National Science and Technology Council

Physical Structures & Systems Interagency Working Group

Regional Strategic Planning

A Framework for Integrated Decision-Making

U.S. Coast Guard

LCDR Jack Dempsey PE

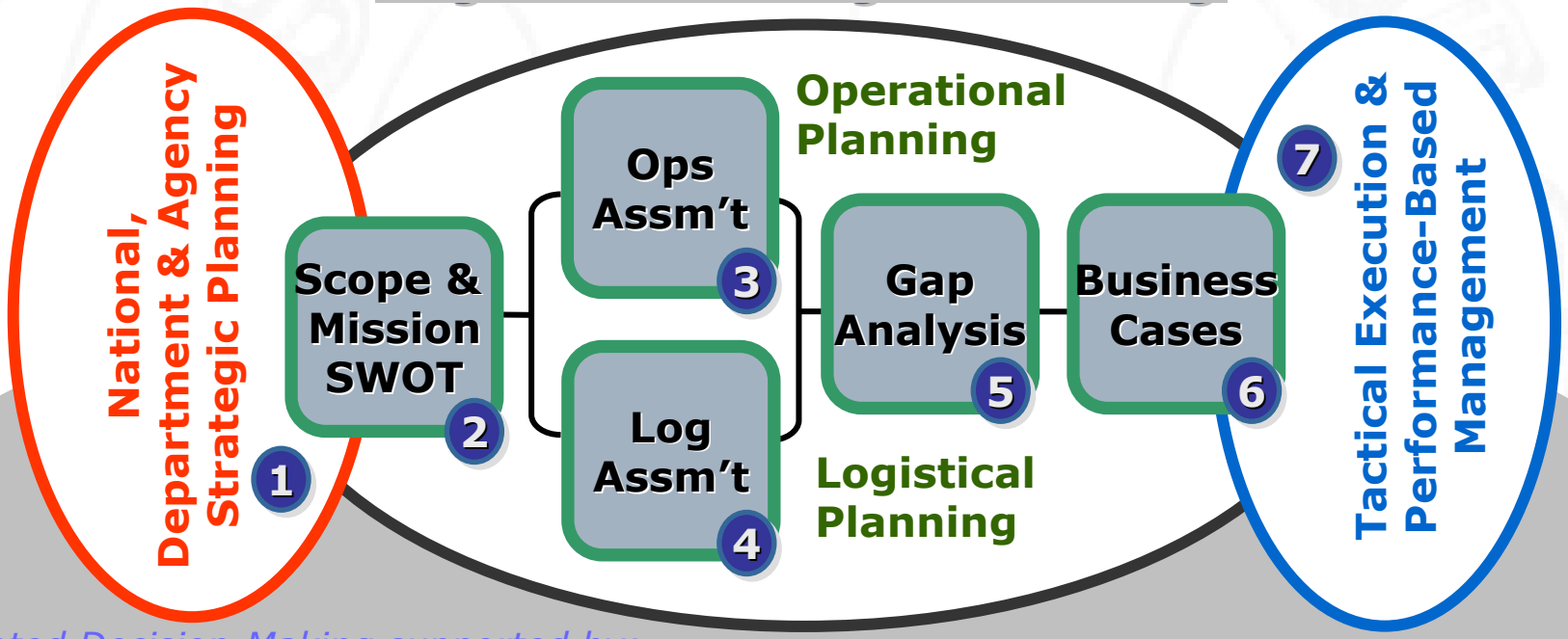
U.S. Coast Guard Headquarters, Office of Civil Engineering

Shore Facilities Capital Asset Management Division

U.S. Coast Guard
Shore Facilities Capital Asset Management

Integrated Decision-Making through:

Regional Strategic Planning



Integrated Decision-Making supported by:

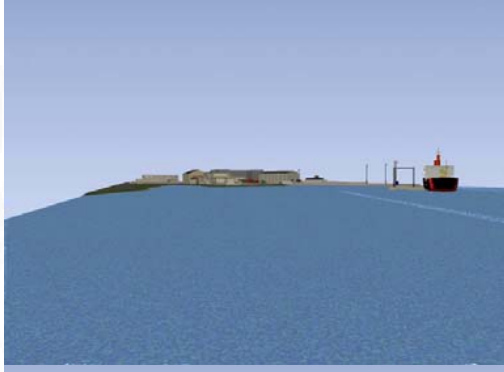
Integrated Facility Management

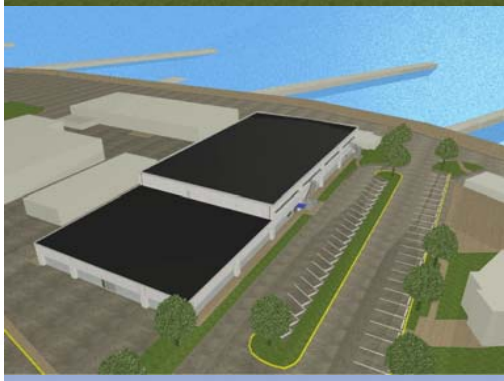
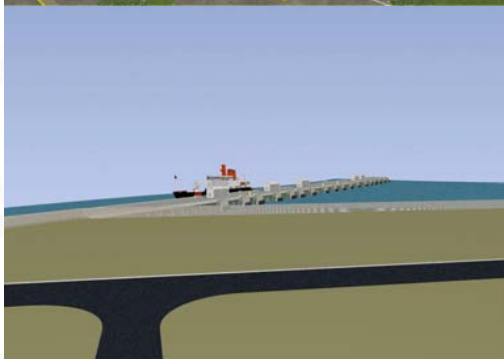
Enabling Information and Geospatial Technologies

Organizational Competencies / Change Management

Integrated Decision-Making,
Leveraging the Geospatial Construct

- Regional Strategic Plans
- Integrated Facilities Management
- Integrated Portfolio Management
- Integrated Operations
- Integrated Data & Interoperability
- Performance & Automated Code Checking
- Total Ownership Cost Models
- M&R Funding Time Density Plots
- Energy Simulations
- Physical Security Simulations
- Particle Flow Analysis (CBR, Sick Building)
- Visual Decision-Making, Pattern Recognition
- Scenario-Based Planning and Gaming
- Common Operational Picture(s)
- Intelligent 4-D Simulations



Hyper Linked Slides

U. S. Coast Guard

US Coast Guard Missions

2-Focus Areas, 5-Strategic Goals, 9-Legal Authorities

Homeland Safety

Maritime Safety

- Search and Rescue
- Maritime Safety

Maritime Security

- Aids to Navigation
- Ice Operations

Protection of Natural Resources

- Marine Environmental Protection
- Fisheries

Homeland Security

Maritime Mobility

- Ports, Waterways, and Coastal Security
- Enforcement of Laws and Treaties

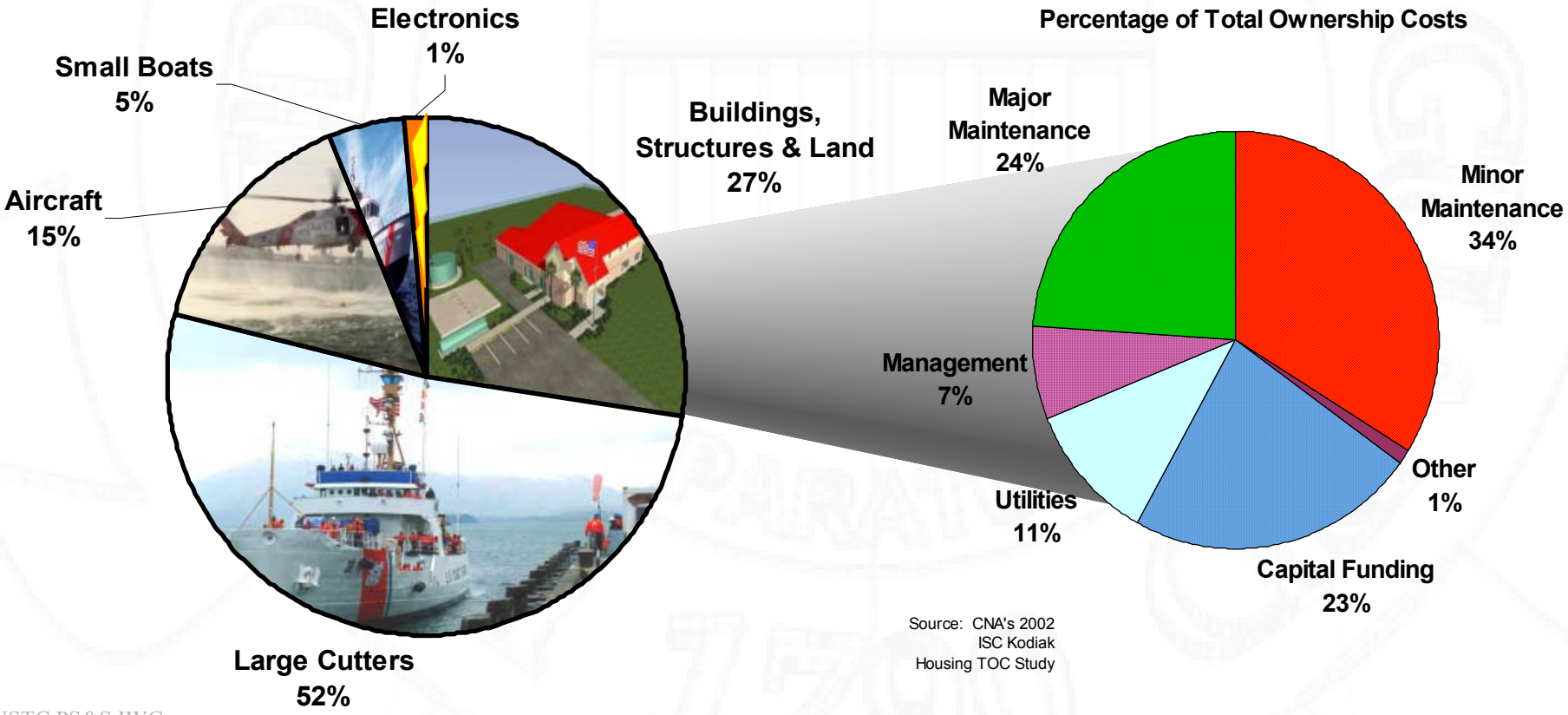
National Defense

- Defense Readiness

FA
data
IDM
RSP

US Coast Guard Assets
Shore Facility Assets & Management

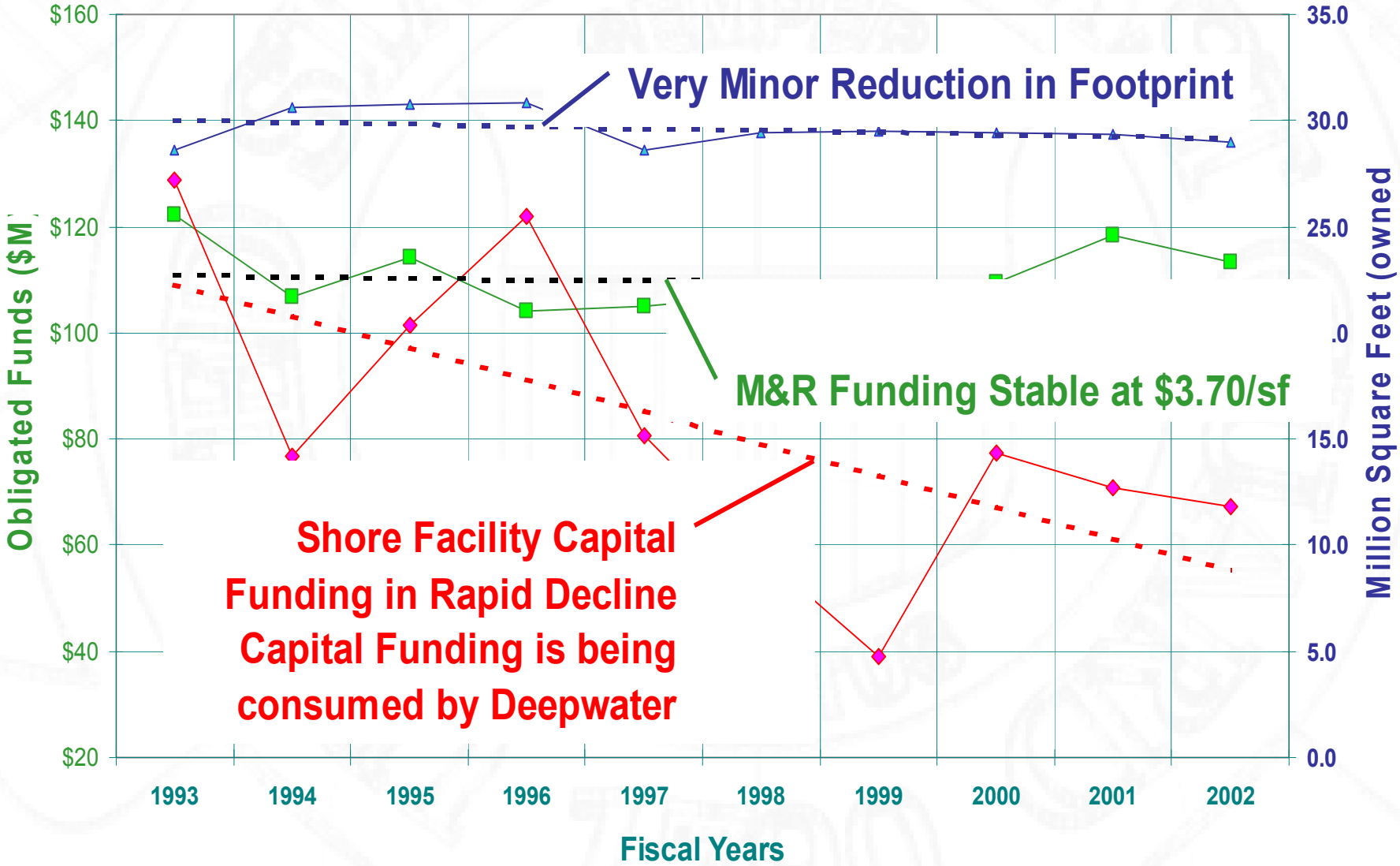
- Total Asset Value is approximately $27B (Shore Facilities $7B)
- 33 million square feet of building space, average age 43 years
- Over 65,000 acres and over 8,000 buildings and structures
- Multiple, interrelated funding streams



Source: CNA's 2002
ISC Kodiak
Housing TOC Study

Shore Facility Asset Management

Macro Level Funding Trends (1993-2002)



FA
data
IDM
RSP

Why the Coast Guard?
Why Capital Asset Management?

Pressure on Budgets and Resources

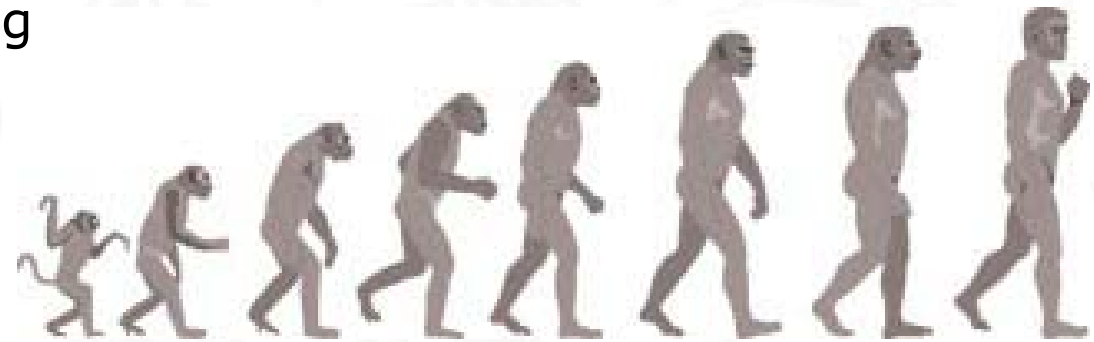
- Integrated Deepwater Systems (~$20B over ~20 years)
  - Block Obsolescence of Operational Assets (Large Cutters & Aircraft)
- Mission-Based Return on Investments
  - President's Management Agenda – Manage the Base

Higher Expectations – Higher Risks

- Post 9/11 – the "New Normalcy"
- Integrated Decision-Making
  - Coast Guard, DHS, and beyond…
  - Strategic to Tactical, Global to Local, Long-range to Real-time
  - Integrate Mission, Operational, Logistical, and Financial Decision-Making

Risks of Not Evolving

- Change v. *Semper Paratus*



FA
data
IDM
RSP

Coast Guard
Capital Asset Management

Fully Integrated Decision-Making, Using a Geospatial Construct

- Integrate Operational, Logistical and Financial Decision-Making
- Strategic Business Case Modeling – Tactical Execution

Linking Facilities to Strategic Outcomes via Operational Planning

- Mission-based SWOT Assessment
- Mission Dependency Index
- Total Ownership Costs/Stewardship Metrics

Virtual Connectivity Through Standards (Data is an Asset)

- The digital asset and the physical asset are one – meta data is the glue
- Managing a portfolio of business cases

4-D Simulations – Dynamic, Flexible, Agile Decision-Making

- Visual decision-making
- Pattern Recognition
- Knowledge-based

Return(s) on Investment

Mission, Operational, Logistical, People, Financial

Two Part Question

- 1st – Do you invest in the future?
- 2nd – How do you measure the return(s) on investments?

