

MARTA's Asset Management Program

ISO 55000 Certification

"*An Agency Perspective*"

David M. Springstead
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May 13, 2015

Topics

1. Tee-up the Conversation
2. Transit Assets in Today's Markets
3. MARTA
   - ✓ Background
   - ✓ The Big Picture
   - ✓ Asset Management Model
4. What is Systems Engineering (SE)?
   - ✓ Optimization of TAM Using SE Approach
   - ✓ Examples - Real Projects
5. MAP-21 and the Pursuit of ISO55000

Tee it Up!

Welcome to Atlanta & MARTA

- Started bus and rail combined service in 1979
- 9th largest transit system in the U.S.
- Approx. 500,000 passengers daily (bus and rail)
- 338 rail cars, 48 miles of service via four lines

  Gold, Red, Blue and Green
- 122 miles of track
- 532 buses, 92 routes
- 187 Mobility (paratransit) vehicles

36th 35th Anniversary
COMBINED BUS AND RAIL SERVICE FOR THIRTY-FIVE YEARS
marta

Transit Relevance in Technology Markets

- New Products are Largely Driven by **Commercial Markets**
- New Products are **Not** Often **Designed for Transit Use**
- **Transits are Unique** and Complex Systems
- **Customer Expectations** are Higher Than Ever

  No Longer About Getting from Point A to Point B
- Time Management - **Access to Information** (Wireless)
- Many Transit **Business Processes are Outdated**
- Very **Traditional Procurement Methods** & Standards
- **Technical Specifications** are Obsolete & **Lack Integration**
- Technology Purchases are **Rarely Fully Optimized**

NOT-SO-GOOD Transit has Challenges

- **Constrained revenue stream & shrinking Federal Dollars**
- Increasing **backlog** of systems and assets needing replacement
- **Poorly defined project scopes**, schedules & budgets (plug #'s)
- Projects **not linked to Authority strategic goals & objectives**
- **No formal project prioritization process** (lobbyist forum)
- No **standardized processes within & across business units**
- Limited visibility and timely controls **(Financial vs Project)**
- Unreliable asset data
  - **Inventory**
  - **Condition Assessment**
  - **Safety (Risk) Assessment**
  - **Configuration Management**
  - **Performance Data**
- **Long procurement cycles**

MARTA's Asset Management Journey

YEAR 2015/16

Final ISO 55000 Audit and Certification; Complete Implementation of EAM Capital Planning Module

New ISO 55000 standards for asset management introduced 2014

Year 2014 – Started Implementation of Capital Planning module; Executive management signed revised Asset Management Policy; ISO 55000 certification process begins.

FTA publishes "Asset Management Guide" / New GDOT requirement for **SSPP Element 22: Transit Asset Management in 2013**

Year 2013 – Implemented Expert Choice project decision software.

FTA MAP-21 standards for asset management published in 2012

Year 2012 - With EAM vendor, started development of a new Capital Planning module; Executive management signed formal Asset Management Policy; MARTA awarded a second FTA grant for $343.2K for ISO certification.

Year 2011 - Phase 1 of the Asset Management Program included implementation of new FASuite capabilities.

Year 2010 – MARTA awarded a 1.36M FTA grant to advance Asset Management Program; Conducted an asset condition assessment.

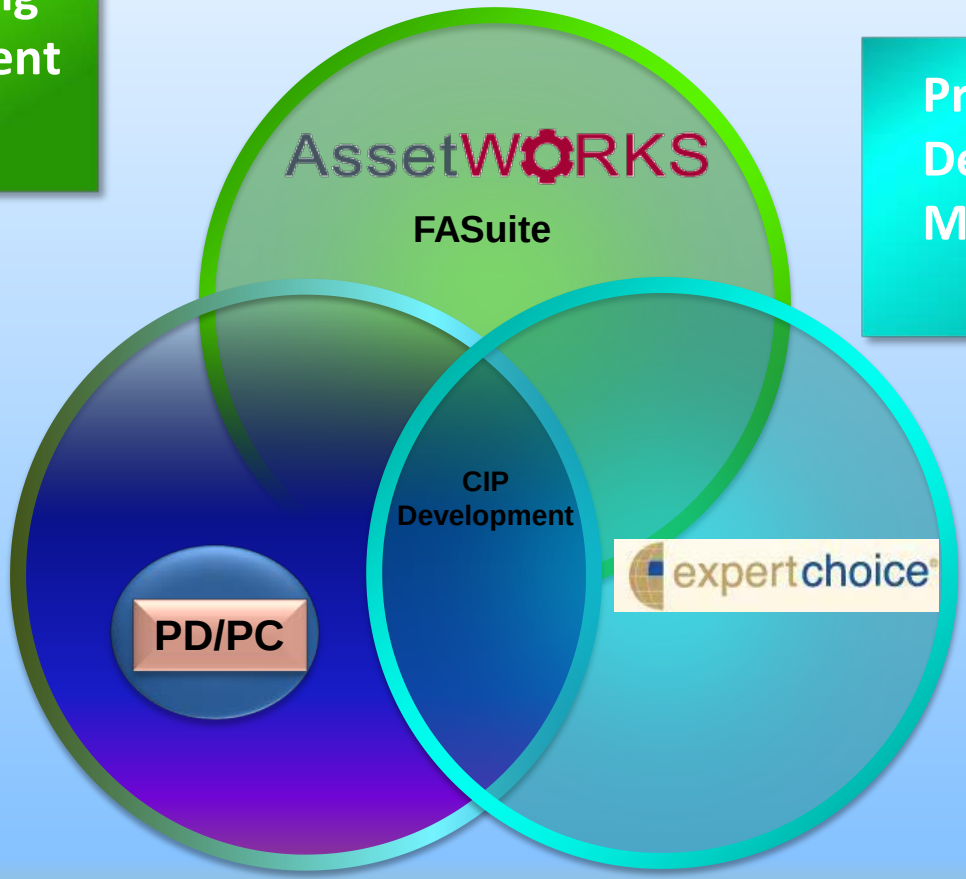
Year 2009 - conducted a comprehensive assessment of safety critical systems.

Year 2006 – MARTA implemented a new electronic Enterprise Asset Management System (FASuite).

Start with…The BIG Picture

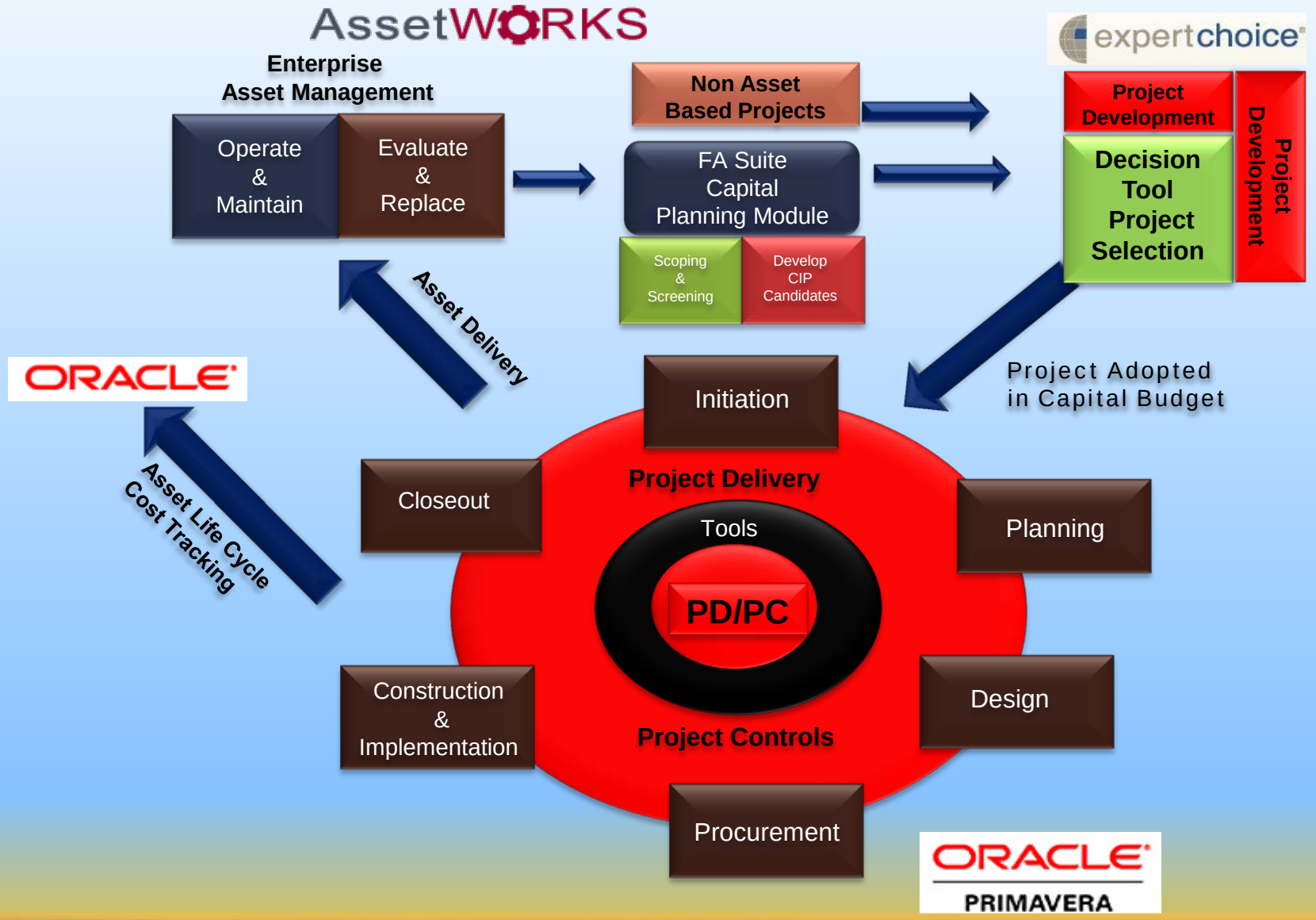
Asset Planning & Management

Prioritization & Decision Making



Project Delivery/ Project Controls

MARTA's Fully Integrated TAM Model – How it Works!



Enterprise Asset Management - Asset Database

Minimum Req'mts:

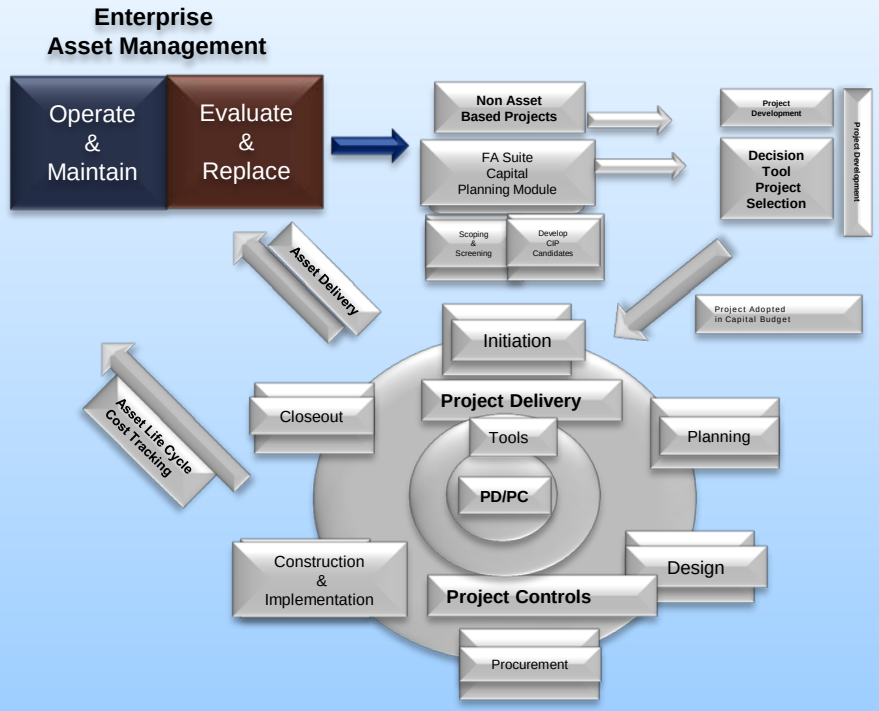
1. Equipment ID
2. Description
3. Manufacturer
4. Model
5. Serial #
6. Asset Category
7. Capital Cat. Code
8. Priority Code
9. Equipment Type
10. Equipment Classes
11. EUL
12. Location
13. Life Cycle Status
14. Condition Code
15. Date in Service
16. Original Cost
17. Planned Retire Date

