



Airports GIS: Getting more Out of the FAA AGIS Program

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Airports
Conference

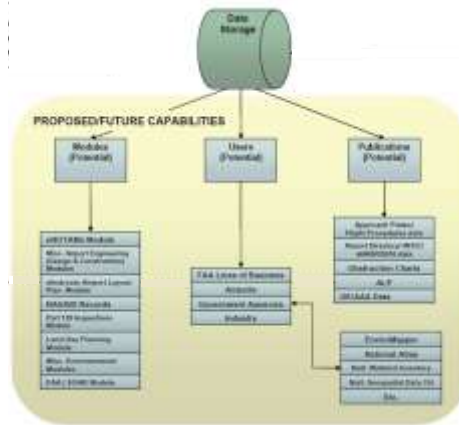
March 28-30, 2017 — Hershey, Pennsylvania

Outline

- FAA tools through AGIS
- Technology and tools airports are using:
 - GIS
 - Part 139 compliance
 - Asset Management
- Keys to Success
- Wrap-up and questions

Proposed Tools through AGIS

- + Several modules in development, including:
 - + eNOTAM
 - + eALP
 - + Part 139 Inspections
 - + Land Use
 - + Environmental
 - + Pavement Management
 - + Mod-to-Standards
 - + Data Cloud Server
 - + Imagery Cloud Server



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Intended use of the data

- NextGEN

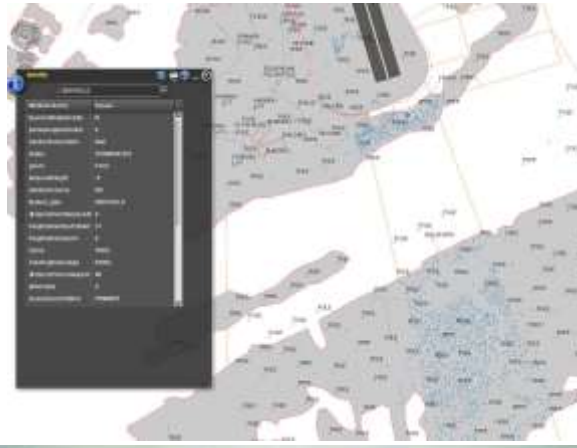


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Existing Tools through AGIS

- GIS Viewer



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Existing Tools through AGIS

- The AGIS web portal already has back-end processes in place for such a conversion
 - It can convert between shapefiles, .dwg, and .dgn formats
 - It can transpose coordinate system values



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Existing Tools through AGIS

- Surface Analysis and Visualization



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Existing Tools through AGIS

- SAV Tool-Enter New Data



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Existing Tools through AGIS

- Modifications-to-Standards

ORD_2011_H20 Special Legacy

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
AIRPORT DESIGN STANDARDS
MODIFICATION OF AIRPORT DESIGN STANDARDS

TAXIWAY	PADO PAVG	AMERICAN BARON	PFG
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100

ACCEPTATION OF STANDARDS

Acceptance of Standards for Design Standards for Existing Runway Taxiways in Airport Terminals

Standard & Section 101 of the New Process. Paragraph Committee Subgroups for New Terminals, Taxiway Standards, and Taxiway Standards with its intended use.

Whichever process that the standard for acceptance allow the present standards, visual standards, and standards to any other parts of the design.

Standards and equipment needed are a high standard in American States. Various from quality and can thereby reduce integrity reduction standards. With the present standard of the present modifications are difficult and expensive. While more effective made to understand the energy. With standardization supports the potential for more effective and efficient visual integrity reduction.