Mission-Based Services

- Directly tied to legal authorities
- Always service to the public

Government's "Bottom-Line" is organizational performance

- Measurable Outcomes
- Reduced Costs
- Reduced Cycle-Times

Spreadsheet Level	Takeoff Quantity	Grand Total	Grand Total Unit Price	Percent of Total
01 GENERAL CONDITNS	15,000.00 SF	246,931	16.46 /SF	10.818
02 SITEWORK	15,000.00 SF	193,924	12.93 /SF	8.496
03 CONCRETE	15,000.00 SF	203,101	13.54 /SF	8.898
04 MASONRY	15,000.00 SF	36,994	2.47 /SF	1.621
05 METALS	15,000.00 SF	253,502	16.90 /SF	11.106
06 WOODS & PLASTICS	15,000.00 SF	34,993	2.33 /SF	1.533
07 THERMAL&MOISTURE	15,000.00 SF	49,586	3.31 /SF	2.172
08 DOORS & WINDOWS	15,000.00 SF	111,428	7.43 /SF	4.882
09 INTERIOR FINISHES	15,000.00 SF	352,697	23.51 /SF	15.452
10 SPECIALTIES	15,000.00 SF	10,396	0.69 /SF	0.455
11 EQUIPMENT	15,000.00 SF	7,670	0.51 /SF	0.336
12 FURNISHINGS	15,000.00 SF	4,621	0.31 /SF	0.202
13 SPECIAL CONSTRCTN	15,000.00 SF	5,776	0.39 /SF	0.253
14 CONVEYING EQUIPMT	15,000.00 SF	157,975	10.53 /SF	6.921
15 MECHANICAL	15,000.00 SF	300,621	20.04 /SF	13.170
16 ELECTRICAL	15,000.00 SF	194,638	12.98 /SF	8.527
18 PRECONSTRUCTION	15,000.00 SF	36,560	2.44 /SF	1.602
19 DESIGN & ENGINEER	15,000.00 SF	76,282	5.09 /SF	3.342

FA
data
IDM
RSP

Next Steps

New Value Proposition(s)

- Owners lead, more to risk and the golden rule
- Integrated decision-making in a geospatial construct
- Knowledge-based organizations
- The digital asset…

Open, Universal Data Standards - Interoperability

- Integrate object-based CAD and GIS technologies
- Real-time data streaming, transactional data management
- Building code integration (Public's Best Interest – Government's Domain)
- Surgical data encryption – "kernels of knowledge"

Rule-Based Decision Making – Predictive Models

- Intelligent 3-D object-oriented modeling – just-in-time always there
- Real-time strategic planning tied to tactical execution
- Emergency re-organizations, spontaneous re-tasking
- Genetic decision-making, self evolving, environment specific

National Geospatial Information Systems

- National Map & Geo-One Stop
- National Asset Stewardship

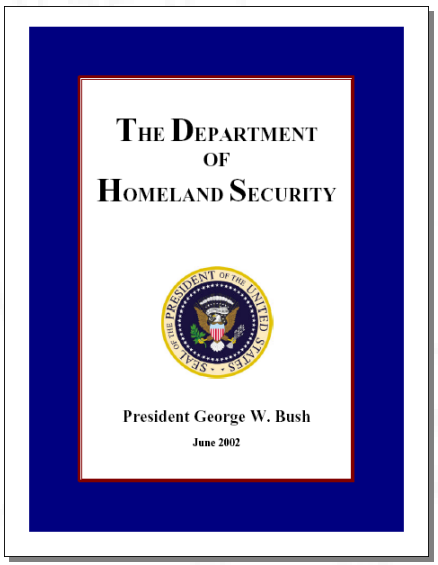
Hyper Linked Slides

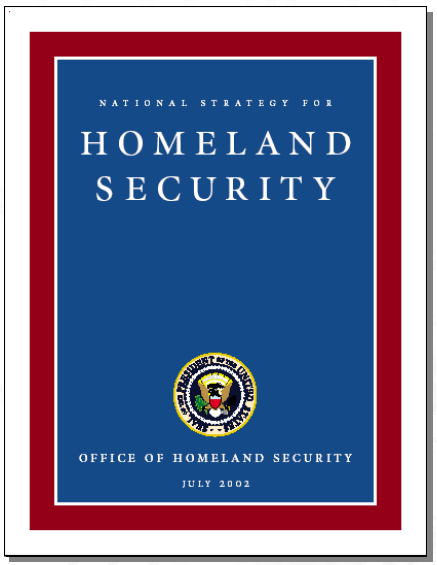
Department of Homeland Security
Real Property Numbers

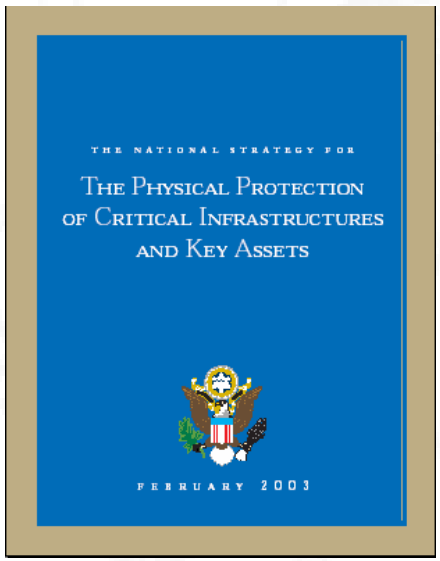
Department of Homeland Security
US Coast Guard (one of 22 agencies)

Capital Asset Management
ROI in DHS

Many agencies with
one purpose, common objectives
and many, many facilities



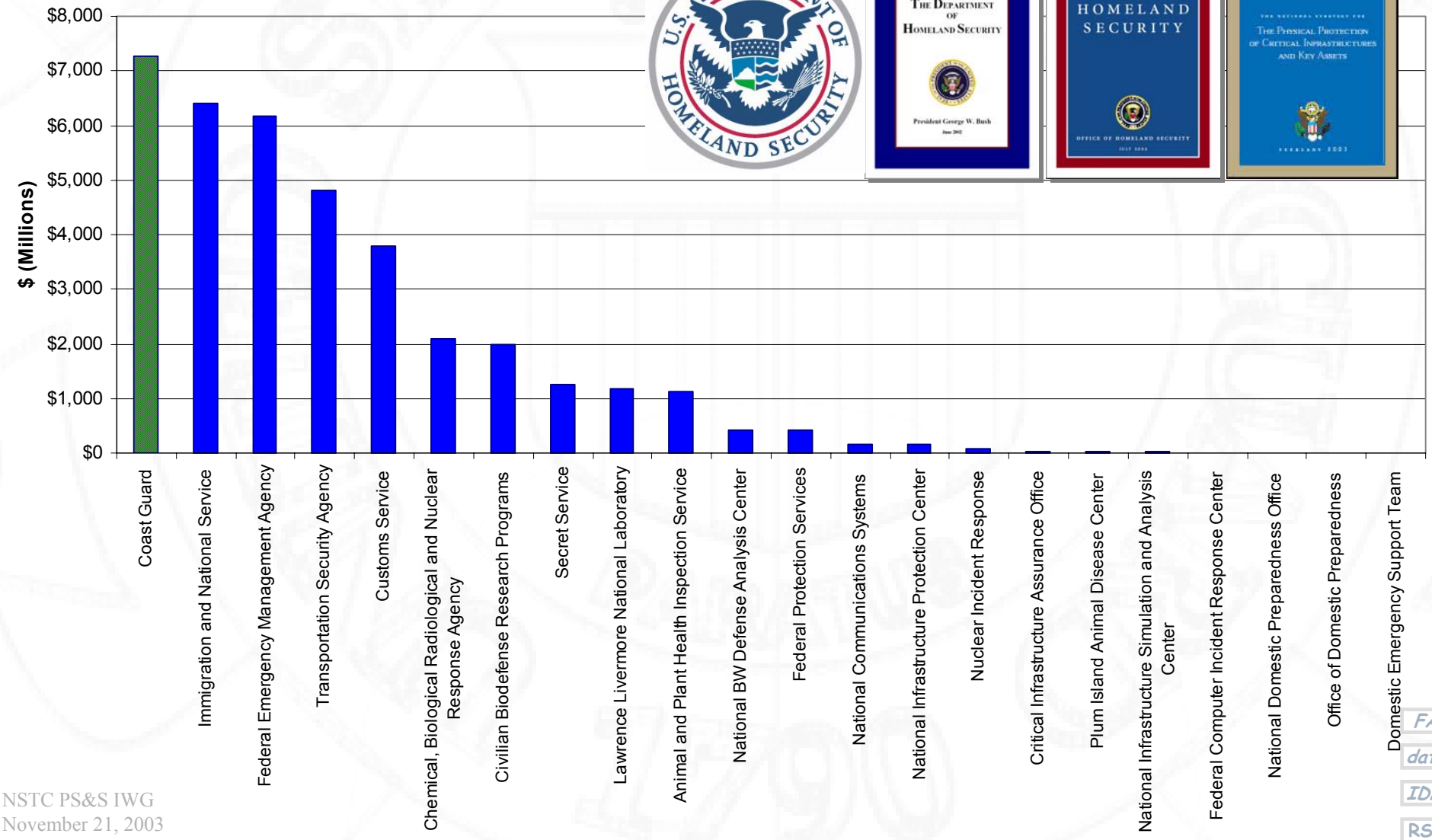




Department of Homeland Security

US Coast Guard (one of 22 agencies)

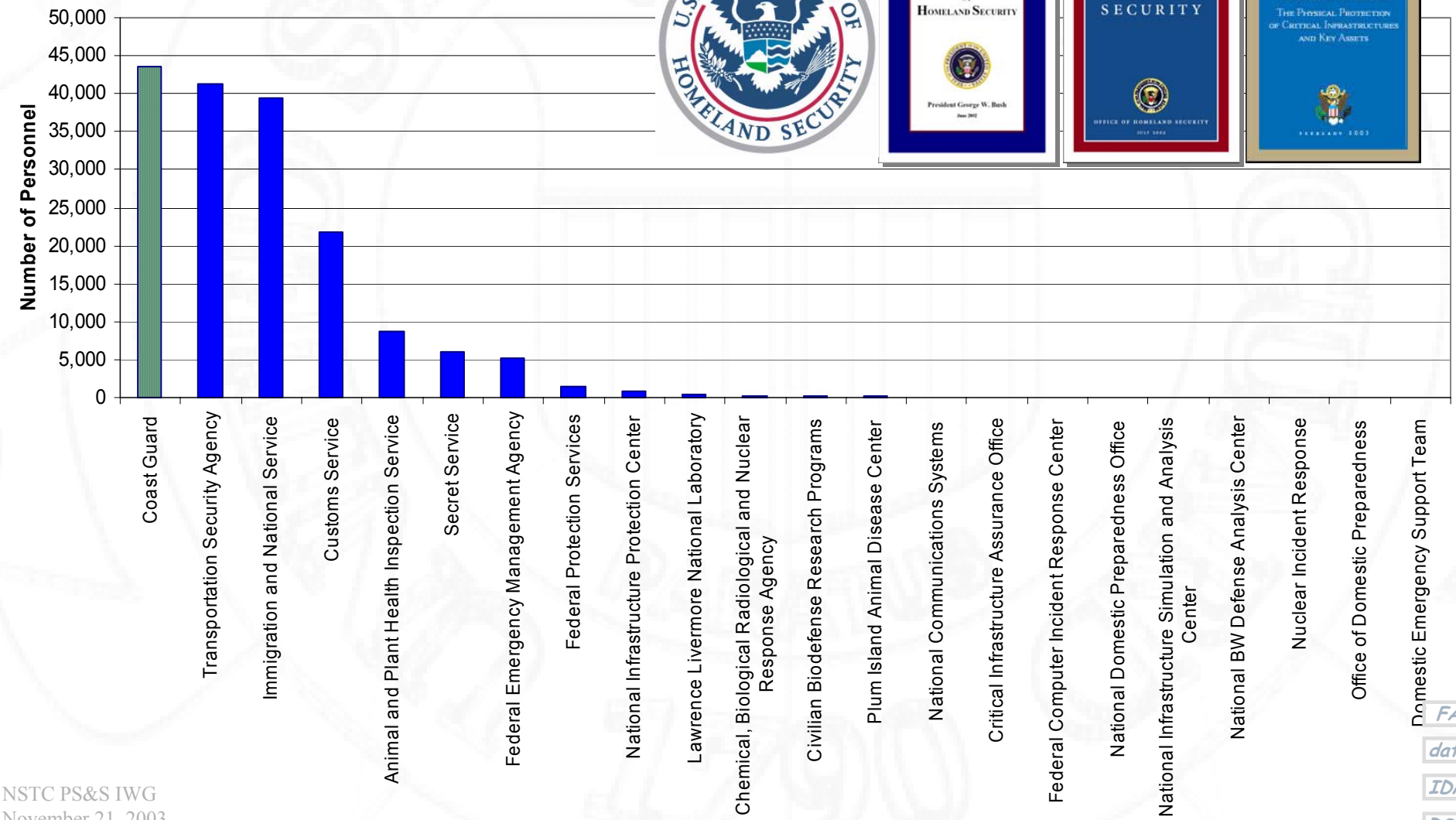
Annual Funding



Department of Homeland Security

US Coast Guard (one of 22 agencies)

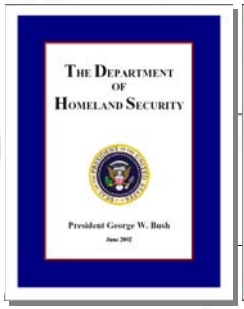
Full Time Equilivents

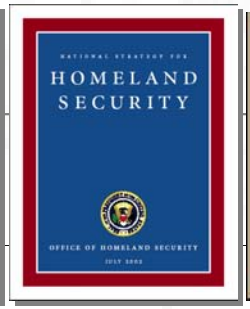


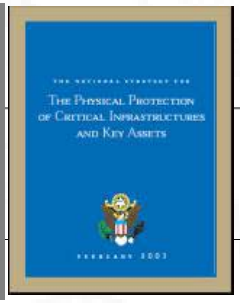
Department of Homeland Security

US Coast Guard (one of 22 agencies)

Building Square Footage







35,000,000
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0

Leased Square Footage

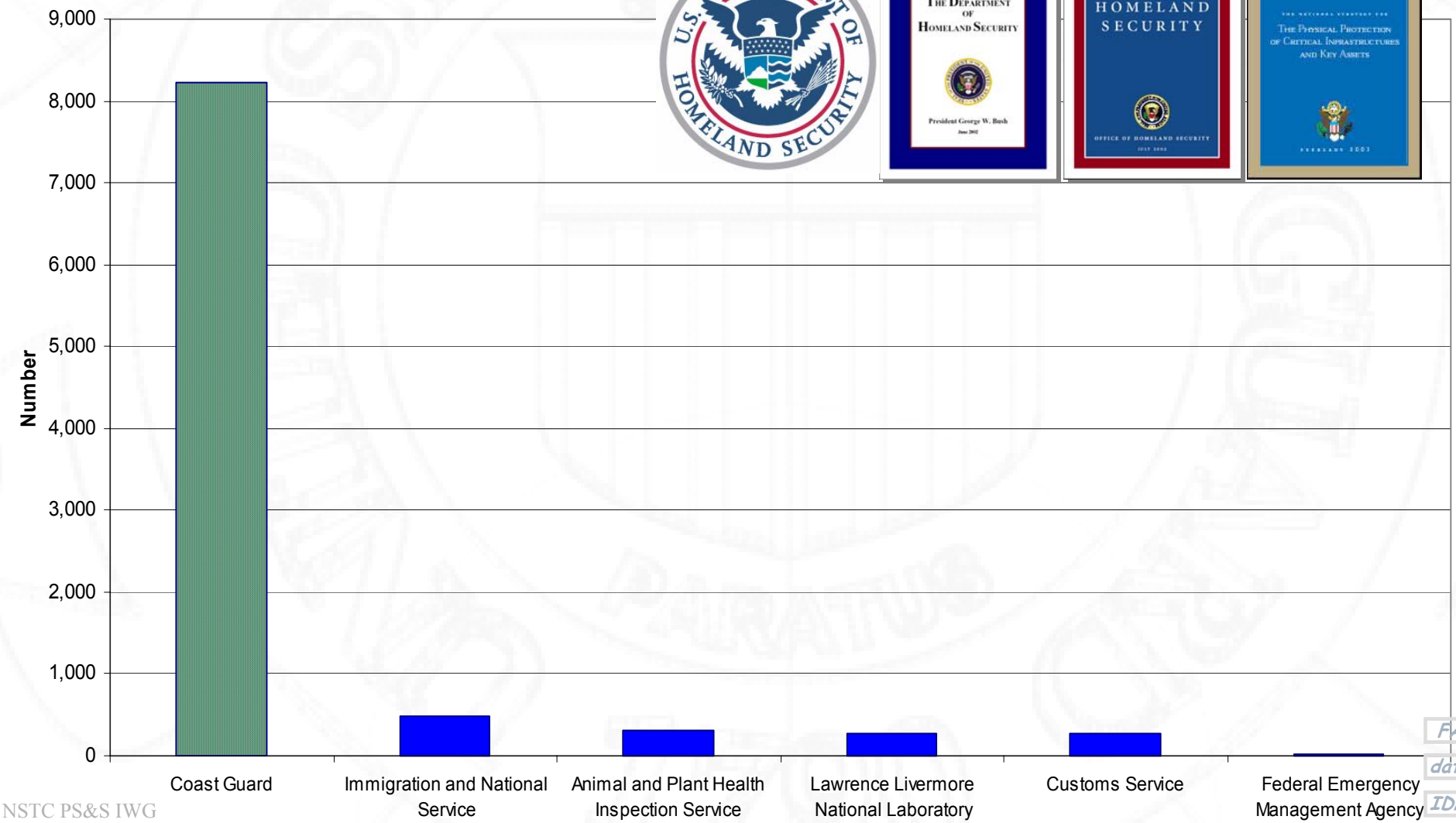
Owned Square Footage

Coast Guard | Immigration and National Service | Customs Service | Lawrence Livermore National Laboratory | Animal and Plant Health Inspection Service | Federal Emergency Management Agency

FA
data
IDM
RSP

Department of Homeland Security
US Coast Guard (one of 22 agencies)

Number of Buildings

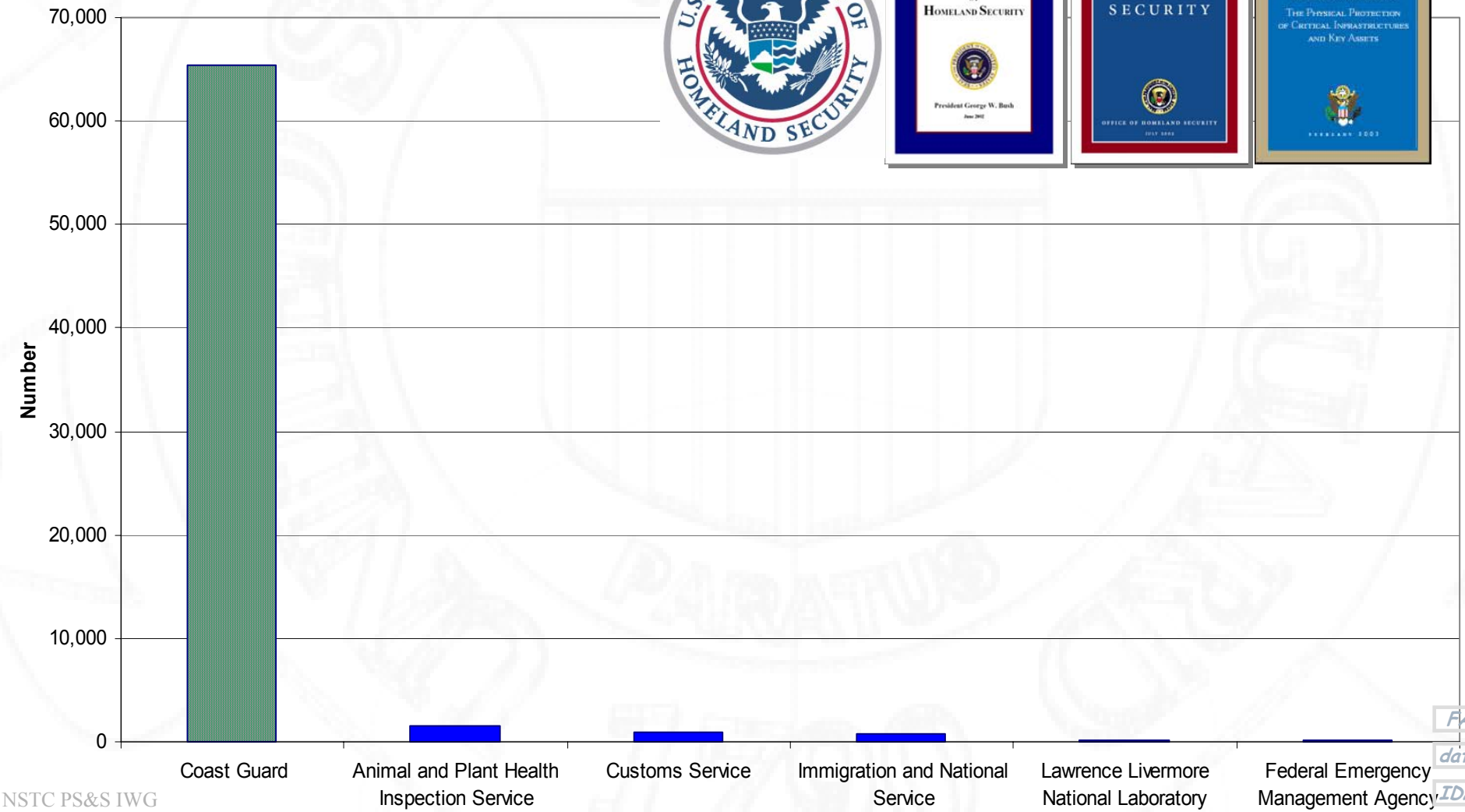


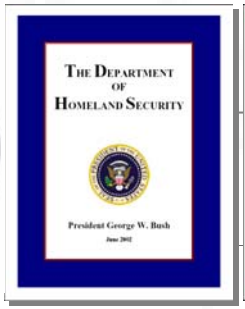
FA
data
IDM
RSP

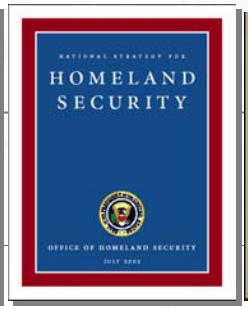
Department of Homeland Security

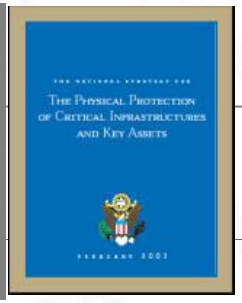
US Coast Guard (one of 22 agencies)

