



Federal Aviation
Administration

Airport Visual Aids

2013 Illuminating Engineering
Society Airport Lighting
Committee

April 17, 2013

FAA Headquarters
Washington, D.C.

Presented by Alvin Logan
FAA AAS-100



Agenda

- Advisory Circular and Engineering Brief Updates
- LED Program Guidance Letter 12-02
- Night Vision Goggle Applications
- EFVS
- Runway Status Lights



Federal Aviation
Administration

AC 150/5340-30H

- Engineering Brief (EB) prepared to integrate existing taxiway edge light spacing requirements specified by AC 150/5345-30G, “Design and Installation Details of Airport Visual Aids” to the newly introduced fillet geometry in AC 150/5300-13A, “Airport Design”.



Federal Aviation
Administration

AC 150/5340-30H

- Review taxiway edge lights spacing as specified per AC 150/5340-30G to reflect the new required spacing per Fillet Geometry changes recently implemented in Airport Design AC 150/5300-13A, Chapter 4.



Federal Aviation
Administration

AC 150/5340-30H

- New geometry captures tapered edge of pavement and zero fillets.
- Review all new geometry for:
 - Runway/Taxiway intersections (curved and acute-angled)
 - Taxiway/Taxiway intersections
 - High speed exits



AC 150/5340-30H

- Equate “best-fit “inner curve radius to match recommended “z” values listed in AC 150/5340-30.
- Explore any possible impact to electrical design.



Federal Aviation
Administration

AC 150/5340-30H

- Review and update figures associated with:
 - Fillet Geometry
 - Taxiway Runway intersections
 - Taxiway / Taxiway intersections
 - Transition from straight to tapered edges
 - Produce and super-impose concentric fillets onto new fillet geometry.



AC 150/5340-30H

- Kick off Meeting Planned April 2013
 - Flight Standards
 - ALPA
 - FAATC
 - AAS-100



Federal Aviation
Administration

EB-XX, Taxiway Edge and Centerline Light Layout Changes Due to AC 150/5300-13A Revisions

