

# Airport GIS Data & eALP

## – Coming To An Airport Near You

Kevin Shirer, AAE – Project Manager

Association of California Airports; September 2009



# Today's Presentation & Expectations

## Take away

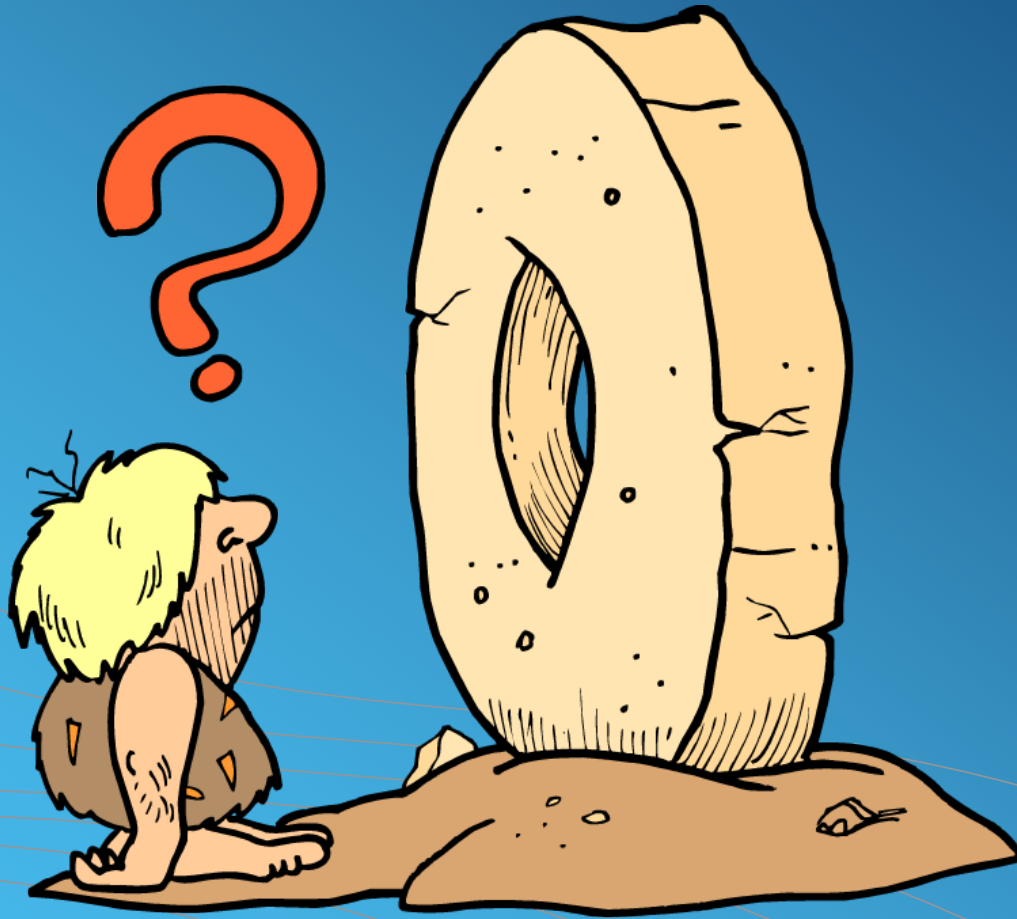
- Basic knowledge of what is GIS – “GIS 101”
- Roles & responsibilities for managing airport data
- What's here – airport GIS standards & FAA “AGIS”
- What's coming – eALP



# The Driving Needs

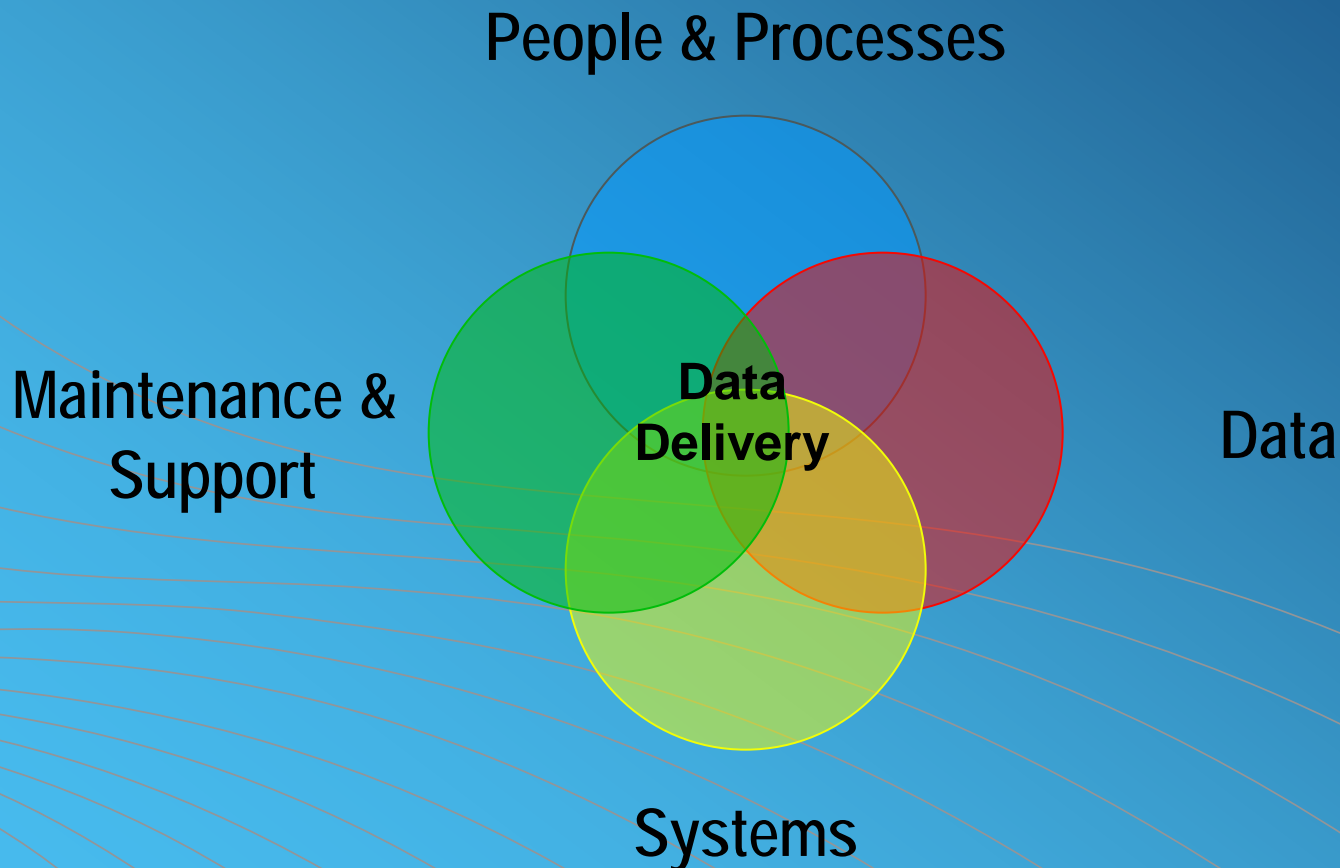
- Need to improved business processes
  - Creation of paperless processes
  - e-Business – faster coordination
- Need of a centralized database
  - Same data used by all
  - Accurate and validated data
  - Maintable data
  - Transferable data
- Need for accurate maps that are easily accessible