Acreage









FA
data
IDM
RSP

Hyper Linked Slides

Regional Strategic Planning

FA
data
IDM
RSP

United States Coast Guard's Strategic Guidance Synopsis

	Vision	Mission statement	Core values
United States Coast Guard (FOUNDED 1790)	The world's best coast guard... ready today...preparing for tomorrow	The United States Coast Guard is a multi-missioned maritime service and one of the Nation's five armed services. Its mission is to protect the public, the environment, and U.S. economic interests—in the nation's ports and waterways, along the coast, on international waters, or in any maritime region as required to support national security.	★ Honor, ★ Respect, and ★ Devotion to Duty

	Readiness	People	Stewardship
U.S. Coast Guard Commandant's Direction (2002-2006)	Capable, competent, and vigilant in all mission areas	The Coast Guard committed to our people... and our people committed to the Coast Guard	Aligned from top to bottom and bottom to top... embracing innovation, technology, and effective management practices to achieve measurable outcomes.
LEADERSHIP COUNCIL MANAGEMENT AGENDA (LCMA) ITEM	R-01 R-02 R-03 R-04 R-05 R-06 R-07 R-10 R-11	P-01 P-02 P-03 P-04 P-05 P-06 P-07 P-08 P-09 P-11	S-01 S-02 S-03 S-04 S-05 S-06 S-07 S-08 S-11 S-12 S-13

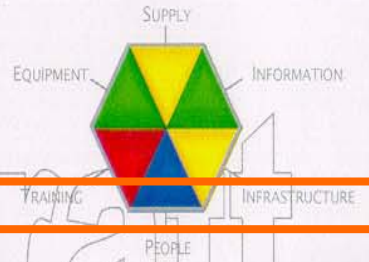
USCG MISSIONS	HOMELAND SAFETY - Protecting people from the sea; protecting the sea from people												HOMELAND SECURITY - Protecting the United States from her enemies												
Strategic Goals	Maritime Safety				Maritime Mobility				Protect Natural Resources				Maritime Security									Nat'l Def			
LEGAL AUTHORITIES	SAR	MARINE SAFETY			AIDS TO NAVIGATION		ICE OPERATIONS		MARINE ENVIRONMENTAL PROTECTION (MEP)			FISH	PORTS, WATERWAYS, AND COASTAL SECURITY (MARITIME HOMELAND SECURITY, AKA MHLS*)						ENFORCEMENT OF LAWS AND TREATIES (ELT)			DEFENSE READINESS			
Performance Goals	SAR lives	Rec Boat	Mar wkrs	Pass Vsls	AtoN	Vsl Traff	Dom Ice	Polar Ops	Oil Spills	Marine Debris	Pollu-tion	LMR	1	❷	3	4	5	6	Drugs	Illegal Aliens	FFV	Mil Read	PSUs		

USCG Capabilities Goals

HUMAN RESOURCES	▲ People
	▲ Training
SYSTEMS	▲ Equipment
	▲ Supply
	▲ Infrastructure
INFORMATION	▲ Information

READINESS MANAGEMENT SYSTEM (RMS) measures the U.S. Coast Guard's CAPABILITY in six dimensions or "facets" (as shown to the right). Although still under development, there are hundreds of readiness measures already approved. Ways to meaningfully map readiness measures to Performance Goals is being studied. RMS uses the following color scheme to communicate readiness based on standards for each measure:

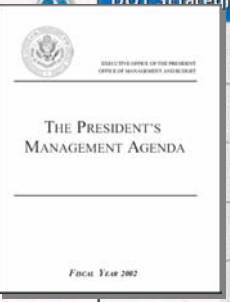
- ▲ Blue = Exceeds Readiness Standard;
- ▲ Green = Ready;
- ▲ Yellow = Marginally Ready;
- ▲ Red = Not Ready



* MHLS Strategy Elements:

1 Increase Maritime Domain Awareness
❷ Conduct Enhanced Security Operations
3 Close Port Security Gaps
4 Build Critical Security Capabilities
5 Leverage Partnerships to Mitigate Security Risks
6 Ensure Readiness for Homeland Defense Operations

Alignments with Departments of...	Transportation (DOT)				Homeland Security (DHS)	Defense (DoD)
DOT Strategic Objectives	Safety	Mobility	Trade	Environment	National/Homeland Security	
Human Capital						
Competitive Sourcing						
Financial Management						
Citizen-Centered eGovernment						
Budget and Performance						



DISCLAIMER: This is an unofficial document, subject to sporadic changes on a daily basis until completed and authorized promulgation by the Leadership Council.

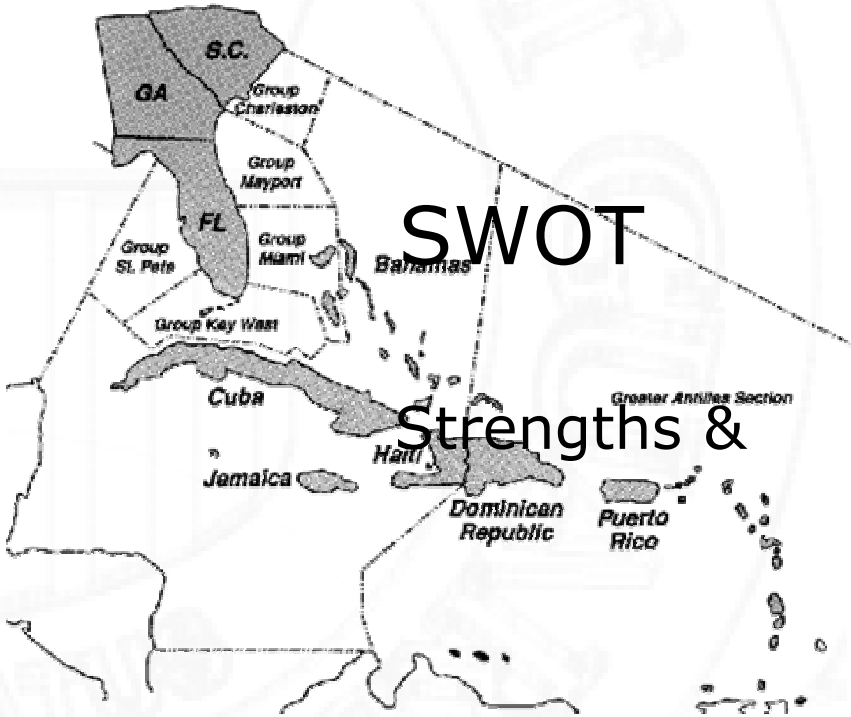
(23-Jan-03 11:25:21)

Draft

FA
data
TDM
RSP

RSP – Step 2
Scope and Mission SWOT

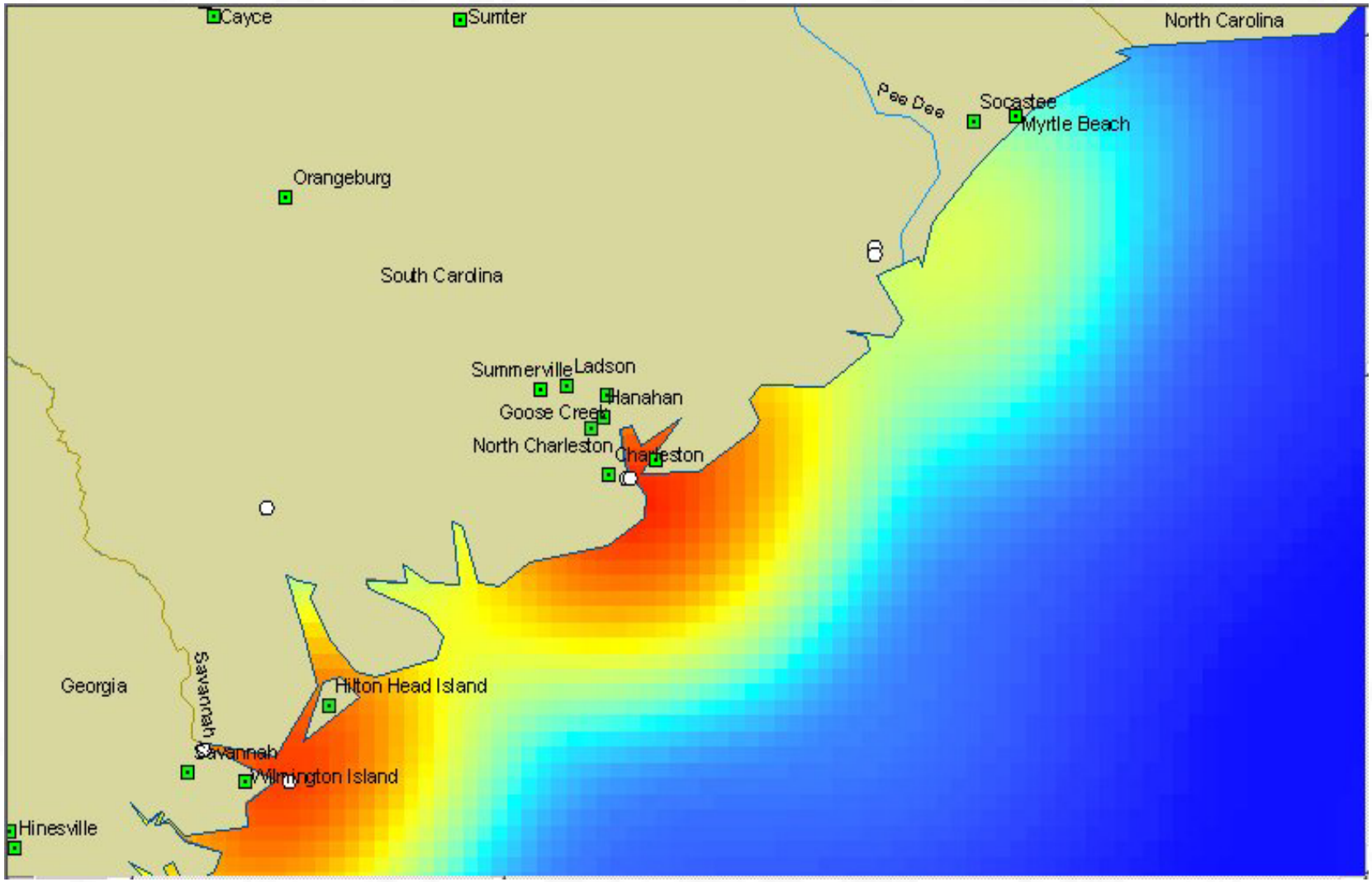
- Scope Defined in Terms Of:
  - Geographical Boundaries
  - Strategic Issues
  - Time Horizon (~10 Years)
- Mission-Based Assessment
  - Internal Weaknesses
  - External Opportunities and Threats



SWOT

Strengths &

RSP – Step 3
Operational Assessment-SAR Example

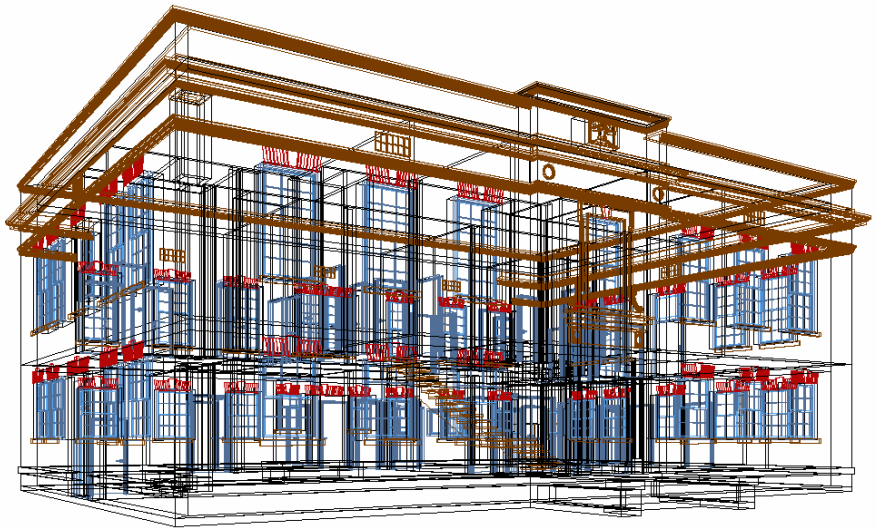


Ten-Year Time Density Plot of Historic Search and Rescue Cases along the South Carolina Coast

RSP – Step 4
Logistical/Facility Assessment

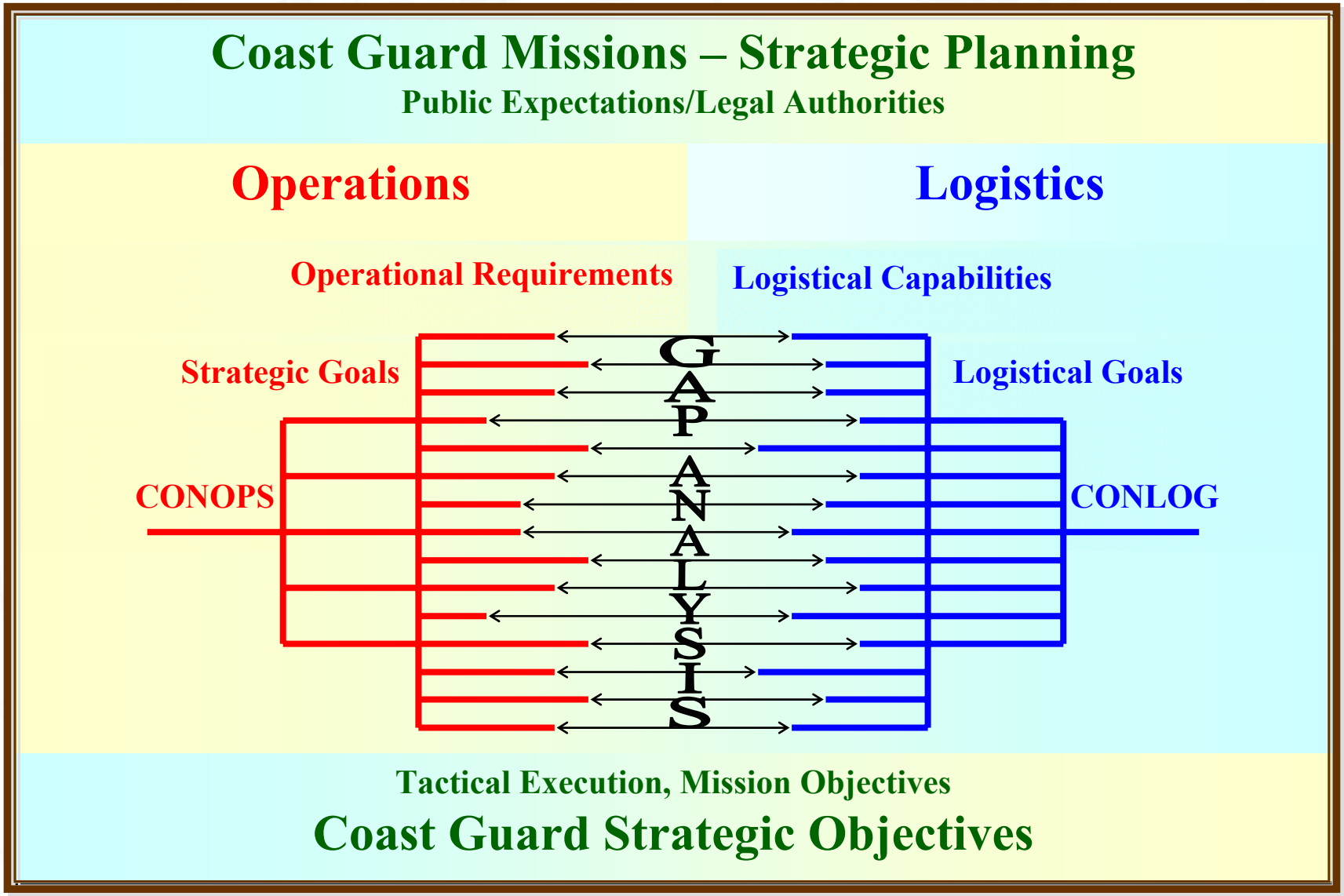
Includes a Battery of Facility Assessments

- Mission Dependency Index
- Facility Condition Measures
- Space Utilization Measures
- Suitability Measures
- Physical Security Measures
- Real Property Measures
- Environmental Measures
- Building Code Measures
- TOC-Risk Measures