Priority Codes:

1.Life Safety Critical
2.Operation Critical
3.Operation Support
4.Operation Enhancement

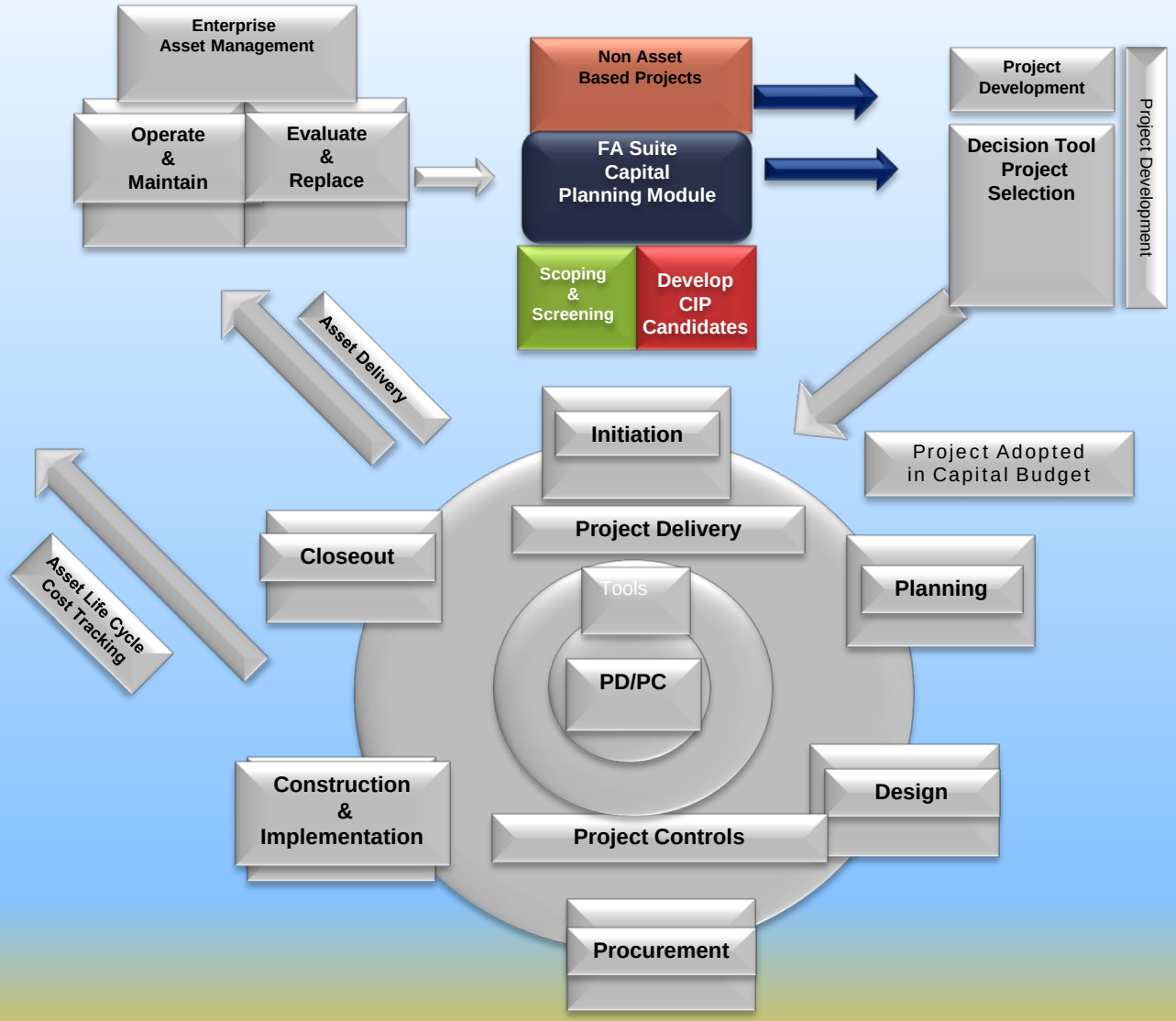
Condition Codes:

5. Excellent
4. Good
3. Adequate
2. Marginal
1. Poor



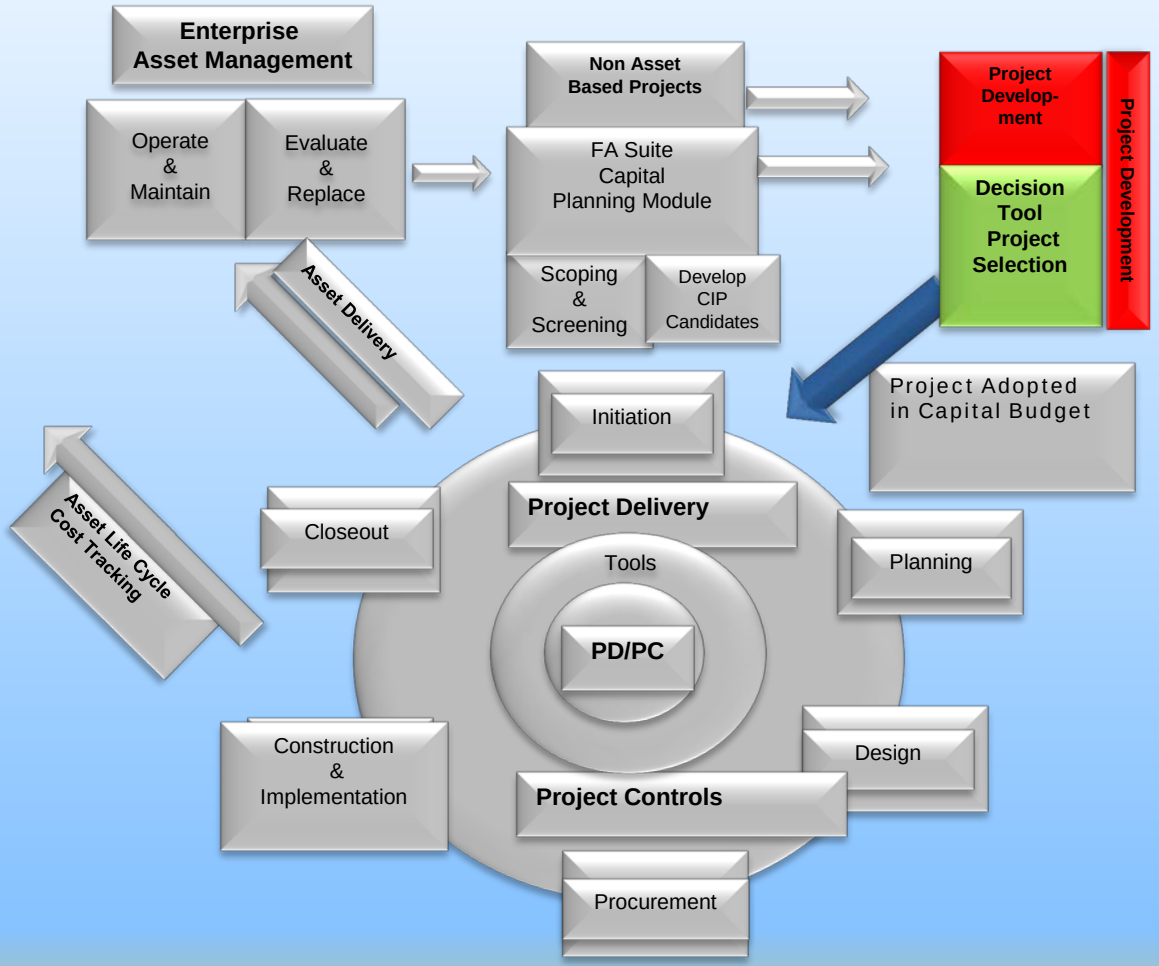
- **Daily management of asset data (PM, PdM & I)**
- **Trusted, readily accessible data**
- **Triggers procurement decisions**
- **Cornerstone of our Capital Improvement Plan**

Capital Program Formation



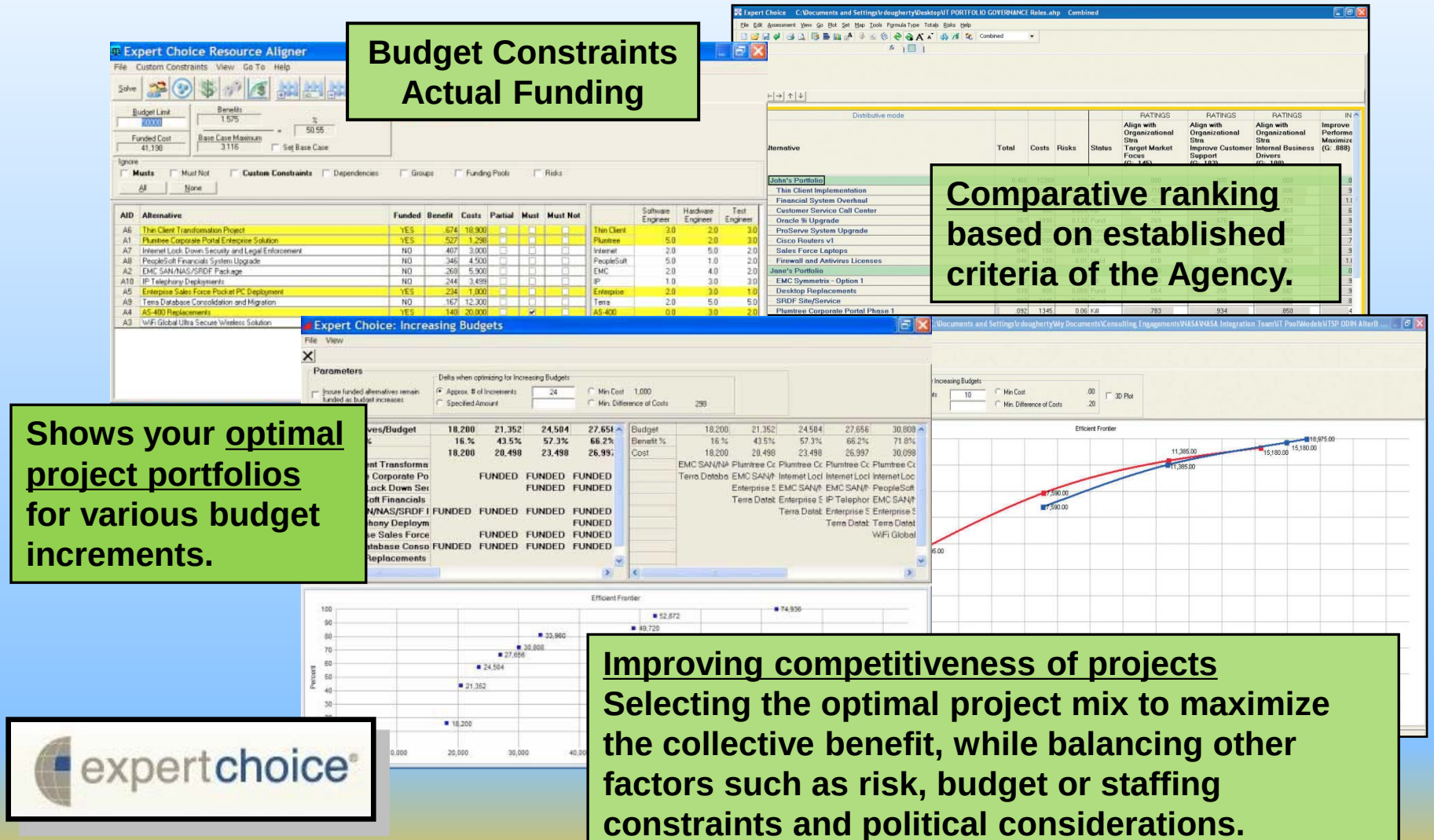
- **Integrated asset management module**, tie-in to FASuite asset tracking and management
- Categorizes assets in meaningful “buckets”
- Identifies replacement assets meeting agency established criteria
- Ensures agency is continuously aware of assets ready for replacement and project identification

