Geospatial Data Collection for the FAA Airports GIS Program
A Change in Direction

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Office of Airports
Office of Airport Safety and Standards
Assistant Manager, Airport Engineering Division

Presented to | MAPPS Luncheon
Date | February 23, 2012
Background - FAA

- 17 years USAF
- 10 years UT Austin
- 9 years US Largest Transportation Consulting Company
- 1 year FAA
  - Office of Airports
    - Office of Airport Safety and Standards
      - Asst Manager – Airport Engineering Division
      - 100 Advisory Circulars
      - Responsible for Airports GIS Program
ACRP Project 03-01

- Very Impressed with the capability of LIDAR based upon research conducted by National Geodetic Survey and NOAA.
- Wrote ACRP problem statement to write a standard procurement specification for LIDAR obstruction surveys for FAA.
- Chair of the Technical Oversight Panel and research conducted by the University of Mississippi.
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Chair of the Technical Oversight Panel and research conducted by the University of Mississippi.
Airports Vary in size, geometry and use

- Large and Medium Hubs
- Small and Non primary Hubs
- Part 139 Certification
- Towered
- NPIAS
- Instrument Approach
- Public Use/ Public Owned
- Public Use/ Private Owned
- Private Use
What is the FAA Airports GIS Program

- About 547 airports have commercial service in US
- About 3,331 receive federal funding and are included in the National Plan of Integrated Airport System (NPIAS)
- There are about 13,450 Airports and 5,856 Heliports
- Of those about 8,377 Airports and 5,508 Heliports are private use landing facilities.
- About 19,782 landing facilities in the FAA database including seaplane bases, gliderports, balloonports and ultralight Flightparks

Airport point location and attributes only - 2013
### Why Did FAA Create Airports GIS?

| Presidential Mandate | • Executive Order 12906 (April 11, 1994)  
|                     | • OMB Circular A-16 (2002; revised 2010)  |
| Improve Efficiencies | • Single, authoritative, accessible data source  |
| Reduce Costs        | • Airports, FAA, consultants  |
| Improve Safety      | • Increased need for real-time data accuracy  |
| NextGen             | • A repository of airport information (not just survey data)  |

**Airports GIS: a true paradigm shift in the way we do business... in the right direction – it’s all about the data!**
Airports GIS | Multiple Stakeholder Perspective

**FAA | Air Traffic Organization (ATO)**
- Owns and operates the National Airspace System
- Needs accurate, safety-critical (runway ends, NAVAIDS, obstacles) data from airport operational environments
- LPV/WAAS (limited interest in non-operational airports data)

**ATO’s Office of Aeronautical Information Management (AIM)**
- Tasked with building FAA’s data-sharing environment and infrastructure
- Initially developed Airports GIS and eALP
- Air Traffic-centric

**Airport Stakeholders**
- Communities own and operate airports
- Must meet FAA grant requirements
- If you’ve seen one airport...
- Local politics often at play
- Need for communication on projects between multiple departments
- 3,400+ NPIAS airports of varying size

**FAA | Office of Airports (ARP)**
- Stewards of airports data
- Manage programming of funds for the Airport Improvement Program (AIP) and Passenger Facility Charges (PFCs)
- AIP funds must benefit airports (ltd off-airport data collection)
- Develop Airports GIS (programming, standards, and policy) and the eALP
Airports GIS at a High Level

**INPUT**
- Survey Data Collection
  - Geodetic Control
    - AC 150/5300-16
    - AC 150/5300-17
  - Photography Control
    - AC 150/5300-18
- Aerial Photos
- Airport Planning
- 5010/NASR Data *
- Airport Ops | NOTAMS *
- Data | Other Agencies **
- New Tech | LiDAR/GPS **

**OUTPUT**
- NFDC | eNASR data
- NAT Flt Procedures data
- iOE/AAA data
- electronic ALP Module
  - Airport Design Module *
  - Modification of Standards Module *
  - Airspace Evaluation*
  - 139 Inspections Module **
  - Misc Financial Modules **
  - Compatible Land Use Module **
  - Misc Engineering Modules **
  - Misc Environmental Modules **

