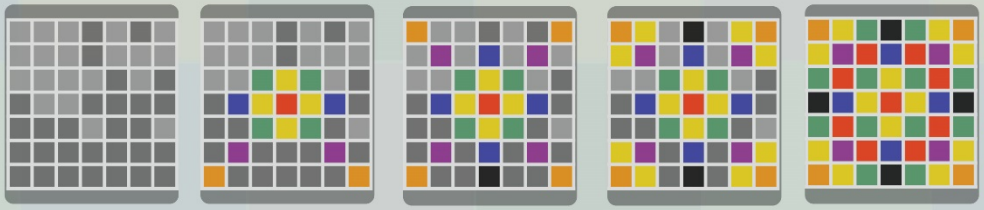

DMLSS-FM 5 YEAR ROAD MAP

Defense Medical Logistics Standard Support Facility Management (DMLSS-FM) - 100% Submittal

HT9402-11-D-0001
Task Order 0012

May 16, 2013

Department of Defense
Military Health System (DOD MHS)

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1.0 Executive Summary

Background

This roadmap will focus on the DMLSS-FM module. Key objectives in this 5 year roadmap focus on what additional measures need to be taken into consideration for DMLSS-FM to provide an effective corporate CMMS/CAFM system that accounts for the entire Facility Life Cycle management. It also seeks to better leverage the data in DMLSS-FM and provide better access to this information as appropriate, across all the levels of a Defense Health Agency or Military Health System. It also needs to identify key dependencies to other DMLSS modules as it relates to the MHS facilities community's mission.

Defense Medical Logistics Standard Support (DMLSS) delivers an automated and integrated information system with a comprehensive range of medical materiel, equipment, war reserve materiel and facilities management functions for the Department of Defense Military Health System:

The purpose of this document is to develop a 5 Year Roadmap for the Defense Medical Logistics Standard Support Facility Management (DMLSS-FM).

Roadmap Objectives

This Roadmap Shall Identify:

1. Existing capabilities that need to be maintained.
2. Key dependencies on other DMLSS modules and their relative importance to the MHS Facilities community's mission.
3. Capabilities that currently do not exist in DMLSS-FM but are needed by the MHS Facilities community for efficacious execution of the MHS Facilities mission.
4. Limitations (or strengths) of the current DMLSS-FM data structure to support the integration/development of needed DMLSS-FM features for an effective corporate CMMS/CAFM system that supports a Facility Life Cycle Management (FLCM) perspective.
5. Critical structural adjustments needed to provide a corporate CMMS/CAFM system to the MHS Facilities community that focusses on the needs of the operators at the local facility while allowing all levels of a Defense Health Agency or Military Health System to effectively access relevant data to support effective defense of the MHS Facilities budgets, inform requirements decision making, understand capacity and utilization of the facilities inventory for the MHS, and allow transparency across the team.
6. Identify critical approaches that provide effective current need solutions which are adaptable and scalable over the next 10 years.
7. Identify approaches and structures that allow secure control of the data, while allowing the means to share selected data via web-service solutions (secure and unsecure).
8. Identify specific solutions that allow the integration of BIM and/or GIS integration of current AEC standard practices in data rich and graphically representative tools.
9. Identify key data structures for the AEC community that allow the transferability of both graphical and data.
10. Identify and demonstrate proof of concepts available to achieve these above goals from web centric platform solutions.

Approach and Methodology

There were several key approaches that were used in developing this document.

First, there was a considerable research effort made to identify relevant government initiatives that relate to issues that should be considered in a multi-year roadmap for alignment and compliance for overarching government goals and objectives. This includes incorporating the principles and fundamental philosophy in "Building a 21st Century Platform to Better Serve the American People". It also identifies specific initiatives such as the Enterprise Energy Information Management (EEIM), installation of Advanced Meter Infrastructure (AMI) Smart Meters and the adoption of the Risk Management Framework for Cybersecurity to replace the Defense Assurance and Accreditation Process (DIACAP). These government initiatives shape the direction of the roadmap as well as inform the tactical approaches towards implementation.

Second, there have been detailed conversations with the Joint Medical Logistics Functional Development Center (JMLFDC) Defense Medical Logistics Standard Support (DMLSS) Program team. This group has documented numerous, key "wishlist" items for DMLSS-FM. These new functionalities have been identified over time and represent many of the tactical functionality that would add value for the facility managers that use DMLSS-FM on a day to day basis.

The combination of these high-level and user-level perspectives has been balanced and coordinated in the development of this roadmap. Much attention has also been placed on providing better access to the data across a wider audience while maintaining security.

- Identify current government initiatives and trends that impact the continuing development of a system such as DMLSS-FM and its associated data
- Identify new functionalities current DMLSS-FM users desire
- Explore opportunities for making the data in DMLSS-FM more useful to a broader number of users while maintaining security requirements

Align Principles and Lessons Learns from developing the SEPS Strategic Plan 3.0 and beyond

The SEPS Strategic plan was an effort to roadmap the development cycles to enhance and sustain the Space and Equipment Planning System (SEPS). Similar to the premise of DMLSS-FM, the current system was making the major move towards a fully cloud-based system. Although there are obvious differences between SEPS and DMLSS-FM including functionality and user communities, there is a timely opportunity to leverage some of the move management principles that have common ground.

2.0 Key Steps in Developing this 5 Year DMLSS-FM Roadmap

- Identify current government initiatives and trends that impact the continuing development of a system such as DMLSS-FM and its associated data
- Identify new functionalities current DMLSS-FM users desire
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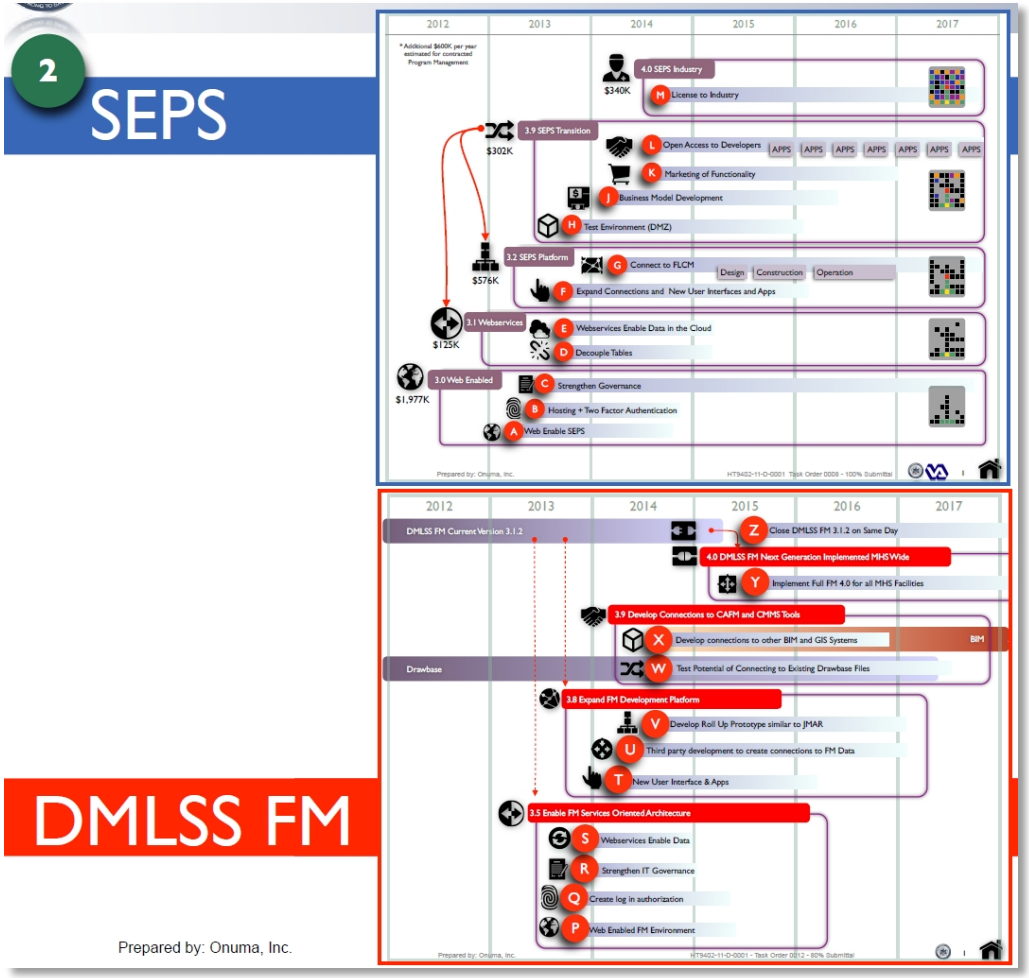


Figure 1: Alignment of the SEPS and DMLSS-FM Development Cycles

3.0 Current Capabilities of DMLSS-FM

Management of all DoD Medical Facilities

DMLSS is the "go-to" system for managing DoD medical facilities.

The DMLSS-FM module is used by all the services for a range of Facility Management functions

- Asset Management of Installations, Facilities & Facility Equipment
- Project & Work Management and Control
- Comprehensive CADD Tool throughout MHS
- Drawings of all MHS MTFs
- Limited Operational Medicine Support

DMLSS is part of the overall Military Health System

- This includes managing data that supports Facility Management (FM),
- Supply Management
- Property Accountability
- Contract Services.

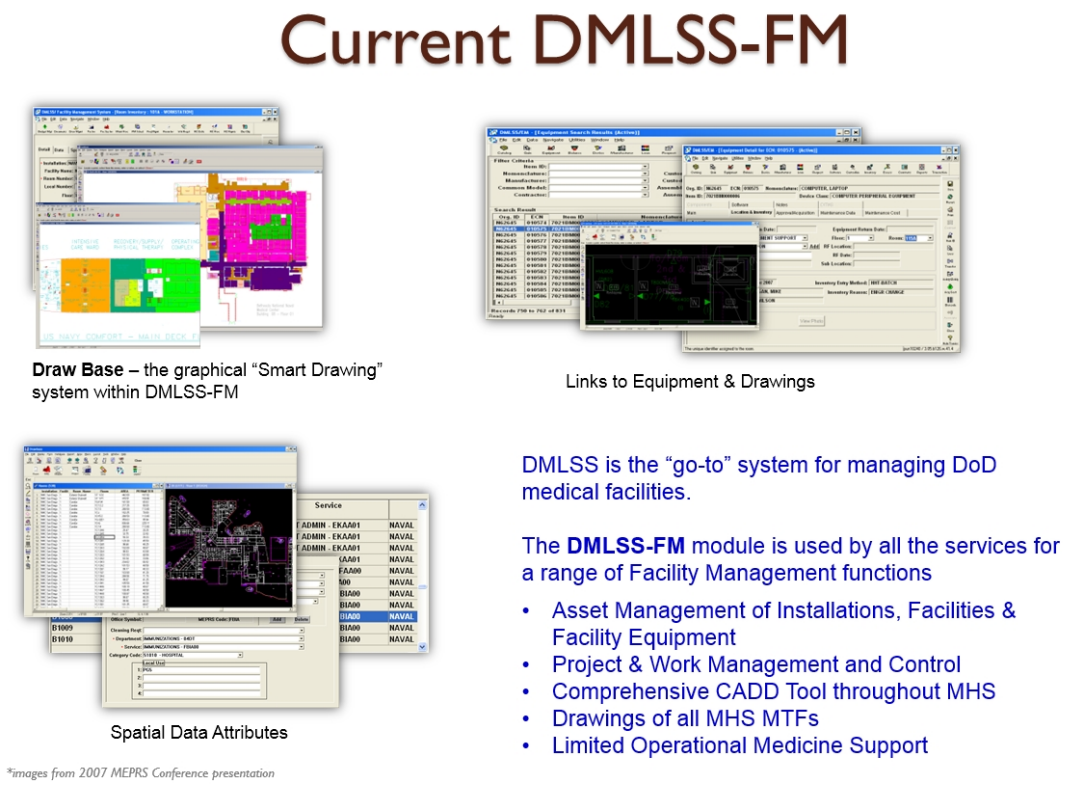


Figure 2: Current DMLSS-FM Capabilities

DMLSS Configuration & Relationships

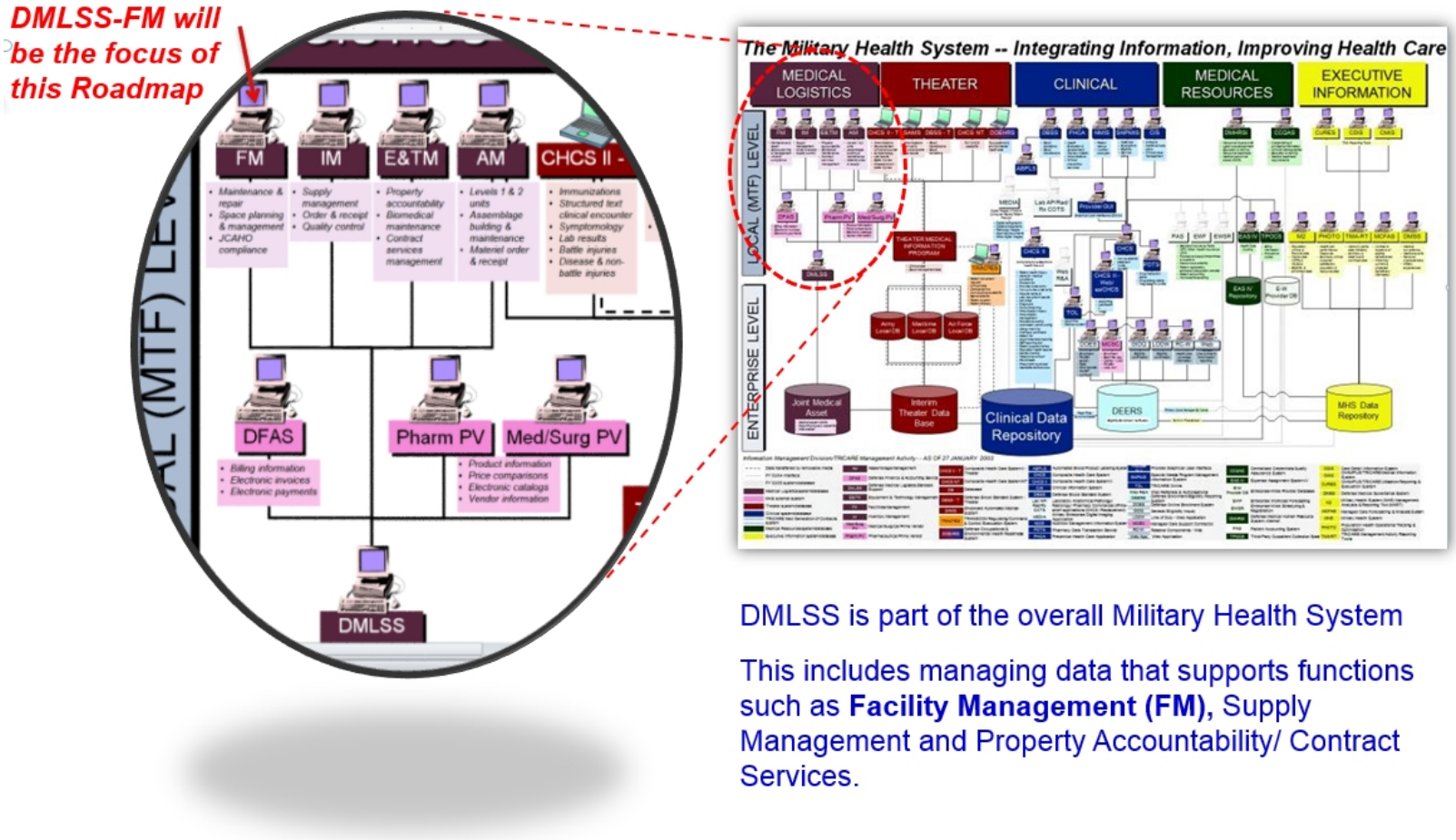


Figure 3: DMLSS-FM is a module out of the larger DMLSS system

4.0 Challenges & Risks

Security

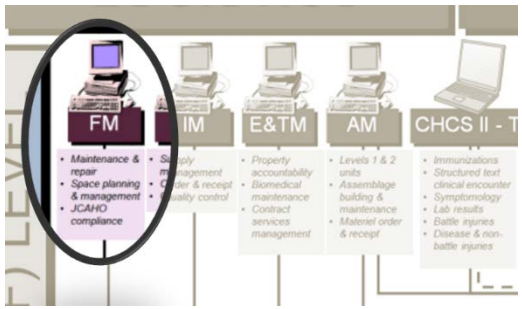


Figure 4: DMLSS-FM Module

The DMLSS-FM module is subject to all the security access restrictions as the entire DMLSS system. This not only includes accessing the module to enter or update data but also includes getting data out of the module.

This valuable data regarding the medical facilities is not made easily available for other purposes relating to the entire Facility Life Cycle Management (FLCM).

The data in DMLSS-FM becomes "locked" within the system. If data requests are made, the data has to be manually exported and assembled to create the required reports. These reports may be emailed, creating a security vulnerability if the data within DMLSS-FM was meant to be secure in the first place.

Stove-Piping of Data

The "stove-piping" of the data in DMLSS-FM module becomes a major barrier towards an integrated Facility Life Cycle Management (FLCM). The vision for a continuous flow of data becomes obstructed whenever data needs to be imported or exported from this module. Members of MHS can not fully leverage the work effort expended to gather this FM data in the first place. DMLSS-FM is not optimally configured for Interoperability, thus, it is not easy to get data in and out of DMLSS-FM.

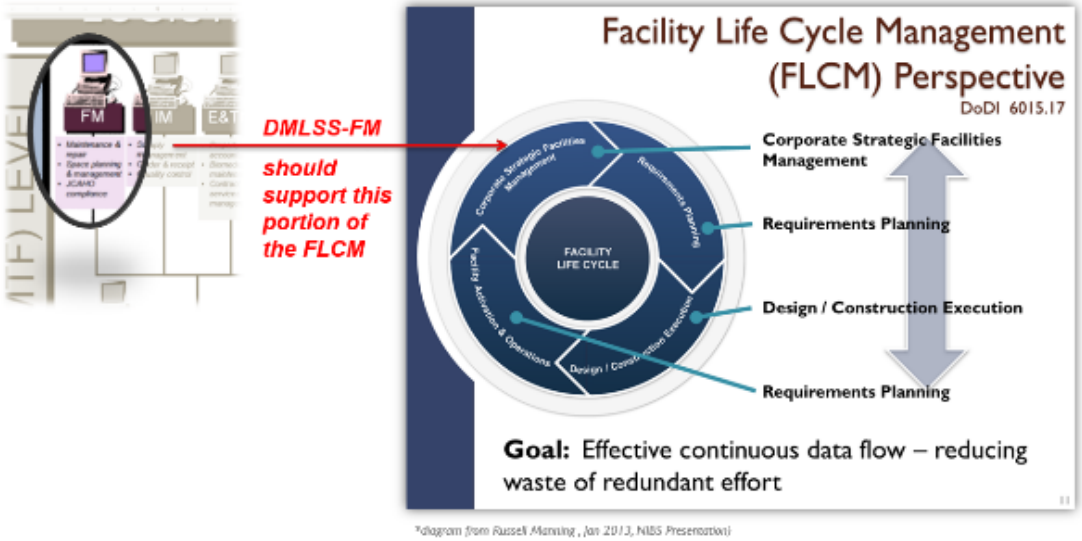


Figure 5: DMLSS-FM to Support FLCM

Fragmented Configuration

DMLSS-FM currently resides on approximately 180 servers that are not connected. This does not provide Total Asset Visibility.

It also makes aggregating facility data or creating data roll-ups a manual process.

To complete a Report or Analysis, it may be necessary to seek data in multiple locations. If one of the many servers are down, it will interrupt completing the work.

Data Consistency While Remaining Agile

It is not easy to add, update or flexibly respond to new needs from the field. Since even adding a new data field requires programming development dollars, the FM side of the services often proceeds in an ad hoc fashion, making use of the fields that already exist. This may lead to inconsistent use of the existing data fields leading to non-normalized data across the various medical facilities.

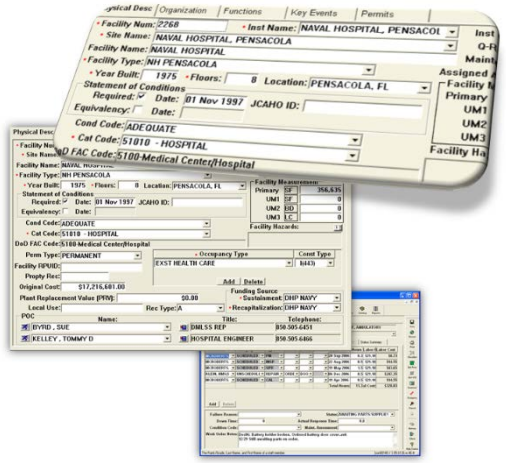


Figure 7: Need ability to easily add data fields

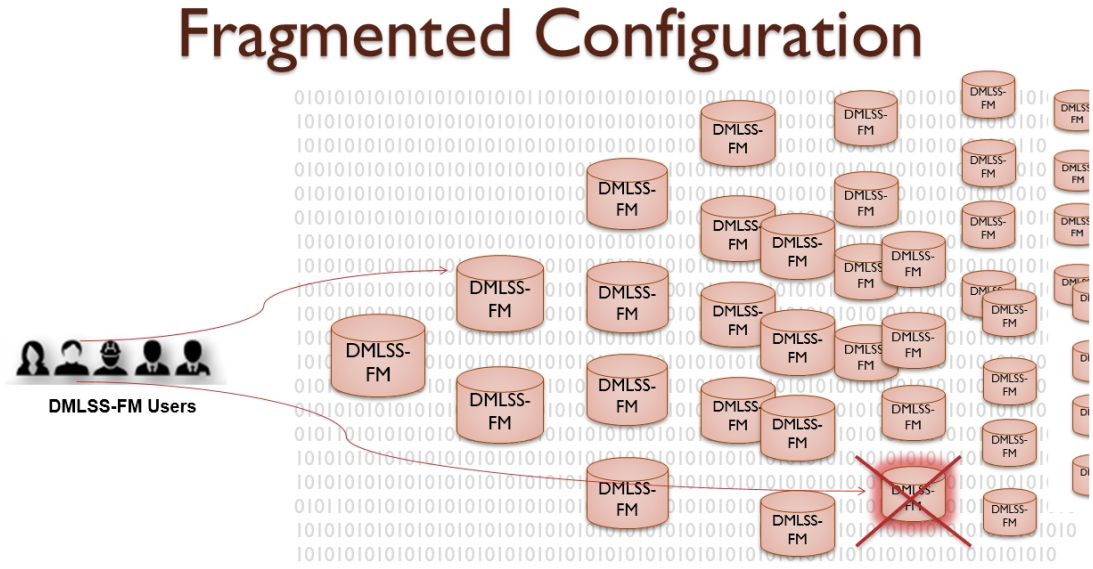


Figure 6: Fragmented Configuration

Monolithic Nature of the Overall DMLSS System and Development

Since DMLSS has been developed over the years to support a wide range of needs throughout MHS, the system's breadth of support also causes problems due to the monolithic nature and interdependencies. It becomes very difficult to add new functionality without taking into account these interdependencies. Since DMLSS FM is centered specifically on facility data such as spaces and equipment other functionality of DMLSS that needs to reference facility data to identify location is dependent on DMLSS FM data.

Risks

As new functionality is needed in DMLSS FM it has become increasingly difficult to scale over time. This risk will increase over time if the current architecture of DMLSS FM is maintained.

Lack of GIS Support

Related to the lack of Total Asset Visibility, DMLSS-FM does not have support for GIS data related to the medical facility locations. One would have to know the name of the site or the Site Code in DMLSS-FM to look up a specific location.

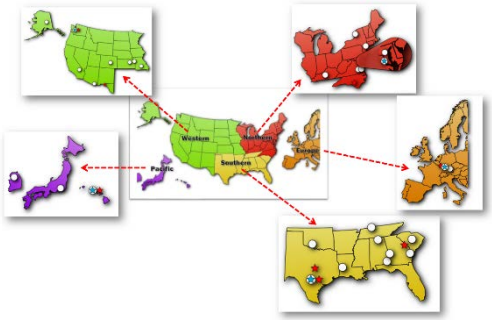


Figure 9: GIS to support total asset visibility

Lack of GIS also means the facility data could not even be layered with publicly available GIS such as weather information for analysis or decision making.

Having facility information available in GIS enables rapid feedback and analysis. It would also show which facilities and the kinds of medical procedures & support that might be compromised in incidents such as natural disasters. GIS capabilities within DMLSS-FM would enable better disaster preparedness. The amount of GIS data that can be generated rapidly, even though crowd-sourced means have dramatically increased with the rise of mobile devices within the last 5 years. It would be a missed opportunity to not have DMLSS-FM be able to leverage this kind of information in real-time if needed.

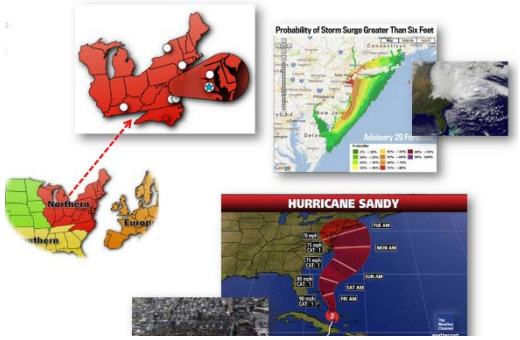


Figure 8: Layer other data in GIS such as weather

Lack of full BIM Support

Draw Base provides a user interface for floor plan views of a facility. It also provides the capability to link equipment data to the spaces within the facility. This is very similar to the functionality of CAD with some additional data management features (similar to Autodesk's Architectural Desktop, now known as AutoCAD Architecture).

This however, is very different from having a BIM of the facility. The BIM provides a more integrated, comprehensive view of the facility (as opposed to stacking 2D plans). It also provides a better means to attachment the pertinent data related to the various building systems that require on-going maintenance and support the minimum data requirements described in the **MHS Facility Life Cycle Management (FLCM) Building Information Modeling (BIM) Minimum Requirements**

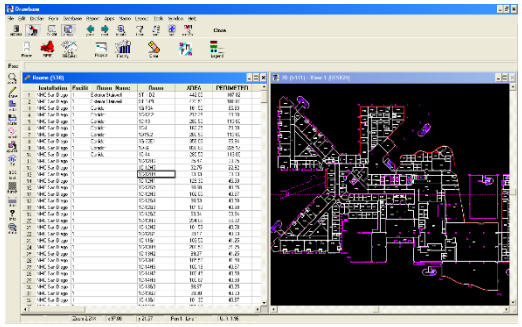


Figure 10: Drawbase

5.0 Government Initiatives

Government Initiatives to Improve Overall Data Management

Figure 12: "Building a 21st Century Platform to Better Serve the American People

A multitude of Executive Orders and initiatives from the Office of Management and Budget (OMB) seek to encourage a more streamlined, transparent execution of data management while employing an effective use of the web. This DMLSS-FM Roadmap acknowledges these larger governmental goals and objectives, as well as pressures, and seeks to use this opportunity to address some of these overarching and overlapping ambitions.

It is understood some of the issues raised by these government studies and initiatives maybe be addressed with a technological resolution or a business and workflow process or a combination of both. This roadmap aims to explore opportunities to address the larger strategic aspirations delineated in these initiatives while focusing on pragmatic steps towards adding value to the current DMLSS-FM users and the potential beneficiaries of the data contained in this system.

See Appendix A for more details.

DOD IT Enterprise Strategy and Roadmap

There are also specific DoD efforts that relate to the overall data architecture that informs the DMLSS-FM Roadmap. The images on the following pages illustrates these directives. They include:

- DoD IT Enterprise Strategy and Roadmap
- DoD Modernization

Figure 11: Government Initiatives towards better data management

- DOD Cloud Computing Strategy (July 2012)
- DoD BCL

Government Initiatives

DoD IT Enterprise Strategy and Roadmap

DoD IT User Base

- 1.4 million active duty
- 750,000 civilian personnel
- 1.1 million National Guard and Reserve
- 5.5+ million family members and military retirees

Total IT Budget

- $ 37 billion
- $10 billion in Infrastructure

Area of Support

- 146 + countries
- 6,000 + locations
- 600,000 + buildings and structures

IT Systems

- 10,000+ Operational systems (20% mission critical)
- 772+ Data Centers
- 67,246 Servers
- 7+ million computers and IT devices

"DoD information environment is overly complex and susceptible to exploitation through these myriad devices, systems, and standards by malicious actors intent on causing harm to national interests."