Project Decision Making



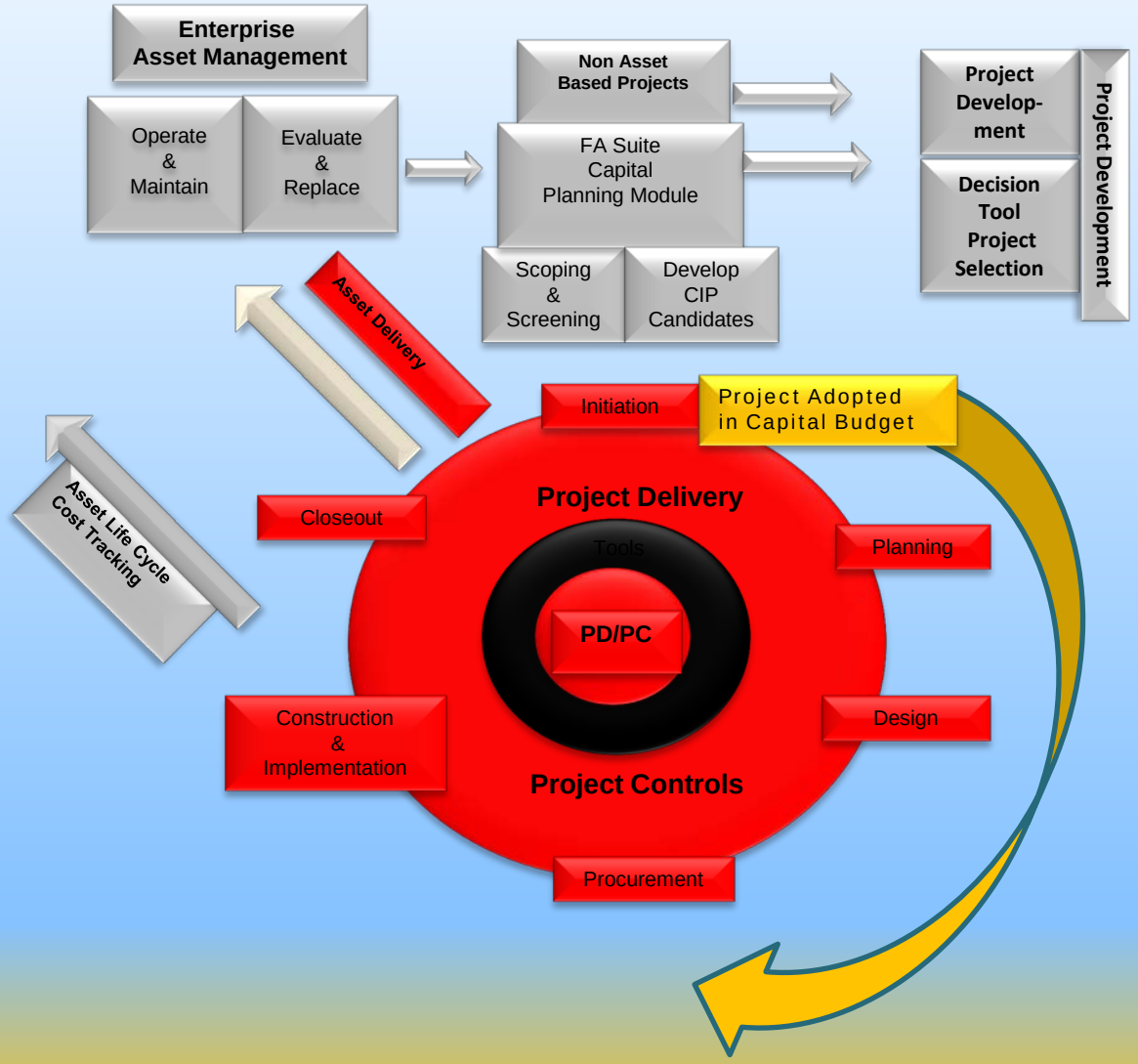
- **Integrated project decision making**, tie-in to FASuite asset database and capital module
- Groups candidate replacement assets by agency-driven criteria
- Creates executive level scenarios optimizing capital project decision making
- Presents financially constrained capital improvement plans ensuring informed decision making

Decision Making Software: *Expert Choice*



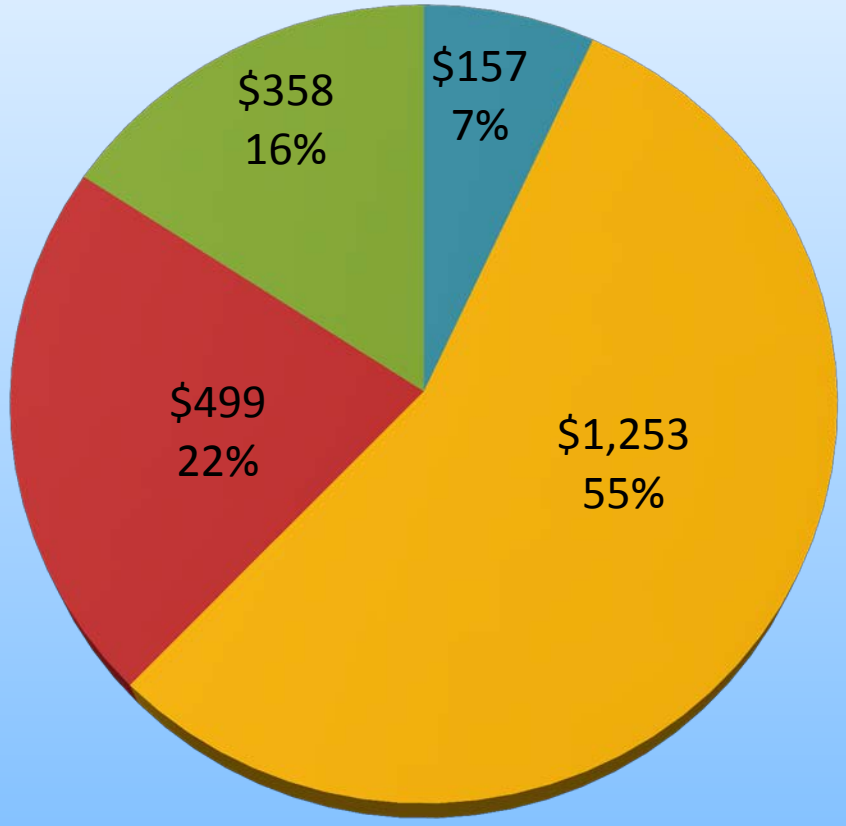
Improving competitiveness of projects
Selecting the optimal project mix to maximize the collective benefit, while balancing other factors such as risk, budget or staffing constraints and political considerations.

Project Delivery



- Ongoing project monitoring and reporting throughout project lifecycle
- Proposed adjustments to project budgets evaluated through capital project decision model
- Actual project costs captured and stored in FASuite database for future capital planning
- New asset data delivered by contract and entered into EAM

Ten Year Capital Program (funded)
by Asset Category (in $M)

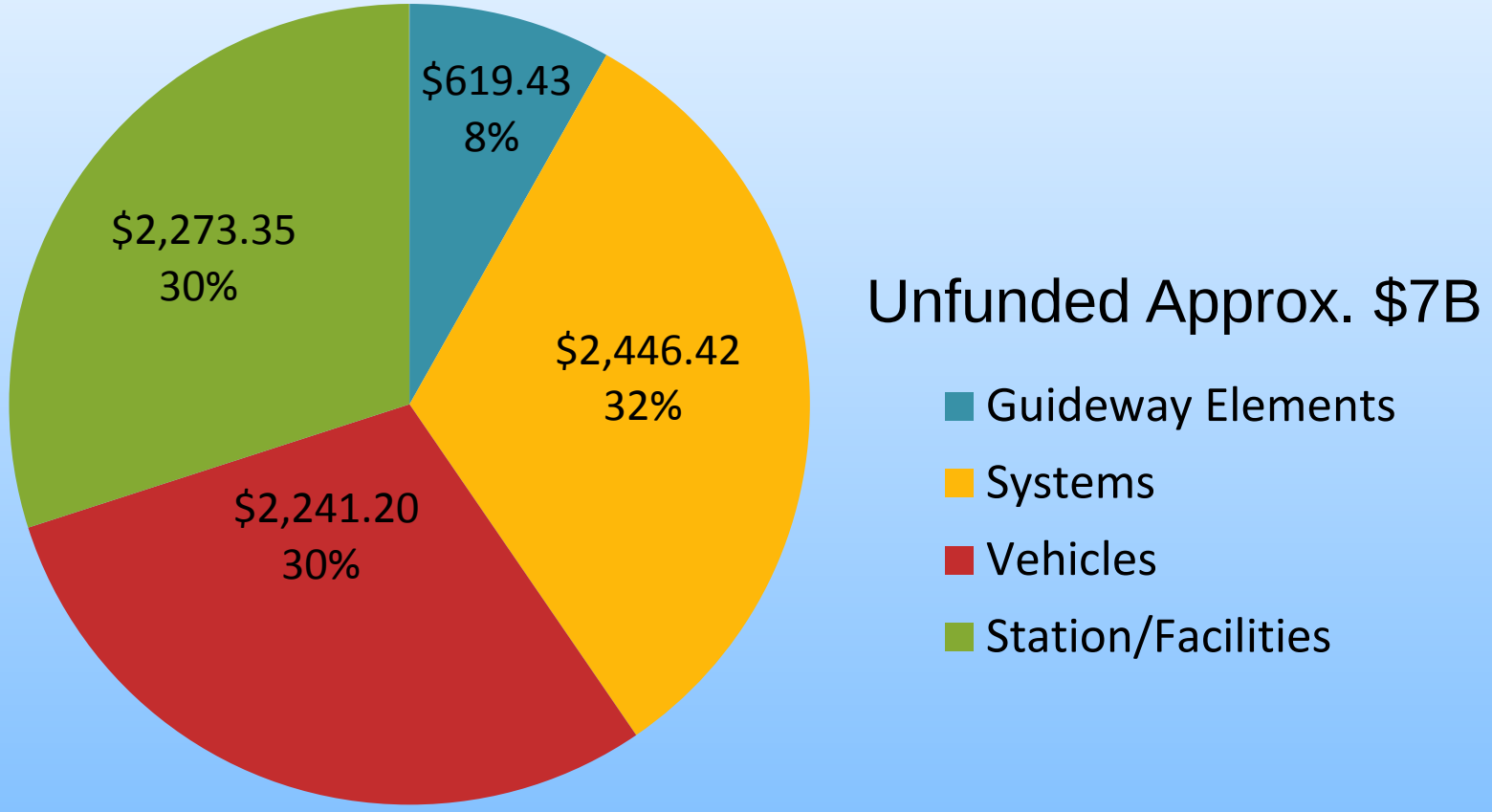


Funded Approx. $2.67B

- Maintenance of Way
- Systems
- Vehicles
- Facilities/Stations

“System Renewal Phase”

Ten Year SGR Backlog (unfunded)
By Asset Category (in $M)



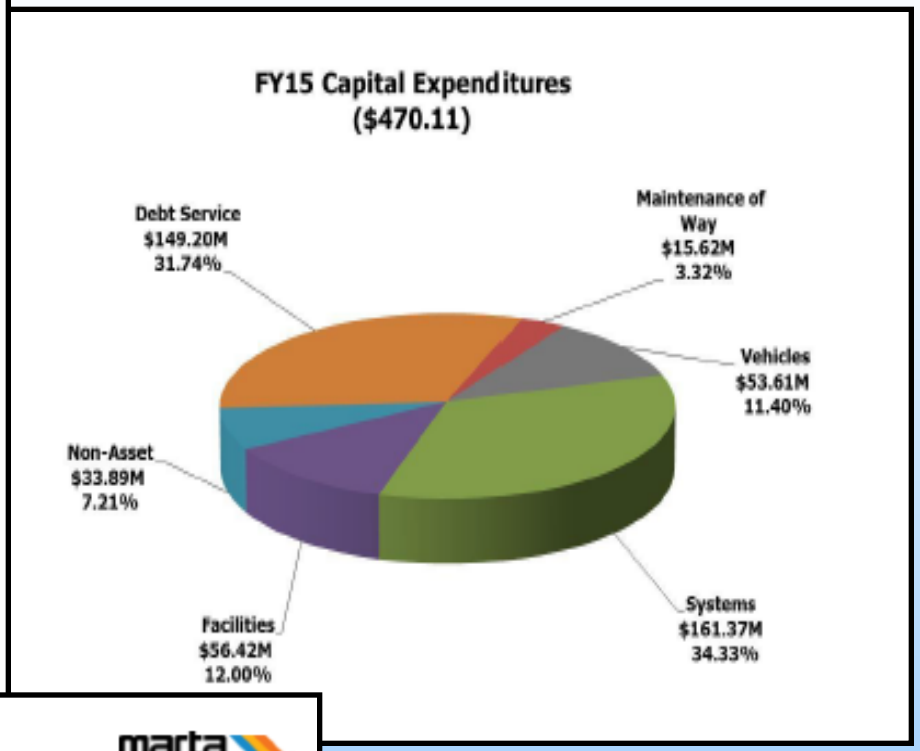
CAPITAL BUDGET OVERVIEW

Capital Improvement Program

MARTA launched capital improvement projects that will help preserve its capability for high-quality service delivery over a ten-year range.