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In-Process Tools through AGIS

- Data & Imagery Cloud Servers
- eALP Module



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Leveraging AGIS Data

- AC-150/5300-16, 17 & 18 require airports receiving federal \$\$ for airfield projects to comply with the standards
- AIP grant eligible (data only)
- Over 100 airfield features included in standard
- A majority of these features are airfield “assets”

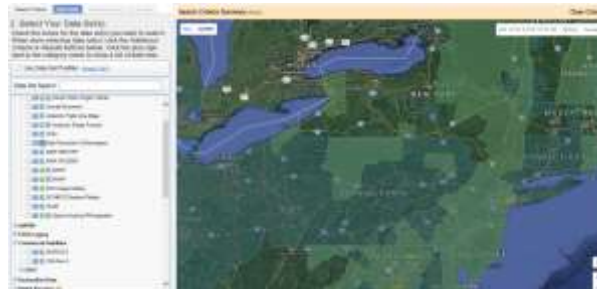


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Leveraging Non-AGIS Data

- Statewide, County or Municipal projects
- USGS DEM & LiDAR Availability
- FEMA
- NED
- DOF, AirNav2, FCC, etc.



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Software Evolution

- 1980's
 - Paper-based systems - Log books!
 - Initial desktop systems - Electronic log books
- 1990's
 - Custom software for Operations Compliance - big airports
 - Homegrown systems MS Windows/Office - Fax distribution
- 2000's
 - Web-based, internet, email
 - Integrated enterprise systems - "stand alone" programs
 - More functionality, more competition
 - [GIS Map - Find this location](#)
- 2010's
 - Cloud-hosted systems
 - Advanced functionality
 - Low-cost, basic systems; more "build your own"
 - [GIS Map - Follow me at all times](#)



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ArcGIS Online



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Why do we need Asset Management?

- Doing more with less
- Airports are complex
- Multiple lines of business require data from different systems
- Asset Management programs will improve performance and create measurable increases in benefits to every department



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Why do we need Asset Management?

- Business Continuity
 - Keeping the business flowing
 - Consequence of Failure
 - If this asset fails how critical is it to business continuity
 - Asset Integrity
 - An asset that is so degraded it can risk putting an airport out of business for a period of time
- Risk Management
 - What's a risk to the business?

Risk = Consequence x Likelihood

Implementing Asset Management - A Practical Guide: Association of Metropolitan Water Agencies; the National Association of Clean Water Agencies; and the Water Environmental Foundation
- Customer Experience
 - Customers impacted by a delay due to an asset failure



Water service restored in all terminals after main break at XXX Airport

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Why do we need Asset Management?

- **Bond Ratings**
 - Bad assets can = lower bond ratings
- **Insurance and underwriting**
 - Unpredicted asset failures
 - Accidents due to a poorly managed asset
 - All influence insurance rates and underwriting
- **Predictable Cash Flow**
 - What financing is needed over time



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Five Core Questions for Sustainable AM

1. **What is the current state of my assets?**
 - What do I own?
 - Where is it?
 - What condition is it in? What is its performance?
 - What is its remaining useful life?
 - What is its remaining economic value?
2. **What is my required level of service (LOS)?**
 - What is the demand for my services by my stakeholders?
 - What do regulators require?
 - What is my actual performance?
3. **Which assets are critical to sustained performance?**
 - How does it fail? How can it fail?
 - What is the likelihood of failure?
 - What does it cost to repair?
 - What are the consequences of failure?
4. **What are my best O&M and CIP repair/replacement strategies?**
 - What alternative management options exist?
 - Which are the most feasible for my organization?
5. **What is my best long-term investment strategy?**

Stretching Budgets With Lifecycle
Asset Management



Related to Part 139 Inspections

Corrective Maintenance - Linear



Predictive Lifecycle - Cyclical

- Airfield “assets”

- Concrete, Markings, Signs, Lights, Safety Vehicles, Nav aids, etc.



Stretching Budgets With Lifecycle
Asset Management



Enhancements & Integrations:

- **Email** - sending & receiving
- **Work Order Management (CMMS)** - repair status?
- **Weather data** - “weather.com” access; or from the field, live and logged
- **Wildlife Management** - logged and reported to FAA Wildlife site
- **Field Condition (FICON)** - FAA reporting; better predict snow conditions
 - Friction measurements
 - Runway temperature sensor
- **FAA NOTAM Manager** - Integrated data from FAA website to your log
- **Runway Incursion Warning System (RIWS)** - passive & active control



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What features do you need?

