Asset Management
System Implementation & Integration

July 17, 2012
About the LIRR

• Chartered April 24, 1834

• Agency of the Metropolitan Transportation Authority (MTA)

• Commuter Railroad Serving Nassau and Suffolk Counties (Long Island) and Queens, Brooklyn and Manhattan (New York City)

• 11 Branches

• 3 Western Terminals –
  ▪ Penn Station (Manhattan)
  ▪ Atlantic Terminal (Brooklyn)
  ▪ Hunterspoint Av (Queens)

• Jamaica Station - LIRR’s hub, served by 10 Branches
About the LIRR

FLEET
1,006 Electric MU Cars
134 Bi-Level Coaches (Diesel-hauled)
23 Diesel Locomotives
22 Dual Mode Locomotives

INFRASTRUCTURE
Over 661 miles of track
124 Passenger Stations
294 Grade Crossings
750 Overgrade/Undergrade Bridges
29 Viaducts
73 Interlockings
328 miles of 3rd Rail
108 Substations
Asset Management – Drivers

• Since 1982, the MTA agencies have had a series of 5 Year Capital Programs, totaling $75 billion in capital investments (1982-2009)

• Capital Planning Process
  ▪ Asset Inventory
  ▪ Twenty Year Needs Assessment
  ▪ Development of 5 Year Capital Program

• Recent Financial Challenges – Re-examine future assumptions of both funding and project scoping
Transformative Projects

• In past LIRR Capital Programs, much of the investments were large scale:
  ▪ Large Scale Fleet Replacement
  ▪ Construction of High Level Platforms at all Diesel Stations
  ▪ Major Investment in Jamaica Station and Atlantic Terminal
Jamaica Station – Before
Station built 1913
Jamaica Station – After
Station Renovation 2002 - 2005
Atlantic Terminal – Before
Station building built 1907 & Demolished 1988

Station Building - 1986

Platform - 2001
Atlantic Terminal – After
Station Renovation 2004 - 2010
Increased Focus on Lifecycle Costs

Moving forward, the LIRR’s focus will be more on minimizing lifecycle costs of assets:

– Examination of Inspection and Maintenance Practices
– Identify Candidates for Component Replacement, focusing on Signals and Substations
– Assess & Prioritize Assets in a more detailed way (i.e. risk, criticality and interdependency)
– Recognition of our unmet data needs, particularly in regards to Maintenance / Repair Costs / Decision Support
Enterprise Asset Management (EAM)

• Implement an EAM program to achieve systematic, optimal and sustainable asset management at the lowest lifecycle cost:
  • Deliver necessary outputs to the asset managers and decision-makers
  • Deliver outputs valued by customers, funders and other key stakeholders
• EAM Benefits:
  • Understand Risks associated with Capital Assets & how these Risks change over time
  • Corporate impact / consequences of increasing or decreasing capital investment levels of a particular asset
  • Provide asset data and information to decision makers on multiple levels that facilitates knowledge-based decisions
  • Consistent asset management framework company-wide
Path Towards EAM

• **Rolling Stock**
  - Rolling Stock Maintenance – Replaced legacy software system with Maximo
  - Fixed locations – Hillside, West Side Yard, Morris Park / Richmond Hill
  - Major Fleet Replacement Effort
  - Implementation of Reliability Centered Maintenance (RCM) Program
    - Need for Data
  - Three Types of Rolling Stock:
    - M-3 Electric Multiple Units (1984 – 1986)
    - M-7 Electric Multiple Units (2002 – 2007)
    - Diesel / Dual Mode Locomotives & Bi-Level Coaches (1998 - 1999)
Planning EAM

Business Process Analysis

• Understand how assets are managed today
  - Identify Current Inspection / Regulatory Requirements
• Compare to industry best practices (PAS55)
  - Determine EAM maturity level
• Examine:
  - LIRR’s business needs and data required for informed decision making
  - What level of detail and frequency of inspection is appropriate
  - Changes / modifications to inspection process
  - Risk and criticality of assets
  - Policies / Resources needed to implement changes
  - Support and training requirements for business process change and technology implementation
Bringing It Together

Building Upon Recent Experiences

• Lessons Learned
  ▪ Already implemented new RCM program for Fleet, done in conjunction with large-scale fleet replacement

• GIS
  ▪ Recent substantial investments in Corporate GIS
  ▪ Training / Maintenance of GIS network
  ▪ Active Users throughout Engineering, System Safety, etc.

• Recognized Unaddressed Data Needs
  ▪ Make informed investment decisions / prioritization
  ▪ Coordinate / refine data that was being collected / maintained by various departments / divisions with goal of migrating to corporate resource
EAM and Geospatial Technology

SPATIALLY ENABLED ASSET MANAGEMENT

GIS Data
- ASSET LOCATION INVENTORY
- Location attributes
- Linear reference

Stores the assets that reside at a geographic location

Stores the geographic locations at which assets reside

Geographic Information System

Asset Life Cycle Management
- Material stock/inventory
- Installation
- PM
- Repair
- Decommission
- Replace
- Asset hierarchy
- Cost tracking
- Discrete and linear assets

Asset Management Data
- ASSET INVENTORY
- Attributes
- Specifications
- Condition

Asset Management Information System

Stores the assets that reside at a geographic location

Stores the geographic locations at which assets reside

Geospatial Information System

Asset Location Management
- Spatial location
- Geographic visualization
- Spatial hierarchy
- Spatial query
- Spatial analytics
- Spatial cost tracking
- Discrete and linear assets

Stores the geographic locations at which assets reside
Map Interface - Bridge Flags

You can create, modify, and delete features on the non-versioned map, and link Maximo records with geographic information system records.

Asset: 21-C-935
Status: OPERATING
Feature Class: LIRR_BRIDGE_V1

Map showing various locations such as Glen Cove, Oyster Bay, Babylon, and New York.
Infrastructure - Where to Start?

- **Line Structures (Bridges, Viaducts, Tunnels & Culverts)**
  - Set Inspection / Reporting Requirements
  - Biggest Rehabilitation Backlog
  - Majority of Bridge Projects are not full Replacements
  - Need for Data
  - Structures Department Strong Supporter of EAM
  - Deterioration / Hidden Problems / Bridge Strikes
  - Impact on Service
  - Concentrated in high traffic areas
  - Age of Bridges
  - Capital & Operating Funded Work
  - Geographic Nature / Involves other Assets (Signal, Power, Comm., etc.)
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Strategy Planning

• **Power Substations**
  - Total of 108 Substations / Breaker Houses
  - Six date from 1945 - 1948
  - 57 Substations were built between 1970 and 1972
    - Electrification to Huntington
    - Power Demands of M-1 Fleet
  - Operational Challenges
  - Property Challenges
  - Balance resource availability with Operational Demands, while factoring in Risk
  - Critical nature of Queens substations
  - East Side Access Service Requirements
Requirements for Success

• Corporate Buy-in / Long-term commitments at all Levels
• Dedicated resources and support at the department level and the capital level
• Clearly defined EAM framework including policy, strategy, initiatives, and measurable goals
• Clearly defined roles, responsibilities, and processes that focus on achieving corporate goals
• EAM Working Groups – project level support and coordination
• EAM Executive Committee – EAM monitoring and issue resolution