

Spatio-temporal Data Analysis and Visualization in Enterprise Level Automated Application

Geosmart Asia 2015

Sept 29 - Oct 1, 2015

Kuala Lumpur

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Federal Aviation Administration

Washington DC

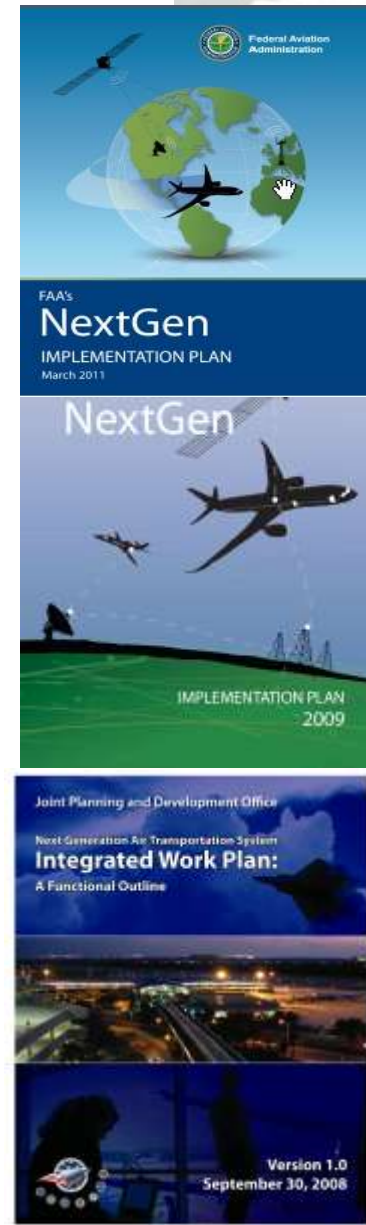


Federal Aviation
Administration

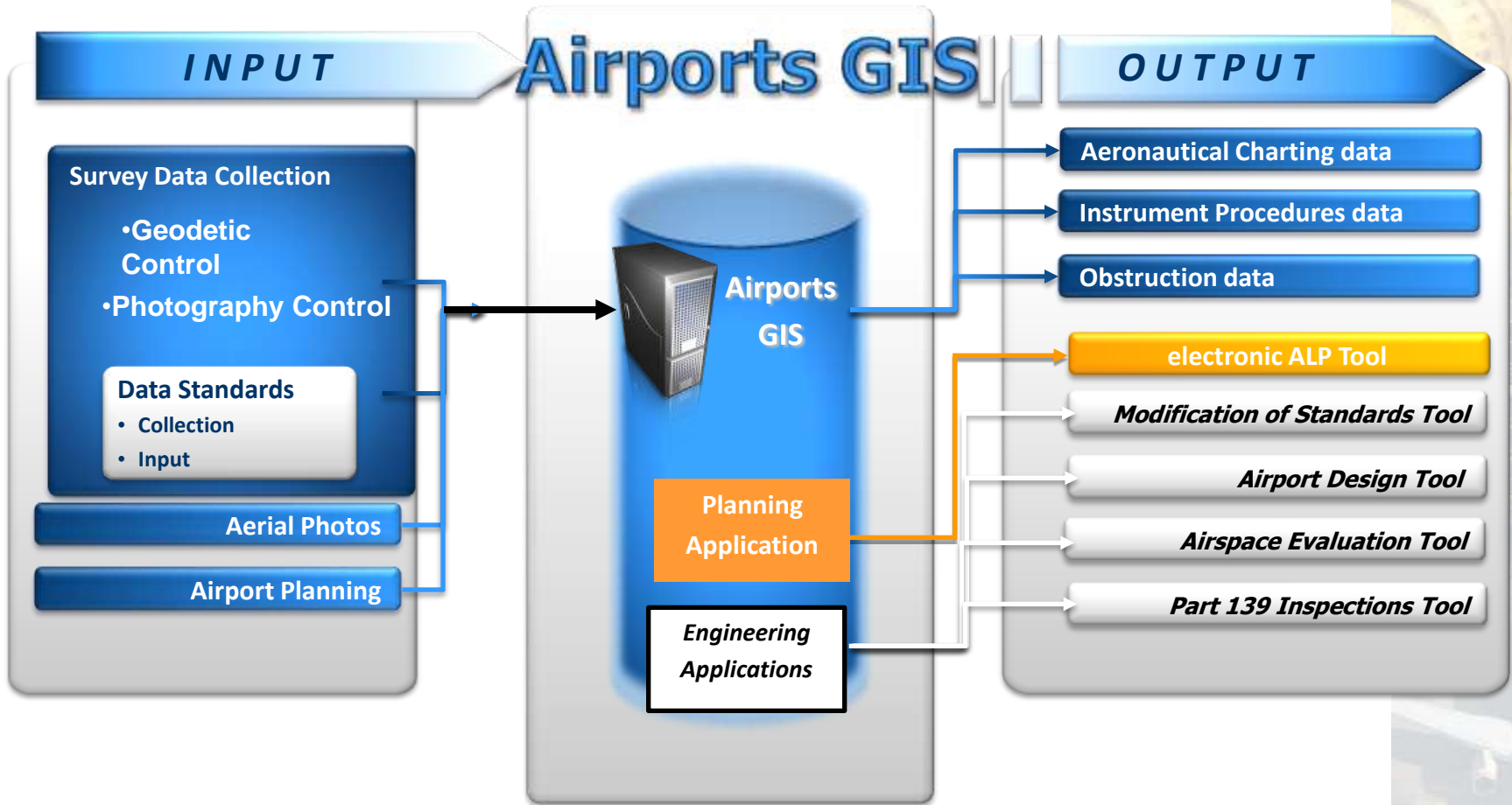


What is driving Airports GIS?

- Reduce costs to Airports, Air carriers, and FAA
- Improve safety and efficiency
- Produce a better management strategy
- Produce a single database for Airport information
- Help share data among stakeholders and aviation partners
- Support New Initiatives – Next Generation of Air Transportation (NextGen)



Airports GIS



Data Collection Requirements

- **AC 150/5300-16 Geodetic Control**
 - National Geodetic Survey (NGS) reviews
- **AC 150/5300-17C Imagery Requirements**
 - Submit Plan in Advance, equipment, ground control
 - Imagery Reviewed and checked for accuracy
 - Imagery used for feature extraction
- **AC 150/5300-18B Feature and schema standards**
 - About 34 safety critical features –
 - Runways, taxiways and safety features - Reviewed
 - About 135 features with attributes
 - 1 foot elevation contours, buildings, proposed features



Airports GIS portal home page



Home Projects Airport View Help Administration Logout [Print this page](#)

Airports GIS Home

