



Homeland
Security

United States
Coast Guard



National Academy of Sciences
Government / Industry Forum
Engineering, Construction, and Facilities Asset Management: A Cultural Revolution

October 31, 2006

BIM: Agency-wide Actions

A Mission Centric Look at Portfolio and Asset Management



Presenter
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Office of Civil
Engineering
U. S. Coast Guard





Overview

Standards based Building Information Modeling

Experiences of a Government Owner-Operator with new business practices and technologies:

- What we intended to achieve
- What we did differently to achieve it
- How we will measured success



What we intended to achieve

Organizational Transformation

- Move from a locally focused sub-optimized facility engineering perspective...
 - To an enterprise-wide asset and portfolio management organization focused on managing \$7.5B PRV for CG-wide Strategic Outcomes.
 - Link Facilities to Mission Outcomes.
 - Achieve 17% to 33% recurring savings in how we deliver services.
 - Achieve CFO Act Audit Certification (Sarbanes/Oxley).
-



What we did differently

- **Reengineered Processes**
- **Identified Enabling IT**
- **Instituted Organizational Change**



Be an Info-Centric Organization

Framework for Integrated Decision-Making

Essence of this IT-Enabled Enterprise Framework:

- Moving away from building-centric and project focus
 - Moving to a portfolio-based, business process linked to strategic outcomes
 - Integration of individual asset portfolios; i.e., Buildings, Cutters, Aircraft, Logistics, IT and HR
 - Continuous horizontal flow across the organization
 - Break down of the traditional structure of professional and trade disciplines and traditional stove piped software development
 - IAI-IFCs and IFGs important because they enable the horizontal process flow through an open architecture and international standards
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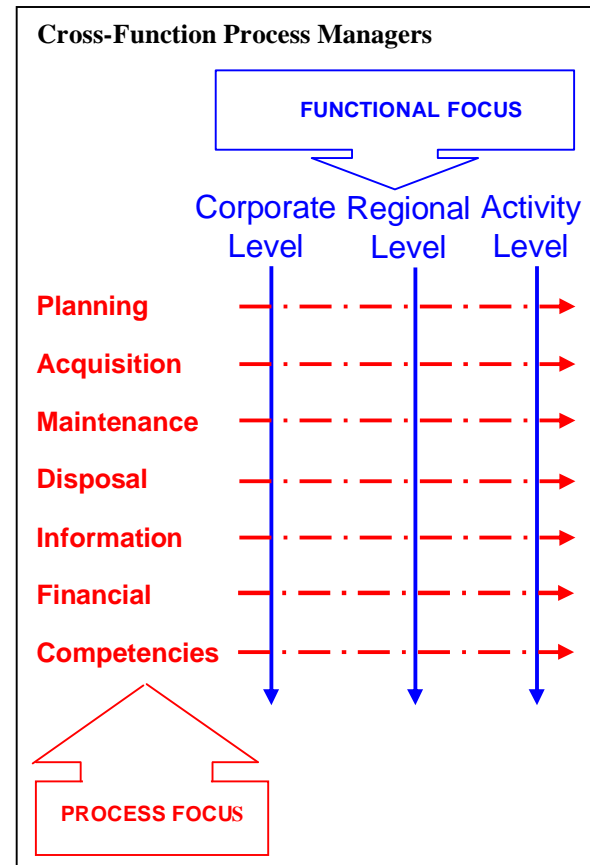
Process Focus

Horizontal Cross-Functional Alignment

Cross-Functional Mgmt Recognizes that:

- *Process, or how we get things done* must be treated as a strategic corporate priority.
- Competition is won by treating all parts of the organization as a single unified whole.
- Critical cross-functional shore infrastructure processes managed by process managers.

Dimancesu



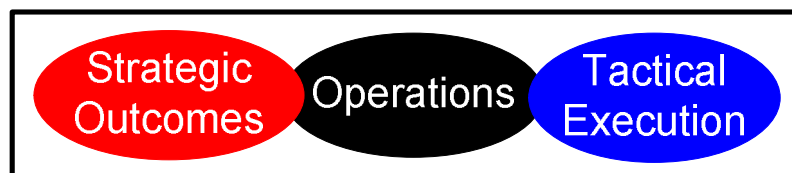


Process Reengineering

Vertical Value Chain Alignment

Process Alignment

- Link and align daily tactical activities to agency-wide strategic outcomes.



Value Chain

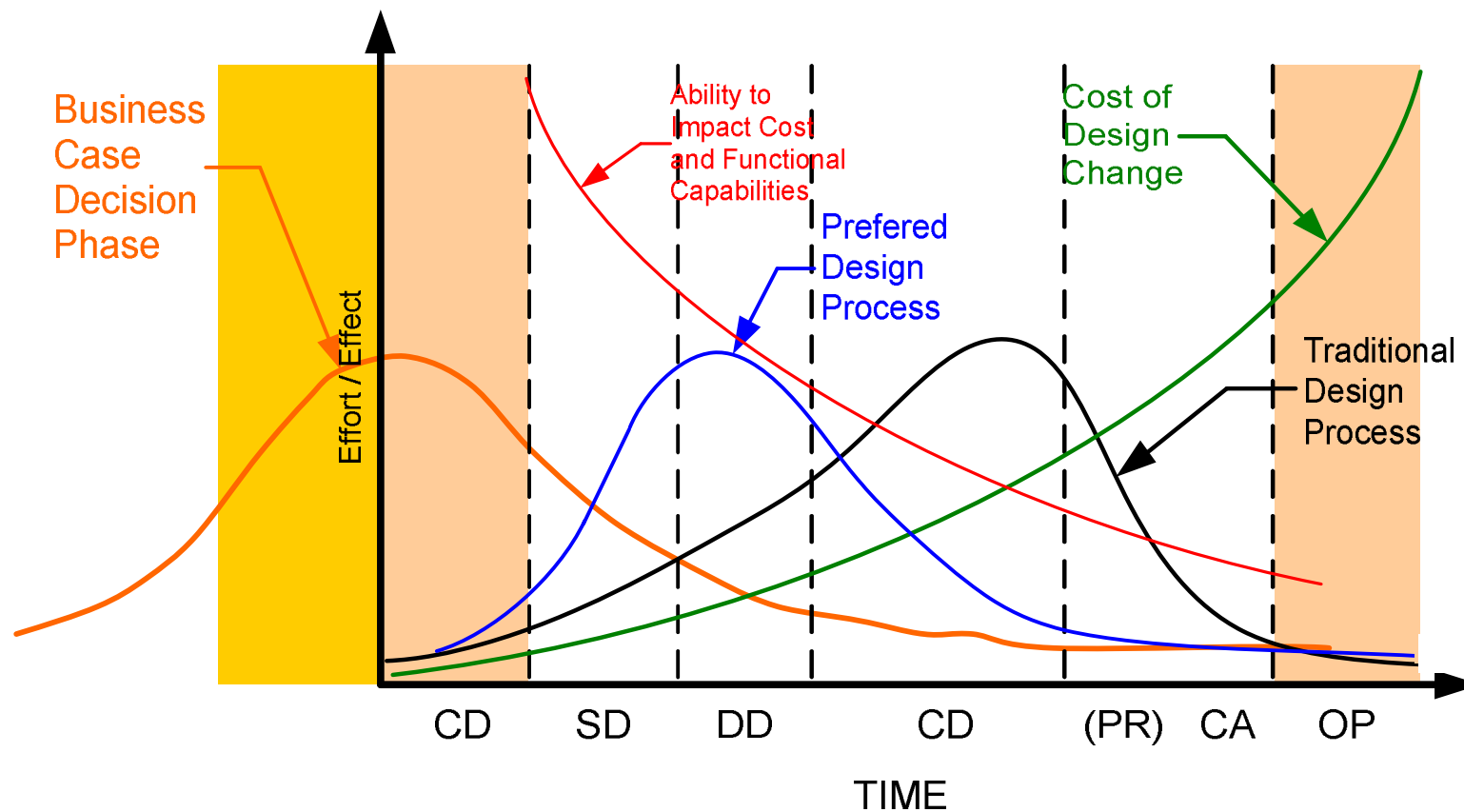
- Link facility capabilities to operational requirements: **our customers**;
- Link operational capabilities to mission requirements
- Link mission capabilities to public demand for goods/services: **our customer's customer**.