Features & Capabilities

- Integrated moving map (follow me)
- Runway Incursion Warning System (RI5W)
- Advanced geospatial data analytics
- Advanced data integrations
- Local or cloud-hosted
- Web based and/or mobile app
- Suite of applications
- Basic map – “find me”
- CMMS component or link to CMMS
- Geospatial data analytics
- Local or cloud-hosted
- Web based and/or mobile app
- Suite of applications
- Basic map – “find me”
- Basic CMMS
- Limited data analytics
- “DIY” forms/workflows
- Web based and/or mobile app
- “DIY” forms/workflows
- No map or Basic map
- No data integration or analytics
- Limited

Software Systems

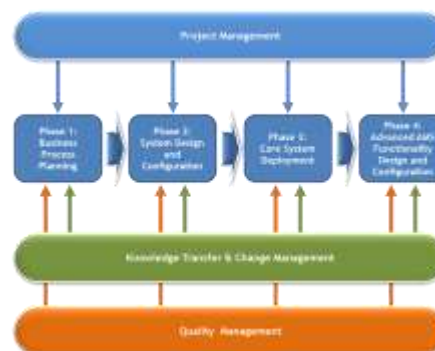
- **Airport Safety Manager (ASM)** – Woolpert
- **AIROps** – Team Eagle, Ltd.
- **AirportIQ** – GCR, Inc.
- **Cityworks** – Azteca Systems
- **Part 139** – ProDIGIQ, Inc.
- **Maximo Part 139 Tool** – EDI
- **Veoci** – Veoci/Grey Wall Software, Inc.
- **GRAIT System** – RAXAR
- **Collector** – ESRI, Inc.
- **App-139** – Gatekeeper Systems
- **Home Grown** – Designed and built by Airport Ops Staff, Airport IT Department or contractor

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Overview

- 4 Project Phases
 1. Business Process Planning
 2. System Design and Configuration
 3. Core System Deployment
 4. Advanced AMS Functionality Design and Configuration
- Project Management
- Knowledge Transfer and Change Management
- Quality Management



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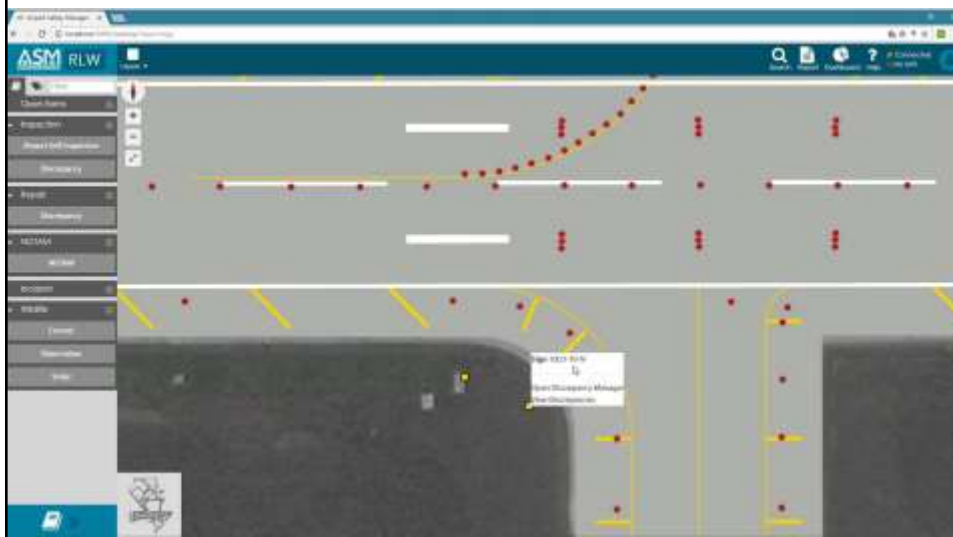
Sample Overview



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Map & Assets Linked to Forms



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Phase 1

- Maintenance, Operations and Fire all using AMS on a daily basis
- Part 139 inspections
- Vehicle maintenance (snow, fire and ops)
- Workorder
- Staff allocations
- Incident logs and tracking