The long-range CIP consists of a portfolio of programs and projects organized by the major asset categories of a transit authority. The CIP also includes a category for non-asset projects. These categories, which were adapted from the Federal Transit Administration's (FTA) asset management guidelines are vehicles; facilities and stations; maintenance of way; systems; and non-asset. Each of these categories then includes a number of on-going programs and each program may contain one or more projects. The CIP categories are depicted below, followed by a description of each of the categories.

Vehicles	Facilities & Stations	Maintenance of Way	Systems	Non Asset
Bus Procurement & Enhancement - Vehicles & On Board Systems	Rail Facilities & Equipment	Track Maintenance & Replacement	Revenue Collection	Transit Planning
Rail Procurement & Enhancement - Vehicles & On Board Systems	Bus Facilities & Equipment	Track Structures	Automatic Train Control	Environmental Sustainability
Paratransit (Vehicles, Lifts, AVL)	Buildings/Offices & Equipment	Work Equipment	Electrical Power & Equipment	Safety & Regulatory
Non-Revenue (Police, Maintenance)	Parking Lots & Decks		Lighting	Customer Service
	Paving, Structures & Drainage		Security	Performance Management
	Roofing & Skylights		Tunnel Ventilation	Asset Management
	Underground Storage Tanks		Fire Protection	Design Criteria/Standards
			Elevators & Escalators	CIP Planning & Controls
			Radio & Communications	
			IT Hardware/Software	
			Fuel Systems	



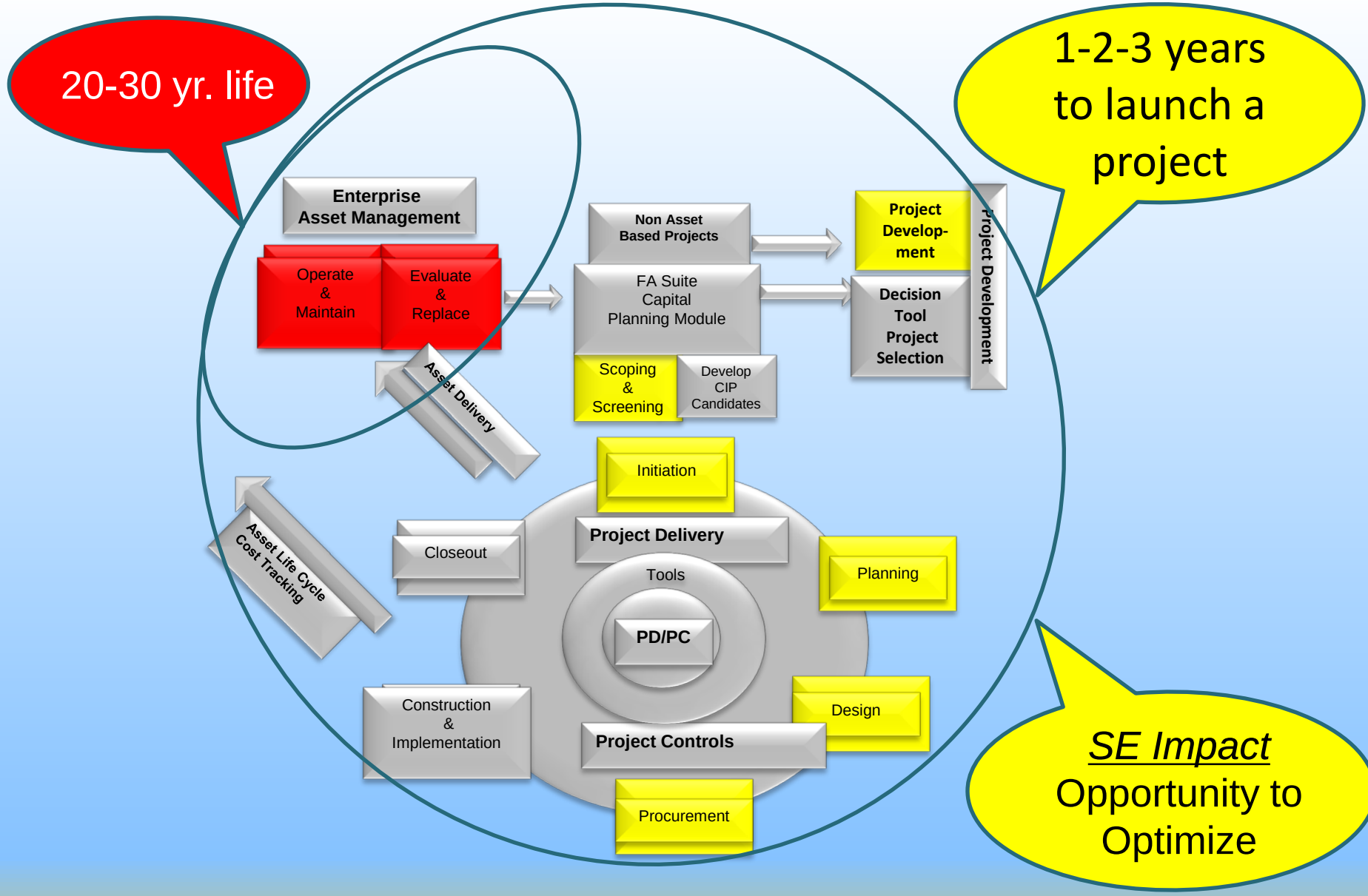
FY2015 OPERATING & CAPITAL BUDGETS

CAPITAL BUDGET OVERVIEW

FY15 Capital Expenditures Summary Table

FY15 Capital Expenditures	Federal	State	MARTA	TOTAL
Capital Improvement Projects	$55,432,000	$1,000,000	$264,476,404	$320,908,404
Maintenance of Way	5,700,000	1,000,000	8,920,000	15,620,000
Vehicles	6,965,173	-	46,642,425	53,607,598
Systems	15,776,827	-	145,597,604	161,374,431
Facilities	26,470,000	-	29,945,962	56,415,962
Non - Asset	520,000	-	33,370,413	33,890,413
Debt Service on Bonds	-	-	$149,200,987	$149,200,987
Total	$55,432,000	$1,000,000	$413,677,391	$470,109,391

MARTA BUDGET BOOK (excerpts)



"A Systems Approach adds value!"

What's Systems Engineering?
(classic definition)

- interdisciplinary **approach**
- focused on defining **customer needs**
- focused on required **functionality** (early)
- focused on **best performance** at **lowest cost of ownership**
- **business** and **technical** needs fully understood
- **documenting** those requirements
- proceeding with **design** synthesis
- **verifying** and **validating** performance
- **implementing, operating & sustaining**
- **replace and renew**

Translation Please?

Systems Engineering is a discipline - like electrical, mechanical, civil etc. focused on optimizing value & performance by bridging the gaps!

An **Approach or Strategy** that considers **all aspects** that contribute towards a desired outcome - level of performance!

Systems is Simple…Really!

Systems Engineering (SE) focuses on the asset before it is selected and follows fundamental **value-added** steps considering cost, risk and performance that includes a:

- concept of operations (how you plan to use the asset)
- requirements/specifications
- acquisition/procurement
- test/implementation
- operations/maintenance
- rehabilitation/replacement and eventually disposal.

For a Transit Agency it means…

Selecting the Right People to implement your projects

Selecting a Proven Technology to meet your needs

Selecting the Best Delivery Method, minimizing risk & cost

- Introducing Non-Traditional Methods - when needed

  Ex: CSI vs. Systems Specification (Building vs. System)

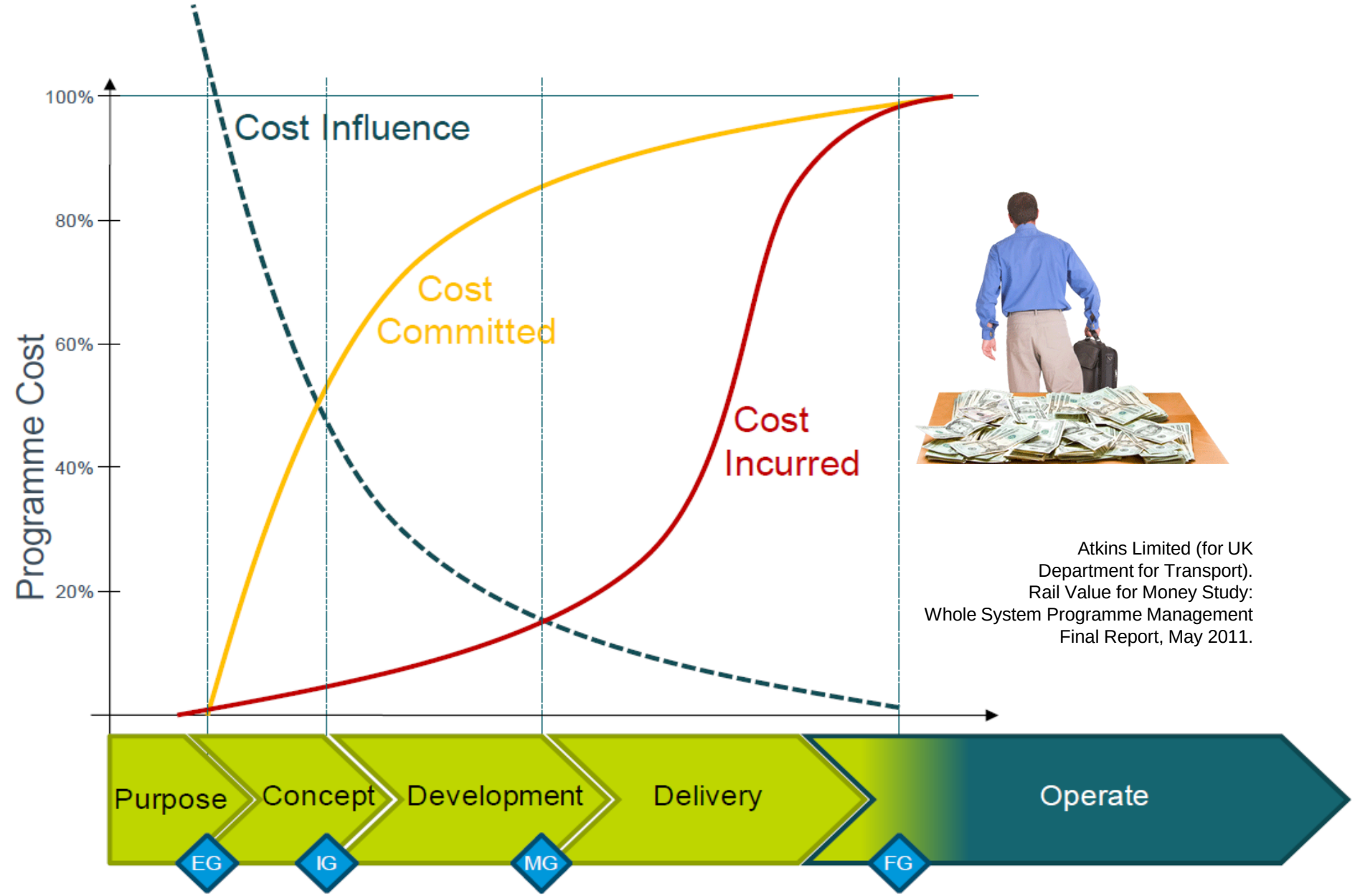
Understanding Organizational Readiness

Understanding Change Management

Understanding Whole Life Cycle Management

PEOPLE + PROCESS + PRODUCT

Influencing Project Outcomes: Cost Influence Curve



Atkins Limited (for UK Department for Transport). Rail Value for Money Study: Whole System Programme Management Final Report, May 2011.