My Account Welcome, Shyam Parhi. Update Account Information Change Password	Survey Projects Manage your survey projects. My Survey Projects Create New Survey Project Test Survey File	eALP Projects Manage your electronic Airport Layout Plan (eALP) projects. My eALP Projects Create New eALP Project Create New eALP Project(Ver)	Runway Safety Area Inventory The Runway Safety Area policy (Order 5200.8, Runway Safety Area Program) requires regional offices to collect and maintain data for each Runway Safety Area (RSA). Download RSAI database
Help & Training Learn more about Airports GIS. About Airports GIS Support Desk Online Help IDLE Training	Online Resources Access the virtual library. National Geodetic Survey (NGS) AeroNav Products (AJV-3) NFDC Portal AC 150/5300	System Information Version 4.4.0 - as of 09/02/2015. View Release History and Notes Feedback Form	Imagery and Data - GovCloud View and upload / download airport data My Imagery My Airport Data
Administration These functions are only for system administrators. User Management Users Pending Approval (0) More administration tools...	MOS (Modification of Standard) Manage your Modification of Standard. My MOS Create New MOS My MOS Best Practice	Surface Analysis and Visualization Surface Analysis and Visualization User's Guide - Booklet format User's Guide - 8.5 x 11 format Quick Reference Guide	Runway Incursion Mitigation Runway Incursion Mitigation

