

# FAA AIRFIELD LIGHTING STANDARDS UPDATE

**Present to: IES ALC CONFERENCE  
ORLANDO, FL  
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**Federal Aviation  
Administration**

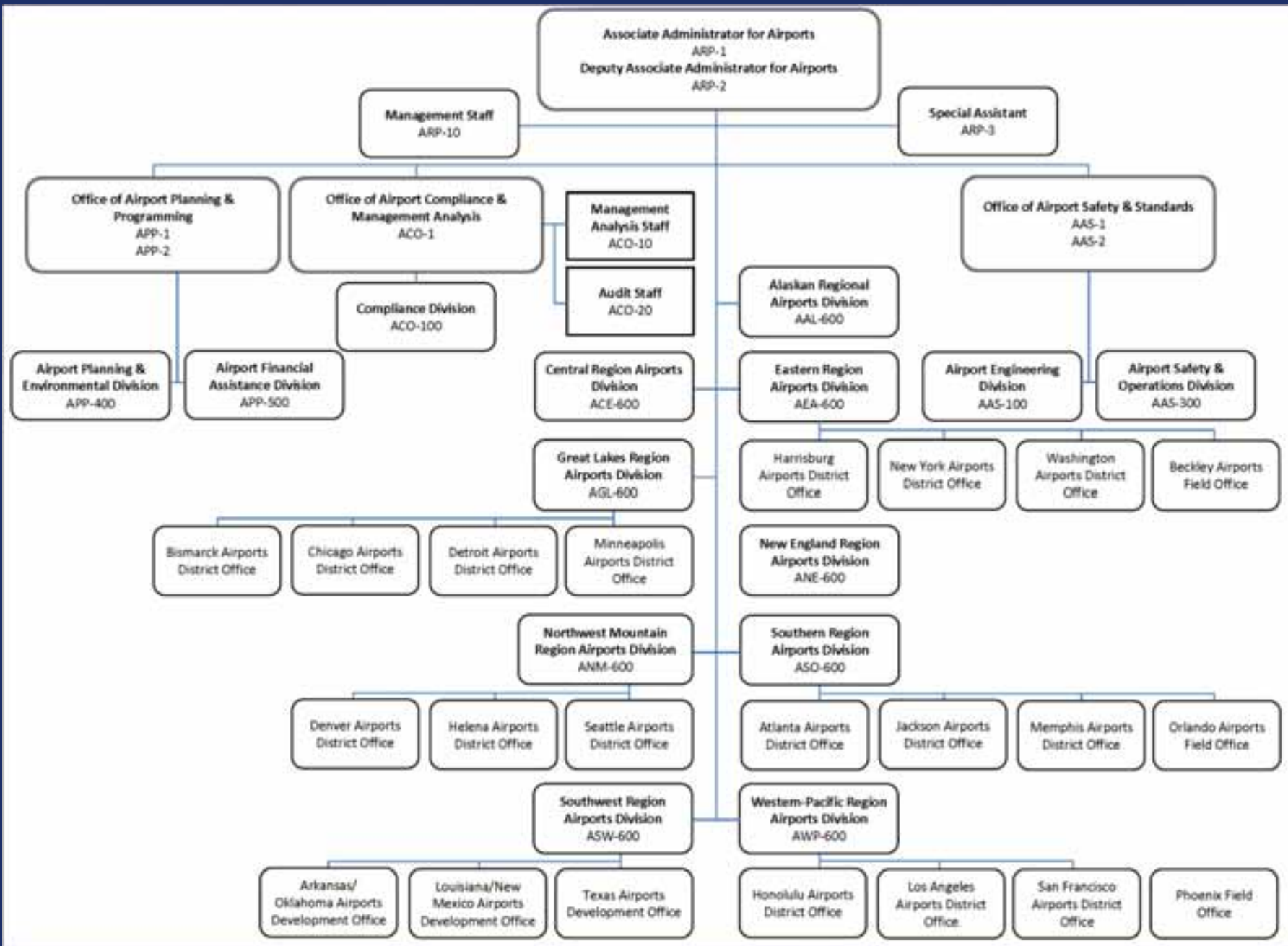


# Agenda

- Overview of FAA Office of Airports (ARP)
- FAA Airfield Lighting Equipment Advisory Circulars (AC's) & Engineering Briefs (EB's) Updated in FY 2014
- Proposed AC's & EB's for FY 2015
- Some relevant Info. on Airfield Lighting
- Q & A