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Benefits for Maintenance

- View Outstanding Work Orders in Real Time

ID	Priority	Status	Assigned To	Assigned Date	Assigned Time
100	High	Open	John Doe	4/7/2017	10:00 AM
101	Medium	In Progress	Jane Smith	4/7/2017	11:30 AM
102	Low	Completed	Mike Johnson	4/6/2017	03:00 PM
103	High	Open	John Doe	4/7/2017	09:00 AM
104	Medium	In Progress	Jane Smith	4/7/2017	12:00 PM
105	Low	Completed	Mike Johnson	4/6/2017	04:00 PM
106	High	Open	John Doe	4/7/2017	08:00 AM
107	Medium	In Progress	Jane Smith	4/7/2017	10:30 AM
108	Low	Completed	Mike Johnson	4/6/2017	05:00 PM
109	High	Open	John Doe	4/7/2017	07:00 AM
110	Medium	In Progress	Jane Smith	4/7/2017	11:00 AM
111	Low	Completed	Mike Johnson	4/6/2017	06:00 PM
112	High	Open	John Doe	4/7/2017	09:30 AM
113	Medium	In Progress	Jane Smith	4/7/2017	12:30 PM
114	Low	Completed	Mike Johnson	4/6/2017	07:00 PM



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Benefits for Maintenance

- Work Orders can be Prioritized based on:
 - Part 139 / Non Part 139
 - Discrepancies
 - Priorities
 - Many more

The screenshot shows a 'Work Order' form with the following fields and values:

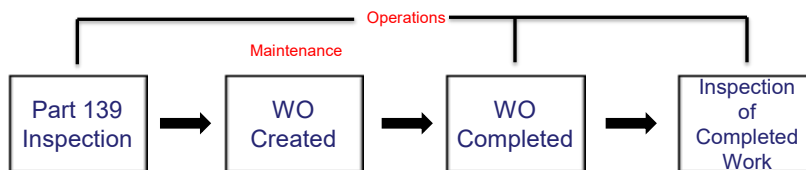
- WG Number: 448
- Asset Type: AIRFIELD/UGHT
- Description: Repair/Replace
- Category: Part 139
- Resolution: Corrective Maintenance
- Status: Assigned (Ready To Work)
- Priority: Immediate
- Requested By: OPS
- Initiated By: DUFFY, JASON
- Submit To: BELTZ, JACK
- Date: 7/29/2015 10:19 PM
- Date: 7/30/2015 3:25 PM

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Benefits for Maintenance

- Customizable to suit Airport Needs
 - Adaptable to Airport's current work flows
 - Checks & Balances



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Benefits for Maintenance

- View Work Orders based upon Individual Needs
 - Work Orders Assigned to Me
 - Past Due Work Orders

ID	Date	Status	Description
101	2017-04-01	Open	Runway 15L Pavement Repair
102	2017-03-15	Past Due	Runway 15L Pavement Repair
103	2017-03-20	Open	Runway 15L Pavement Repair
104	2017-03-25	Open	Runway 15L Pavement Repair
105	2017-03-30	Open	Runway 15L Pavement Repair
106	2017-04-05	Open	Runway 15L Pavement Repair



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Benefits for Operations

- Airfield Inspections Completed Digitally in the Field
 - Submitted to Maintenance from the Field

Inspection Form Fields:

- Location (Dropdown)
- Inspection Station (Dropdown)
- Runway Lights (Dropdown)
- Runway Marking (Dropdown)
- Obstructions (Dropdown)
- Runway Width Adjustment (Dropdown)
- Runway Surface (Dropdown)
- Wind Indicators (Dropdown)
- Runway Safety Systems (Dropdown)



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Benefits for Operations

- Logbook Entries
 - Escorts
 - Diversions
 - Tours
 - Noise Complaints
 - More / Configurable



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Benefits for Operations

- Reporting
 - NOTAM
 - Airfield Condition Reporting
 - Airfield Inspections
 - Diversion
 - Wildlife
 - More / Configurable



