Topics

- SUA/ATCAA & Airports GIS
  - Introduction to concept
  - Needs for AIXM & GIS
  - Approach
  - Findings

Introduction to SUAs and ATCAAs

- Special Use Airspace (SUA)
  - Airspace in which activities must be confined or limitations may be imposed on aircraft, generally below en route airspace
- Air Traffic Controlled Assigned Airspace (ATCAA)
  - En Route airspace analogous to SUAs
- These airspaces may depend on many other features
  - NAVAIDs, airports, runways, cities, other airspaces, geographic features or arbitrary points

Goals for this Project

- Define SUAs and ATCAAs using an editing tool

- Manage the review of those on a website

- Use a SOA to confer that data to interested users

- Manage the schedule and status of those airspaces

Editing Requirements

- Editing of airspaces
  - Polygons with edges built from:
    - Line segments
    - Arcs defined by distance from a (significant) point
    - Geoborders
  - Airspaces built from other airspaces
    - Union
    - Subtraction
- Generation of a legal definition
  - Human readable text

AIXM Requirements

- Needed to support the use of application schemas which extend AIXM
  - New elements on existing features/objects
  - New relationships
- All of this needed to work through existing APIs

Approach

- Using Lucy and LuciadMap
  - With custom-built AIXM5 extension
  - Customized some user interface interactions
    - Both for CAD editing and other UI panels
  - Provided customized panel view of the data, textually
- The review system will use LuciadWMS
  - More detailed discussion with Airports GIS

Approach, cont'd

- Avoided "eating the world"
  - That is, only treated first-class features as fully-complete, referenceable features to avoid exploding scope beyond budget
  - Required through Interface Requirements Documents that SUA messages are complete, which does indicate that message isn't separable into feature components
  - Example: NAVAIDs do not have a true UUID and their timeslices in the message are tied to the airspace on which it depends
    - Potential redundancy in data, but avoids need to implement all of the AIXM features before we are ready to

Findings (1)

- Non-Luciad: Issues with AIXM, XMLBeans and the IONA/FUSE software

  – Addressed in the latest release of IONA/FUSE

- With custom add-on, Lucy/LuciadMap 8.1 were able to handle the input XSDs

  – The feature set supported by the modifications will be integrated into Luciad 9.0

  – Lucy/LuciadMap 8.1 does not directly support these features

  – These included custom application schema

Findings (2)

- Manipulation through code was possible
  - Geometries generated via CAD-style editing
    - Written to the GML
  - Properties managed through Java UI elements
  - Writing out and reading AIXM was managed through AIXM5 module
 - Real-time modifications to geometry were reflected within AIXM

Next Steps

- Integration with SOA using AIXM
- Finalization of SUA and ATCAA Model based on prototyping and requirements gathering
- More robust management of linkages between features (xlink)
- Implementation of geoborder handling

Summary

- We were successful in using the custom-built module to built an Airspace editor prototype
  - Positive response from those who have seen it
- Awaiting release of 9.0 for the more full-featured support of AIXM5 in Lucy/LuciadMap
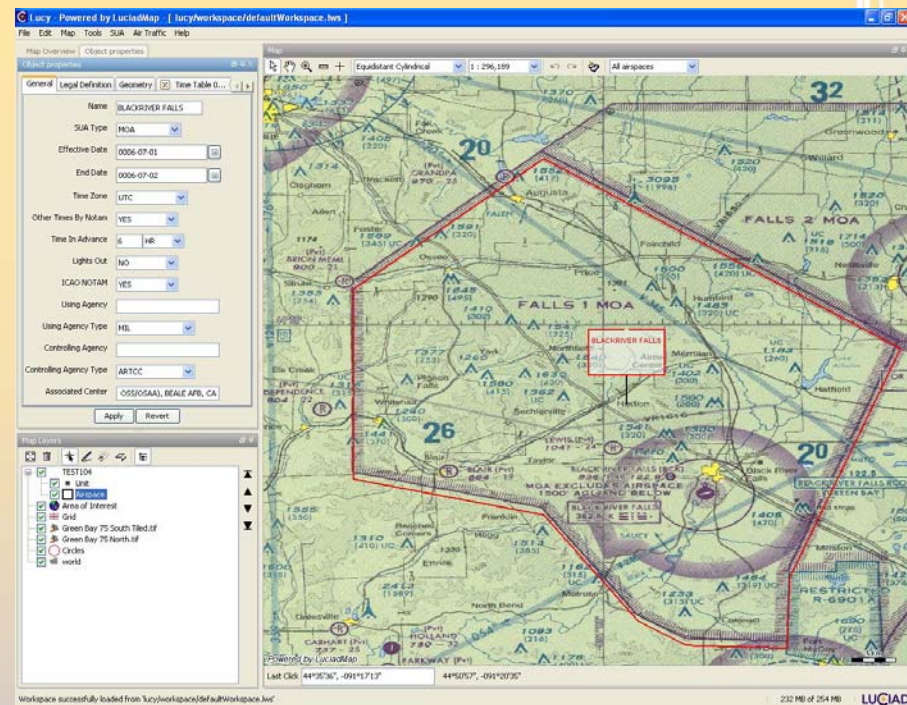
Airports GIS