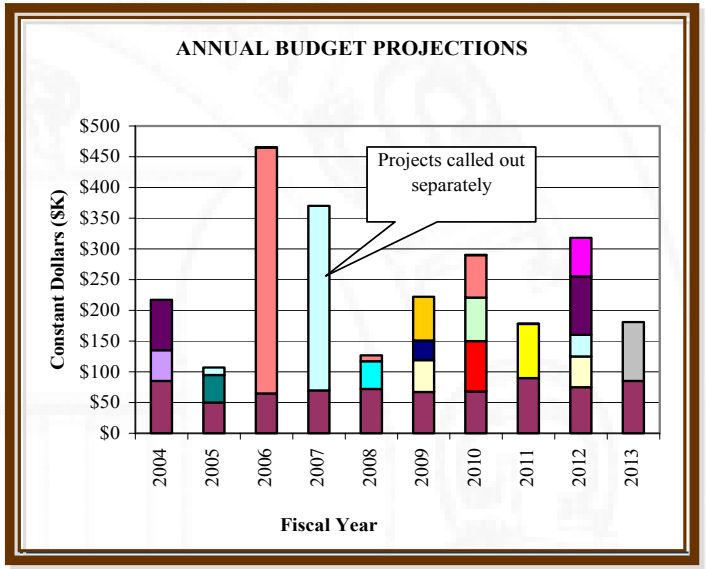
FA
data
IDM
RSP

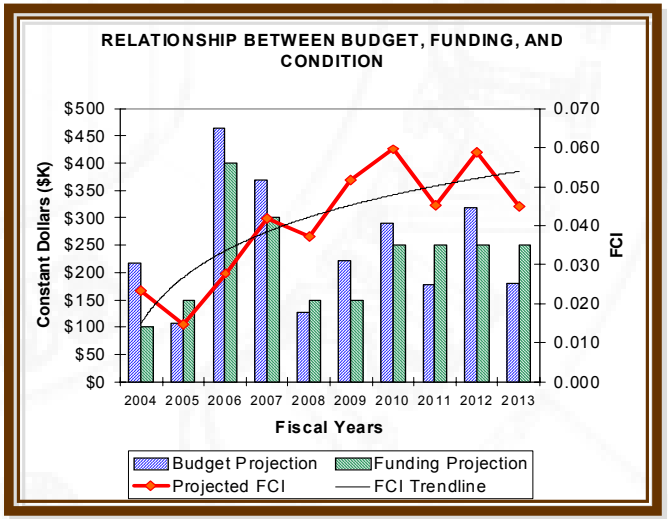
RSP – Step 5
Gap Analysis



RSP – Step 6
Business Case Generation

- Dynamically Mission-Based
- Total Ownership Cost Proforma
- Predictive Life Cycle Cost Models
- Step 7: 4-D Business Cases





PFAC 31150: Base Charleston

RPFN	Property Name	YearFunde	MDI	Uniformat II Element	ProjectDescription	ProjectCosts
101	MSO Bldg.	2004	73	B20 (Exterior Enclosure	Exterior Walls, Doors, Frames, Entrances	$191,877.00
101	MSO Bldg.	2004	73	B1020 (Roof Construction)	Roof & Structural Framing System	$329,071.00
101	MSO Bldg.	2007	73	D5010 (Electrical Service & Distributi	Panel Boards	$6,714.00
101	MSO Bldg.	2008	73	C3020 (Floor Finishes)	Floor Finishes	$32,079.00
102	Op. Center (Rice Mill Bldg.)	2004	95	D5090 (Other Electrical System)	Lighting Fixtures	$34,968.00
102	Op. Center (Rice Mill Bldg.)	2004	95	D5010 (Electrical Service & Distributi	Panel Boards & Transformers	$65,168.00
102	Op. Center (Rice Mill Bldg.)	2004	95	D30 (HVAC)	Air Handling Systems	$45,647.00
102	Op. Center (Rice Mill Bldg.)	2004	95	C3030 (Ceiling Finishes)	Suspended Systems	$50,160.00
102	Op. Center (Rice Mill Bldg.)	2004	95	C3020 (Floor Finishes)	Floor Finishes	$75,380.00
102	Op. Center (Rice Mill Bldg.)	2004	95	C3020 (Floor Finishes)	Floor Finishes	$75,380.00
102	Op. Center (Rice Mill Bldg.)	2004	95	B2010 (Exterior Walls)	Exterior Walls, Waterproofing, Damproofing, In	$615,874.00
102	Op. Center (Rice Mill Bldg.)	2007	95	D5030 (Communications & Security)	Fire Alarm/Signaling System	$31,307.00
102	Op. Center (Rice Mill Bldg.)	2009	95	D3030 (Cooling Generating Systems	Air Handling Systems	$73,038.00
102	Op. Center (Rice Mill Bldg.)	2010	95	D3050 (Terminal & Package Units)	Air Handling Systems	$23,918.00
102	Op. Center (Rice Mill Bldg.)	2010	95	C1010 (Partitions)	Interior Walls and Finishes	$202,165.00
104	Barracks Bldg.	2004	53	B1020 (Roof Construction)	Roof & Structural Framing System	$872,066.00
104	Barracks Bldg.	2004	53	B20 (Exterior Enclosure)	Exterior Walls & Windows	$379,652.00
104	Barracks Bldg.	2004	53	C1010 (Partitions)	Interior Walls and Finishes	$353,173.00
104	Barracks Bldg.	2004	53	C3020 (Floor Finishes)	Floor Finishes	$79,523.00
104	Barracks Bldg.	2004	53	D2010 (Plumbing Fixtures)	Bathroom Accessories and Ventilation	$39,370.00
104	Barracks Bldg.	2004	53	D3040 (Distribution Systems)	Air Handling Systems	$109,796.00
104	Barracks Bldg.	2004	53	D5010 (Electrical Service & Distributi	Panel Boards & Transformers	$25,757.00
104	Barracks Bldg.	2007	53	D3020 (Heat Generating Systems)	Pumps	$24,490.00
105	Industrial Bldg.	2008	65.5	D5020 (Lighting & Branch Wiring)	Lighting Fixtures	$93,857.00
105	Industrial Bldg.	2009	65.5	D3040 (Distribution Systems)	Air Handling Systems	$49,067.00

FA
data
IDM
RSP

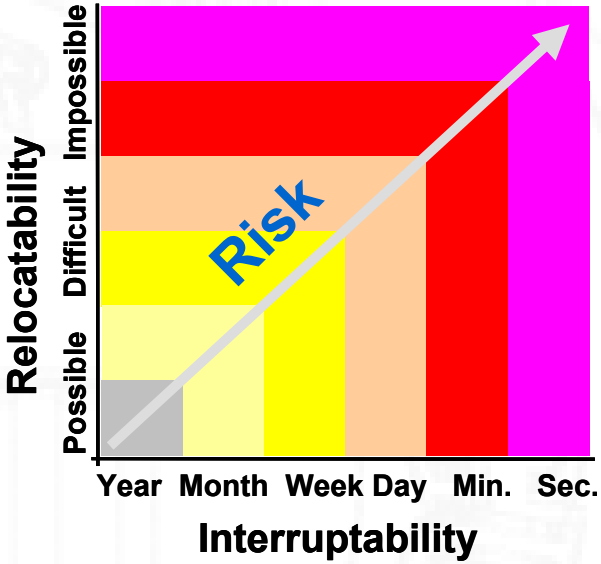
Hyper Linked Slides

Facility Assessments

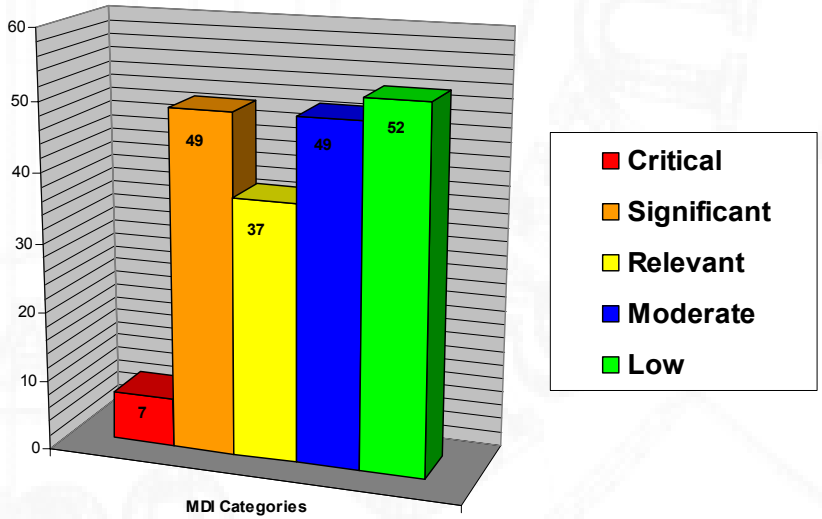
Facility Assessments
Mission Dependency Index

ORM Metric Used for:

- Project Prioritizations
- Physical Security
- Resource Allocations
- ID Divestiture Opportunities
- Funding Analysis

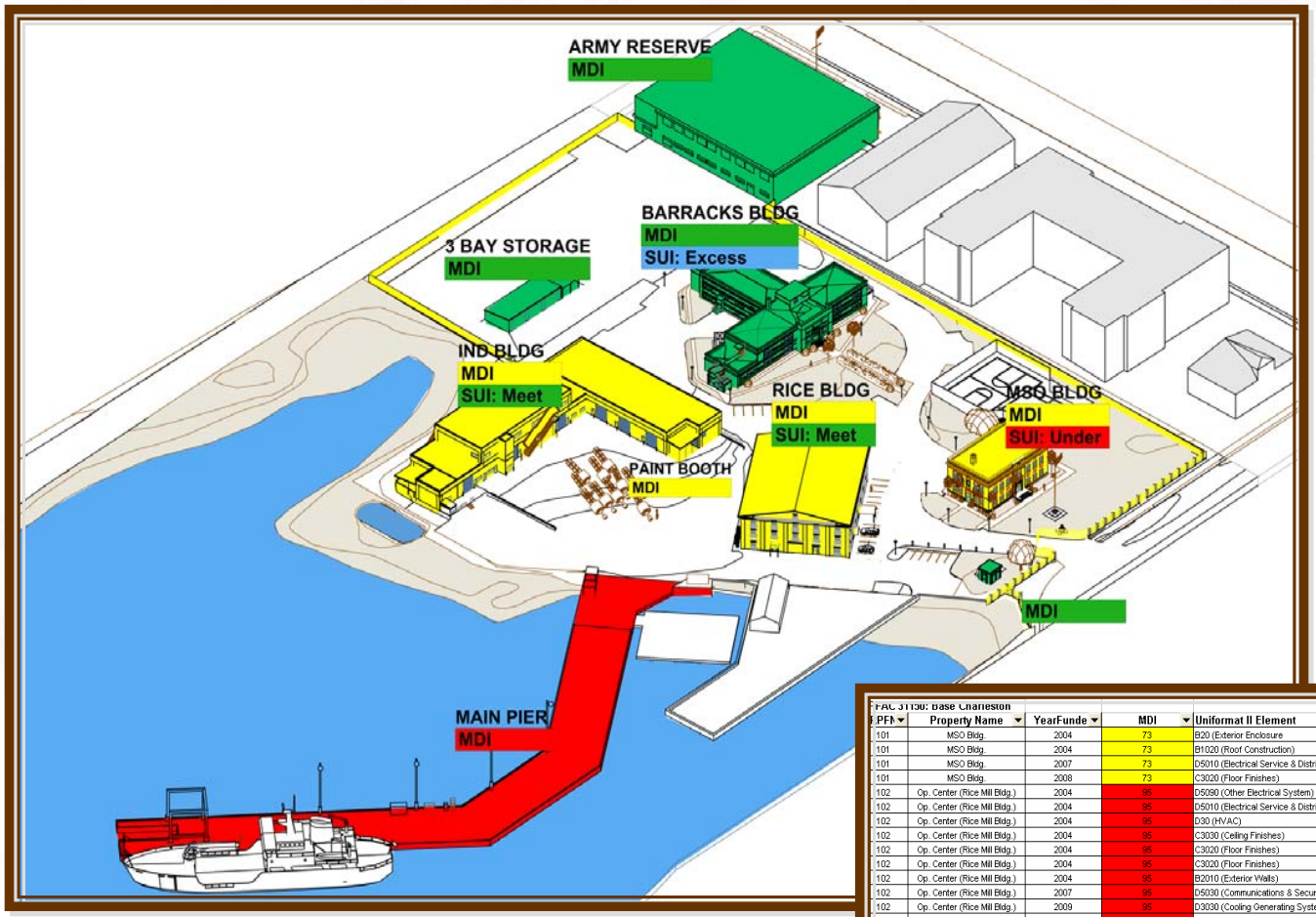


MDI Score	Term	Color Scheme	Relative MDI
100 - 85	Critical	red	top 1/5th percentile
85 - 70	Significant	orange	next 1/5th percentile
70 - 55	Relevant	yellow	next 1/5th percentile
55 - 40	Moderate	green	next 1/5th percentile
40 - 0	Low	blue	last 1/5th percentile



For Mission Dependency Index Assessment of Seattle Area U.S. Coast Guard Activities

Facility Assessments
MDI Presentations



FAC 31150: Base Charleston

PFN	Property Name	YearFunde	MDI	Uniformat II Element	ProjectDescription	ProjectCosts
101	MSO Bldg.	2004	73	B20 (Exterior Enclosure	Exterior Walls, Doors, Frames, Entrances	$191,877.00
101	MSO Bldg.	2004	73	B1020 (Roof Construction)	Roof & Structural Framing System	$329,071.00
101	MSO Bldg.	2007	73	D5010 (Electrical Service & Distributi	Panel Boards	$6,714.00
101	MSO Bldg.	2008	73	C3020 (Floor Finishes)	Floor Finishes	$32,079.00
102	Op. Center (Rice Mill Bldg.)	2004	95	D5090 (Other Electrical System)	Lighting Fixtures	$34,968.00
102	Op. Center (Rice Mill Bldg.)	2004	95	D5010 (Electrical Service & Distributi	Panel Boards & Transformers	$65,168.00
102	Op. Center (Rice Mill Bldg.)	2004	95	D30 (HVAC)	Air Handling Systems	$45,847.00
102	Op. Center (Rice Mill Bldg.)	2004	95	C3030 (Ceiling Finishes)	Suspended Systems	$50,160.00
102	Op. Center (Rice Mill Bldg.)	2004	95	C3020 (Floor Finishes)	Floor Finishes	$75,380.00
102	Op. Center (Rice Mill Bldg.)	2004	95	C3020 (Floor Finishes)	Floor Finishes	$75,380.00
102	Op. Center (Rice Mill Bldg.)	2004	95	B2010 (Exterior Walls)	Exterior Walls, Waterproofing, Dampproofing, In	$615,874.00
102	Op. Center (Rice Mill Bldg.)	2007	95	D5030 (Communications & Security)	Fire Alarm/Signaling System	$31,307.00
102	Op. Center (Rice Mill Bldg.)	2009	95	D3030 (Cooling Generating Systems	Air Handling Systems	$73,038.00
102	Op. Center (Rice Mill Bldg.)	2010	95	D3050 (Terminal & Package Units)	Air Handling Systems	$23,918.00
102	Op. Center (Rice Mill Bldg.)	2010	95	C1010 (Partitions)	Interior Walls and Finishes	$202,165.00
104	Barracks Bldg.	2004	53	B1020 (Roof Construction)	Roof & Structural Framing System	$872,066.00
104	Barracks Bldg.	2004	53	B20 (Exterior Enclosure)	Exterior Walls & Windows	$379,652.00
104	Barracks Bldg.	2004	53	C1010 (Partitions)	Interior Walls and Finishes	$353,173.00
104	Barracks Bldg.	2004	53	C3020 (Floor Finishes)	Floor Finishes	$79,523.00
104	Barracks Bldg.	2004	53	D2010 (Plumbing Fixtures)	Bathroom Accessories and Ventilation	$39,370.00
104	Barracks Bldg.	2004	53	D3040 (Distribution Systems)	Air Handling Systems	$109,796.00
104	Barracks Bldg.	2004	53	D5010 (Electrical Service & Distributi	Panel Boards & Transformers	$25,757.00
104	Barracks Bldg.	2007	53	D3020 (Heat Generating Systems)	Pumps	$24,490.00
105	Industrial Bldg.	2008	65.5	D5020 (Lighting & Branch Wiring)	Lighting Fixtures	$93,857.00
105	Industrial Bldg.	2009	65.5	D3040 (Distribution Systems)	Air Handling Systems	$49,067.00

FA
data
IDM
RSP

Facility Assessments
MDI Intra-Dependencies

Q1: How long could the (functional element) be interrupted before impacting your mission readiness?

Q2: How difficult would it be to relocate the (functional element) located in (RPFN) to another location without impacting mission readiness?

Within the Command

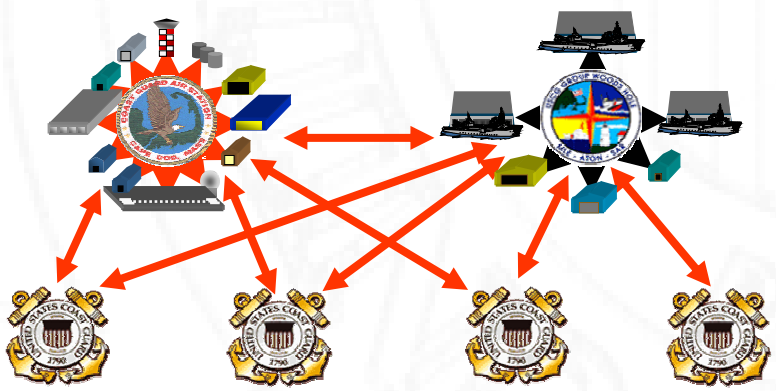
MISSION INTRA-DEPENDENCY SCORE					
MD_W		Q1: Interruptibility			
		None (24/7)	Brief (min/hrs)	Short (days/weeks)	Prolonged (months)
Q2: Relocatability	Impossible	4.0	3.6	3.2	2.8
	Extremely Difficult	3.4	3.0	2.6	2.2
	Difficult	2.8	2.4	2.0	1.6
	Possible	2.2	1.8	1.4	1.0

MD_W = Mission Dependency Within a Functional Element

Facility Assessments
MDI *Inter*-Dependencies

Q3: How long could the services provided by (named command) be interrupted before impacting your mission readiness?

Q4: How difficult would it be to replace or replicate the services provided by (named command) with another provider from any source?