# What is GIS?



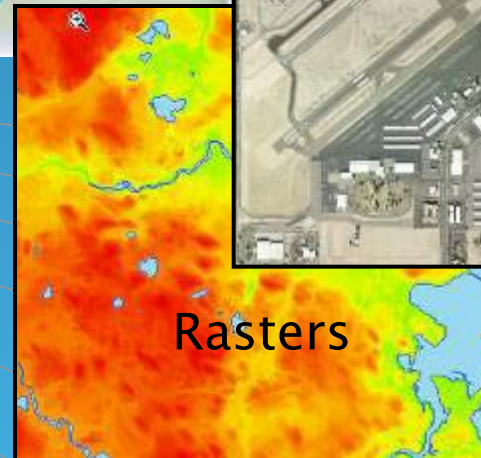
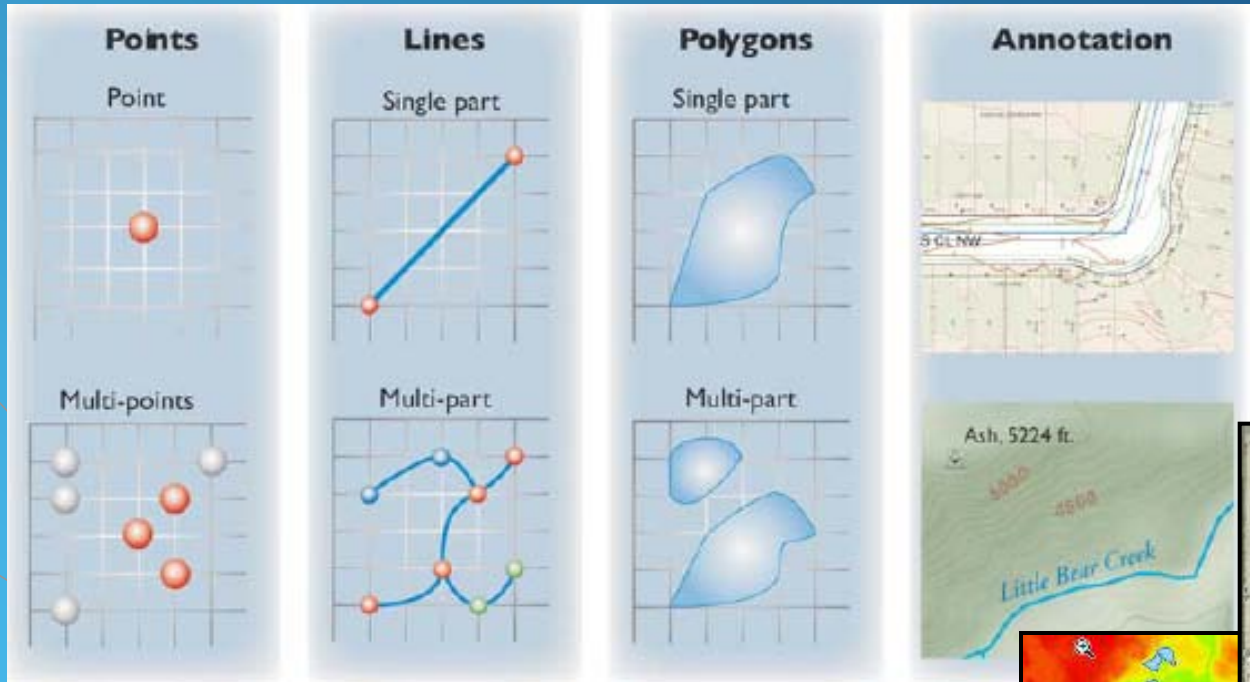
# The Big Picture: “GIS 101”