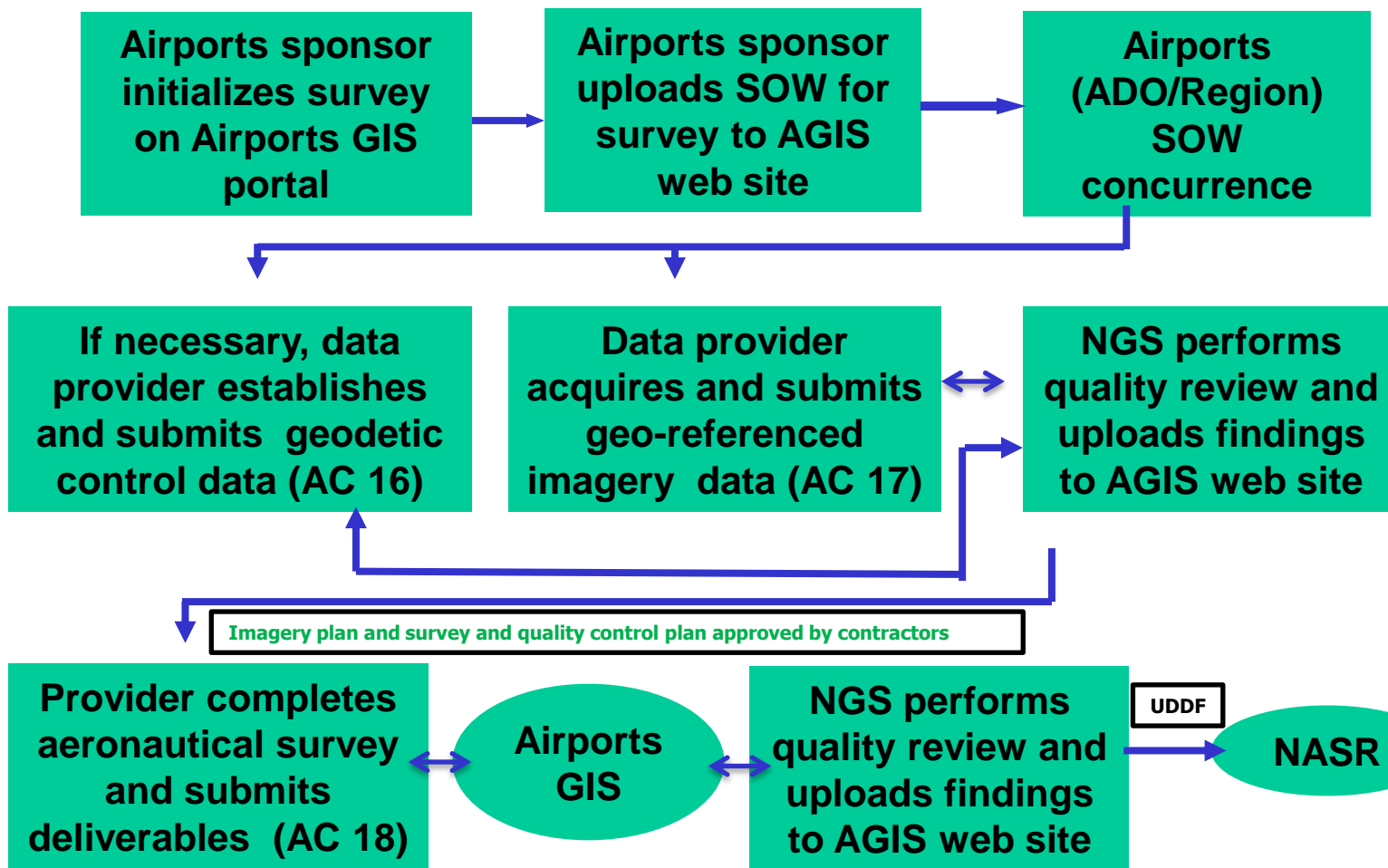


Technologies used in Airports GIS

- **Language:** Java, Python, Adobe Flex, JavaScript, Unix Shell
- **Framework:** J2EE, Spring, Hibernate, AJAX
- **Database:** PostgreSQL/PostGIS
- **Information Exchange Model:** AIXM (in progress)
- **GIS Tool:** GEOS (Geometry Engine), PROJ.4 (Cartographic projections)
- **Data conversion:** FME Server
- **GIS Server:** ESRI ArcGIS Server (10.0 and 10.1), ArcSDE
- **Operating System:** Windows, Red Hat Linux, Ubuntu, Solaris, OpenSolaris, WINE (Windows Emulator)
- **IDE (Integrated Development Environment):** MyEclipse, Flash Builder
- **Web/Application Server:** Apache Tomcat Server
- **Software Engineering:** Agile Methodology
- **Desktop tool:** ArcGIS Desktop (10.0 and 10.1), FME Desktop
- **Issues and Project Tracking:** Atlassian JIRA
- **Version Control:** Subversion SVN