Between Commands

MISSION INTER-DEPENDENCY SCORE					
MD_B		Q3: Interruptibility			
		None (24/7)	Brief (min/hrs)	Short (days/weeks)	Prolonged (months)
Q4: Replaceability	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

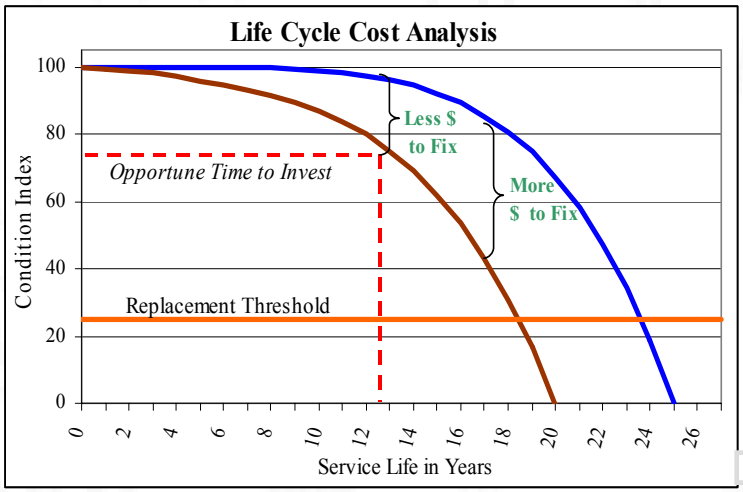
MD_B = Mission Dependency Between Functional Elements

FA
data
IDM
RSP

Facility Assessments
Facility Condition Assessment

- FCI = Cost of Deficiencies/CRV
  - Filters MDI, SCI, Uniformat II, Navy Use Codes, etc.
- Facility Deficiencies Impact
  - Mission Readiness
  - Financial Performance
  - Worker Satisfaction & Productivity
- Physical Condition & Predictive Models are used to evaluate optimal funding levels and Total Ownership Costs

FCA	MDI > 80	80 > MDI > 60	60 > MDI
Level 1	Annually	Annually	Annually
Level 2	Every 2 Years	Every 2 Years	Every 4 Years
Level 3	Every 4 Years	Every 6 Years	Never



FA
data
IDM
RSP

Facility Assessments
Space Utilization Assessment

Space Utilization Color Codes

SUI	Color	Term
greater than 1.15	blue	Excess Space
between 1.15 & 0.95	green	Sufficient Space
less than 0.95	red	Needs Space

- Space Utilization Index = Actual SF/Allowable SF
  - Based on USCG Commandant Space Standards
- Building Space is a dominant cost driver
- Ensures equitable distribution of space and funding to support mission execution

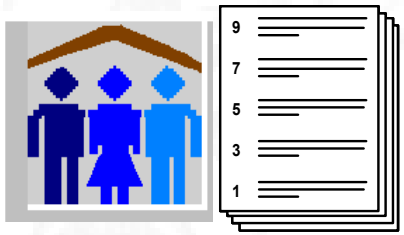
Space Categories (adapted from NAVFAC P-80)

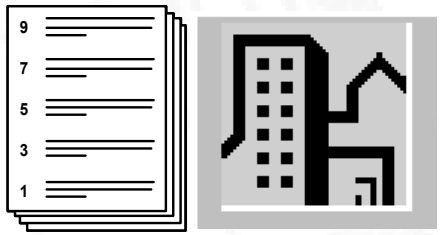
Navy Category Code Series	Coast Guard Property Use Codes	Land Use Name	Land Use Color
100 - Operations & Training		Operational	
140 Operational Buildings	140 - Land Operations	Port Ops	
170 Training Facilities	171 - Educational	Training	
200 - Maintenance & Production		Maintenance	
211 - Aircraft Maintenance	211 - Maintenace - Aircraft	Aircraft Maintenace	
213 - Ships, Spares Maintenance	213 - Maintenance - Boat/Cutter	Ship Maintenance	
218 - Miscellaneous Equipment Maintenance	218 - Aids to Navigation		
219 - Installation Repair and Operations	219 - Maintenance - Facilities Engineering		
300 - R&D, Testing, Evaluation			
400 - Supply Facilities		Supply/Storage	
500 - Hospital & Medical	500 - Health Care	Medical/Dental	
600 - Administrative		Adminstrative	
610-10 Administrative Office	610 -Administrative		
700 - Housing, Community Facilities		Housing	
721 - Unaccompanied Personnel Housing	721 - Bachelor Housing	BEQ/BOQ	
722 - Unaccompanied Housing - Mess Facilities	722 - Dining	Community/Personnel Support	
730-10 Fire Station	730-10 Community Facilities - Fire Station	Community/Personnel Support	
730-25 Gate/Sentry House	730-25 Community Facilities - Gate House	Community/Personnel Support	
740-10 No listed (01-19 = Exchange)	740-10 Commuity Facilities - Exchange	Community/Personnel Support	
740-38 Hobby Shop - Automotive	740-38 Community Facilities - Auto Hobby Shop	Community/Personnel Support	
740-44 Physical Fitness Facility (replaced 43 Gym)	740-43 Community Facilities - Gymnasium	Community/Personnel Support	
740-54 Recreation Center	740-54 Community Facilities - Recreation Center	Community/Personnel Support	
740-63 Enlisted Club	740-63 Community Facilities - Clubs	Community/Personnel Support	
740-83 Not listed	740-83 Community Facilities - Chapel	Community/Personnel Support	
800 - Utilities, Ground Improvements	800 - Facilities Support	Utiliites	
900 - Government Owned Land	900 - Personnel Support	Community/Personnel Support	

Facility Assessments

Functionality/Serviceability Assessment

Functionality | **Suitability** | **Serviceability**





Demand → **Compare** ← **Supply**

Demand

Calibrated tools to specify the levels of functionality and service life required by stakeholders

Compare

Supply is more =

Supply is less =

Supply matches demand =

Standard demand and supply scales are different, but matched

Supply

Calibrated tools to measure the levels of capability and service life of a design, a building, or infrastructure

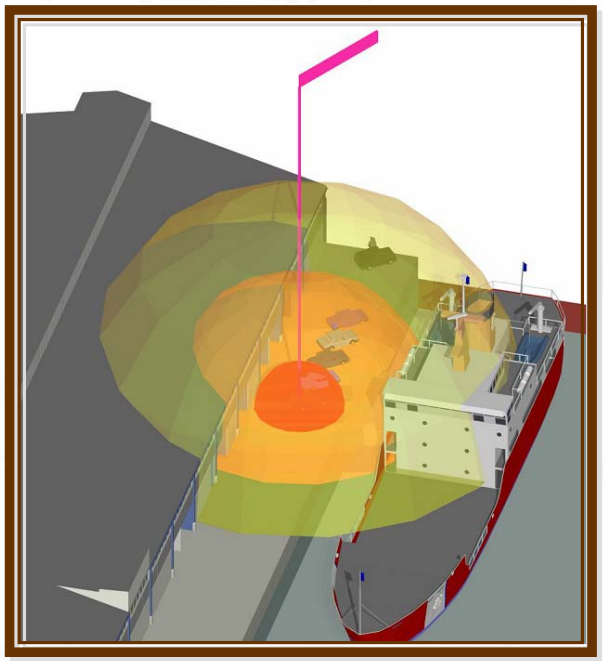
Serviceability Tools & Methods, ST&M, and BestFIT are Trademarks of Serviceability Tools & Methods, Inc., which operates under license from the International Centre for Facilities, Inc.

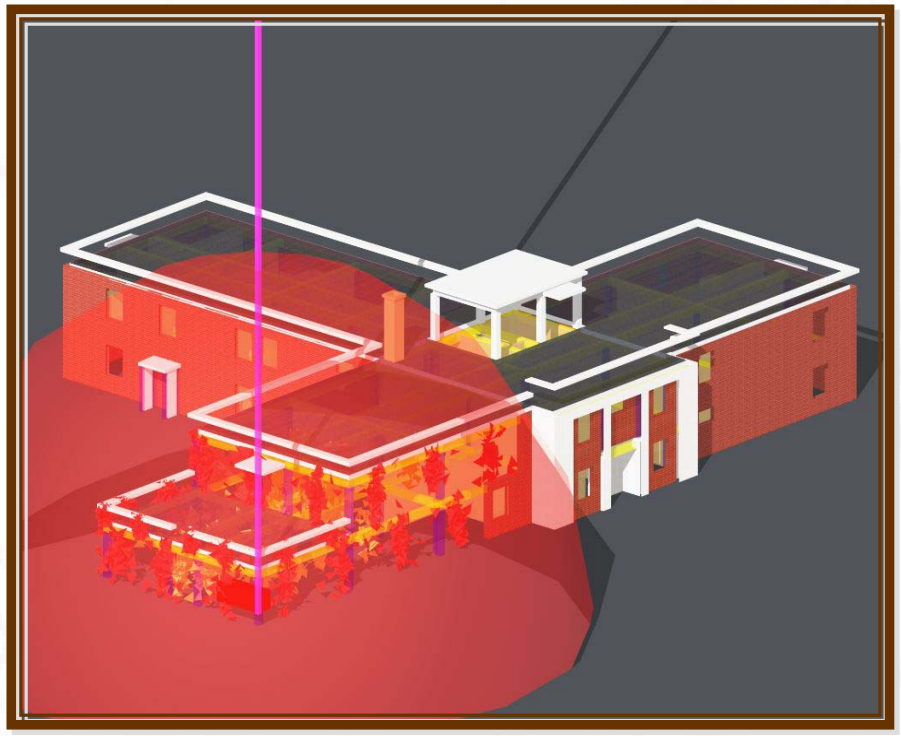
© 1993, 2001, 2002 International Centre for Facilities, Inc.

Facility Assessments
Physical Security Assessment

Applies CPTED-RED Methodology

Crime Prevention Through Environmental Design coupled with Response Enhancing Design





- Uses 3-D Object Models
- Simulates Blast Effects

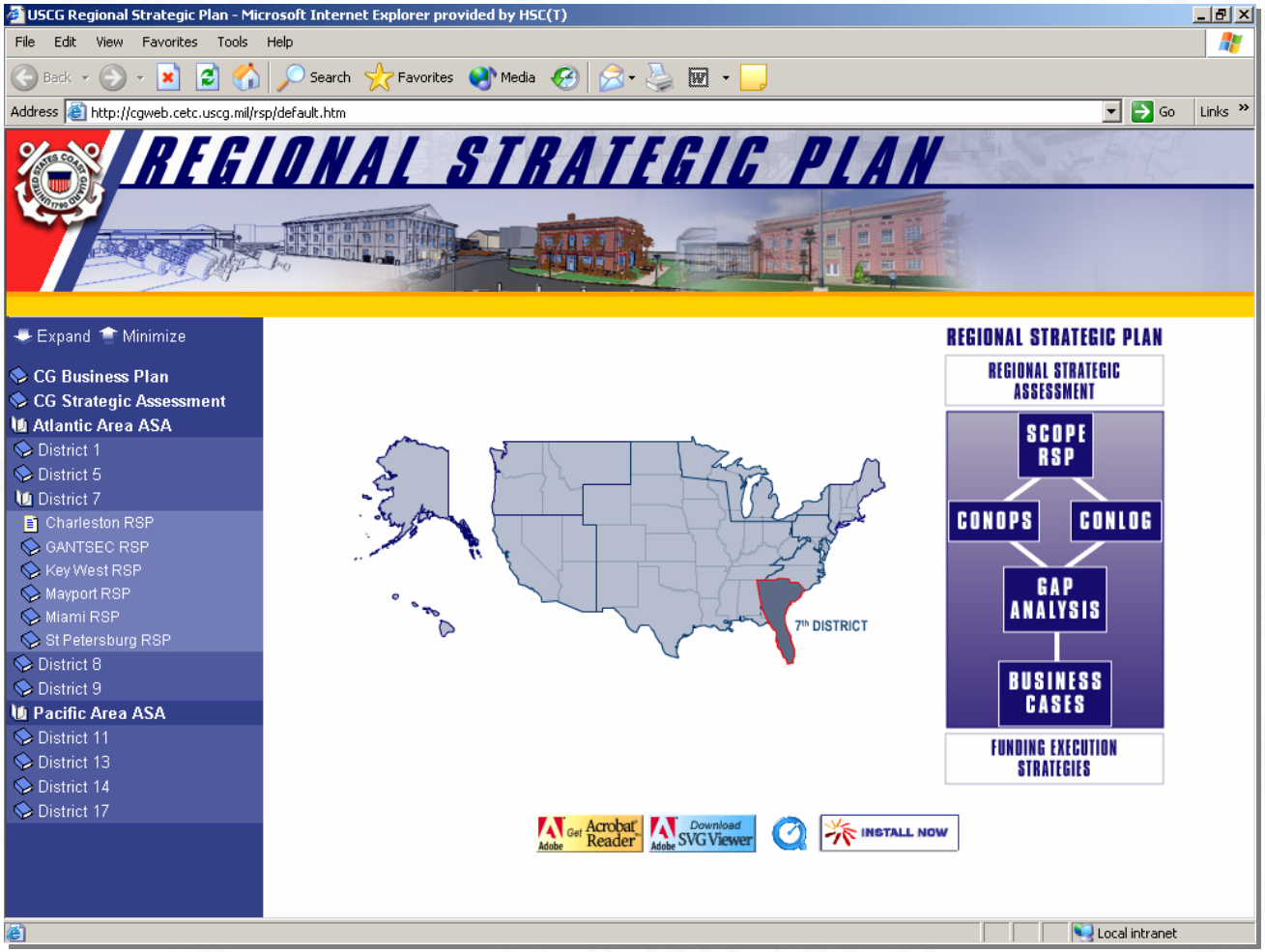
Hyper Linked Slides

Integrated Decision-Making

FA
data
IDM
RSP

Integrated Decision-Making, Regional Strategic Plans

Connecting the full spectrum of decision-making

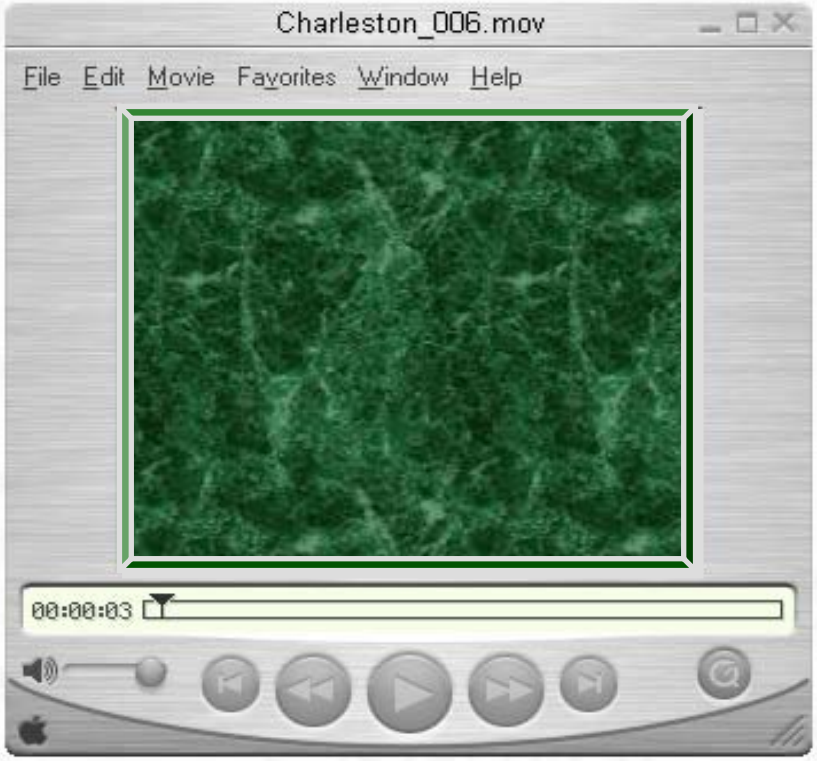


Integrated Decision-Making, Integrated Facilities Management

Connecting decision-makers and data

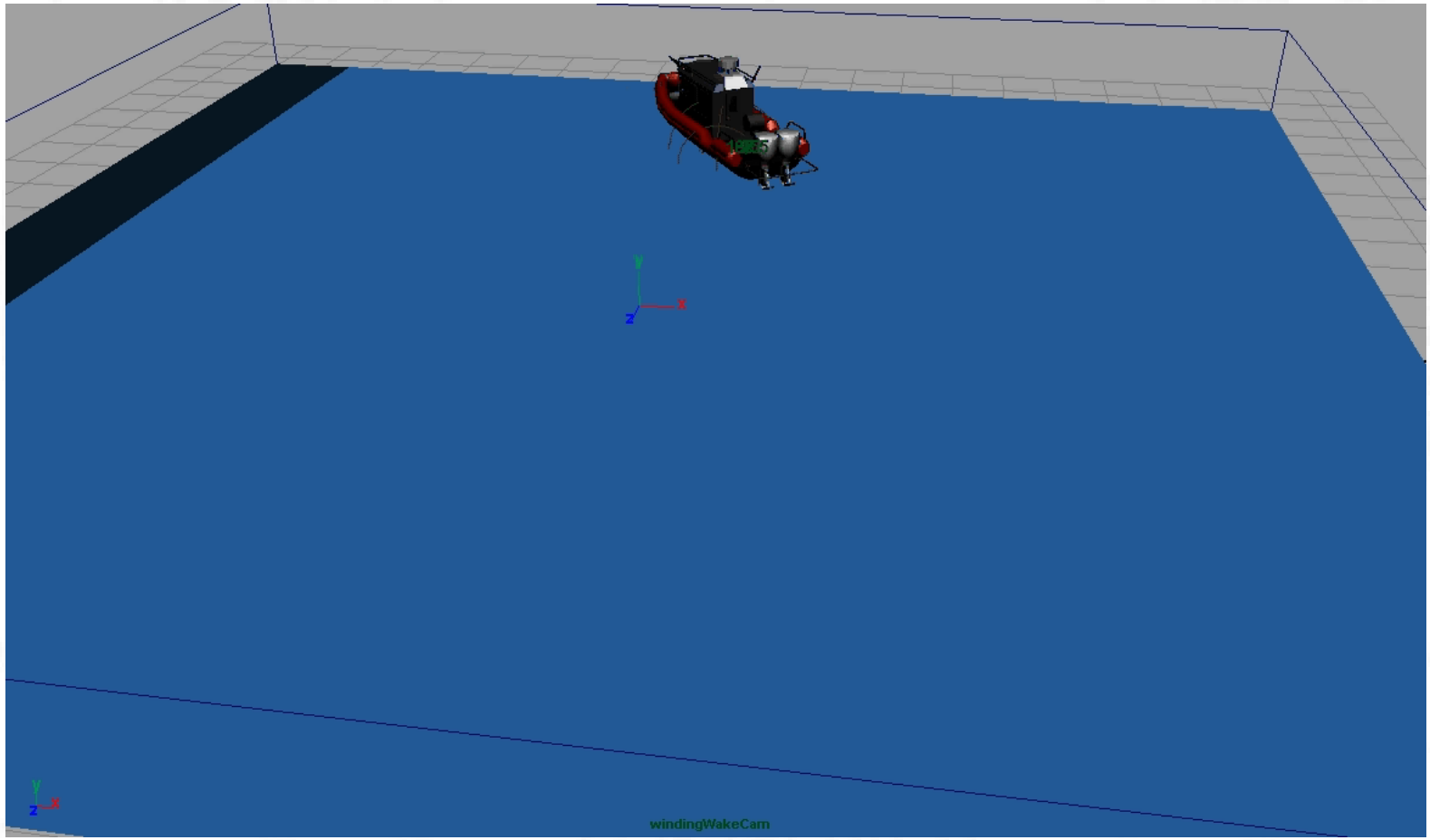
Integrated Decision-Making, Integrated Portfolio Management