Figure 13: DoD IT Enterprise Strategy and Roadmap

Government Initiatives

DoD IT Enterprise Strategy and Roadmap

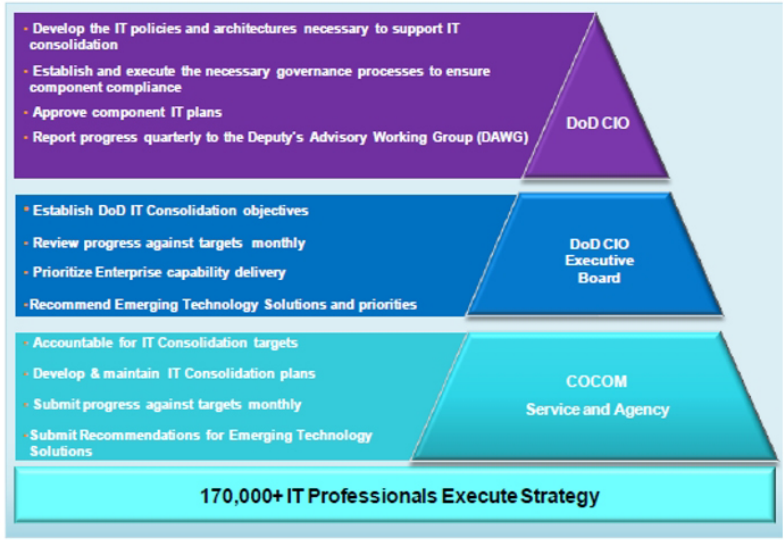


Figure 4-2: DoD IT Enterprise Governance Framework

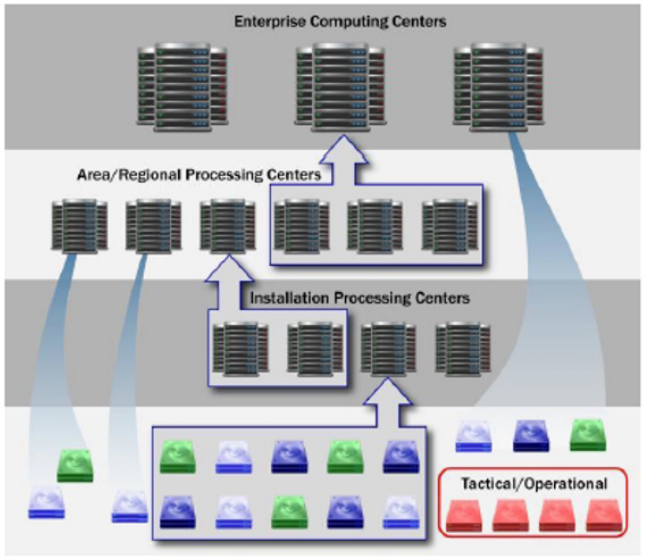


Figure 5-3: DoD Computing Center Consolidation Approach

Initial DoD plans will result in—

- 32% reduction in data centers
- 30% reduction in racks
- 25% reduction in servers

DoD plans to further reduce the number of data centers to 428 by FY15 (32% reduction from FY10)

Figure 14: DoD IT Enterprise Strategy and Roadmap

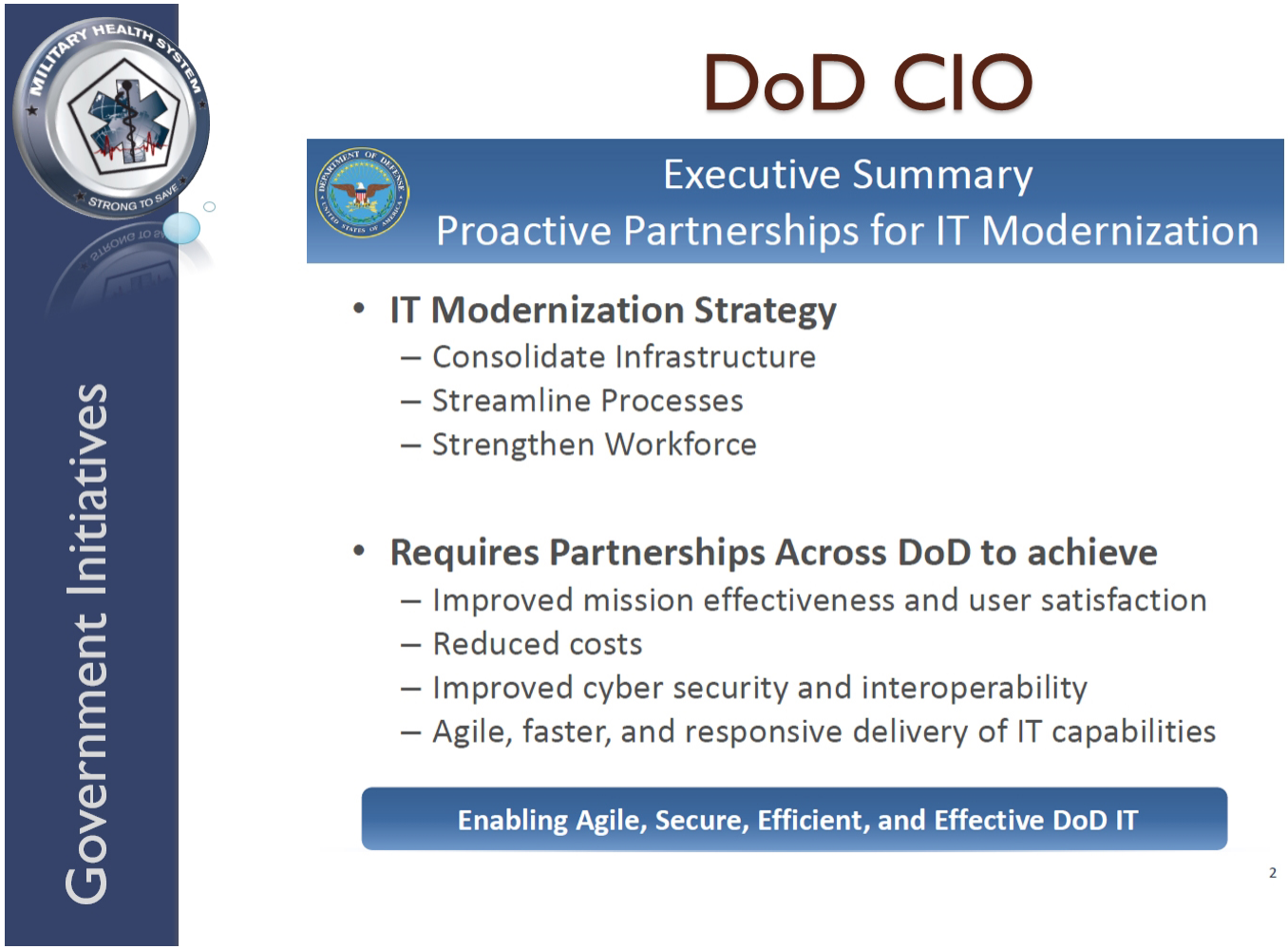


Figure 15: IT Modernization Executive Summary

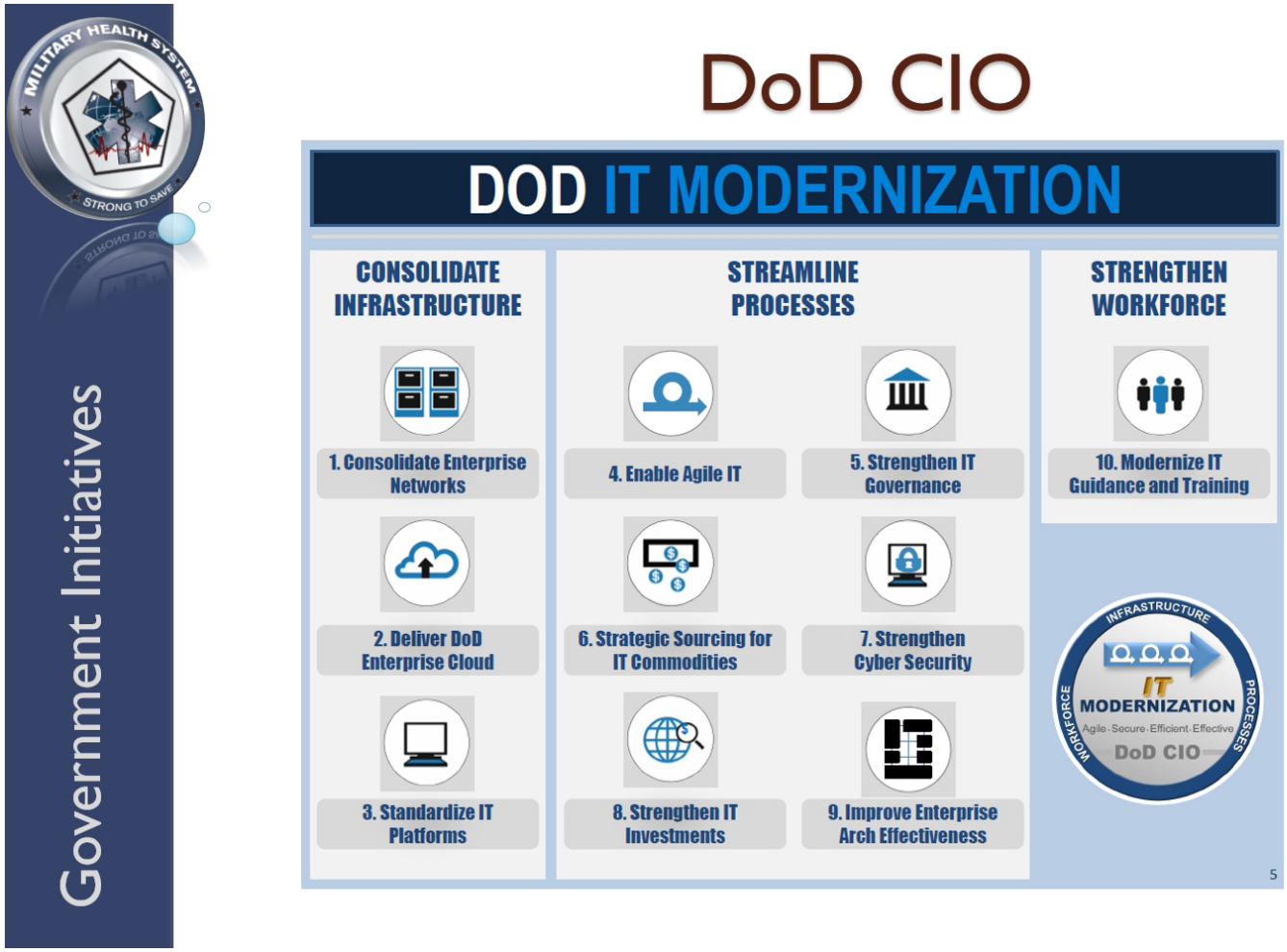
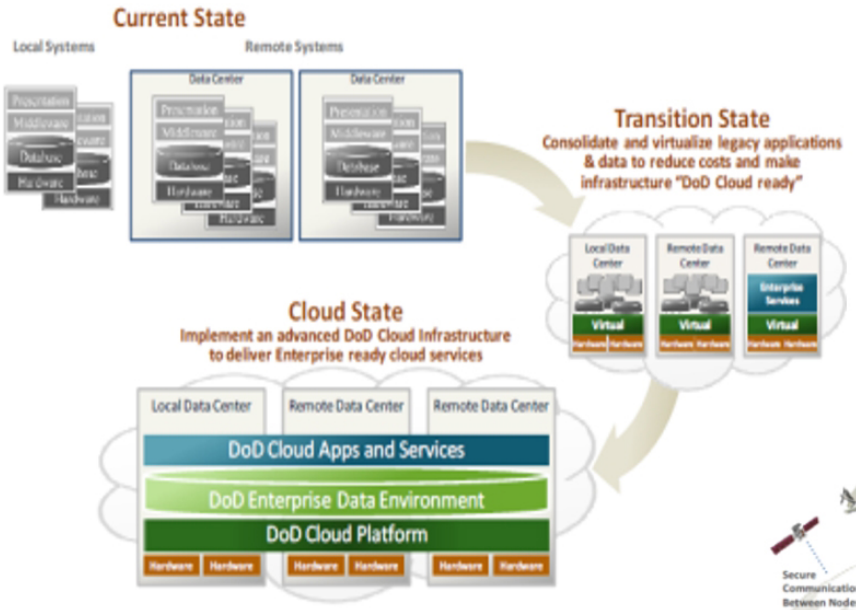


Figure 16: DoD IT Modernization

Government Initiatives

DoD Cloud Computing Strategy July 2012



DoD CIO: "implement cloud computing as the means to deliver the most innovative, efficient, and **secure** information and IT services in support of the Departments mission, anywhere, anytime, on any authorized device."

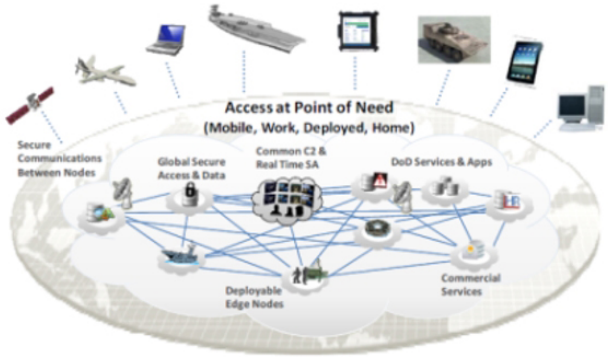
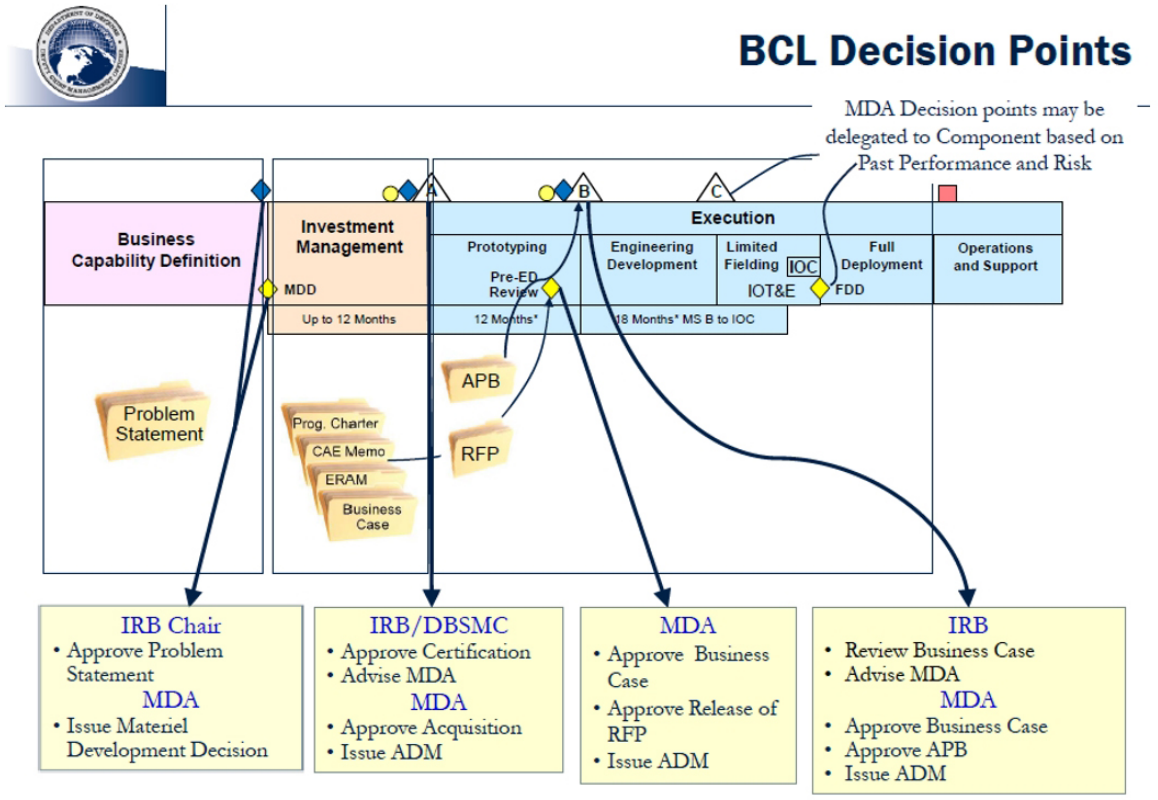


Figure 1: DoD Enterprise Cloud Environment

Figure 17: DoD Cloud Computing Strategy (July 2012)

Government Initiatives

DoD BCL



DMLSS-FM needs to be updated in DITPR, plan for BEAV10, and plan to follow the BCL process

Figure 18: DoD BCL

Government Initiatives – Direct DMLSS Impact

In addition to the general government initiatives to improve data management, there is a multitude of DoD initiatives directly or indirectly impacting DMLSS-FM

- Enterprise Energy Information Management (EEIM)
- Advanced Meter Infrastructure (AMI) Smart Meters
- Risk Management Framework for Cybersecurity to replace the Defense Information Assurance and Accreditation Process (DIACAP)
- Implement Continuous Commissioning of buildings to keep them in peak operating efficiency

Within DoD, there are several initiatives underway as required by legislation and executive order that are likely to have a direct or indirect impact on the DMLSS-FM module. The first initiative is the Enterprise Energy Information Management (EEIM) capability, the second is the installation of Advanced Meter Infrastructure (AMI) Smart Meters, the third is the adoption of the Risk Management Framework for Cybersecurity to replace the Defense Information Assurance and Accreditation Process (DIACAP), and the last is to implement Continuous Commissioning of buildings to keep them in peak operating efficiency.

Figure 19: Smart Meters

EEIM will provide the services and DoD the ability to capture, monitor, and report in near real time, the energy and water consumption at the installation and building level. The EEIM capability was formalized in FY 2012 with an implementation plan to have the full capability by 2015. The EEIM Functional Requirements were published in July 2012 and the services and vendors of CMMS and CAFM software are in the process of evaluating the data elements and information flows. As a tenant on a military installation, TMA may need to incorporate the EEIM capability into DMLSS, or may be able to use the host EEIM system.

The AMI Smart Meters provide the real time capability to measure and report the energy and water consumption at the building level. The Navy has made substantial progress installing and getting the meters connected to a Meter Data Management (MDM) system, as they had a separate network in place to use for these devices. The Army and Air Force were initially denied the authority to connect and operate as they used the NIPR net and the devices did not meet the information assurance DIACAP security standards. TMA and DMLSS-FM may need to account for the meters as Real Property Installed Equipment (RPIE); the entity (host or tenant) that accounts for the meter and connects to the MDM will likely be responsible for the full EEIM capability.

The EEIM and AMI are part of the larger federal government and private sector efforts to build the Smart Grid, which will enable two way energy flows, and energy to be produced or stored at the building level. To make the Smart Grid a reality and to enable DoD to connect to the next generation power and IT networks, DoD has begun the adoption of the NIST Risk Management Framework (RMF), with

implementation scheduled for early 2013. EEIM, AMI and other Operational Technologies (called platform IT by DoD) controls systems must now meet the full set of security controls as IT systems. As stated in DoDD 8500 Cybersecurity Directive, Enclosure 3, "Examples of platforms that may include PIT are:

"weapons, training simulators, diagnostic test and maintenance equipment, calibration equipment, equipment used in the research and development of weapons systems, medical technologies, vehicles and alternative fueled vehicles (e.g., electric, bio-fuel, Liquid Natural Gas that contain car-computers), buildings and their associated control systems (building automation systems or building management systems, energy management system, fire and life safety, physical security, elevators, etc.), utility distribution systems (such as electric, water, waste water, natural gas and steam), telecommunications systems designed specifically for industrial control systems to include supervisory control and data acquisition, direct digital control, programmable logic controllers, other control devices and advanced metering or sub-metering, including associated data transport mechanisms (e.g., data links, dedicated networks)."

NIST refers to the Platform IT control systems as Industrial Control Systems (ICS), and requires an Overlay to be developed by each organization to secure the systems. To meet this new requirement, the EEIM Working Group established an Information Risk Management Technical Working Group and created the first ICS-PIT Overlay, with formal submission to the Committee for National Security (CNSS) scheduled for early 2013 and approval and implementation beginning in spring 2013. A key part of the security controls is to conduct an inventory of all IP enabled systems and devices. It is anticipated that the inventory can be kept in the CMMS or CAFM software.

TMA and the DMLSS-FM module may need to have additional data elements added to maintain the ICS devices IP addresses and other metadata information.

Lastly, the new generation of High Performance Green Buildings (HPGB's) must now be operated and maintained to maintain peak efficiency. The HPGB Federal Personnel Training Act requires the staff to maintain their credentials on the Facility Institute Management website (www.fmi.gov). Each building is tracked and monitored using the Real Property Unique Identifier (RPUID). The EEIM, AMI and O&M staff will use Continuous Commissioning to ensure the building stays within the design and operating parameters.

TMA and the DMLSS-FM module may need additional data elements and capabilities such as RFID and bar code scanning, tied to a real time Energy Management System (EMS) and the Building Automation System (BAS), to be able to provide the Continuous Commissioning capability.

Enterprise Energy Information Management

Energy consumption and production data tied to real property asset information. Allows for:

- Energy efficiency awareness throughout the entire organization
- Trend analysis and benchmarking at the asset level
- Identifying opportunities for energy use/production improvement

- Tracking progress against goals near-real time
- Measuring energy projects performance

Energy audit findings allows for:

- Tracking and managing status of energy efficiency projects and projected savings
- Documentation and prioritization of needed energy efficiency potentials

Renewable Energy (RE) feasibility analysis & project tracking allows for:

- Identifying and tracking RE opportunities
- Managing status of project implementation
- Measuring performance

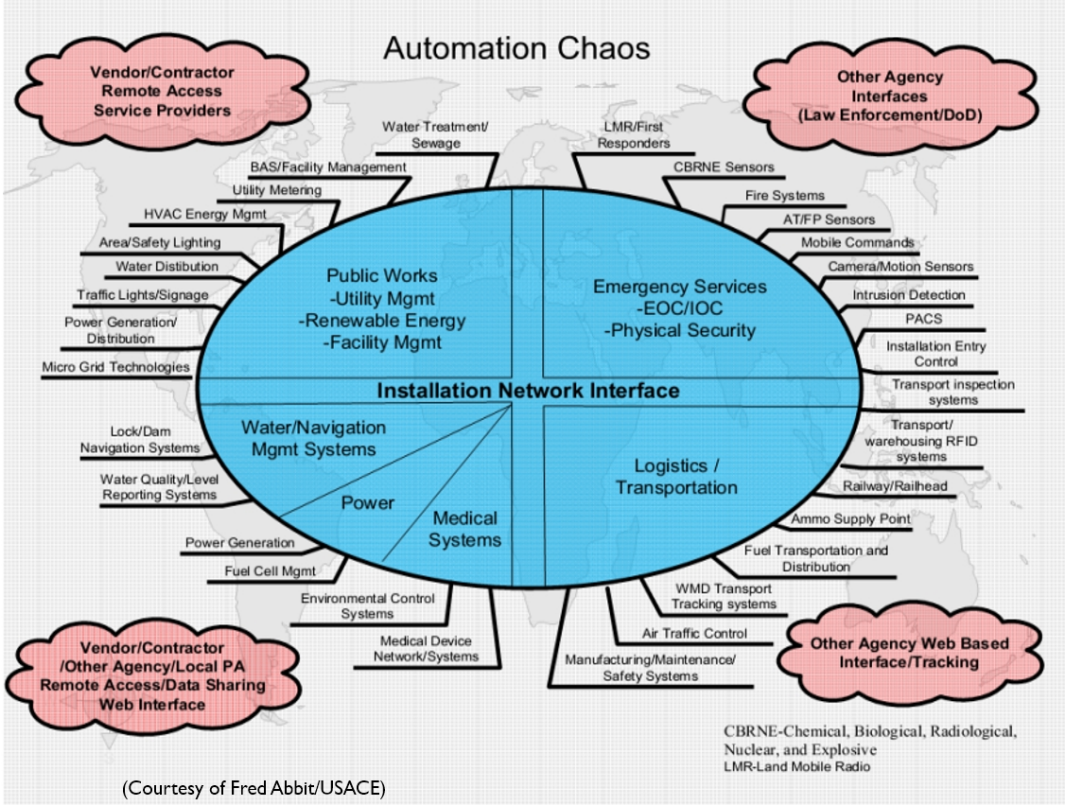


Figure 20: Automation Chaos

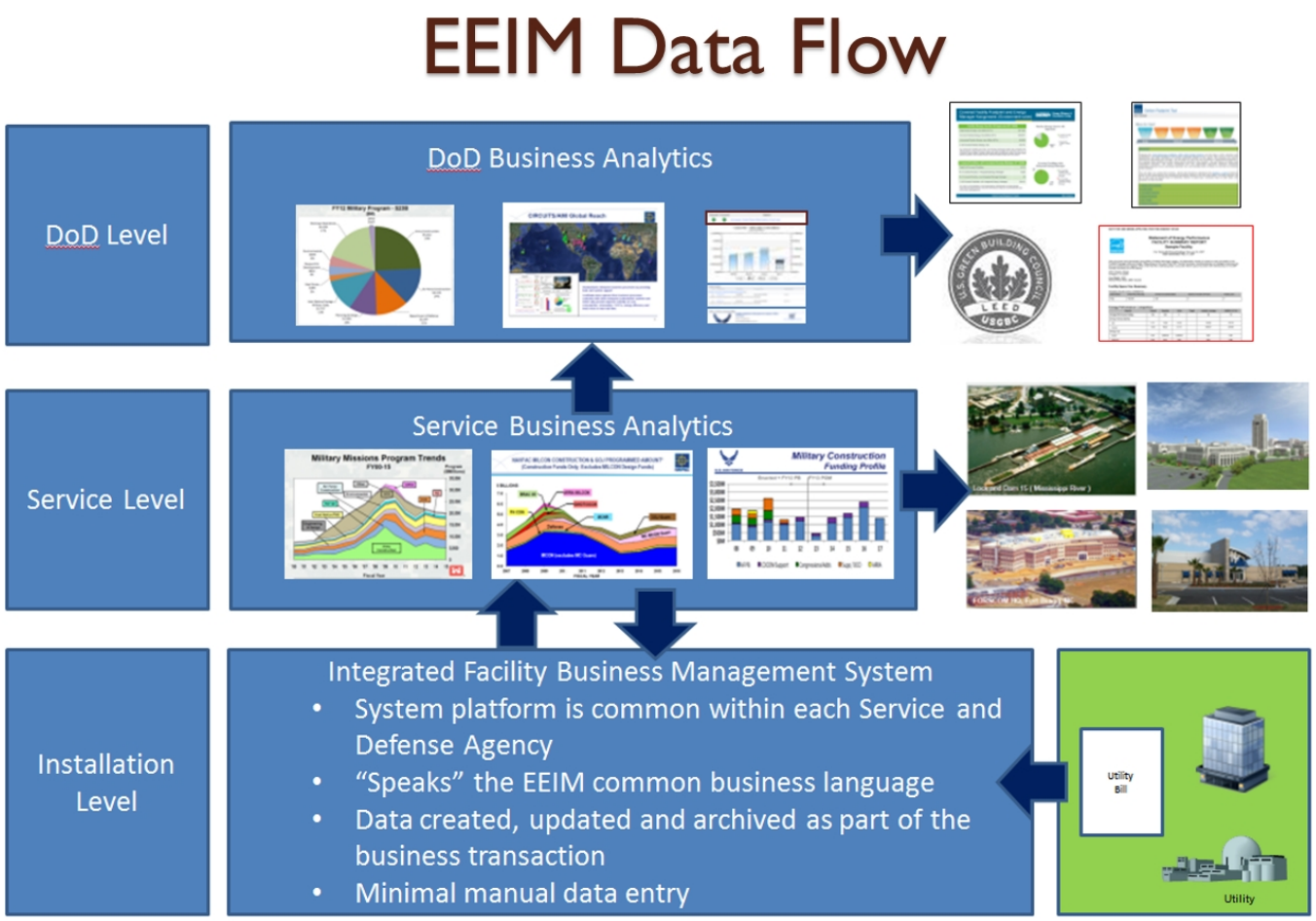


Figure 21: EEIM Data Flow

EEIM Phasing Approach

Phase	Description	Proposed Timeline
I – Data Standardization & Integration of Current Processes	1. Site-level energy use data based on estimates or utility bills 2. Tie/integrate energy use and production data with authoritative real property site information 3. Identify renewable energy potential by real property site 4. Identify energy audit and project (conservation and renewable) information by real property asset and site, respectively	October 2011 – October 2013
II – Partial Asset Level Energy Use Information	1. Asset level energy use data from existing meters 2. Automate capturing utility provider invoice information 3. Tie in weather information to energy data to enable analytics 4. Geo-enable site-level energy use/production information	TBD
III – Full Automation of Asset Level Energy Use Information + Enhanced Analytics	1. Metered asset level energy use data using AMI 2. Complete EEIM capability implementation	TBD