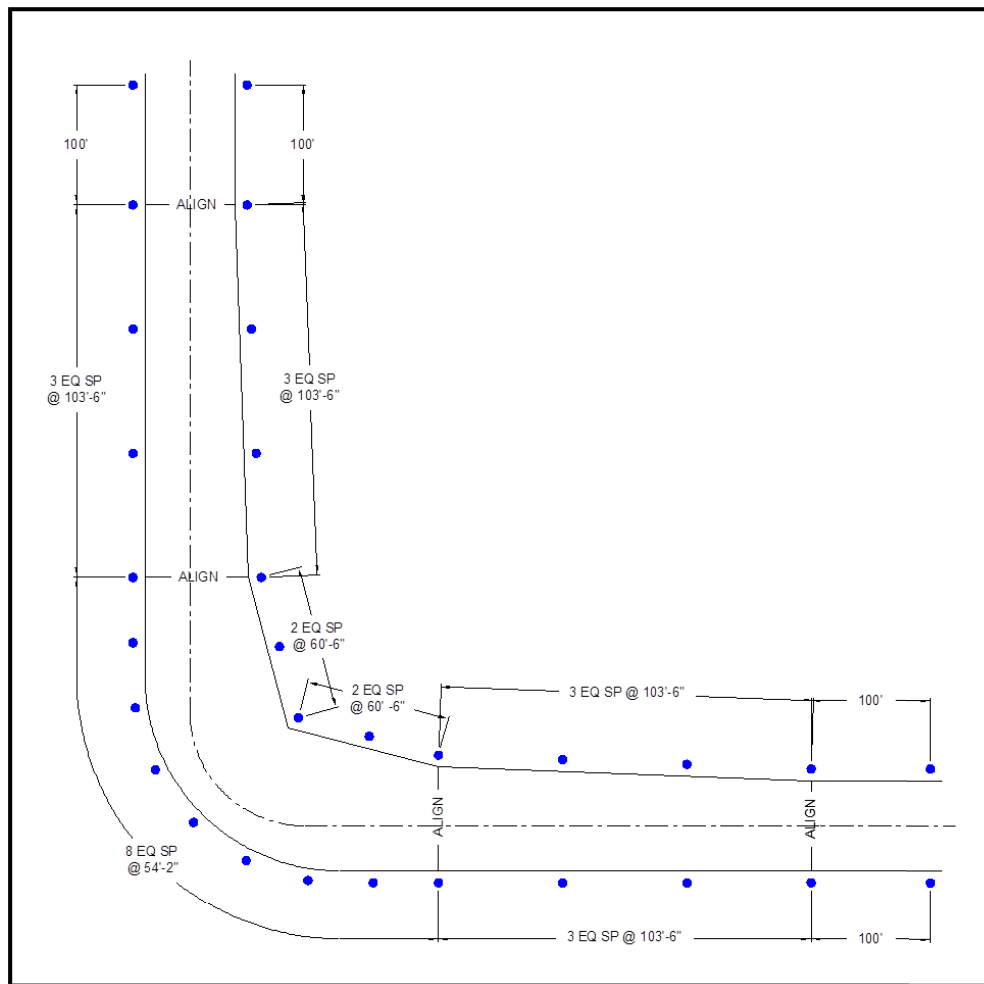


FIG 1 of Draft EB

Example of 90 degree Taxiway
with Fillet Determined via
AC 150/5300-13A



EB-XX, Taxiway Edge and Centerline Light Layout Changes Due to AC 150/5300-13A Revisions