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Benefits for Operations

RFD - Part 139 Airfield Inspection Report



05/02/2015 Evening Shift

AIRFIELD INSPECTION

Logbook # 28 Inspected By DUFFY, JASON Inspection Date/Time 04/02/2015 4:39:51PM

AIRFIELD DISCREPANCIES

Discrepancies are indicated in red and no discrepancies in black. Work Orders headed during this shift are listed below

Pavement Areas		Lighting		Obstructions	
A. Pavement Lip Over T	Satisfactory	A. Obscured/Dirty/Faded	Satisfactory	A. Obstruction Lights	Satisfactory
B. Hole 6" Diameter Deep	Satisfactory	B. Damaged/Missing	Satisfactory	B. Cones/Tripes	Satisfactory
C. Cracks/Spalling/Bumps	Satisfactory	C. Inoperative	Unsatisfactory	C. Fencing/Gates/Signs	Satisfactory
D. FOD: Gravel/Debris/ES	Satisfactory	D. Faulty Aim/Adjustment	Satisfactory	ARFF	
E. Rubber Deposits	Satisfactory	Navigation Aids		A. Equipment/Crew Available	Satisfactory
F. Rounding/Edge Damage	Satisfactory	A. Rotating Beacon	Satisfactory	B. Communications/Alarms	Satisfactory
G. Rut/Humps/Creases	Satisfactory	B. Wind Indicators	Satisfactory	Fueling Operations	
Safety Areas		C. REILS/VGSI Systems	Satisfactory	A. Fencing/Gates/Signs	Satisfactory
A. Drainage/Construction	Satisfactory	Base and Ice		B. Fuel Marking/Labeling	Satisfactory
B. Objects/Fragile Bases	Satisfactory	A. Surface Conditions	Satisfactory	C. Fire Extinguishers	Satisfactory
Public Protection		B. Snowbank Clearings	Satisfactory	D. Grounding Clips	Satisfactory
A. Fencing/Gates	Satisfactory	C. Lights/Sign Obscured	Satisfactory	E. Fuel Leaks/Vegetation	Satisfactory
B. Signs	Satisfactory	D. NAV/WDS/Fire Access	Satisfactory	Markings and Signs	
Wildlife Hazards		Construction		A. Visible Standards	Satisfactory
A. Dead Birds	Satisfactory	A. Barricade Lights	Satisfactory	B. Hold Lines/Signs	Satisfactory
B. Piles of Sods/Animals	Satisfactory	B. Equipment Parking	Satisfactory	C. Fragible Signs	Satisfactory

