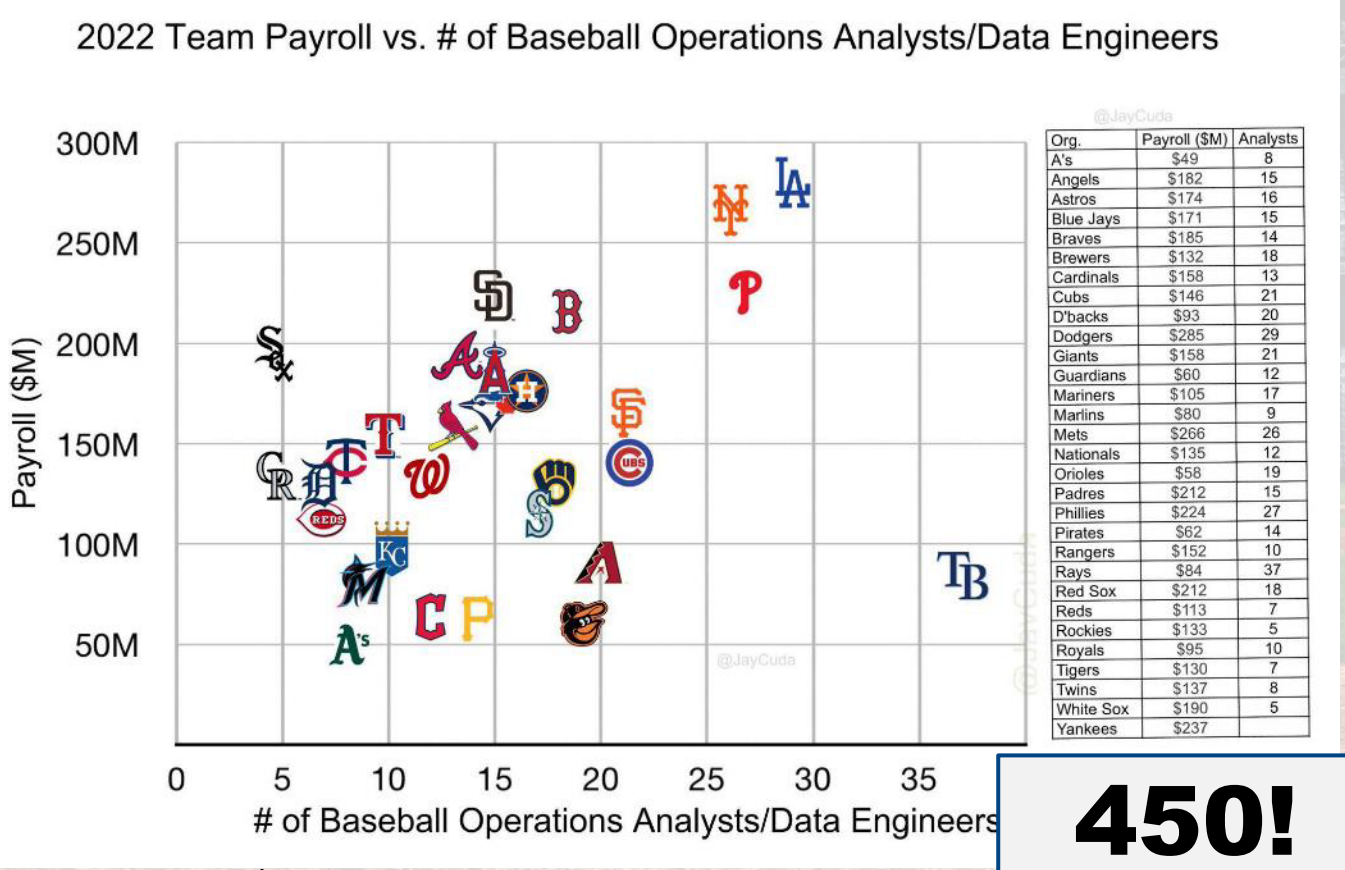
$12.3B†
FY23 Facilities Sustainment Model *Budget* (90% Goal)

*U.S. Government Accountability Office (GAO) Report 22-104481
†DoD Facilities Sustainment Model v2023

ANALYSTS AND DATA ENGINEERS

4th

How do MLB teams optimize a $4.8B player investment?



Org.	Payroll ($M)	Analysts
A's	$49	8
Angels	$182	15
Astros	$174	16
Blue Jays	$171	15
Braves	$185	14
Brewers	$132	18
Cardinals	$158	13
Cubs	$146	21
D'backs	$93	20
Dodgers	$285	29
Giants	$158	21
Guardians	$60	12
Mariners	$105	17
Marlins	$80	9
Mets	$266	26
Nationals	$135	12
Orioles	$58	19
Padres	$212	15
Phillies	$224	27
Pirates	$62	14
Rangers	$152	10
Rays	$84	37
Red Sox	$212	18
Reds	$113	7
Rockies	$133	5
Royals	$95	10
Tigers	$130	7
Twins	$137	8
White Sox	$190	5
Yankees	$237	

Source: @JayCuda

450!
Analysts

How do military bases optimize a $12.3B facility sustainment budget out of a $137B deferred maintenance backlog?

20? (ish)
Military HQ or Base Facility Investment
Analysts

+

SUSTAINMENT MANAGEMENT
TCX
SYSTEM

OLD SCHOOL BATTING AVERAGE → DOD FCI

- **DoD Facility Condition Index (FCI)**
  - Benchmark Index to compare the relative condition of a (like) group of facilities
  - First published by the National Association of College and University Business Officers (NACUBO) in 1991

$$\mathbf{FCI} = \left(\mathbf{1} - \frac{\mathbf{Repair\ Needs}}{\mathbf{Plant\ Replacement\ Value}}\right) \mathbf{x\ 100}$$

- **Limitations**
  - FCI only exposes “bad-enough” conditions; doesn’t depict total degradation
  - Only provides awareness of accumulated work needs; NOT future renewal requirements
  - Requires clear definitions of its inputs

FOCUSING ONLY ON THE FCI METRIC WILL NEVER OPTIMIZE THE BACKLOG INVESTMENT

CLUTCH PLAYER → MISSION DEPENDENCY INDEX

"A clutch player must thrive in situations where the pressure is high, and the consequences of their performance are great."

Mission Dependency Index (MDI): Advanced, objective, and repeatable means to link facility and installation capabilities to mission readiness.

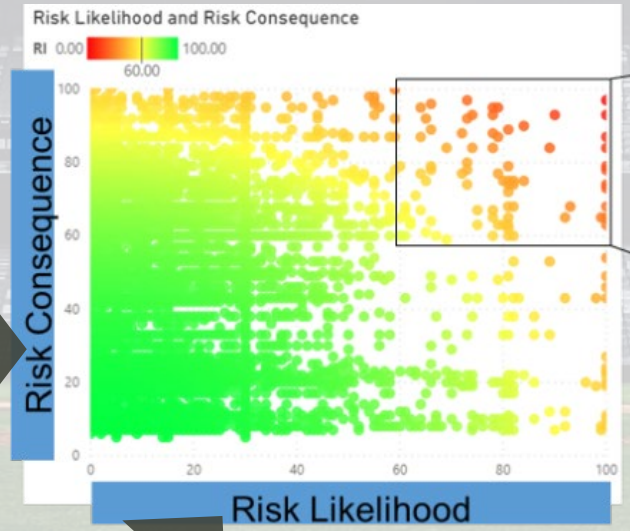
MISSION DEPENDENCY INDEX

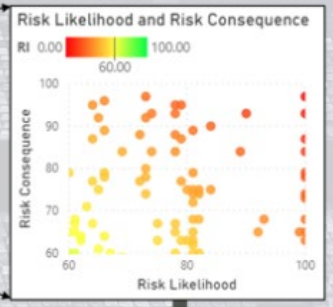
MDI

Question 1 **INTERRUPTABILITY**
How fast would the mission be impacted if the asset's operations were interrupted?

Question 2 **REPLICABILITY**
How difficult would it be to relocate the asset's mission capabilities?

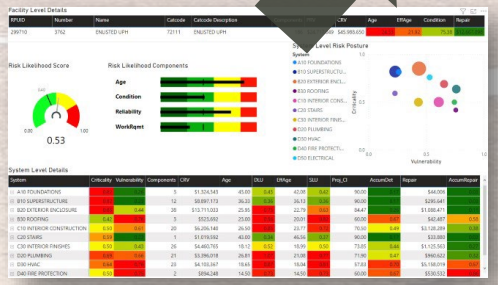
	IMMEDIATE < 15 minutes	BRIEF < 24 hours	SHORT < 7days	PROLONGED > 7 days
IMPOSSIBLE	100	88	76	64
EXTREMELY DIFFICULT	92	80	68	56
DIFFICULT	84	72	60	48
POSSIBLE	76	64	52	40

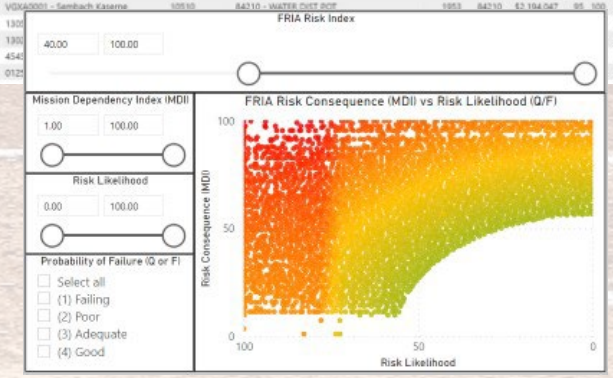




1-N prioritized List







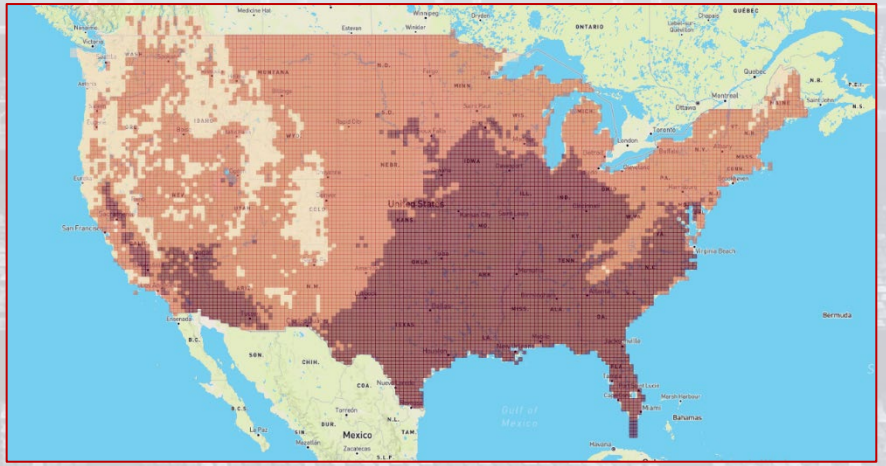
STATCAST PARK FACTORS → CLIMATE FACTORS

5th

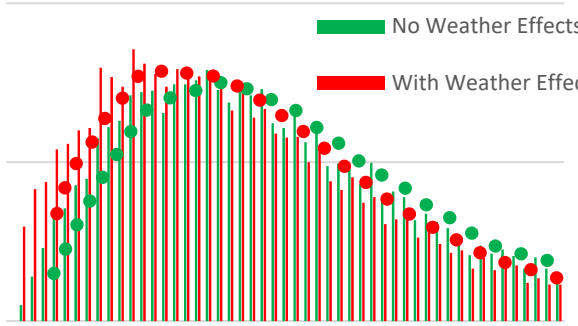
Statcast park effects show the observed effect of each displayed stat based on the events in the selected park.