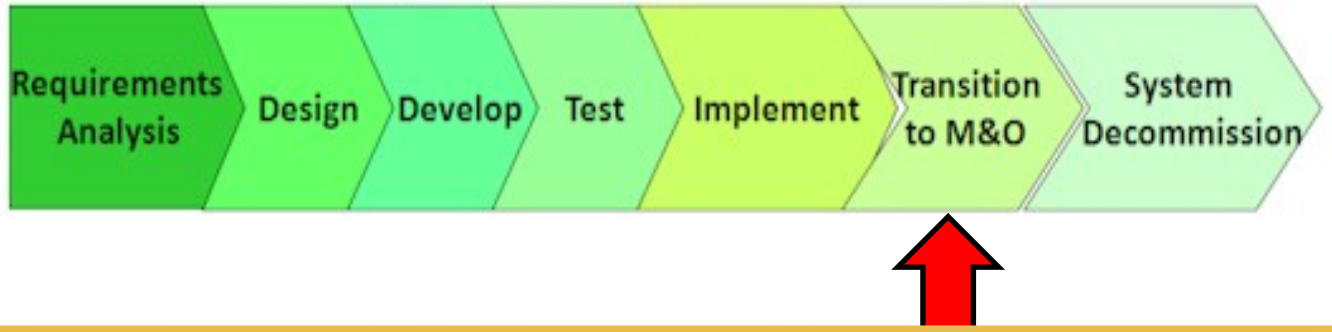
Project Management Life Cycle

Project Funding Approval Life Cycle

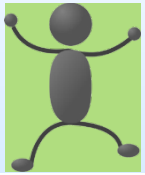
What's Missing?
Just the entire life of the asset.

Acquisition Life Cycle

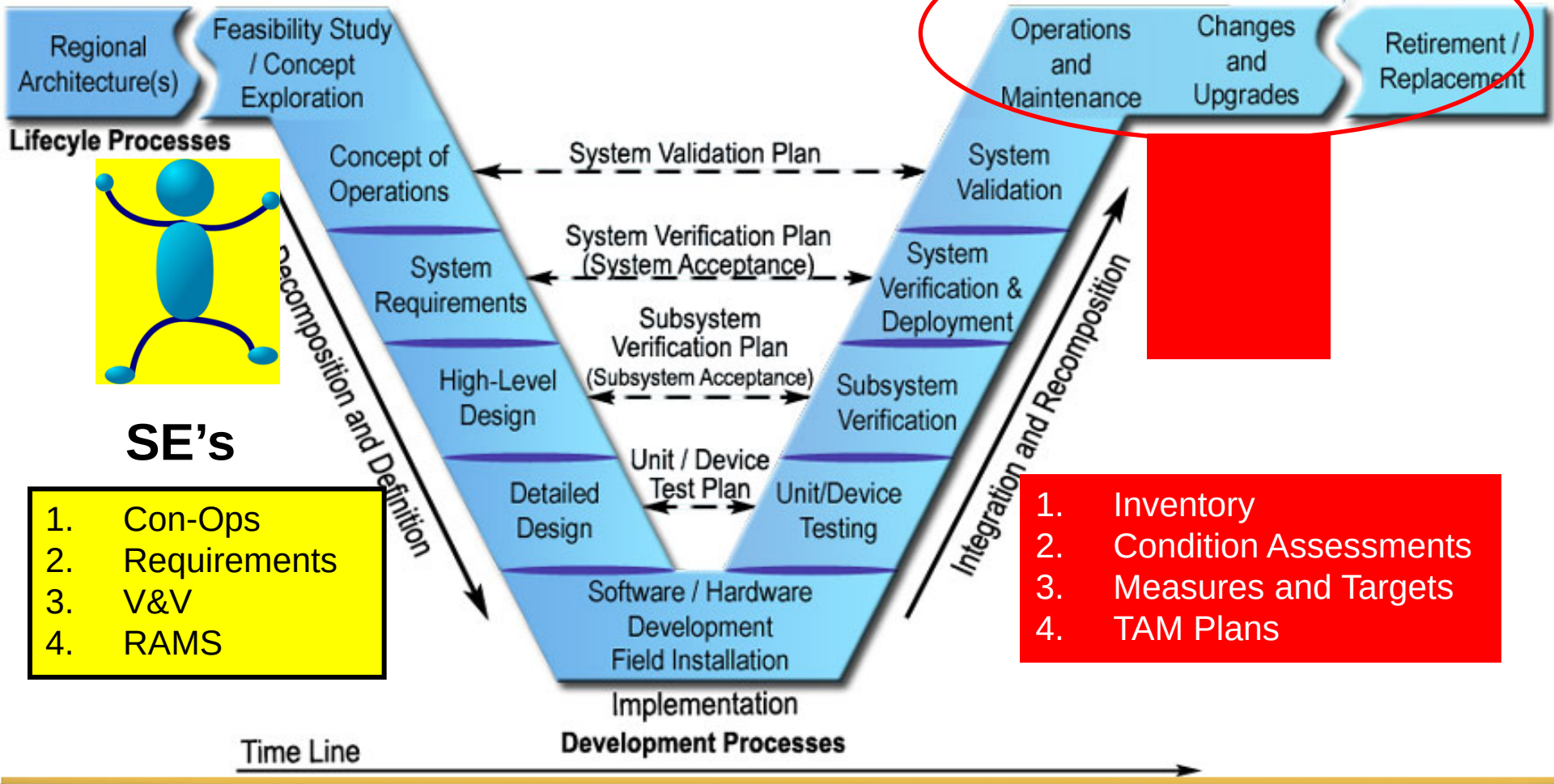
System Development Life Cycle



Observation worth noting!



Customer - "I need …"



SE's

1. Con-Ops
2. Requirements
3. V&V
4. RAMS

1. Inventory
2. Condition Assessments
3. Measures and Targets
4. TAM Plans

It is already being done…*successfully!*

Time for Transit to Get on Board !!!

Challenges

- **Agency Culture & Processes**

  awareness, buy-in, structure, participation

  - How to Implement SE in a Non-Mature Environment?
  - Break the traditional mold
    - Within Engineering
    - Within Contracts & Procurement
    - Within Operations & Maintenance (Stakeholder/End-User)
    - All Other Contributing Business Units – including leadership team!
- **Lack of Resources**
  - Where to find personnel that have a basic SE understanding?
  - Where to find SE expertise to deliver your projects?
  - How to "gather requirements" from a busy Operations & Maintenance units?
  - How to deliver once awarded?

You Are Not Alone!

(There's a Body of Knowledge Out There)

Industry Resources and Talent

- Look within your own Agency!
- APTA - Systems Engineering Sub-Committee
- INCOSE - International Council of Systems Engineers
- Peer Agencies (MARTA, NYCT, BART…)
- International Peers (UK – London Underground)
- Outside Transit (Aviation, Medical, Telecom…)
- Consultant Support - wealth of knowledge
- Supply Chain - vendor community

Project Demonstration Method

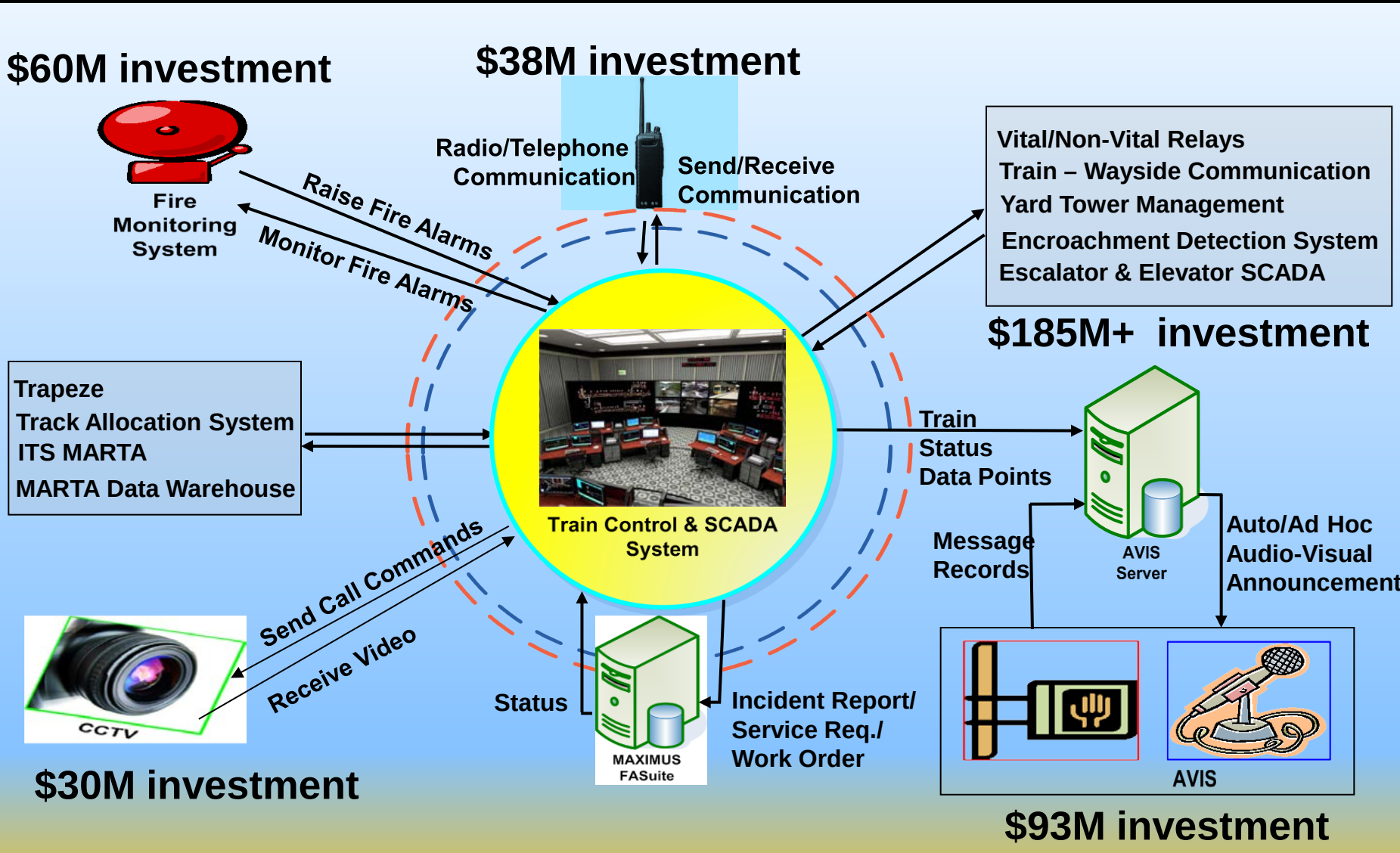
- Identify upcoming projects that could be used as a proving ground for an SE approach
    - *Train Control & SCADA Upgrade*
    - *Tunnel Ventilation System Upgrade*
    - *North Rail Yard & Maintenance Shop*
- Conceptualize, plan, develop and implement these projects
- Demonstrate success and/or contrast against projects that fully or in-part failed to apply a systems engineering approach

Project: Designed to Optimize Our Operation Flexibility, Growth and Regional Opportunities

- Rare opportunity to design and build an industry leading, combined **Integrated Control Center** (IOC) and **Emergency Operations Center** (EOC), housing Rail, Bus and Police control and communications staff.
- **Scalable design**, open theatre, universal work stations, customizable display board, training center, and room for **regional expansion & partners**.
- ***This project is more about a successful business transformation than it is a technology upgrade!***