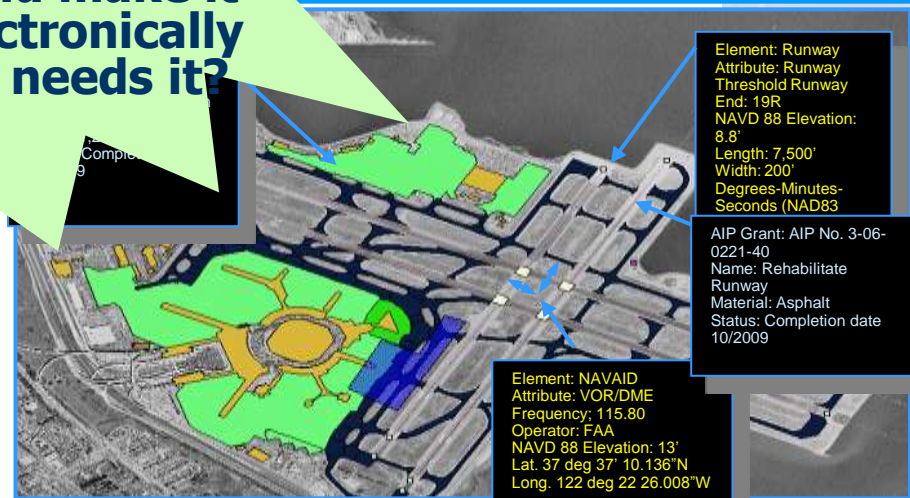
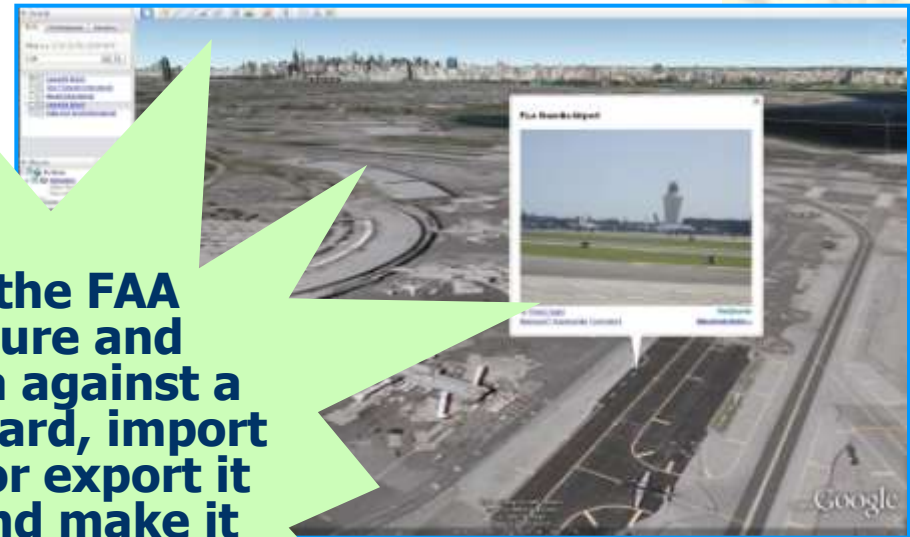


Airports GIS Data Flow



Why FAA is Developing eALP?

What if... the FAA could capture and validate data against a defined standard, import it from and/or export it to an ALP, and make it available electronically for whoever needs it?



Element: Runway
Attribute: Runway
Threshold Runway
End: 19R
NAVD 88 Elevation:
8.8'
Length: 7,500'
Width: 200'
Degrees-Minutes-
Seconds (NAD83)

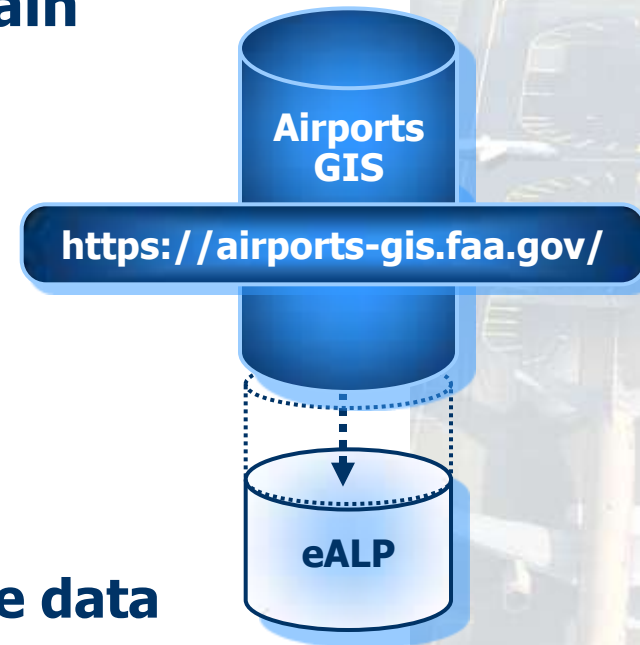
AIP Grant: AIP No. 3-06-
0221-40
Name: Rehabilitate
Runway
Material: Asphalt
Status: Completion date
10/2009