Left Shift in Decision Support

Simultaneous Life Cycle-Spanning Business Case

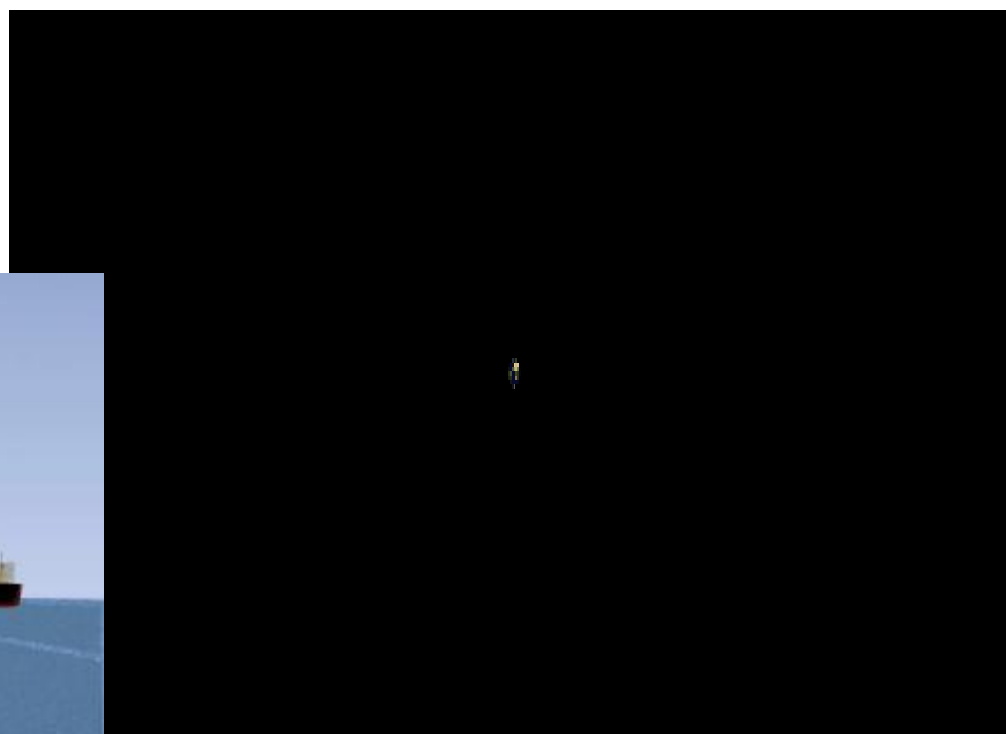
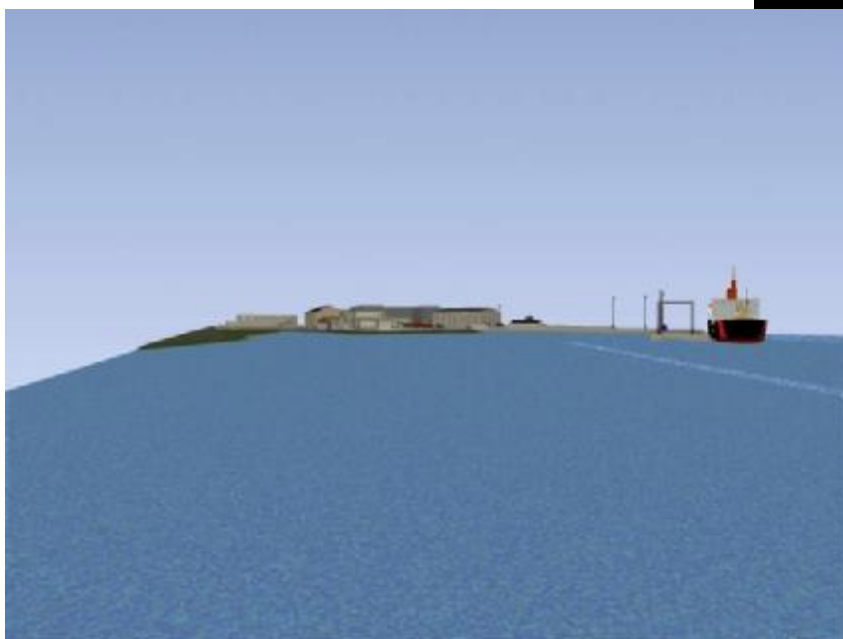




Combined BIM and GIS Strategy

Capital Assets are Part of the Common Operational Picture

Managing Operational
Req'mts, Infrastructure
Capability, and
Organizational Needs.





Capital Asset Management Portal

Access to Aggregated Database and Graphics

CAMP combines and displays portal tools and data views supporting Portfolio Management and Integrated Decision-Making and Value Chain.

