Port Asset Management

Presented By:
Scott Cattran - Woolpert

November 18th, 2009
Agenda

- Woolpert introduction
- Define Asset Management
- Key Elements of an Asset Management Program
  - Defining a Program
  - Inventory and Condition Assessment
  - Improving Situational Awareness & Decision Making
- Selecting an Asset Management System
- Funding an Asset Management Program
- Open Discussion
Woolpert, Inc.

- 98 year old firm – since 1911
- 800+ professionals
- Architectural, Engineering and Technology Firm
  - Enterprise Information Management
  - Surveying/GPS
  - Photogrammetry/Remote Sensing
  - Water Management
  - Facilities Design
  - Planning and Design
  - Site/Civil Design
Woolpert Clients & Markets

**Airports, Ports, & DOT’s**
- Phoenix Sky Harbor, AZ
- Port of Miami, FL
- San Diego Regional County Airport Authority, AZ
- South Carolina State Ports Authority, SC
- Miami International, FL
- Cook County Highway, IL
- McGee Tyson, TN
- Indianapolis, IN
- Inchon International Airport, Korea

**Cities and Counties**
- Los Angeles County, CA
- City of Phoenix, AZ
- City of Indianapolis/Marion County, IN
- City of Long Beach, CA
- City of Cincinnati, OH
- City of Columbia, SC
- City of Charlotte, NC

**Public Safety & DOD**
- Honolulu Fire Department, HI
- Federal Protective Services, CO
- Johnson County AIMS, KS
- Vandenberg AFB, CA
- Wright Pat AFB, OH
- McDill AFB, FL
- Kirtland AFB, NM

**Water Utilities**
- Orange County Sanitation District, CA
- Denver Metro Wastewater Reclamation District, CO
- Miami-Dade Water and Sewer Department, FL
- Honolulu Board of Water Supply, HI
- Newport News Public Works Department, VA
Defining Asset Management

• Asset management means different things to different people.
  – Asset management is
    • A program
    • Accurate inventory of Assets
    • Geographic Information Systems
    • Facility management
    • CMMS/EAMS Systems
    • Process that directs O&M
    • CIP planning
    • Improved situational awareness
    • Regulatory Compliance
An Effective Asset Management Program should help answer:

• “Where are my...?”

• “How do I gain access to this facility?”

• “Who is the tenant of this facility and how do I contact them?”

• “What hazardous materials exist at this facility?”

• “How would I manage and coordinate a spill event?”

• “Where should we be spending dollars for facilities management?”

• “How do we extend the life of our assets/ facilities/ infrastructure?”
Drivers for an Asset Management Program

- Security
  - Situational Awareness and Port Security
  - Emergency Response
  - Real time vehicle location

- Save Money
  - Extend the life of current assets
  - Efficient Work Scheduling
  - Effective Property and Lease Management

- Green/ Environmental management and compliance
  - Air and water quality
  - Noise Pollution
  - Species Transport
Defining Asset Management

• Asset management is a program and a system

  – The Asset Management Program is set of processes and practices focused on maximizing levels of service and minimizing total cost of ownership

  – The Asset Management System provides information for the acquisition, maintenance, operation, rehabilitation and disposal of assets in support of organizational objectives
• Asset Management is a convergence of programs
Asset Management Program - Highlights

• Define asset management objectives and link to organizational goals
• Map Workflows
• Perform Gap Analysis
• Define Minimum and Optimal Levels of Service
• Define Key Performance Indicators
• Identify data, systems, people to support the program
• Quantify the savings of extending the life of assets vs. run to failure
Adopting Asset Management

- Conduct a gap analysis to establish the basic roadmap for organizational and system improvements

Where We Are Now

Where We Want To Be

GAP

Resources

Action Plan

- One year
- Three year
- Ultimate
Asset/Maintenance Mgmt
Program Decision Tree
Where are we now?

Do we have a PM program?

- Y: Evaluate PM program’s effectiveness
  - Y: Review maintenance stores
    - Y: Are stores effective (>95% service level?)
      - Y: Implement effective PM procedures
      - N: Develop effective stores procedures
    - N: Develop a PM program
  - N: Implement effective PM procedures

- N: Develop a PM program
Asset/Maintenance Mgmt
Program Decision Tree
Where are we now?