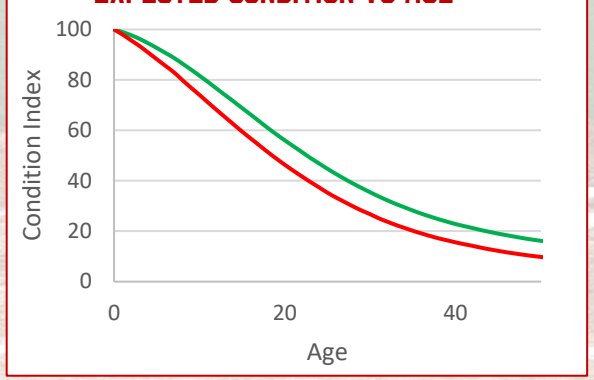
Rk.	Team	Venue	Year	Park Factor	wOBACon	BACON	R	OBP	H	1B	2B	3B	HR	BB	SO
1	Rockies	Coors Field	2021-2023	112	109	108	125	109	115	111	122	171	117	93	83
2	Reds	Great American Ball Park	2021-2023	110	113	109	121	107	109	103	108	79	145	104	101
3	Red Sox	Fenway Park	2021-2023	109	109	109	119	108	111	107	124	135	109	101	94
4	Angels	Angel Stadium	2021-2023	103	104	102	106	101	102	100	92	109	122	104	101
5	White Sox	Guaranteed Rate Field	2021-2023	103	101	99	106	101	99	97	92	74	126	107	96
6	Royals	Kauffman Stadium	2021-2023	102	99	102	104	104	106	109	114	138	79	95	88
7	Phillies	Citizens Bank Park	2021-2023	102	104	103	104	101	101	98	98	128	114	100	103
8	Orioles	Oriole Park at Camden Yards	2021-2023	101	101	101	102	101	103	107	91	81	106	97	96
9	D-backs	Chase Field	2021-2023	101	101	103	102	101	105	106	115	128	82	96	98
10	Dodgers	Dodger Stadium	2021-2023	101	104	102	102	99	100	96	103	77	118	93	107
11	Pirates	PNC Park	2021-2023	101	98	100	102	103	103	105	106	105	86	105	91
12	Giants	Oracle Park	2021-2023	101	100	102	102	102	101	102	105	148	85	104	100
13	Brewers	American Family Field	2021-2023	100	100	97	100	99	96	93	93	104	115	108	
14	Astros	Minute Maid Park	2021-2023	100	101	100	100	99	100	98	97	136	107	101	
15	Braves	Truist Park	2021-2023	100	103	103	100	101	100	102	96	88	102	101	
16	Guardians	Progressive Field	2021-2023	99	99	98	98	99	97	96	99	75	102	103	
17	Cubs	Wrigley Field	2021-2023	99	100	100	98	100	99	100	91	145	101	104	103
18	Rangers	Globe Life Field	2021-2023	99	98	98	98	99	99	100	96	83	102	98	99
19	Nationals	Nationals Park	2021-2023	99	99	98	98	98	99	97	104	78	105	94	97
20	Twins	Target Field	2021-2023	99	99	99	98	100	99	99	107	74	93	104	100
21	Yankees	Yankee Stadium	2021-2023	99	100	98	98	99	95	94	88	59	114	105	106
22	Blue Jays	Rogers Centre	2021-2023	98	99	98	96	97	99	96	109	58	104	90	100
23	Marlins	loanDepot park	2021-2023	98	98	99	96	99	99	101	97	130	86	97	101
24	Tigers	Comerica Park	2021-2023	97	93	96	94	100	98	101	98	201	75	104	93
25	Rays	Tropicana Field	2021-2023	95	98	97	90	96	93	91	100	78	94	99	110
26	Cardinals	Busch Stadium	2021-2023	95	94	95	90	97	97	100	100	83	84	92	96
27	Mets	Citi Field	2021-2023	95	95	96	90	97	94	98	85	76	88	105	105
28	Athletics	Oakland Coliseum	2021-2023	94	93	96	88	97	96	99	100	93	77	97	100
29	Padres	Petco Park	2021-2023	94	94	95	88	95	94	97	87	54	94	99	105
30	Mariners	T-Mobile Park	2021-2023	91	92	92	83	92	91	93	86	46	93	95	108

Source: www.baseballsavant.mlb.com



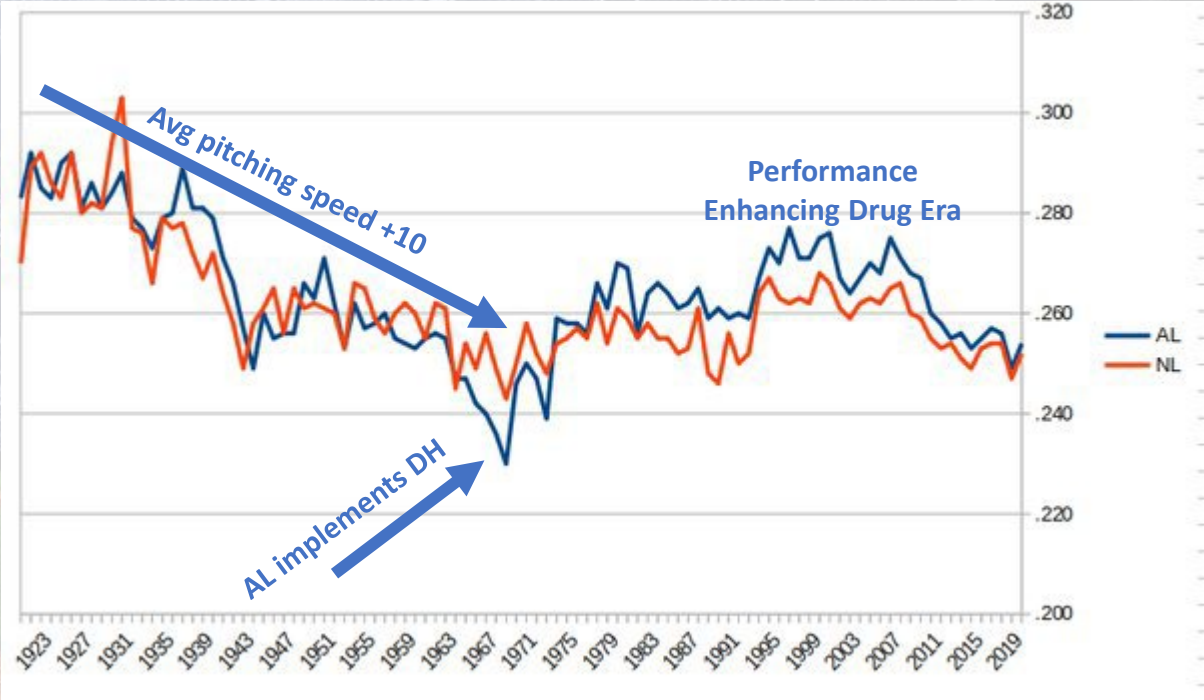
Projected CDD change between 2005-2060

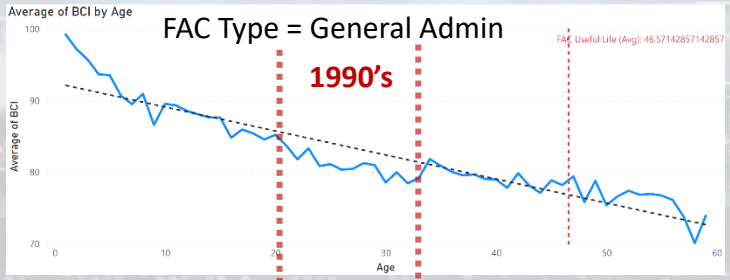


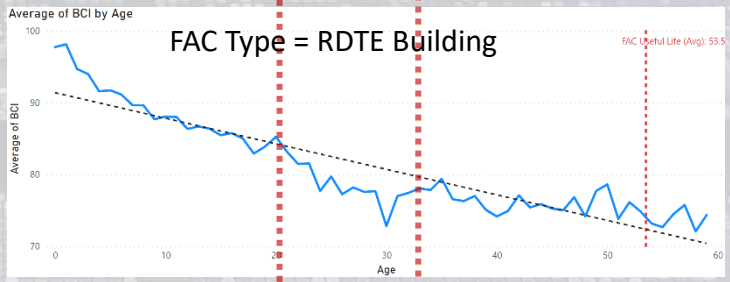


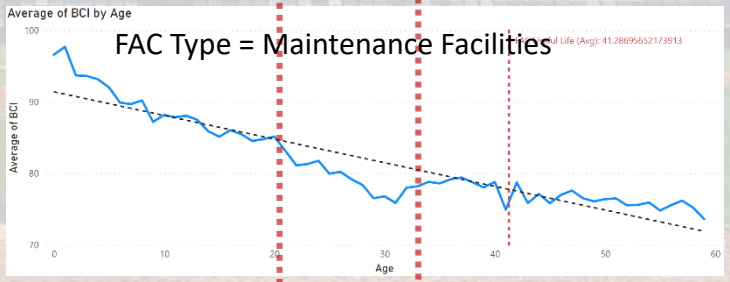
BATTING AVG BY YEAR → CONDITION AVG BY AGE

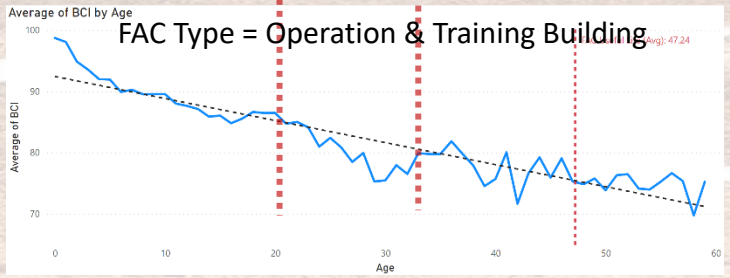
6th









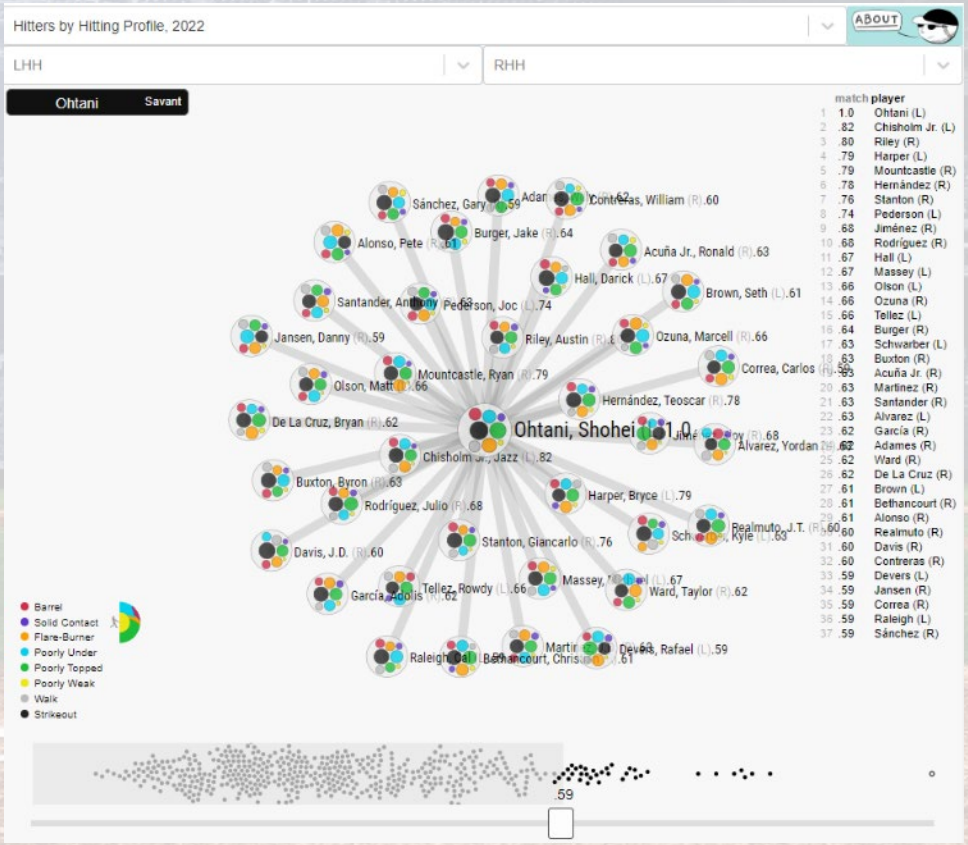


Cause of unusually low average condition for facilities built during 1990's

1. **Renewable components are at the end of life-cycle**
2. **Defense spending all time low in 90s**
3. **Vast exterior envelope issues in 90s construction leading to water and moisture issues**

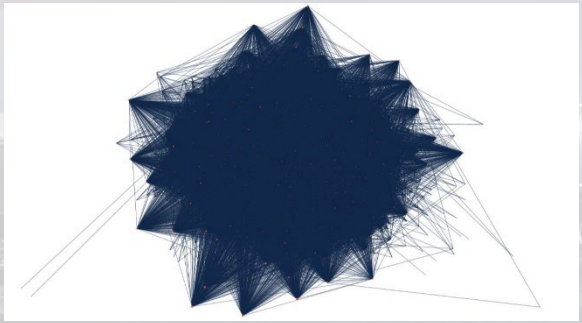
PLAYER SIMILARITY → CONDITION DATA MINING

6th

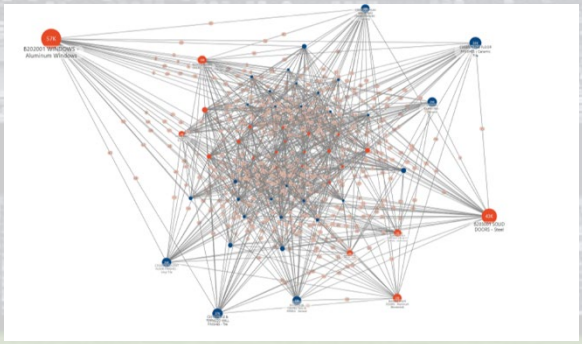


Source: www.baseballsavant.mlb.com

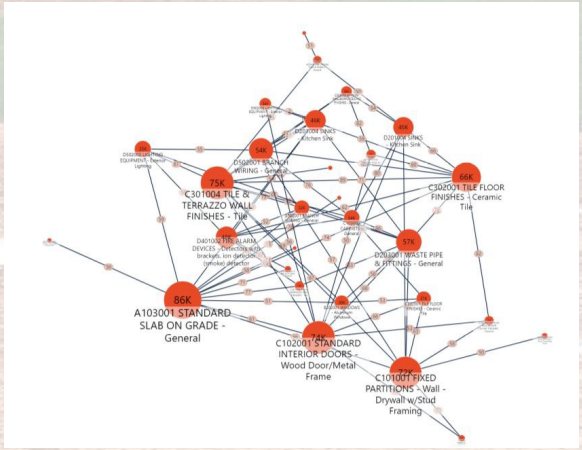
Support = N/A
Confidence = N/A



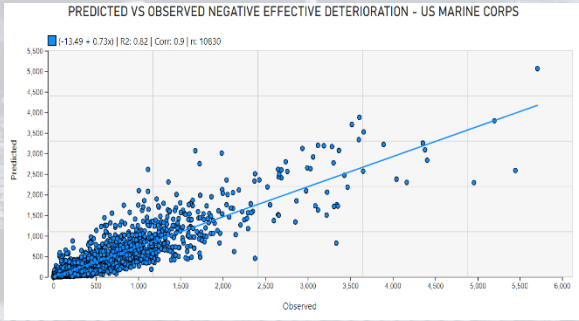
Support > 1%
Confidence > 80%



Support > 50%
Confidence > 90%



ASSOCIATION RULE MINING OF NEGATIVE EFFECTIVE DETERIORATION IN BUILDING COMPONENTS



Training Data Validated against Observed Data (R2: 0.82; Corr: 0.9)