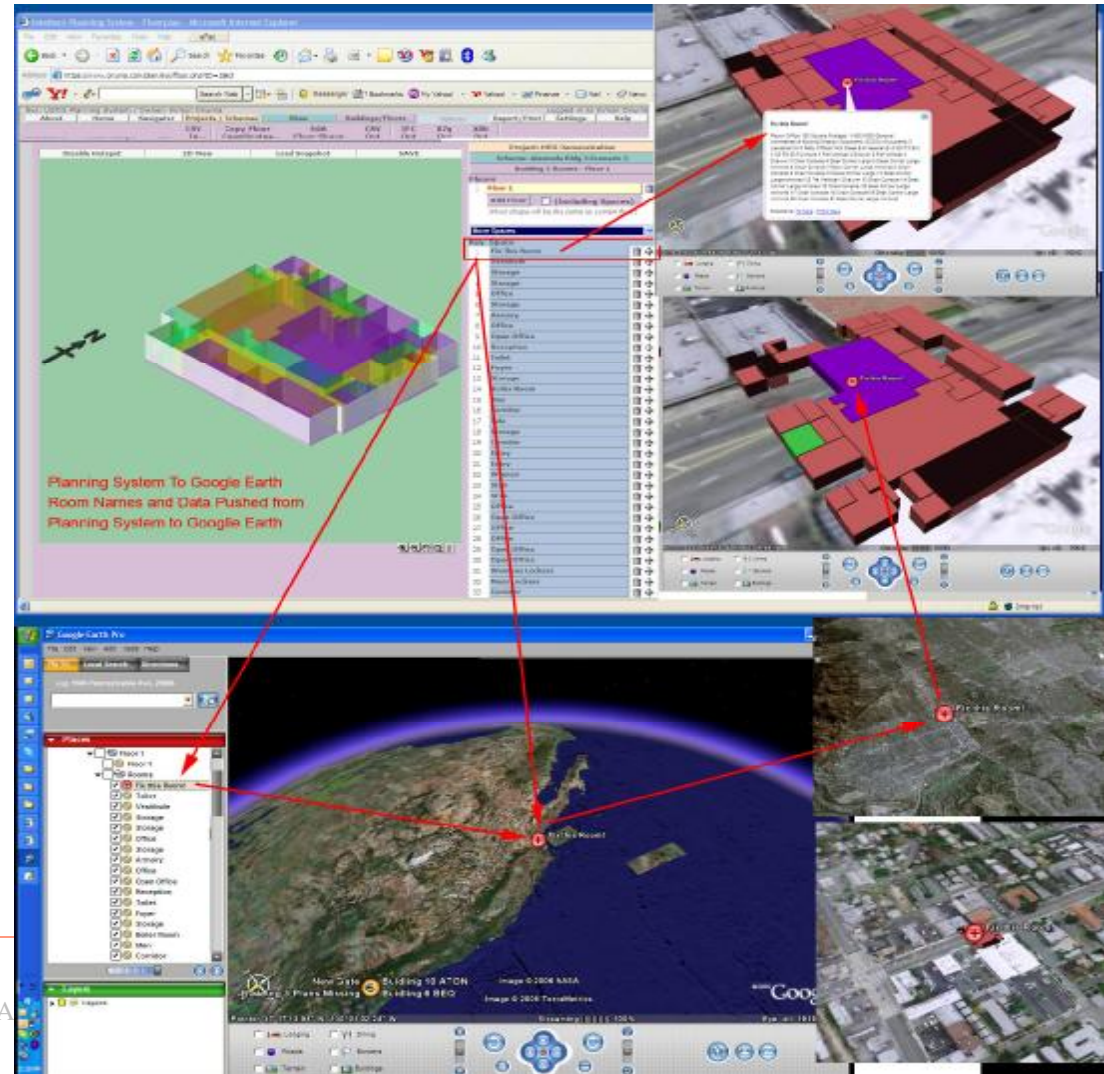
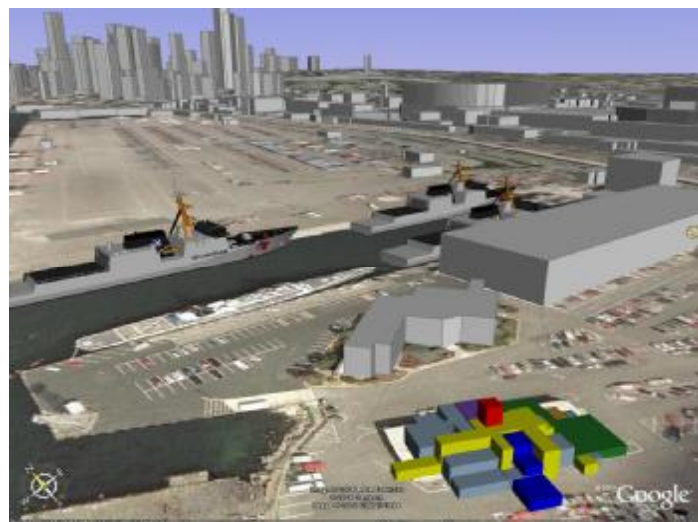
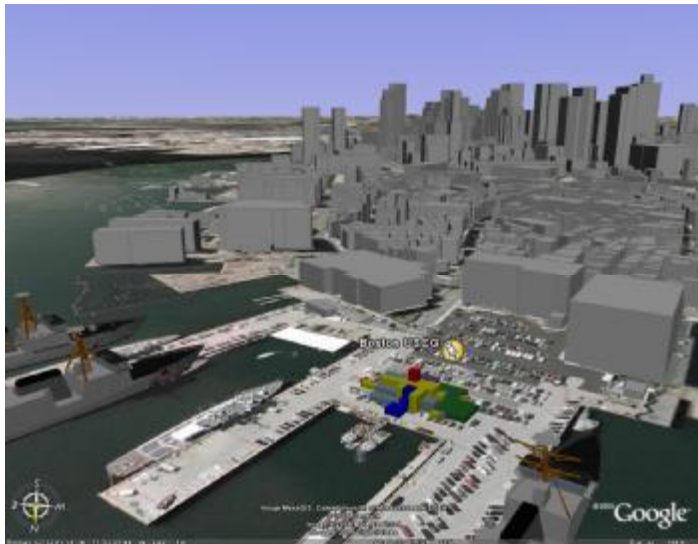
- Portfolio Management Links Supply and Demand Side of Scenario Based Mission Planning:
- Real Time Mission Readiness
- Scenario Based Business Case Development
- Automated Planning Documentation and Web-enabled Approval Process
- Value Chain as Web-enabled Workflow