Review work order system

- Work orders utilized (100% coverage)?
  - Y: Review planning and scheduling
  - N: Implement effective work order system

  - Review planning and scheduling
    - Scheduling effective (>80% weekly)?
      - Y: Investigate computerization of work order system
      - N: Implement effective planning and scheduling

Implement effective work order system

Implement effective planning and scheduling

Investigate computerization of work order system
Comprehensive Inventory

• Effective Asset Management requires a comprehensive understanding of what you own
  – Asset type
  – Size and capacity
  – Construction materials
  – Location
  – Installation date
  – Original cost
  – Condition assessment
  – Performance assessment
  – Original service life
  – Estimate of remaining useful life
Asset Location and Condition Assessment

- Port infrastructure assets:
  - Utilities
  - Containers
  - Buildings
  - Storage areas
  - Roads
  - Security cameras
  - Channels
  - Wharfs

- Data
  - Data assessment
    - Data collection – GPS, GIS, Aerial Lidar, Ground base Lidar
    - Data Migration
Case Study: Phoenix Sky Harbor International Airport

- Owned by the City of Phoenix
- Ninth busiest US Airport
- 3.5 million square feet in 3 terminals
Data – Exterior and Utilities

- Survey
  - Outside Utilities – water, wastewater, gas, communications, etc.

- Photogrammetry
  - Aerial Photography
  - Digital Orthophotos

- Planning Design
  - HVAC
  - Plumbing Mechanical Electrical
  - Doors, Windows, Signs, Emergency Services, etc.
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<th>Category 2</th>
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**Legend**

- Blue Text—Accuracy of ± 2'-0"
- Red Text—Accuracy of ± 0'-3"
Exterior Data

- Large Features Best Collected Photogrammetrically
  - Building Footprints, Roof Prints
  - Roads & Parking Lots
  - Airfield Features & Markings
  - Light/Utility Poles
  - Manholes
Exterior Data

- GPS, Laser Scanning or Conventional Surveys are needed to collect Exterior Features not visible in the aerial imagery.
  - Fuel Shut-offs
  - Fire Extinguishers
  - Wall mounted signs
Laser Scanning

- Interior Laser Scanning
- Three-dimensional cloud of points from which features can be extracted.
- Photographs can be draped over the points for visualizations
Portal Building Navigator

To change the view in the GIS Portal:
Click on a building level or exterior view to zoom to that location in the Portal Map Window.

Airport Building Navigator

Building Levels
- GROUND 3
- GROUND 2
- GROUND 1
- GROUND APRON
- GROUND 4
- GROUND 5
- GROUND 6
- GROUND 7
- GROUND 8

Rental Car Center
- L5 - Roof
- L4 - Passenger
- L3 - Garage
- L2 - Garage
- L1 - Garage
- L0 - Tunnels

TERMINAL 2
- L3 - Roof
- L2 - Mezzanine & Concourse
- L1 - Apron, Passenger, Security, EDS, Ticketing, Baggage Claim, Support Areas, Tug Drive, & Baggage Makeup

TERMINAL 3
- L5 - Roof, Comm. Cntr.
- L3 - Mezzanine
- L2 - Passenger, Security, Concourse
- L1 - Apron, Baggage Makeup, EDS
- L0 - Ticketing-Baggage Claim
- L1 - Baggage Conveyors

TERMINAL & GARAGE
- L9 - Parking Garage 9
- L8 - Parking Garage 8
- L7 - Parking Garage 7
- L6 - Parking Garage 6, N2 Ramp Tower Cab
- L5 - Parking Garage 5, N2 Ramp Tower Offices
- L4 - Parking Garage 4, Concourse Mezzanines
- L3 - Passenger, Security, Concourse
- L2 - Ticketing/Apron, EDS, Departures
- L1 - Baggage Claim, Arrivals, S2 Basement
- L0 - Baggage & Tunnels

EXTERIOR VIEWS
- RCC
- T2
- T3
- T4
- FBOs
- AANG
- EEP

East Economy Parking (A & B Garages)

PHX Airport Building Navigator V1.1
Port Of Miami, FL

• Reviewed all existing utility Data
• Prioritized areas for Subsurface Utility Engineering
• Used geophysical prospecting techniques – electromagnetic and radio frequency technologies – to denote utility lines
• Used above ground SV to capture features
Air Force Mobility Command

AMC Mission Fulfillment

Mission-Ready Network

Enabling the "Global" in "Global Vigilance, Reach and Power."