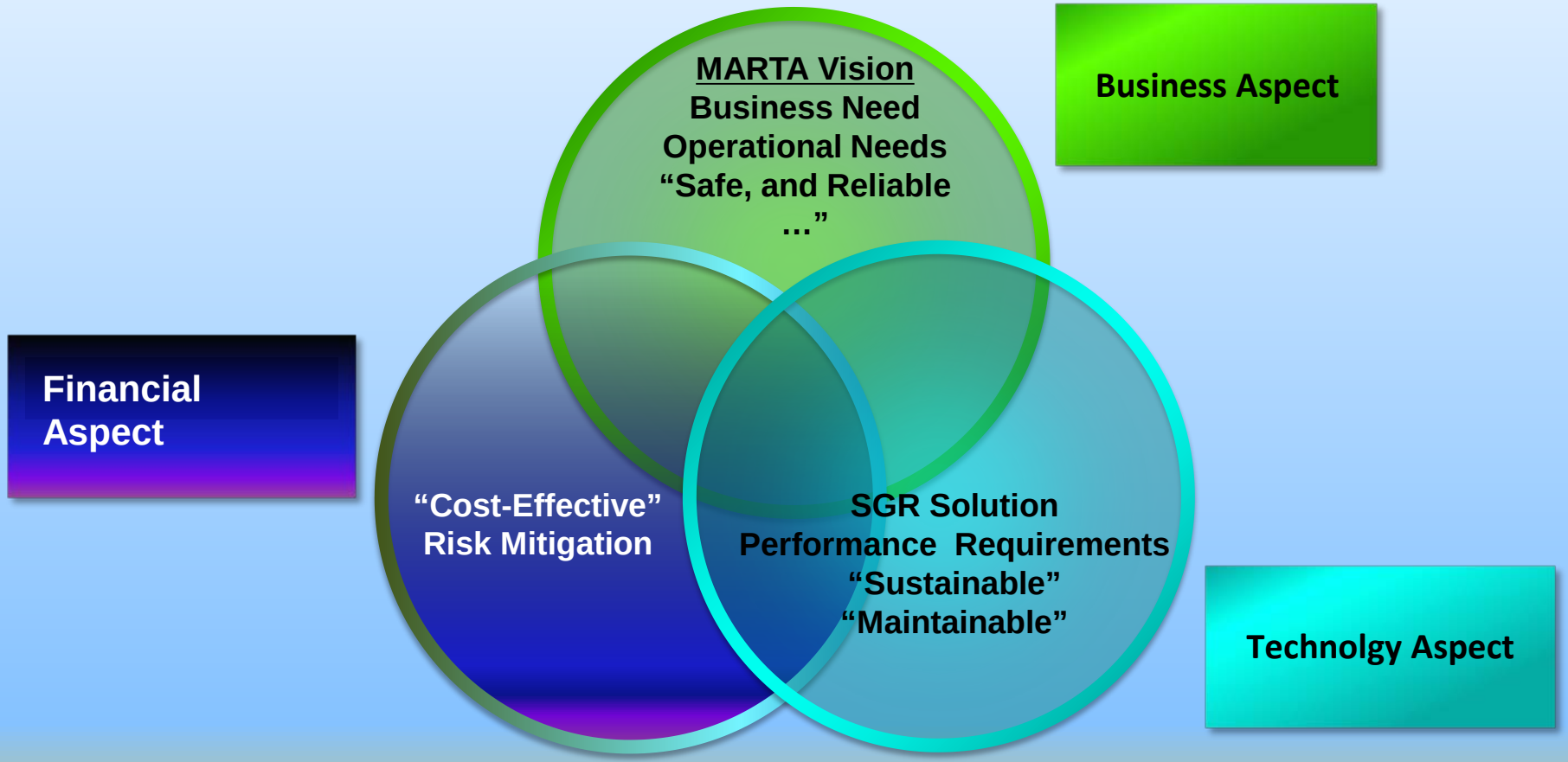
Example: $200M+ Project, Two Contracts
1) Train Control & SCADA Upgrade (TCSU)
2) Integrated Operations Center (IOC)

RFP for Single Platform for Integrated Systems

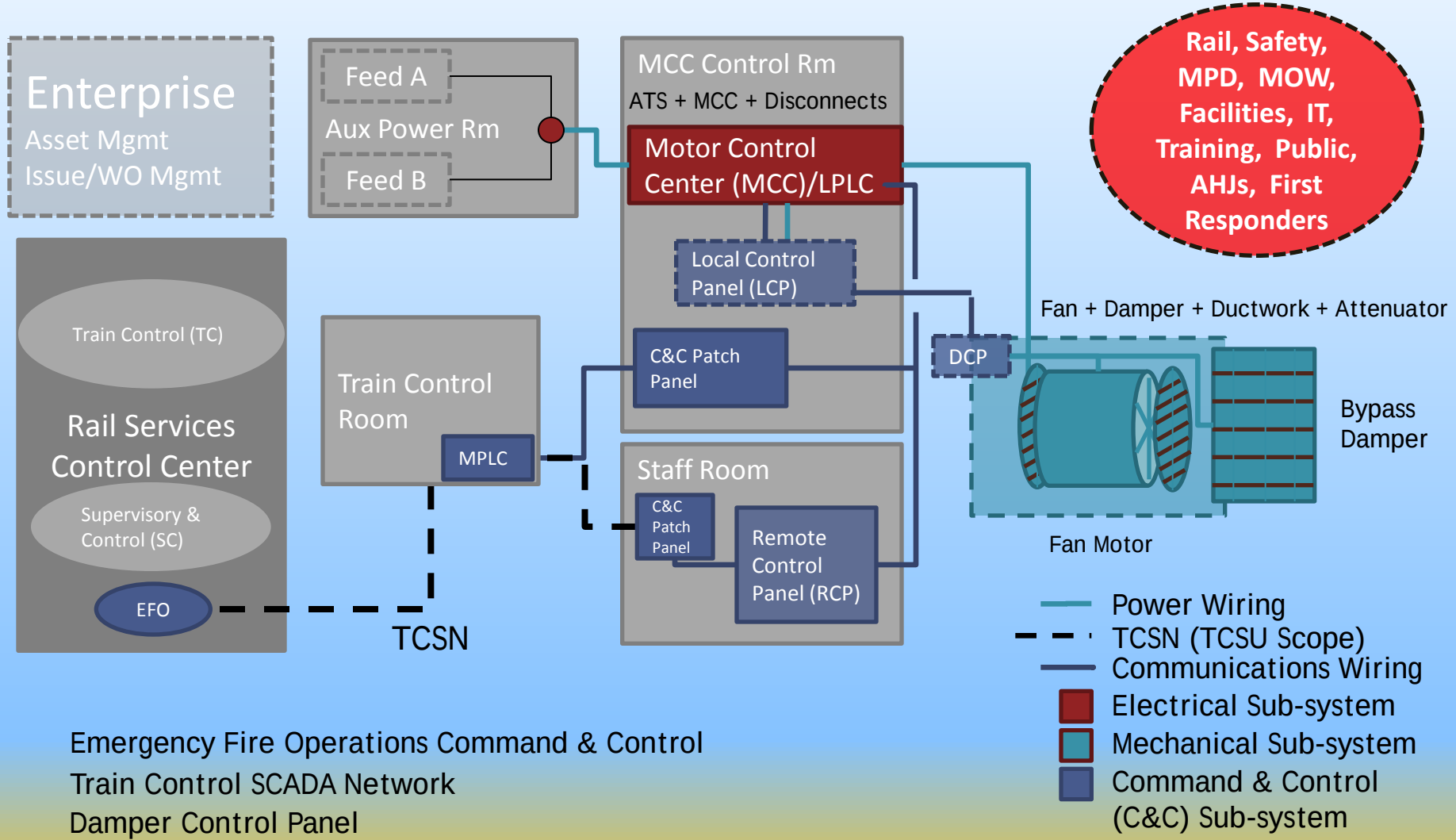


IOC Building Design (Renovation) Traditional Invitation For Bid (IFB)

Tunnel Ventilation System Lifecycle Considerations



Tunnel Ventilation System
(People, Process & Technology)



Emergency Fire Operations Command & Control
Train Control SCADA Network
Damper Control Panel

Field	Field Format/Length	Example
Model Year	4 Digits	2013
Manufacturer ID	15 Characters	MECHANICAL INC.
Model ID	15 Characters	55-555555555555
Equipment Description	40 Characters	FAN-MIDTUNNEL
Serial Number	50 Characters	B-123-45678-QRS-123456789123456-4
Physical Location	Should be one of predefined locations already in the system	2 digit location codes to be provided upon contract award
Estimated Useful Life	6 Characters	30
In-Service Date	mm/dd/yyyy	06/06/2016
Original Cost	10 digits before decimal, 2 digits after decimal	60,000
Estimated Replacement Date	mm/dd/yyyy	12/31/2017 (may not be same as in service date +estimated useful life)
Equipment Type	30 Characters	Fan, mid tunnel
From Marker	20 Characters	1400
From Segment	10 Characters	NE
From Offset	18 Characters	47.000
To Marker	20 Characters / 10 Characters	2800
To Segment	10 Characters	SYD
To Offset	18 Characters	-111.0000
Latitude	25 Characters	304.xxx
Longitude	25 Characters	-84.xxx

Upcoming APTA Recommended Practice

"The goal of this paper is to encourage all agencies to include requirements for asset data that is most efficiently provided by the contractor, supplier or vendor at the time of procurement and prior to the asset being placed into operation."


In Contrast!
Limited SE Approach Used: Lack of Stakeholder Input
Armour Yard Facility 2005: $300M
• On schedule - under budget - state of the art
Operations-wise:
• Yard location is not optimal; problematic
• Dead-end tracks (wash track & cleaning platform) and lack of a run-around track – unnecessary moves.
Armour Cir NE
Mainline, Yard and Maintenance Facility Not Optimized

Transit Asset Management MAP-21 Implementation

National Transit Asset Management System

Define *state of good repair*, including objective measures of asset conditions

Establish SGR performance measures -- each grantee must set SGR performance targets and report to FTA annually

All recipients and sub-recipients must develop transit asset management plans

Report to the NTD data on asset inventories and condition assessments

Technical assistance from FTA

U.S. Department of Transportation
Federal Transit Administration

go to www.fta.dot.gov

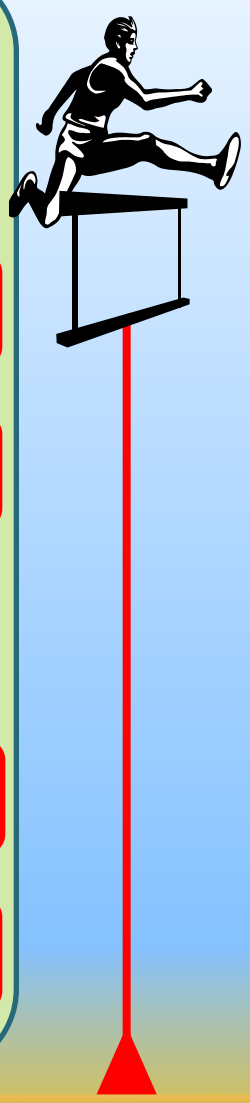
MAP-21 ISO55000

FTA/GDOT Safety Management System Requirements

- SMS Hazard/Risk Assessment
- Establish Safety Targets
- Develop Risk Controls & Monitoring Strategy
- Public Transportation Agency Safety Plan

FTA/GDOT Transit Asset Management Requirements

- Asset Inventory / Condition Assessment
- Establish SGR Targets
- Required Reports on System Condition
- Prioritize Investments / Program of Projects
- Transit Asset Management Plan