Combined BIM and GIS Workflows

Multiple Data Sources Accessed through CAMP

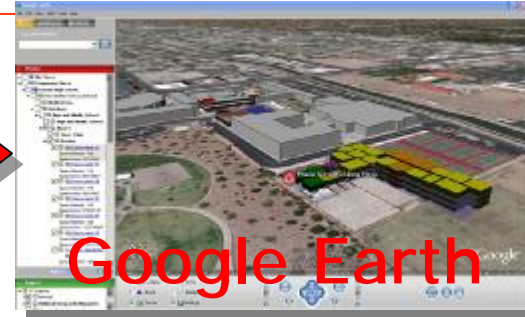
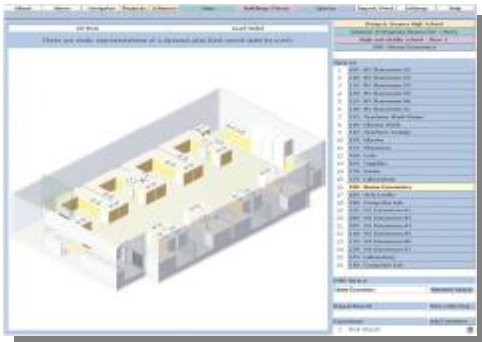
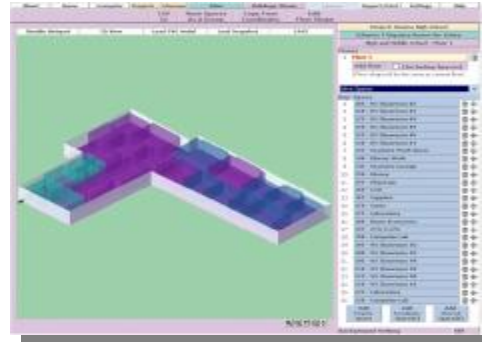
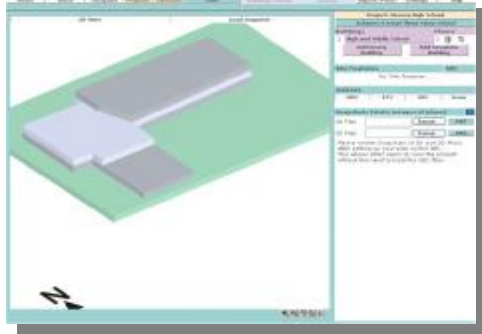




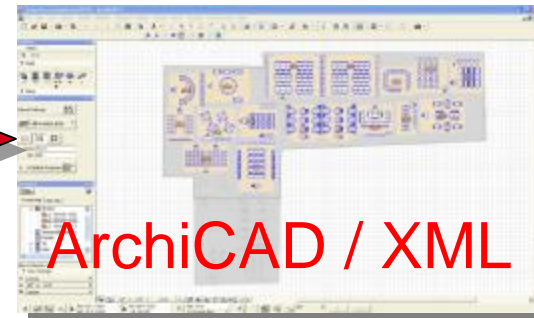
Combined BIM and GIS Workflows

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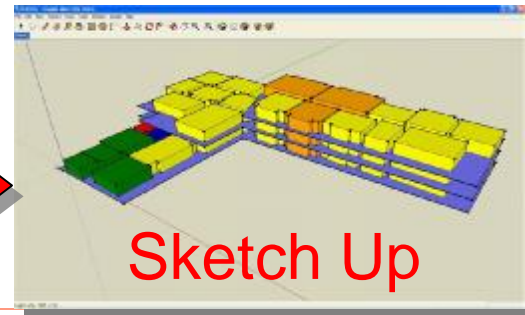
Onuma Planning System



Google Earth



ArchiCAD / XML

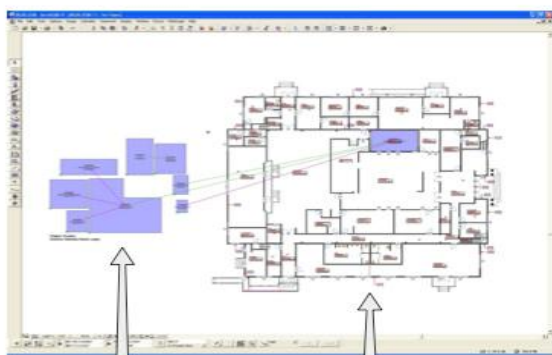


Sketch Up



Rapid Planning Tools Fit Into BIM

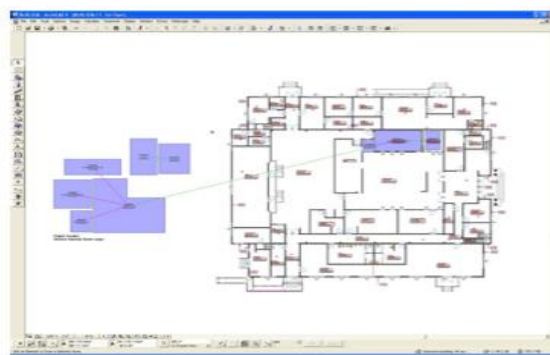
Integrated Planning & Business Case Decisions



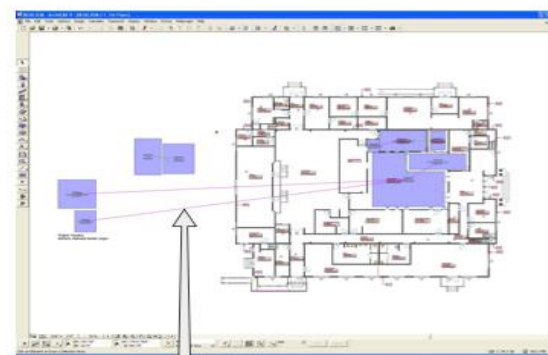
PROPOSED (APPROXIMATE) PLAN FROM SECTOR TOOL

PROPOSED (APPROXIMATE) PLAN FROM SECTOR TOOL

PROGRAM ELEMENTS (ROOMS) IMPORTED TO EXISTING FLOOR PLAN FROM SECTOR PLANNER



PROGRAM ELEMENTS MOVED INTO FLOOR PLAN OF EXISTING FACILITY/BUILDING



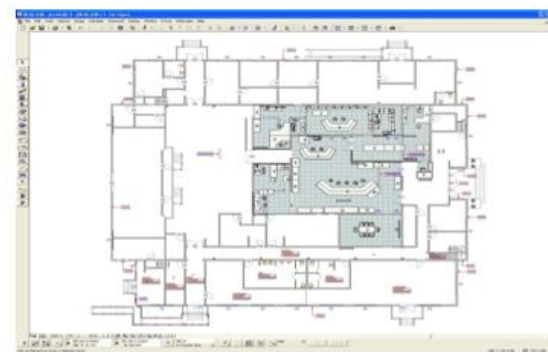
ADJACENCY LINKS MAINTAINED IN ARCHICAD DURING PROGRAM FITTING



APPROXIMATE FIT OF 'IDEAL' PROGRAM INTO EXISTING BUILDING.