Connecting all decision-makers



Integrated Decision-Making, Integrated Operations

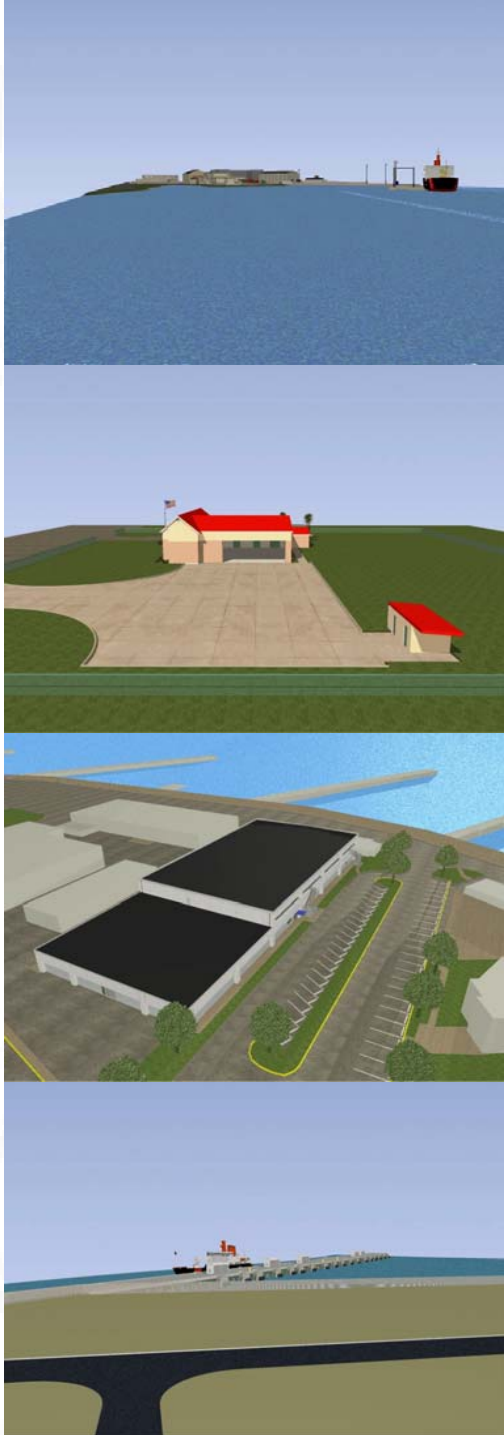
Connecting decision-makers and data



FA
data
IDM
RSP

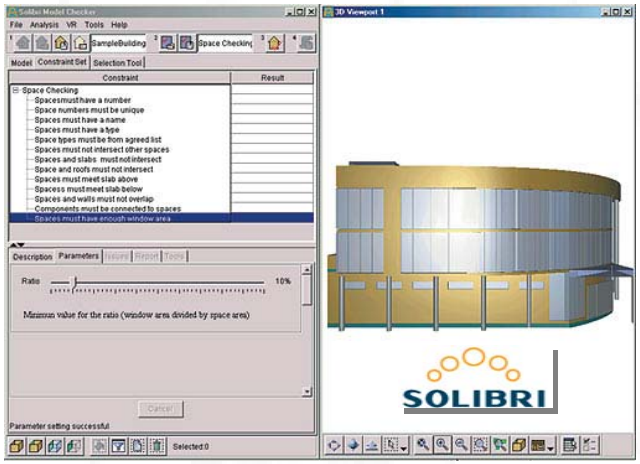
Integrated Decision-Making,
Integrated Data & Interoperability

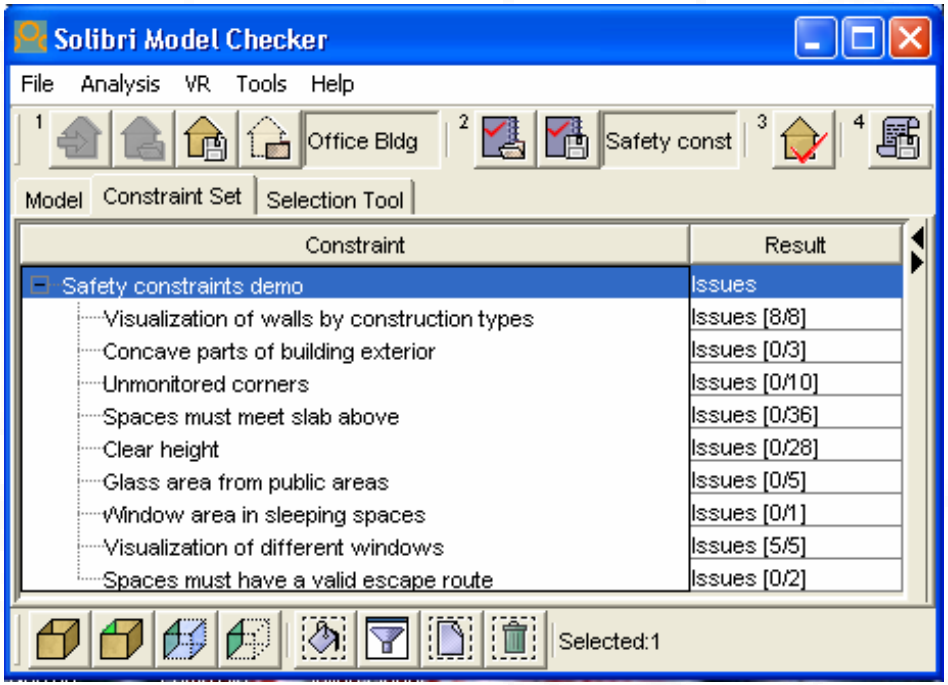
- Force = mass *x* acceleration
- Open, Universal Standards
- Enterprise IT Architectures
- What If Capabilities
- Intelligent, Parametric CAD
- Credentialed Models
- Object-Based IT Architecture
- Transactional Data Management
- Real-Time, Dynamic Linking
- Data Visualization
- National Map & Geo One Stop
- Cost Influence – Cash Flow Curves



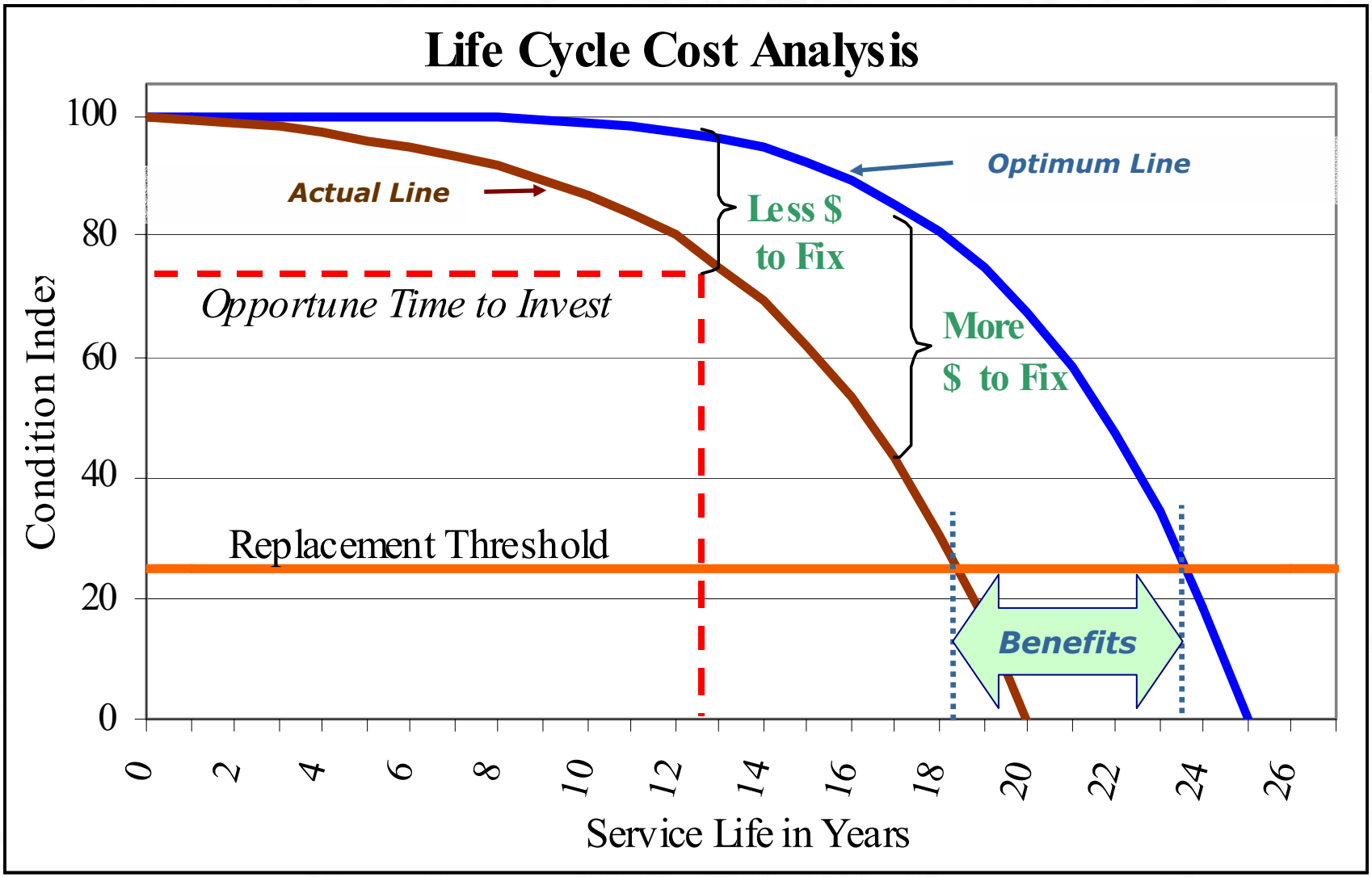
Integrated Decision-Making
Performance & Automated Code Checking

- Solibri Model Checker
- Singapore, Building Code Checking





Integrated Decision-Making
Total Ownership Cost Models



Integrated Decision-Making
Total Ownership Cost Models

Objective, Auditable Condition Assessment

- Complete inventory of buildings, structures, and systems (ASTM E-1557, Uniformat II)
- Quantifies type and severity of a distress
- Generates a condition index for assets
- Linked to discrete degradation criteria
- Condition index is "monetized" & financially modeled
- Penalty cost for deferred maintenance are calculated
  - Quantify costs for not doing work
- Predictive and repeatable

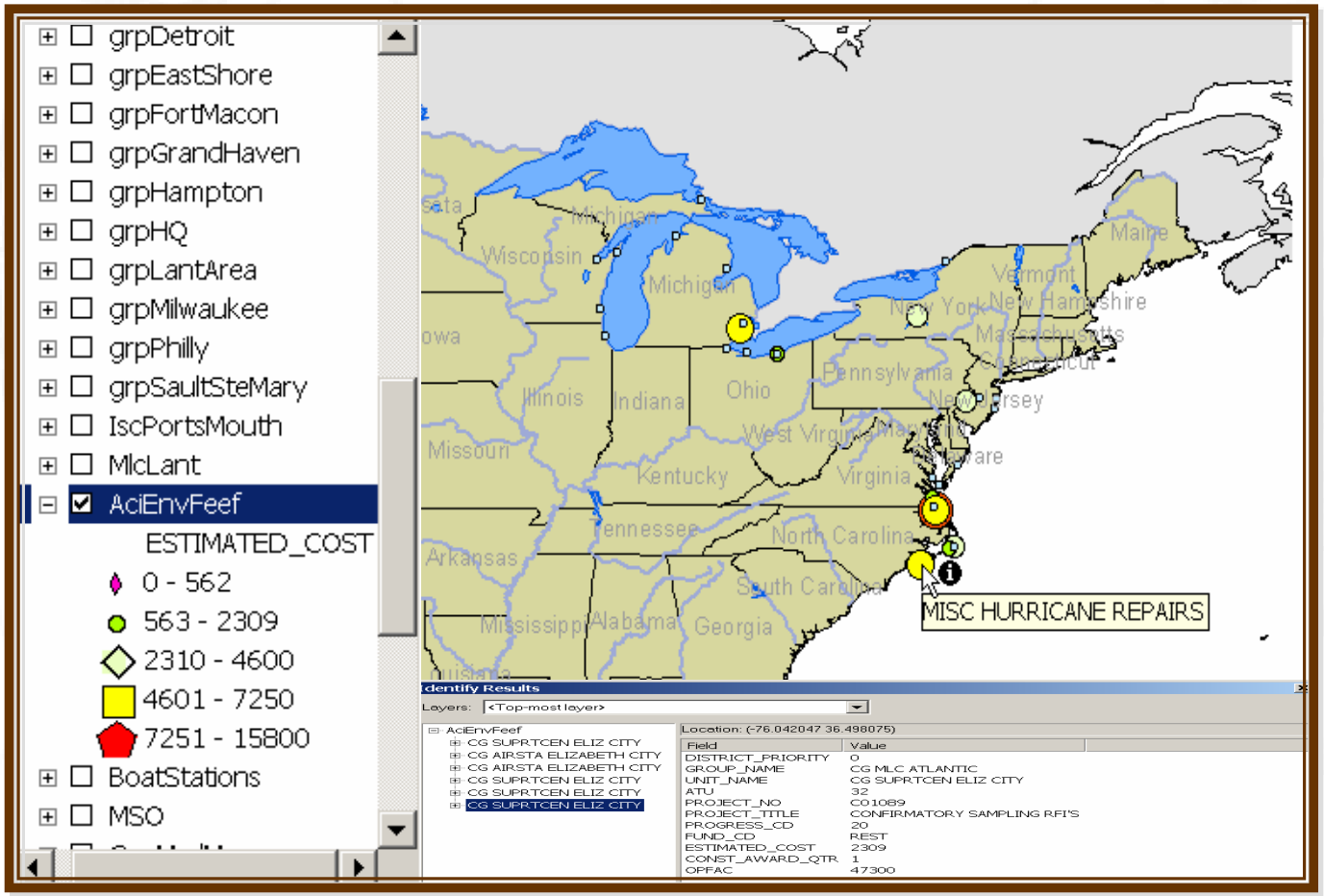
Integrated Decision-Making
Total Ownership Cost Models

Business Case Modeling

- Linked to geospatial object models
- Financial, Cash-Flow Perspective
  - Optimizes budgets for maintenance, repair and capital replacement
- Economic, Cost-Benefit Perspective
  - OMB Circular A-96 – "cost-benefit" methodology
  - Federal "Cost of Capital" pegged to US Treasury
- Supports "what if" modeling – optimization analyses
  - I.e. multiple funding scenarios
  - Multiple user profiles

Integrated Decision-Making
M&R Funding Time Density Plots

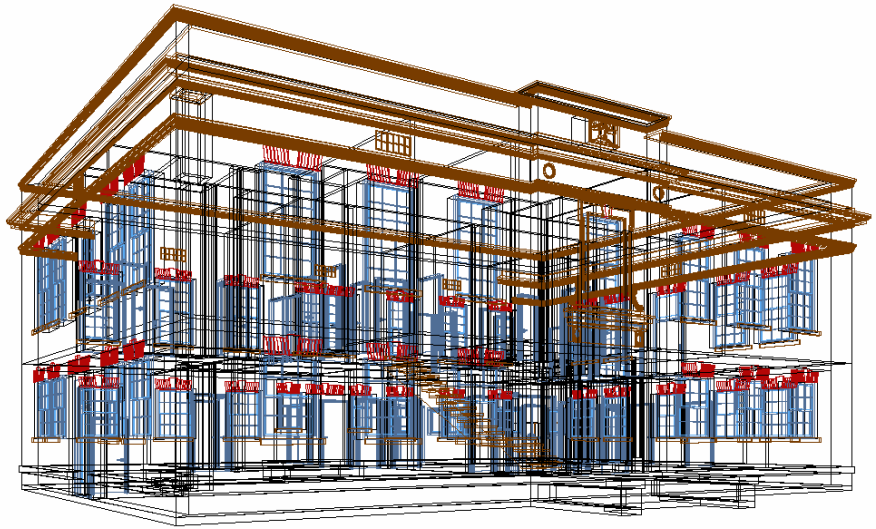
Leveraging the geospatial construct to visualize maintenance and repair funding trends

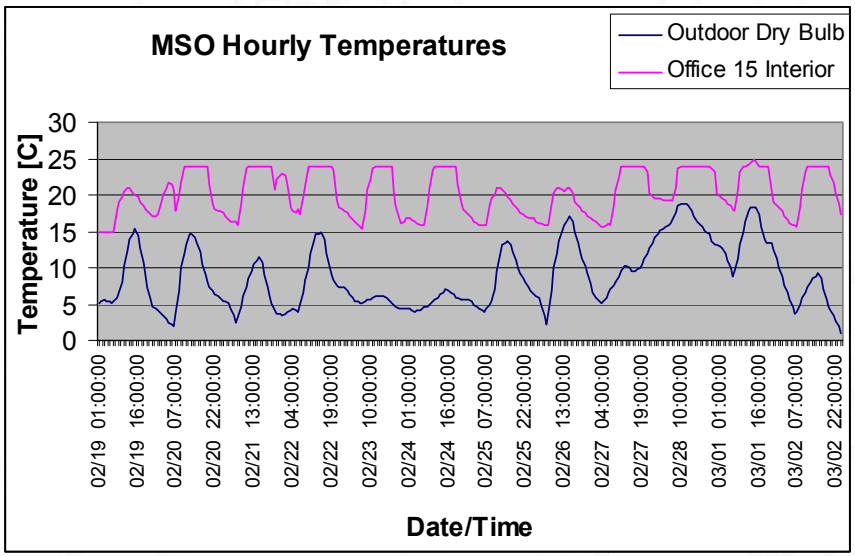


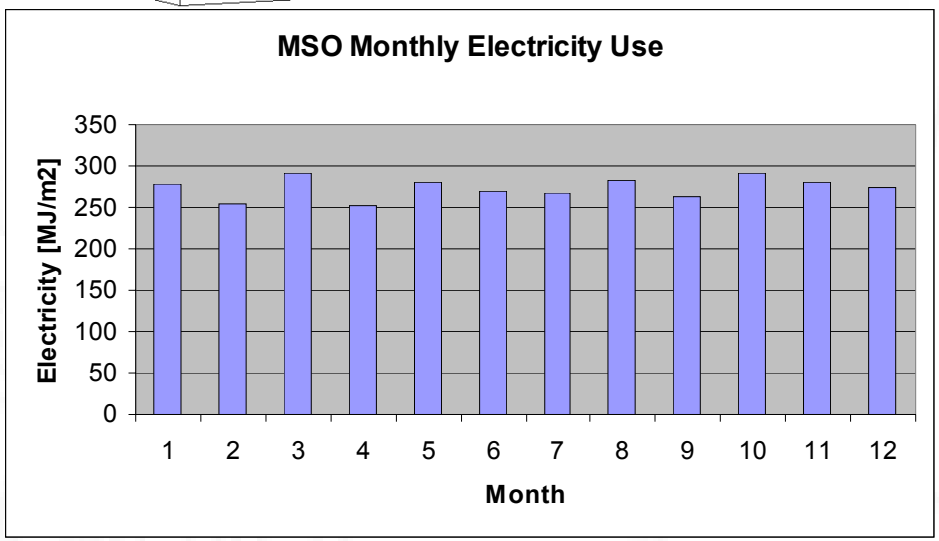
Integrated Decision-Making
Energy Simulations