Applications and Future Research

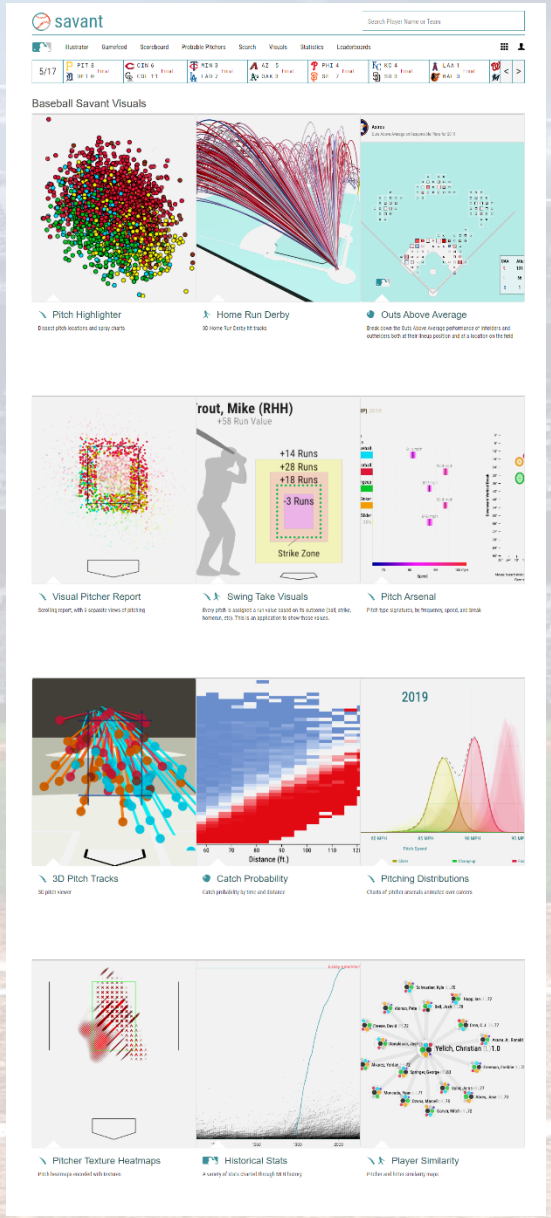
Missing Inventory QA/QC

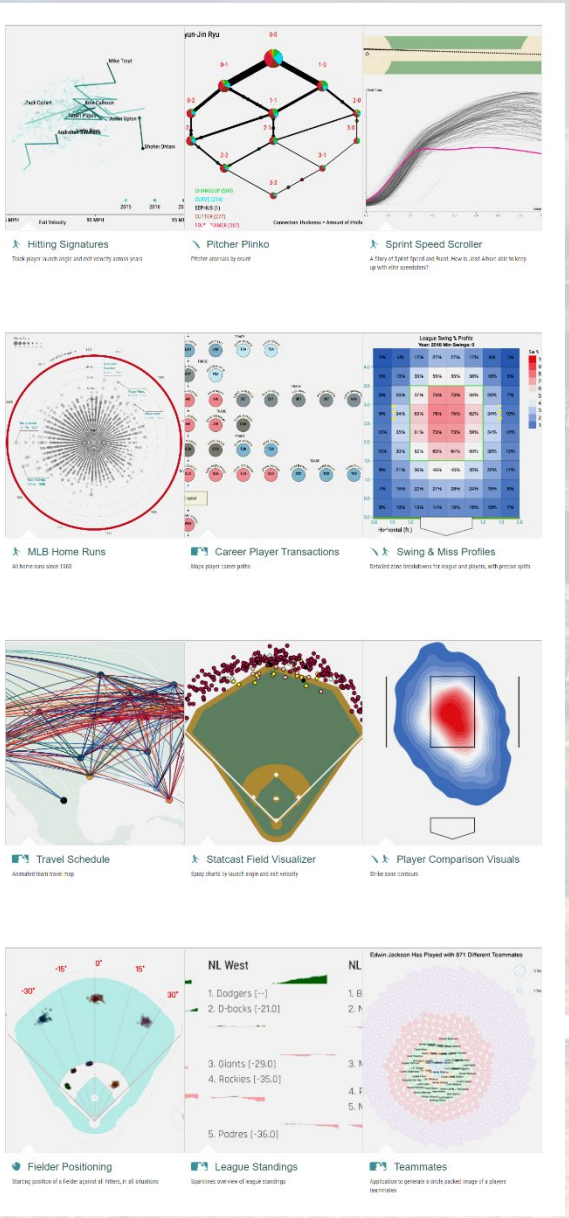
Knowledge Based Inspection Algorithm

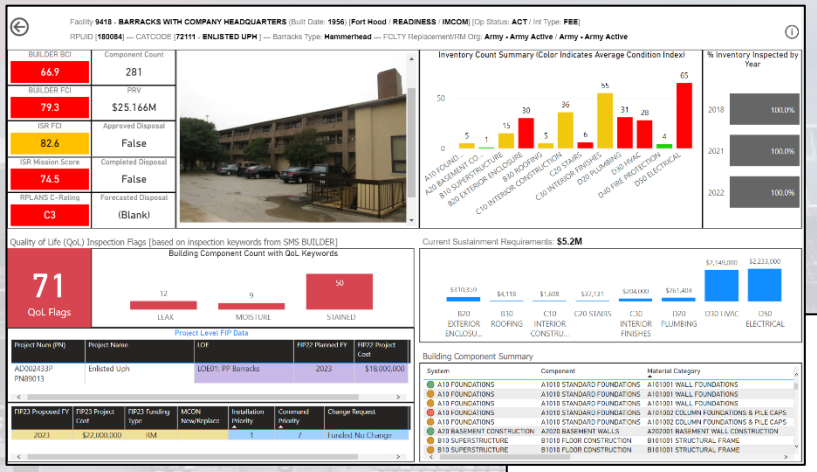
Exterior Envelope and Roofing FPA for Disaster Response

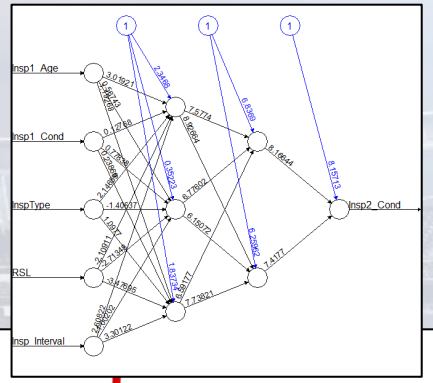
Remote Sensing and Sensor Integration

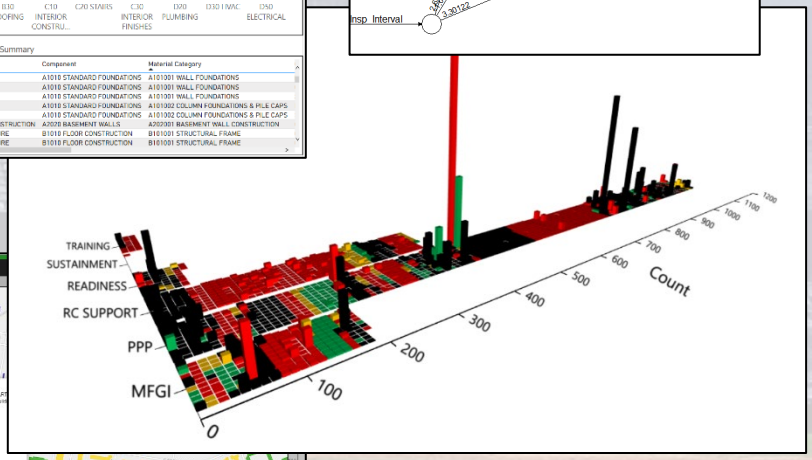
DATA VISUALIZATION

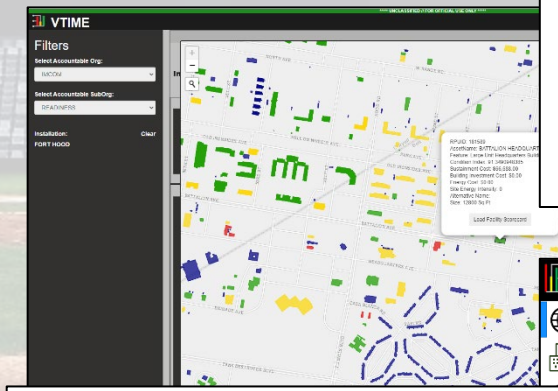


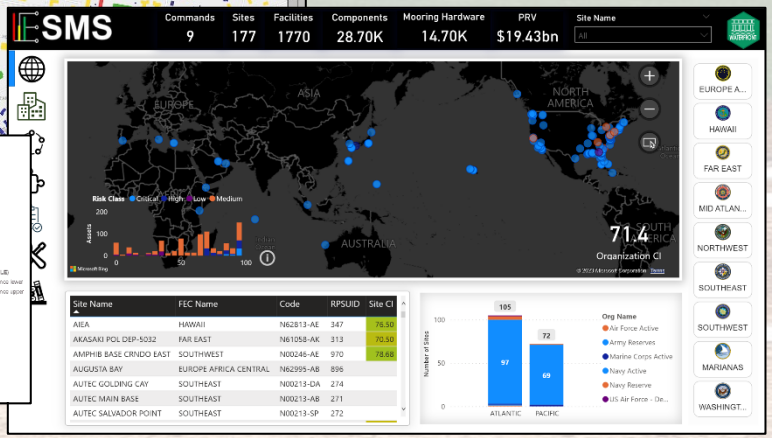


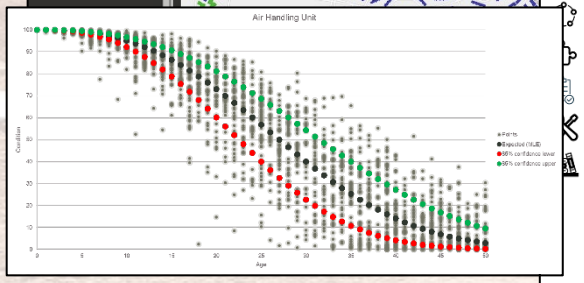










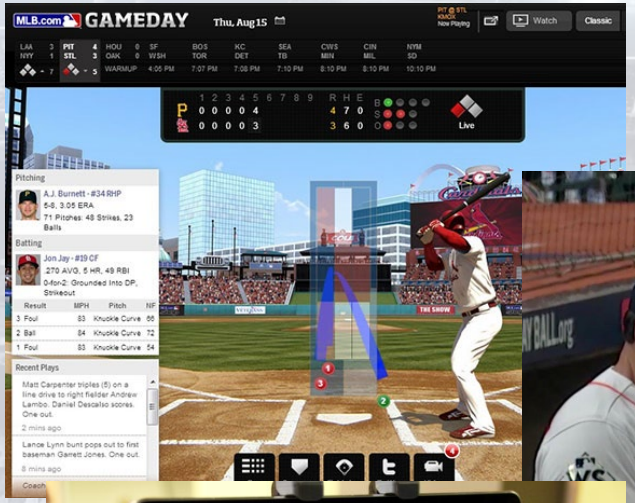


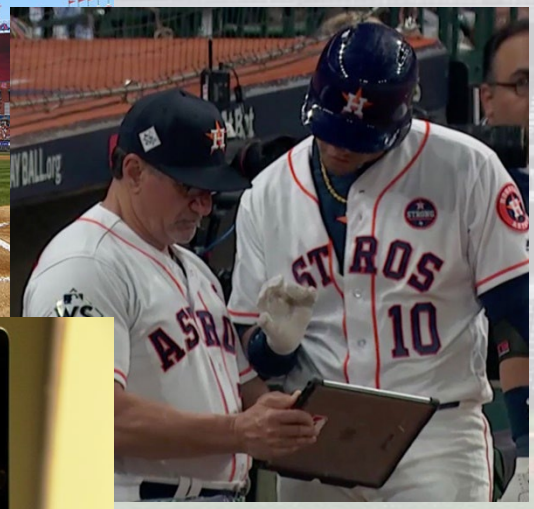
Source: www.baseballsavant.mlb.com

BALLPARK SENSORS → BUILDING SENSORS

7th

Predicting Equipment Condition Ratings in the Enterprise Sustainment Management System (ESMS) using Building Automation System Data