SHOWING DETAIL OF PROGRAM ELEMENTS PLACED INTO FLOOR PLAN



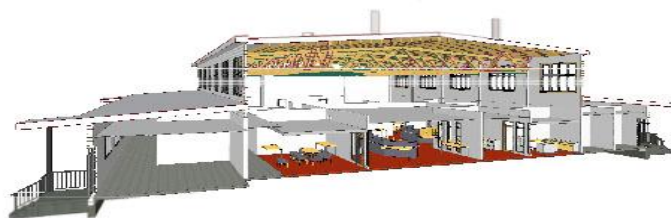
FINAL ADJUSTMENTS MADE ACCORDING TO PROGRAM ELEMENTS, FURNITURE, EQUIPMENT & FLOOR SPACE.

SECTOR COMMAND TOOL - PROCEDURAL GUIDE



Rapid Design Tools Fit Into BIM

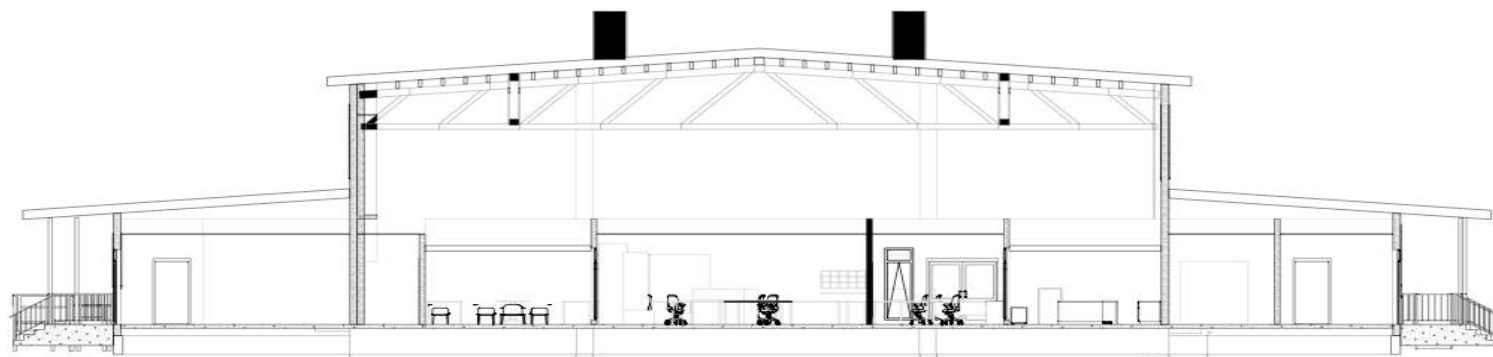
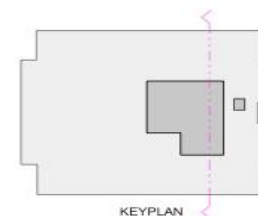
Rapid Project Execution of Chosen Business Case