Airports GIS: Overview

- Managing the collection / validation / dissemination of airport data
- Survey standards and specifications (Advisory Circulars) adopted by the FAA
- Vision: to become a common portal for many activities performed by Airports
  – Provide a foundation of quality airport data

Airports GIS: e-ALP

- Electronic Airport Layout Plans (e-ALP)
  - Developing a national standard for ALPs
  - Digitizing a currently manual process
  - Process improvement / consolidation efforts
- GIS viewer forms the foundation for e-ALP as well as other tools for Airports GIS
  - Airspace Analysis, Airport Diagrams, etc.

Visualization Requirements

- **General criteria**
  - Browser based for decentralized user base
  - Thin client capability
  - Meet OGC standards
  - High performance with large quantities of data (vector & raster)

- **Specific criteria for e-ALP views**
  - Complex labeling
  - Styling based on business rules
  - Map re-projection

AIXM Requirements

- FAA AIM Group is implementing AIXM throughout our programs

- Airports GIS currently supports various file formats
  - Oracle, PostgreSQL/PostGIS, ESRI Shape, AutoCAD DWG, KML

- Airports GIS's development pipeline includes support for AIXM
  - Planning for this now

Approach

- Planning ahead for future Airports GIS needs with our current mapping capability decisions
  - Current: Thin Client, Customizable, Visualization
  - Future: AIXM, Redlining & Annotation, 3D
- Standards Based
  - Web Mapping Service (WMS)
    - Standard set of parameterized HTTP requests
- Extended WMS with Luciad
  - To satisfy the unique requirements of Airports GIS

Findings (1)

- Luciad WMS:
  - Provided the OGC standard WMS foundation
  - Provided access to the LuciadMap core functionality

- Luciad WMS extensions:
  - To meet the specific needs of Airports GIS
    - ex. addition of parameters specific to the Airports GIS project workflow framework (project #, etc.)

Findings (2)

- Benefits of Luciad's Java based API toolkit
  - Reusability of code across applications
  - Near linear horizontal/vertical scaling
  - High quality image outputs
- Clear scalability path provides application growth
  - Luciad WMS: Thin client / Server with WMS (distributed visualization)
  - LuciadMap / Lucy: Thick client for future functionality (editing, redlining)
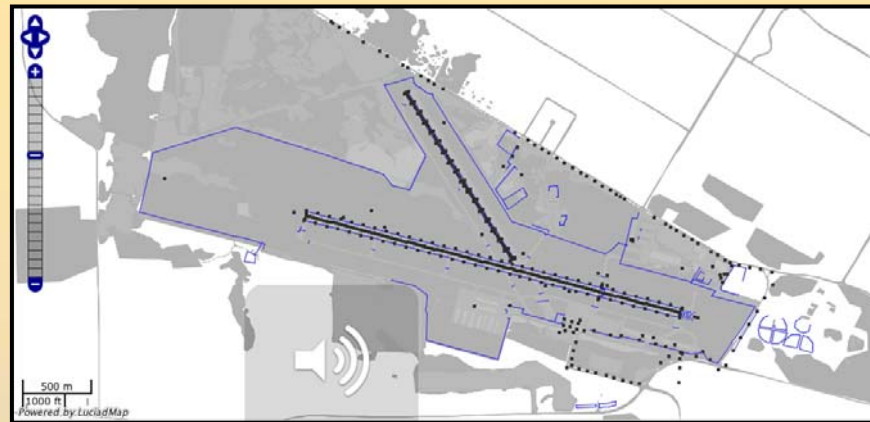
Next Steps

- Initial version of e-ALP built with Luciad WMS will be available Fall 2009
- Next version of e-ALP will incorporate additional tools & advanced configuration
  - Redlining
  - Editing / Customization
  - Annotations

Summary

- Airports GIS is in the beginning stages of visualization implementation

  – Received positive results with first prototype

- Current and future mapping criteria and ability to use AIXM considered in decision to use Luciad WMS

Questions?

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