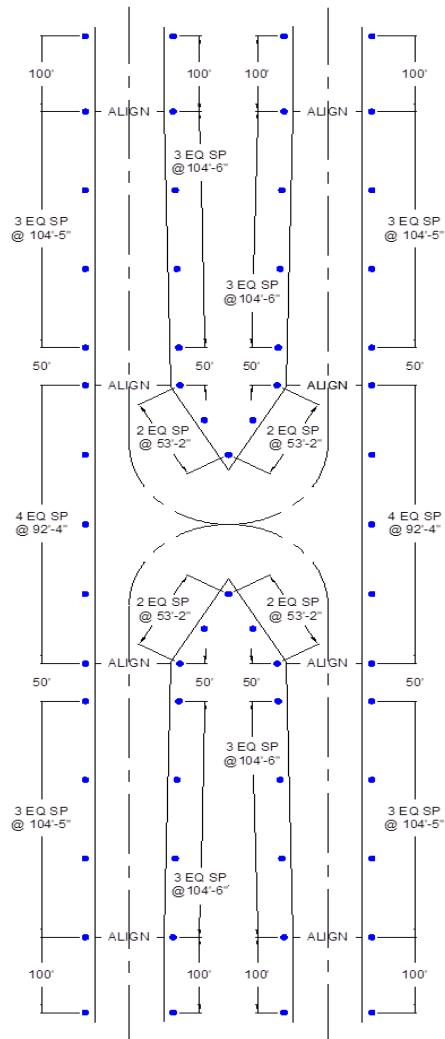


FIG 2 of Draft EB

Example of 180 degree turn

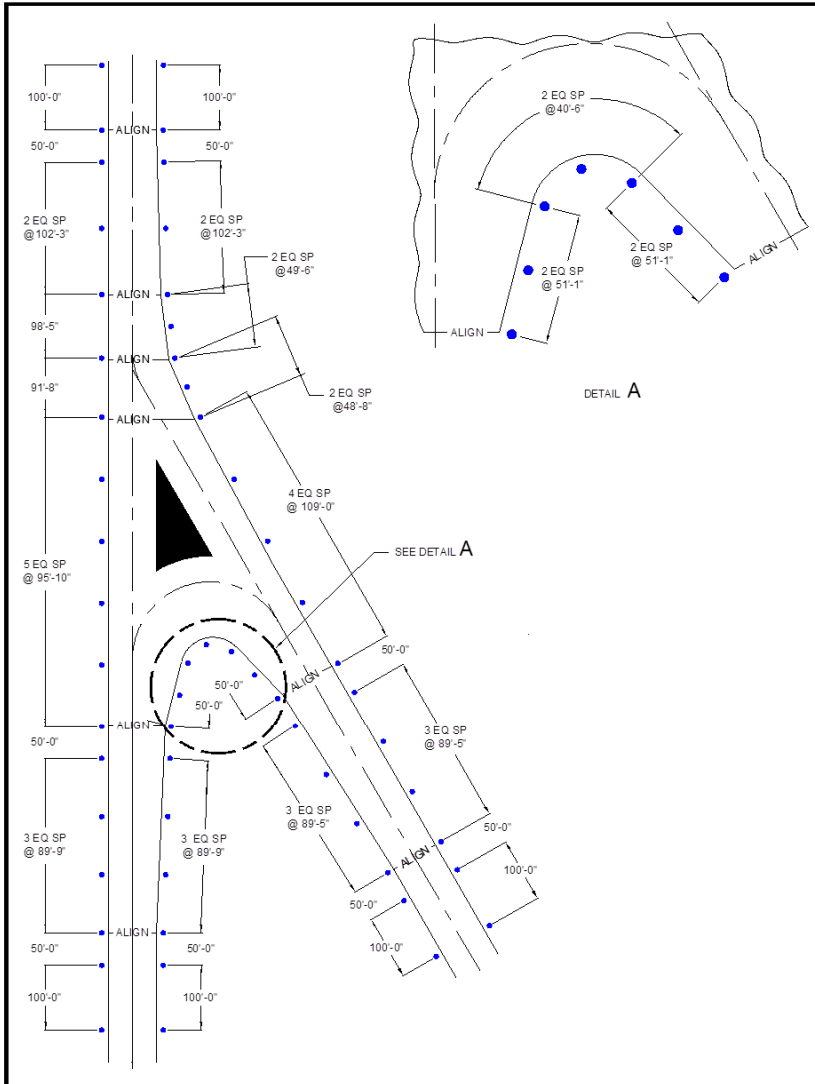
Single straight line segments
are used in the example in
Figure 2 per Table 2-1 in
AC 150/5340-30



EB-XX, Taxiway Edge and Centerline Light Layout Changes Due to AC 150/5300-13A Revisions

FIG 3 of Draft EB

Example of a Complex Taxiway Edge Layout



AC 150/5345-7G

- Specifies the Federal Aviation Administration (FAA) requirements for L-824 underground electrical cable for airport lighting circuits.
 - Updated all references to latest revisions.
 - Updated all internet links for obtaining publications.
 - Deleted FAA-STD-013, Quality Control Program Requirements. Replaced with ANSI/ISO 9001, Quality Management Systems – Requirements



Federal Aviation
Administration

AC 150/5345-5D

- Segmented Circle Airport Marker System
 - Part 139, no controlled tower airports are required to have segmented circle equipment. Also in light -of sequestration, some airport that have towers closed at night, must have this equipment.
 - Need to search for companies that have equipment certified
 - Ready for industry circulation this week.



AC 150/5345-27F

- FAA Specification For Wind Cone Assemblies
 - Small, frangible mounted wind cone, L-806, need to allow internal lights inside the windsocks.
 - FAA Tech Center is currently testing commercial available internal lighted wind cone to validate the requirements.
 - When the Tech Center report is available, AAS-100 will review and incorporate the recommendation into the AC if appropriate & feasible.



Federal Aviation
Administration

AC 150/ 5370-10D

- Standards For Specifying Construction of Airports
 - Major overhaul of “P” sections (pavement and related subjects)
 - Update Part 11, Lighting Installation, to bring it up to date spec and requirements.
 - Harmonize with the spec & criteria in 5340-30



AC 150/5360-12F

- Airport Signing and Graphics
 - This AC incorporates the recommendations and guidelines developed under Airport Cooperative Research Program (ACRP) Report 52, Wayfinding and Signing Guidelines for Airport
 - Terminals and Landside, completed in 2011.
 - In contact with ACRP for final coordination before release.



Federal Aviation
Administration

150/5345-43H

- Specification for Obstruction Lighting Equipment
 - Initial work on flashing L-810 light requirements has begun via formal meetings between AT, OEG and AAS-100



Federal Aviation
Administration

DRAFT EB-XX

- Engineering Brief - “Aviation Obstruction and Ground Lighting Visibility with Night Vision (NVIS) Systems”
 - Draft Engineering Brief allows infrared emitters to be optionally included in LED obstruction lighting fixtures.
 - Engineering Brief remains internal to FAA. FAA (AFS-200) committee studying LED impacts to aviation safety.
 - AAS-100 plans to get concurrence within this committee and then release the IR Engineering Brief for industry review.