- GIS – Any information system that integrates, stores, edits, analyzes, shares, and displays geographic information





# Data: Vector Geometry, Text & Rasters



# Data – Sample “beginning” airport layers

AIRFIELD SIGN

APRON

BRIDGE

BUILDING

CONTROL POINT

DRIVEWAY

ELEVATION CONTOUR

FENCE

GATE

HELIPAD

INFIELD

NAVAID

OBSTACLE

OBSTRUCTION SURFACE

PARKING LOT

PAVEMENT MARKING

POLICE & FIRE STATION

RUNWAY/TAXIWAY

SHOULDER

SIDEWALK

SPOT ELEVATION

WEATHER EQUIPMENT



# Data Collection

- How do we get data into GIS ?
  - Geodetic Control – Survey
  - Aerial Photography
  - Digital Terrain Model – Photogrammetry
  - State, County and City GIS Data – Shared
  - As-built Plans
  - Exterior Data – Specifically collected

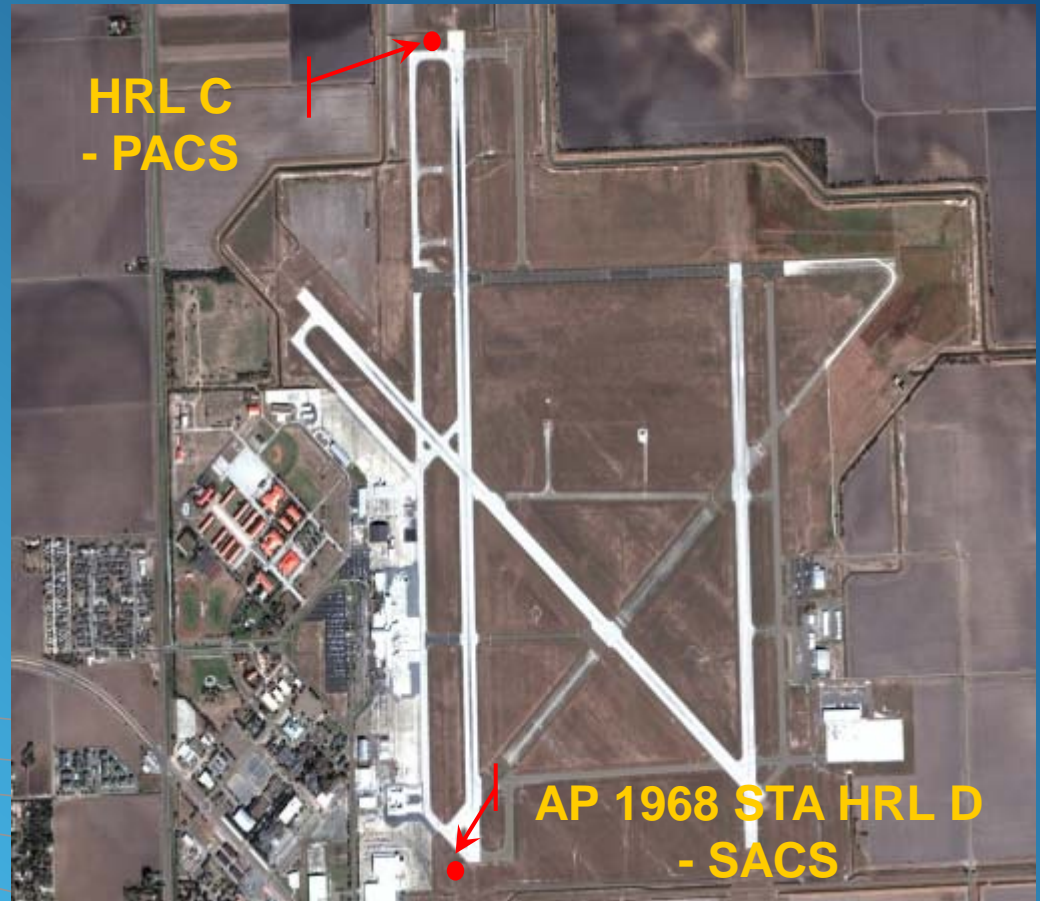
# Data: Geodetic Control

- Marks on the ground: known latitude, longitude and elevation.
- Primary Airport Control Station (*PACS*) and Secondary Airport Control Station (*SACS*) serve as reference for all surveys at the facility.
- FAA Advisory Circular 150/5300-16: Establishment of Geodetic Control and Submission to the National Geodetic Survey.



# Data: Geodetic Control

- Use PACS and SACS to determine the positions of features using:
  - GPS
  - Laser Scanning or
  - Traditional survey techniques, and
  - Photogrammetry – (measurements from aerial photos)



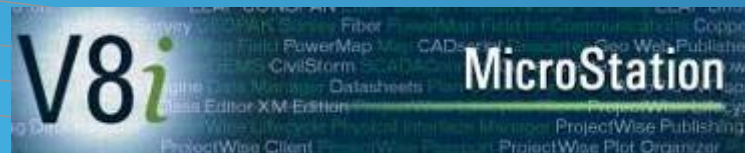
# Data Accuracy is Serious Business

- Airport Data will be used for:
  - Obstruction Analysis
  - Approach Development
  - Engineering & Planning
  - Navaid Siting
  - Land Management
  - Airport Layout Plans



