



FAA Airports GIS | Implementation Plan March 26, 2012

**A Change in Direction
Digital and Geospatial Data**

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What is Airports GIS?

The FAA's Airports Geographic Information System (GIS) combines data, software, hardware, and procedures to provide an authoritative source of quality survey and mapping data for U.S. airports. This electronic repository holds data on current layout, project plans, airspace obstructions, navigational aids, and environmental concerns. It provides web-based tools that support specific processes such as airport layout plan reviews, airfield design, and obstruction analyses. Airports GIS also provides airport sponsors and consultants with the standards and guidance they need to collect high-quality data that airport, FAA, and industry stakeholders can more readily use.

Airports GIS is a shift in the way we do business. Traditional airport surveys required collecting the same information for different types of projects and entering the data into a variety of databases. By establishing a standardized methodology for capturing, validating, and publishing information, our focus can shift from processing data to using data to make timely and informed decisions.

What Can Airports GIS Do?

The system provides the following capabilities:

- **Electronic Airport Layout Plan (eALP)** – Provides advanced tools for reviewing and analyzing proposed changes to identify potential problems, for reviewing existing non-standard conditions, and ultimately for approving projects and ALPs quicker and with more confidence.
- **Thorough Analysis** – Measures heights, distances, and clearances of runways, taxiways, obstacles, and other features in comparison with design standards.
- **Improved Collaboration** – Allows FAA, airport, and consultant stakeholders to immediately share comments and questions to ensure more efficient and effective resolutions.
- **Access to Multiple Sources of Information** – Provides one-stop access to a variety of airport mapping, operations, and historical grant data as well as other resources.

- **Better Decisions** – Helps airports and other stakeholders make better and faster decisions by providing more timely and accurate data affecting flight procedure minimums, protected critical areas, modifications to standards, and safety determinations.

What Are the Benefits and Costs?

An outside consultant recently completed a comprehensive benefit-cost analysis of Airports GIS. The analysis closely followed FAA guidance for benefit-cost and investment analysis and included alternative assumptions about program implementation and program costs. The analysis used two independent models to estimate the benefits from both a bottom-up and a top-down perspective. All runs of the models, even those reflecting less advantageous assumptions, showed benefit-cost ratios greater than one. Using expected values for costs and benefits, the analysis showed substantial net benefits over a 20-year period under the two implementation scenarios: (1) \$639 million (NPV) for all primary and 352 non-primary airports that are Part 139 certificated and/or have a tower and (2) \$659 million (NPV) for all airports included in the National Plan of Integrated Airport Systems (NPIAS).

The primary benefits we expect Airports GIS to provide include:

- Increased productivity and earlier completion of projects due to improved coordination
- Better information for more efficient planning and preliminary design
- Broader use of GIS at airports due to FAA standards and funds for data collection
- Elimination of redundant airport mapping and survey costs

These benefits closely correspond to other major IT investments in other venues. They were identified by interviewing a broad range of stakeholders—including both supporters and opponents of the program—from the FAA, airports, consultants, and GIS vendors.

Program costs fall into the following six categories.

1. Initial full data collection when an airport first enters the system
2. Periodic updates to obstruction survey and evaluation after initial collection
3. Updates to reflect design and as-built status of airfield construction projects
4. As needed updates to show short-, medium-, and long-term plans on eALP
5. Verification of data entered into the system
6. FAA program overhead

We anticipate the first four cost categories will be funded through the normal Airport Improvement Program (AIP) process (i.e. as projects are normally justified, programmed, and approved for AIP funding). Costs associated with the remaining two categories will likely be funded through other FAA sources. We expect the additional costs necessary to meet the Airports GIS requirements will decrease over time as implementation is completed and stakeholders gain experience with the program.

What is the Plan for Deploying Airports GIS?

After studying several options, we recommend collecting complete data for approximately 825 airports over the first five years. In addition to complete data collection, the plan will require all large airports to submit project as-built data for all construction projects at an accelerated rate. The following table summarizes the short-term goals for initial, complete data collection.

Initial Data Collection Projection - Short Term

NUMBER OF AIRPORTS	FY10	FY11	FY12	FY13	FY14	FY15	FY16	TOTAL
Large and Medium Hubs	4	5	35	15	5	2		66
Small and Non Hubs	3	15	12	100	100	34		264
Non Primary Certified	0	10	10	20	100	45	36	221
Towered not Certified	0	0	0	0	20	150	104	274
TOTAL	7	30	57	135	225	231	140	825

We believe this recommended deployment plan will allow a quick transition to Airports GIS without causing undue burden on airports or their consultants.

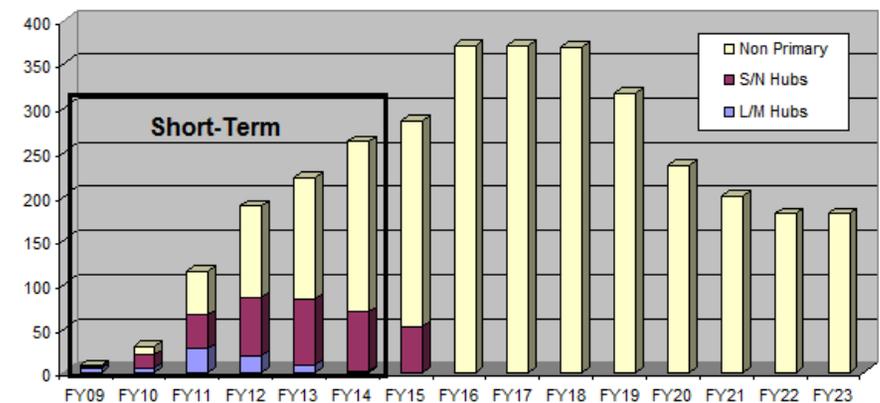
The plan calls for the following schedule for ALP data collection:

- Large and medium hubs – FY 12 to FY 17
- Small hubs and non primary airports – FY 13 to FY 19
- Part 139 and towered airports – FY 14 to FY 20
- Reliever and general aviation airports with 25 based aircraft – FY 15 to FY 25

Additional geospatial data collected for portions of the airport during construction projects will also provide useful information in advance of full GIS implementation.