GARRISON

EXPEDITIONARY

GLOBAL NETOPS

Planning and Monitoring

Protecting and Maintaining

Rapid Response and Impact Assessment

Communications Mission Data Set

CIPS Visualization

GeoSpatial for Netcentric Infrastructure

Mission-Enabling Infrastructure View

Design Drawings

Paper

CSIR

Paper

Situational Awareness for Mission Support

To be the BEST!
Data: Validate, Convert, Access
Recommendation

- Data driven asset management programs start as inventories…but they need to evolve into Condition and Criticality programs.
Condition and Criticality

- Level III: Scheduled Rehabilitation in CIP
- Level IV: Periodic Condition Monitoring
- Level I: High Priority Rehabilitation
- Level II: Aggressive Condition Monitoring

Condition (Probability of Failure)

Criticality (Consequence of Failure)
### Condition and Criticality Rating

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<td>Mid Priority Program Rehab</td>
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## Criticality By Asset

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<th>Asset Register and Hierarchy</th>
<th>Current LOS</th>
<th>Min Perf</th>
<th>Backup Reduction (Redundancy)</th>
<th>Prob of Fail</th>
<th>Conseq of Fail</th>
<th>BR&amp;E Rating</th>
<th>Renew Strat</th>
<th>Maint Strat</th>
<th>Future Maint % Change</th>
<th>Current FY Budget Adjustments</th>
<th>Est. Cost of Renew Option</th>
<th>Recom’d Renewal Year</th>
<th>Present Value of Renewal Cost</th>
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# CIP-Forecasting for Preventive Maintenance

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**Total:** $36.800
Viewing/Analyzing Indicators

Dashboards
True EAM is an integration of multiple systems

- GIS – visualize the spatial data, incident response,
- Asset Management – maintain facilities and assets
- Property Management – lease and tenant information
- Automatic Vehicle Location – port security and situational awareness
- Permitting – environmental compliance, hazardous and parking permits for ships
- Electronic Document Management Systems - access historical information
- Performance Management or Dashboards – single lens view to operational performance metrics
- Mobile /field solutions
Case Study: McGee Tyson Airport
Traverse by Following Photos
Built-in Redline Tools

This door has been moved in by 18"
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<th>Unique Data Identifier</th>
<th>Analog and Digital Map</th>
<th>Metadata</th>
<th>Media</th>
<th>Feature Description Text</th>
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Retrieve Work Order Data From GIS
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<th>WO</th>
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<th>Service</th>
<th>Task</th>
<th>Type</th>
<th>Shop</th>
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<tr>
<td>7043</td>
<td>Track all labor and materials used against terminal entrance renovation project</td>
<td>Misc. Airfield Maintenance Task</td>
<td></td>
<td>Demand</td>
<td>Airfield Maintenance</td>
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<tr>
<td>4444</td>
<td>Locate utilities as needed for Terminal Entry Improvements Project: Complete no sooner/faster than Monday-July 12. Coordinate with David Jones 679-7681 Nescal P.O. Box 1462/24-56471</td>
<td>Locate Utilities</td>
<td></td>
<td>Demand</td>
<td>Access Control Administration</td>
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<td>6965</td>
<td>Misc. custodial services</td>
<td>Misc. Service</td>
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<td>7388</td>
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<td>Misc. Service</td>
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<td>470</td>
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<td>9751</td>
<td>Install Equipment</td>
<td>Install Equipment</td>
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<td>Date a notice to renegotiate term or termination must be given</td>
<td>4/30/2005</td>
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<td>Date the term Ends</td>
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<td>Amount of total rent payable</td>
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<tr>
<td>Date the rent is due (day of the month)</td>
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<td>Date to give rent increase notice</td>
<td>5/1/2005</td>
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<td>Date the rent is increased</td>
<td>7/1/2005</td>
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<td>Rent notes</td>
<td>No rent notice is required in the agreement</td>
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<tr>
<td>Applicable fee payable: licensing, concession, permit, etc.</td>
<td>Landing Fee</td>
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<tr>
<td>Date when fee report and payment are due</td>
<td>10th</td>
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</table>
Case Study – Federal Protective Services

- Federal Protective Service is responsible for policing and securing all non-military federal facilities.
- Goal to increase situational awareness and officers’ abilities to better manage and respond to incidents.
- This proved to be the foundation for the IRIS (Immediate Response Information System) program that Woolpert created.
Sample Functionality

- Automatic Vehicle Location
- Cordon Tools
Automated Vehicle Locating
Cordon Tools

- Purpose is to provide an accurate means to identify “safe” areas away from an incident as well as identify “roadblock” points for preventing traffic from entering a dangerous area.
Cordon Tools
Battalion: ...
Station: ...
Location:

Select a Battalion or Station as a spatial filter OR search for a location...
- In the LOCATION field, enter:
  A place name (ex. Aloha Towers)
  A street address (ex. 1742 N. King St.)
  An intersection (ex. Bishop & Beretania)
  A Tax Map Key (TMK) ex. 21031021
- Click 'Go' to run a search.
- Select an application from the MENU BAR to view information.