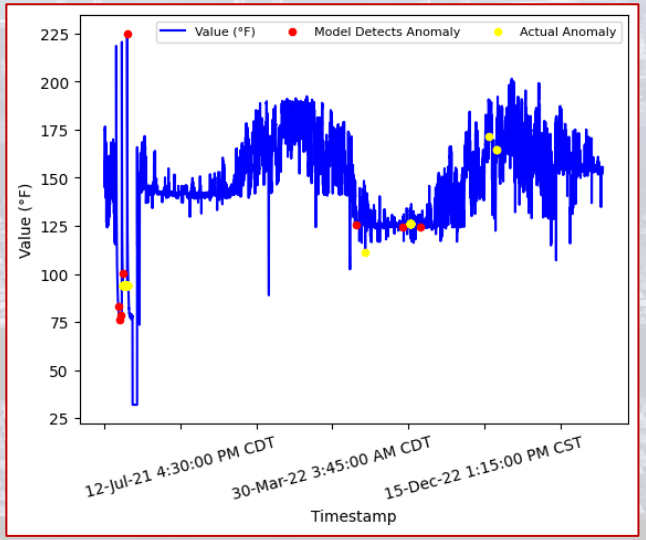


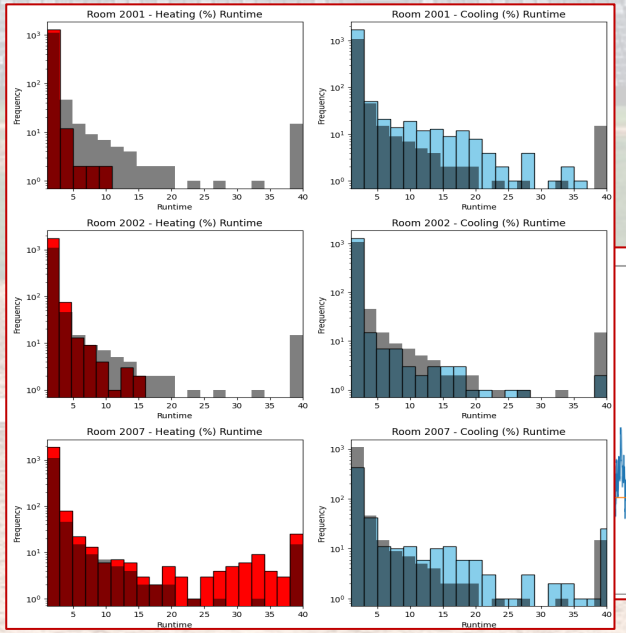


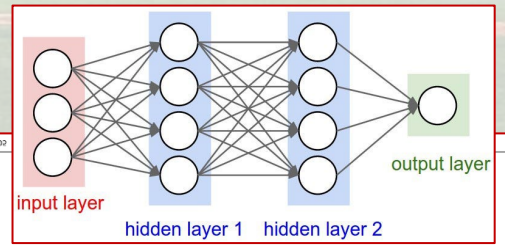


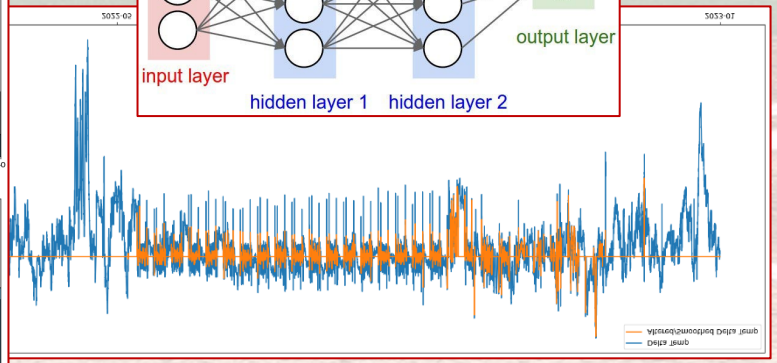






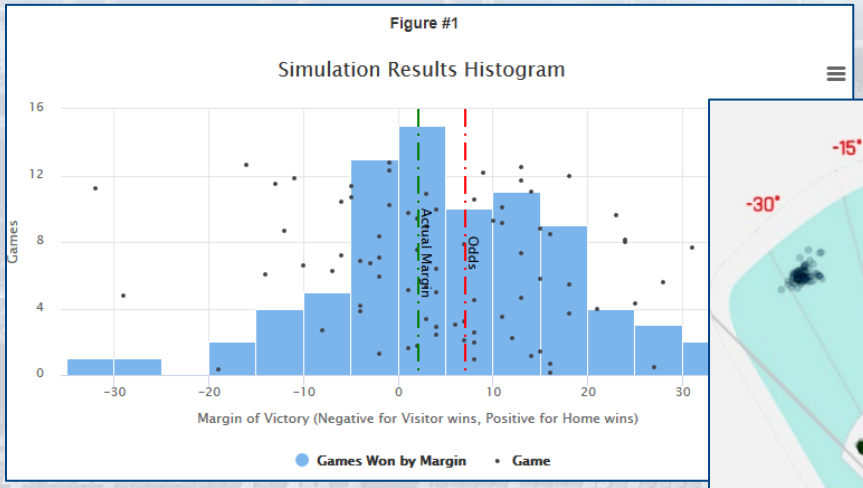


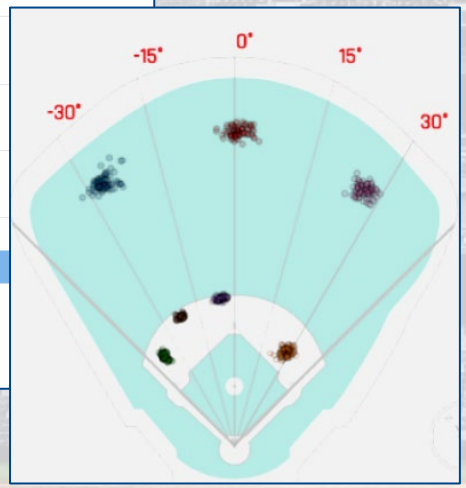


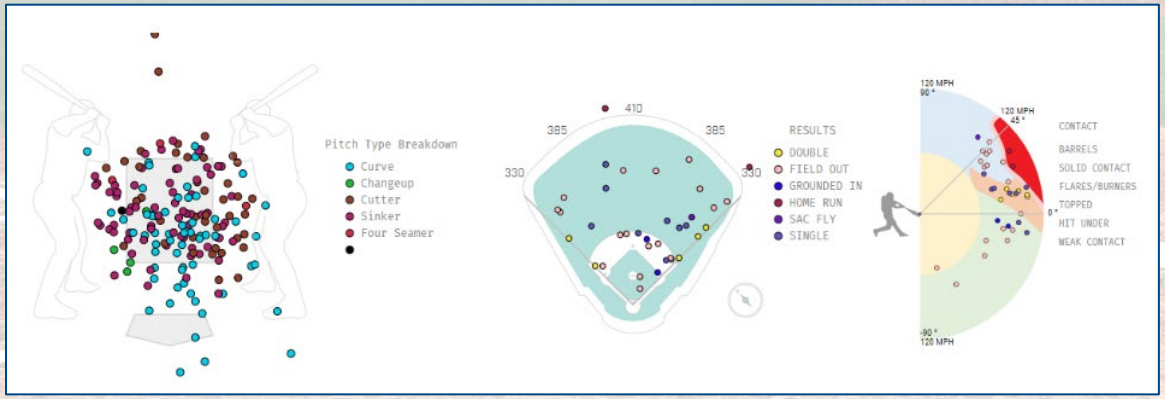


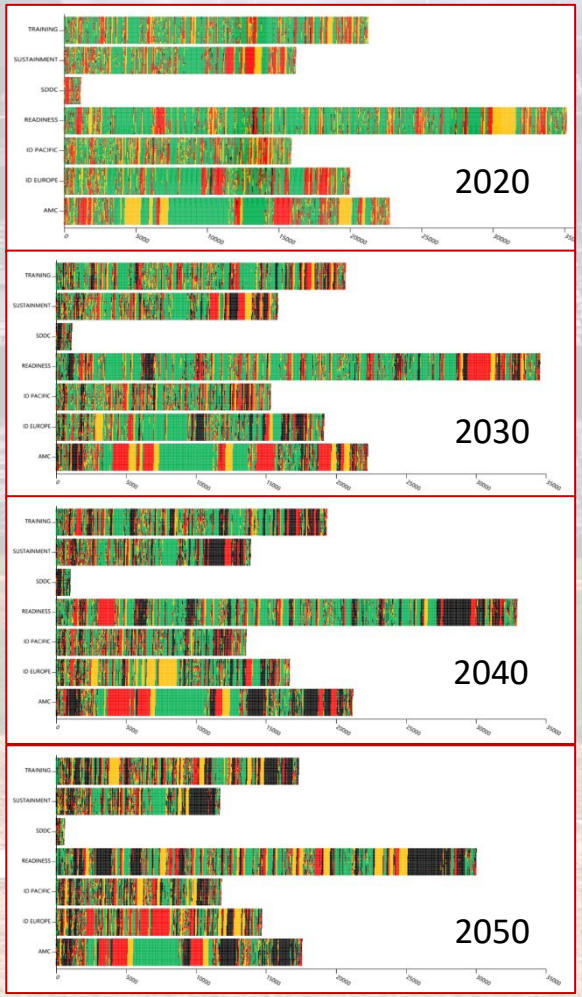
SEASON SIMULATION → SMS SCENARIO ANALYSIS

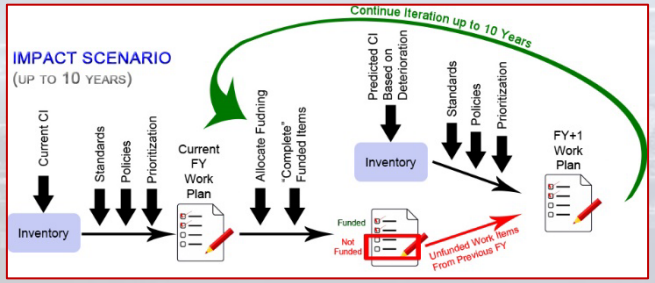
8th











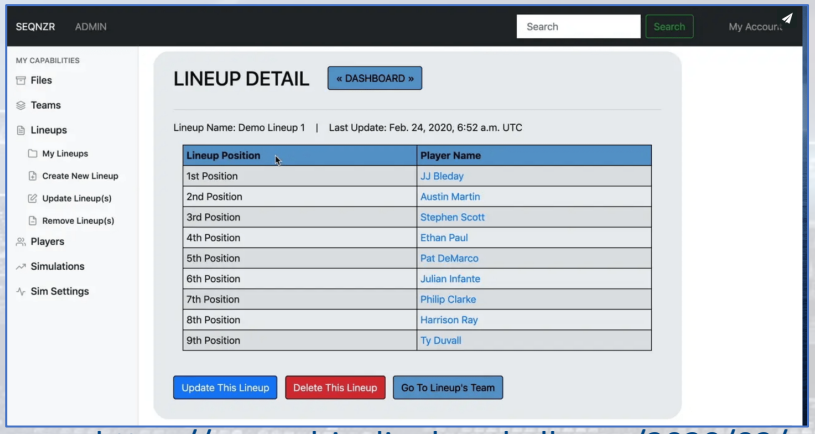


SMS Forecasting and Scenario engine allows long-term investment analytics based on varying:

- *Budgets*
- *Standards & Policies*
- *Prioritization Schemes*
- *Reference Books (ie. cost, service life, other factors)*

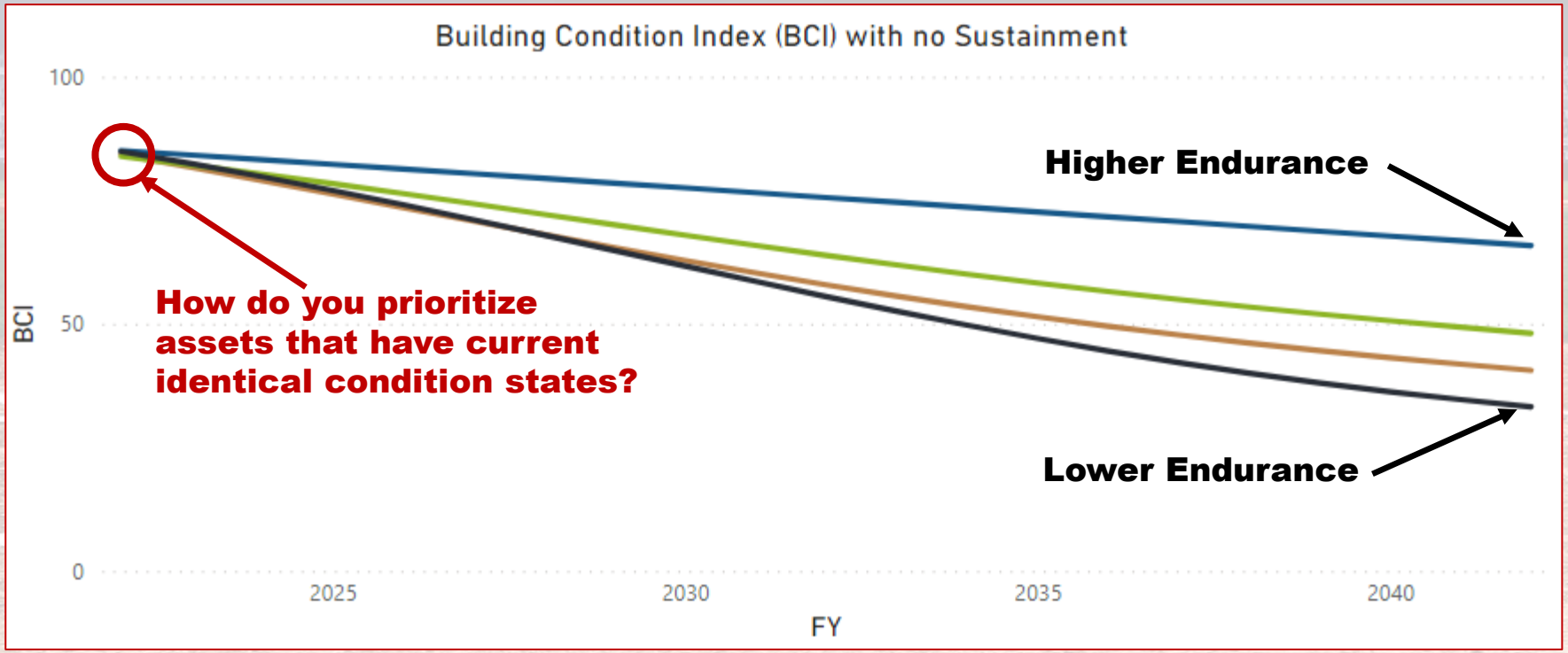
LINEUP OPTIMIZATION → FACILITY OPTIMIZATION