Element: NAVAID
Attribute: VOR/DME
Frequency: 115.80
Operator: FAA
NAVD 88 Elevation: 13'
Lat. 37 deg 37' 10.136"N
Long. 122 deg 22 26.008"W

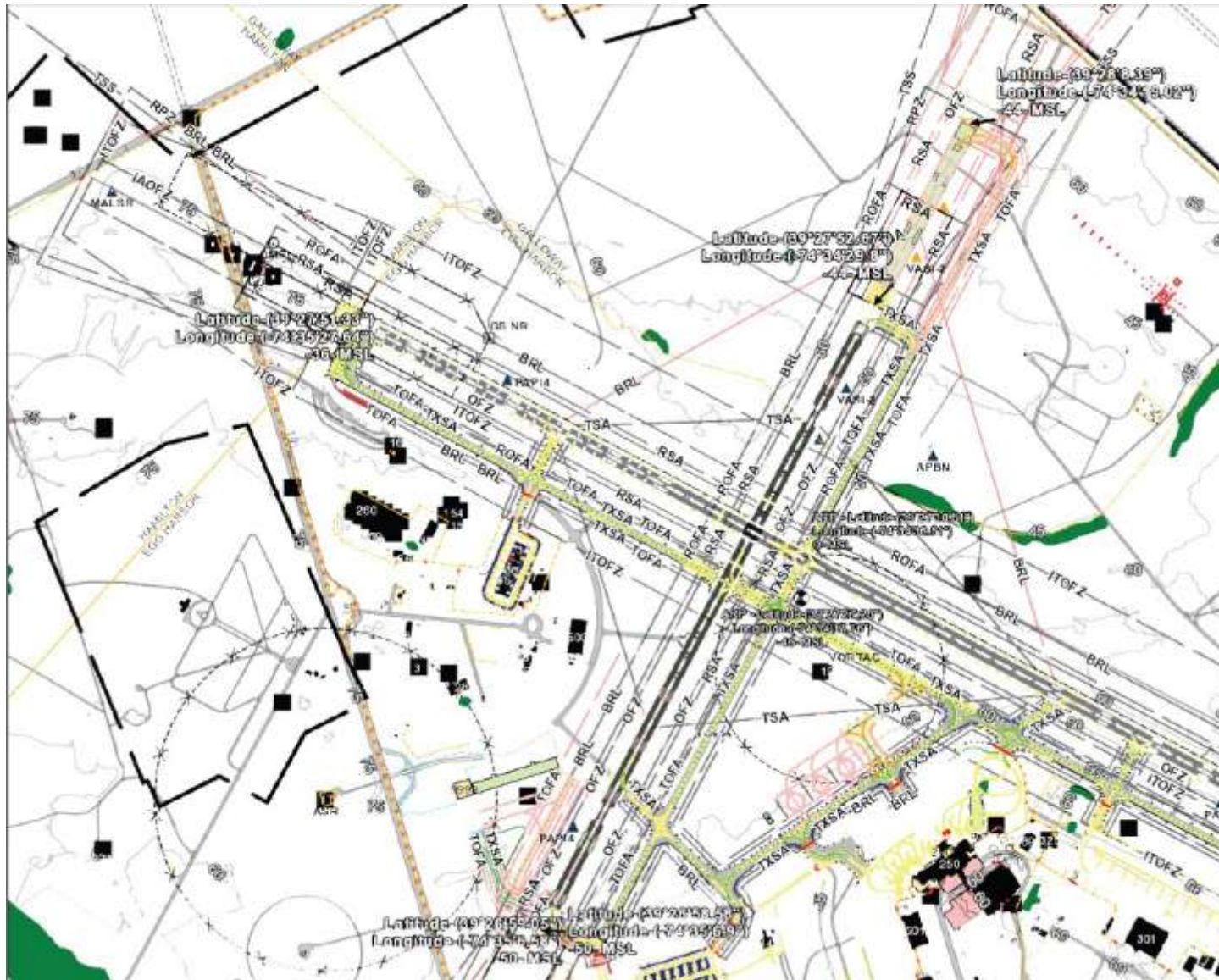


Benefits of an electronic ALP?