Figure 22: EEIM Phasing Approach

DMLSS Exhibit 300 & Needs

DMLSS-FM is in the IT spend, but needs additional enhancements to meet legislative and Executive Order requirements:

- EPAct 2005
- EISA 2007
- NDAA 2010
- NDAA 2012
- EO 13323
- EO 13514

EXHIBIT 300 UII 007-000000613

Exhibit 300: Capital Asset Summary
Part I: Summary Information And Justification (All Capital Assets)

Date Investment First Submitted: 2009-06-30
Date of Last Change to Activities: 2012-01-30
Investment Auto Submission Date: 2012-02-23
Date of Last Investment Detail Update: 2012-02-23
Date of Last Exhibit 300A Update: 2012-03-13
Date of Last Revision: 2012-07-20

Agency: 007 - Department of Defense Bureau: 97 - Department of Defense Agencies

Investment Part Code: 01

Investment Category: 00 - Agency Investments

1. Name of this Investment: Defense Medical Logistics Standard Support

2. Unique Investment Identifier (UII): 007-000000613

1. **Provide a brief summary of the investment, including a brief description of the related benefit to the mission delivery and management support areas, and the primary beneficiary(ies) of the investment. Include an explanation of any dependencies between this investment and other investments.**

Defense Medical Logistics Standard Support (DMLSS) program provides the Military Medical Departments (Army, Navy, and Air Force MilDeps) one standard Department of Defense (DoD) medical logistics system. The DMLSS suite of applications provides the healthcare driven capability to support the medical logistics needs of the DoD community for critical medical commodities - pharmaceuticals and medical/surgical supplies across the continuum of care from the battlefield to tertiary care at a major DoD medical center. This capability is enabled by the partnership of the Defense Logistics Agency (DLA) Defense Supply Center Philadelphia and the Military Health System providing an industry to practitioner supply chain for the medical commodity. The DMLSS Defense Logistics Agency Wholesale (DMLSS-W) applications are funded by Defense Logistics Agency while the garrison medical treatment facilities and theater applications are funded by the Defense Health Program. The current DMLSS system provides full spectrum capability for medical logistics management. Basic functionality includes stock control, Prime Vendor operations, preparation of procurement documents, research and price comparison for products, property accounting, biomedical maintenance operations, capital equipment, property management, inventory, and a facility management application that supports the operations of a fixed medical treatment facility physical plant and supports Joint Commission on the Accreditation of Healthcare (JCAHO) accreditation requirements. DMLSS, in coordination with the Theater Medical Information

Page 1 / 9 of Section300 Date of Last Revision: 2012-07-20 Exhibit 300 (2011)

Figure 24: Exhibit 300 Capital Asset Summary

Technology Advancement: Smart Meters

- Meters use the IP network
- Integrate with the utility billing and payment systems
- Have Cat 5/6, wireless and infrared ports connections
- Mobile devices used for O&M

Washington Post July 11, 2012

Tridium's driving technology, 4 million lines of software code called the Niagara Framework, is a marvel of innovation. With the click of a mouse, Niagara enables plant managers to view video streams, high-rise superintendents to operate air conditioners and elevators, security officials to track personnel inside U.S. military facilities, and nurses to monitor medical devices in hospitals.

At least 11 million devices and machines in 52 countries, including security and surveillance systems in homes, have been linked to the Internet through Niagara, most of them in the past two years.

Figure 23: technology Smart Meters

DoD Mobile Device Strategy May 2012

DoD CIO: "Our challenge today is ensuring our networks can securely support the information demands of our users – user who requires access to information anywhere and anytime across the DoD Information Enterprise"

DoD I&E community has/uses millions of mobile devices, and this is only the beginning; infrastructure systems are currently a mix of analog and digital, but becoming more digital (bar code, RFID's, scanners, Smart Meters, etc.)

Figure 25: DoD Mobile Device Strategy (May 2012)

Securing the New Paradigm

Defense Information Assurance and Certification and Accreditation Program (DIACAP)

- Intended primarily for Business and IT systems
- Inconsistent application to Platform IT systems; tactical weapons, medical equipment, industrial control systems, etc.
- Required significant time and cost, recertification every 3-5 years
- DoD unique, not compatible with Smart Grid integration

Risk Management Framework (RMF)

- Intended primarily for Business and IT systems
- Consistent application to Platform IT systems; tactical weapons, medical equipment, industrial control systems, etc.
- Continuous monitoring and extended certification
- All federal agencies use
- Enables Smart Grid interoperability

Installations & Environment Key Drivers

Legislation and Executive Orders

- EPAct 2005, EISA 2007, NDAA
- EO 13423, EO 13514

Key Driver – FY12-16 Defense Planning and Programming Guidance:

- "(U)The Secretaries of Military Departments and the Directors of Defense Agencies will:"
- "(U) Provide detailed plans to meet facilities energy management mandates, beginning in FY12, including milestones and programmatic details, … should address … establish(ing) energy information management systems …"

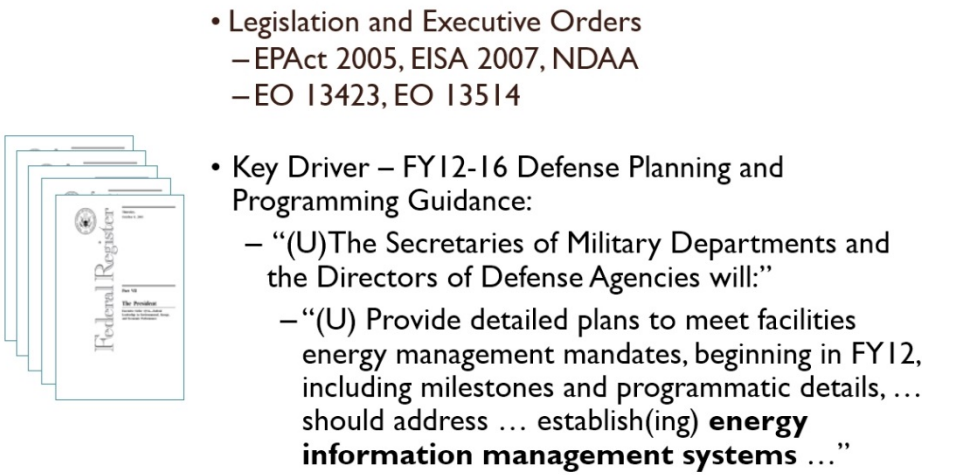


Figure 26: Installations & Environment Key Drivers

Operational Technology (OT)

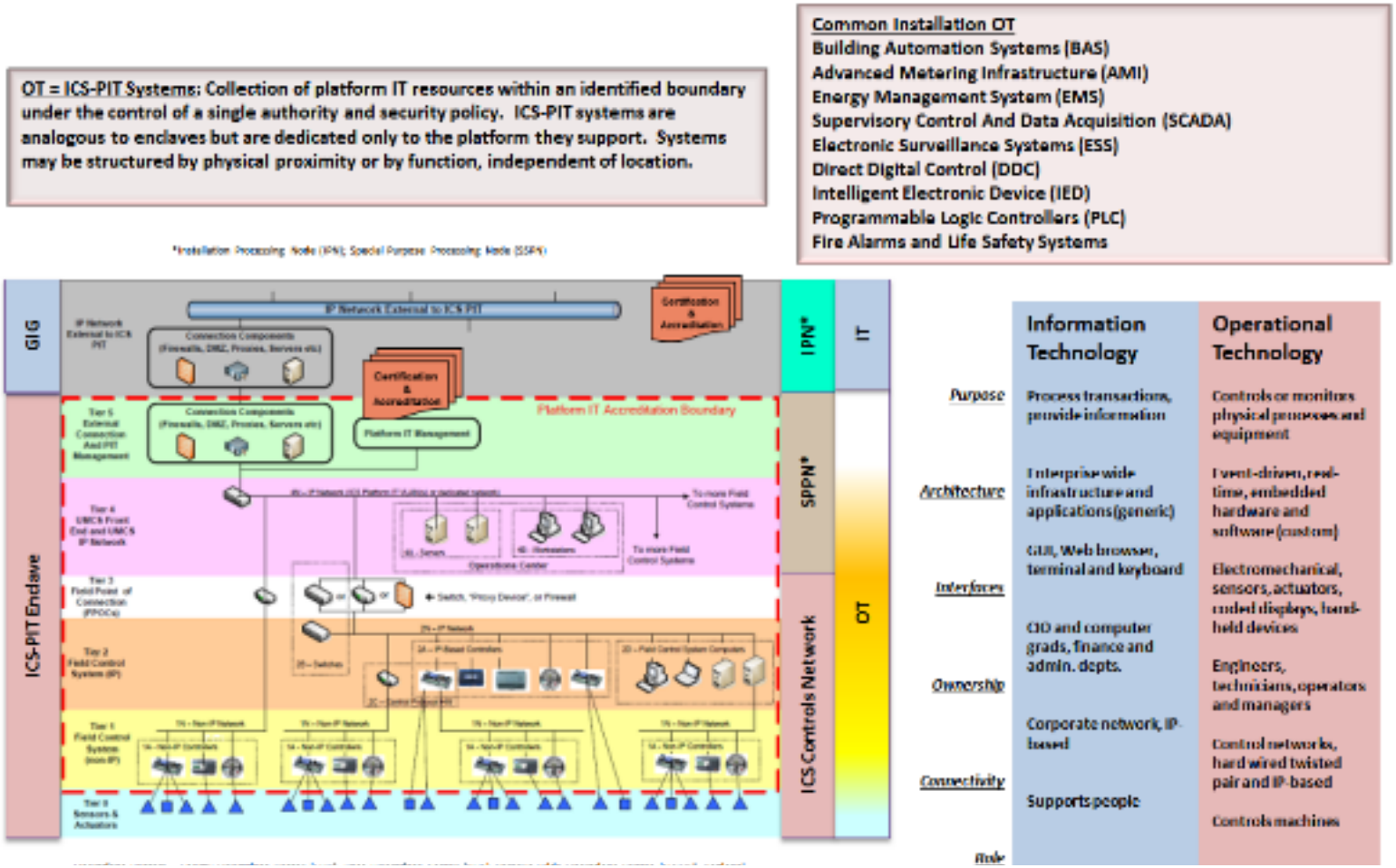


Figure 27: Operational Technology

6.0 DMLSS-FM 5 Year Roadmap

Web-Based Solution

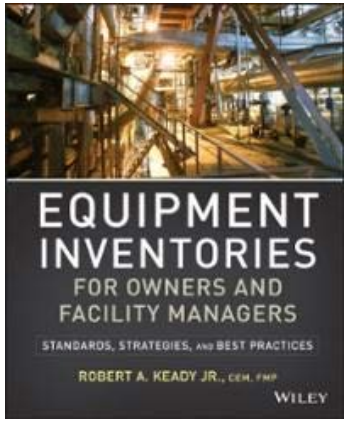
Facility data not only plays a critical role in Facility Management, but it is an essential component of the entire FLCM process. Currently, the data that is stored in DMLSS-FM is not easily leveraged for other phases such as Strategic Management and Requirements Planning. The number of people that could benefit from having access to this data outnumber the current community of people who actively use DMLSS-FM. This concept of "enter once, reuse many times" can be applied towards the larger MHS community that could be beneficiaries of having total asset visibility for the entire inventory of medical facilities.

Figure 28: DMLSS-FM Development Milestones

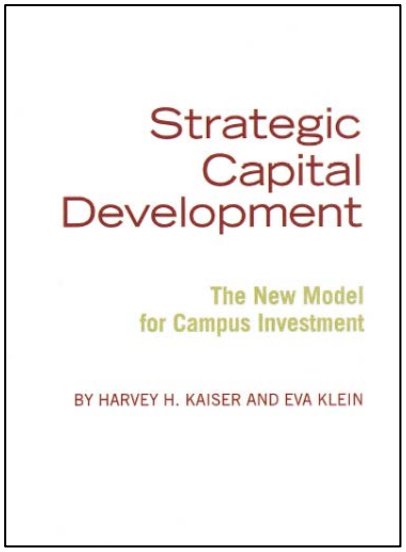
Data Standards and Best Practices

There has been a great deal of research and work effort completed in the Facility Management industry related to data management. Much of these standards and best practices are published and publicly available. This aligns with developing a future DMLSS-FM.

The key to maintaining a relevant data system is to plan ahead and structure the information so it is normalized and consistent across the enterprise. Some good references for this effort can be found in the following sources.



Equipment Inventories for Owners and Facility Managers: Standards, Strategies and Best Practices (by Robert Keady)



Strategic Capital Development - The New Model for Campus Development (by Harvey H. Kaiser and Eva Klein)

In addition to these published sources, good resources for keeping current on emerging industry standards is

- Whole Building Design Guide (WBDG)
- buildingSMART.

Information Security Issues

The DMLSS application suite is categorized as a DoD Business Information System, and as such, is required to meet the Information Assurance/Cybersecurity requirements of DODI 8500.01 and 8510.01. The 8500 series documents are currently in final draft and the DoD CIO is adopting the National Institute of Standards and Technology (NIST) Risk Management Framework (RMF) and sun setting the Defense Information Assurance and Accreditation Process (DIACAP). The RMF is expected to be implemented in the Fall 2013, with a period of overlap time with DIACAP to allow the new authorization process to be phased in as systems come up for Certification and Accreditation (C&A) renewal or for new systems first submission. The adoption of the RMF is part of the DoD CIO IT Enterprise Strategy and Roadmap.

In addition to adopting the RMF, the CIO has undertaken an aggressive effort to consolidate servers and data centers, as required by legislation and Executive Orders. The DMLSS servers will eventually be consolidated into Defense Enterprise Computing Centers (DECC) and/or Regional Computing Centers. As part of the consolidation, the CIO and Defense Information Systems Agency (DISA) are significantly enhancing the infrastructure and network capabilities, to include deployment of a 10 Gigabit Ethernet and the Virtual Desktop Interface (VDI) environment.

The DMLSS-FM capability should be prepared for the shift in operating locations, connectivity, and use of VDI at host sites that will operate in Cloud environments. The DMLSS suite will need to be reauthorized using the RMF within the next 2 years. As part of the reauthorization, the system will need an assessment. The DoD, as a member of the Committee for National Security Systems (CNSS), is required to use the NIST RMF and the CNSS 1253 Security Categorization and Control Selection for National Security Systems.

Two executive orders issued in February 2013 direct NIST and DOD to support the development of Critical Infrastructure Cybersecurity efforts. The DMLSS-FM module contains Critical Infrastructure information, and potentially cross domain interfaces (i.e., Advanced Meters/Smart Meters, Utility Billing, and Accounting systems) that will present information security challenges. The DMLSS-FM module could be used as a Pilot Test with the RMF and the DHS Cybersecurity Evaluation Tool (CSET). The CSET has the entire compendium of NIST, DoD and CNSS publications and standards and is used to conduct the self-assessment, develop the Architecture and supporting artifacts, and assist in the creation of the DoDI 8500 submission packages. The tool will require User Training, and a cross-discipline group from TMA, CIO, and I&E to develop the Workforce training materials. The pilot could then be expanded to the larger DMLSS suite.

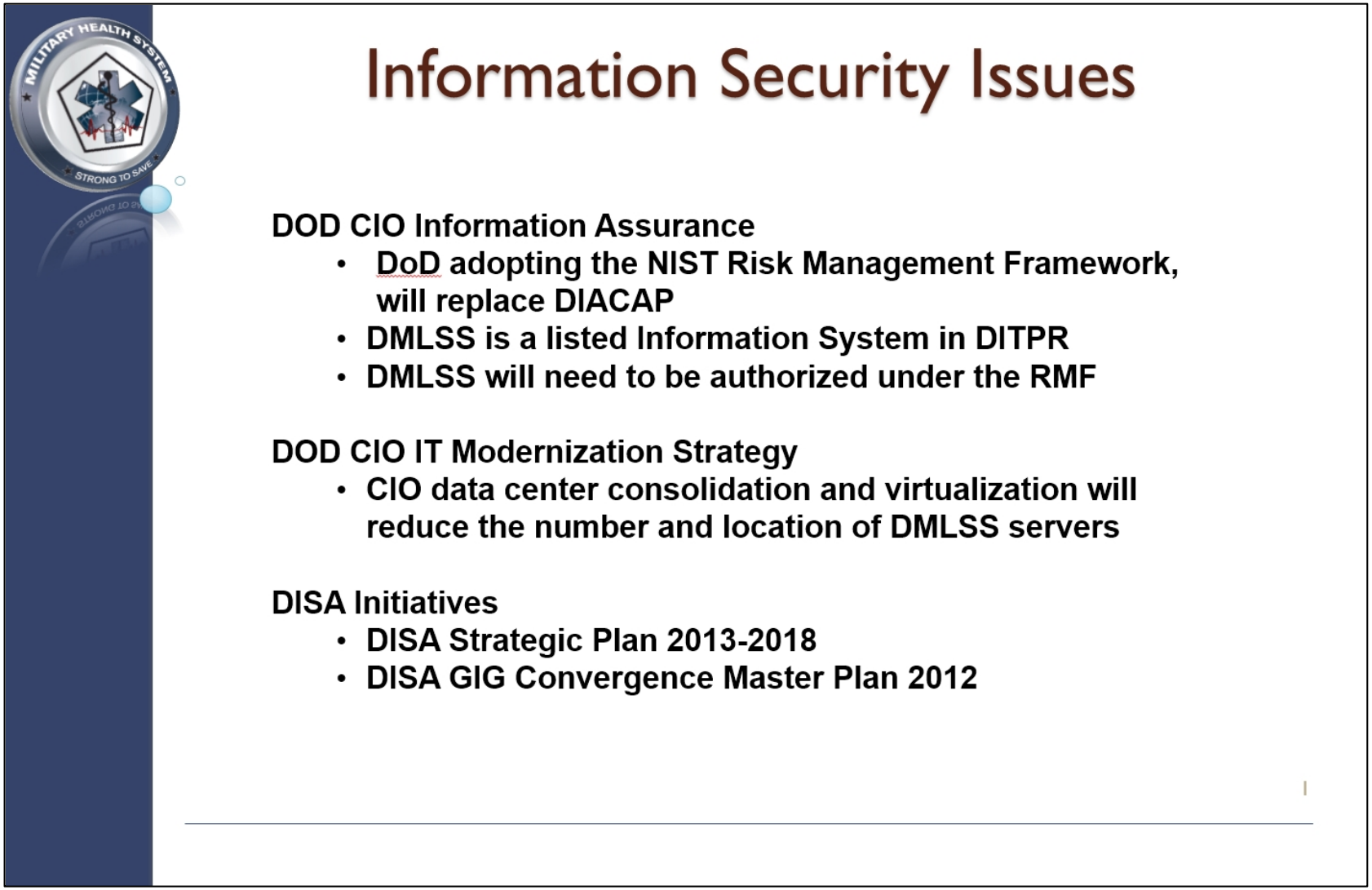


Figure 29: Information Security Issues

DoD CIO: Adopting NIST RMF

- Information Assurance (IA) is already embedded throughout DoD's acquisition and capabilities development life-cycles
- NIST SP 800-37 risk management framework aligns closely with the *existing* DIACAP process
- Primarily changes in terminology
- Goal is minimal impact to programs in pipeline
- Risk Management Framework implemented via the DIACAP Knowledge Service and DoDD/I updates

National Institute of Standards and Technology – develops standards for government and industry; focus of 2 new Executive orders for Critical Infrastructure
Low, Moderate, High "Impact" vs. "Mission Assurance Category" 1, 2, 3
Continuous Monitoring replaces 3yr Recertification

Figure 30: DoD CIO: Adopting NIST RMF

IT Security Objectives

- Objectives for securing any IT
  - Confidentiality (i.e., unauthorized disclosure of info)
  - Integrity (i.e., unauthorized modification or destruction of info)
  - Availability (i.e., disruption of access to or use of info or an information system)
- Assess impacts for each objective based on information system and information type
  - Low (loss has limited adverse effect on operations, assets, or individuals)
  - Moderate (loss has serious adverse effect on operations, assets, or individuals)
  - High (loss has severe or catastrophic adverse effect on operations, assets, or individuals)

DMLSS-FM contains Critical Infrastructure information, Moderate Impact

Figure 31: IT Security Objectives

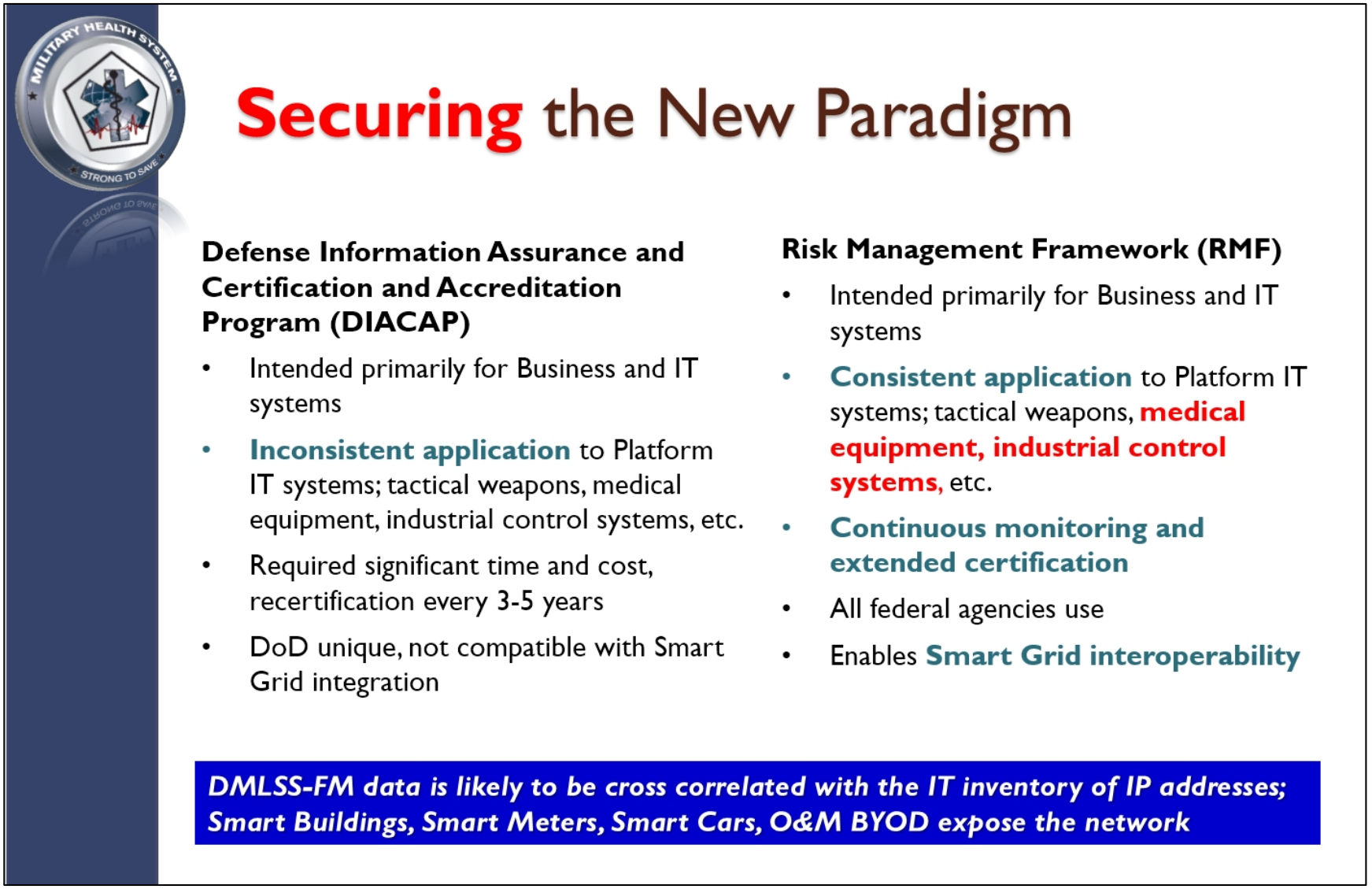
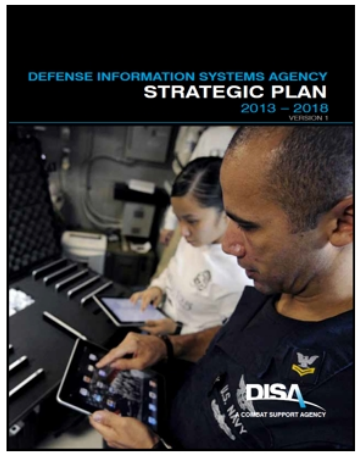


Figure 32: Securing the New Paradigm

DISA Strategic Plan

DISA Strategic Plan 2013-2018

- Global Defense Posture
  - ❑Remain Focused on "The Fight"
  - ❑Rebalancing of Forces/Shift to Asia-Pacific
- Cyber Command and Control (C2)
  - ❑Defensive Cyber Operations (DCO)
  - ❑DoD GIG Operations (DGO)
- DoD Joint Information Environment (JIE) Synchronization
  - ❑Enabling the JIE Vision
  - ❑JIE Technical Synchronization Office (JTSO)
- DoD Cloud Services
  - ❑Cloud Broker
  - ❑Cloud Infrastructure/Services



DMLSS-FM will have faster network connection speed, in a Cloud environment

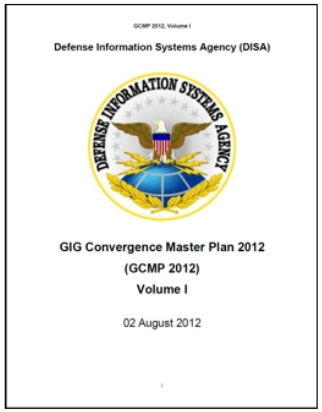
Figure 33: DISA Strategic Plan

DISA GIG Convergence Master Plan

Long-term objectives:
1. Move to a commercial-government hybrid cloud computing environment with DoD retaining the identity provider role.
2. Improve service interoperability across core, intermediate and tactical edge environments.

Mid-term objectives:
1. Develop feasible methods, when using commercial cloud service providers, which protect data in transit and at rest, authenticate users, and apply appropriate access controls.
2. Provide virtual container technologies supporting secure unclassified operating environments on a wider variety of approved end-user devices.
3. Extend the DoD platforms to provide services for coalition enclaves.

Short-term objectives:
1. Provide a more efficient and capable set of common user services and platform services through consolidation of infrastructure and existing software licenses already purchased by DoD components.
2. Provide two private clouds: an unclassified DoD Platform, and a classified DoD Platform.
3. Improve end-user device access by migrating end-user applications to a web based interface and migrating end-users to a Virtual Desktop Interface (VDI) environment.