Data for all 3,331 NPIAS airports will be available by FY 25 (including an assumed 18 months for data collection and verification). Figure 1 shows the approximate number and types of airports participating by fiscal year.

Figure 1 - Airports GIS Complete Data Collection Plan



How Does Airports GIS Support NextGen?

Accurate and up-to-date maps of airport facilities and equipment are essential to NextGen systems and capabilities. As a result, Airports GIS is a key enabler for NextGen implementation.

The areas of NextGen that Airports GIS support include:

- **Instrument Approaches** – The establishment of Instrument Approach Procedures is facilitated with airport layout, obstruction, and terrain data from Airports GIS.
- **eNOTAMS** – The eNOTAM system provides rapid dissemination of airfield condition reports to air traffic controllers and aircraft operators. Airports GIS supports this by providing a common, authoritative geospatial data set (i.e. location information of airport buildings, runways, taxiways, and other infrastructure) for the eNOTAM system.
- **Situational Awareness** – Improved situational awareness at airports requires geospatial information. Pilots will use moving map displays to improve safety (e.g. avoiding runway incursions) and efficiency (e.g. reduced taxi times). Air traffic controllers and airline dispatchers will use electronic maps to facilitate surface management to reduce taxi times.

What Are the Next Steps?

The transition to Airports GIS is a significant change for the FAA as well as industry and calls for a phased approach. The transition began with 7 airports that participated in the Phase I Pilot Program and continues with an additional 28 that are participating in Phase II.

The implementation plan identifies the following major milestones, shown in Figure 2, in our move to Airports GIS:

- **Data Collection Projects** –There are three general types of projects that result in data collection into Airports GIS—only one of which is an ALP or planning project. The others being data collection for instrument approaches/ obstruction analysis and construction projects design and as-built data collection. Aerial photography is the principal method of extracting data features and attributes specified in FAA Advisory Circular 150/5300-18. Some projects will require fewer feature types and attributes than are included in the complete data set. Data collected only on obstructions or non-safety critical data will submit Airports GIS data only for the features required or collected. Either the National Geodetic Survey (NGS) or a third party will review the process for verification of the data before it is entered into Airports GIS.
- **PDFs of ALPs** – As an interim step, Airports GIS will assemble a central database of airport ALPs in PDF format for airports that have not yet completed an eALP.
- **Airport Safety Data Program Integration** – This program has data on nearly 20,000 landing facilities in the National Airspace System Resources (NASR) database. Starting in FY 13, we will transition this data set into Airports GIS.

Figure 2 – GIS Tool Development Milestones

GIS TOOL DEVELOPMENT	FY10			FY11			FY12			FY13			FY14			15	16	17	18																	
ESRI Data Viewer to Airports																																				
eALP Version 1.0 Tool to Airports																																				
eALP version 2 refinements																																				
Airport Centric and Design/as-built tool																																				
Modification to Standards Beta tool to Airports																																				
Modification to Standards Final tool to Airports																																				
Cloud to archive Airports imagery and ALP																																				
5010 Airport Data Tool to Airports																																				
Planned Runways to IOE/AAA																																				
Airport Design Tool to Airports																																				
Airspace Analysis tool to Airports																																				
Runway Safety Area Tool to Airports																																				
Grant and PFC Tracking Tool to Airports																																				
Pavement Management Tool to Airports																																				
	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S

- **Module Development and System Enhancements** – We will add a series of seven application modules and additional enhancements on top of the core functionality of the Airports GIS within the next few years. The modules will be made available to FAA and authorized airport staff on an as-needed basis to extend GIS capabilities in support of specific business processes and decision-making needs.
 - The **Electronic Airport Layout Plan (eALP)** module will provide planning, measurement, compliance checking, and review/comment capabilities to allow FAA and airport planners to work collaboratively. With detailed ALP information readily available in a consistent manner, the eALP module will reduce ALP review and approval times.
 - The **Modification to Standards** module will allow FAA staff to review airport requests for modifications to standard airport design criteria and ensure policy is consistently applied.
 - A **cloud server** will allow for a central repository for aerial photography collected through Airports GIS and the Wide Area Augmentation System Office. This will give FAA offices access to the imagery and the latest legacy ALP for airports that have data available.
 - We will provide Airports GIS data to IOE/AAA for **airspace evaluation to Planned Runways** as an interim deliverable.
 - The **Airport Design Tool** will help airport planners and designers design and allow FAA staff to confirm proposed airport configuration changes fall within acceptable design criteria.
 - The **Airspace Module** will allow FAA and airport staff to check the heights of existing and/or proposed obstacles to navigable airspace. This will facilitate planning and zoning decisions and help the FAA establish safe arrival and departure procedures.
 - The **Runway Safety Area** module will help airports check for conflicts within the runway safety areas.
 - Links to **Grants and PFC Data** will allow authorized users to research historic grant and PFC data within Airports GIS.
 - The **Pavement Management** module will allow FAA and airport staff to monitor airfield pavement, predict its useful life, and allocate resources to better maintain it.

For more information, visit the FAA's Airports GIS website at <https://airports-gis.faa.gov/>.