1 Section
NTS



3 Perspective Cutaway
NTS



2 Section A
3/16" = 1'-0"

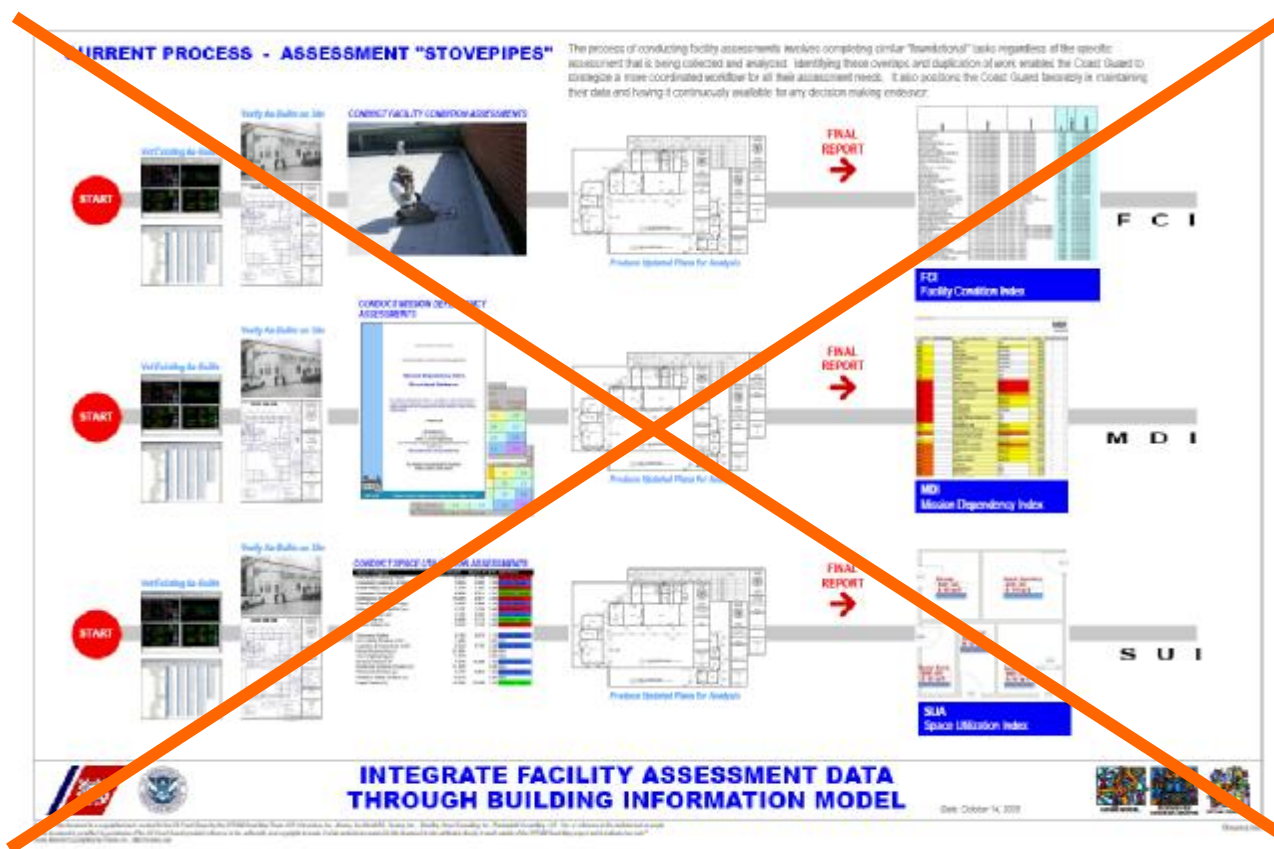
SECTIONAL VIEWS - BUILDING 3



Inefficient Workflows

“Stove-Piped” Data Collection Diagram

Efficient Integration of Numerous Data Points is Required

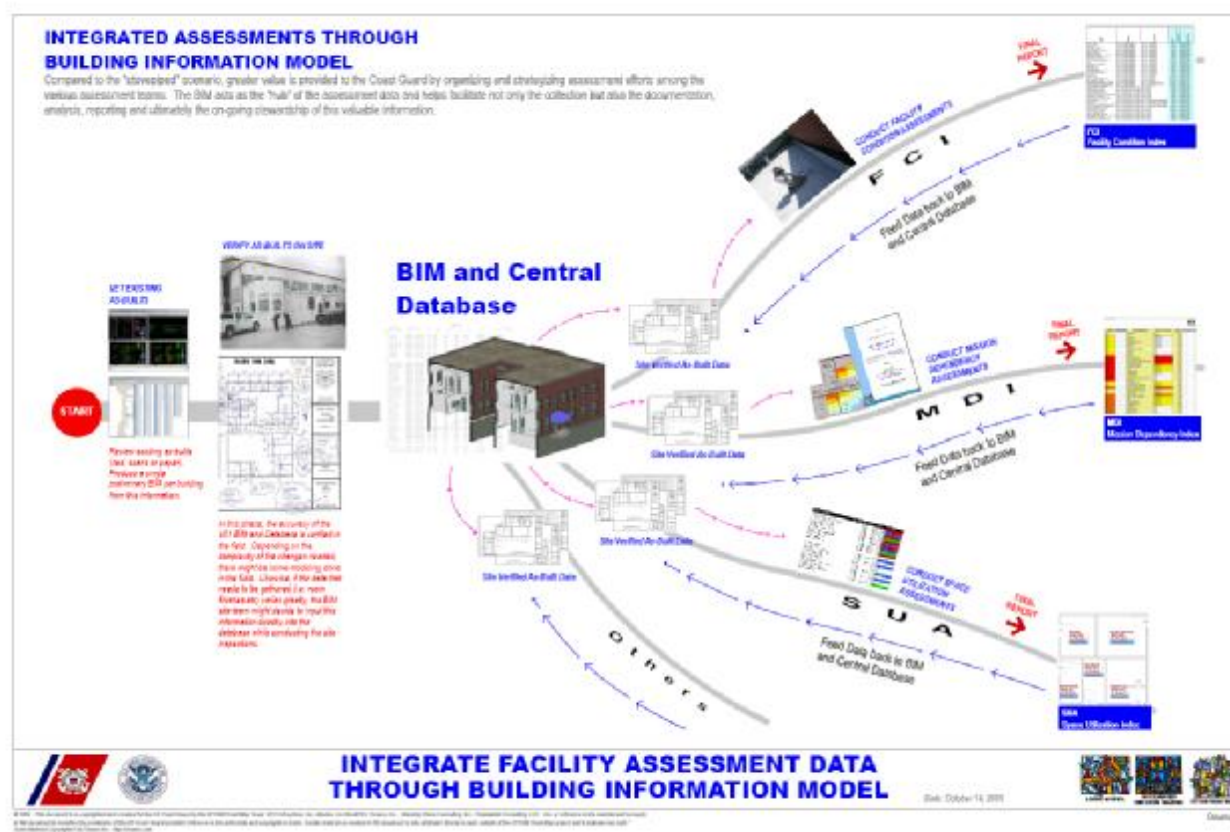




Efficient Workflows

Integrated and Interoperable Data Collection

Leveraging BIMs to Integrate Disparate Data Points

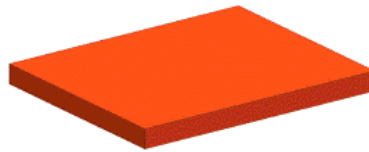




BIM Levels of Information

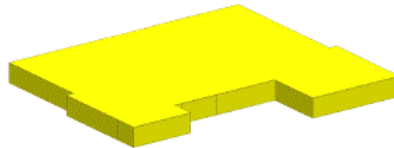
Stepped Strategy of Data Collection and Modeling

Minimal level of data modeling necessary to integrate BIMs with other data?

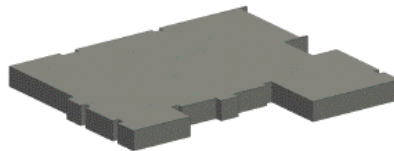


Simple Mass Defining Total Square Footage 16,900 SF

Surprising little is needed to get the highest value from the BIMs.



Mass With Rough Outline Defining Total Square Footage 16,900 SF



Mass Accurate Outline Defining Total Square Footage 16,900 SF

Value comes over time in a logical stepped sequence of data collection.



All of the levels can reference data that exists in other levels of detail.



How we will measure success

- Organizational Performance
- HPO Contract Performance
- Asset and Portfolio Performance
- Continuous Performance over Time



Quality Control Plan (QCP)