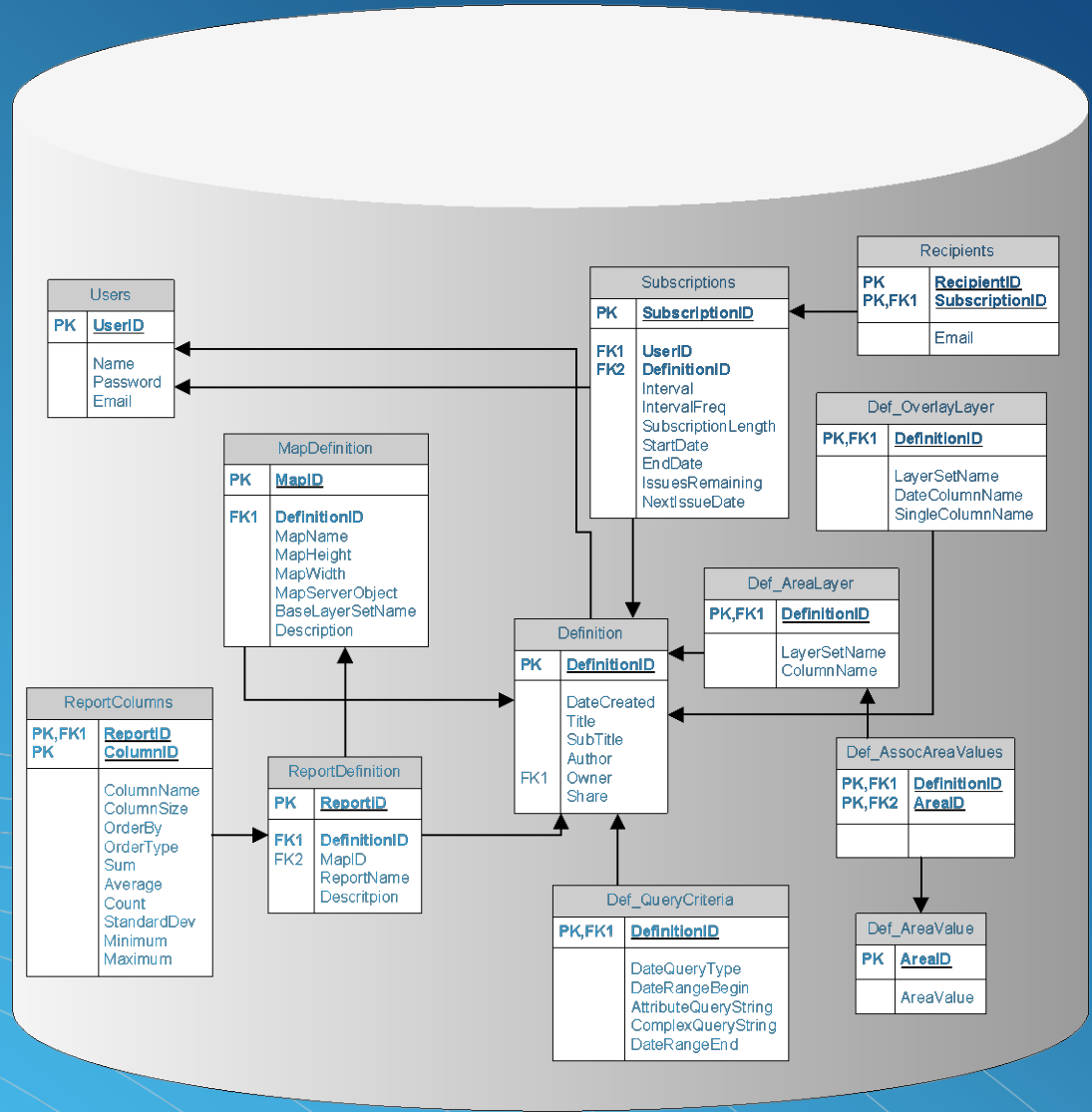
# Systems: GIS & CAD Software

- ESRI: ArcGIS 9, ArcIMS, ArcPAD, ArcSDE, MapObjects...
- Autodesk: AutoCAD, AutoCAD Map 3D, MapGuide, Revit...
- MicroStation : Version 8
- Intergraph: GeoMedia, GeoMedia Professional...



# Systems: What is a database (DB)?

- Organized and related (linked) collection of data tables:
  - Spatial
  - Non-Spatial
- Software
  - SQL/PostgreSQL
  - Oracle
  - Oracle Spatial



# Data Maintenance & Support

- Data Maintenance – Roles
  - Airport Staff & Consultants
  - FAA & NGS
- Data Maintenance – Policies & Procedures
  - Change Control: Update data for ongoing Improvements



# FAA Airports GIS (AGIS)

- What's Here Now
  - FAA Advisory Circulars – Geospatial Data Standards
  - FAA Airports Surveying–GIS (AGIS) Website
- What's Coming
  - FAA Industry Education – Integrated Distance Learning Environment (FAA IDLE)
  - Electronic Airport Layout Plans – eALP
- FAA Office of Airport Safety and Standards – Airport Engineering Division (AAS–100)