DMLSS to be in a Virtual Desktop Interface environment

Figure 34: DISA GIG Convergence Master Plan

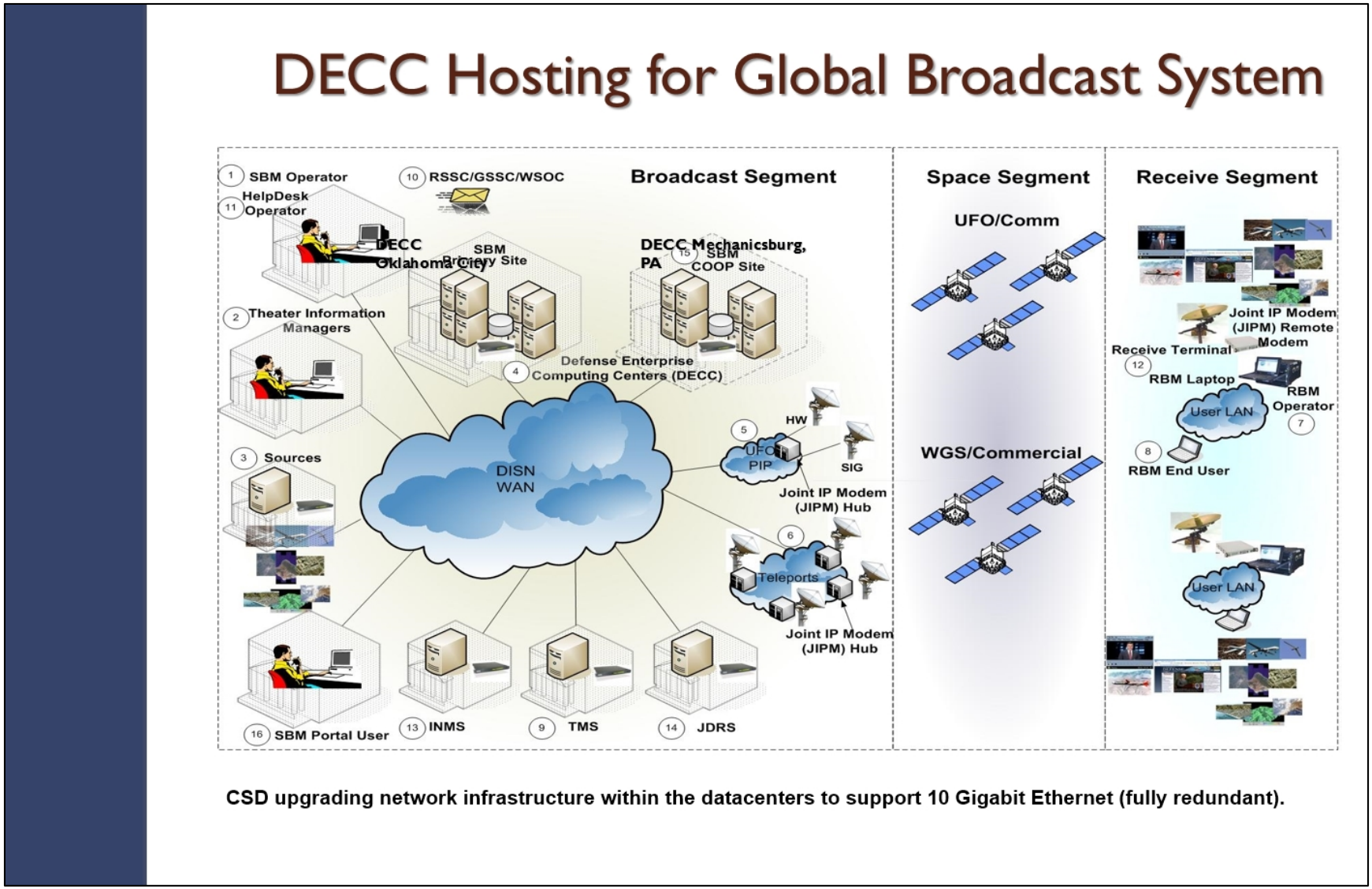


Figure 35: DECC Hosting for Global Broadcast System

Enterprise Data Center Types

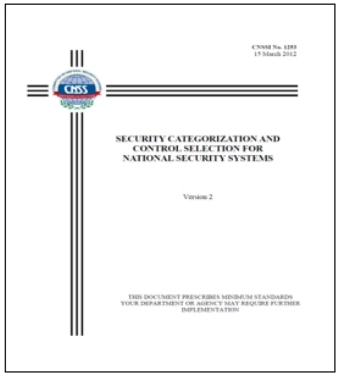
DC Type	Definition
Core Data Center (CDC)	A fixed DoD data center meeting DoD standards for facility and network infrastructure, security, technology, and operations and adhering to enterprise governance under a "franchise" model. CDCs provide access outside the DoD environment.
Installation Processing Node (IPN)	A fixed DoD data center serving a single DoD installation with local services that cannot be (technically or economically) provided from a CDC. There will only be one IPN per DoD installation but each IPN may have multiple enclaves to accommodate unique installation needs (e.g. Joint Bases). IPNs will connect to the CDCs.
Special Purpose Processing Node (SPPN)	A fixed data center supporting special purpose functions that cannot (technically or economically) be supported by CDCs or IPNs due to its association with mission specific infrastructure or equipment (e.g., communications and networking, manufacturing, training, education, meteorology, medical, modeling & simulation, test ranges, etc.). No general purpose processing or general purpose storage can be provided by or through a SPPN. SPPNs will connect to the CDCs via IPNs.
Tactical/Mobile Processing Node (TPN)	Tactical/Mobile Processing Nodes will provide services similar to a CDC but optimized for the tactical or deployed environment. Depending upon the circumstances, TPNs will connect to the CDCs directly or via IPNs.

Figure 36: Enterprise Data Center Types

DoD CNSSI 1253 Security Controls

As part of the Joint Task Force Transformation Initiative Working Group, the Committee on National Security Systems (CNSS) has worked with representatives from the Civil, Defense, and Intelligence Communities to produce a unified information security framework and to ensure NIST SP 800-53 contains security controls to meet the requirements of National Security Systems (NSS).

As a result of these collaborative efforts, the Director of National Intelligence and the Secretary of Defense have directed that the processes and controls described in NIST SP 800-53 shall apply to all NSS. This means NIST SP 800-53 now provides a common foundation for information security controls across the U.S. Federal Government.



Security control overlays are specifications of security controls and supporting guidance used to complement the security control baselines and parameter values in Committee on National Security Systems Instruction (CNSSI) No. 1253 and to complement the supplemental guidance in NIST SP 800-53. Organizations select and apply CNSSI No. 1253 security control overlays by using the guidance in each of the standardized, approved and CNSS-published overlays.

Figure 37: DoD CNSSI 1253 Security Controls

Figure 38: DHS CSET with CNSSI 1253 Security Controls

Funding Issues

The Department of Defense budgets over $7 billion a year for business system investments. Section 901 of the Fiscal Year 2012 National Defense Authorization Act (FY2012 NDAA), now codified at Title 10 United States Code § 2222, included significant changes to the requirements for investment review and certification of defense business systems before funds, whether appropriated or non-appropriated, can be obligated. Continuing to build on existing statutory guidance that requires Business Process Reengineering (BPR) and alignment to the Business Enterprise Architecture (BEA), Section 901 requires the establishment of a single Investment Review Board (IRB) chaired by the DoD Deputy Chief Management Officer (DCMO) and an investment management process, consistent with section 11312 of Title 40. It also significantly expands the scope of systems requiring certification to include any business system with a total cost in excess of $1M over the period of the current future–years defense program, regardless of type of funding or whether any development or modernization is planned

To implement this new investment management process, the DCMO issued guidance to ensure that the Department continues to treat its business system investments with the firmness of purpose and discipline that will enable cost savings to be redirected to critical operational needs of the warfighter. The guidance, now updated annually, creates an Integrated Business Framework to align broad Departmental strategy with functional and organizational strategy, all the way to system implementations. This framework, utilizes new plans, called Functional Strategies and Organizational Execution Plans to help achieve the Department's target business environment. The guidance and implementing memoranda are included below.

Fiscal Year 2014 Guidance

- **DCMO Memorandum, Defense Business Systems Investment Management Process Guidance, April 8, 2013 (PDF)**
- **Defense Business Systems Investment Management Process Guidance, April 2013 (PDF)**
- **Organizational Execution Plan Presentation Template (PPT)**
- **Organizational Execution Plan Excel Template (XLS)**

The DMLSS-FM community should begin preparation for the creation of documentation and submission package with the Functional Strategy and the Organizational Execution Plan using the Business Enterprise Architecture (BEA) 10.0.

The DMLSS suite will need to have continuing software development and support, and must be accounted for in the Defense Information Technology Portfolio Repository (DITPR), and the Select and Native Programming Information Technology System (SNaP-IT) for budgeting and accountability. The DMLSS suite requires the identification of the Research, Development, Test and Evaluation (RDT&E) accounts that will be used to pay for the development support. In 2013, the DoD released the Business Enterprise Architecture 10.0, which is the process used to submit projects for funding. DMLSS as a whole falls into several areas, but the DMLSS-FM module is part of the Real Property Installations Lifecycle Management (RPILM) Core Business Mission. A new requirement added to the BEA RPILM is for Enterprise Energy Information Management (EEIM).

EEIM improves the Department's ability to make informed investments regarding energy usage in the real property domain by establishing a capability to analyze comprehensive energy use and investment data and establish standardized processes and integrated systems to systematically track, analyze, and report facility energy and water use and related costs. Incorporated EEIM standards within the BEA for compliance assertion as a set of DoDAF products specifically to include:

- Creation of EEIM Information Exchanges
- Addition of EEIM Business Rules to reflect the re-engineered processes
- Addition of the re-engineered OV-6c Business Processes
- Addition of DIV-2 to mandate information requirements and System Data Exchanges
- Addition of new Operational Activities, ICOMs, and associated Information Exchanges
- Update of OV-2 to assign a performer to the newly-identified Operational Activities

The DMLSS-FM module could be used to support the EEIM data collection, analysis and reporting, or share the capability with the host system (i.e. Maximo, Tririga, SAP, etc.).

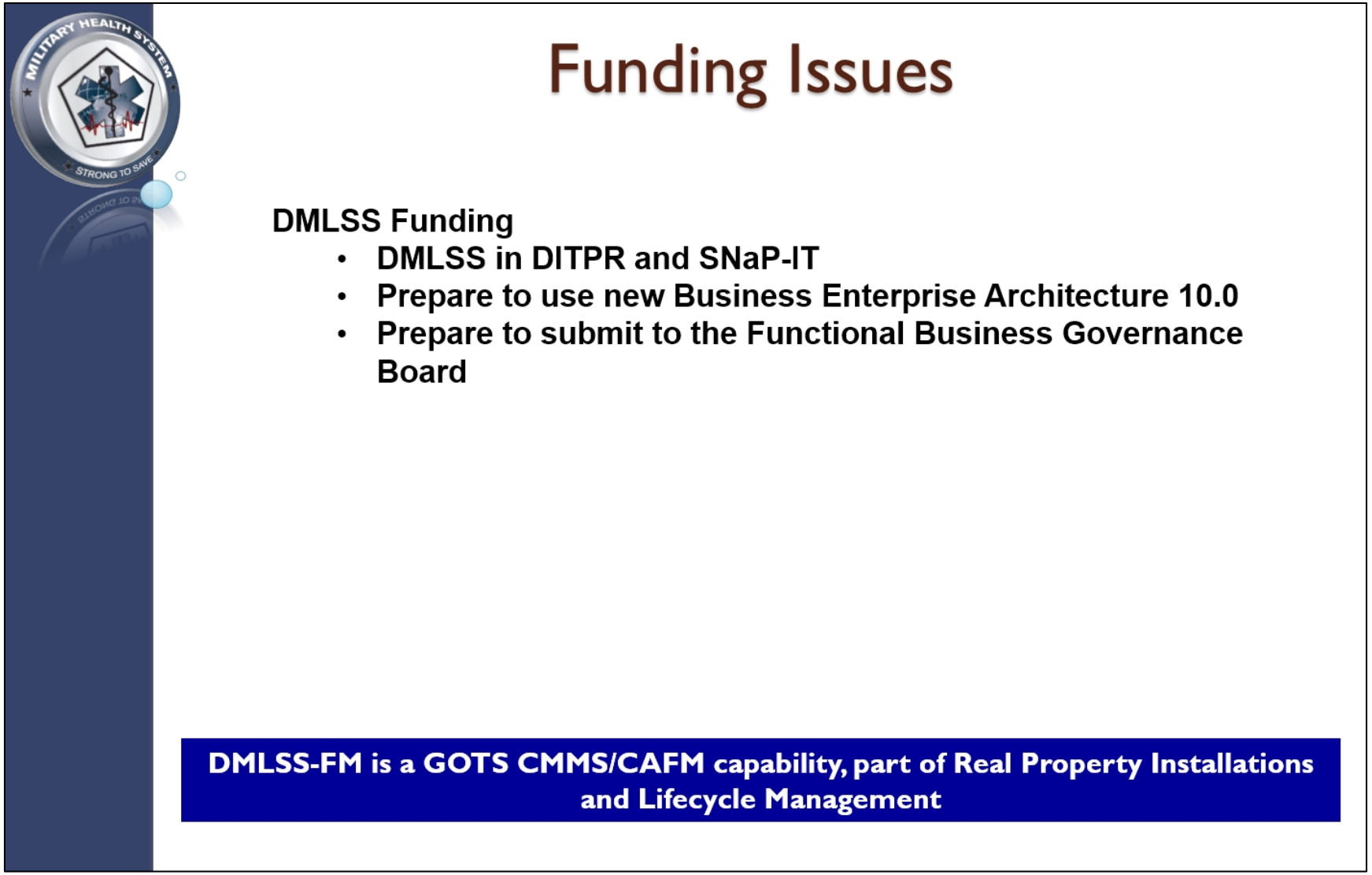


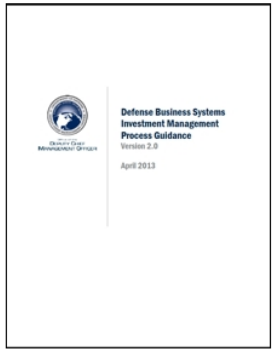
Figure 39: Funding Issues

Figure 40: BEA 10.0

DMLSS DITPR

DMLSS Funding

- DMLSS is currently in DITPR and SNaP-IT
- To update the FM capability, need RDT&E funding, split DMLSS-FM out as a separate module?
- Defense Business Systems Investment Manage Process Guidance April 2013



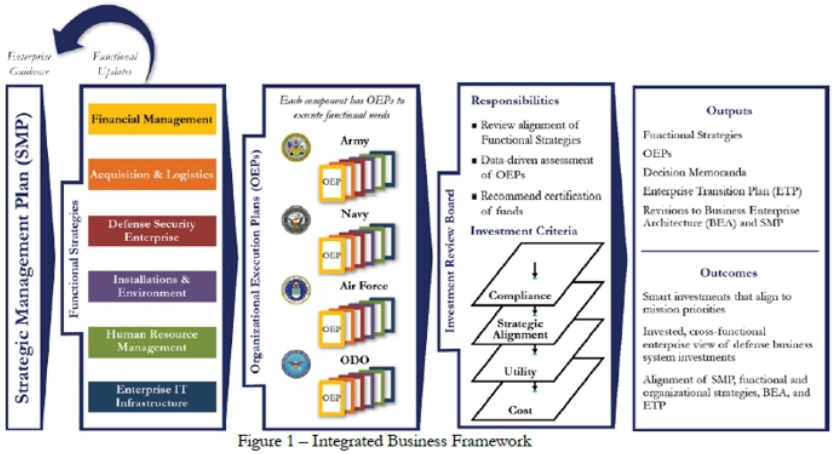


Figure 1 – Integrated Business Framework

Figure 41: DMLSS DITPR

BEA 10.0 RPILM

3.1.4. Real Property and Installations Lifecycle Management (RPILM)

The following bullet outlines the content changes made within the RPILM CBM:

Enterprise Energy Information Management (EEIM). Improves the Department's ability to make informed investments regarding energy usage in the real property domain by establishing a capability to analyze comprehensive energy use and investment data and establish standardized processes and integrated systems to systematically track, analyze, and report facility energy and water use and related costs. Incorporated EEIM standards within the BEA for compliance assertion as a set of DoDAF products specifically to include:

- Creation of EEIM Information Exchanges
- Addition of EEIM Business Rules to reflect the re-engineered processes
- Addition of the re-engineered OV-6c Business Processes
- Addition of DIV-2 to mandate information requirements and System Data Exchanges
- Addition of new Operational Activities, ICOMs, and associated Information Exchanges
- Update of OV-2 to assign a performer to the newly-identified Operational Activities

Will DMLSS-FM be used for EEIM, or rely on host system?

Figure 42: BEA 10.0 RPILM

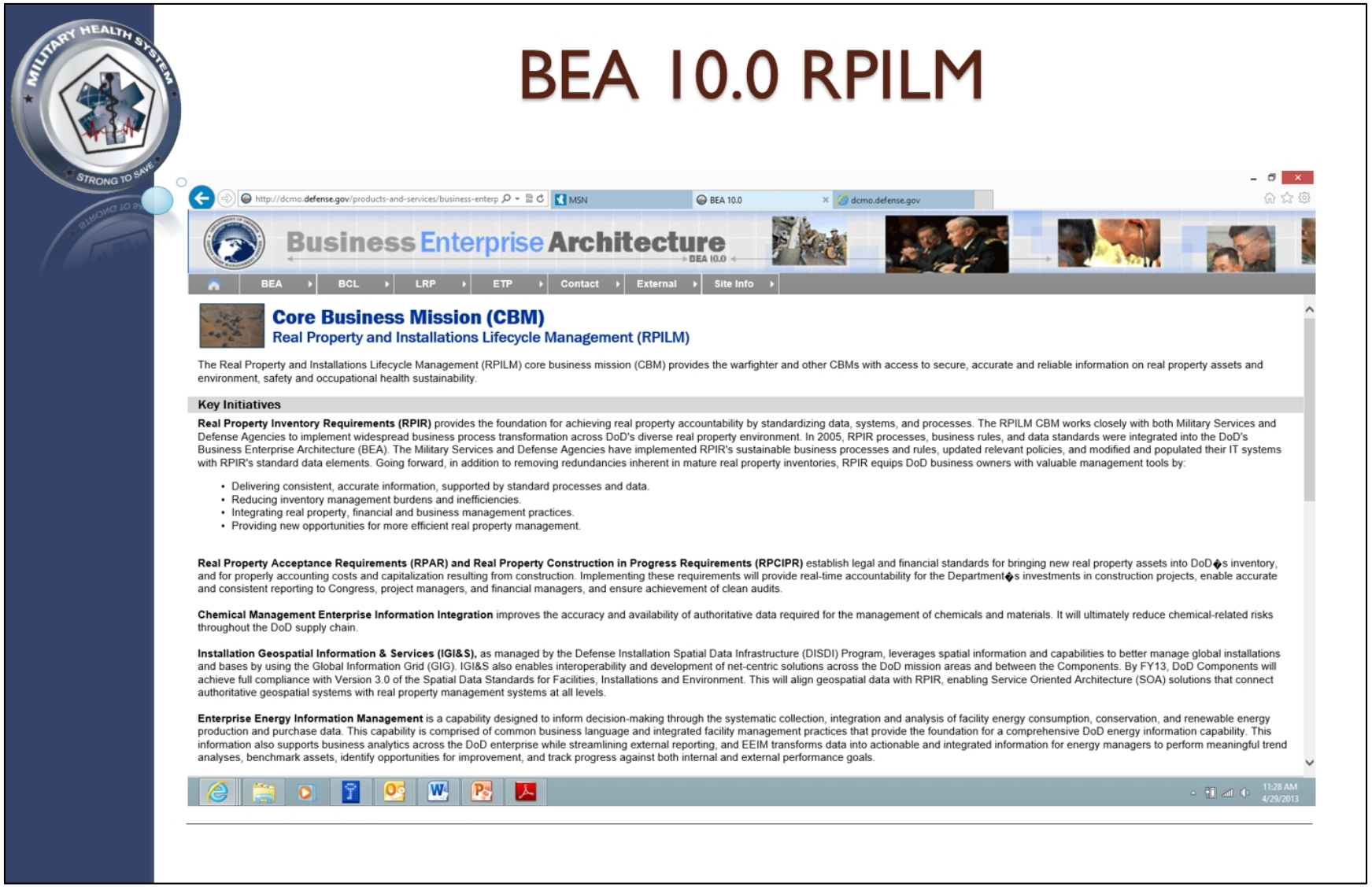


Figure 43: BEA 10.0 RPILM

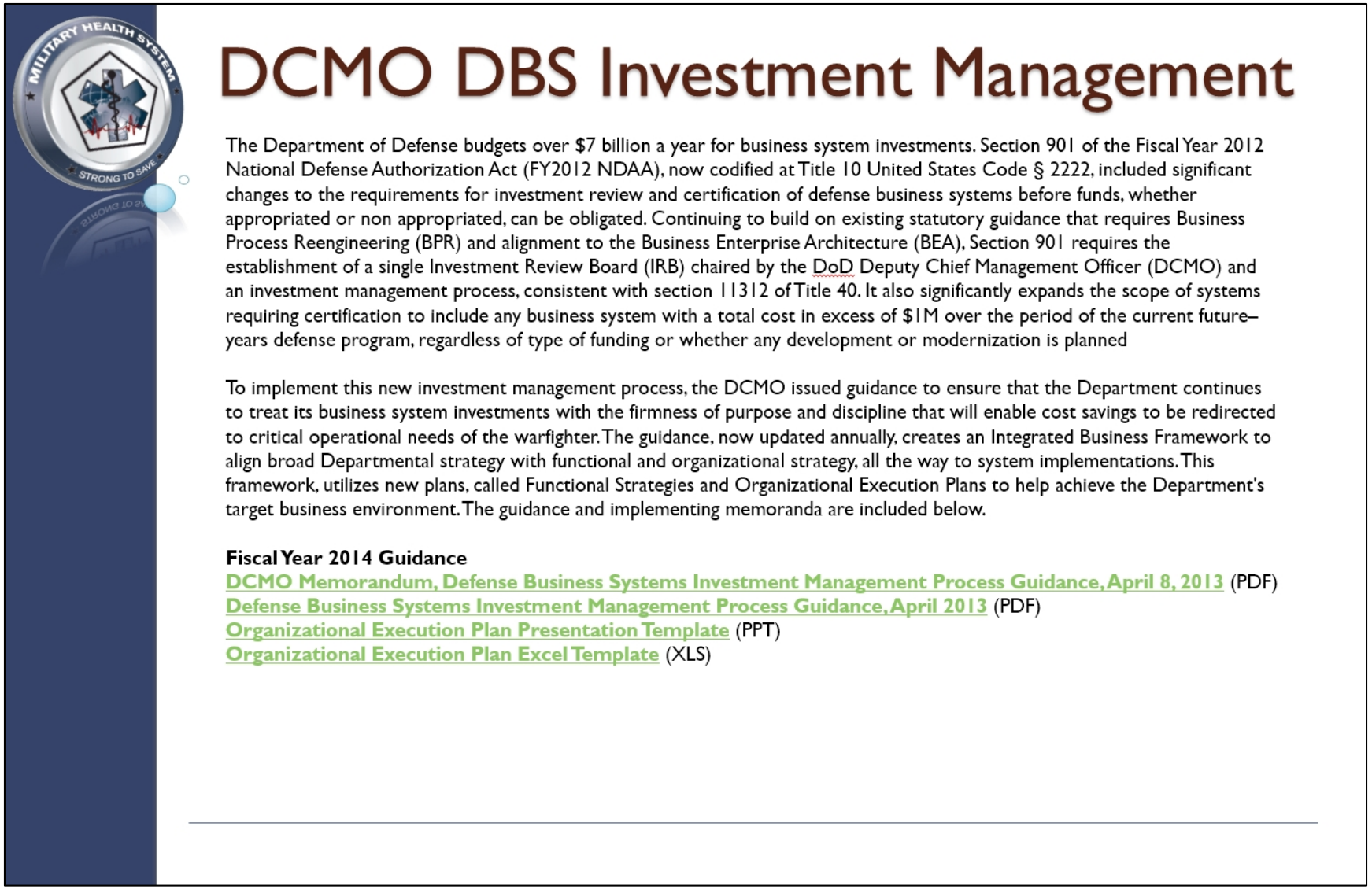


Figure 44: DCMO DBS Investment Management

Performance of Web-Based Systems

It has been reported during the course of assembling this DMLSS-FM 5 Year Roadmap, some users who have used web-based systems experienced mixed results in terms of performance. This includes lag time when trying to enter data, complete a function or even navigate from user interface to user interface. Since the premise of this roadmap seeks to fundamentally build a web-based system, there are some key recommendations that will support optimizing performance and user experience.

It should first be noted that there are numerous factors that could contribute to the lag one experiences on a web-based system and that the issue is not exclusively tied to bandwidth or internet connection speeds. Some of these issues include the following:

- **Local machine is running a much older Operating Systems (i.e. Windows XP).**
- **The local machine is an older computer with an inadequate processor and insufficient RAM**
- **The local machine is running an older version web browser.**
- **The program pages have not been optimized for use on the web.**

Any combination of these issues along with other collateral factors may hinder the final user experience in the performance of the web-based application. It is therefore desirable to be able to build into the system, mechanisms that monitor and isolate these main factors. Web-based systems are particularly well suited to gathering analytics. By monitoring and collecting data about these critical factors, this will provide valuable information to make strategic decisions in the future on how to mitigate any lagging performance users might experience. It will better identify where the choke points are and what measures are needed.

Performance Tracking Metrics on MAX.gov

Some of the recommendations made here are already best practices that have been implemented on MAX.gov. The main principle is to let the system automatically collect data about its performance so it helps identify where mitigating actions are required. The recommendations can be summarized as follows:

1. **Track rendering time for every page**
2. **Track Response Times for each Community on the system**
3. **Allow for third party application monitoring in the event any lags are caused by application specific configurations.**

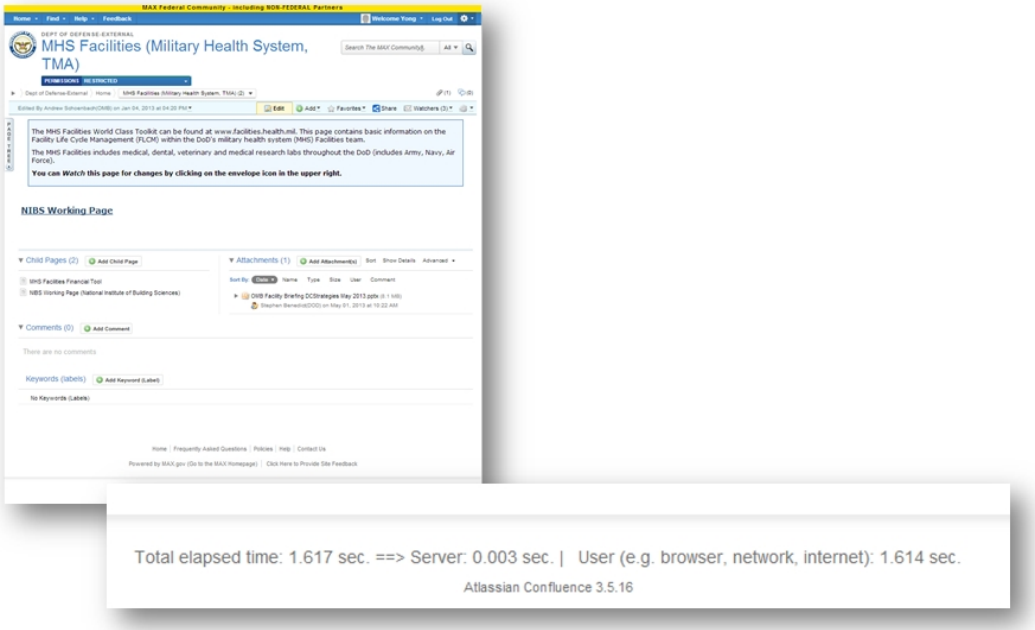


Figure 45: Each web page tracking page rendering time

Once a user logs into MAX.gov, *each* web page is designed to provide information regarding the page rendering time and its breakdown (time expended due to Server and User). This will help identify common patterns and problematic pages as well as single user anomalies due to specific, inadequate workstation performance issues.