# FAA OFFICE OF AIRPORTS (ARP)



# Airport Engineering Division

## AAS-100

- AAS-100 is responsible for developing engineering, design, and construction standards for civil airports, heliports, and seaplane bases. This includes standards for airport configuration and design, airfield pavement, airfield lighting, marking, signs, and other visual aids; safety during construction; surveying and GIS data; deicing, ARFF, and other facilities;



# AIRFIELD LIGHTING EQUIPMENT

- Taxiway / Runway Lights
- Runway & Taxiway Signs
- Beacons
- Obstruction Lights
- Wind Cones
- Isolation Transformers
- Retroreflective Markers
- Cables & Connectors
- ALCMS
- Portable Runway Lights
- Light Bases
- Constant Current Regulators
- Precision Approach Path Indicators (PAPI)
- Runway End Identification Lights (REIL)
- Radio Controls
- Many more...





# AIRFIELD LIGHTING EQUIPMENT AC's

AC Number	Date	Subject
AC 150/5340-1K	04/29/2005	Standards for Airport Markings
AC 150/5340-5C	09/14/2007	Segmented Circle Airport Marker System
AC 150/5340-18F	08/16/2010	Standards for Airport Sign Systems
AC 150/5340-26A	09/30/2009	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30E	09/29/10	Design and Installation Details for Airport Visual Aids
AC 150/5345-3G	09/29/2010	Specification for L-821 Panels for Control to Airport Lighting
AC 150/5345-5B	09/14/2009	Specifications for Airport Lighting Circuit Selector Switch
AC 150/5345-7E	08/02/2001	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10G	09/29/2010	Specification for Constant Current Regulators and Regulator Monitors
AC 150/5345-12F	09/24/2010	Specification for Airport and Heliport Beacons
AC 150/5345-13B	09/20/2007	Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits
AC 150/5345-26D	09/3/2008	Specification for L-823, Plug and Receptacle, Cable Connectors
AC 150/5345-27D	06/02/2004	FAA Specification for Wind Cone Assemblies
AC 150/5345-28F	04/12/2005	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39C	09/14/2006	Specification For L-853, Runway and Taxiway <u>Retroreflective Markers</u>
AC 150/5345-42F	10/17/2006	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories



# AIRFIELD LIGHTING AC's (Cont.)

AC 150/5345-43F	09/12/2006	Specification for Obstruction Lighting Equipment
AC 150/5345-44J	09/29/2010	Specification for Runway and Taxiway Signs
AC 150/5345-45C	04/06/2007	Low-impact Resistant (LIR) Structures
AC 150/5345-46D	05/19/2009	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47B	06/30/2005	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-49C	06/27/2007	Specification L-854, Radio Control Equipment
AC 150/5345-50B	09/20/2007	Specification for Portable Runway and Taxiway Lights
AC 150/5345-51B	09/08/2010	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-52A	09/05/2007	Generic Visual <del>Glideslope</del> Indicators (GVGI)
AC 150/5345-53C	09/30/2005	Airport Lighting Equipment Certification Program
AC 150/5345-54B	09/30/2000	Specification for L-884, Power and Control Unit for Land and Hold Short Lighting Systems. (Including Change 1)
AC 150/5345-55A	06/27/2007	Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure



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## Airport Programs & Guidance

The FAA ensures the national airport system is safe, efficient, and environmentally responsible and meets the needs of the traveling public.

### News & Highlights

- **New AIP Handbook (Order 5100.38D)**  
The AIP Handbook provides FAA staff with guidance to manage the Airport Improvement Program (AIP). The Handbook update incorporates changes to the AIP that were part of the FAA Modernization and Reform Act of 2012, related Program Guidance Letters and other guidance, and comments from the public review process.
- **Airports Standard Operating Procedures**  
The FAA's Airports organization has released two additional Standard Operating Procedures (SOPs) addressing Safety Risk Management (SRM) and CATEx Determinations.
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## Airport Engineering, Design, & Construction

### Airports

The FAA develops engineering, design, and construction standards for civil airports, heliports, and seaplane bases. This includes standards for airfield pavement; airport lighting, marking, signs, and other visual aids; safety during construction; surveying and GIS data; deicing, ARFF, and other facilities; bird radar and foreign object detection systems; and more.