More help...

Links

HFD Links
Honolulu Fire Dept. - Internet

Traffic
Oahu Traffic Reports

Weather
Weather - Weather.COM
NCAA Weather - Honolulu
Honolulu Traffic Cameras

Please select and bookmark your favorite page below.

Zone View
Select six cams in a zone

Regional View
Select any cam all zones

Text Version
Choose cams from a list

Fast-Check
Quick view of conditions

Select an option from the MENU BAR to view information.

More help...
Select an option from the MENU BAR to view information.

More help...
City of Topeka, Kansas

Key Objective: Develop an Asset Management Program that could leverage a single asset management software solutions

- Document the key business processes of each department as it relates to managing assets

- Identify the data and applications used to support the successful completion of these tasks

- Identify what systems are working, could be enhanced to be more effective, and those that do not support the business functions of the department
Match Business Processes with Key Systems

- Receive Customer Service Calls and Requests
- Communicate resolution to caller.
- Investigate Request
- Resolve Request
- Receive Request
- Determine appropriate party to handle request
- Route Request
- Investigate and Resolve Request
- Internal phone calls and investigations
- Hansen

KEY:
- Data collections
- Manual processes or data retrieval
- Activities
  - Performed by Management
  - Performed by Water/Call Center
  - Performed by WPC
  - Performed by Development Services
  - Performed by Transportation Operations
  - Performed by Engineering

Various Excel Spreadsheets and Access DBs:
- PIMS
- GIS
- Datastream
- Hansen
- KIVA
- HTE
- Legato
Key Findings

• Limited integration & potential bottlenecks were everywhere
• Many systems were being used as data repository’s... double data entry
• Institutional knowledge was in desktop excel and access databases...not enterprise applications
• Employee frustration was prevalent
• Preventative maintenance and predictive maintenance was low
Asset Management System Selection

- Developed requirements (RFP)
- Developed Benchmarks
- Created Sample datasets
- Selected 3 cmms vendors
- Developed Evaluation Criteria:
  - Must follow scenarios that match City’s work processes
  - Must integrate with GIS (leverage City’s investment)
  - Scored on ability to meet each scenario
Integration with GIS, CMMS, Permitting

Project Mgmt Integration

Data Warehouse for Integration

Improved Reporting via Crystal Reports

Enterprise Geodatabase

EDMS, CMMS, Permitting Integration

Project Mgmt Integration

Address Validation/Update API

CMMS (Cityworks)
Non-WPC Plant Operations
SQL Server

Cityworks

CMMS (DataStream MP2)
WPC Plant Operations
Oracle

MP2

CMMS (Cityworks)

Non-WPC Plant Operations
SQL Server

Cityworks

Permitting (Govern)

SQL Server

Govern Server Components

EDMS (App Xtender)

SQL Server

Application Xtender

Application Xtender

Addressing (KAIS)

SQL Server

KAIS

Legend

New System
Enhanced System
Benefits

• Single Enterprise Asset Management Systems for All Infrastructure
  – Information centralized and accessible by all departments
  – Simplified IT Architecture
  – Lower Total Cost of ownership
Return on Investment

- **Costs**
  - Master Plan – 100K

- **Savings**
  - **ANNUAL** Software license maintenance savings – $150K+ per year
  - Preventative Maintenance $$$$$$
Asset Management Systems

- gbaMS
- SAP
- Cityworks
- HANSEN
- Datastream

To be the BEST!
## Asset Management - Compare and Contrast

### Table 1. Vendor Comparison Results

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<th>Arco Cityworks</th>
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<th>Datastream Deliver7N</th>
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<th>H:\blipac</th>
<th>Mission &amp; Blaise</th>
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Summary: Successful AM Program Commonalities

- Creation of an Asset Management Program – links asset management goals with organizational objectives
- Comprehensive inventory of the assets and determining condition and criticality
- Extending the life of these assets through improved maintenance practices (preventive and predictive vs. reactive)
- Improve Situational Awareness and Security
- Address regulatory compliance/environmental issues
- Improved financial management, reporting and compliance
How to Justify paying for an Asset Management Program

- After capital project pressures the money gets tight
- Pilot project: Determining costs associated with critical asset failures vs. preventative maintenance
- Potential cost savings from reduced software portfolio
- Port Security Grant Program?
  - Maritime Domain Awareness?
- Pray
Contact Information

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