Federal Aviation
Administration



LED Program Guidance Letter 12-02



Federal Aviation
Administration

LED Program Guidance Letter 12-02

- LED Program Guidance Letter Policy
 - Discusses the impact of Engineering Brief (EB) 67D which allows for the design selection of LEDs (or other than incandescent lighting equipment) as stipulated in EB-67D during the design phase of a project to be funded with AIP funds.

 U.S. Department of Transportation Federal Aviation Administration		Memorandum	
Subject: ACTION: Program Guidance Letter 12-02		Date: March 5, 2012	
From:  Manager, Airports Financial Assistance Division, APP-500		Reply to Attn. of: Nancy S. Williams 202-267-8822	
To: PGL Distribution List			
<p>This Program Guidance Letter (PGL) discusses the impact of Engineering Brief (EB) 67D which allows for the design selection of LEDs (or other than incandescent lighting equipment) as stipulated in EB 67D during the design phase of a project to be funded with AIP funds.</p> <p>FAA Regional Airports Offices and Airports District Offices are encouraged to distribute this PGL widely to the airport and consultant community.</p>			



Federal Aviation
Administration

Where LEDs Can/Cannot Be Used

- LED Program Guidance Letter Policy:
- LED airport lighting fixtures are designated as “L-XXX(L)” type as listed in AC 150/5345-53C Addendum.
- All LED lighting applications are AIP eligible with the following exceptions:
 - LED obstruction lights
 - LED approach lights
 - LED High Intensity Runway Edge Lights (HIRL)



Federal Aviation
Administration

Night Vision Goggles



Federal Aviation
Administration

NVG Policy

- Air Transportation Division 135 Air Carrier Operations Branch
 - The 135 Air Carrier Operations Branch oversees national standards and policies for 14 CFR Part 135 fixed wing and helicopter operations, to include Helicopter Emergency Medical Service (HEMS) and Part135 On-demand Cargo Operations.



Federal Aviation
Administration

The Use of Night Vision Devices and LEDs

- FAA to conduct comprehensive assessment of impacts of LEDs in EFVS and Night Vision Goggle applications



Federal Aviation Administration

Memorandum

Date: OCT 10 2012

To: David Grizzle, Chief Operating Officer, Air Traffic Organization, AJO-0
Christa Fornarotto, Associate Administrator for Airports, ARP-1 ✓

From: Margaret Gilligan, Associate Administrator for Aviation Safety, AVS-1 *M. Gilligan*

Prepared by: John M. Allen, Director, Flight Standards Division, AFS-1

Subject: Light Emitting Diode (LED) Lighting and its Impact on Aviation Safety

Background: In response to the Energy Independence and Security Act of 2007, the Federal Aviation Administration (FAA) has made substantial progress in replacing current airport incandescent lighting systems with newer Light Emitting Diode (LED) lighting technology. However, there continues to be significant safety questions which remain unanswered as to the equivalency of LED lights to incandescent lights for the purposes of air navigation. This is particularly true in light of the rapidly growing field of technology-assisted vision systems, which often rely on portions of the electromagnetic (EM) spectrum emitted by incandescent lighting, but not emitted by LED.



Federal Aviation
Administration

The Use of Night Vision Devices and LEDs

- FAA Working Group – Light Emitting Diode (LED) Lighting and It's Impact On Aviation Safety
 - Air Traffic Organization – AJO-0
 - Aviation Safety AVS-1
 - Flight Standards Division AFS-1
 - Associate Administrator for Airports ARP-1



Federal Aviation
Administration

SAFO for NVGs



U.S. Department
of Transportation

**Federal Aviation
Administration**

SAFO

Safety Alert for Operators

SAFO 09007
DATE 3/6/09

Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo

A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.

Subject: Night Vision Goggle (NVG) Advisory Pertaining to Certain Red Color Light Emitting Diodes (LED)

Purpose: This SAFO advises operators utilizing NVGs that certain LED lighting systems fall outside the combined visible and near-infrared spectrum of NVGs.

- Safety Alert for Operators
 - Advises users of NVGs that certain LEDs lighting applications may fall outside the visible and near IR spectrum of the NVGs.