Energy Simulations

- LBNL
- EnergyPlus
- IAI-IFC
- BLIS-Project



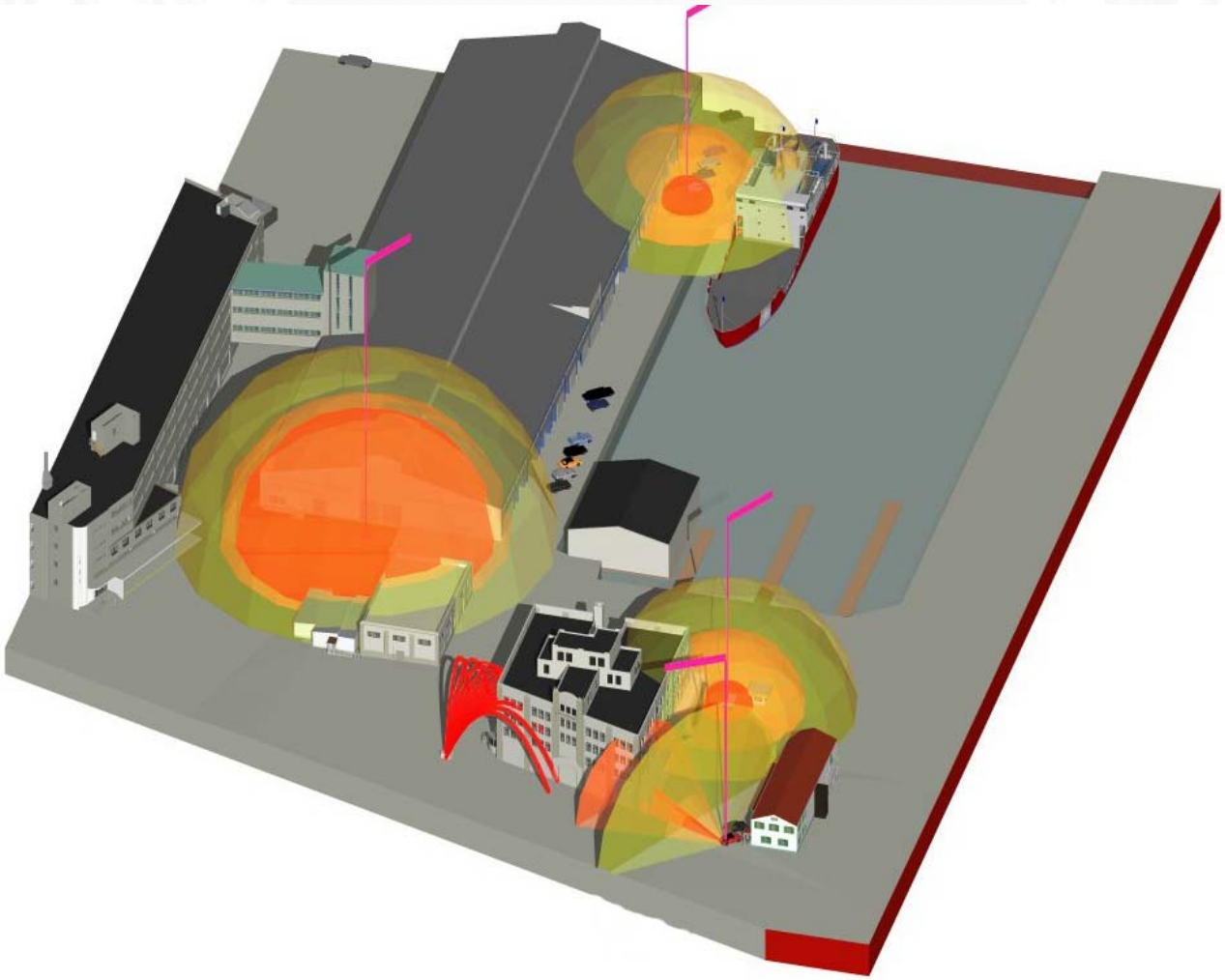




FA
data
IDM
RSP

Integrated Decision-Making
Physical Security Simulations

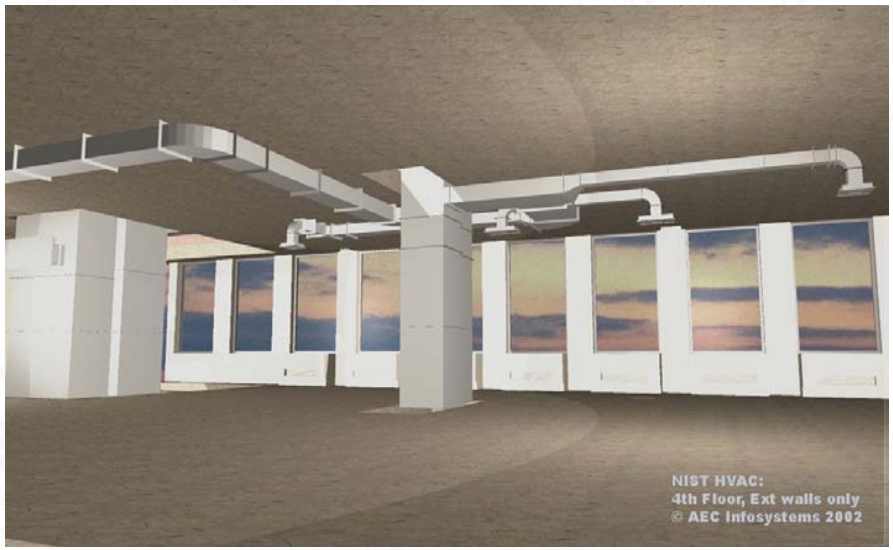
Bomb objects interact with intelligent models



FA
data
IDM
RSP

Integrated Decision-Making
Partial Flow Analysis

- CONTAM at NIST
- CBR Analysis
- Sick Building (ex. Legionnaire's Diseases)



Integrated Decision-Making

Visual Decision-Making, Pattern Recognition

Metric	*Color*	*Meaning*
MDI		Mission Critical
SUI		Needs Space
FCI		Poor Condition
MDI		Mission Significant
SUI		Excess Space
FCI		Good Condition
MDI		Low Criticality
SUI		Excess Space
FCI		Poor Condition

Needs Urgent Attention

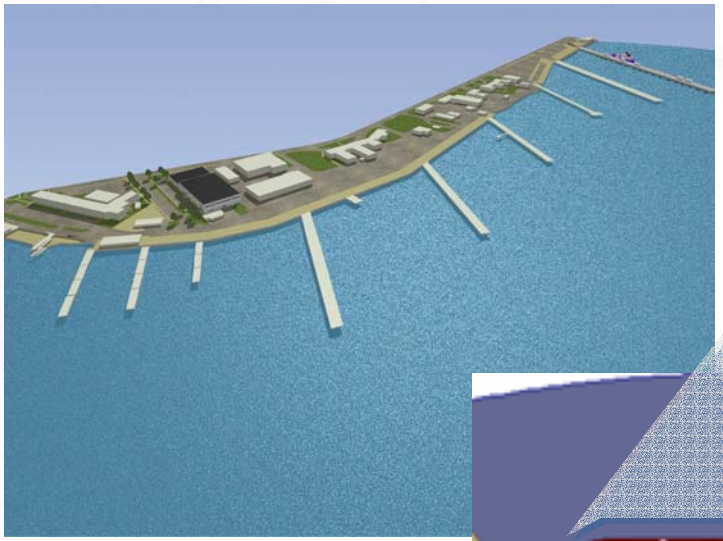
Consolidation Opportunity

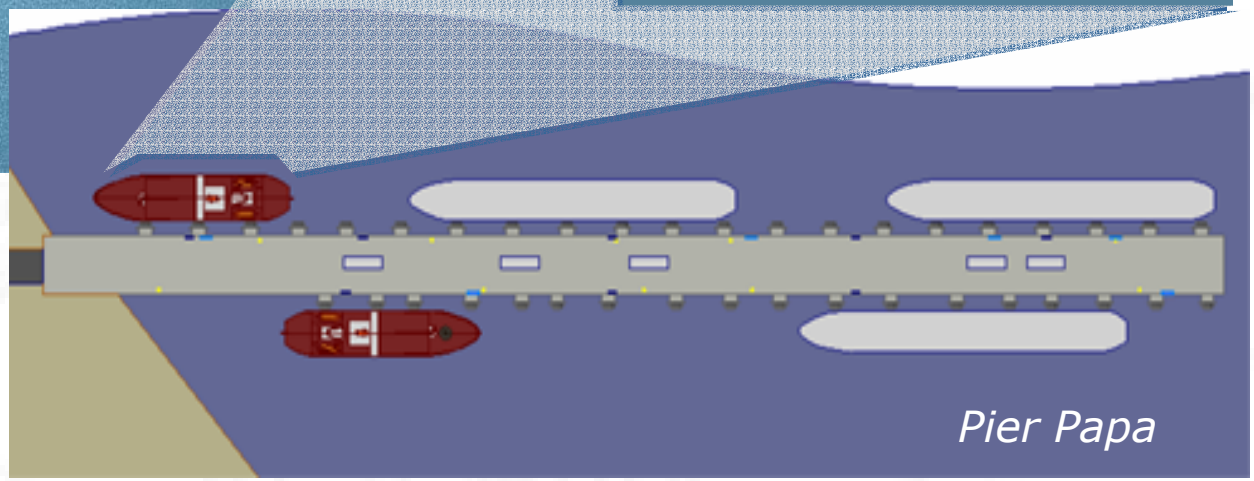
Low Value - Divestiture Opportunity

FA
data
IDM
RSP

Integrated Decision-Making
Scenario-Based Planning and Gaming

- Operations and Logistics coordination
- Optimum facility configurations
- Harbor Master and the harbor





Integrated Decision-Making
Common Operational Picture(s)

- An object-oriented, geospatial construct enables the Common Operational Picture
- Multi-purpose data is more valuable and more creditable

Group Charleston
Charleston,
South Carolina

Integrated Decision-Making
Intelligent 4-D Simulations

- Uses Approved Business Case
  - Multi dimensional views (I.e. years, buildings, systems…)
- Linked to Total Ownership Cost Models
  - Benched from predictable life cycle models
- Master Portfolio Schedule
  - Dynamic and adjustable
  - Drag and drop project/activity management
  - Generates economic and mission critical paths
- Visualize Data, Information > Share Knowledge
  - Conditional formatting base on condition indexes
  - Transparent building systems (Uniformat II)

CURRENT DATE
10/30/2003
Poor Condition
Fair Condition
Good Condition

Hyper Linked Slides

Integrated Data

Integrated Data…
The Physics of Integrated Decision-Making

Bodies at rest tend to remain at rest

F = ma

Force = good, balanced decisions - results

Mass = creditable, actionable data & analysis

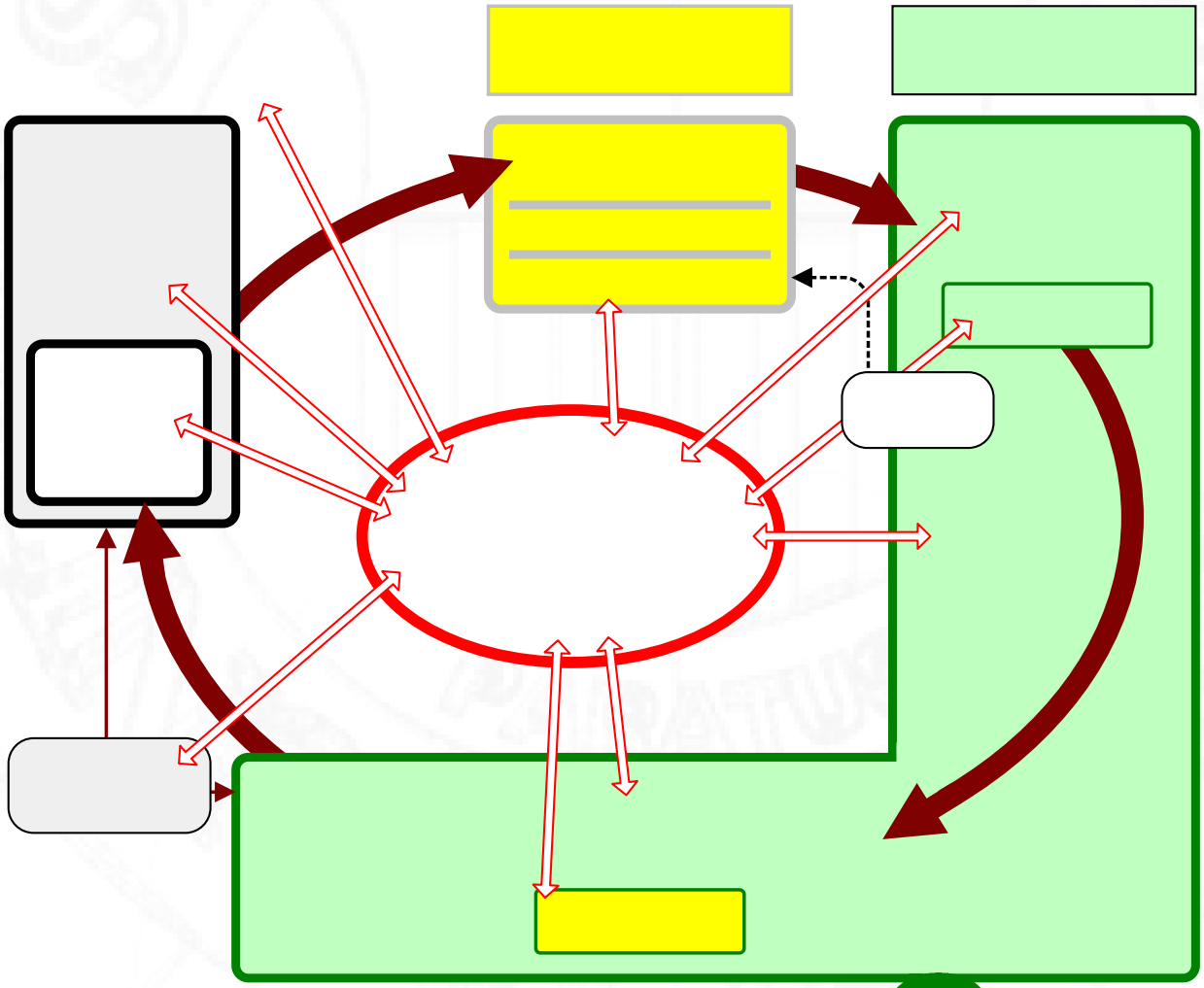
Acceleration = ability to integrate and communicate

Integrated Data…
Open, Universal Standards

- A common, data language enables > a universal decision-making logic
- Drawing Standards
  - National Institute for Building Sciences' – National CAD Standards
- Model Standards - Interoperability
  - International Alliance for Interoperability – Industry Foundation Classes
  - International Organization for Standardization
  - BLIS Project (Building Lifecycle Information System)
- Geographical Data Standards
  - CAD/GIS Technology Center's Spatial Data Standards for Facilities, Installations, and Environmental (SDS-FIE)
  - Open GIS Consortium

Integrated Data…
Enterprise IT Architecture

Geospatial data pulls is the virtual hub



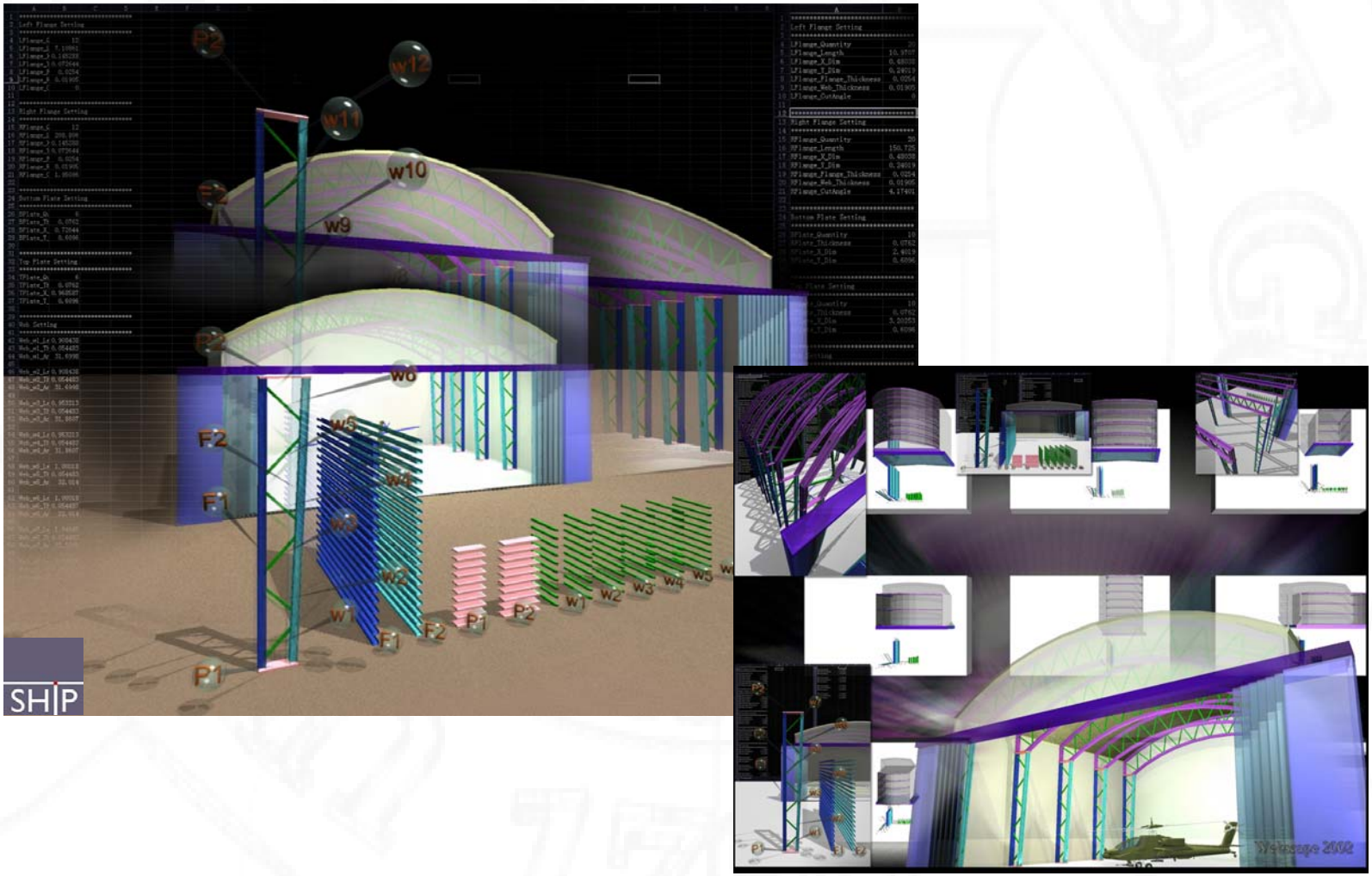
FA
data
IDM
RSP

Integrated Data…
What If Capabilities

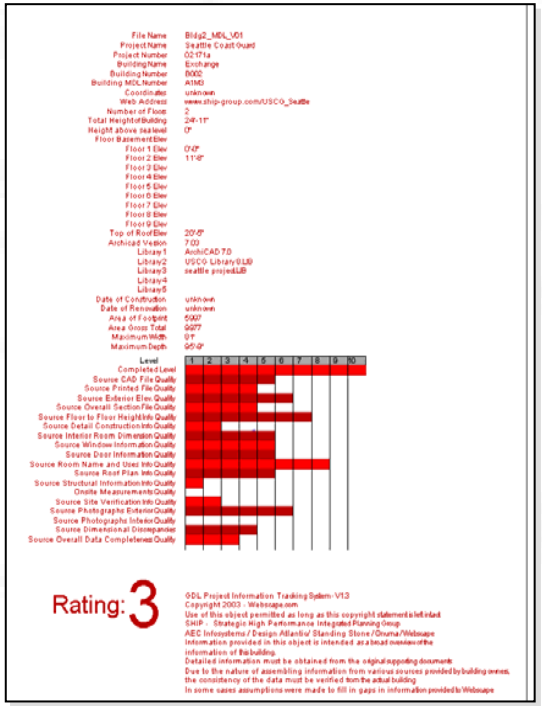
- Dynamic Operational/Logistical Integration
- Operational Scenario Analysis
- Homeport Studies
- Visual Decision-Making using Virtual Models
- Financial/Budget Modeling
- Funding/Condition Relationships
- Cost/Resource Balancing & Optimization
- Rule-Based Modeling
  - Parametric CAD Modeling – Designing
  - Decision Trees
  - Aggressor/Defender Scenarios