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# AIRFIELD LIGHTING STANDARDS DEVELOPMENT

- AAS-100 develops airfield lighting standards in the form of Advisory Circulars (ACs) and Engineering Briefs (EBs)
- Our visual aid standards for lighting, marking and signage are based solely on visual acquisition (i.e. intensity, color, beam spread, configuration and spacing)
- Works with the FAA WJHTC (FAA Tech Center) to conduct lighting R&D and evaluate /validate findings before incorporating applicable recommending results into the ACs.
- Collaborative effort with Industry through IESALC & our stakeholders. All ACs & EBs revisions go out for comment to receive valuable input.



# AC's REVISED IN FY 2014

- AC 150/5340-26C - Maintenance of Airport Visual Aid Facilities (6/20/14)
- AC 150/5345-10H, Specification for Constant Current Regulators and Regulator Monitors (Pending FAA Public Affair Review)
- AC 150/5340-30H, Design and Installation Details for Airport Visual Aids (7/21/14)
- AC 5345-53C Airport Lighting Equipment Certification Program (Addendum is updated monthly)
- EB 92, Light Spacing Guidance for New Taxiway Fillet Geometry



# AC 150/5340-26C- Maintenance of Airport Visual Aid Facilities (6/20/14)

## Principal Changes

- Paragraph 2.0 has an added section to better introduce the concept of safety.
- Paragraph 2.2 – a new section is added to be in better alignment with the personnel safety requirements in National Fire Protection Association (NFPA) 70E, Standard for Electrical Safety in the Workplace.
- Paragraph 2.4.1.1 is added for arc flash protection description and requirements.
- Figure 2-1 is added to show an example of an arc flash warning label.
- Paragraph 3.2.1 is added to describe maintenance log requirements for PAPI, VASI, and ODALS.
- Paragraph 3.7 is added to describe what to do when visual aids are implicated in an aircraft accident. How to return a visual aid to service that was previously NOTAMed.
- Paragraph 5.3.4 is expanded to add requirements for bolt torque and explain one-time bolt use for in-pavement light fixtures.
- Paragraph 5.11 – removed “hazard beacons” and added note.
- Paragraph 5.15, Omnidirectional Approach Lighting System (ODALS), is added.
- Appendix B is added for Maintenance Log Preparation Guide.



# FAA National Part 139 CertAlert No. 14-03



## Federal Aviation Administration National Part 139 CertAlert

**\*\*Advisory\*\*Cautionary\*\*Non-Directive\*\*Advisory\*\*Cautionary\*\*Non-Directive\*\*Advisory\*\*Cautionary\*\*Non-Directive\*\***

**Date:** June 25, 2014 **No. 14-03**  
**To:** Airport Operators, FAA Airport Certification Safety Inspectors (ACSI's)  
**Subject:** Preventive Maintenance of In-Pavement Lighting Systems  
**Point of Contact:** Randy Moseng, AAS-300, (404) 474-5114  
Alvin Logan, AAS-100 (202) 267-8743

- 1. Purpose.** This CertAlert informs airport operators of a recent incident in which a departing air carrier aircraft dislodged an in-pavement runway light fixture, causing significant damage to the aircraft. It reminds them to properly maintain lighting systems as required by 14 Code of Federal Regulations part 139.311(d). This section states, "Each certificate holder must properly maintain each marking, sign, or lighting system installed on the airport." Airports comply with this requirement through routine inspections and by applying a detailed preventive maintenance program.



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# CertAlert No. 14-03

## Recommendations

- Apply AC 150/5340-26, Maintenance of Airport Visual Aid Facilities. This AC discusses maintenance procedures for in-pavement lighting systems and provides guidelines and a schedule of periodic checks. It is important that maintenance personnel review the schedule of periodic checks, including the need to periodically check bolts used to install in-pavement lights and torque them to the required standard
- Airport operators should review the requirements in AC 150/5340-26, as well as the maintenance recommendations found in the current version of AC 150/5340-30, *Design and Installation Details for Airport Visual Aids, Chapter 12*, that discuss the unique requirements associated with the maintenance of ‘load-bearing lighting fixtures’ such as in-pavement centerline or touchdown-zone lighting.



# CertAlert No. 14-03

## Recommendations

- Engineering Brief (EB) 83, In-Pavement Light Fixture Bolts, offers guidance and information to be used when installing stainless steel hardware to secure in-pavement light fixtures. It also offers guidance on the use of anti-seize compound with stainless steel bolts and the use of ceramic-metallic coated bolts in lieu of stainless steel. Operators should be aware of EB 83 when selecting materials such as bolts and installing light systems.
- In addition to conducting the required maintenance, airport operators must also ensure these maintenance activities are properly documented.



