FAA Airport Surveying – Geographic Information System (GIS) Program

Airport Data and Information

By: Chris Criswell, Federal Aviation Administration

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Topics

• Overview of Airport Surveying – GIS Program
• Why collect rich, location based airport data?
• System Demonstration
• Questions & Answers
Airports GIS Vision

• Provide an interoperable web-based toolset to electronically collect, collaborate, manage, process, approve, maintain and share airport data addressing the needs of the FAA and its customers collectively rather than individually.
Airport Data and Information

Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight.

- Hazardous Weather
- Taxi and Runway closures
- Data Changes
- New Obstructions
- Airspace Restrictions
- Procedure Changes
AIRPORTS GIS

WHAT IS GIS?

- In GIS, data is layered like a stack of transparencies

- Data that may come from many different sources is geographically projected, through the use of common datum's and coordinate systems, to align with each other

- Metadata: data about data

AIRPORTS GIS?

- A single, web-based database system for validated data in support of airport design & construction programs

- A GIS planning tool to help airport planners visualize the characteristics of airport facilities & features (runway length, width, surface type)

- A tool to help field personnel address & coordinate airport changes in a timely manner in an integrated environment
Survey Data Collection

• **FAA Advisory Circulars 150/5300 Series**
  – 16, Geodetic Control
  – 17, Imagery
  – 18, Survey Data Collection

• **Provide standardized data collection guidance and a common view of airport survey data**

• **Current efforts to make data model more AIXM compliant**

• **Current Airport GIS survey projects**
  – 3000+ airport surveys
• Conceived to address the airport data consistency and maintenance problems the FAA was experiencing agency-wide
• To create a better way of collecting, storing, managing, and sharing airports data
• To design a tool to assist the FAA’s Office of Airports’ personnel located across the United States in accomplishing their duties (both planning & engineering) in an integrated environment
Airports GIS Objectives

• Single portal for airport data into the FAA
  – Currently there are too many interfaces and ways for data to enter the system, causing confusion and extra workload

• Eliminate disparate airport data sets
  – Provide a means to acquire essential data as it is created in a digital form with associated metadata

• Provide standards based, verified and maintained airport data for use in …
  – Airport Planning
  – Airport Design
  – Airport Operations
Airports GIS Objectives (continued)

• Data standard harmonized with national (Federal Geographic Data Committee) and International standards (AIXM)

• Support NextGen initiatives of the FAA
  – High density Airports
    • More accurate standards based data for use in airport planning and trajectory based instrument procedure design
  – Flexible Airports and Terminals
    • Requires digital representations of the airports developed to a single standard
    • Create a Standardized Process for conducting airport and aeronautical surveys – Advisory Circulars
    • Current FAA guidance (FAA Specification 405) was not robust enough for the required data
## Airports GIS - Example

### Project Summary: SOW / Concurrence

- **Project Type:** New Airport Survey
- **Created By:** shyamsundar parhi on 04/09/2010
- **Airport:** HAMILTON MUNI
- **Category:** NPIAS Non-Part 139 Airport
- **Purpose:** Airports GIS - Example
- **Verification:** Geodetic Control, Imagery, Survey

### Surveyor/Consultant Information

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<th>Name</th>
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There are no Surveyor/Consultant(s) associated with the Survey Project.

### Project History & Documents

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Program Benefits

Greater Productivity

Dependable

Connected

Submission and processing of airport geospatial data

Data is collected once and then managed through the system ensuring the most current data is readily available

Electronic management and processing of all airport data … one stop shop for managing and updating an airports data

GIS is a scalable and interoperable technology allowing others to use and share data without recollecting, because the metadata provides the source, accuracy, collection methodology, etc. of the dataset. Each entity builds on the base data set to meet its own requirements

Best Economics
Why Implement Such A Process?

**New Navigation Technologies**

- Current initiatives within aviation industry (moving maps, electronic flight information, advanced avionics) require a data centric airport environment, as opposed to the traditional product based environment.

**New Process**

- To meet the challenges of the changing role of aeronautical data in the system, the FAA needed to rethink the way it collects, stores, maintains and shares data.
- We needed to change and focus on managing our airport and aeronautical data.
Airport Benefits

✓ Provides a single point of entry for the submission and maintenance of **AIRPORT DATA** and to communicate the changes electronically to the FAA.