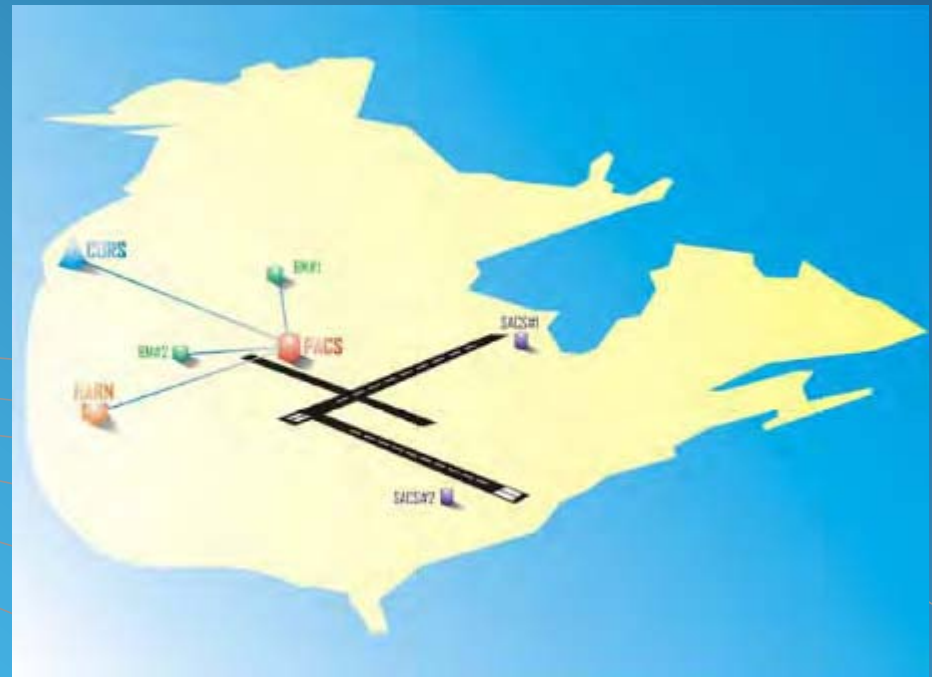
# FAA Advisory Circulars: “-16, -17 & -18”

- AC 150/5300-16: *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey*
- AC 150/5300-17: *General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to the National Geodetic Survey*
- AC 150/5300-18: *General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards*



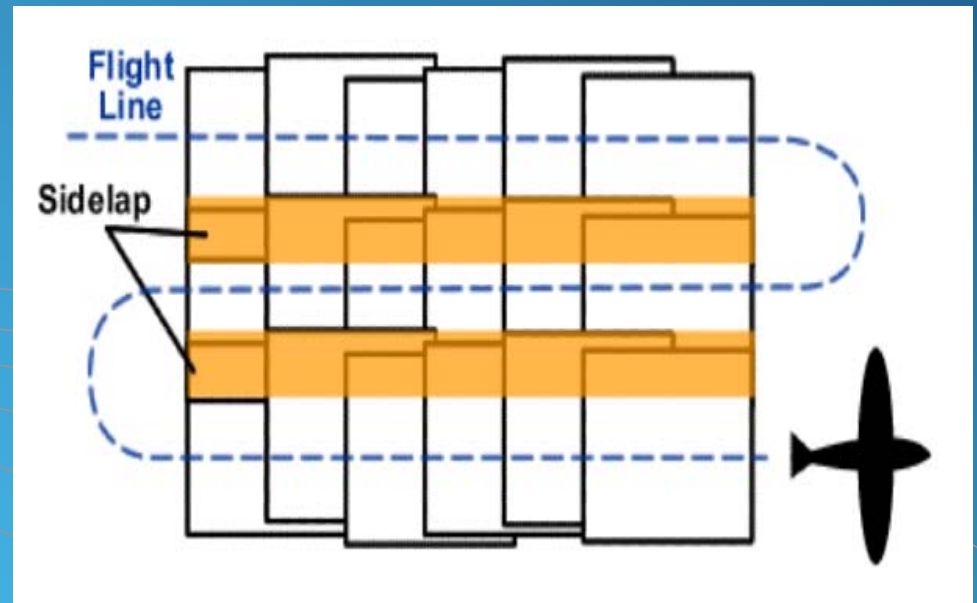
# AC 150/5300-16: Aeronautical Survey Control

- Managing Geodetic Control for Submittal to FAA
  - Reconnaissance & Planning
  - Establishing Monuments: PACs & SACs
  - Monument Selection
  - GPS Positioning
  - Adjusting GPS Data
  - Data Submittal



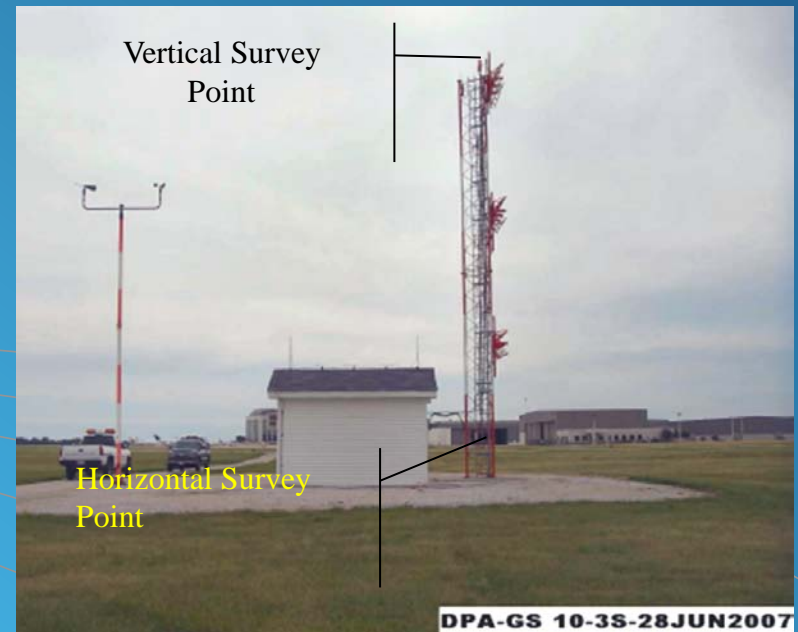
# AC 150/5300-17: Aerial Photography

- Guide to Aerial Imagery Acquisition & Planning
  - Roles & Responsibilities
  - Imagery Plan Requirements
  - Image Control Points
  - Equipment & Materials
  - Flight Planning
  - Requirements
  - Deliverables