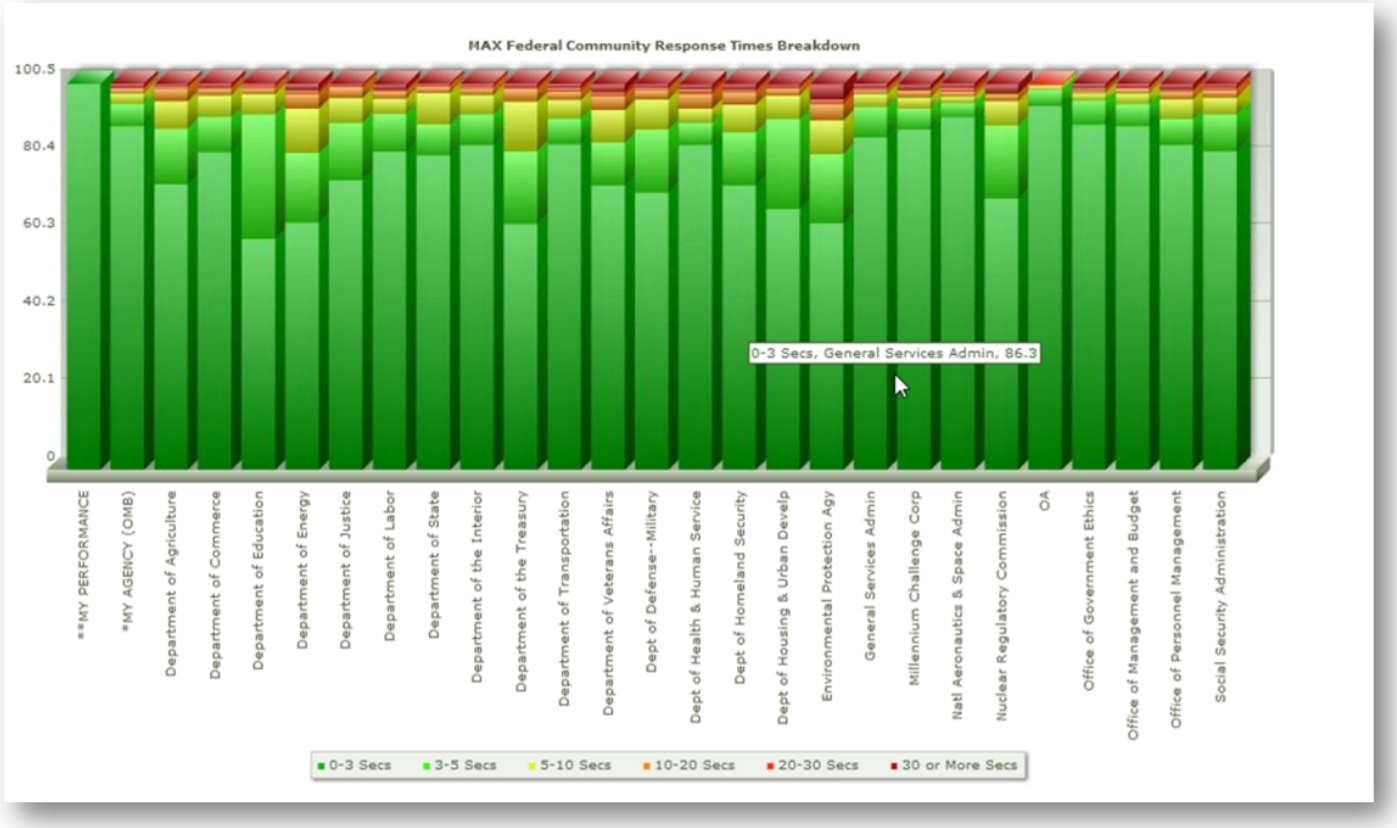


Figure 46: Track Response Time by Specific Communities

Another analytic MAX.gov implemented was the ability to track response time by each specific MAX Federal Community. This again will help identify if a particular issue is experienced across the entire enterprise or if the issue might be localized for a particular group. By seeing patterns of performance, this allows each issue to receive the appropriate course of action and provides better direction for system administrators to understand if the performance issue is a localized matter or a concern felt across all users.

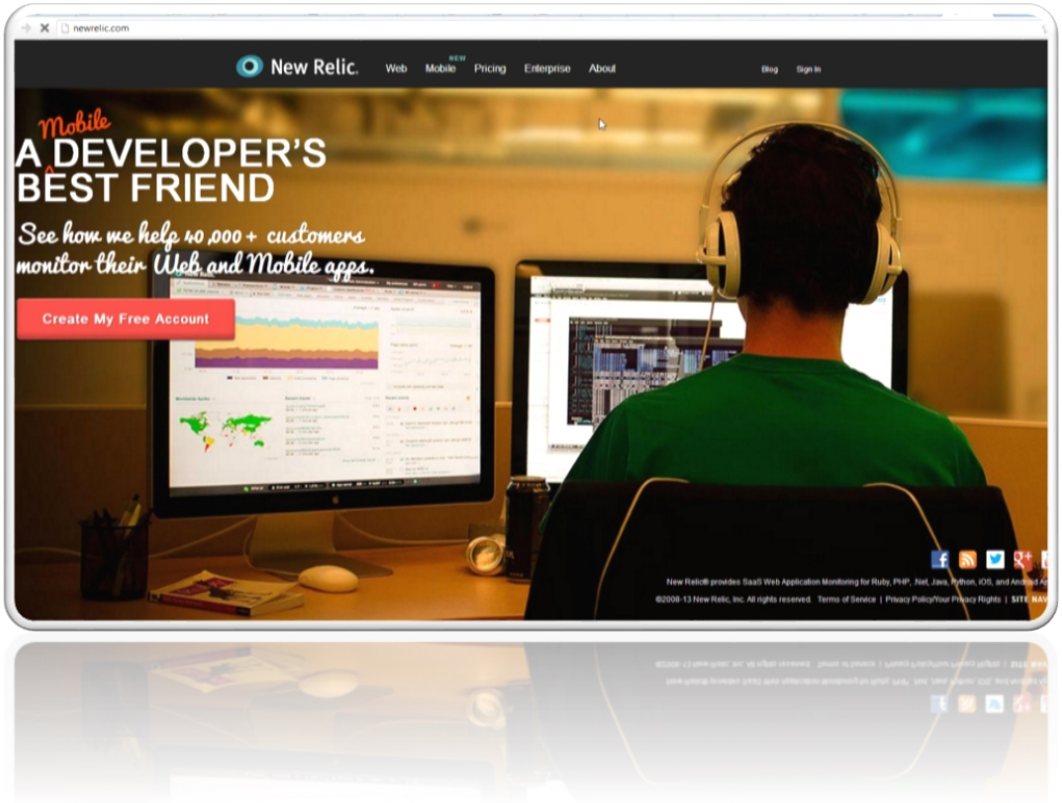


Figure 47: 3rd Party Application Monitoring Services

The open and interoperability of web - administrators to make use of 3rd party systems and services to support the diagnosis and resolution of performance issues. MAX.gov has successfully made use of systems such as New Relic to monitor the performance of their web-based applications. It should be noted that the direction towards web-based systems allows for this wide availability of tools and services to help support systems built on ubiquitous web standards. This means future DMLSS-FM administrators can leverage tools that have been purpose-built to address a particular issue without having to build everything themselves.

This support structure is part of the ecosystem of tools that is envisioned in this Roadmap.

Max.Gov

The benefits of Service Oriented Architecture (SOA) is that it provides a very flexible, modular approach to developing a software solution. This allows for growth and smaller, but more frequent development cycles that are less disruptive for users of the system. Max.gov is a government wide SOA solution available for adoption towards a web-based, CMMS/CAFM enterprise solution for MHS.

The catalyst to initiate the DMLSS-FM 5 year Roadmap is to initiate the implementation of Max.gov.

- Flexible Service Oriented Architecture
- Scalable Solution
- Web-based
- "Future-proof"
- Built-in Collaborative Environment
- Provides Government to Government, intra-agency collaboration
- Interact with Non-Government partners in secure "Enclaves"
- 2- Factor Authentication
- Web-orientated APIs

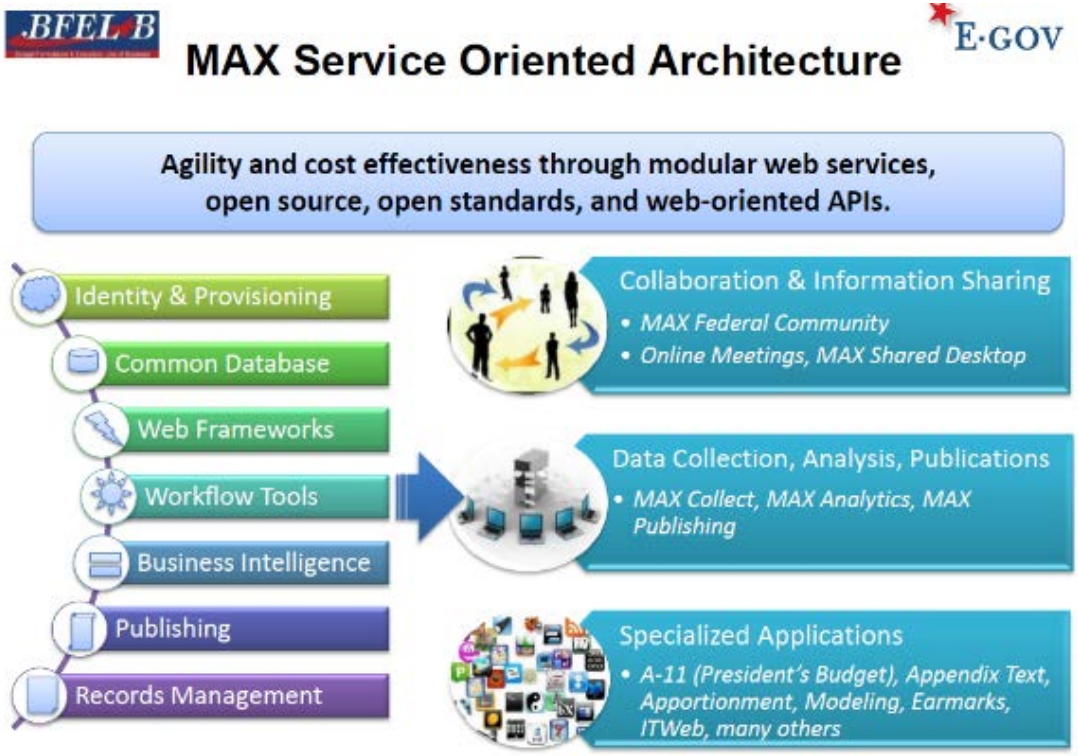


Figure 48: MAX.gov - Service Oriented Architecture

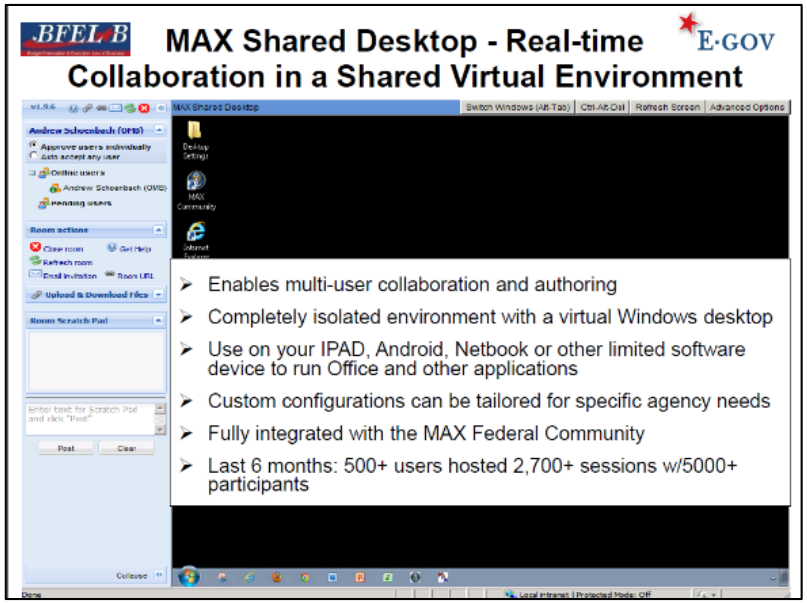


Figure 49: MAX Shared Desktop

The service orientated architecture of Max.gov allows for a flexible, scalable, modular approach to developing an entire CMMS/CAFM system for the MHS organization. As new requirements and needs are identified, the open-ended system allows for ease in growth with a variety of tools built within the system.

- **Max Collect**
- **MAX Shared Desktop**
- **MAX Infrastructure**

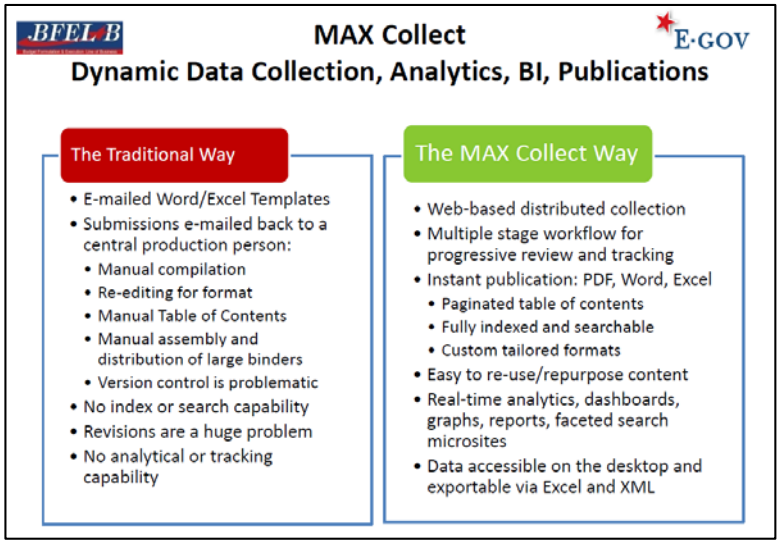


Figure 50: MAX Collect

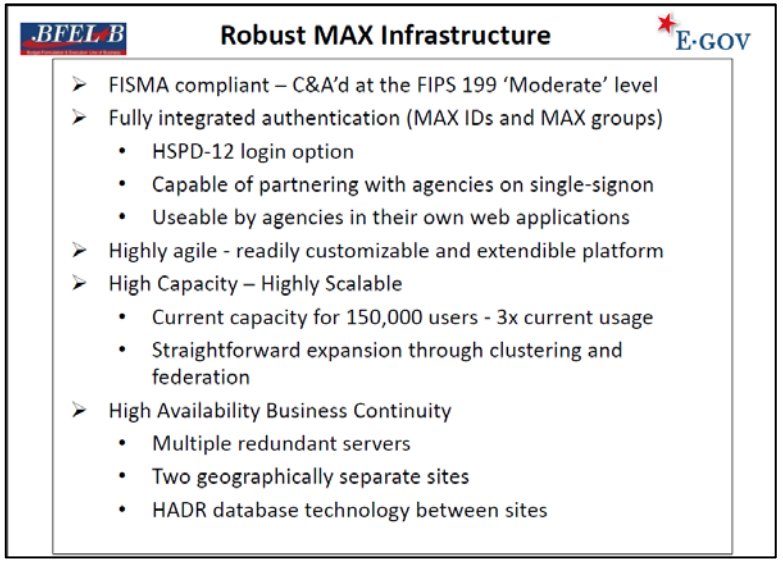


Figure 51: MAX Infrastructure

DMLSS to Support FLCM

The DMLSS-FM Roadmap capitalizes on the opportunity to develop a ground-up, corporate CMMS and CAFM system. The data that resides in such a system can prove valuable beyond the Facility Management personnel. This data would be established as the authoritative source for total asset visibility. This means the usefulness of this system extends into numerous other business process and governmental agencies that currently have to request time-consuming data calls of a snapshot-in-time view of a particular query they need for an immediate purpose.

The vision is to have this data available to the appropriate personnel and make the views of data relevant to suit their purpose. This includes a variety of roll-ups and combinations of data that they routinely require. This produces a CMMS/CAFM solution that builds in a better sustainment model for business processes.

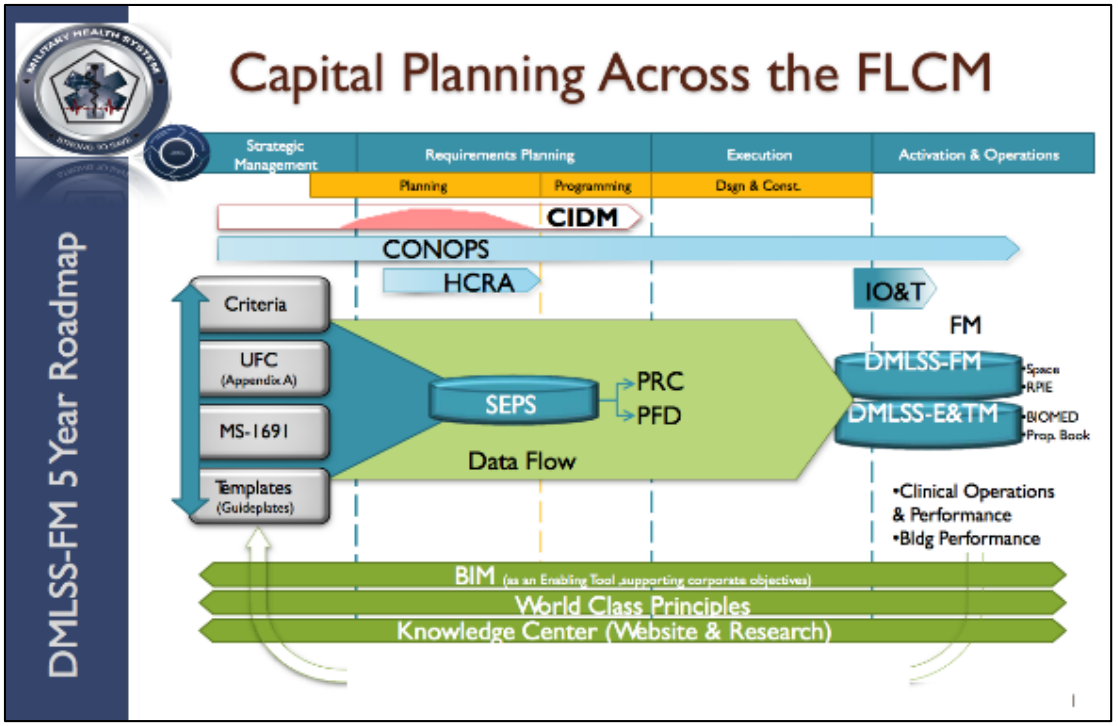


Figure 52: Capital Planning Across the FLCM

Synergies with the SEPS Strategic Plan

As DoD looks to move to a web-based system for their new corporate CMMS/CAFM system, there are other activities currently underway that can provide synergies and support. At present, DoD and VA are also preparing to launch their SEPS system on the OMB-cloud in 2013.

Similar to this Roadmap for DMLSS-FM, there was a study conducted to develop a Strategic Plan for SEPS as it migrates to the cloud. Many of the issues that arise when making such a migration have been reviewed and a path has been carved to implement the gradual progression towards making use of the web. Although SEPS and DMLSS-FM are different tools with different work processes and user communities, they both do share some commonality in the sense they are both applications making this migration towards the cloud. The lessons learned to the extent applicable, have been transferred towards the DMLSS-FM roadmap for consideration. The other benefit to align these efforts is that the transition team can see the pros and cons of each step as they occur and perform course correction measure on a more scalable manner as opposed to managing the migrations as if they were two disparate activities.

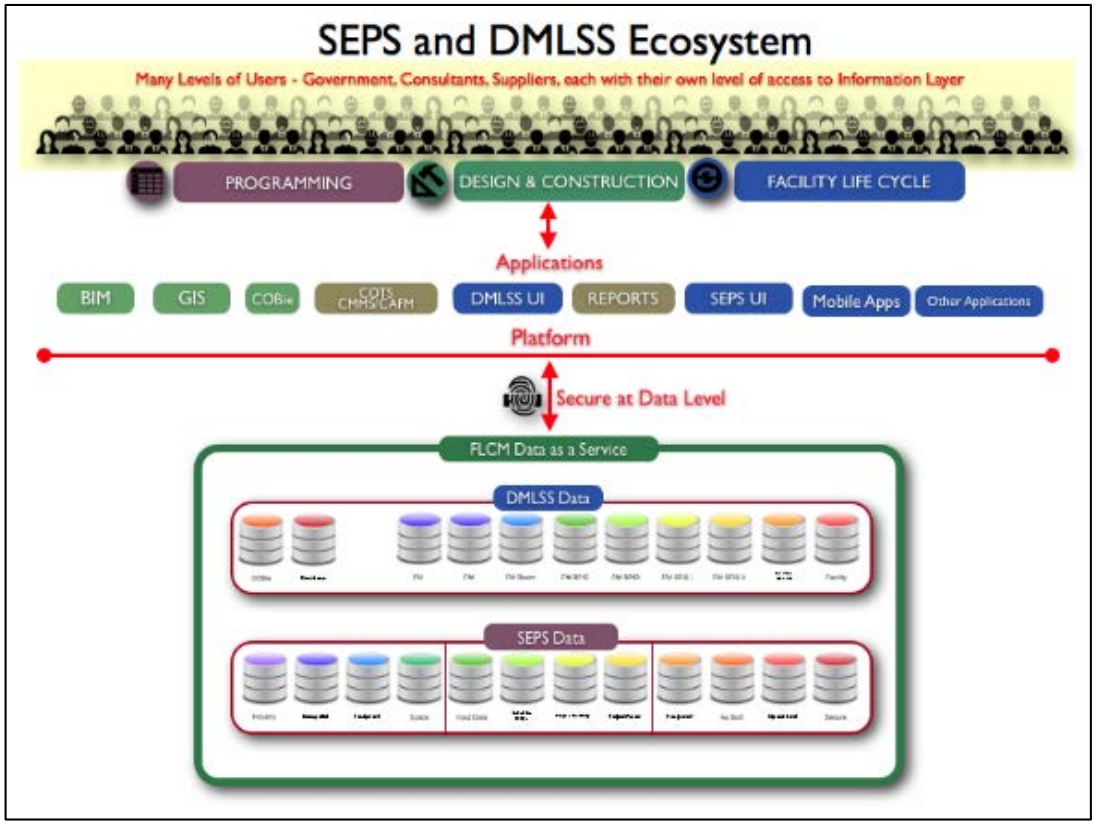


Figure 53: SEPS and DMLSS Ecosystem

The other longer term vision is that these two applications are important components of the overall FLCM. By treating them as components that are parts of the same "engine", it becomes clearer to establish authoritative data sources and workflows as these two create the first "building blocks" of the integrated data system for the government.