8th



Source: https://www.drivelinebaseball.com/2020/02/seqnzr-simulation-lineup-optimization/

Facility Endurance:
"the ability or strength of a facility to continue or last, especially despite lack of sustainment actions for building components"



69
FY23 CI

60 (-9)
FY29 CI
No Sustainment

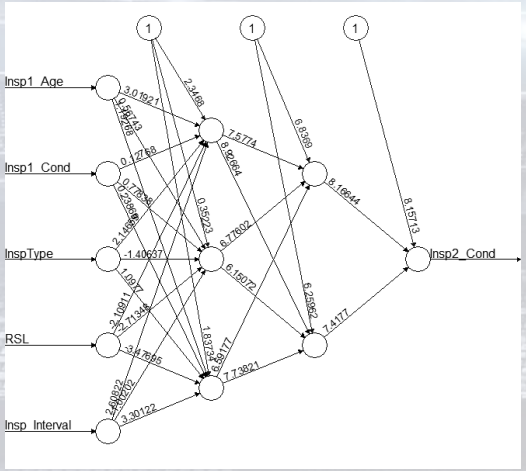
68 (-1)
FY29 CI
100% Sust
"Worst First"
Optimization

73 (+4)
FY29 CI
100% Sust
"**Endurance**"
Optimization

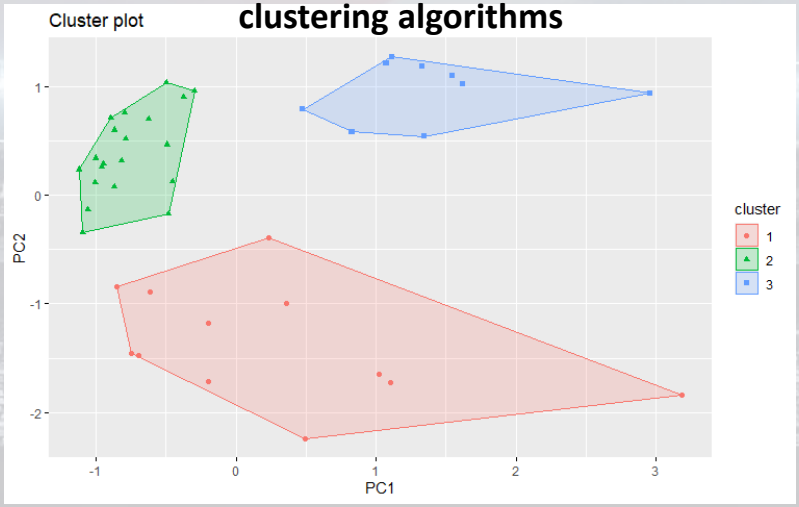
MORE FACILITY OPTIMIZATION

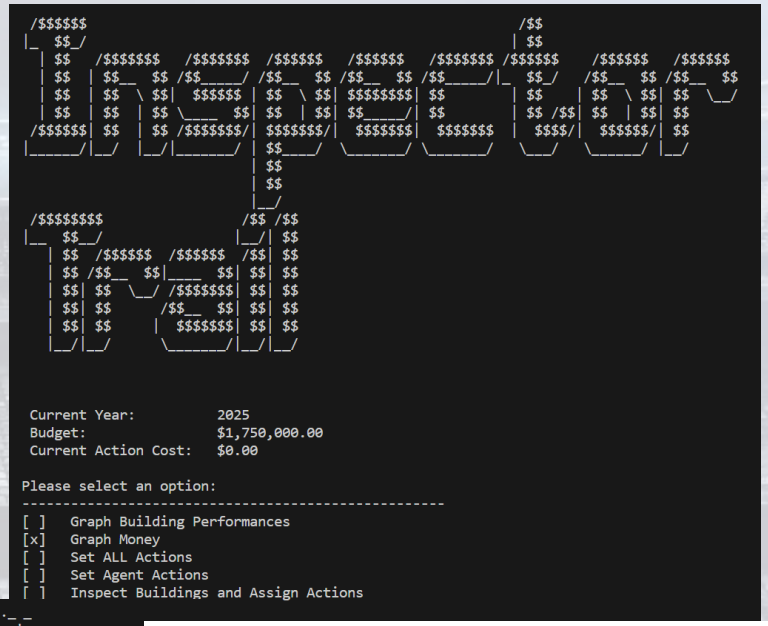
9th

Machine Learning / Neural Network Condition Prediction

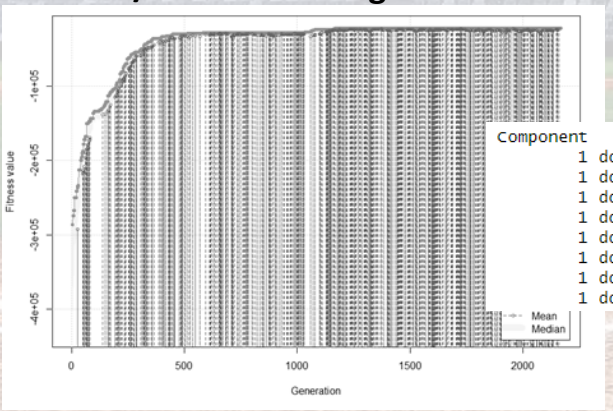


Knowledge Informed Inspection by clustering algorithms

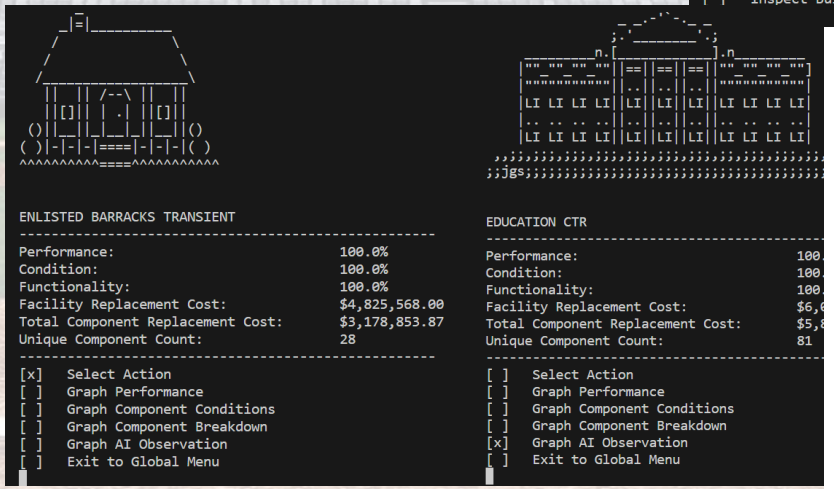


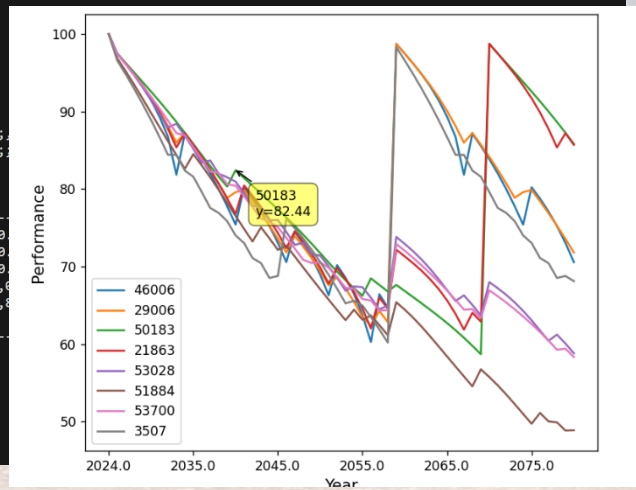


BCI Goal/Unknown Budget AND Given Budget/Unknown BCI Goal



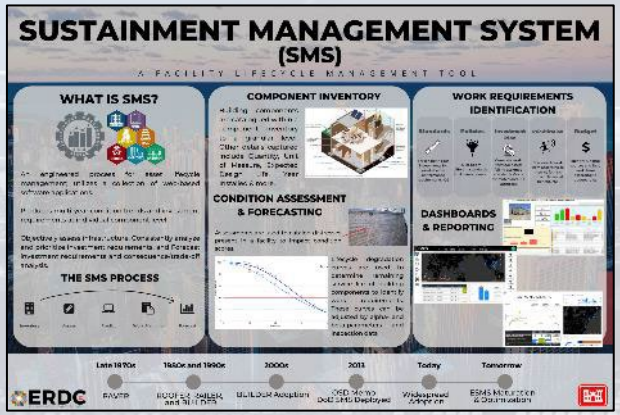
Component	Year 1	Year 2	Year 3
1	do_nothing	do_nothing	do_nothing
1	do_nothing	do_nothing	repair
1	do_nothing	do_nothing	replace
1	do_nothing	repair	do_nothing
1	do_nothing	repair	repair
1	do_nothing	repair	replace
1	do_nothing	replace	do_nothing
1	do_nothing	replace	repair

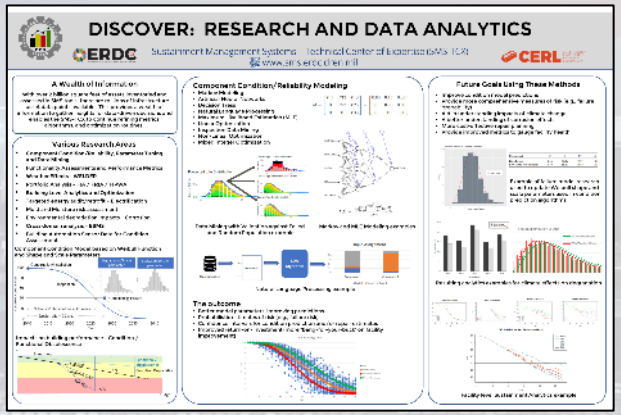


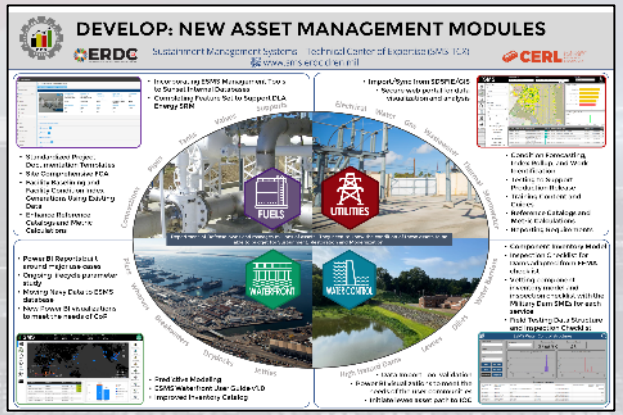


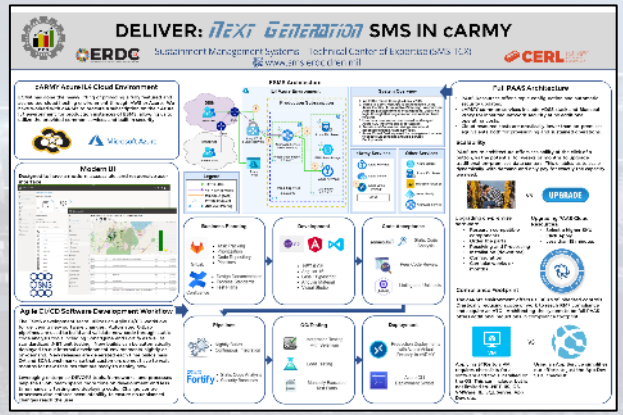
ULTIMATE GOAL IS "WINNING" BY IMPROVING INVESTMENT OUTCOMES FROM WHOLE BUILDING OPTIMIZATION