**Data Transformation**
- Reduced Redundancy
- Reduced Costs

**Data Standards**
- Collection
- Input

* In Development | ** Planned
AC 150/5300-18, Chapter 5 | Feature Groups

- Airfield
- Airspace
- Cadastral
- Environmental
- Geospatial
- Man Made
- Navigational Aides
- Seaplane
- Security
- Surface Transportation
- Utilities

<table>
<thead>
<tr>
<th>Feature Group</th>
<th>Description</th>
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<tr>
<td>Airfield</td>
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5.3.1. Paragraph Number and FeatureClassName

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<tr>
<th>Definition: Definition of feature.</th>
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<tbody>
<tr>
<td>Feature Group</td>
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<td>Feature Class Name</td>
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<td>Feature Type</td>
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<th>CADD Standard Requirements</th>
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<td>Line type</td>
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<td>MicroStation Standards</td>
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<tr>
<td>FGDC</td>
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<tr>
<td>SDSFIE</td>
<td>SDSFIE equivalent of feature.</td>
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<th>Documentation and Submission Requirements</th>
<th>The required documentation for feature class elements. Minimum requirements are defined in paragraphs 15.2 and 15.3. Additional or expanded documentation requirements are located here.</th>
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<table>
<thead>
<tr>
<th>Related Features</th>
<th>Description of proper collection limits and requirements for feature class element.</th>
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<table>
<thead>
<tr>
<th>Monumentation</th>
<th>Description of specific HSP location.</th>
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<tbody>
<tr>
<td>Survey Point Location</td>
<td>Description of specific VSP location.</td>
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<tr>
<td>Horizontal</td>
<td>Vertical</td>
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<tr>
<td>Accuracy Requirements (in feet)</td>
<td>Orthometric</td>
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<tr>
<td>Accuracy requirement</td>
<td>Accuracy requirement</td>
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<tr>
<td>Resolution</td>
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<table>
<thead>
<tr>
<th>Feature Attributes</th>
<th>Description of attribute specifications</th>
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<td>Name of attribute field</td>
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February 23, 2012
https://airports-gis.faa.gov/
Data Distribution Before Airports GIS

- No aerial photography
- Airport Layout Plan @ ADO
  - Paper
  - PDF
  - CAD
- Obstruction Surveys to National Geodetic Survey (NGS)
- No airport Data @ HQ
Data Distribution After Airports GIS

- No aerial photography
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- Aerial Photography to Cloud Server
- Digital data eALP derived from feature extraction from photography
- Obstruction Surveys in Airports GIS
- Central repository for all digital airport geospatial data
- Signing of eALP reduced from 120 days to 30 days
Full Feature Airport GIS Implementation

Immediate Steps

**Safety Critical Data:** if a survey is required for a project involving safety-critical data submit into Airports GIS

<table>
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<th>NUMBER OF AIRPORTS</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
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<th>FY14</th>
<th>FY15</th>
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<td>35</td>
<td>15</td>
<td>5</td>
<td>2</td>
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<td>Small and Non Hubs</td>
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<td><strong>7</strong></td>
<td><strong>30</strong></td>
<td><strong>57</strong></td>
<td><strong>135</strong></td>
<td><strong>225</strong></td>
<td><strong>231</strong></td>
<td><strong>140</strong></td>
<td><strong>825</strong></td>
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Most requested data – 1 foot elevation contours for planning and preliminary design
AC 150/5300-17C, Standards for Using Remote Sensing Technologies in Airport Surveys

- Mandatory for all Federally Funded Airports
- Survey required for Safety Critical Projects
  - Master Plans, Airport Layout Plan updates
  - Instrument Procedures Updates
  - Major Construction Projects
  - Maybe required for off airport FAA installed Navaids
- Aerial Photography Required
- LIDAR permitted but must be cost effective
Data Required

- 3,331 NPIAS Airports
- Major airports require updates 3-5 years
- 4000 projects per year (60%-70% require survey)
  - Peak Data collection time
- 15 years to collect all airports
- Unless we find ways to reduce future costs it will cost a very big number.
- Can we leverage LIDAR (aerial or ground based) with other airport or FAA data needs?
Thank You: Questions Welcome!