How to bring the power of GIS into a CAD centric airport environment

Presenters:
Paul Burns
GIS Manager, Los Angeles World Airports

Ed Maghboul
President, x-Spatial, LLC
Overview

• Requirements / Goals
• Data Management & Challenges
• Solution
• Hurdles
• Benefits
• Q/A
Requirements/Goals

- Provide engineering data to a wider audience at the airport
- Support applications that have GIS integration points, e.g., CMMS, Lease Management, etc.
- Perform Sophisticated Model Driven Spatial Analysis and Visualization of Results
- Use ArcGIS map creation and publishing tools
- Take advantage of the tools and technologies that are built around GIS, e.g. Spatially driven mobile applications
Challenges

• Variety of data
  – Over 200 feature classes
  – Over 2 Million geometric features in the database
    • 1.5 Million floor plan features
    • 500 ~ 700K of SDS/FIE classified features
• Years of effort have been devoted to authoring maps and developing symbology for a “corporate look and feel”
Challenges

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Data Management - Foundational Blocks

- Data Organization and Management
- Tools for Maintaining and Viewing the data
- Enterprise Application Support (CMMS, Lease Management, etc.)
- Geospatial Analysis (Locating facilities, view in 3D)
Data Management - Organization

- Adopt flexible data standards to support current and future requirements
  - Support for NCS
  - Support FAA A/C-5300 18b
  - Support for multiple platforms (e.g. Autodesk, ESRI, etc.)
  - Easily customizable

- Full implementation of SDS / FIE data standards
  - An existing national data standard
  - Ability to filter out relevant data for the airport
  - Open spatial data standard covering both CAD & GIS platforms
Data Management - SDSFIE Implementation

ESRI Geodatabase
- Feature Dataset
  - Feature Class
    - Subtype

Conceptual Organisation
- SDS/FIE
  - Entity Sets
    - Entity Classes
    - Entity Types
      - Entities
        - Tables
          - Attributes
            - Domains
            - Lists
            - Ranges

Physical Schema
- Relationships
- Oracle Repository
  - "Utilities"
    - "Water"
  - "Line"
    - "MAIN"
Data Management - Application of standards

SDS / FIE:
Set=Utility
Class=Waste Water System
Type=Line
Entity=Service
LAWA CAD Layer=C-SSWR-SERV

A/C 5300-18b:
Group Name=Utilities
Class Name=Utility Line
FAA CAD Layer= C-SSWR-MAIN-

ESRI Geodatabase:
Dataset=Utilities-Waste Water System
Class=Line
Sub-Type=Service
Solution- Web Based Maintenance of the dB Schema

- Using the web interface to maintain the dB schema.
- Defining new features using web forms rather than "GIS or CAD centric" tools.
- Easier and more efficient.
- Eliminates the need for ad-hoc programming.
Solution - Why Use CAD to Maintain Data?

- AutoCAD is the primary tool for data development at the airport
  - All construction / engineering / survey data is delivered in BIM / CAD format
  - AutoCAD provides a simpler & more streamlined tools for data development and maintenance
    - Communication with outside AE firms
- Data maintenance tools are currently CAD based
- CAD data requirements from other airport groups
Design
GIS Data
Solution

- Development of tools for cleaning data
  - CAD geometry are not as clean as they need to be for GIS use
- Development of tools for creation of geodatabase
  - Ability to publish any SDS / FIE feature types into its corresponding Geodatabase feature class
  - Leveraged the SDS/FIE open standard to bridge data between CAD & GIS
  - Automated process for creation of a geometric network
Solution

• Development of tools for:
  – Creation of Map Services based on existing corporate thematics & symbology
Example - Web App.
Example – ArcGIS Online
Hurdles

- Geometry data issues
  - Incompatible Geometry types (e.g. AutoCAD Polyline with an arc segment is not supported in GIS)
  - Geodatabase feature classes are limited to a single geometry type (i.e. Point or line or polygon)
Benefits

– The automated creation of feature class definitions has greatly streamlined the geodatabase creation
– Changes to feature class definition (attributes, domains, sub-types) are automatically transferred to Geodatabase
  • No need to use ArcCatalog
– Maintain synchronicity between CAD & GIS platforms
– Leverage the best tools for solving real-time problems
Example .. ArcMap
Example .. AutoCAD
Example .. Web App
Example .. ArcGIS Map Services
Q/A

• For more information please contact;
  Paul Burns
  424-646-5764
  pburns@lawa.org

Ed Maghboul
  310-862-1305
  Ed.Maghboul@x-spatial.com
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