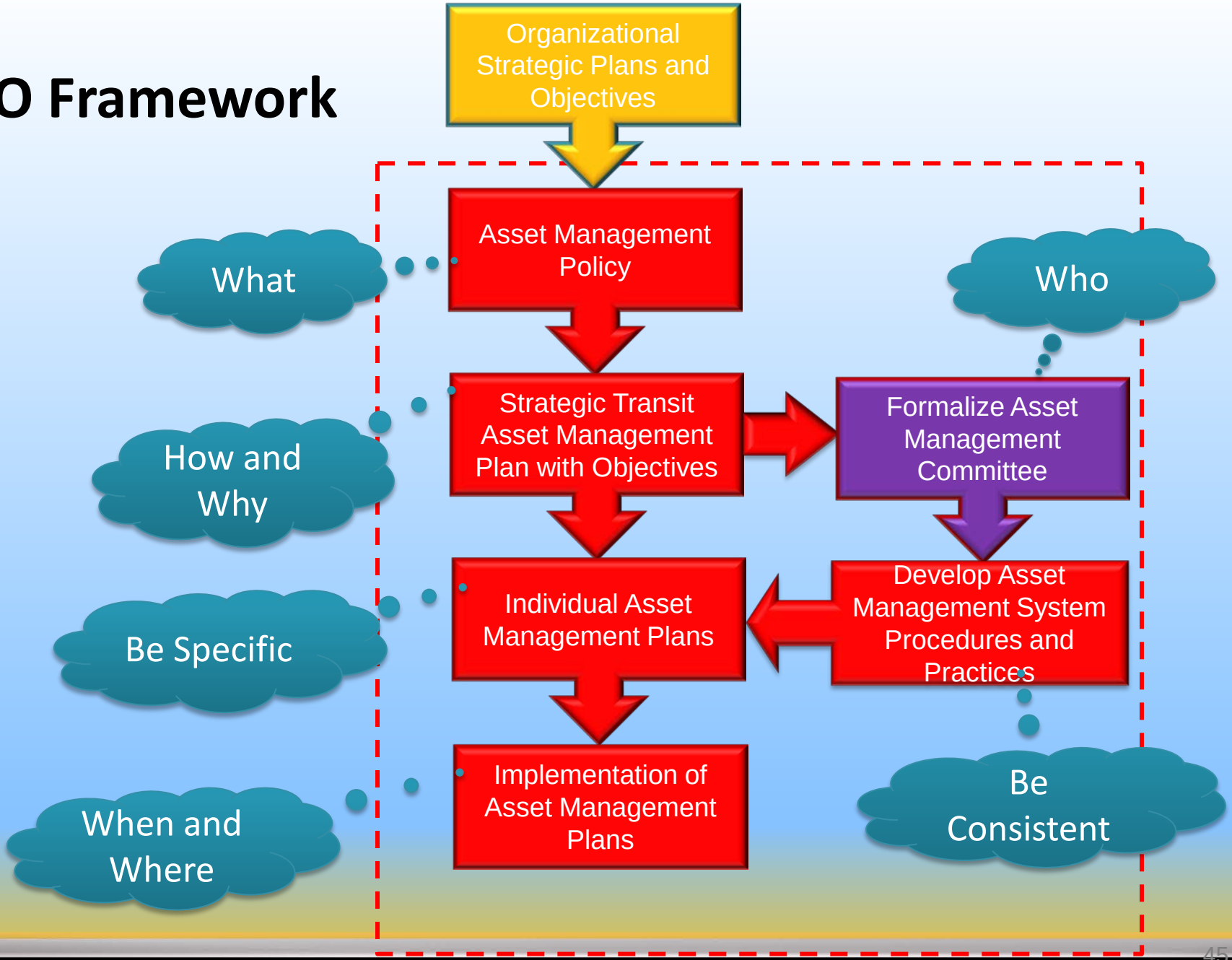
ISO 55000 Asset Management Requirements

- Lifecycle Management
- Continual Improvement
- Cost and Performance Optimization
- Risk Management in Individual AMPs
- Agency Certification

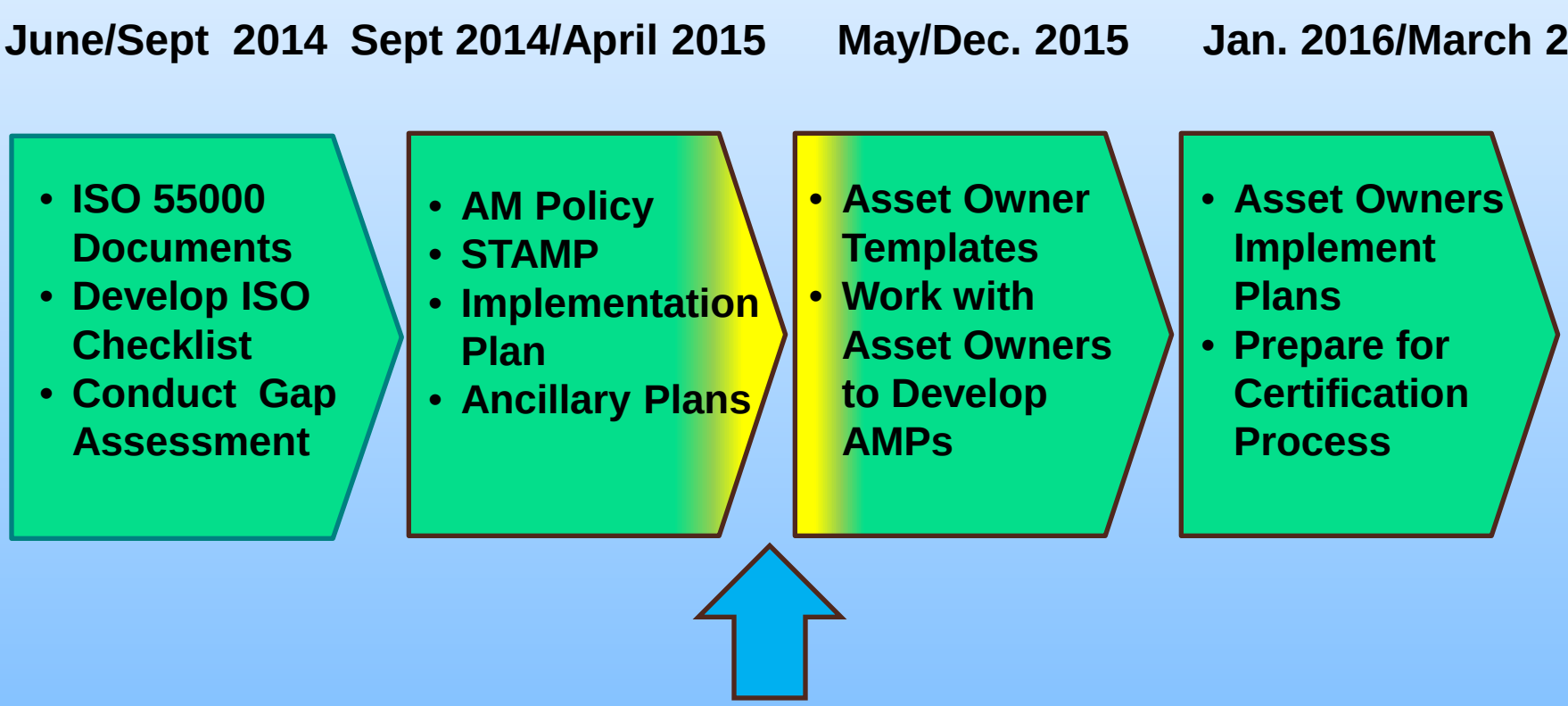
So Why ISO Certification? Why Bother?

- **Improved customer service –** assuring the performance of assets can result in improved relations with **customers and external stakeholders.**
- **Manage short and long-term effects -** expenditures and performance of assets.
- **Informed** asset investment **decisions** – **by Top Management!** Single platform for balancing costs, risks, opportunities, and performance .
- Transcend the entire organization – **bring the Agency together**!
- Demonstrate social **responsibility** and compliance with legal, statutory and regulatory requirements.
- **Improve efficiency & effectiveness** through improved asset management using a "**systems**" **approach.**
- Results in a **healthier, sustainable and fiscally responsible** MARTA.
- MARTA wants to **remain at the forefront** of asset management!
- *Greater focus on **cost**, **risk** and **performance!***

ISO Framework

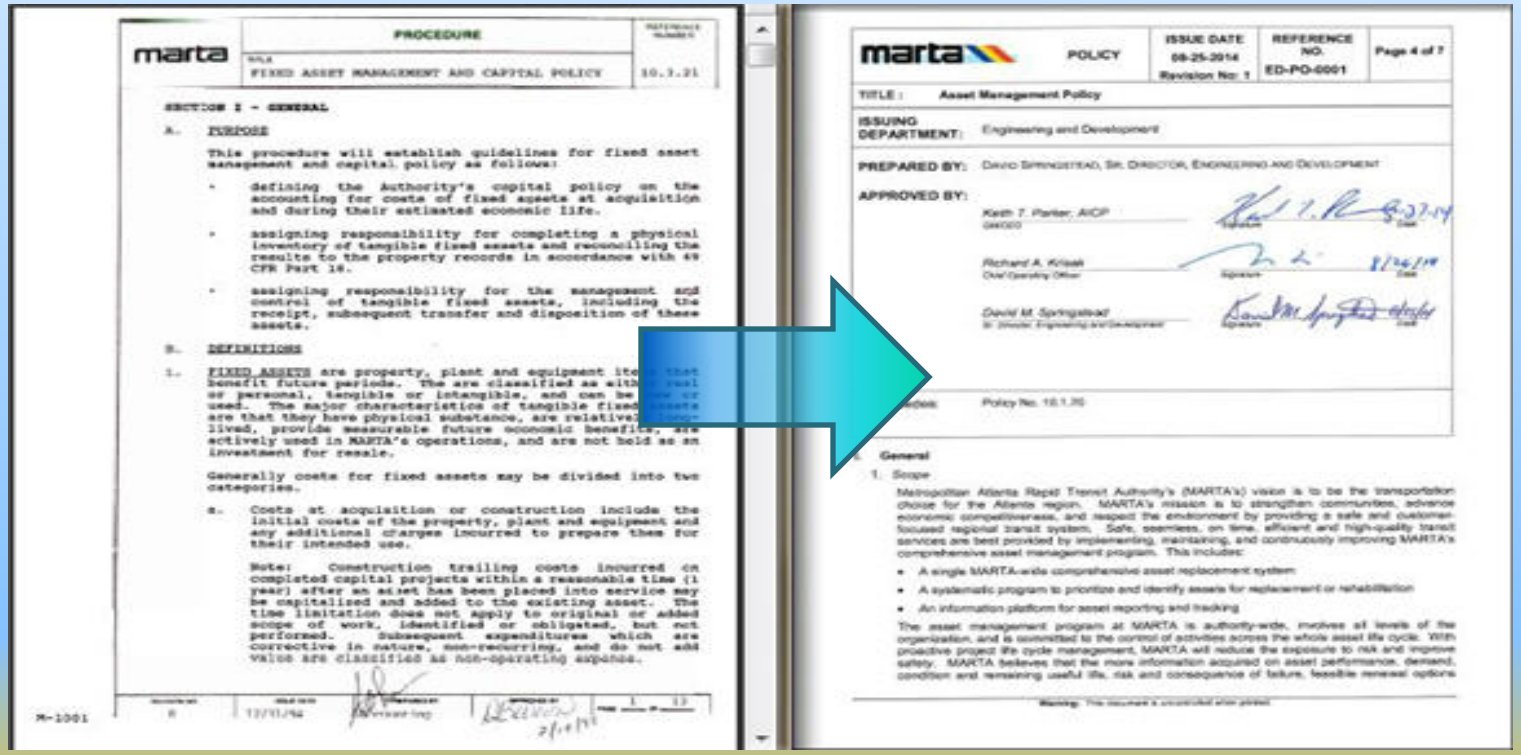


Certification Process Roadmap



Asset Management Policy

- MARTA's Asset Management Policy sets the overall statement on the organization's commitment to asset management – needed an ISO update!



marta | PROCEDURE

FIXED ASSET MANAGEMENT AND CAPITAL POLICY 10.3.21

SECTION I - GENERAL

A. PURPOSE

This procedure will establish guidelines for fixed asset management and capital policy as follows:

- defining the Authority's capital policy on the accounting for costs of fixed assets at acquisition and during their estimated economic life.
- assigning responsibility for completing a physical inventory of tangible fixed assets and reconciling the results to the property records in accordance with 49 CFR Part 18.
- assigning responsibility for the management and control of tangible fixed assets, including the receipt, subsequent transfer and disposition of these assets.

B. DEFINITIONS

1. FIXED ASSETS are property, plant and equipment ite... that benefit future periods. The are classified as with... or personal, tangible or intangible, and can be ... used. The major characteristics of tangible fixed ... are that they have physical substance, are relative... lived, provide measurable future economic benefits, are actively used in MARTA's operations, and are not held as an investment for resale.

Generally costs for fixed assets may be divided into two categories.

a. Costs at acquisition or construction include the initial costs of the property, plant and equipment and any additional charges incurred to prepare them for their intended use.

Note: Construction trailing costs incurred on completed capital projects within a reasonable time (1 year) after an asset has been placed into service may be capitalized and added to the existing asset. The time limitation does not apply to original or added scope of work, identified or obligated, but not performed. Subsequent expenditures which are corrective in nature, non-recurring, and do not add value are classified as non-operating expense.