Federal Aviation
Administration

EFVS/NVG SAFO



U.S. Department
of Transportation

**Federal Aviation
Administration**

InFO

Information for Operators

InFO 11004
DATE: 2/15/11

Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info

An InFO contains valuable information for operators that should help them meet certain administrative, regulatory, or operational requirements with relatively low urgency or impact on safety.

Subject: Enhanced Flight Vision System (EFVS), Enhanced Vision Systems (EVS), and Night Vision Goggles (NVG) compatibility with Light-Emitting Diodes (LEDs) at airports and on obstacles

Purpose: This InFO advises operators that LED lights are significantly less visible than traditional incandescent lightbulbs when viewed through EFVS, EVS and NVG. Random installations of LED lights are occurring at airports and on obstacles worldwide.

- Combined EFVS/NVG SAFO



Federal Aviation
Administration


FAA Order 8400.13D



Federal Aviation
Administration

Procedures for the Evaluation and Approval of Facilities for Special Authorization CAT I Operations and All CAT II and CAT III Operations

- **FAA Order 8400.13D**
 - Authorizes CAT I approaches with a DH of 200 feet and visibility minimums of RVR 1800 at runways with reduced lighting, using an aircraft flight director (FD) or autopilot (AP) with an approach coupler or head-up display (HUD) to DA.

	U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION National Policy	ORDER 8400.13D
		Effective Date: 10/22/09
SUBJ: Procedures for the Evaluation and Approval of Facilities for Special Authorization Category I Operations and All Category II and III Operations		
<hr/>		
FOREWORD		
<p>This order provides guidance for all personnel in the authorization of instrument landing system (ILS) ground facilities to support Category I (CAT I) operations to Runway Visual Range (RVR) 1800 and Special Authorization CAT I to RVR 1400, and all Category II (CAT II) and Category III (CAT III) operations (including Special Authorization CAT II).</p> <p>With a growing emphasis on performance-based operations, different levels of operation may be authorized based on the flight equipment of a specific operator, and the ground equipment available at specific runways. While certain ground facility requirements are needed to support all levels of either CAT I, CAT II, or CAT III operations, a higher category of operations may be performed on different "types" of ground equipment if the airborne equipment, crew training, or other factors offset any changes in ground facility requirements. In these situations, operations are predicated on the use of specific equipment and/or procedures, which will be required in the operator's applicable authorization (such as an operations specification (OpSpec), management specification (MSpec), or letter of authorization (LOA)).</p>		
ORIGINAL SIGNED by		
John M. Allen Director, Flight Standards Service		



Federal Aviation
Administration

FAA Order 8400.13D

- Airports Division Checklist for CAT II Operations

Airports Division Checklist for CAT II Operations			
Runway: _____	Airport: _____	City: _____	State: _____
This checklist is to verify that the equipment for the runway listed above meets the requirements to support the proposed CAT II/III approach and landing operations.			
CAT II RVR 1600: <input type="checkbox"/> Yes <input type="checkbox"/> No	CAT IIIa RVR 700: <input type="checkbox"/> Yes <input type="checkbox"/> No		
CAT II RVR 1200: <input type="checkbox"/> Yes <input type="checkbox"/> No	CAT IIIb RVR 600: <input type="checkbox"/> Yes <input type="checkbox"/> No		
CAT II RVR 1000: <input type="checkbox"/> Yes <input type="checkbox"/> No	CAT IIIb RVR300: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Confirm that all ground systems and obstacle clearance requirements are met. Completion of this checklist must reflect achieved/completed status, not planned actions. When all portions of this checklist are complete, please return the checklist expeditiously to the Flight Standards AWOPM in order to preclude delay of CAT II/III service to the users. Once approval is granted, Flight Standards will issue authorization for CAT II/III operations.			
I. General Information: Immediately upon initiation of this checklist, please provide the Flight Standards AWOPM (listed below) with the name and telephone number of your staff member/point of contact for monitoring the accomplishment of the checklist.			
AWOPM: _____		Phone Number: _____	
Alternate: _____		Phone Number: _____	
II. Lighting Aids. Indicate if the following visual aids meet installation standards. If a modification to an airport design standard was approved, list each approval in section VII. (Ref. AC 150/5340-30 and Order 6850.2)			
A. High Intensity Runway Edge Lights:.....		<input type="checkbox"/> Yes <input type="checkbox"/> No	
B. Threshold/Runway End Lights (in addition to threshold lights which are integral to the approach light system):.....		<input type="checkbox"/> Yes <input type="checkbox"/> No	
C. Runway Centerline Lights:.....		<input type="checkbox"/> Yes <input type="checkbox"/> No	
D. Runway Touchdown Zone Lights:.....		<input type="checkbox"/> Yes <input type="checkbox"/> No	
E. ALSF-2 Approach Lights (if non-federal):.....		<input type="checkbox"/> Yes <input type="checkbox"/> No	
NOTE: For authorization less than RVR 1200, include a copy of the SMGCS plan and taxi chart with details of all required lighting aids (taxiway centerline lights, stop bars, etc.)			