# AC 150/5340-30H- Design and Installation Details for Airport Visual Aids (7/21/14)

## Principal Changes

- Paragraph 1.5 is added for Airports Geographical Information Systems (GIS) and AC 150/5300-18, General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards, requirements.
- Paragraph 2.1.2.a(2)(c) is clarified to ensure that taxiway edge lights do not obscure runway edge lights.
- Paragraph 4.8 is updated for independent control of elevated and in-pavement runway guard lights.
- Paragraph 4.8e(3) is updated to clarify use of a 5-step CCR with high intensity LED lighting systems.



# AC 150/5340-30H

## Principal Changes

- Paragraph 6.2.d is added to cite National Fire Protection Association (NFPA) 780, Standard for the Installation of Lightning Protection Systems, requirements for airport beacon lightning protection system requirements.
- Paragraph 6.7.2.e is updated to separate power sources for wind cones and associated obstruction lights.
- Paragraph 7.4.b(1) through (4) is updated to clarify runway end identifier lights (REIL) requirements.
- Paragraph 7.5.d(1)(c) is added to include Engineering Brief (EB) 79, Determining RSA NAVAID Frangibility and Fixed-by-Function Requirements. A note is added to consult equipment manufacturers before attempting to relocate precision approach path indicator (PAPI) components.
- Paragraph 7.5.d(8) is updated with CertAlert information for PAPI operation.
- Paragraph 7.7.f(7) is added to detail and clarify PAPI commissioning requirements.
- Paragraph 13.2.c is updated for arc flash and short circuit coordination study/analysis.



## AC 150/5345-10H, Specification for Constant Current Regulators and Regulator Monitors (Pending approval)

- Requirement is added for the constant current regulator response (CCR) to short duration AC power glitches.
- Requirement added for testing CCR response to zero voltage AC power glitches.
- Numerous requirements and tests clarified to facilitate better 3rd party testing.





# Engineering Brief (EB) 92 – Light Spacing Guidance for New Taxiway Fillet Geometry

- Written to address new taxiway fillet edge and centerline lighting layouts that arise from taxiway design changes in AC 150/5300-13, Airport Design.
- EB details taxiway edge and centerline lighting design when airport installs new or upgraded taxiway.
- EB should be used in conjunction with AC 150/5340-30, Design and Installation Details for Airport Visual Aids.
- New taxiway design fillets can consist of straight line segments rather than the customary curves based on arcs or chords. Using these new design rules may significantly affect new taxiway edge lighting designs in both appearance and the number of lights used.



# Proposed AC's for FY 2015



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# Proposed ACs for FY 2015

- AC 5340-18G, Standards for Airport Sign Systems
- AC 150/5345-44, Specification for Runway and Taxiway Signs
- AC 150/5345-42G, Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
- AC 150/5345-46E, Specification for Runway and Taxiway Light Fixtures
- AC 150/5340-30H, Design and Installation Details for Airport Visual Aids
- AC 150/5345-49C, Specification L-854, Radio Control Equipment
- AC 150/5345-50B, Specification for Portable Runway and Taxiway Lights
- Engineering Brief -PAPI



# Draft AC 150/5345-42G, Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories

- Add elevated light cover plates to the AC. The plates are currently in AC 150/5345-46, Specification for Runway and Taxiway Light Fixtures, but most manufacturers purchase their cover plates from only 2 manufacturers. Placing the cover plates in AC 150/5345-42 would allow certification of the just the cover plate for generic part selection with elevated lights.
- Update/check all referenced documents in the AC.



# Draft AC 5340-18G, Standards for Airport Sign Systems



Figure 13. Construction Ahead Signs



Figure 14. Construction on Ramp



Figure 15. Take-Off Run Available Signs





# Draft AC 150/5345-44, Specification for Runway and Taxiway Signs

- New Approach Hold Sign & Orange Construction Signs
- Incorporate 3<sup>rd</sup> party certification body comments and clarifications for sign color and reflectivity requirements.
- Clarify sign warranty requirements to be compliant with AC 150/5345-53, Airport Lighting Equipment Certification Program
- Update/check all referenced documents in the AC.