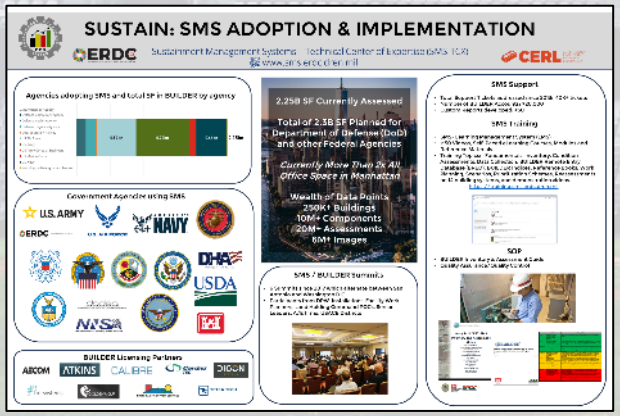
SMS SUMMARY

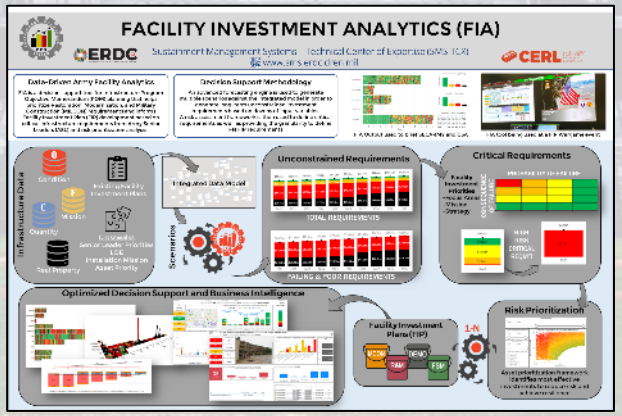


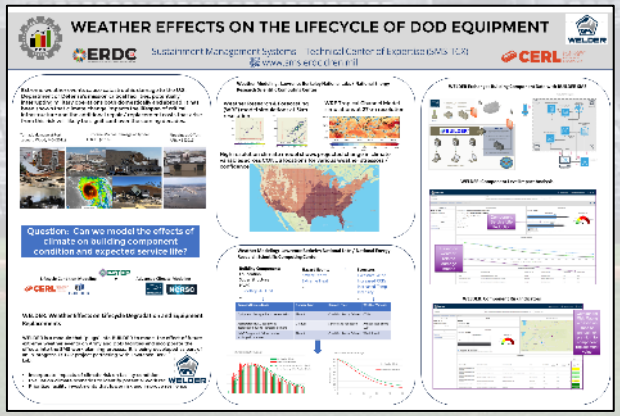














QUESTIONS?

EXTENDED USES OF SMS DATA

Julie Krebs (NNSA), Jay Tulley (ERDC CERL), Kelly Olson (OSD),
Gary Keller (Army DCS G-9) – Moderated by Lisa Cooley