- **Requirement:** All NPIAS airports are required to keep their ALPs current (many are outdated)
- **Versioning:** Paper copies of ALPs are typically housed in multiple locations and the “latest” version(s) often vary
- **Accuracy:** Plotted ALPs frequently contain airport information that differs from airports data collected for use in other LOBs and/or other airport projects
- **NextGen:** needs real-time, web-based access of the same (“living” document) version by all stakeholders
- **Efficiency:** Efficient use of updated, precise data (input into Airports GIS) for optimal NextGen airport planning, reporting, and decision making



How a typical eALP looks like today



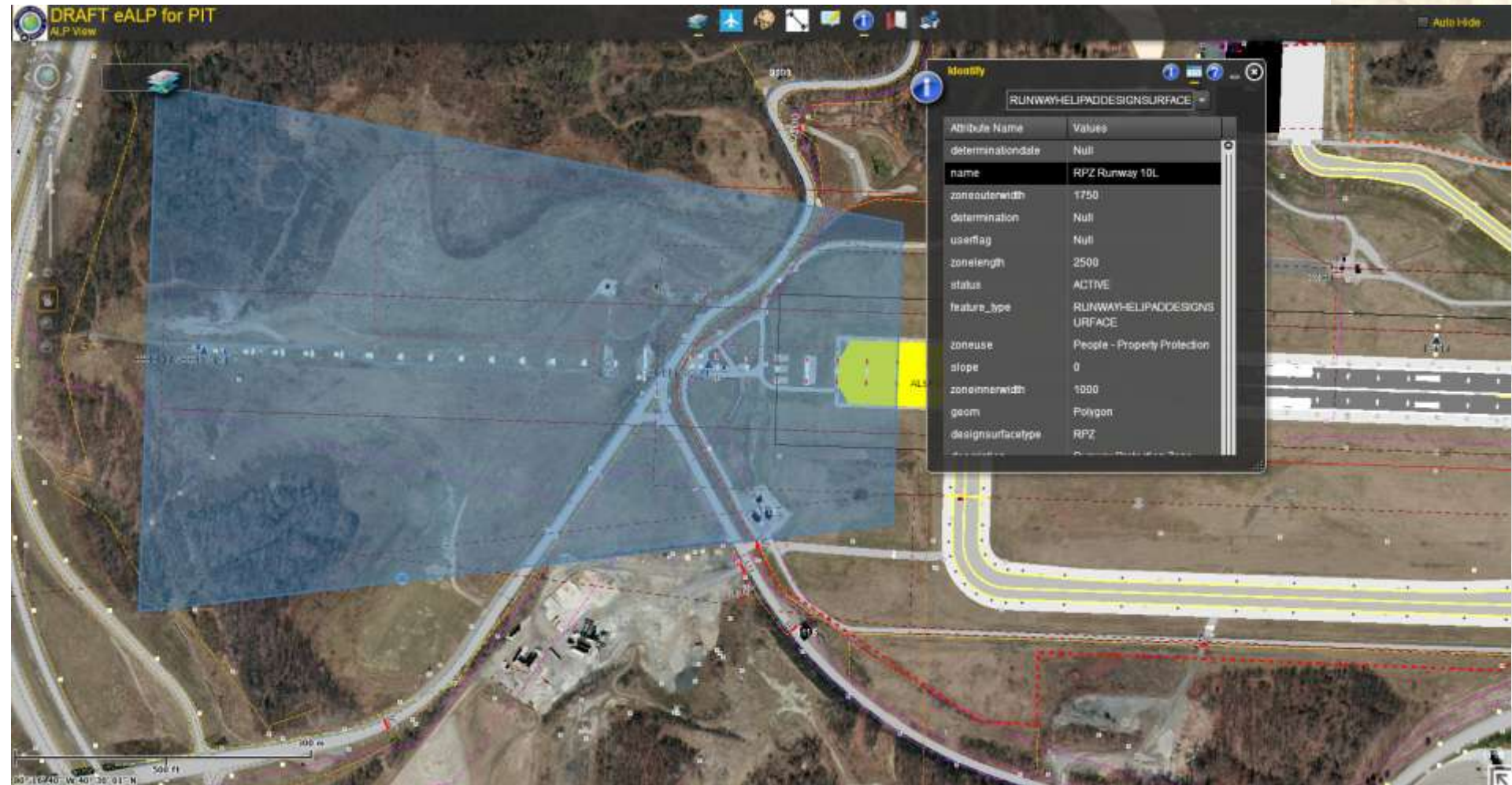
How a typical eALP looks like today

The screenshot shows a GIS application interface with the following components:

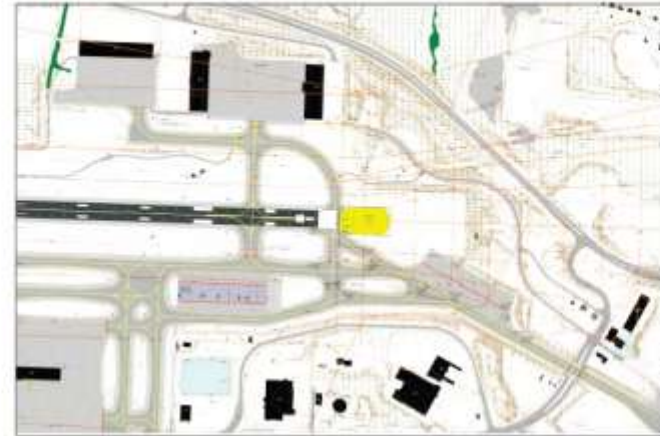
- Layer List:** Shows the current view as 'Runway End Protect - 13'. It includes filters for 'Short Term', 'Medium Term', and 'Long Term'. Buttons for 'Selected All', 'Deselected All', 'Expand All', and 'Collapse All' are present. Transparency is set to 1. Layers include 'UTILITYLINE (ST) (MT)', 'UTILITYPOINT', 'UTILITYPOLYGON', 'FAA Ortho Imagery', and 'ESRI Base Map' (World Imagery, Low Resolution 15m Imagery, High Resolution 60cm Imagery, High Resolution 30cm Imagery).
- Draw and Measure:** Contains drawing tools (point, line, polygon, etc.) and measurement options. Line Color is red, Style is Solid, Width is 10, and Transparency is 1. 'Show Measurements' is checked. Distance is set to Feet, and Font is Arial size 12.
- Identify:** Shows the details for the selected feature 'RUNWAYSAFETYAREABOUNDARY'. The table below lists the attribute names and their values.

Attribute Name	Values
alternative	0
determinationdate	2000-01-01
name	C-RUNW-SAF-
geom	Polygon
determination	UNKNOWN
status	ACTIVE
description	Runway Safety Area
feature_type	RUNWAYSAFETYAREABOUNDARY
userflag	Null
runwayenddesignator	13

How a typical eALP looks like today



How a typical eALP looks like today



Legend	
APP	APP-PROJECT
CONSTRUCTION	CONSTRUCTION
RESERVED AIRSPACE	RESERVED AIRSPACE
ENVIRONMENTAL SENSITIVE AREAS	ENVIRONMENTAL SENSITIVE AREAS
WETLANDS	WETLANDS
WATERWAYS	WATERWAYS
RAILROADS	RAILROADS
ROADS	ROADS
UTILITIES	UTILITIES
UNDEVELOPED LAND	UNDEVELOPED LAND
RECREATION	RECREATION
EXISTING BUILDINGS	EXISTING BUILDINGS
EXISTING PAVEMENT	EXISTING PAVEMENT
EXISTING ASPHALT	EXISTING ASPHALT
EXISTING CONCRETE	EXISTING CONCRETE

GENERAL NOTES

1. This document is a preliminary study and is not to be used for final design or construction. It is subject to change without notice. The user of this document is advised to verify all information and data used in this document and to consult with appropriate agencies and authorities as required. This document is not to be used for final design or construction.

PITTSBURGH INTL (PTT)			
VIEW DRAWING SHEET 2 OF 2			
PROJECT NUMBER:		DATE:	
DRAWN BY:		SCALE:	
CHECKED BY:		DATE:	



Further Implementation Plan

- **Pen and Ink changes (versioning)**
- **Temporality**
- **Implementing non 18B data**
- **Improving pdf printout**
- **Final manual tune-up of eALP by Airports**
- **Moving from PostgreSQL to Oracle**
- **Implementing SOP checklist items**
- **Implementing pilot program comments**