Federal Aviation
Administration

FAA Order 8400.13D

- Airports Division Checklist for Special Authorization CAT II Operations
- Airports Division Checklist for CAT II Operations

Airports Division Checklist for Special Authorization CAT II Operations			
Runway: _____	Airport: _____	City: _____	State: _____
This checklist is to verify that the equipment for the runway listed above meets the requirements to support the proposed CAT II approach and landing operations.			
CAT II RVR 1600: <input type="checkbox"/> Yes <input type="checkbox"/> No		CAT II RVR 1200: <input type="checkbox"/> Yes <input type="checkbox"/> No	
Confirm that all ground systems and obstacle clearance requirements are met. Completion of this checklist must reflect achieved/completed status, not planned actions. When all portions of this checklist are complete, please return the checklist expeditiously to the Flight Standards AWOPM in order to preclude delay of CAT II service to the users. Once approval is granted, Flight Standards will issue authorization for CAT II operations.			
I. General Information: Immediately upon initiation of this checklist, please provide the Flight Standards AWOPM (listed below) with the name and telephone number of your staff member/point of contact for monitoring the accomplishment of the checklist.			
AWOPM:		Phone Number:	
Alternate :		Phone Number:	
II. <u>Lighting Aids.</u> Indicate if the following visual aids meet installation standards. If a modification to an airport design standard was approved, list each approval in section VII. (Ref. AC 150/5340-30C and Order 6850.2)			
A. High Intensity Runway Edge Lights.....		<input type="checkbox"/> Yes <input type="checkbox"/> No	
B. Threshold/Runway End Lights (in addition to threshold lights which are integral to the approach light system).....		<input type="checkbox"/> Yes <input type="checkbox"/> No	
C. Runway Centerline Lights (not required).....		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
D. Runway Touchdown Zone Lights (not required).....		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
E. Approach Lights (MALSR, SSALR, or ALSF-1/2) (if non-federal).....		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	



Federal Aviation
Administration

Runway Status Lights



Federal Aviation
Administration

Runway Status Lights

- Presently MCO (key site) is the only RWSL site that has declared IOC and is operating 'live'.
- Joint Acceptance Inspection at MCO is scheduled to occur by the end of March.
- The program is working towards receiving an In Service Decision by Spring (2013).



Runway Status Lights

- There are eleven sites that have completed or are nearing completion of system installation, checkout and SAT - IAD, IAH, PHX, CLT, LAS, MSP, SEA, FLL, LGA, DTW, and ORD (Phase 1).
- It's anticipated the first of those sites will declare IOC and begin operational field familiarization testing by the end of April.



Federal Aviation
Administration

Runway Status Lights

- The IOC date for any site is contingent on local technicians (2) completing the training course, and a few key shelter and FLS grounding mods being completed.
- The last of these eleven should begin field fam by the fall. ORD/Commissioning for any site is expected to occur 3-4 months after the start of field fam, contingent on receiving the ISD at MCO.



Runway Status Lights

- In addition, three other sites are in construction or will start within the next year, LAX, SFO and BWI.
- Total RWSL sites targeted for completion is 15. There are 8 additional sites that have been deferred
 - May be built under a future phase 2 plan.