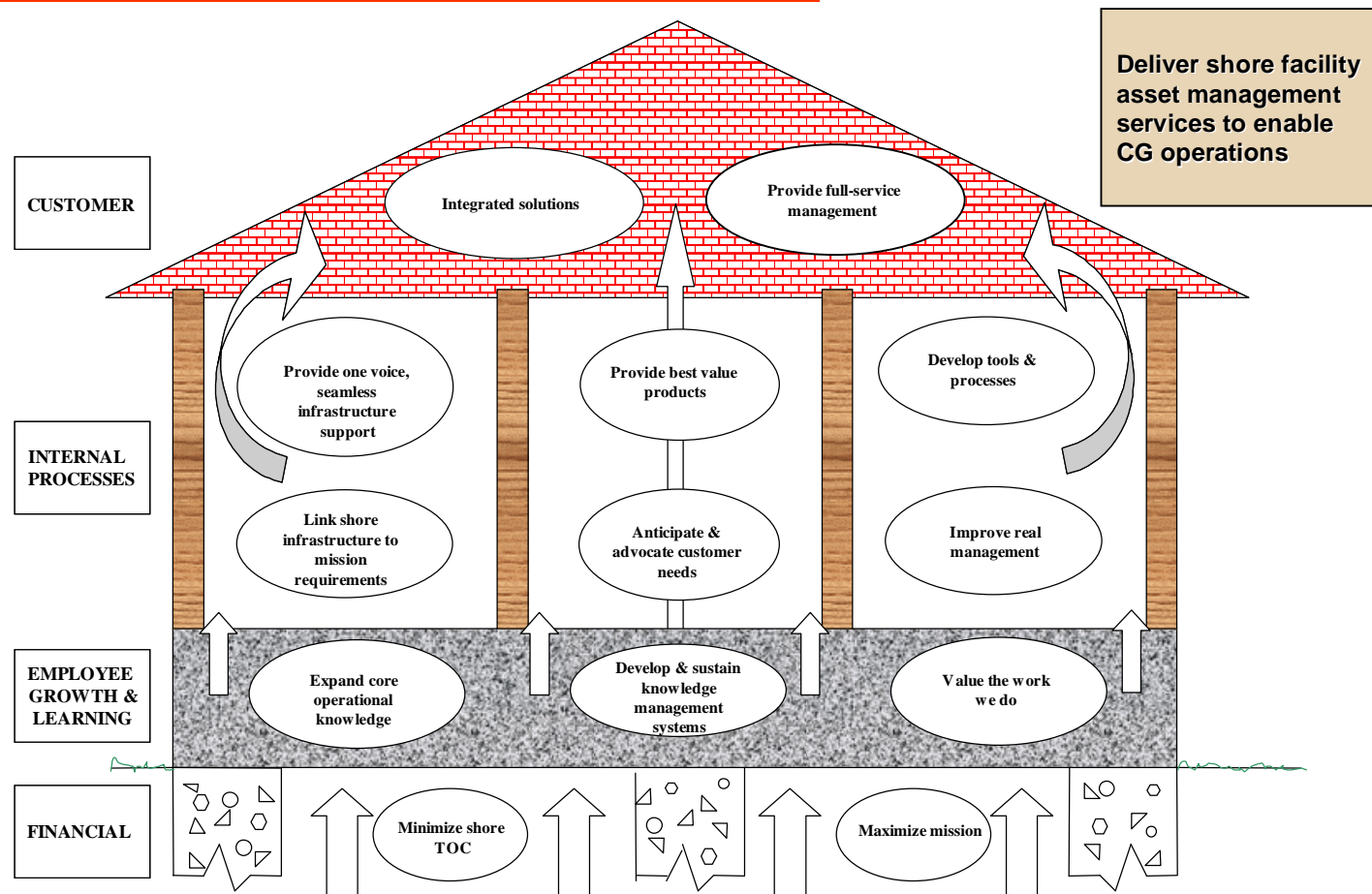
Quality control processes

- Balanced Score Card (BSC)
- Operational Metrics
- Performance Requirement Summary (PRS)
- Continuous Performance over Time



Balanced Score Card

Organizational Performance

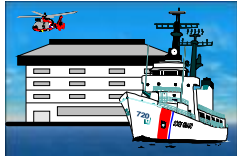




BSC and Operational Metrics

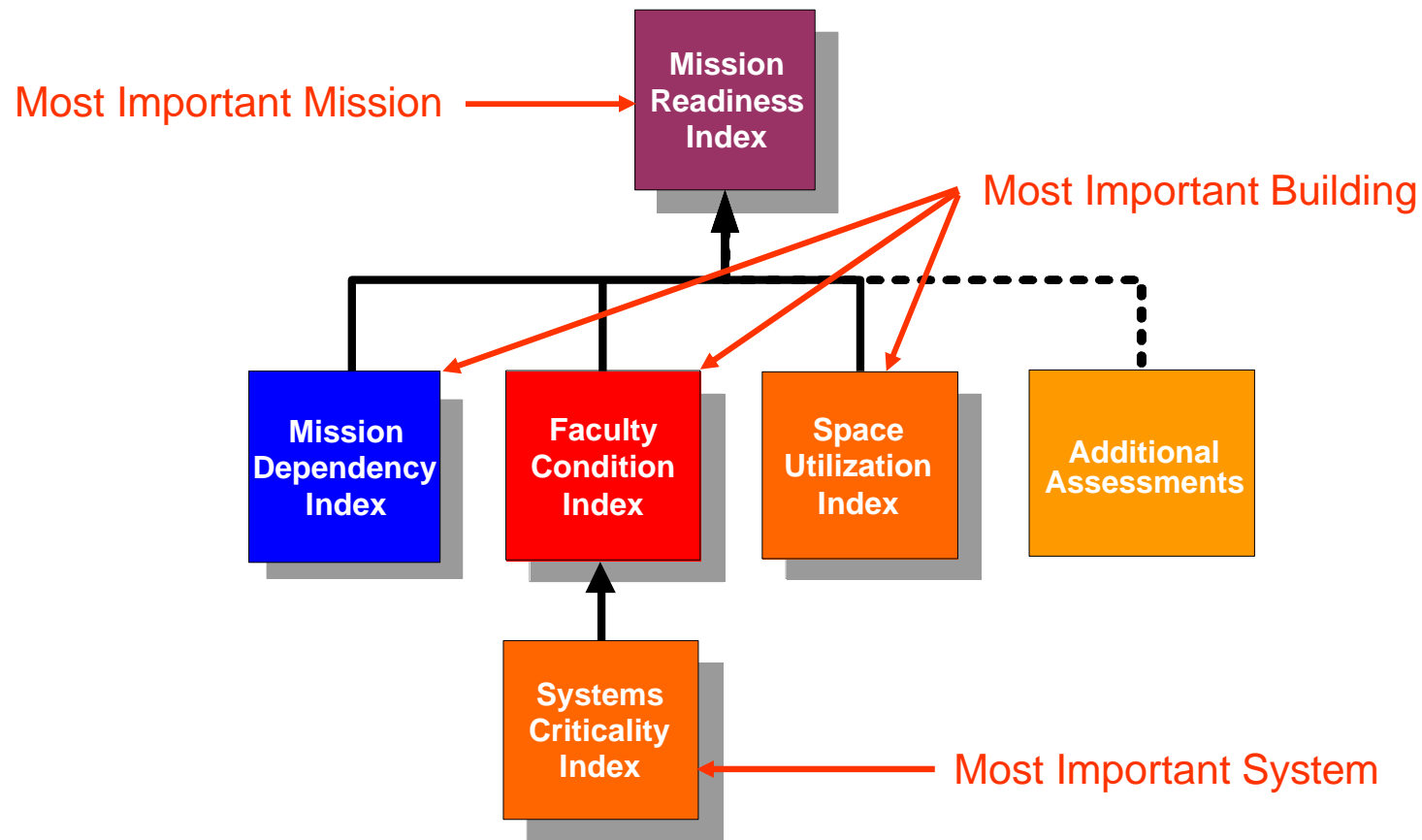
HPO Contract Performance

BSC Perspective	BSC Objective	Operational Metrics
Customer	<i>C1- Provide timely, integrated solutions</i>	Customer Survey
	<i>C2 - Provide full service facility management</i>	Customer Survey
Internal Business Processes	<i>P1 - Produce Best Value Infrastructure Product</i>	I/O
	<i>P2 - Provide one voice, seamless infrastructure support</i>	Customer Survey
	<i>P3 - Develop innovative tools and processes</i>	IT FRD Index
	<i>P4 - Improve Shore Infrastructure Asset Management</i>	Inspection Index
	<i>P5 - Link shore infrastructure to mission requirements</i>	Data Index
		Mission Alignment Index
		Utilization index
Learning & Growth	<i>P6 - Anticipate and advocate customer needs</i>	Condition Index
		Functionality index
	<i>L1 - Human Capital, Expand core competencies and operational knowledge</i>	PersonnelFit
	<i>L2 - Information Capital, Develop and sustain knowledge management system</i>	Employee Survey
Financial	<i>L3 - Climate for Action, Value the Work We Do</i>	Employee Survey
		PersonnelFill
	<i>F1 - Minimize shore infrastructure TOC</i>	Life Cycle Cost Analysis
	<i>F2 - Maximize return on mission</i>	Funds on Target Index