M-1001

marta | POLICY | ISSUE DATE 08-25-2014 Revision No: 1 | REFERENCE NO. ED-PO-0001 | Page 4 of 7

TITLE: Asset Management Policy

ISSUING DEPARTMENT: Engineering and Development

PREPARED BY: David Springstead, Sr. Director, Engineering and Development

APPROVED BY:

Keith T. Parker, AICP

Richard A. Krisak

David M. Springstead

Policy No. 10.1.20

General

1. Scope

Metropolitan Atlanta Rapid Transit Authority's (MARTA's) vision is to be the transportation choice for the Atlanta region. MARTA's mission is to strengthen communities, advance economic competitiveness, and respect the environment by providing a safe and customer-focused regional transit system. Safe, seamless, on time, efficient and high-quality transit services are best provided by implementing, maintaining, and continuously improving MARTA's comprehensive asset management program. This includes:

- A single MARTA-wide comprehensive asset replacement system
- A systematic program to prioritize and identify assets for replacement or rehabilitation
- An information platform for asset reporting and tracking

The asset management program at MARTA is authority-wide, involves all levels of the organization, and is committed to the control of activities across the whole asset life cycle. With proactive project life cycle management, MARTA will reduce the exposure to risk and improve safety. MARTA believes that the more information acquired on asset performance, demand, condition and remaining useful life, risk and consequence of failure, feasible renewal options

Warning: This document is uncontrolled when printed.

Strategic Transit Asset Management Plan (STAMP)

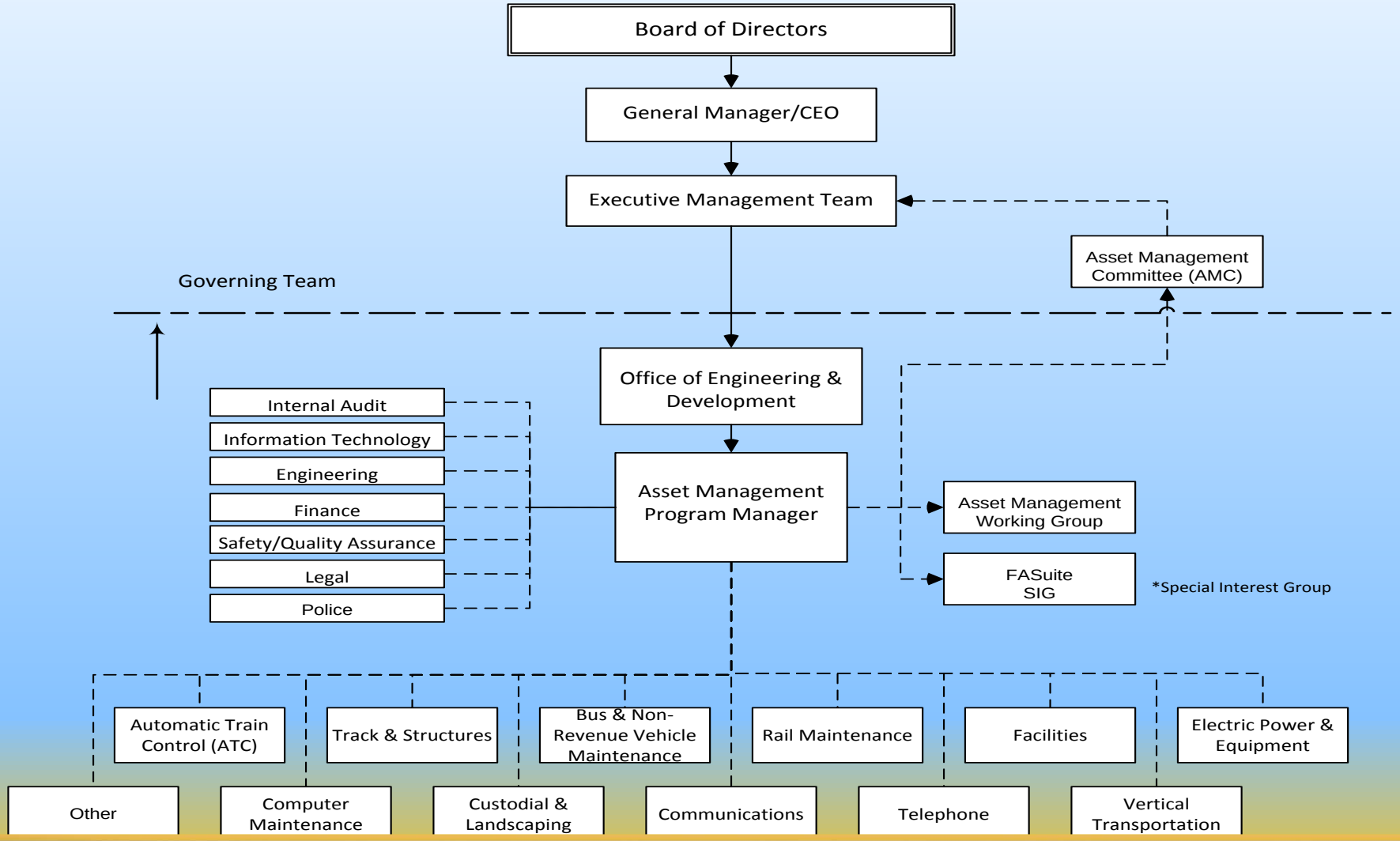
- The purpose of the STAMP is to develop a **long-term optimized approach** to the management of MARTA's assets, consistent with the **organizational strategic plan** and the asset management policy.
- Defines the expected achievement of asset management activities and timelines. **Results oriented.**
- Addresses the condition and performance requirements of MARTA's assets and **lays out a blueprint** on how MARTA intends to satisfy these requirements.
- Contains information on **stakeholder requirements, asset lifecycle requirements and asset related risks.**

Key Elements of MARTA's STAMP

1. Dedicated Asset Manager
2. Internal & independent verification of asset priority and condition
3. System automation for asset replacement/decision-making with link to CIP – accessible to all departments
4. Governance documents in place for asset management
5. Comprehensive and accurate asset data
6. Asset Management Policy and Plan in place
7. Operational compliance – staff are executing the plan
8. Culture change – must see the value of asset management practices
9. Utilization of industry resources - APTA, TRB,FTA,FHWA,IMM, PAS, ISO
10. MAP-21 compliant
11. Detailed user training, SUPER user training
12. SOPs across all relevant MARTA departments
13. Senior management invested in the process
14. Total organization participation

Asset Management Transcends the Agency

"Everyone has a Role to Play"



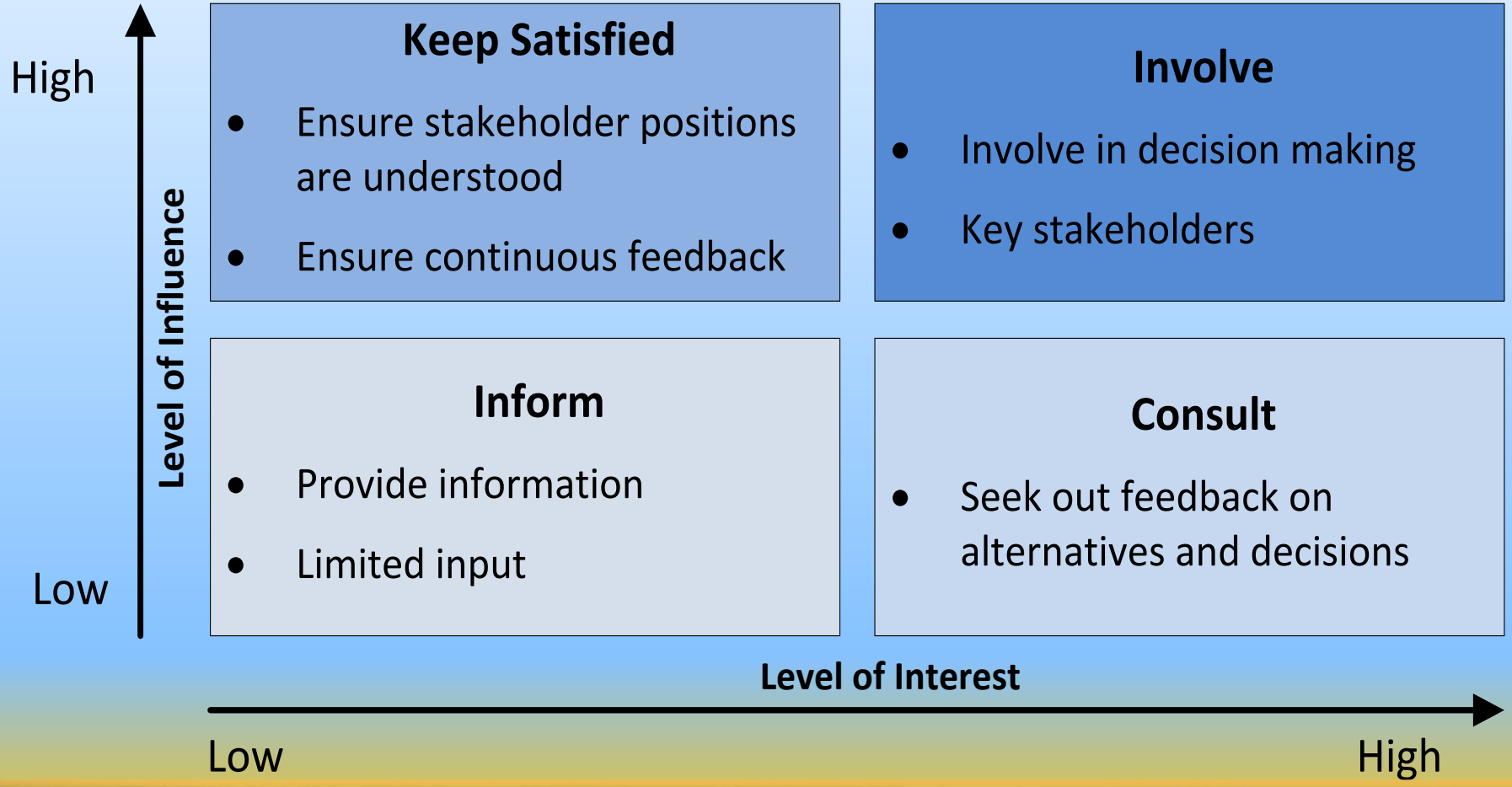
Integration of Asset Management across MARTA

ISO Elements	Executive Management	Balanced Scorecard Team	Risk Management Team	Asset Management Staff	Asset Management Committee	Asset Owners	Project Managers	Engineering	Maintenance	Maintenance Planners	Quality Assurance	Safety	Finance	Union Rep./Other Stakeholders	Environmental Health & Safety	Corporate Communications	Regulatory Affairs	Contracts & Procurement	Information Technology	Human Resources	Training	Legal	Audit	Emergency Management
Asset management planning	x			x	x	x	x	x					x											x
Contingency planning	x			x	x	x	x		x															x
Asset management activities outsourcing			x		x	x	x		x	x			x	x	x			x						
Training, awareness and competence			x	x		x	x	x	x	x	x									x				
Consultation/participation/communication	x		x	x	x		x	x		x			x											
Asset Management Program documentation				x	x		x																	
Information management/distribution				x		x	x	x	x	x		x							x					
Risk management process(es)			x																					
Risk management methodology			x																					
Risk identification and assessment			x	x		x		x							x									x
Asset risk management information use/maintenance			x			x							x											
Legal and other requirements	x		x	x		x		x				x								x	x			
Management of change				x		x							x											
Life-cycle activities				x	x																			
- creation, acquisition or enhancement of assets				x	x	x		x		x			x					x	x					
- utilization of assets						x		x	x															
- maintenance of assets						x			x	x	x													
- decommissioning and/or disposal of assets				x		x		x		x								x						
Performance and condition monitoring		x	x	x		x		x		x														
Investigation of asset-related failures, incidents, nonconformities			x			x		x				x			x									
Evaluation of compliance		x	x	x							x						x					x	x	
Audit		x		x	x	x						x	x	x									x	
Corrective and preventative action			x			x						x			x									
Continual improvement			x	x	x	x															x			
Records				x	x	x	x			x			x				x		x				x	

DON'T PUT SLIDES UP THAT PEOPLE CAN'T READ!

Stakeholder Participation

- Each stakeholder will have specific roles and responsibilities for implementing the Asset Management Program. The chart below shows the possible levels of influence and interest for each stakeholder.



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