✓ Provides non-GIS Equipped Airports with a GIS Foundation for:
  ✓ Airport Layout Plans,
  ✓ Obstruction Charts,
  ✓ Construction plans, and other airport mapping products
  ✓ Planning
  ✓ Zoning

✓ Improves Response to Airport Changes

✓ Provides On-line Access to Electronic Obstruction Charts and Airport Layout Plan Data to FAA, Airports, and Consultants

✓ Provides the sponsor access to FAA data

✓ Speeds Production and Currency of FAA Charts and publications
Why Implement Such A Process?

• To provide a common platform for the collection, maintenance and dissemination of airport and aeronautical information and sharing of the data for improved efficiency of airport operations for both the sponsor and the FAA.

• Current initiatives within aviation industry require a data centric airport environment, as opposed to the traditional product based environment.

• To meet the challenges of the changing role of aeronautical data in the system, the FAA needed to rethink the way it collects, stores, and maintains the data about airports.

• We need to focus on managing our airport and aeronautical data.
### Why Change?

| ASR (MFR) | 422306.6000 | -1225146.7000 | 1310.0 | | | 0721993 |
| DME (14 MFR) | 422140.0470 | -1225201.8010 | 1334.0 | | | 0721993 |
| GS (14 MFR) PP | 422424.4910 | -1225224.7530 | 1297.1 | | | 0721993 |
| GS (14 MFR) CLPT | 422411.0590 | -1225229.7230 | | | 400R | 1081 | 0721993 |
| LMM (14 MFR) | 422321.0000 | -1225250.6000 | | | | 3250 | 0721993 |
| LMM (14 MFR) CLPT | 422322.5454 | -1225249.3030 | | | 4L | 3250 | 0721993 |
| LOC (14 MFR) | 422140.1380 | -1225157.8070 | 1318.9 | | | 998 | 0721993 |
| LOM (14 MFR) | 422703.2000 | -1225448.2000 | | | | 27420 | 0721993 |
| LOM (14 MFR) CLPT | 422702.5454 | -1225444.3030 | | | 221L | 27385 | 0721993 |
| VORTAC (OED) | 422846.5000 | -1225446.7000 | 2080.0 | | | | 0721993 |

- UDDF (Universal Data Delivery Format) delivered data … it was an outline, it did not tell the whole story!
- Did not provide Metadata
The answer ... a richer data set

- Geospatial data identifies the geographic location and characteristics of natural or man-made features.

- Moving to a geospatial environment allows us to not only know the geographic location but also, and sometimes more importantly the characteristics of a feature.

- In the example (left) of a runway ...
  - We not only have the coordinates (1)
  - We also have the characteristics (2)

- A much richer data set ... all together in a single place!
High-Level Operational Concept

Airport Survey Data
AC 150/5300

Airport Data Changes

AIM/AIS

Office of Airports

AGIS

Collect
Evaluate
Deliver
Process

Digital Products

Static Airport Data

• OE/AAA
• SDAT
• SAA
• FNS
• NFPO

• SWIM
• TFDM
• ERAM
• TMA/TBFM
• TDDS
• RTCA
Integrating Airports GIS into *Our* Business Processes

Airport Sponsor

Data collection, planning, design, development, or analysis activities

Airports GIS Database

Data Sharing

Proposed Data

Current Data

Region/ADO

AIM/AIS

Airport Data
Airport GIS – High Level Workflow

1. Data Submission
   - Data Submission Type?
     - NPIAS
     - Stored in Airport GIS Database
     - eNASR Change Request
     - NFDC Review
     - NFPG (for IAP development)

2. Automated Validation
   - Pass
   - Survey
     - Survey Category?
       - Workflow B
       - Workflow A
         - NGS Verification
           - Pass
           - Stored in NASR

   - Fail
     - Survey
       - Available for Multiple Uses
Airport GIS – High Level Workflow

1. **Data Submission**
   - **Automated Validation**
     - Pass
     - Fail
   - **Survey**
     - **Survey Category?**
       - Workflow A
       - Workflow B
   - **Data Submission Type?**
     - Non-NPIAS Available for Multiple Uses
   - **Existing Airport Data**

2. **NGS Verification**
   - Pass

3. **Stored in Airport GIS Database**

4. **NFDC Review**
   - eNASR Change Request

5. **NFPD (for IAP development)**
   - Stored in NASR

Phase IV
Airport GIS – System Demonstration

Airports GIS

Web Application – http://airports-gis.faa.gov
Web Services –
NEXT STEPS

• What does the future hold?
Questions & Answers
Contact Information

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Airports GIS
Web Application – http://airports-gis.faa.gov
Web Services –