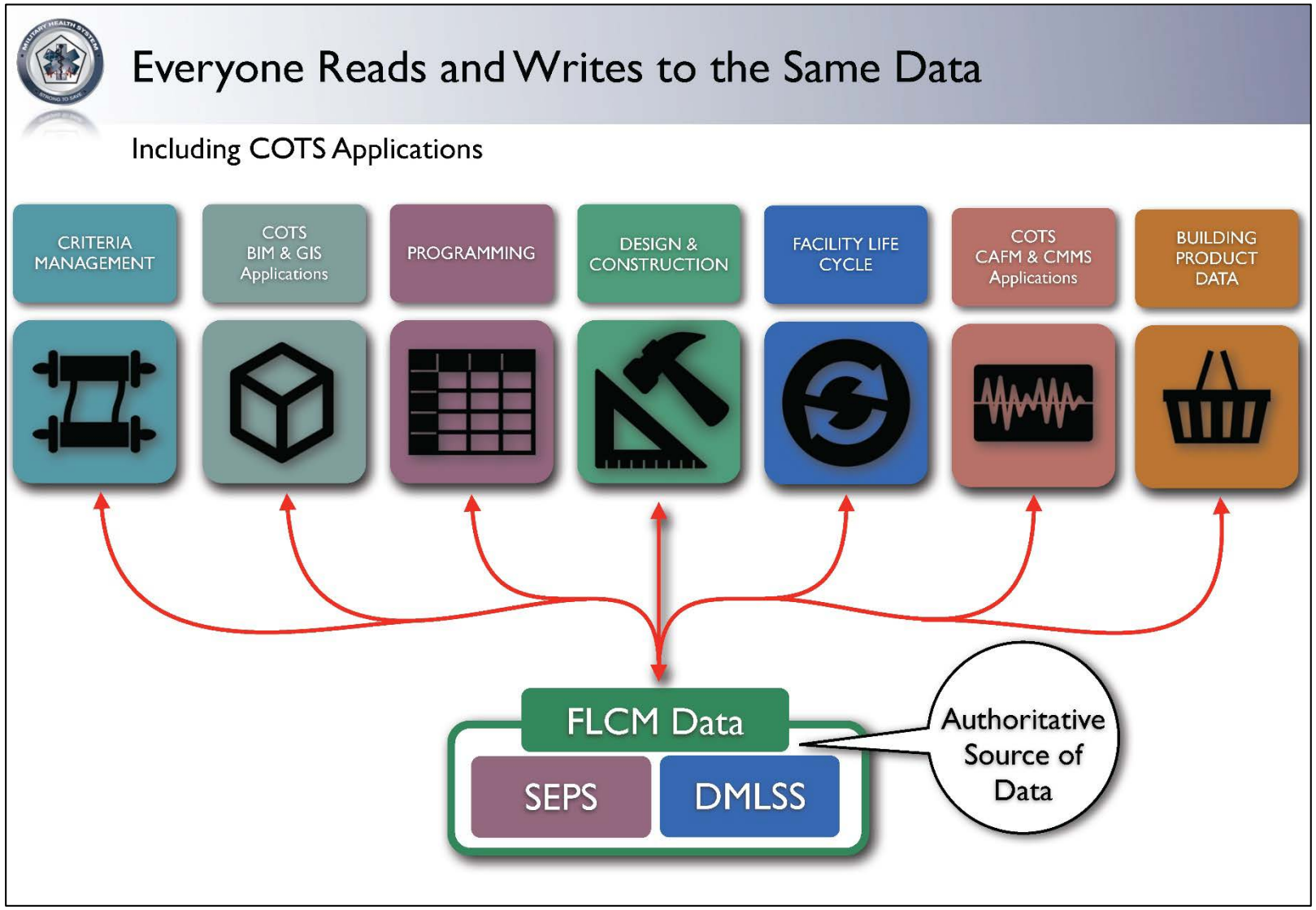


Figure 54: Use Same Data - Common Operational Picture

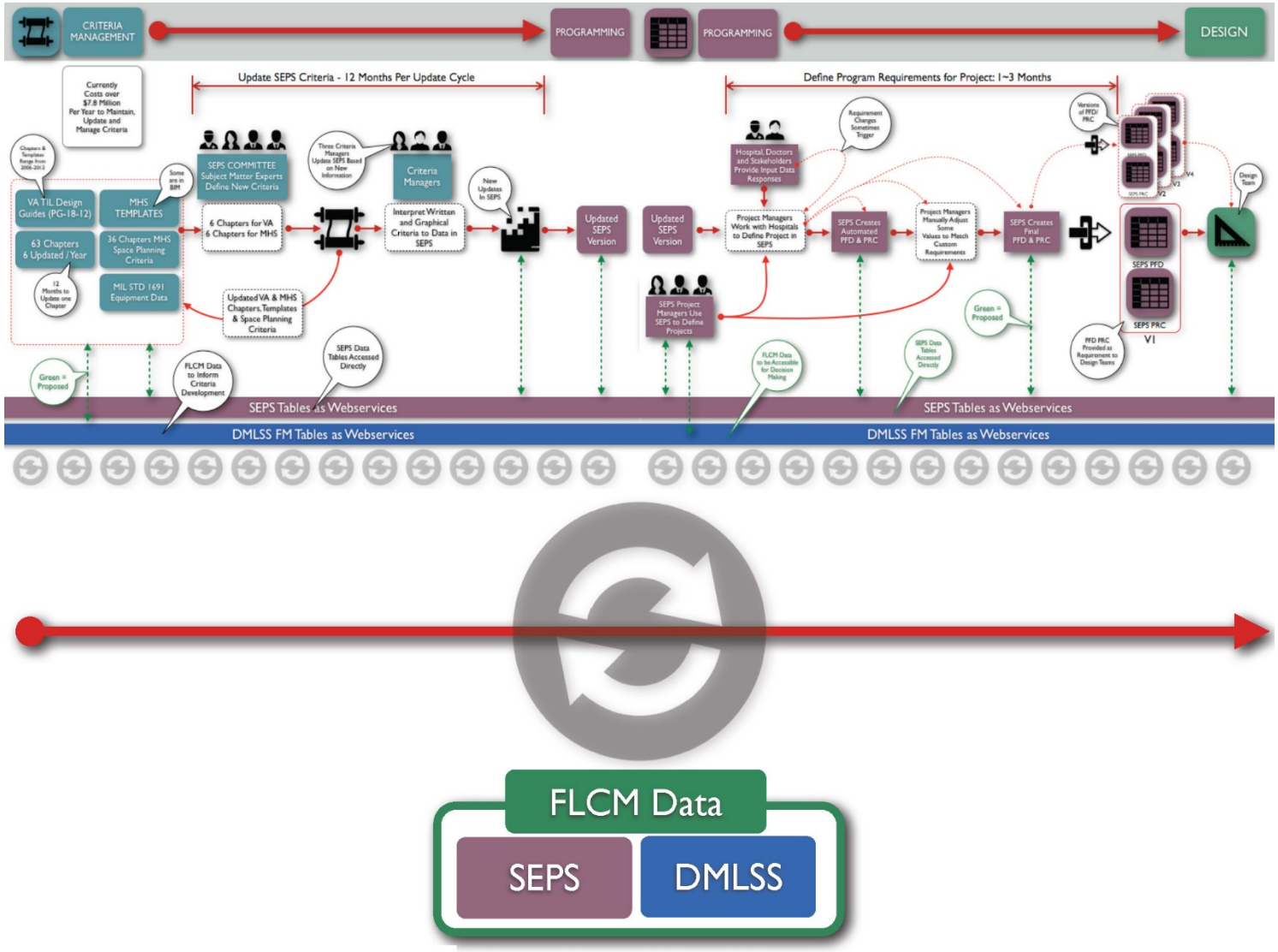


Figure 55: SEPS and DMLSS - FLCM Data Integration

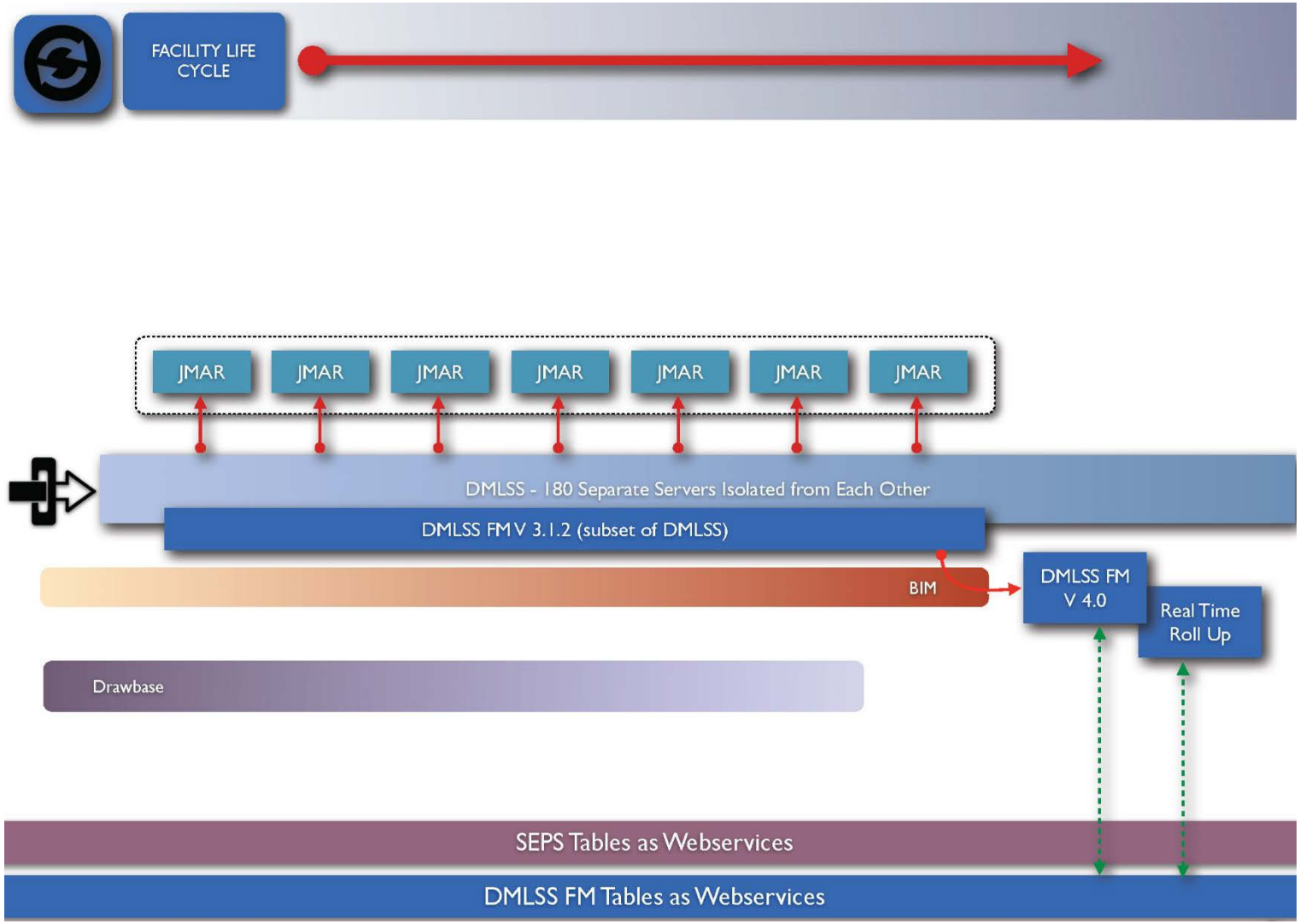
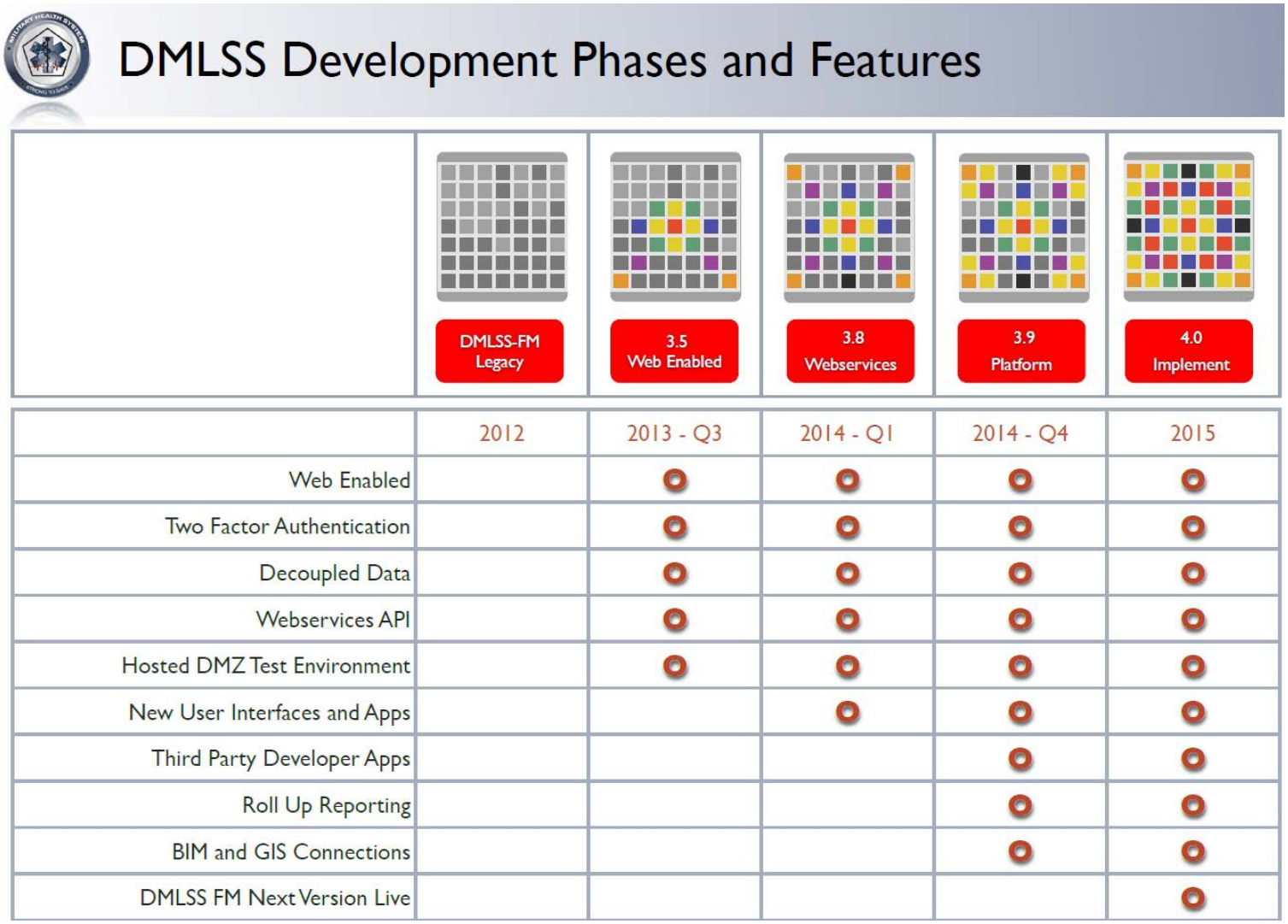


Figure 56: Support needs currently addressed by Joint Medical Asset Repository (JMAR)

DMLSS-FM Development Phases and Features



	2012	2013 - Q3	2014 - Q1	2014 - Q4	2015
Web Enabled		●	●	●	●
Two Factor Authentication		●	●	●	●
Decoupled Data		●	●	●	●
Webservices API		●	●	●	●
Hosted DMZ Test Environment		●	●	●	●
New User Interfaces and Apps			●	●	●
Third Party Developer Apps				●	●
Roll Up Reporting				●	●
BIM and GIS Connections				●	●
DMLSS FM Next Version Live					●

Figure 57: DMLSS-FM Development Phases and Features

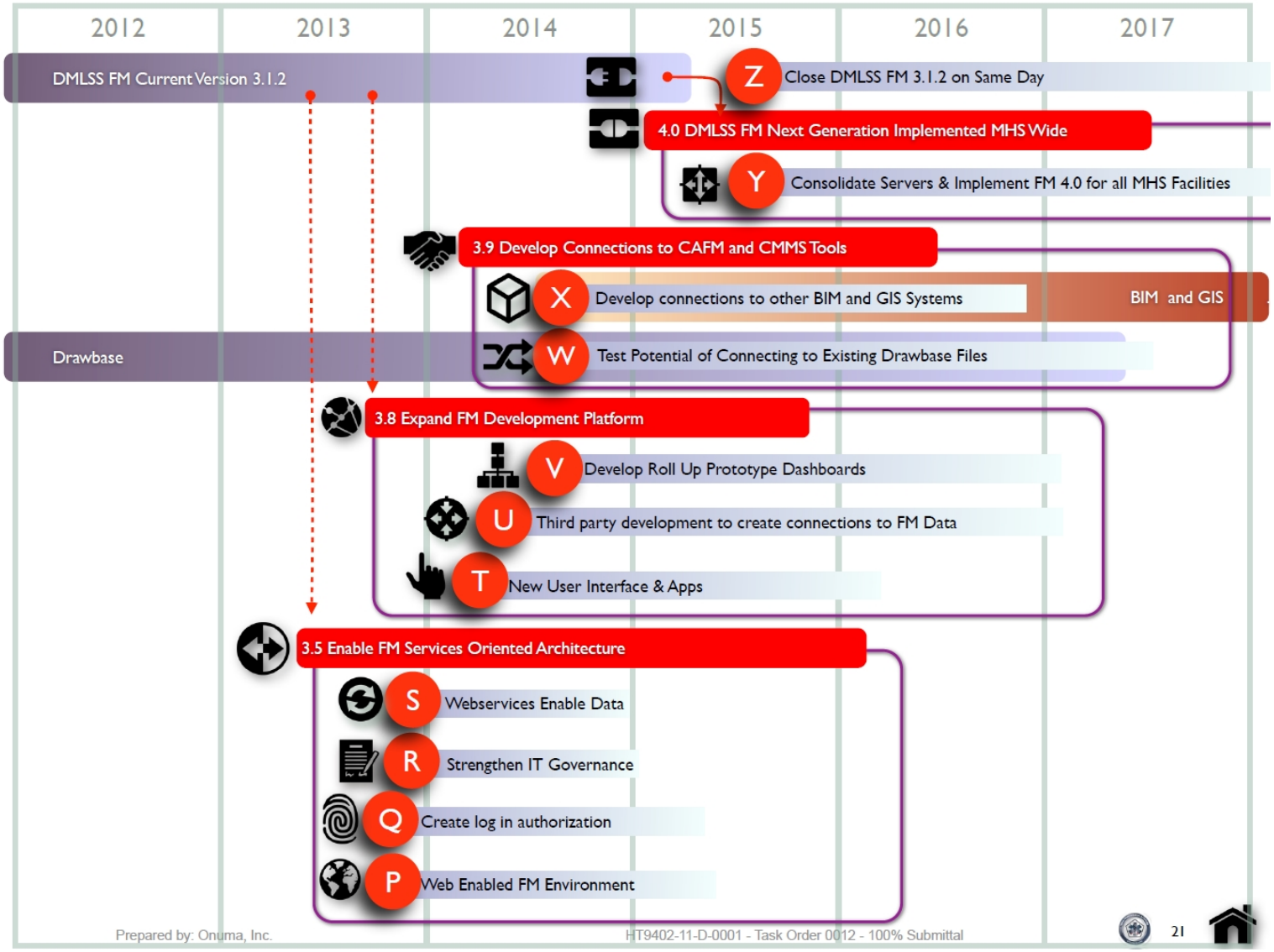


Figure 58: DMLSS-FM Timeline

Key Dependencies

DoD is in the process of migrating the Real Property Assets Database (RPAD) to a cloud environment. RPAD is the single authoritative source for all DoD real property inventory and will be available to authorized users via standardized Web-Services.

The RPAD primary key is the Real Property Unique Identifier (RPUID). This 24 random, unique character serves as a critical identifier for the real property managed within DMLSS-FM.

RPUID will play a vital role in connecting the various modules of data within DMLSS as well as other locations that integrate with the RPAD data warehouse. This also applies to its employment of any Geographic Information Systems (GIS) capabilities. Installations/Sites are identified by its Site Code. The RPAD RPUID is used by the Defense Installation Spatial Data Infrastructure (DISDI) Portal, and ESRI based GIS, that currently has over 70 layers of data.

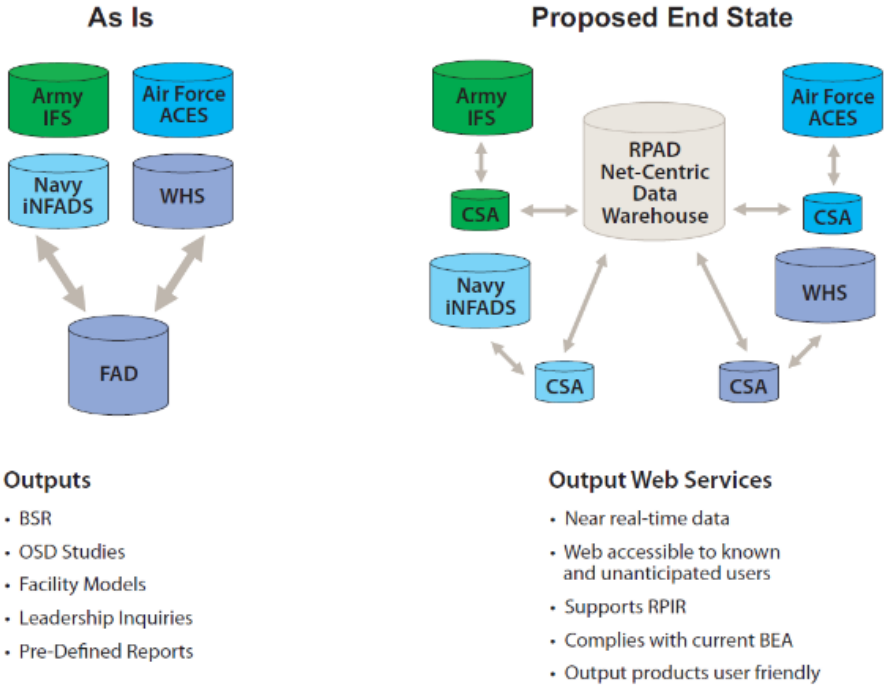


Figure 59: Key Dependencies

The Defense Installation Spatial Data Infrastructure (DISDI) Portal

The Scope of the Defense Installation Spatial Data Infrastructure

- The World Extent National Geospatial-Intelligence Agency
- The Installation & Environment Extent Defense Installation Spatial Data Infrastructure
- The Facility Extent, A Role for Building Information Modeling

Key Questions Answered by DISDI Portal

- Where are DoD real property assets?
- What is the spatial relationship between these assets?
- What is the size (area, extent) of these assets?
- Where are these assets in relation to other key things (people, resources, renewable energy potential zones, force protection threats, etc.)?

Key Performance Indicators Supported

- What is the completeness of the Real Property Inventory?
- What is the quality of the RPI (duplicates, overlaps, gaps)?

The DISDI Portal - Map Viewer

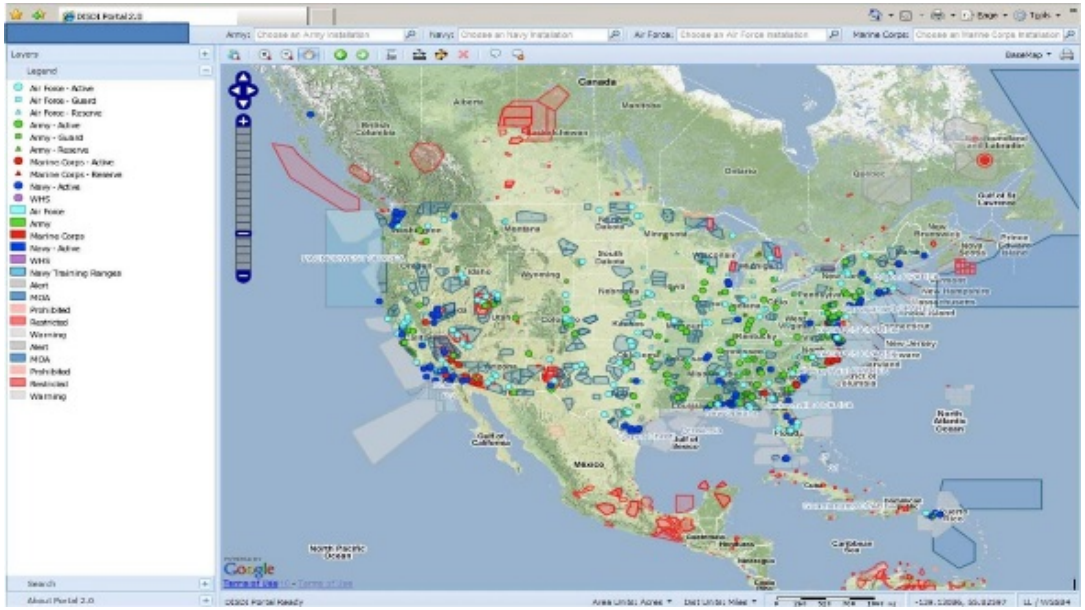


Figure 60: The DISDI Portal - Map Viewer

BUILDER™ Sustainment Management System

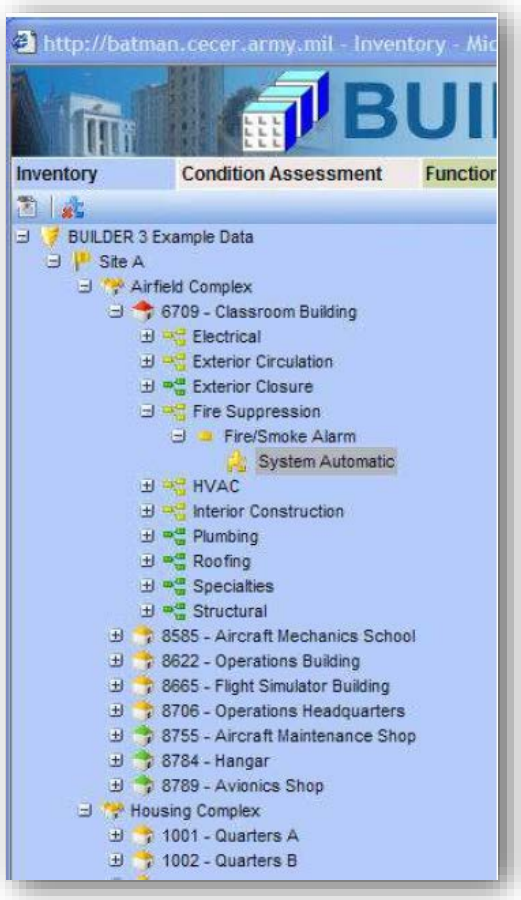
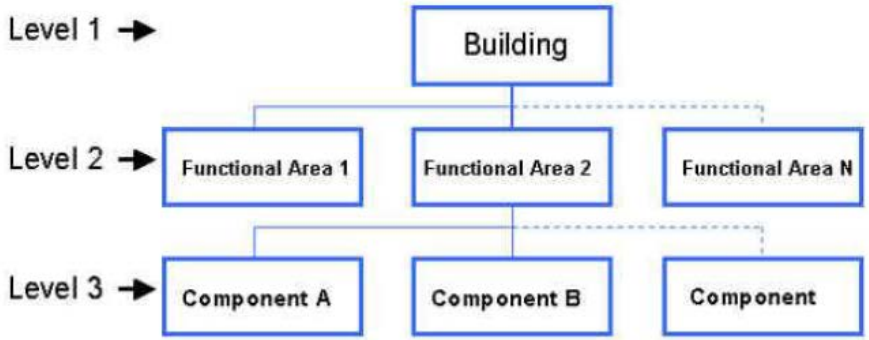
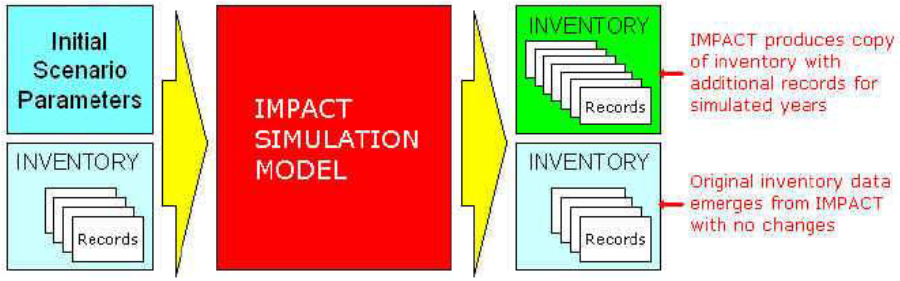


Figure 61: BUILDER™ Sustainment Management System





7.0 New Capabilities & Features

Introduction

The recommendations made in this DMLSS-FM Roadmap are organized by distinct "releases" of DMLSS-FM. These incrementally developed versions of the application utilize the concept of an "**Agile**" approach vs. the "**Waterfall**" approach to software design. The main advantages of an agile approach is its adaptability and responsiveness to course correction when implementing new features and capabilities. The traditional or "waterfall" approach towards software design is based on a serial, sequences of steps. Each step must be completed before the next step can start. The disadvantage of this traditional approach is it requires long development cycles and is not conducive to course correction once decisions have been made in each step. A shift in policy, procedures or implementation strategies means going back to previous steps and adjust accordingly. An example of software using the Waterfall Model for development is Microsoft Windows operating system (i.e. XP, Vista, Windows 7, and Windows 8).

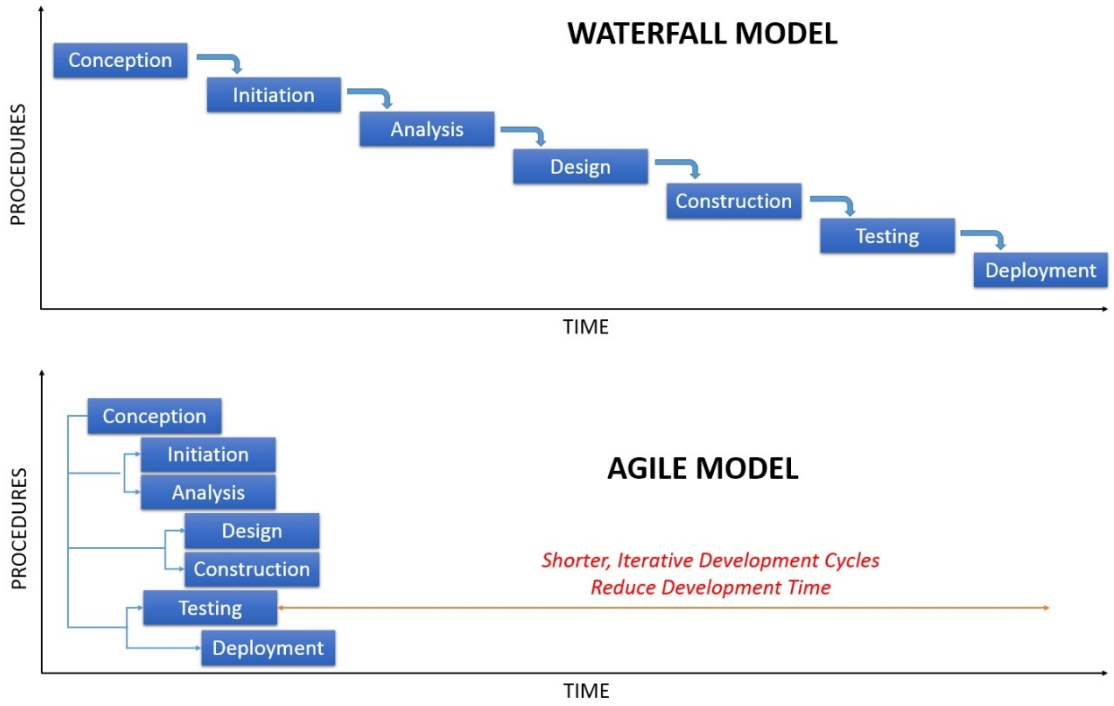


Figure 62: Agile vs. Waterfall Model

The Agile Model assumes adjustments and course corrections will be needed. It also acknowledges smaller, incremental developments will be less disruptive to users than major shifts to the application's user interface, functionality and overall user experience. Rather than adopt a serial accession, this model may have several steps running in parallel. The incremental changes are small enough to manage and evaluate as it is being designed and tested. This method is also

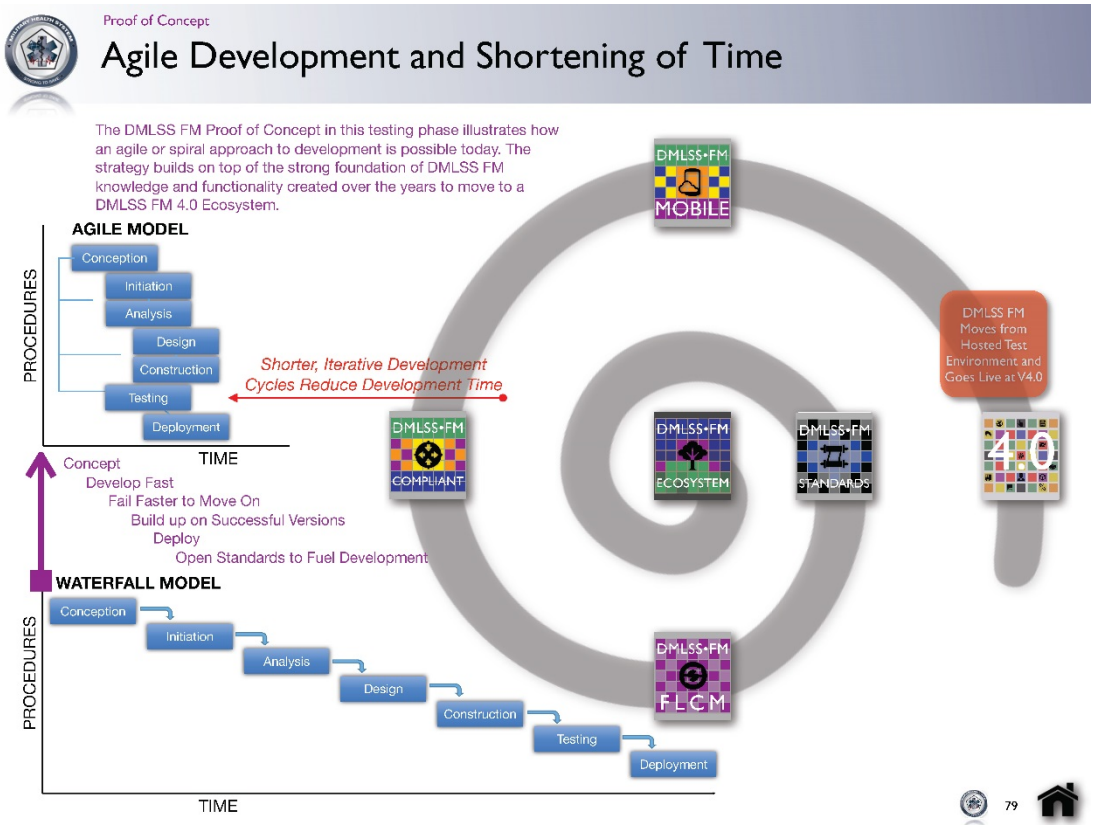


Figure 63: Agile Development

better suited to take advantage of future technologies since it is less "fixed", thus making the system more "future-proof". Examples of applications using the Agile Model include the various web-based products from Google (i.e. Gmail, Google Maps, and Google Calendar).