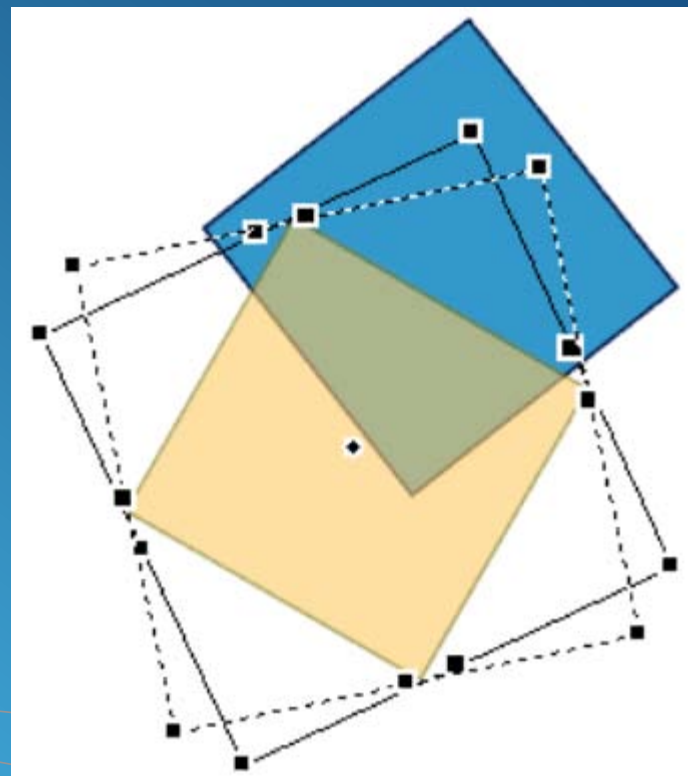
# AC 150/5300-18: Data Collection & GIS Stds.

- Survey Specs & Standards
  - Aeronautical, One-Engine Inoperative (OEI)
  - Cat II & III Operation Area
  - Airport Mapping
  - Construction Survey
  - Airport Pavement Survey
  - Boundary Survey / Land Use



# AC 150/5300-18: Data Collection & GIS Stds.

- Data Translation & Use of Existing Data
- FAA Data Migration Tool (DMT)
- Note: “Survey Requirements Matrix” – Table 2-1
- Note: Chapter 5 – Airport Data Features
  - Don’t let it’s thickness scare you – mostly detailed specs



# FAA Airports Surveying–GIS (AGIS) Database

- Purpose: To streamline the airport survey process and centralize airport data storage into one integrated web–based Geographic Information System
- <https://airports-gis.faa.gov>
- Supplementary Information
  - A Guide to Airport Surveys – FAA Whitepaper May 2009





## Quick Links

[Home](#)

[Airports](#)

[Surveyors](#)

**[Airports GIS](#)**

[Newsletters](#)

[FAQ's](#)

[AGIS Issues/Questions](#)

## FAA Airports GIS / TPSS

Login for: [AGIS](#) | [TPSS](#)

[New User Registration](#) | [Forgot my Username](#) | [Forgot my Password](#)

Username:	<input type="text"/>
Password:	<input type="password"/>
	<input type="button" value="Login"/>

Support Desk: 202-580-7500 or [FAASurveySupportDesk@cgtech.com](mailto:FAASurveySupportDesk@cgtech.com)

## FAA Airport Surveying - Integration

The Federal Aviation Administration (FAA) is actively working to streamline the multiple existing survey applications into a single integrated system for the delivery of airport and aeronautical survey data to the FAA. While in development, this page serves as a gateway to the existing web applications: Airport GIS and the Third Party Survey System (TPSS). This integration is scheduled for completion in 2008 with the introduction of a single internet portal for the submission of airport and related aeronautical data. This integration is designed to meet the data requirements of an evolving national airspace system while planning to support the Next Generation national airspace system.

The integration is planned for implementation in three phases. The first phase includes integrating all survey submissions into a single application; support for open data standards; enhanced workflow and tracking capabilities; automatic validation on all submitted data; and a GIS viewer for the airport data. The second phase includes support for and production of electronic Airport Obstruction Charts and electronic Airport Layout Plans. The final phase of integration is planned to support multiple versions of the airport (preliminary, current, planned, and temporary) data and the ability to share data with other FAA systems such as iOEAAA and eNASR. Please stay tuned for more information regarding these future phases.

There is a tremendous amount of work ahead for the program but in the end it will be worth it. Please continue visiting our site to see our progress, which we will update in the News section.

## Latest News Letter

Volume 2, Issue 1 includes the following:

- Airports Geographic Information System (AGIS)
- A Guide to Airport Surveys
- Airport Policy Guidance
- AC Integrated Distance Learning Environment (IDLE)
- 5010 Program Into AGIS
- AGIS Issue Tracking Form
- Electronic Airport Layout Plan (eALP)
- Tech Tips
- Airport Conferences

 [Open as PDF](#)

# AGIS – What an Airport Owner Needs to Know

- Airport Sponsors and Proponents (AS/P) are the owner of all data for their airport, even after loading into AGIS
- The AS/P (or designated contractor) must ensure all documentation is complete, accurate, and meets criteria outlined in the ACs
- Data accuracy begins with the creation of the project's Statement of Work (SOW)
- FAA provides a draft SOW on the AGIS Site



# AGIS – Projects

## New Project Form

### Step 1 of 4: Airport & Project Type

▪ **Airport:**

*This is an "auto-lookup" field: type locator ID or airport name.*

▪ **Project Type:**

New Airport Survey Project

This project involves a new airport survey meeting the AC 150/5300-18 standards.