U.S. ARMY

US Army Corps of Engineers®

SMS for Building Decarbonization

SMS Summit

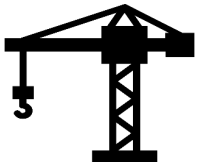
August 10, 2023

Decarbonization Requirement & Challenge

E.O. 14057 Goals



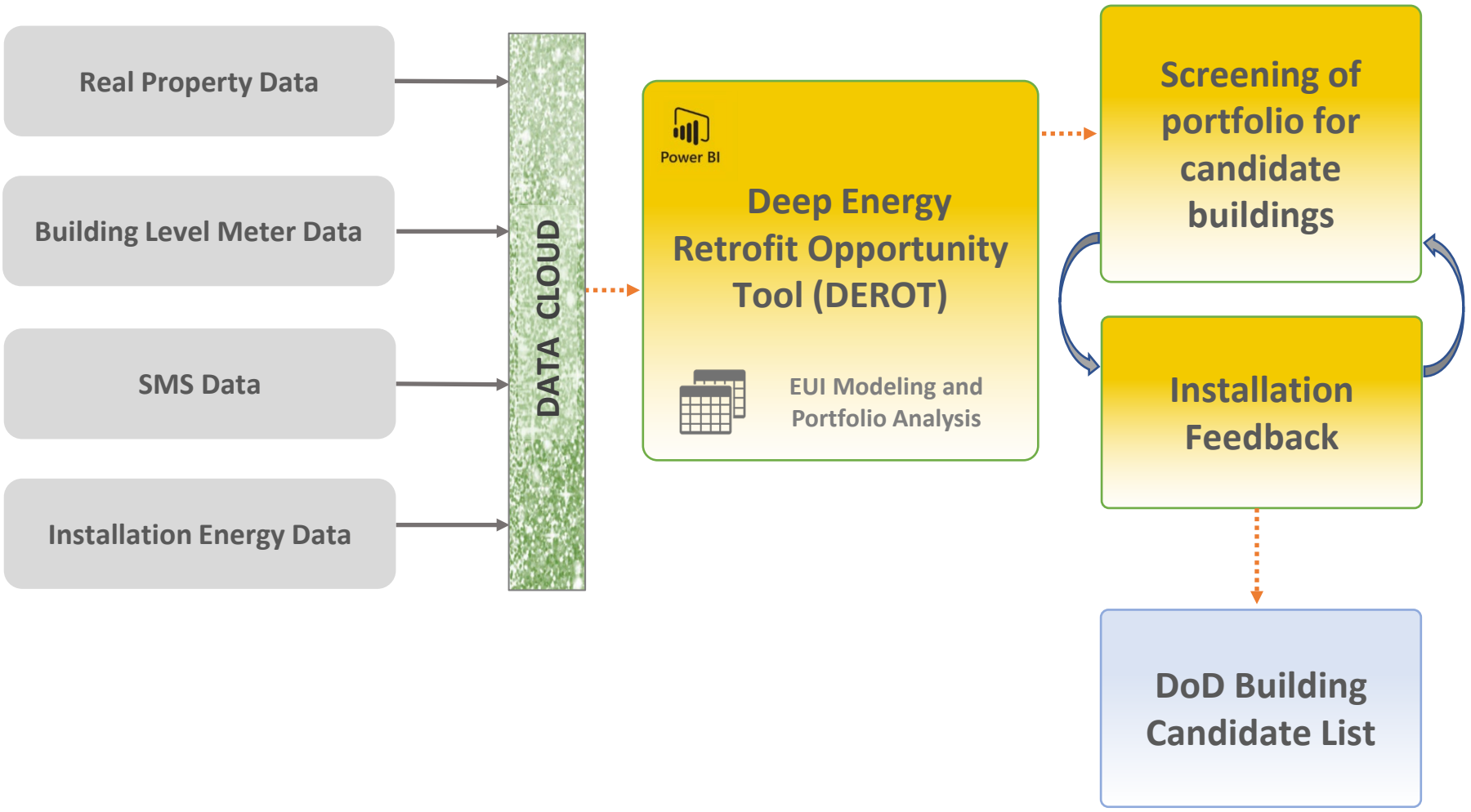
New Construction



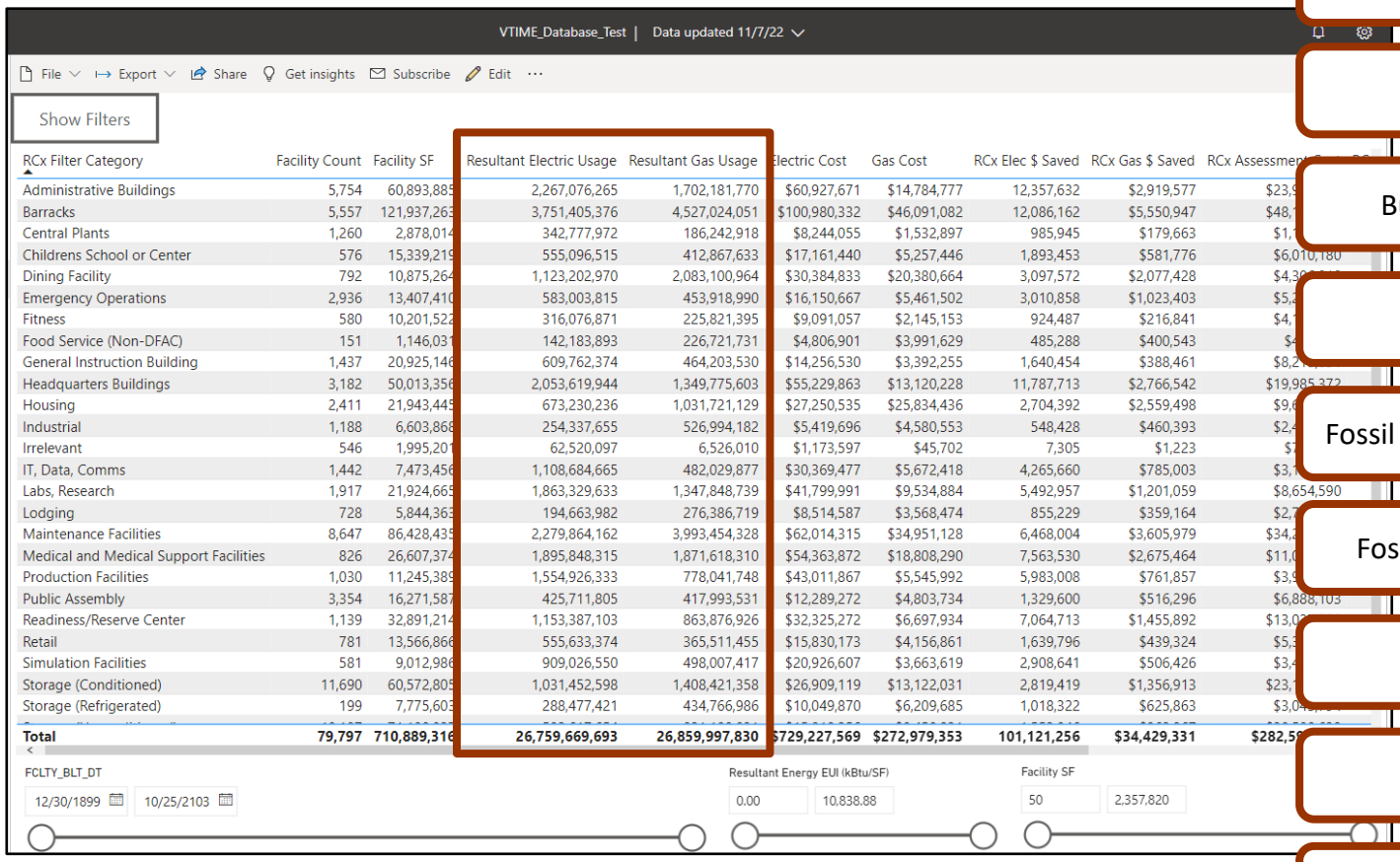
Existing Facilities



Integration of Data and Overall Process



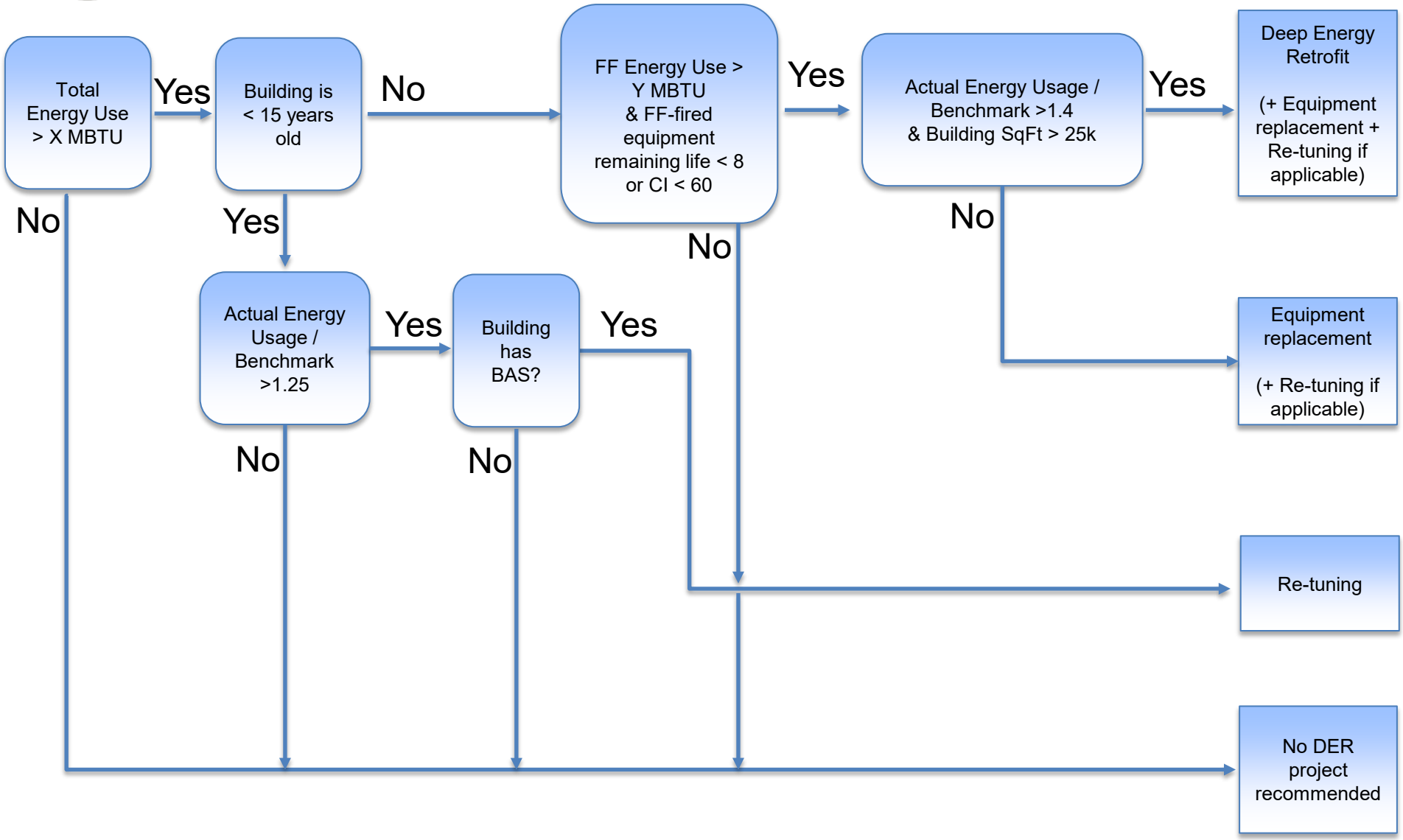
Energy Use and Screening Criteria



RCx Filter Category	Facility Count	Facility SF	Resultant Electric Usage	Resultant Gas Usage	Electric Cost	Gas Cost	RCx Elec $ Saved	RCx Gas $ Saved	RCx Assessment
Administrative Buildings	5,754	60,893,885	2,267,076,265	1,702,181,770	$60,927,671	$14,784,777	12,357,632	$2,919,577	$23,9
Barracks	5,557	121,937,263	3,751,405,376	4,527,024,051	$100,980,332	$46,091,082	12,086,162	$5,550,947	$48,1
Central Plants	1,260	2,878,014	342,777,972	186,242,918	$8,244,055	$1,532,897	985,945	$179,663	$1,1
Childrens School or Center	576	15,339,219	555,096,515	412,867,633	$17,161,440	$5,257,446	1,893,453	$581,776	$6,010,180
Dining Facility	792	10,875,264	1,123,202,970	2,083,100,964	$30,384,833	$20,380,664	3,097,572	$2,077,428	$4,3
Emergency Operations	2,936	13,407,410	583,003,815	453,918,990	$16,150,667	$5,461,502	3,010,858	$1,023,403	$5,2
Fitness	580	10,201,522	316,076,871	225,821,395	$9,091,057	$2,145,153	924,487	$216,841	$4,1
Food Service (Non-DFAC)	151	1,146,031	142,183,893	226,721,731	$4,806,901	$3,991,629	485,288	$400,543	$4
General Instruction Building	1,437	20,925,146	609,762,374	464,203,530	$14,256,530	$3,392,255	1,640,454	$388,461	$8,2
Headquarters Buildings	3,182	50,013,356	2,053,619,944	1,349,775,603	$55,229,863	$13,120,228	11,787,713	$2,766,542	$19,985,372
Housing	2,411	21,943,445	673,230,236	1,031,721,129	$27,250,535	$25,834,436	2,704,392	$2,559,498	$9,6
Industrial	1,188	6,603,868	254,337,655	526,994,182	$5,419,696	$4,580,553	548,428	$460,393	$2,4
Irrelevant	546	1,995,201	62,520,097	6,526,010	$1,173,597	$45,702	7,305	$1,223	$2
IT, Data, Comms	1,442	7,473,456	1,108,684,665	482,029,877	$30,369,477	$5,672,418	4,265,660	$785,003	$3,1
Labs, Research	1,917	21,924,665	1,863,329,633	1,347,848,739	$41,799,991	$9,534,884	5,492,957	$1,201,059	$8,654,590
Lodging	728	5,844,363	194,663,982	276,386,719	$8,514,587	$3,568,474	855,229	$359,164	$2,7
Maintenance Facilities	8,647	86,428,435	2,279,864,162	3,993,454,328	$62,014,315	$34,951,128	6,468,004	$3,605,979	$34,2
Medical and Medical Support Facilities	826	26,607,374	1,895,848,315	1,871,618,310	$54,363,872	$18,808,290	7,563,530	$2,675,464	$11,0
Production Facilities	1,030	11,245,389	1,554,926,333	778,041,748	$43,011,867	$5,545,992	5,983,008	$761,857	$3,9
Public Assembly	3,354	16,271,587	425,711,805	417,993,531	$12,289,272	$4,803,734	1,329,600	$516,296	$6,888,103
Readiness/Reserve Center	1,139	32,891,214	1,153,387,103	863,876,926	$32,325,272	$6,697,934	7,064,713	$1,455,892	$13,0
Retail	781	13,566,866	555,633,374	365,511,455	$15,830,173	$4,156,861	1,639,796	$439,324	$5,3
Simulation Facilities	581	9,012,986	909,026,550	498,007,417	$20,926,607	$3,663,619	2,908,641	$506,426	$3,4
Storage (Conditioned)	11,690	60,572,805	1,031,452,598	1,408,421,358	$26,909,119	$13,122,031	2,819,419	$1,356,913	$23,1
Storage (Refrigerated)	199	7,775,603	288,477,421	434,766,986	$10,049,870	$6,209,685	1,018,322	$625,863	$3,0
Total	**79,797**	**710,889,316**	**26,759,669,693**	**26,859,997,830**	**$729,227,569**	**$272,979,353**	**101,121,256**	**$34,429,331**	**$282,5**

- Total Energy Use Benchmark
- Building Age
- Building Automation System
- Fossil Fuel Energy Use
- Fossil Fuel Equipment Remaining Life
- Fossil Fuel Equipment Condition
- Central Plant
- Building Size
- Planned Projects

Example Criteria Flowchart

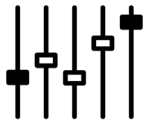


* Assume no BAS if Age > 20 years

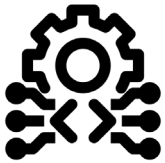
How Else Can We Use SMS Data?



- Develop **Better Metrics** than EUI
  - Heating Capacity/SF: Electric vs. Fossil Fuel, Panel Capacity (Spare or Upsize?)
  - Cooling Capacity/SF
  - Ventilation Capacity/SF or /Anticipated Occupant
  - Design Occupancy by Building Type



- Characterize **Controls Systems**
  - For Retuning or Retro-Commissioning
  - Relationship between EUI and Type of Controls Systems



- Apply **Machine Learning**
  - Better Categorize Building Type
  - Derive Metrics Based on Known Characteristics



- Help us Answer **Portfolio & Building Cluster** Questions:
  - Do ERUs work? How do we correlate energy use to equipment?
  - How much energy do BASs save us?
  - How do we know if a building is on a central plant? Does a low EUI mean a building is efficient?
  - How can BUILDER help us understand the relationship between buildings?
  - How do we use BUILDER data to plan?

Initial Results and Next Steps

- **Phase I DEROT Results**
  - About 10% of buildings are responsible for 75% of energy use
  - There are ~30,000 buildings with Scope 1 emissions (natural gas, fuel oil, & propane-powered HVAC and DHW per SMS analysis)

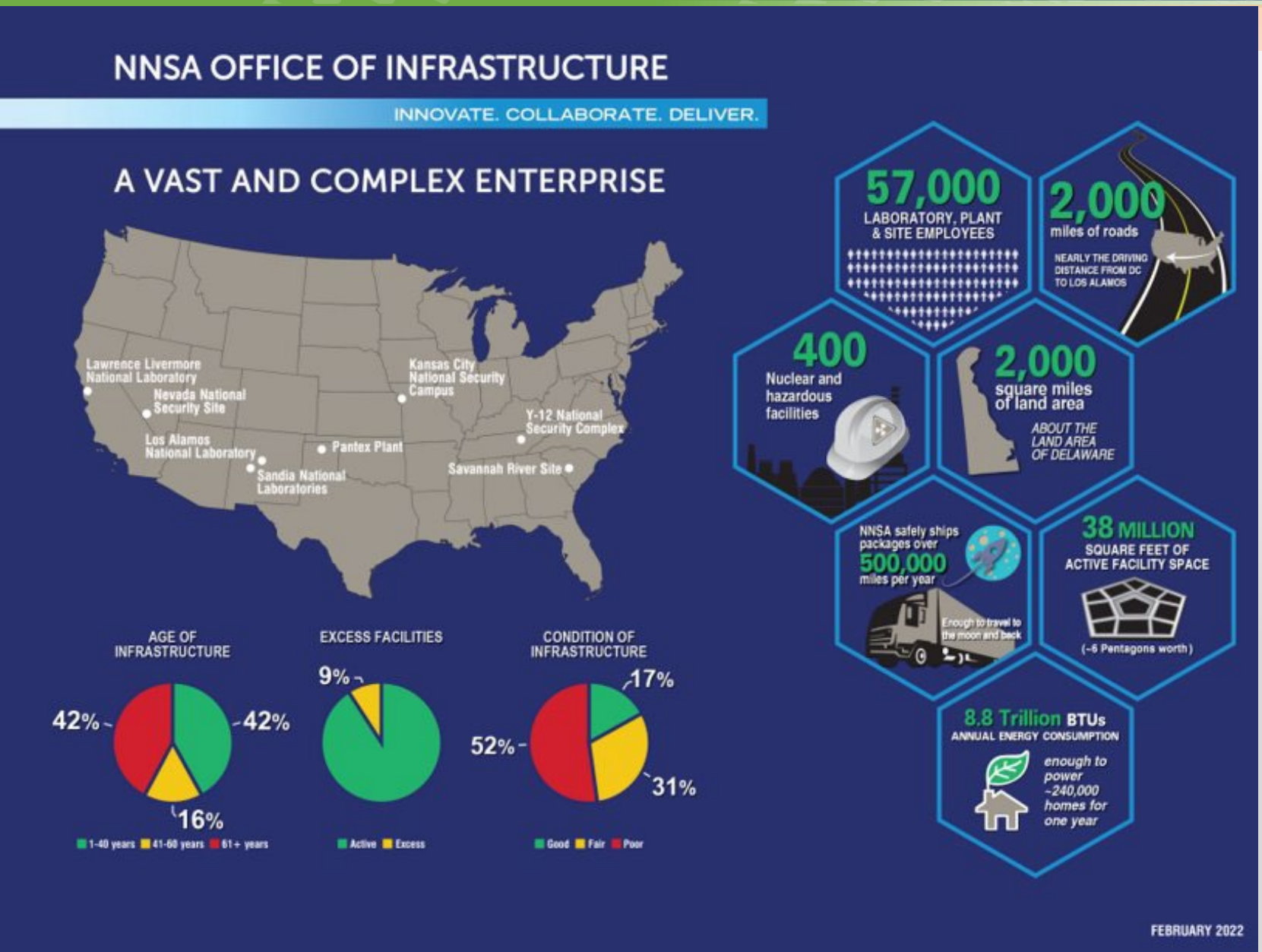
	Building Count	Top 25% Energy Users	25-50% Energy Users	50-75% Energy Users	75-100% Energy Users	Unaccounted / Not Yet Assessed
Air Force	40,865	286	1,209	3,573	35,051	746
Army	68,981	368	1,656	4,606	61,461	890
Marine Corps	9,651	159	336	724	7,724	708
Navy	30,653	195	710	2,140	25,065	2,543
WHS	90					90
Total	**150,240**	1,008	3,911	11,043	129,301	4,977

- **Next Steps**
  - Improve energy meter analysis
  - Work with Military Departments to review Phase I findings – Where are projects currently planned? Where can we resolve energy meter discrepancies?

NNSA Use of BUILDER

Julie B. Krebs
BUILDER Program Manager
Infrastructure Operations & Maintenance (NA-914)

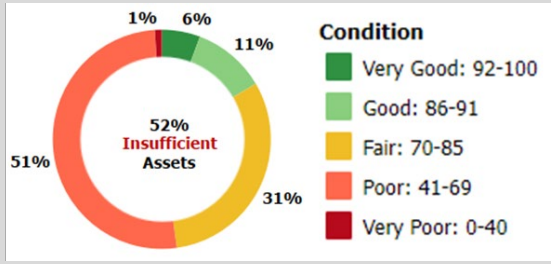
NNSA Infrastructure



NNSA's Top Infrastructure Challenges

- Age & Condition
- Delivery Speed & Agility
- Vendor Base/Supply Chain

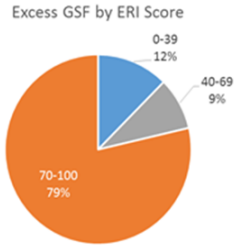
52% of 5,000+ NNSA assets are in poor or very poor condition



Science-Based Infrastructure Stewardship

NNSA is deploying a suite of **holistic, data-driven, risk-informed tools and metrics** to better assess risks, prioritize investments, and cost effectively modernize its aging infrastructure. Central to this new, **Science-Based Infrastructure Stewardship** approach is the BUILDER Sustainment Management System (SMS)

Excess-Facility Risk Index



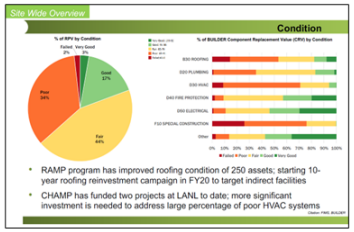
Measures risk posed by excess assets

Computerized Maintenance Management Systems

IBM maximo · AssetWORKS FleetFocus · VENTYX AN ABB COMPANY · infor EAM · SAP

Track daily maintenance activities

Deep Dives



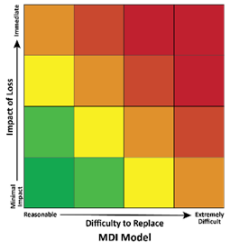
In-depth triennial infrastructure reviews