# Draft AC 150/5345-46E, Specification for Runway and Taxiway Light Fixtures

- Remove elevated light cover plates from this AC and place in AC 150/5345-42.
- Add note to paragraph 3.10.1.1 to lessen confusion about light hardware that is used for a light fixture and hardware that is used to secure a light fixture to the light base.
- Update/check all referenced documents in the AC.



# Draft AC 150/5340-30J, Design and Installation Details for Airport Visual Aids

- Incorporate EB92, Light Spacing Guidance for New Taxiway Fillet Geometry
- Update reference to runway guard light intensity requirements. Reference AC 150/5345-46 rather than attempting to paraphrase.
- Update/check all referenced documents in the AC.



# Draft AC 150/5345-49D, Specification L-854, Radio Control Equipment

- Review L-854 FM receiver specifications to determine if there are any issues with intermittency reported by several airports.
- Update/check all referenced documents in the AC.



# Draft EB- PAPI

- **Engineering Brief** - disseminate additional information about how PAPI Obstruction Clearance Surfaces (OCS) are evaluated by FAA Flight Inspection. In addition, provide information about how to deal with obstructions that are outside the 20 degrees PAPI OCS imaginary plane.



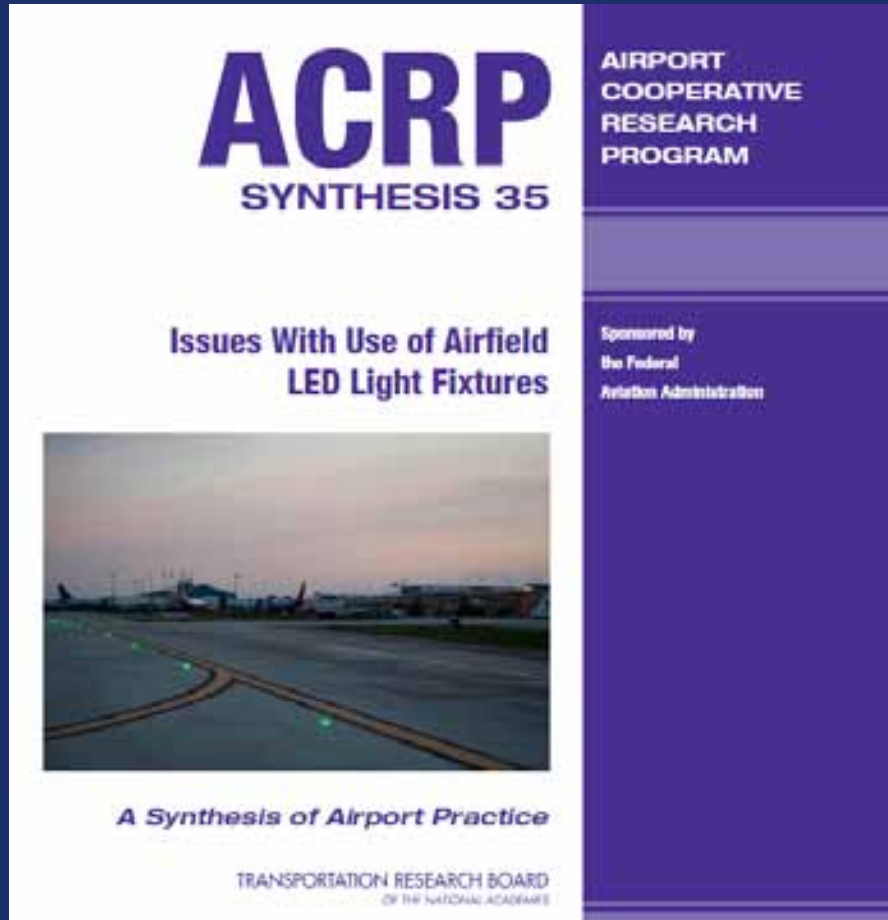


# ACRP LED Studies

- ACRP Synthesis 35 “Issues With Use of Airfield LED Light Fixtures”. Published 2012
- ACRP Project 09-09 “LED Airfield Lighting System Operation and Maintenance”- On-going



# Issues With Use of Airfield LED Light Fixtures



- 22 Airports participated in data collection with 100% response rate.
- Addresses:
  - LED Lighting Installation Issues
  - Failure Modes and Frequency
  - Response of Flight Crews
  - Compatibility with Legacy Systems
  - Life-Cycle Cost and Return on Investment
  - Operating Cost



# Q & A



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***Thank You!***



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