Existing Airport Data Project

This project involves current airport data in use that was transformed to meet the AC 150/5300-18 standards and is being provided to Airports GIS.

**Next**

# AGIS – Sponsor Actions

**New Project Form**

**Step 3 of 4: Additional Data**

• **Purpose of Survey:**

- Airport Airspace Analysis - Non-Vertically Guided
- Airport Airspace Analysis - Vertically Guided
- Airport Layout Plan - Airport Design or Planning
- Airport Layout Plan - Airport Movement Area Construction
- Airport Layout Plan - Airport Non-Movement Area Construction
- Airport Layout Plan - Obstruction Removal IFR Operations
- Airport Layout Plan - Obstruction Removal VFR Operations
- Airport Layout Plan - Periodic Update
- Airport Mapping Database - Initial Development
- Airport Mapping Database - Periodic Update
- Airport Obstruction Chart - Initial Development
- Airport Obstruction Chart - Periodic Update
- Construction - Airside
- Construction - Landside
- NAVAID Siting - Non-Precision/Visual
- NAVAID Siting - Precision

**AIP Grant Number:**

format like: 3-36-1234-012-2005 (must have dashes)

[Back](#) [Next](#)

- Confirm information to create an AGIS Project
- Then authorize consultants & upload a SOW

# AGIS Process – Electronic File Testing & Upload

## : Survey File Upload

This project is to **test** survey files for data standard compliance. | [Start a New Survey File Test](#)

▪ **Feature Schema:** Advisory Circular 150/5300-18B ▼

▪ **Survey file (zip only):**

▪ **File Format:** Autocad DWG/DXF ▼

▪ **Coordinate System:** LL-83 (NAD83 Latitude/Longitude, Degrees) ▼

▪ **Accuracy:**  Field Survey AC 150/5300-18 **or** Horizontal  ft Vertical  ft  
(Enter as "Feet at 95% Confidence Level")

**Description:**

# Integrated Distance Learning Environment (IDLE)

- An online distance learning management system (LMS) for training on airport survey related ACs and AGIS
- Accessed through AGIS user registration
- Accessible only after AGIS system administrator validates user credentials



# FAA IDLE

- **Roll-based Training**
  - **Tier 1 – Airport Managers/Proponents/Planners**
    - Basic airport project management, advisory circular requirements and overviews, and general AGIS use
  - **Tier 2 – Functional Managers**
    - Overseers of multiple airports – FAA, State
  - **Tier 3 – Surveyors/Contractors**
    - Tier 1 & 2 information, plus...
    - Detailed requirements and procedures tailored to airport surveyors/contractors



# FAA IDLE

- Easily accessible educational tool
- Fills educational gap:
  - AAS-100 AC program updates
  - Airport survey requirements/procedures
- Provides visualizations of survey processes
- Provides training for airport sponsor roles and responsibilities



# Electronic Airport Layout Plan (eALP)

Note: This is my mock up – Not FAA Sample

WINGS - Microsoft Internet Explorer provided by Woolpert, Inc.

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Refresh Print W Links

Address http://localhost:WINGS/AppFrames.aspx

**WINGS**  
Hawaii DOT - Airports Division

Sunday, November 02, 2008 Welcome Moon

HOME AIRPORTS APPLICATIONS MAP LAYERS DATA MAP

**AIRPORTS** Select an airport from the list below.

**OAHU**

- Honolulu International Airport (HNL)
- Dillingham Airfield (HDH)
- Kalaheo Airport (JRF)

**HAWAII**

- Hilo International Airport (ITO)
- Kona International Airport (KOA)
- Upolu Airport (UPP)
- Waimea-Kohala Airport (MUE)

**MAUI**


- Kahului Airport (OGG)
- Hana Airport (HNM)
- Kapalua West Maui (JHM)

**MOLOKAI**

- MoloKai Airport (MKK)
- Kalaupapa Airport (LUP)

**LANAI**

- Lanai Airport (LNY)



Imagery Property Pavement Refresh Map Zoom to Airport Quick Print

# ALP Set = Drawing Sheets; eALP = Saved Views

- Airport Layout
- Airport Airspace
- Inner Portion of the Approach
- Runway Departure Surfaces (AC 150/5070-6B)
- Terminal Area
- Land Use (Zoning) – On & Off Airport
- Airport Property Map
- Data Sheet, Narrative Report, Cover Sheet
- Others – Access Plan, Utility, Saved Queries & Views



# ALP to eALP Paradigm Shift

## ALP

- Local CADD Standards →
- Paper deliverables →
- Paper signature approvals →
- Defined plan sheets →
  
- Enterprise Viewing – No →
- Planning accuracy →

## eALP

- FAA AC data standards
- Electronic deliverable
- Electronic approvals/signatures
- Defined maps & saved views in electronic Portal
- Geospatial Database
- Feature & Attributes
- Enterprise Viewing – Yes
- Engineering accuracy

# Electronic Airport Layout Plan – eALP

- eALP platform & standards – in development
- Integrated with AGIS database
- Provide access by authorized airport owners, managers, planners and designers
- Users will be able to:
  - View, evaluate, format, print
  - Grant access to their airport data located within AGIS
  - Import/export data from/to authorized FAA resources