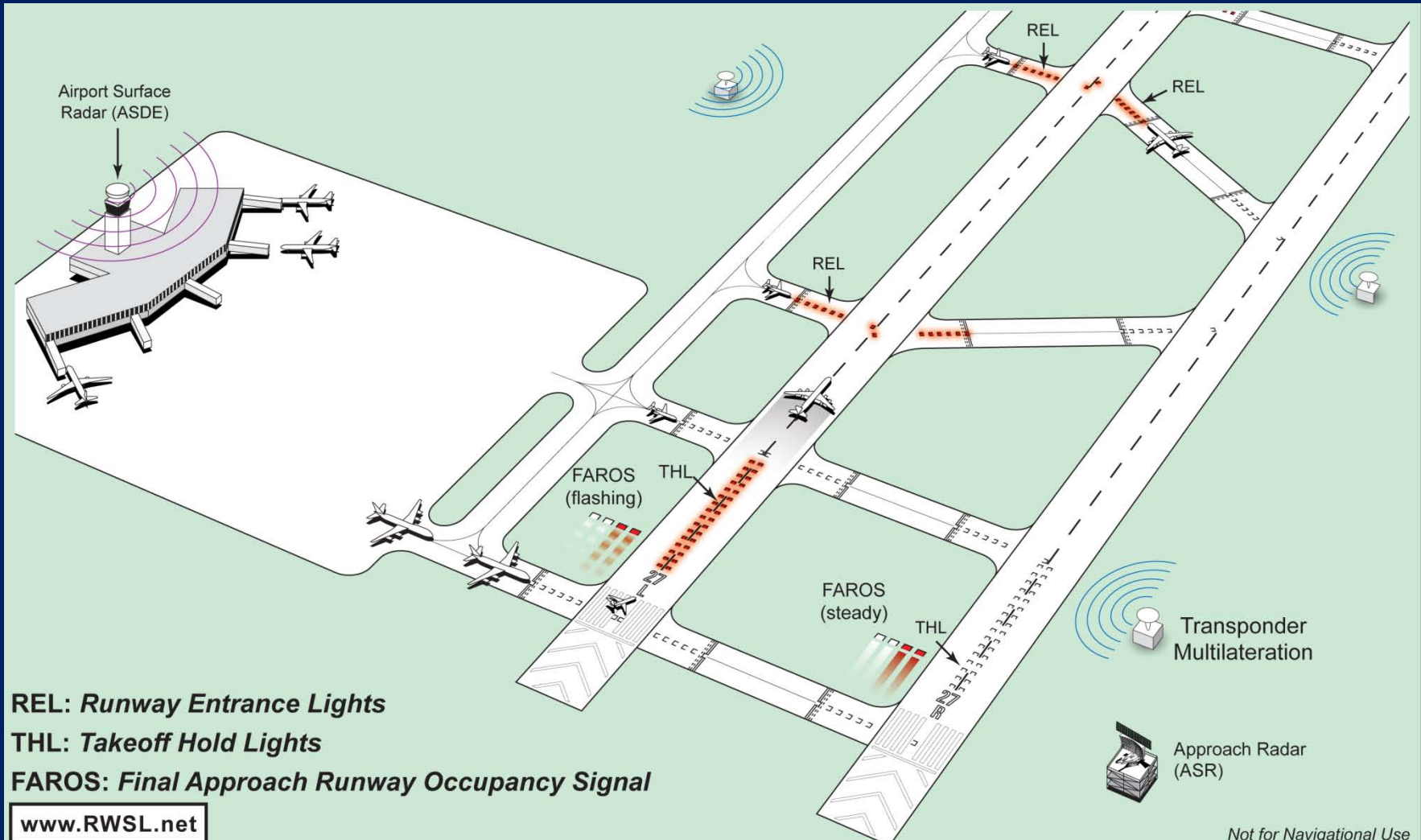


FAROS

FAROS

- Developed by AJP-671, Research & Technology Development Office
- EB for FAROS/eFAROS
 - Design guidance for implementation of a direct warning system (based on LOOPs sensor) to airborne flight crews of runway occupancy status.
- FAROS Engineering Brief has been circulated to FAA Regions for comment to make a determination of feasibility, practicality of usage.

FAROS Operational Concept



FAROS

- A recent meeting was held between Airports and Runway Safety Office regarding FAROS eligibility for Airport applications.
- The meeting determined that use of FAROS applications will not be eligibility for AIP funding within Airports. The Office of Airports is not pursuing any further action for FAROS applications at this time.

Questions?