Integrated Data…
Intelligent, Parametric CAD Modeling

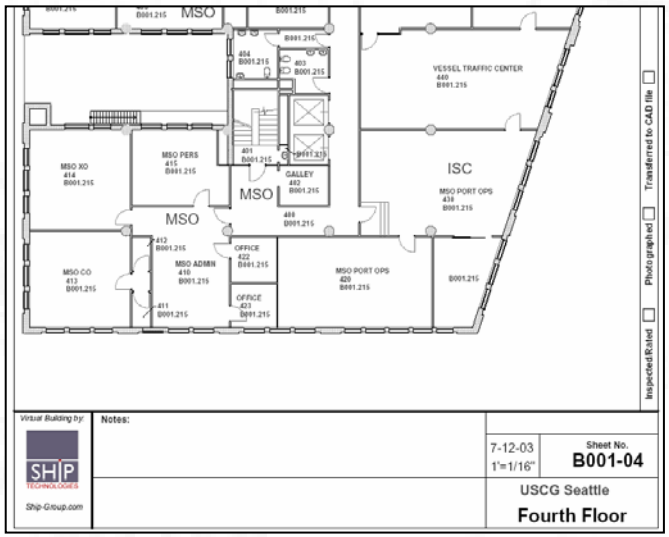
Rule-based modeling – interactive design on the fly



Integrated Data… Credentialed Models



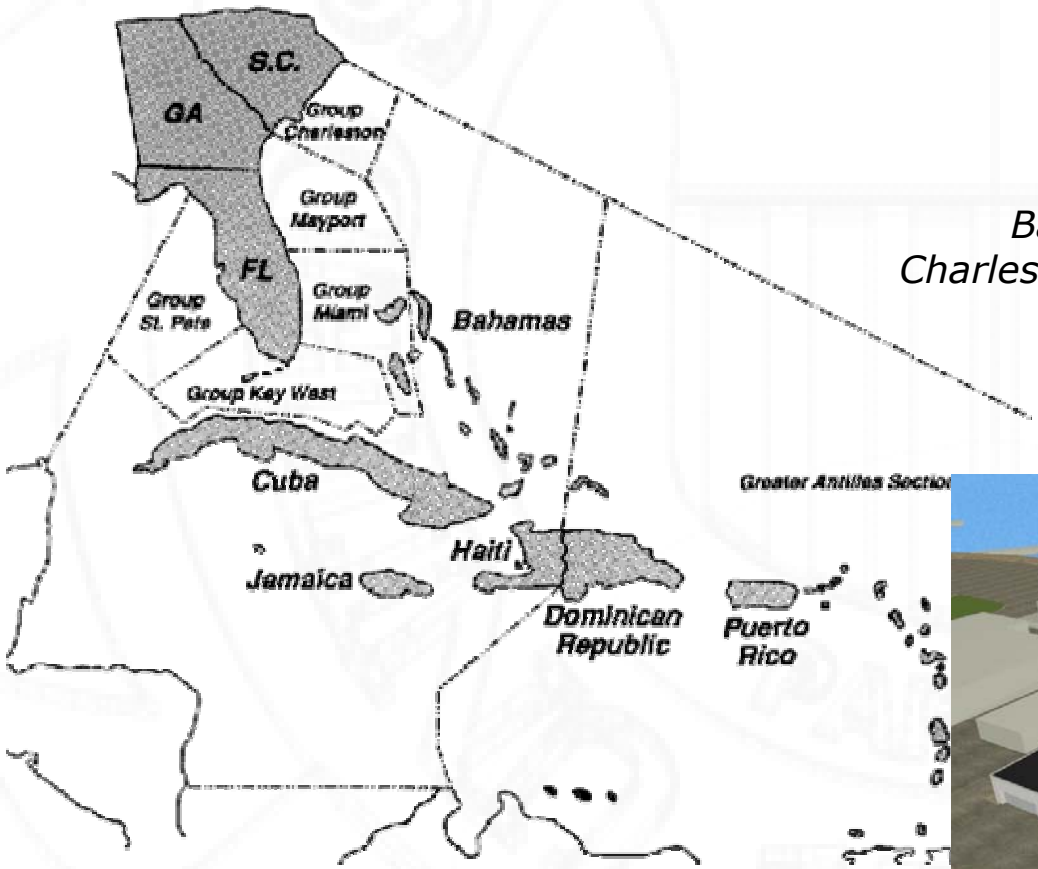
- Information Stamp/Title Block
- Signed Models
- Catalogs Metadata
- Documents Standards
- Accuracy Measures
  - Completeness – Conceptual to As-Built
  - Version Control
  - Etc.

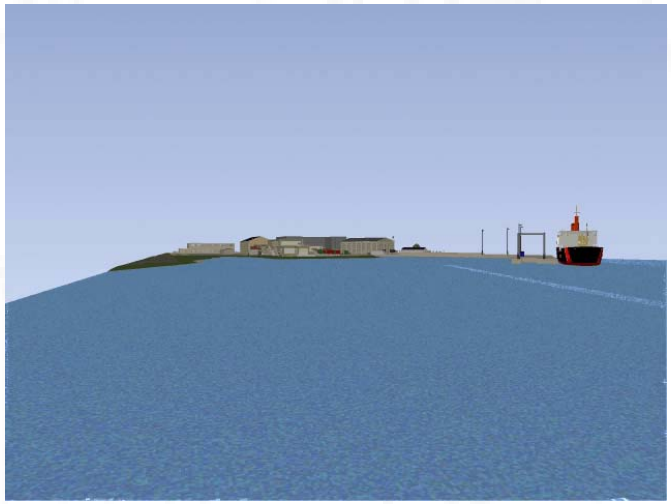


FA
data
IDM
RSP

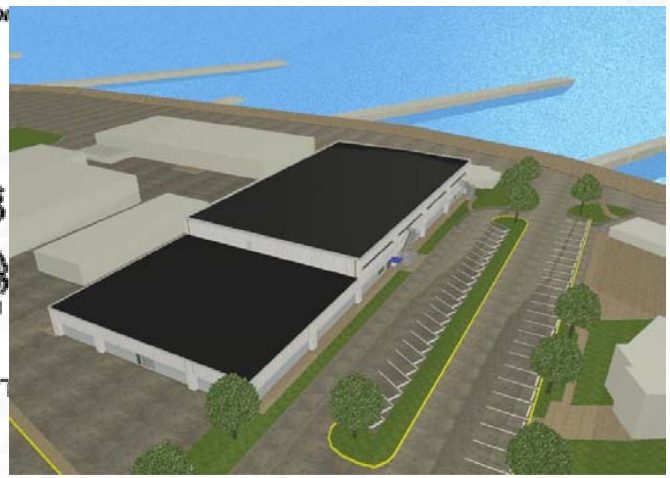
Integrated Data…
Object-Based IT Architecture

A geospatial construct virtually integrates all levels of decision-making





Base Charleston



North Charleston

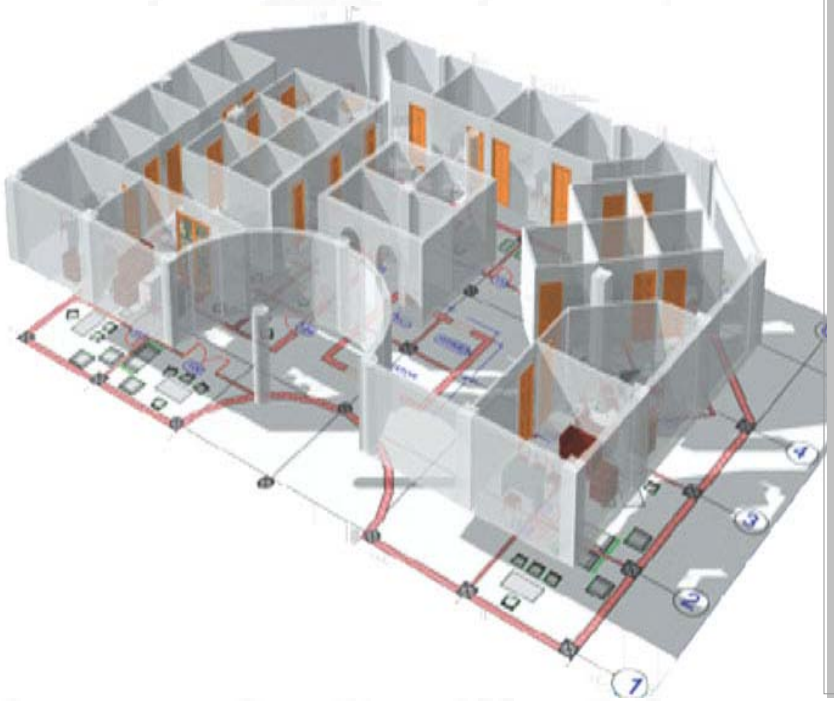
FA
data
IDM
RSP

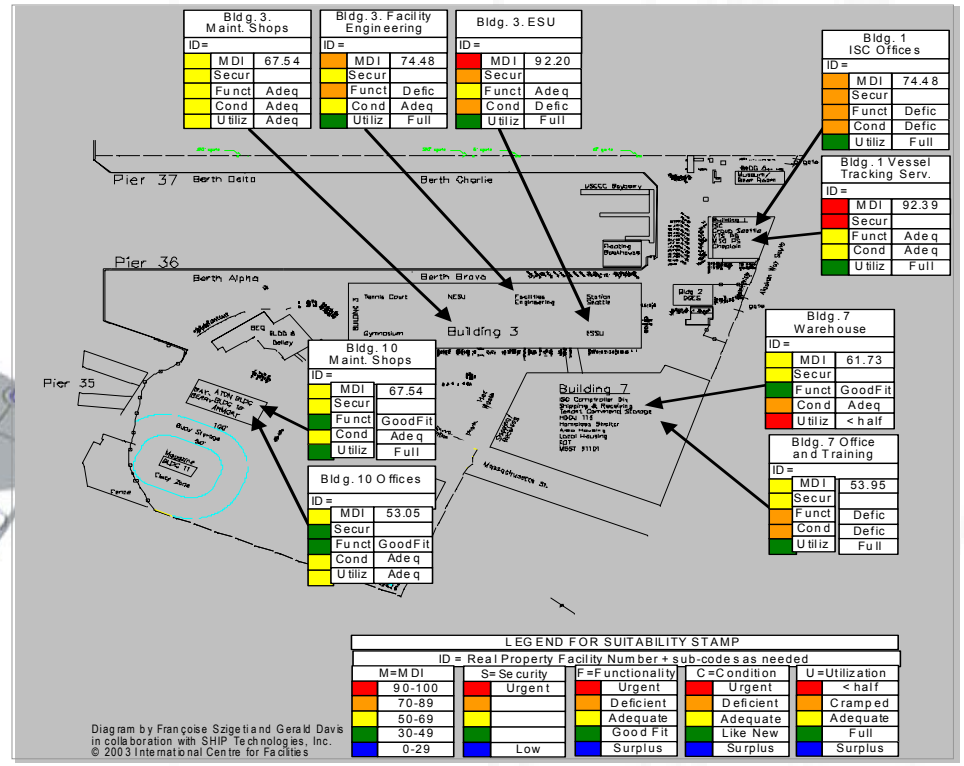
Integrated Data…
Transactional Data Management

- Parallels natural business processes
- Leverages time when hands are on the data
- Data credibility must be important to data creators
- Time as the 4th dimension,
  - Refresh and latency is an aspect to be studied
  - Appropriate v. Real-Time
- Automated logic checks
- Rule-based data acquisition
- Accelerated refresh rates
- Confidence/creditability gains

Integrated Data…
Real-Time, Dynamic Linking

Data and Decision-Making Dynamically Linked to Building Information Models





FA
data
IDM
RSP

Integrated Data…
Data Visualization

M=Mission Dep.	
	Critical
	Exceptional
	Important
	Minor
	Not Req'd

S=Security	
	Urgent
	Deficient
	Consider
	Acceptable
	Redundant

F=Functionality	
	Dysfunctional
	Deficient
	Adequate
	Good Fit
	ExceedsNeed

C=Condition & SL	
	Urgent
	Deficient
	Adequate
	Appropriate
	ExceedsNeed

B=Building Codes	
	Urgent
	Deficient
	Adequate
	Appropriate
	ExceedsNeed

R=Real Property	
	Critical
	Exceptional
	Important
	Minor
	Not Req'd

E=Environmental	
	Critical
	Exceptional
	Important
	Minor
	Not Req'd

U=Utilization	
	Overutilized
	Cramped
	Full
	Appropriate
	Underutilized

$=Costs	
	Extreme
	Major
	Normal
	Minor
	Not Req'd

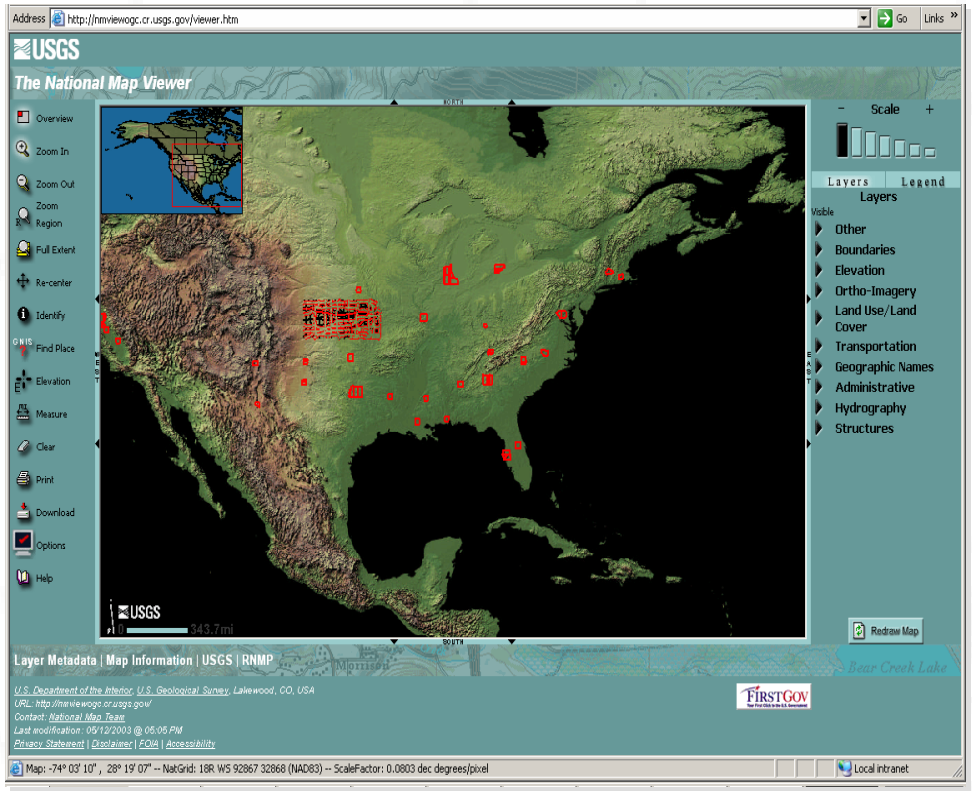
Legend for Zone Stamps that display suitability in response to requirements

Diagram by Françoise Szigeti and Gerald Davis in collaboration with SHIP Technologies, Inc.

© 2003 International Centre for Facilities

Integrated Data…
National Map & Geo One Stop

- US Geological Survey
- National Spatial Data Infrastructure



FA
data
IDM
RSP

Integrated Data…
Cost Influence – Cash Flow Curves

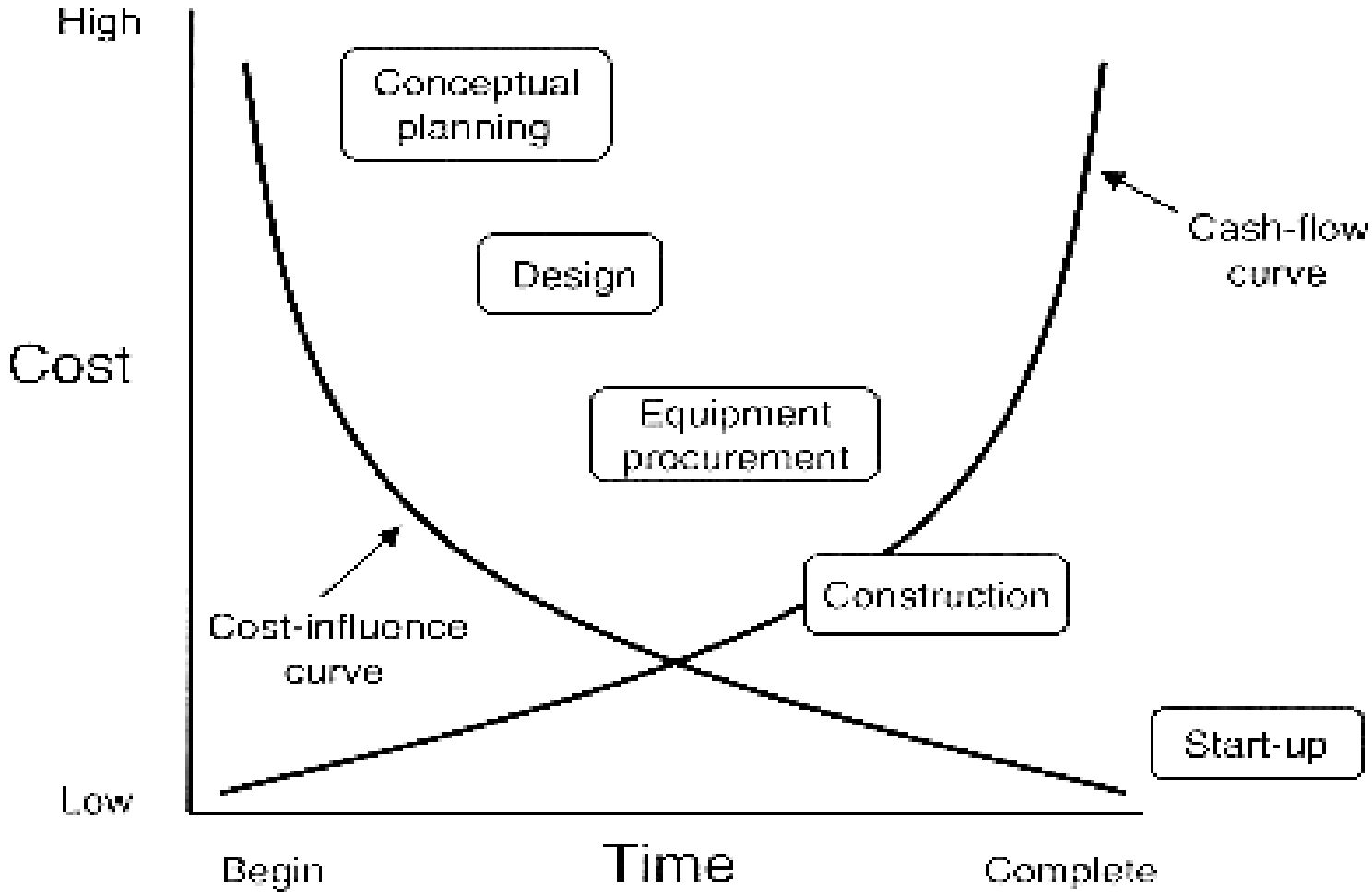


FIGURE 2-2 Cost-influence and cash-flow curves. Source: FEC, 2000.