Conceptually, much of the strategies and implementation steps were based on the agile approach. The following releases of DMLSS-FM have steps built into them that work well and create synergies with each other. Each subsequent release builds off the foundation the previous release provides as well as synergizing and adding new functionality incrementally to the overall application.

The earlier efforts in DMLSS-FM 3.1 and to some extent, 3.2 are meant to mobilize the application to more fully capitalize on the new web-based environment. These efforts, to a large extent, are meant to be more "behind-the-scenes" preparatory releases and the typical DMLSS-FM user will not notice much change in their day to day use of DMLSS-FM. However, these early steps are critical to the success of maintaining SEPS in this new web-based environment and fully taking advantage of all the potential of integrating with other web-based capabilities in this cloud ecosystem.

Amazon.com's Success Story

Service Oriented Architecture (SOA)

The growth of Amazon.com's sales have tripled in the last five years with 2012 topping over $60 billion. Much of their ability to accommodate rapid growth can be attributed to their adoption of SOA. Back in 2002, founder and CEO, Jeff Bezos issued a mandate with the following key points:

1. **All teams will henceforth expose their data and functionality through service interfaces.**
2. **Teams must communicate with each other through these interfaces.**
3. **There will be no other form of interprocess communication allowed: no direct linking, no direct reads of another team's data store, no shared-memory model, no back-doors whatsoever. The only communication allowed is via service interface calls over the network.**
4. **It doesn't matter what technology they use. HTTP, Corba, Pubsub, custom protocols — doesn't matter.**
5. **All service interfaces, without exception, must be designed from the ground up to be externalizable. That is to say, the team must plan and design to be able to expose the interface to developers in the outside world. No exceptions.**
6. **Anyone who doesn't do this will be fired.**

The implications of this mandate, exiguous in words, were tremendously profound. As noted on tech blog, API Evangelist:

"Think about what Bezos was asking! Every team within Amazon had to interact using web services. If you were human resources and you needed some numbers from marketing, you had to get them using an API. He was asking every team to decouple, define what resources they had, and make them available through an API. Every team within your company essential becomes a partner of the other. Some of the lessons Amazon learned along the way:

- ***Support*** *- Support for your teams interface becomes critical*
- ***Security*** *- Every teams becomes a potential DOS attacker requiring service levels, quotas and throttling*
- ***Monitoring / QA*** *- Monitoring and QA are interconnected, you will need smart tools for not just telling if something is up and running, but actually delivering the expected results*
- ***Discovery*** *- Service discovery becomes important. You will need to know what APIs there are, if they are available and where to find them.*
- ***Testing*** *- Sandbox and debugging is essential for all APIs"*

Governance

The current business process of maintaining DMLSS-FM is greatly managed by the Joint Medical Logistics Functional Development Center (JMLFDC). With a web-based DMLSS-FM system, there is now an opportunity to also provide a feedback loop from the users of the system on a continuous basis. There is a greater ability to gather information such as new feature requests, bug reports, and troubleshooting. This ability to engage users also applies to user communities that only need to "read" data from DMLSS-FM.

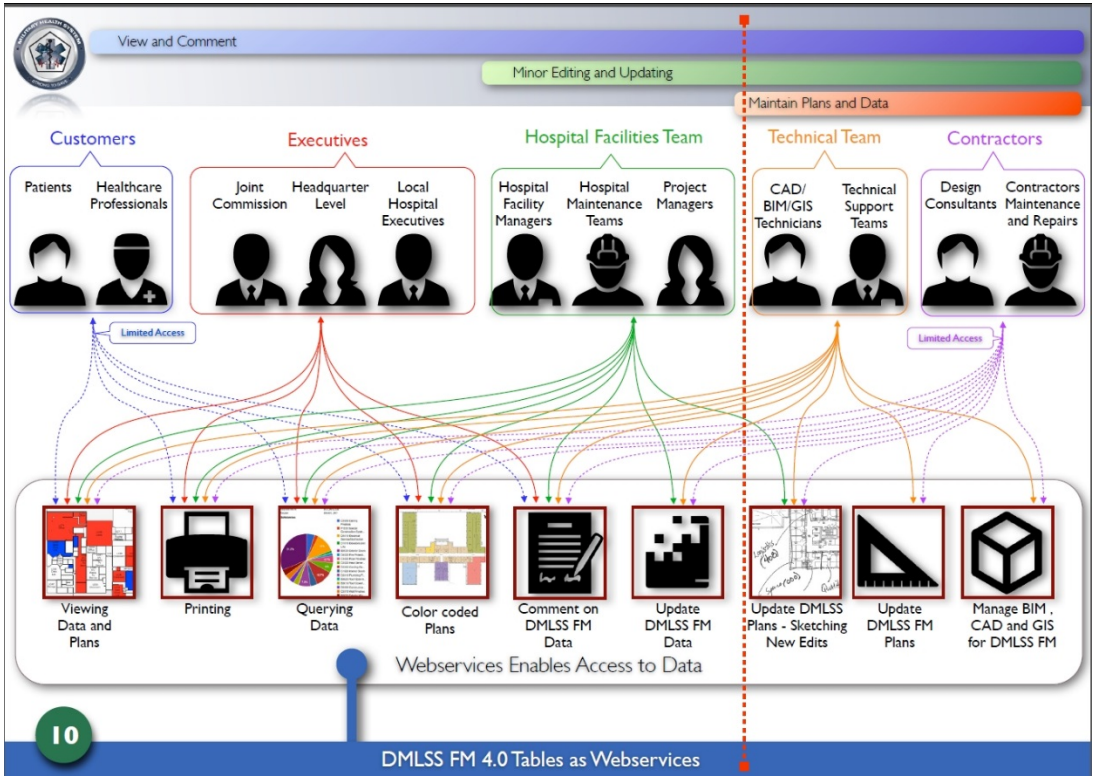


Figure 64: DMLSS-FM User Communities

"Wishlist" of New or improved Functionality

Independent of the platform DMLSS-FM is built upon, the following features have been identified by the Joint Medical Logistics Functional Development Center (JMLFDC) | Defense Medical Logistics Standard Support (DMLSS) Program as features and capabilities that would be most useful to improve the use of DMLSS-

1. FM Enable Bar Code/RFID implementation
2. Better utilities management
3. Better management of space assignments
4. Better capabilities to coordinate for disaster preparedness
5. Ability to interoperate with other AIS
6. Support Service management contract
7. Housekeeping
8. Help Support Audits
9. Request funds, award funds, spend funds
10. BIM/CAD tools - better data sharing with these applications

Figure 65: Support Management Contract

Figure 66: RFID Tagging Equipment

Figure 68: Manage Housekeeping

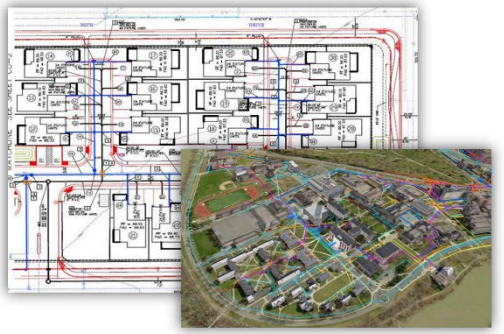


Figure 67: Better Utilities Management

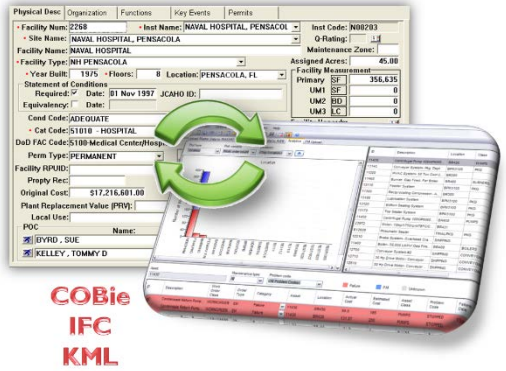


Figure 69: Ability to interoperate with other AIS

DMLSS-FM Roadmap Phases

The phases of the DMLSS-FM Roadmap can be broken out in the following phases. Each phase would be considered a new release of DMLSS-FM following the agile development approach.

Since the application is online, the users would receive updates immediately as it was ready to be deployed.

- **3.1 DMLSS-FM Legacy**
- **3.5 Web-Enabled**
- **3.8 Web-services**
- **3.9 Platform**
- **4.0 Implement**

3.1 DMLSS-FM Legacy

This is the current DMLSS-FM system and will be used as the "baseline" standard to measure the kinds of functionality and workflows that need to be supported. This version is also used as a "strawman" to determine where there are opportunities to improve upon the system to better support the current mission. This legacy version is also useful to identify the data calls that are currently needed beyond the facility management community. It establishes a framework for determining where chokepoints exist when trying to access data especially for the personnel that do not use DMLSS-FM on a regular day-to-day basis, yet require the visibility into medical facility assets.

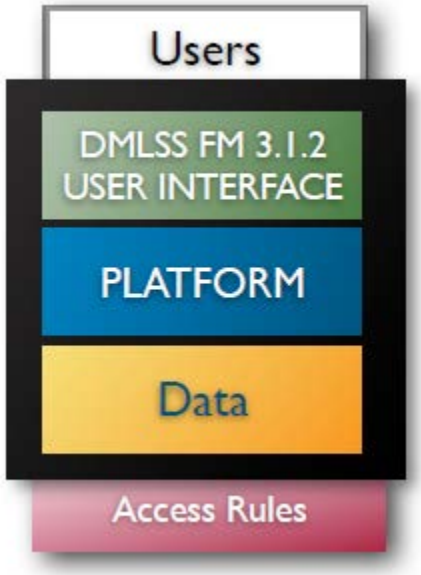


Figure 70: DMLSS-FM 3.1.2

3.5 Web-Enabled

The implementation of web-services begins the roadmap towards optimal flexibility and scalability for the data collected and processed in the DMLSS-FM system. Steps include identifying and decoupling data tables from the actual DMLSS-FM application and have the information available through web-services. This phase will also begin to identify the various stakeholders that will become part of the overall ecosystem. This not only includes the DMLSS-FM user base and the governmental personnel needing to access the facility data, but also vendors and manufacturers that can make their product data accessible through web-services as well. It is recommended to start a hosted DMX Test Environment where these governmental and private collaborations can take place. There is a general growing trend towards making vendor product data available and DMLSS-FM should prepare now to make use of this "free" effort that is being provided in the industry.

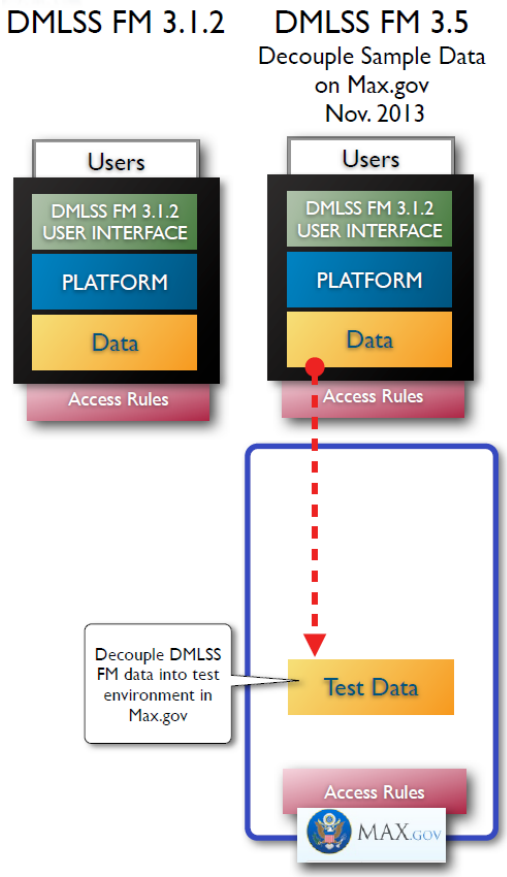


Figure 71: DMLSS-FM Decouple Sample Data in 3.5

3.8 Web-services

The previous releases of DMLSS-FM started the foundational preparations of decoupling data tables and unlocking data to be used in web-services. The 3.8 release of DMLSS-FM will focus on developing user interfaces (UI) and functionality from this data that can now be integrated through web-services. Third party developers will be invited to the DMZ sandbox to develop and test new UI's and apps as well. This release will also expand functionality and develop the necessary roll-ups of data that is now currently being addressed by JMAR. This is a critical step. The objective is to develop streamlined tools and processes to automate the necessary views of data across many different levels of people and minimize any additional effort to produce these roll-ups or "snapshot" copies of data. The goal is to get all data stakeholders to see the same common data in terms they need.

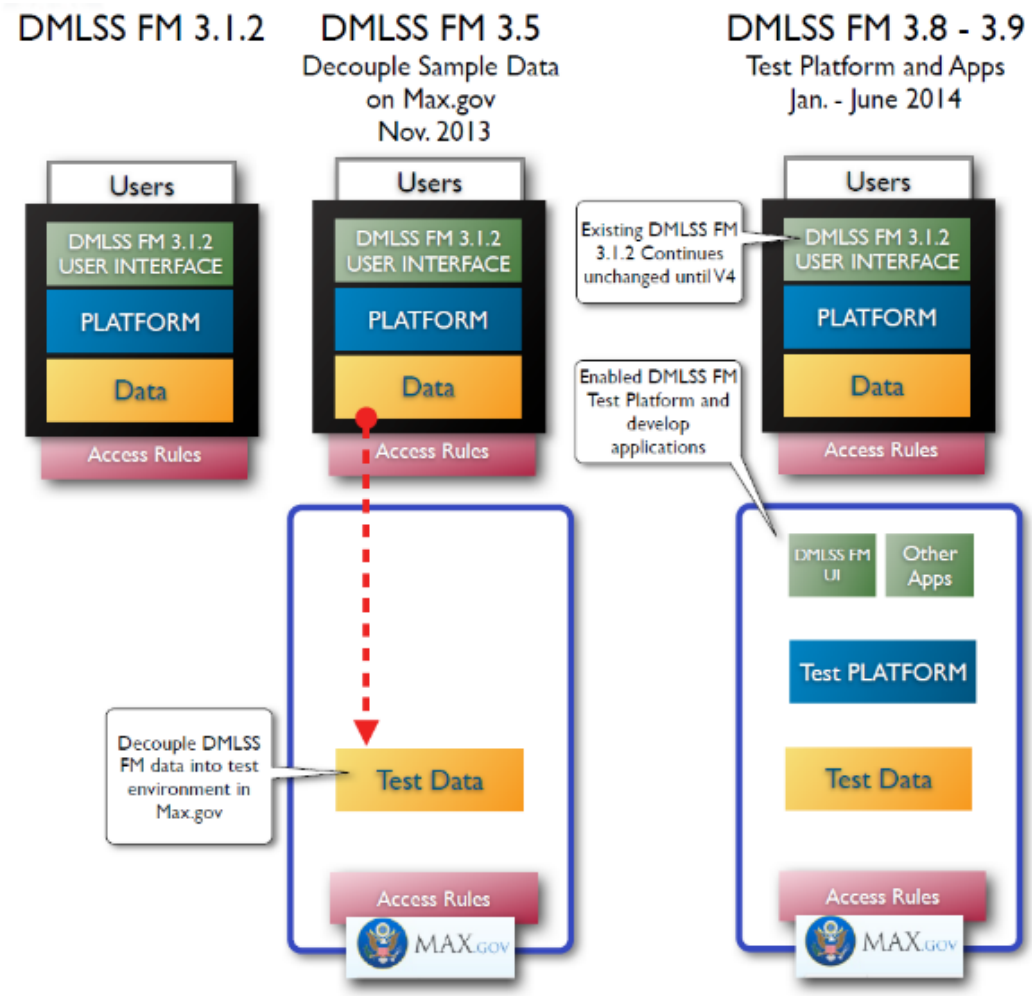


Figure 72: DMLSS-FM Testing and Apps in 3.8 - 3.9

3.9 Platform

As the tabular data portion of the DMLSS-FM continue to evolve, 3.9 will develop connections to CAFM and CMMS tools. This includes integrating GIS and BIM data using industry standards to guide the structuring of the data. It will also evaluate the current DrawBase files. It is possible a transition towards a more robust BIM-centric platform merits consideration to future-proof the growing use of BIMs to document buildings. The GIS interface will focus on making flexible, fast interfaces to quickly provide the total asset visibility that often hampers CMMS systems. There will also be a focus on being able to access this information on a wide variety of devices such as tablets and smartphones. These mobile capabilities will be tied together with user needs coming from the field as well as managers requiring a higher level roll-up view.

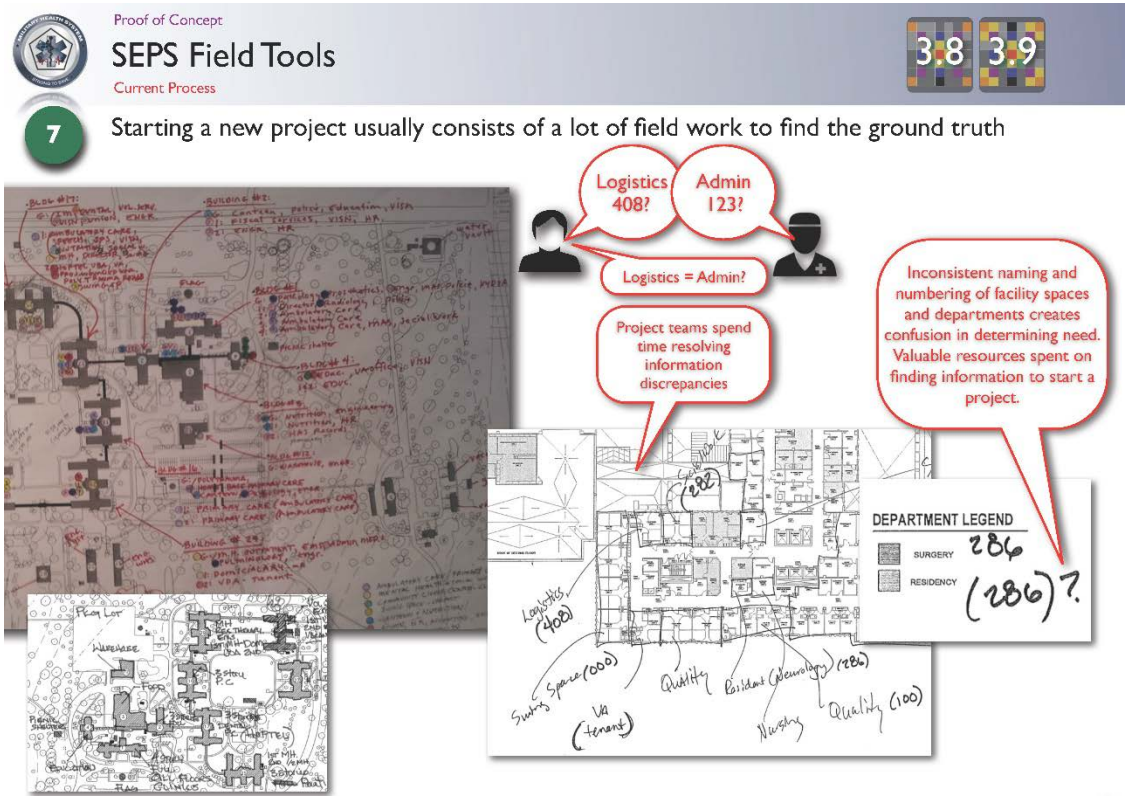


Figure 73: Support data collection in the field

4.0 Implement

DMLSS-FM 4.0 will not only be a mature application but also a mature ecosystem. This means the capabilities of DMLSS-FM will even manifest itself in different ways for different people depending on the views of data they require. The core engine will drive numerous "branches" of functionality that can continue to be developed and added upon in rapid, development cycles to respond to the growing changes that the facility management community faces.

DMLSS-FM 4.0 will be a fully matured application and ecosystem of tools and functionality that can be replicated for other enterprises. The potential to commercialize the application is greatly enhanced since the modular development principles can also be translated to other organizations that might need to tweak and customize the system.

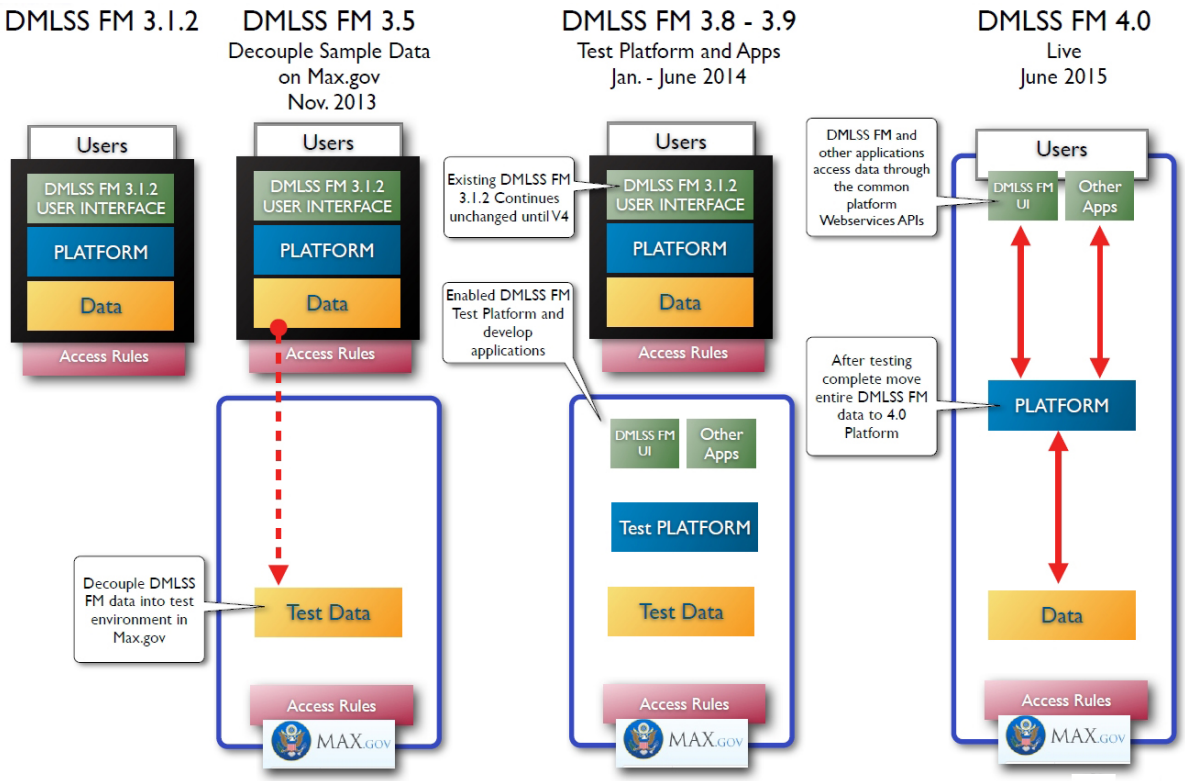


Figure 74: DMLSS-FM 4.0

8.0 Return on Investment (ROI)

The size and scale of the DoD Military Health Care Facilities is massive and to the extent improvements to the CAFM and CMMS functionality included in DMLSS-FM, the return on investment (ROI) can be significant. An April 2013 report from the DMLSS-FM servers, supplemented by JMAR, included the following:

Portfolio Size		
DoD MHS Total Healthcare Facilities	Facilities	4,200
DoD MHS Total Healthcare Facilities	GSF	80,000,000
Total Plant Replacement Value	PRV	**$40 Billion**
Active Rooms	#	**290,000**
Active Real Property Installed Equipment	# RPIE	**679,000**
Work Requests (1 Oct 2011 to 30 Sep 2012)	# FY 12	**784,000**
Active Facility Requirements	#	**25,000**
Value of Active Facility Requirements	$	**$7 Billion**
Active Projects	#	**10,000**
Preventive Maintenance Records	#	**104,000**
Regulatory Compliance (RC) Schedule Records	#	**2,400**
Drawbase Dwgs	#	**3,300**
Number of DMLSS-FM Users	#	**6,500**

Figure 75: Return on Investment

The work request process is one of many FM processes in DMLSS-FM that are ripe for improvement through both workflow innovation and cloud- and web-services based technology. For example, as a rule of thumb each work request can take approximately 60 minutes in time spent from clipboard to DMLSS data entry and in transit. That 60 minutes may actually take place over a period of several days, so the lag in inputting the information and having it available for enterprise reporting is a source of frustration. In the case of regulatory compliance or safety-related work requests, the lag in information can be more significant.

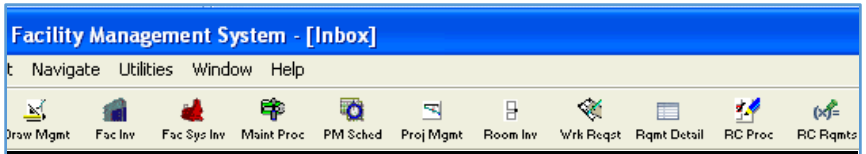
The following "back of the envelope" calculation of ROI improvements for the work request process by just 15 minutes per work request suggests a significant savings of almost $57 million over 5 years:

ROI "back of the envelope" Calculations			
Extrapolated Total Work Requests / Month		**65,333**	
Potential Savings / Month		**$ 946,891**	**See Note 1**
Potential Savings / Year		**$ 11,362,693**	
5 Year Savings		**$ 56,813,465**	

Note 1: Potential Savings assume that 15 minutes / work request is saved, with an hourly rate of a GS09 at $57.97, or $14.49 / work request. With about 65,333 work requests / month, the savings per month is $946,891, or almost $57 million for 5 years

Figure 76: Return on Investment

Work requests are just of one several key FM functions in DMLSS. If savings similar to the analysis for work requests were applied to these other functions, the ROI could be an order of magnitude higher in a new and improved CAFM and CMMS data ecosystem.