139 WORK ORDERS - OPENED DURING SHIFT

139 WORK ORDERS - CLOSED DURING SHIFT

NOTMAS:
Log.# Notes.# Opened WD

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Benefits for Management

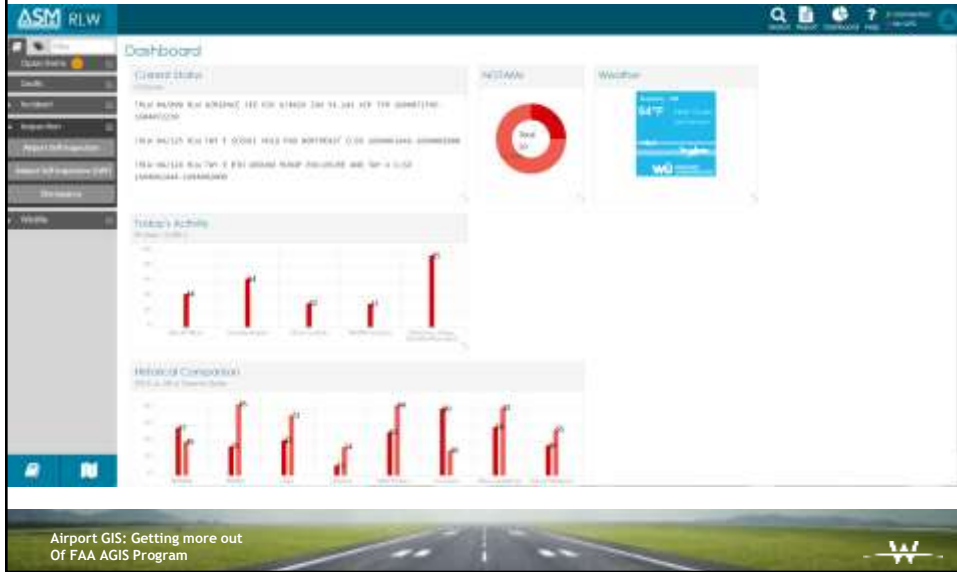
- Dashboard metrics can be customized



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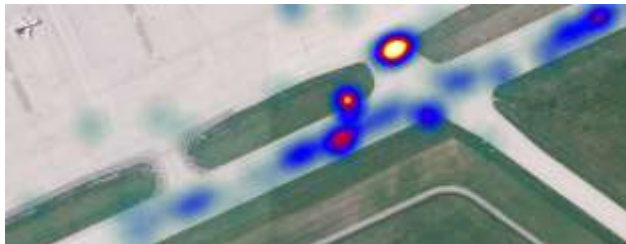


Benefits for Management



Benefits for Management

- More Informed Decisions
 - How much money have we spent on a certain asset?
 - Is it better to repair an asset or to completely replace?
 - Are there trends of failures in certain areas of the airport?



Data, data, and more data

PHX Data:

Doors - **5194**

Airfield Electric Lights - **7507**

Smoke Detectors - **1499**

Airfield Shoulder Markings - **1973**

- Surveyed airfield & all terminals
- 2.5 Million Square Feet of space inventoried

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Keys to Success

- *Data Maintenance, Data Maintenance, Data Maintenance*
- Take advantage of project deliverables
 - As-builts, survey data, new imagery
 - Apply data standards to large construction project deliverables
 - Contract language to enforce data standards
- Integration with other systems



Stretching Budgets With Lifecycle Asset Management



Keys to Success

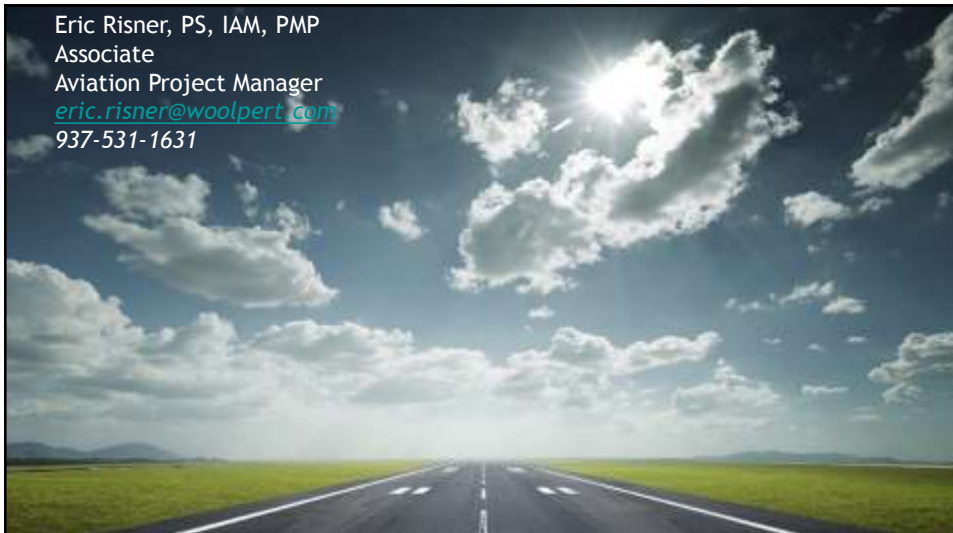
- Understanding of not what is required for AGIS but what's best for your Airport
 - ADO's like to enforce minimum required for construction projects
 - Any feature that changes as a part of that construction project & is shown on the ALP should be required to be updated



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