Operational Metrics

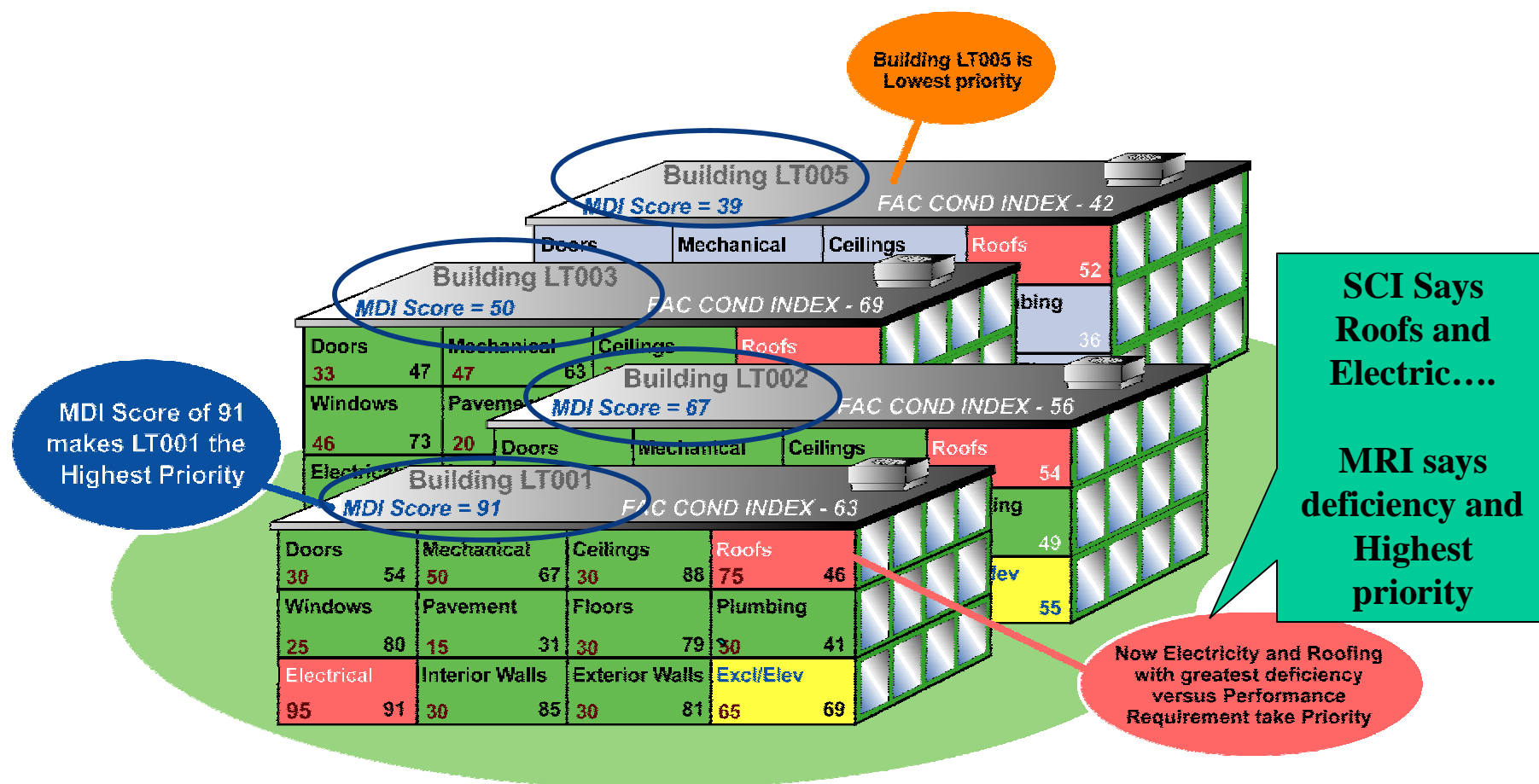
Asset and Portfolio Performance





Mission Driven Decisions

Linking Facilities to Missions





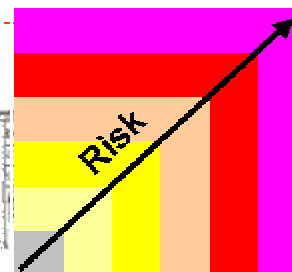
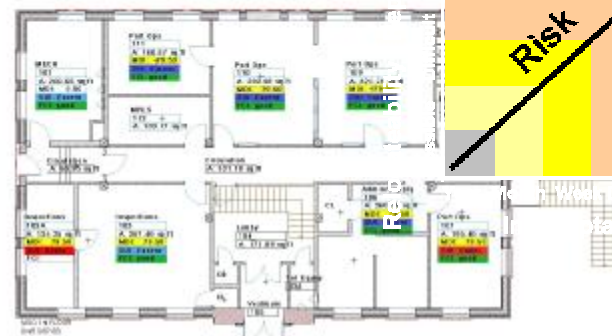
Mission Dependency (MDI)

Linking Facilities to Missions



Facility Name	Q1/Q2 MDw	MDb ave	n
Operations Hanger	5.00	3.87	5

Sites Requiring Air Station Support	Q3/Q4 MDb
Station Catham	4.33
Station P-town	4.33
Station Woods Hole	3.67
ATN Woods Hole	1.00
Group Woods Hole	6.00
MDb total	19.33
MDb ave	3.87
(Number of Missions) n	5



This critical Facility Assessment links facilities to mission from an Operational Risk Management perspective.

Created by Naval Facilities Engineering Service Center, Port Hueneme CA and co-developed with the USCG

MISSION INTRA-DEPENDENCY SCORE					
MD _W		Q1: Interruptability			
		Immediate (24/7)	Hours (min/hrs)	Days (<7days)	Weeks (>7days)
Q2: Relocatability	Impossible	4.0	3.6	3.2	2.8
	Extremely Difficult	3.4	3.0	2.6	2.2
	Difficult	2.8	2.4	2.0	1.6
	Possible	2.2	1.8	1.4	1.0
MD _W = Mission Dependency Within a Command Entity					



Linking Facilities to Missions

Missions to Public Outcomes