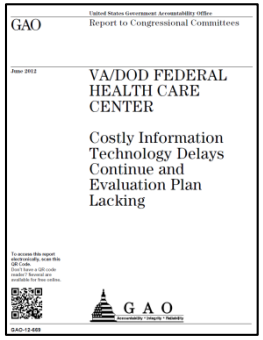
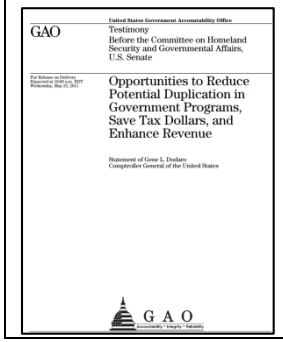
1) **Facility Inventory**
2) **Room Inventory**
3) **Real Property Installed Equipment (RPIE) Inventory**
4) **Maintenance Procedures and Preventive Maintenance (PM) Schedule**
5) **Budget Management**
6) **Work Request** -- Work below an established cost/scope threshold that will be executed immediately (generally within 6 mos, but governed by service policy)
7) **Project Management** – Work above an established cost/scope threshold that will be executed immediately (generally within 6 mos, but governed by service policy)
8) **Requirements** – Identified deficiencies/work that will NOT be executed immediately due to resources/funding constraints
9) **Regulatory Compliance (RC) Procedures and RC Schedule** -- Similar to PM Schedule module but for recurring management activities (inspections, safety training, fire drills, disaster drills, etc.) instead of RPIE items
10) **Drawing Management**
    a. Repository for Computer Aided Design (CAD) drawings for the site
    b. Utilizes Drawbase Version 6.4 (commercial-off-the-shelf CAD software)
11) **Business Objects** (commercial-off-the-shelf reporting software)
    a. Basic standard reports provided
    b. Powerful ad-hoc reporting capability using drag/drop user interface
12) **COBIE**
    a. Construction to Operations Building Information Exchange
    b. Ability to load Room and RPIE inventory into the DMLSS database from a spreadsheet compliant with the industry-standard COBIE format
13) **Joint Medical Asset Repository (JMAR)**
    a. DoD Corporate Data Repository (website) for the medical logistics enterprise
    b. The following Facility Management data is sent to JMAR weekly: Facility, Room, RPIE, Requirements Projects, Work Request Summary Costs
14) **Miscellaneous**
    a. Common Access Card (CAC) / Smart Card Login

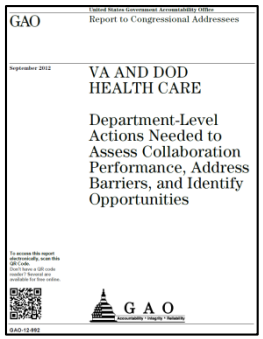
Robust User Privileging

Figure 77: Potential areas of improvement

Appendix

Appendix A: Government Initiatives to Improve Overall Data Management

	• OMB Digital Government: Building a 21st Century Platform to Better Serve the American People (May 23, 2012) • Makes case for a "mobile-first" vision towards data management • Unlock federal data and make accessible to the public to spur innovation • *"Early mobile adopters in government—like the early web adopters—are beginning to experiment in pursuit of innovation... Building for the future requires us to think beyond programmatic lines. To keep up with the pace of change in technology, we need to securely architect our systems for interoperability and openness from conception. We need to have common standards and more rapidly share the lessons learned by early adopters. We need to produce better content and data, and present it through multiple channels in a program and device-agnostic way. We need to adopt a coordinated approach to ensure privacy and security in a digital age."*
	• VA/DOD FEDERAL HEALTH CARE CENTER - Costly Information Technology Delays Continue and Evaluation Plan Lacking (June 2012) • Integration of VA and DoD medical health care experience costly delays in the area of Information Technology (IT) • *"...However, as previously reported by GAO, there have been delays implementing 1 of the integration areas—IT—which have resulted in additional costs for the FHCC, although the FHCC has been unable to quantify the total costs resulting from these delays. Despite an investment of more than $122 million for IT capabilities at the FHCC, VA and DOD have not completed work on all components required by the Executive Agreement, which were to have been in place in time for the FHCC's opening in October 2010..."*
	• Opportunities to Reduce Potential Duplication in Government Programs, Save Tax Dollars, and Enhance Revenue (May 25, 2011) • Testimony seeks to reduce waste by identifying and reducing redundant efforts • *"...We found that duplication and overlap occur for a variety of reasons. First, programs have been added incrementally over time to respond to new needs and challenges, without a strategy to minimize duplication, overlap, and fragmentation among them. Also, agencies often lack information on the effectiveness of programs; such information could help decision makers prioritize resources among programs. Lastly, there are not always interagency mechanisms or strategies in place to coordinate programs that address crosscutting issues, which can lead to potentially duplicative, overlapping and fragmented efforts...."*

	• VA AND DOD HEALTH CARE - Department-Level Actions Needed to Assess Collaboration Performance, Address Barriers, and Identify Opportunities (Sept 2012) • Improved collaborations between VA and DoD can lead to reduced overlap between these two separate health care systems. • Because VA and DOD collect, store, and process health information in different IT systems, providing access to information needed to best treat patients has proved problematic. • *"...VA and DOD do not have a fully developed process for systematically identifying all opportunities for new or enhanced collaboration. Instead, the identification of those collaboration opportunities is largely left to local medical facility leadership. Although the departments have a process for jointly identifying a select number of sites with opportunities for new or expanded collaboration, that process does not address all opportunities for collaboration across both health care systems and there is no requirement that sites identified by that process move forward to implement collaboration. Without a fully developed process to systematically identify and select additional collaboration opportunities, the departments may miss opportunities to achieve their shared goals and reduce duplication of services, such as through additional sharing agreements…"*
	• http://www.data.gov/ • *"A primary goal of Data.gov is to improve access to Federal data and expand creative use of those data beyond the walls of government by encouraging innovative ideas (e.g., web applications). Data.gov strives to make government more transparent and is committed to creating an unprecedented level of openness in Government. The openness derived from Data.gov will strengthen our Nation's democracy and promote efficiency and effectiveness in Government."* • *"…Public participation and collaboration will be key to the success of Data.gov. Data.gov enables the public to participate in government by providing downloadable Federal datasets to build applications, conduct analyses, and perform research. Data.gov will continue to improve based on feedback, comments, and recommendations from the public and therefore we encourage individuals to suggest datasets they'd like to see, rate and comment on current datasets, and suggest ways to improve the site…"*
	• http://www.whitehouse.gov/open • Three principles of **transparency**, **participation**, and **collaboration** form the cornerstone of an open government. • Empower the public through greater openness and new technologies to influence the decisions that affect their lives. • See DoD and VA data scorecard

	• http://www.usaspending.gov/ • Provide the public with information about how their tax dollars are spent • Provide greater transparency about federal grants, loans and contacts • Provide an immense amount of data in easy to view charts and graphs, leveraging modern, web-based interfaces with simple “point and click”. Minimal training to use.

DoD IT Enterprise Strategy and Roadmap

“DoD information environment is overly complex and susceptible to exploitation through these myriad devices, systems, and standards by malicious actors intent on causing harm to national interests.”

Initial DoD plans will result in—

- 32% reduction in data centers
- 30% reduction in racks
- 25% reduction in servers

DoD plans to further reduce the number of data centers to 428 by FY15 (32% reduction from FY10)

DoD CIO

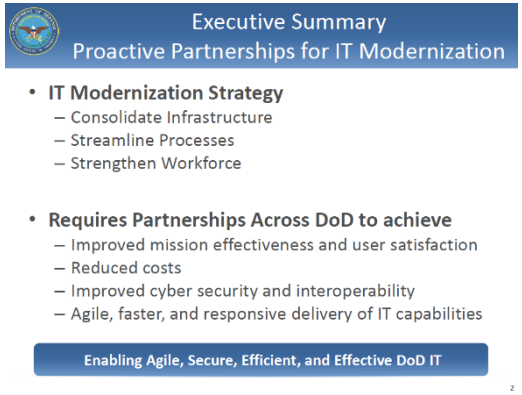


Figure 78: Executive Summary - Proactive Partnerships for IT Modernization

DoD Cloud Computing Strategy July 2012

DoD CIO: "implement cloud computing as the means to deliver the most innovative, efficient, and secure information and IT services in support of the Departments mission, anywhere, anytime, on any authorized device..."

DoD BCL

DMLSS-FM needs to be updated in DITPR, plan for BEAV10, and plan to follow the BCL process.

Appendix B: Industry Outreach

The following letters demonstrate a sampling of the vendors and design professionals who are ready to capitalize on the availability and interoperability of government data as outlined in this roadmap. This illustrates the compounding benefits of implementing open data standards through web-services. In addition to better coordination between governmental personnel, there is the potential to leverage research and development efforts and from parties already embracing this growing trend.

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B1: Balfour Beatty Construction – Case Study on SEPS Experiences

Balfour Beatty Construction

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Potential Balfour Beatty case study thoughts for SEPS experiences

We welcome the opportunity to continue to provide feedback on the focus on the Onuma, Inc. SEPS case study and report in hopes that we can help evolve and make better data transfer and exchange for healthcare.

The case study we are envisioning, based on Balfour Beatty's experience with SEPS from past projects, will come in two phases:

1) Outline of our thoughts for feedback and inclusion in Onuma's 80% report to NIBS contained in this memo.
2) White paper case study. This would organize and elaborate on the Bulleted Outline.

Jason A. Reece

Contact information:

Please contact Jason Reece with any questions regarding this outline

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Process of interfacing with SEPS and Federal entities using that system

1) Any design-build (DB) federal hospital starts with someone in the government developing a Project Room Contents (PRC) list. There is also a Program For Design (PFD) that outlines the general design requirements of a facility or campus that the design build team must also conform with.

   The PRC, an output of SEPS, is part of the governments RFP and the DB Team is expected to use this list as the basis of design for room type counts, room sizes, and room contents. Often the PFD and the PRC are in conflict with each other, as the PFD information is an independent document that is not contained within SEPS.

2) Immediately after the start of design, the SEPS database information is transferred over to the internal working of the design team. This is a means and methods process driven by the business tools of the designers. This includes various tools like BIM, Excel, and Access depending on the team.

   At this stage the PRC is immediately outdated. The actual design and subsequent decisions made by the design build team represent the true nature of the design. A one to one comparison of the SEPS program to the design is not possible and the team must reconcile the differences manually.

   Often the RFP information is stale before the contract is awarded. The government KO may be making changes to the SEPS database as they engage more with the end users of the facility.

   Prior to award, any changes made after the most recent printed form of the PFD and PRC that are not reflected in an amendment to the solicitation are already lost to the competing offerors. After contract award, the same risk exists, but becomes compounded as more changes are made in SEPS that are not communicated via a contractual vehicle to the design build contractor via the KO's office.

   - Not everyone on the government side of the equation understands or agrees with this premise.
   - The data is inherently old which many items being obsolete and pricing/budgets can be off by multiples
   - As long as SEPS is using JSN's, you at least have consistency across 2 or 3 potential commercial products. However, at Walter Reed, SEPS didn't have the capacity to add simple data to allow us to track data by "design" room number. We wanted to bring design data into SEPS to help create a means to relate design room numbers to SEPS rooms, but could not do so.
     - The primary key in the database was first by department then room name.
   - The JSN, which is the primary ingredient of SEPS, is a strong piece of data since it allows you to pull up all the specs

   For the SEPS program to be most useful, it should use similar fields as a designer would:
   - bldg,
   - level,
   - room #,
   - dept,
   - room name,
   - guide
   - plate/room
   - etc.

   Some of those exist, but you really need all of them when you get into the procurement and construction phase after NTP.

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required of any piece of equipment (spatial allocation and footprint, MEP utilities and R/I requirements, etc).

- The advancement of commercial healthcare products is far outpacing the update and maintenance of the master JSN book (MIL-STD 1691) when its most recent update was April 2011 (see http://www.wbdg.org/ccb/M1691/1691.pdf).

3) The original PFD and PRC is used as a benchmark to compare room counts and room contents bought at contract to what a hospital design contains in progressive design iterations. This comparison is necessary so that the government can ensure themselves that they are getting what they bought (due diligence).

- There is no good method to catalog design changes (agreed upon with the government) within SEPS. SEPS appears to be output only and provides reports as a snapshot in time. Keeping SEPS up to date with design would be a manual process, and is not something that the government does.
- There is no versioning tool, that can catalog changes from the original SEPS to a current SEPS that represents agreed upon design changes.
- There is not a mechanism where SEPS reads and records changes directly from an output derived from a design model (BIM).
- The project design team can easily be delayed in making efficient progress when they have to re-visit previous decisions and discussions with people that were uninvolved during the original conversation.
  - These individuals typically insert themselves late into the process questioning settled issues.
  - This may be more of an organizational challenge than a SEPS related issue, but it adversely affects the efficiency of design.
  - NAVMED personnel have no contractual relationship with the design build team which made NAVFAC the middle man when our design did not match their SEPS lists.
- Changes from the SEPS derived PFD and PRC are typically cataloged outside of SEPS on comparison spreadsheets. This is excessively time consuming and produces a third or fourth tracking mechanism for accurate program data.
  - SEPS has no "change request" interface for end users to submit requested changes for approval prior to incorporation into the live database.

Change management
Ideally, each change to the room counts and equipment lists needs to be identified with:

- Reason/Cause
- Date/time stamp,
- Persons involved in the discussion.

Doing so would likely save an enormous amount of time. BBC uses our proprietary system, EquipWare to do as a response to this very issue.)

It may be possible to quantify time saving in a qualitative way a post-project exercise.

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  - The "comparison" spreadsheets did the job, but tracking down what RFI, MOD, Design Review Session, etc., led to a change in the design model that subsequently made a change in the equipment list and was a cumbersome task.
    - This was and is a huge issue as there is limited information tracking all the room and equipment changes back to the RFP's.
    - Many times the RFP did not agree with what the design team or HFPA expected.
- Some Government Equipment Planners continued to use SEPS after design started to make changes to the SEPS database based on input they received from their User Groups. The Government Equipment Planners would then complain that a Designer provided Equipment List extracted from a more mature design model did not match.
  - This led to a frustrating "do loop", where we be continually trying to determine/explain and re-explain why SEPS data differed from the design.
  - They fundamentally did not understand that the ONLY valid count of equipment and room MUST come from the design model, not their SEPS database.
    - This is the only thing that we are planning. When you are in a FFP situation this gets more difficult to manage as scope can creep.
- In some occasions, the government equipment planners were reluctant to inform the Design Team of changes outside of issuing an official a MOD.
  - Contractually, this is correct procedure.
  - However, sometimes the Design Team was being held accountable for not making design changes that were still unofficial and in negotiation.
  - It would have been beneficial if SEPS had a mechanism to catalog or identify FUTURE contract modifications so as to not confuse Government reviewers and planners that still have to execute the contract. Again, this might be remedied by having a more transparent interface with SEPS.
- Examples - Developing a consensus at Walter Reed on the final equipment list:
  - Due diligence team reviewing: Us, the Designer of Record, and NAVMEDNCA.
  - We went through every room over a three week period with about 8 designers from Dallas. This was

One consideration to reduce a lot of re-coordination and reconciliation should be that all hospitals should use a dedicated design build division 10 subcontractor/designer.

It would allow for vetting and selection of acceptable equipment prior to IFC documents.

This which would eliminate having design docs with a sample JSN material or piece of equipment that is different from what is ultimately procured through subcontracting, submitted, approved, furnished, installed, and commissioned or accepted.

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necessary due to two equipment lists developed in parallel, but separate paths:

- The design PRC
- NAVMED's SEPS list

- Once equipment lists were reconciled, we needed about 5 people between C-BB, W&S, NAVFAC, and NAVMED to reconcile the equipment list, but could have used 8-10.
- Only in certain circumstance was the design team asked to meet with the end users. This led to later confusion as the HFPA teams got more comfortable with meeting directly with the users then issuing changes to the design team.
- Eventually we created an access database to manage this data, and had a PE dedicated full-time to coordinating all RFI responses, submittal comments, shop drawing and coordination efforts, etc.
- A major difference between the private sector and the federal is that the Log Cat C validation is done after design, instead of during. This led to many "in-place" changes and rework during construction.

4} If we had our way:

- SEPS access provided to Design Team?
  - Today, you can get it, but have to have a recommendation and support from the military side. It would still provide minimal value without better interactive data that relates to the design.
- SEPS would record when and why changes were made.
  - We do this in our system now due to the issues above, creating an inefficiency in database reconciliation, but negating a contractual nightmare.
- SEPS could be synched with Design Model?
  - They would have to take our flat file output and input into their system.
  - It is possible that this might not provide a high value unless back-feeding SEPS would be useful downstream to the client.

5} Other questions:

- Why even use SEPS after handoff to a design team? What is the need?
  - No current need to do this from a DB perspective, after award, the design must be compliant with the original RFP; everything else is done through a mod, not through SEPS.
  - The SEPS data is too old and we would spend more time updating it than using our own system.

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- Technology Refresh: How did this happen? Did it happen? I assume it was handled outside of SEPS.
  - They supposedly update the system constantly but they contract out this service and as we have seen over and over the data is anywhere from 4 to 10 or more years old. Great examples of the lack of JSN's for equipment booms or even integration packages for the OR's
  - SEPS' usefulness is limited by both the care and maintenance of the MIL-STD 1691 equipment itself, as well as the complexity of integrated suites, eg:
    - The difference between a Siemens Symbia T and T16
    - The difference between a Varian Trilogy Tx, Novalis Tx (same thing with Brain Lab attached), and Tomotherapy, all of which had the same JSN designation (X8710) in SEPS (later appended with an alphabetical suffix like 8710A, 8710B, etc)
    - Motek's CAREN lab with its dozen or so options
- Dealing with late equipment changes.
  - Requires the right people with the right tools, and a clear understanding of what's in contract vs. post-award wishlist.
- Coordinating the eventual equipment purchases were handled outside of SEPS…?
  - We upload all the final EQ list data into our system and then conduct user meetings to validate as well as ensure the make, model and accessory selections.
  - We never put it back into SEPS and in the end we have to hand jam it into DMLSS. The DMLSS will not take data from SEPS or even a flat file such as Excel.
  - Requires the right people with the right tools, and a clear understanding of when preliminary coordination docs are required from the vendors.
  - Ideally the government would pay us to manage the PO's under a separate cost plus contract with BRG so we avoid late coordination of the infrastructure needed.

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B2: Aditazz Position on Machine Readable Data

ADITAZZ

We improve patient care through a radical new approach to the design of the built environment.
Better buildings. Faster execution. Lower Cost
http://www.aditazz.com

March 20, 2013

To Whom It May Concern:

Planning, Designing and Building modern healthcare facilities pose some significant challenges today. This is further amplified by project delays, rising costs and increased complexity throughout the whole process. As a result, the single biggest capital expense in a healthcare provider's budget is usually obsolete by the time it is built and ready to operate.

At Aditazz, we have a new approach that integrates innovations across technology, design, and manufacturing to meet the challenging demands.

The Aditazz approach is based on a revolutionary technology platform, which is called the Aditazz Realization Platform or ARP. This technology is derived from the world of integrated circuit design and scales to specifically address the challenges.

Specifically, the benefits include:

- A transparent planning and design process. This process allows all stakeholders involved to easily and objectively compare the various options and make data driven tradeoffs. This results in designs that meet specific operational performance and efficiency metrics.
- Rapid realization. Shrink the design plus construction time by 30% or more.
- A 10% reduction in first cost.
- A process that allows consistency in design and scales across multiple building and project types. This translates to savings in operations cost of up to 10% or more.

The Aditazz innovation will harness exponential benefits, enabling our clients to achieve their goals of better care, under the imperatives of today's needs for improving the health of populations and reducing the per capita costs.

In order to truly enable our vision, it is imperative that we seamlessly integrate our technology platform with our customer's requirements, which is represented by their data. We can achieve unprecedented efficiency by digitally integrating our platform with our customer's platform using standards based (web) technology. At a minimum, if our clients can provide us with machine readable, digital input data and accept our results in the same way, we will make a major leap forward together.

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B3: Observations on the use of SEPS data with CodeBook

CodeBook

Observations on the use of SEPS data with CodeBook

Document produced by

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www.CodebookSolutions.com 25 April 2013

CodeBook

Observations on the use of SEPS data with CodeBook

1.0 Introduction to CodeBook

CodeBook has established itself as a collaborative software tool for design and construction professionals across the globe, used on complex projects as diverse as hospitals, airports and schools. It's the vital link enabling smooth and easy bi-directional interoperability between all major CAD systems and a growing number of design, construction and facility management software applications.

CodeBook provides tools to create and develop project programs, link and share both FFE and Room Data with BIM models and validate and analyse the design against the program. CodeBook can be used at all stages from project inception through design and construction, including the needs of building owners and operators.

2.0 Importing SEPS data into CodeBook

In addition to creating programs directly within CodeBook, there are wizards provided to import programs and room data from Excel files. These files are often the output of specialist programming software tools. CodeBook can also re-export the data back to an Excel file at any stage during the design and construction phases.

CodeBook has been used successfully with SEPS programs using this method, but the use could be enhanced if the links between the SEPS program and CodeBook could be dynamic and bi-directional.

3.0 Implementation Observations

We recently carried out some consultancy that involved creating xls file output from SEPS and importing this to CodeBook for use by the design team. During this process we identified several issues that might impact the effectiveness of the process.

- the outputs from SEPS required manual manipulation of the files to ensure each room had a unique identifier. The room number was not suitable for this, because there were duplicates.

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www.CodebookSolutions.com 25 April 2013

CodeBook

- It was observed that if the program was altered in SEPS, the entire import process would have to be repeated, because without a unique identifier for each room or FFE item a merge of the new data was not possible. This would result in the loss of any data the designers may have created in CodeBook and also break the links between CodeBook and the cad or bim models.
- Without the ability to merge project variations, the designers need to update their project data manually, wasteful of effort and likelihood of introducing errors.
- The SEPS output didn't indicate whether any variations to the standard room types had been applied to any of the rooms. One of the things designers will do with CodeBook is create template room layouts that can be used to automate the room loading process, and it is important that the designers know where there are variations to the standard.
- The design and construction phases will result in variations to the program, there doesn't appear to be a method to feedback these variations to the original program. This may include assets not originally in the program, such as power, lighting etc.

4.0 Improvement to Data Sharing Process

At the most basic level, a unique identifier for each Room and FFE asset, would allow developers such as CBi to provide a better data transfer experience for the designers.

At a higher level, these identifiers should be combined with a windows server that allowed bi-directional data transfer avoiding the need for the manual xls stage. A most important value in this, is that updates and revisions to the program would be merged directly to the design team's CodeBook database, so they can use the CodeBook tools to validate that their design fully meets the new requirements. It would also allow CodeBook to write back to the program any agreed variations made as part of the design or construction phases.

We would be happy to discuss these issues further, and if appropriate to assist with any proof of concept studies that might be appropriate.

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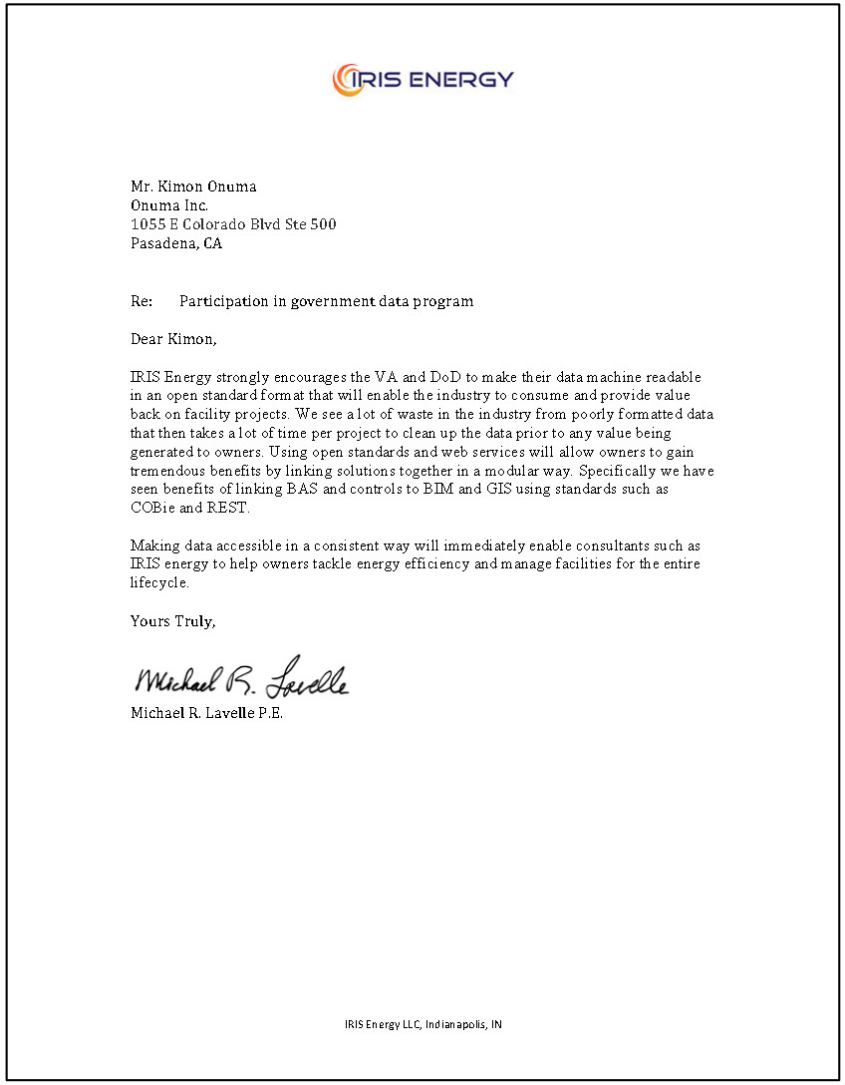
B4: Iris Energy – Participation in Government Data Program



IRIS ENERGY

Mr. Kimon Onuma
Onuma Inc.
1055 E Colorado Blvd Ste 500
Pasadena, CA

Re: Participation in government data program

Dear Kimon,

IRIS Energy strongly encourages the VA and DoD to make their data machine readable in an open standard format that will enable the industry to consume and provide value back on facility projects. We see a lot of waste in the industry from poorly formatted data that then takes a lot of time per project to clean up the data prior to any value being generated to owners. Using open standards and web services will allow owners to gain tremendous benefits by linking solutions together in a modular way. Specifically we have seen benefits of linking BAS and controls to BIM and GIS using standards such as COBie and REST.

Making data accessible in a consistent way will immediately enable consultants such as IRIS energy to help owners tackle energy efficiency and manage facilities for the entire lifecycle.

Yours Truly,

Michael R. Lavelle

Michael R. Lavelle P.E.

IRIS Energy LLC, Indianapolis, IN

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B5: Onuma Open Letter To Government Agencies

Onuma, Inc.
1055 E. Colorado Blvd. STE 500
Pasadena, CA 91106
626-793-7400

Thursday, May 16, 2013

Open Letter to Government Agencies

Founded in 1988, we are a Pasadena, CA, technology company. Onuma, Inc. has worked on many projects with the federal government. We are very pleased and excited to see the growing trend and effort the government has been making to improve and modernize their entire approach to better data management. Since information provides the backbone for making informed decisions, it is very encouraging to see initiatives such as the Digital Government: Building a 21st Century Platform To Better Serve the American People. This opens the door to creating new innovations that keeps pace with the information age.

Developing software and providing technology consultation, we have built a business implementing open industry standards. We see the mark of successful, scalable, future-proof data management to be more about how flexible and interoperable one structures their data and enables any open solution to connect to the authoritative source of data. Information is an asset and it must not be trapped in any one proprietary solution. It is proven that a services oriented approach to data that is shared across solutions provides the most flexibility and value. Example concepts included in this Road Map for DMLSS FM demonstrate some solutions that are just the beginning of what is possible. As government agencies make their data more machine readable it will rapidly result in many more solutions. By implementing the approaches outlined in the DMLSS FM Road Map, we strongly believe that the Department of Defense Military Health System could be the catalyst for this change.

Very sincerely,

Kimon Onuma, FAIA

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