Enhanced Minor Construction & Commercial Standards (EMC²) Pilot



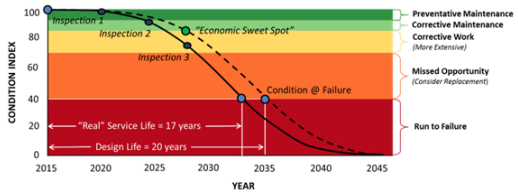
Construct non-complex projects <$50M faster

Mission Dependency Index



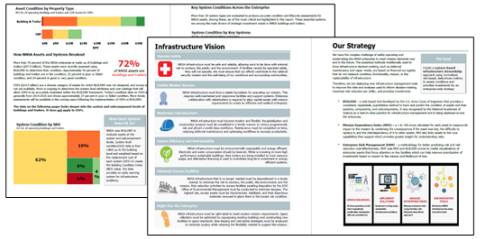
Measures mission impact if an asset were lost

BUILDER™



Measures asset condition & replacement cost

Master Asset Plan



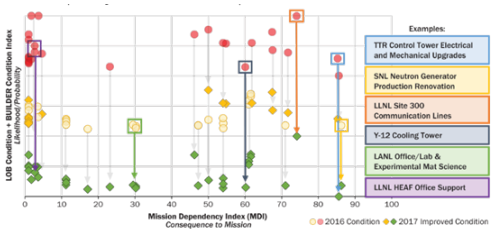
Integrated 25yr infrastructure plan

Standardized Acquisition & Recapitalization (STAR)



Leverage standardized designs & requirements

Enterprise Risk Management



Measures asset risk and risk trending

G2



Award-winning program management system

Site Area Plans



Roadmap for modernizing NNSA infrastructure

Minor Construction

Increased from $10M to $25M in 2018 and authority to dispose of process-contaminated facilities up to $50M

Increase NNSA's minor construction threshold

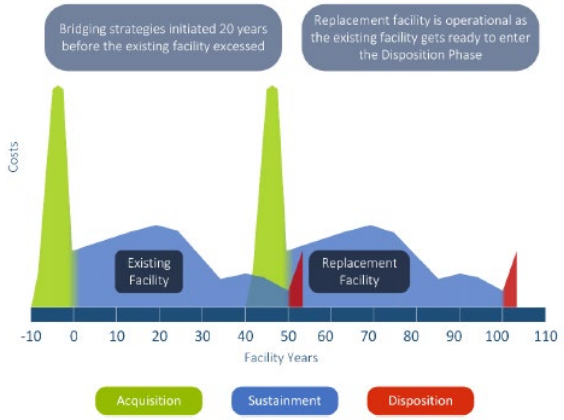
Leveraging BUILDER

IMPLEMENTATION TIMELINE
OCT 2014 – SEP 2024

REAL PROPERTY LIFECYCLE PLANNING

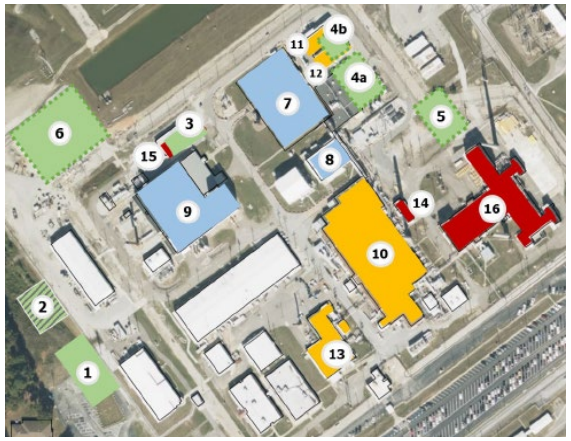
BUILDER component design lives help forecast asset lifecycle

Major System	Deign Life Range (Yr)
Roofing	24-32
Plumbing	16-38
HVAC	16-27
Fire Protection	21-51
Electrical	20-42
Special Construction	20-21



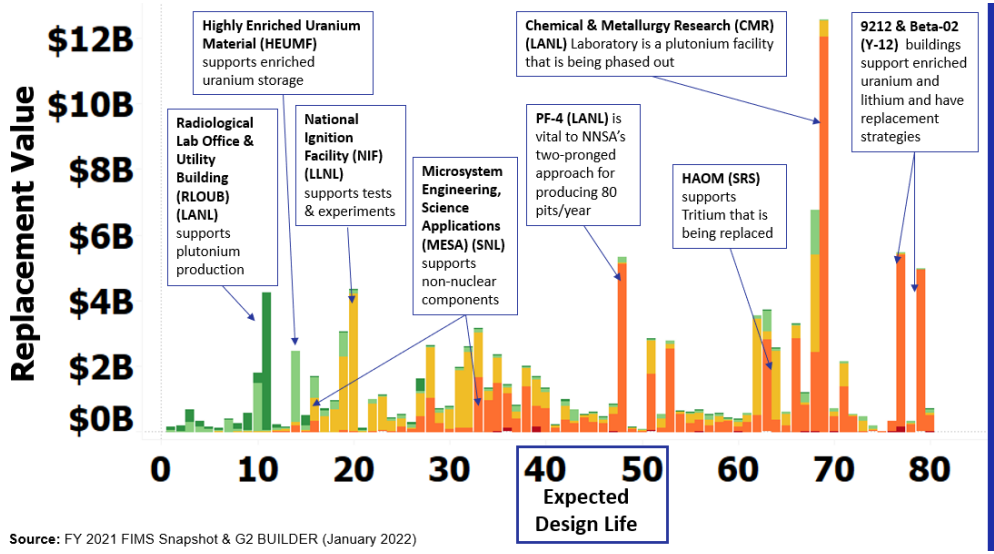
MAP Area Plans





REAL PROPERTY LIFECYCLE PLANNING

BUILDER identifies key infrastructure risks by capability



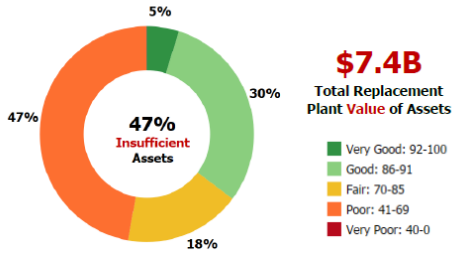
Source: FY 2021 FIMS Snapshot & G2 BUILDER (January 2022)

Facility Condition by Age & Replacement Plant Value (RPV)

Condition
- Very Good: 92-100
- Good: 86-91
- Fair: 70-85
- Poor: 41-69
- Very Poor: 40-0

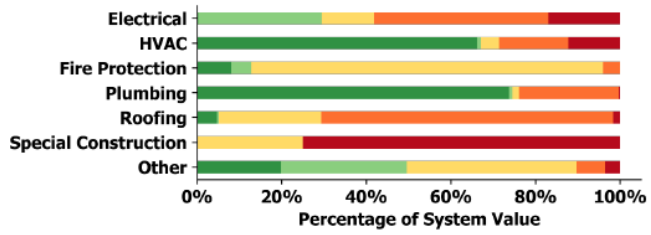
Asset Condition by RPV %

BCI for operating buildings and trailers and Laboratory Operating Board (LOB) scores for other structures and facilities (OSF)



System Condition by Key Systems

System Condition Index score for operating buildings and trailers



BUILDER generates federally required Deferred Maintenance, Repair Needs, and Replacement Plant Value (adding Functionality in FY23)

Initiatives Are Yielding Results

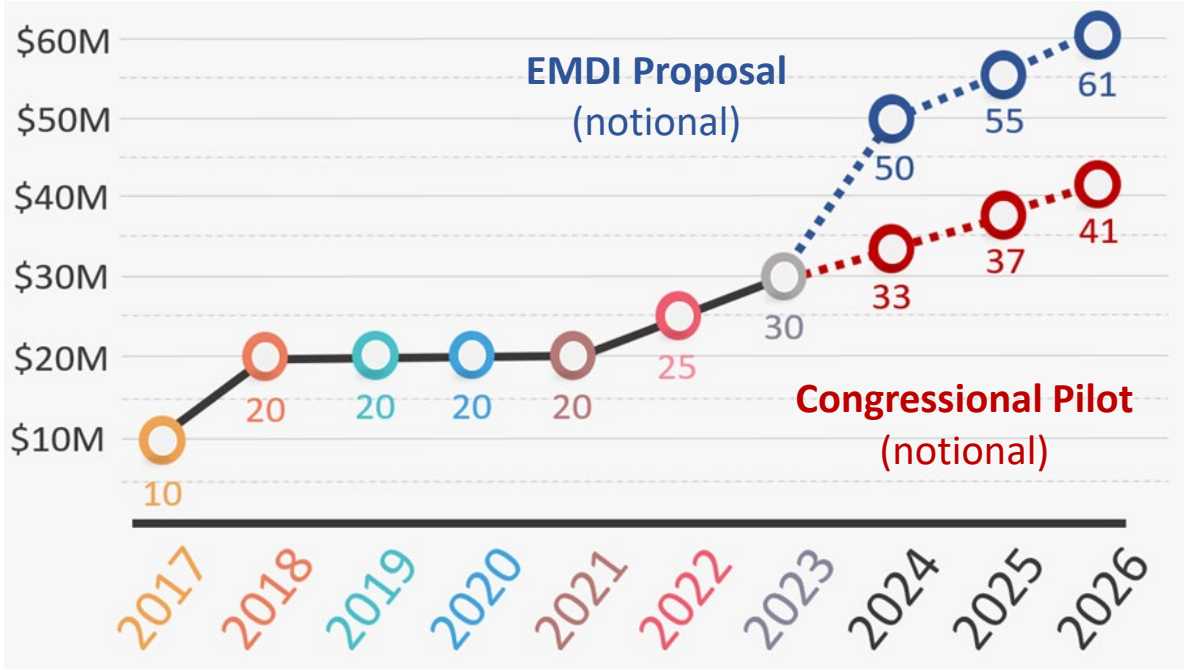
INCREASED MINOR CONSTRUCTION THRESHOLD

FY2018
- Increased from $10M to $20M

FY2022
- Increased from $20M to $25M

FY2023
- Increased from $25M to $30M
- Plus 3-year pilot indexed for inflation

FY2024
- Leverage new NDAA escalation authority to increase threshold to adjust for inflation



Supply Chain Collaboration

Identify enterprise equipment needs using BUILDER and other tools to increase NNSA's purchasing power

Purchases

Executed first ever lease-purchase authority to acquire Y-12 facility (leveraged BUILDER to anticipate O&M needs)

Numerous "good news" stories from across the enterprise…

- BUILDER quickly identified electrical equipment that was recalled due to safety concerns likely saving hundreds of thousands of dollars by not having to field locate the recalled components
- BUILDER data helped identify and evaluate 'air flow' equipment (HVAC systems and filtration) in response to COVID

BUILDER Opportunities

HOW CAN WE USE BUILDER TO…

- Better inform operations and maintenance activities
- Provide modernized replacement plant values
- Conduct budget scenario analysis
- Anticipate future needs

If you wish to collaborate with the NNSA, please reach out to:

Julie B. Krebs, NNSA BUILDER Program Manager
Julie.Krebs@nnsa.doe.gov; **Best Method to Reach POC**
Mobile: (505) 382-4410
Working from home in Albuquerque, NM

U.S. ARMY

SMS Summit 2023

Office of the Deputy Chief of Staff, G-9 (Installations)
Gary Keller
9 August 2023



G-9 Mission

The DCS, G-9 leads integration across the Army enterprise to modernize installations, enhance quality of life, and develop and implement policies, plans, and programs that enable the Army to recruit, train, deploy, fight, and win.

G-9 Vision

Dedicated professionals driving excellence across the Army Installations Enterprise to support Soldiers, families, and Army civilians wherever they train, work, and live.

Army BUILDER Status

- Army-wide BUILDER facility inspections started in FY2018 for all buildings >1000 square feet; plan to complete all buildings by end of FY24
- Facility condition is currently reported through the Army's Installation Status Report – Infrastructure (ISR-I) system to support aggregation with assessments for other facility types and functionality (mission) rating
- In 4QFY2022, all BUILDER condition index and cost were top-loaded into ISR for aggregation and reporting to OSD through the Headquarters Installation Information System (HQIIS)
- ESMS will replace ISR-I for BOTH condition and functionality as capabilities are developed and implemented for ALL facility types



SMS LOOK-AHEAD

Michael Grussing and Matt Walters – SMS-TCX

U.S. ARMY

US Army Corps of Engineers®

SMS LOOK-AHEAD

U.S. ARMY

- Interoperability – how do systems talk
  - CMMS
  - BIM/eOMSI
  - GIS
- Data quality
  - Field collection tools – MICA Platform for ESMS
  - Reports and dashboards
  - Data inputs – quantity, install date
- Catalog
  - Expanded or new items?
  - Narrowed scope – what matters, what's significant
- Assessment focus areas
  - Mold, lead
  - Corrosion – tropical and coastal environments
  - Energy and right sizing of equipment
  - Alternate assessment methods – sensors, autonomous vehicles and image recognition

What are your ideas? What is on your SMS wish list?

CLOSING REMARKS

U.S. ARMY

THANK YOU!

Slides and recordings (as available) will be available @
https://support.sms.erdc.dren.mil
https://training.sms.erdc.dren.mil

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