# Why eALPs?

- Paper ALPs are all stored by the FAA, airports and their consultants, yet...
- Identifying the “latest” version is not always easy
- Plotted ALPs may contain out-of-date information that varies from other data sources
- NextGen is driving the need for real-time access of the same data by all stakeholders simultaneously



# eALP Challenges

- Paradigm Shift
  - Standards development & standardizing ALP checklists
  - Accommodating standards and desire for custom views
  - Desire for paper ALP's
- Technical challenges
  - Electronic approvals/signatures
  - Data update processes & data archiving
  - Symbology that works at different scales
  - Viewing electronically



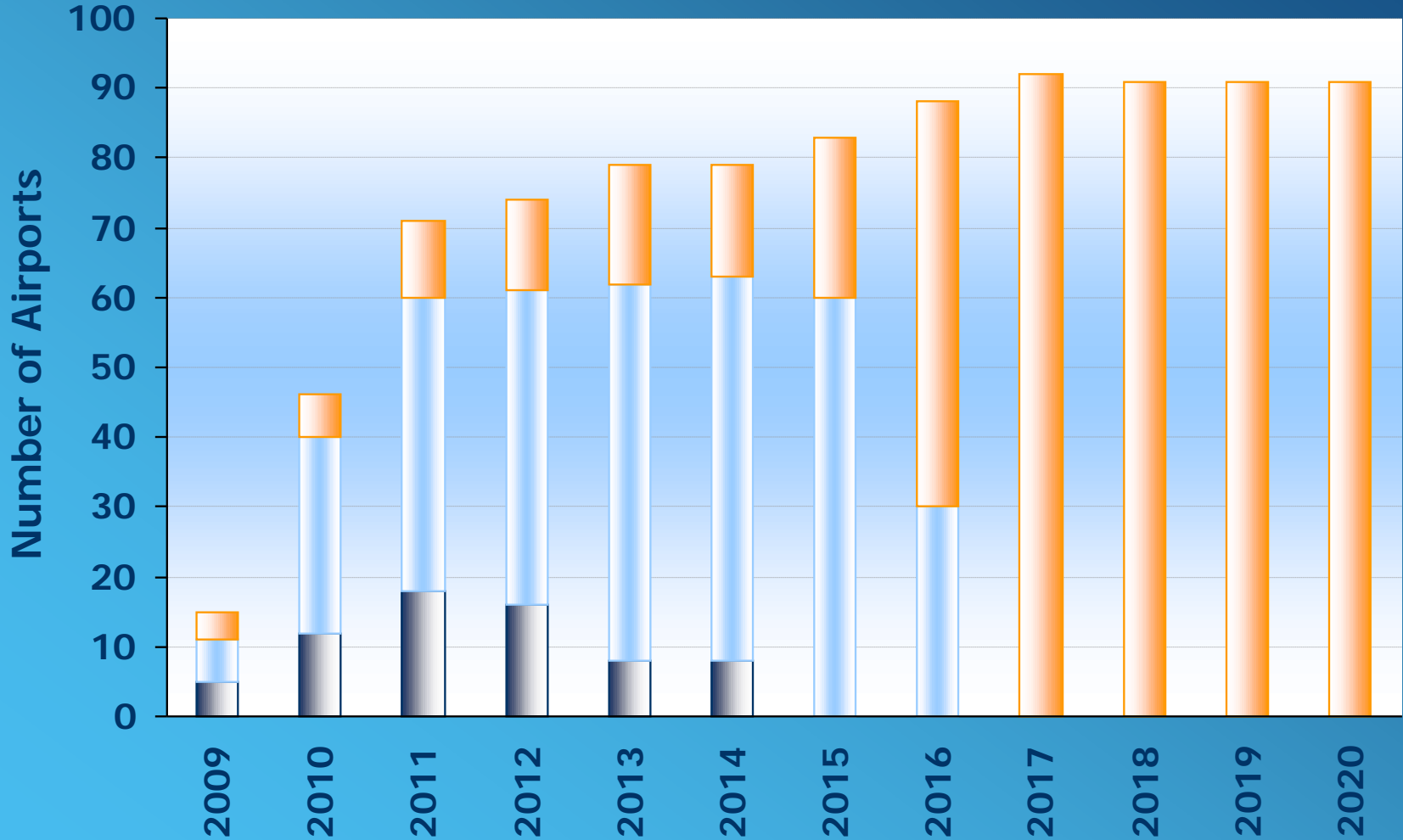
# eALP – FAA Program Status

- FAA Southern Region has six “test bed” airports
  - Full ALP airport surveys are in progress/coordination
- Develop “Proof of Concept Data” for testing
  - Identify “Best Practices”
  - Identify costs
  - Develop electronic coordination procedures to improve AGIS portal and eALP coordination/approval
- Develop capability within the AGIS for eALP and digital obstruction charts; SEPTEMBER 2009



# eALP – Proposed Future

- Non Primary
- Small/Non Hubs
- Large/Medium Hubs



Graphic Courtesy of FAA AAS-100

# eALP – Looking Forward

- Development of AGIS and eALP guidance
  - Software program adjustments
  - Associated policy changes for conducting surveys and electronically-generated ALP drawing sets
- How you can help
  - Implement current AC project/survey requirements
  - Use the AGIS website
  - Submit survey costs in SOWs
  - Suggest practical improvements & best practices



# Summary

- This being achieved – not science fiction
- Technology is the easy part, culture shift is not easy
- Benefits
  - Nextgen – aeronautical data to same standards
  - Integrations with other databases – environmental
  - Get us all on the same page
- Supplementary Information
  - <https://airports-gis.faa.gov>
  - A Guide to Airport Surveys – FAA Whitepaper May 2009

# Questions?



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