Airports GIS Training

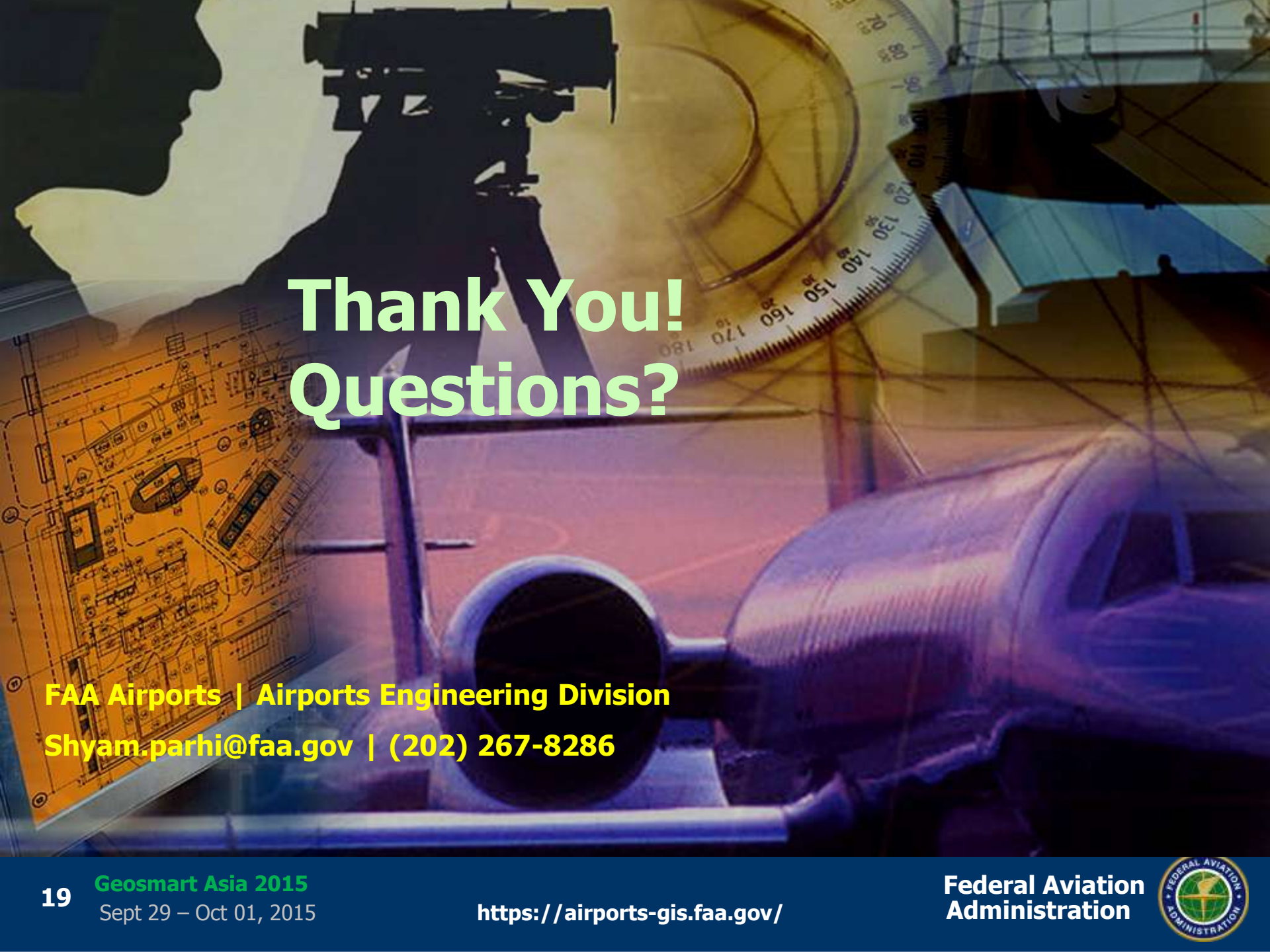
- **Outreach program is a significant part of Airports GIS**
- **Different levels of IDLE training are updated regularly
Levels 1-3 (AC 150/5300-16, 17C, and 18B)**
- **FAA employees can now do their IDLE training through eLMS**
- **Short video is available for eALP. Will continue to make videos for other applications.**
- **Airports GIS Academy training was conducted recently at OKC. It focused on Advisory circulars, surveys, eALP, and Nav Lean program.**



Airports GIS Training contd.

- **MOS testing was conducted in southern and south-west regions last year.**
- **Webinars and VTCs are being planned for existing and future applications in Airports GIS.**
- **Publish Airports GIS newsletter quarterly.**
- **Users guide, quick reference guide, FAQs are being developed to help users understand the applications easily.**





Thank You! Questions?

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