

LEDs in Aviation Lighting

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Why LEDs in Aviation Lighting?

- **Light-emitting diodes (LED) have many advantages**
 - Reduced energy consumption, reduced maintenance cost, greater durability, and longer lifetime
 - Significant savings in airport operations budget
- **2007 Energy Independence and Security Act**
 - Mandated that incandescent lamps of certain wattages no longer be produced
 - Manufacturer's of incandescent Airport Lighting systems complying by changing to LED
- **FAA responsibility to ensure safe operations**
 - Equivalent or better level of performance and safety compared to incandescent lighting

LED Integration into NAS

- **Some areas of concern have been brought to our attention:**
 - **LED Obstruction lighting**
 - Incompatible with some Night Vision Goggles popular with helicopter operators
 - **Incompatibility of LED with Enhanced Vision Systems**
 - Approach lighting systems and runway lights
 - **Brightness perception of LED vs. incandescent**

Extend AIP funding restrictions for LEDs

- **Obstruction lights**
- **Approach Lighting System***
- **High intensity runway edge lights**



FAA (ARP) Progress on LED Airfield Lighting Systems

- **AC 150/5340-30H prohibits mixing LED and incandescent technologies on the same lighting system. Interspersing LED light fixtures with incandescent fixtures is also prohibited. Consider working with APP to extend this requirement into a complete runway or taxiway lighting system in next draft AC 5340-30J**
- **The use of a 5-step regulator for an LED taxiway centerline lighting system currently recommended in AC 5340-30H for new installations. Draft AC 150/53450-30J will consider this as a requirement.**
- **Working with Industry on LED Stroboscopic Effect Issues; Participated flight tests at Friday Harbor.**
- **Continue supporting AFS-410 on operational flight testing (RDU and GSO)**
- **Task Tech Center to conduct a research study on Infra-red (IR) requirements for developing a FAA L-862(L) LED High Intensity Runway Edge light fixture with an IR emitter.**



FAA LED SSI

- **Cross organizational issues that have potential to be identified as high risk.**
- **“LED Lighting of Airfields, Obstacles, and Aircraft” is #1 of the top 10 list for full SRM**
- **Stakeholders: ATO, AVS, ARP**



Administrator's Strategic Initiative

- In FY15, FAA LOBs/Staff Offices established formal, repeatable processes to identify Significant Safety Issues (SSIs) as part of Activity 2b within the Risk-Based Decision Making (RBDM) Strategic Initiative.

2b

Develop and implement processes to identify and mitigate the safety risk of cross-organizational issues that are found to exist as a result of incidents in the system

- An FAA SSI Team established a process to prioritize the LOB/SO lists and developed a prioritized list of 10 FAA-level, cross-organizational SSIs.
- The FAA SMS Executive Council agreed to apply cross-organizational resources to conduct comprehensive safety risk assessments for:
 - Light Emitting Diodes (LED) Lighting of Airfields, Obstacles, and Aircraft
 - Mid-air Collision with Unmanned Aircraft Systems (UAS)

LED SSI PHA

- LED SSI PHA Team was assembled in Nov 2015 to conduct a safety analysis on the LED SSI
- Team conducted PHA on the LED SSI, including:
 - Broad look at entire LED SSI issue
 - Identification of hazards
 - Risk analysis
 - Recommended prioritization of hazards
- Team NOT develop hazard controls or mitigation monitoring plans
- LED SSI PHA Report published (Jan 2016)
- Safety Risk Assessment Report for the LED Lighting Significant Safety Issue (SSI) published (March 2016)

LED SSI PHA Next Step

- PHA Team reconvenes in Summer 2016 and extend the members from Industries.
- The next step is to conduct an in-depth study on those hazards that fell in the "yellow" to complete the remaining steps of the Safety Risk Management (SRM) process. The final product will be an SRM Report, which will meet the FY16 Business Plan target. Once the Hazard Identification, Risk Management & Tracking (HIRMT) tool launches, AVP will work with the Office of Primary Responsibility (OPR) to document and track these results in HIRMT.



Hazards that will be further studied

- FY15_SSI_LEDPHA_01: LED-lit Obstacle Detection (with NVGs)
- FY15_SSI_LEDPHA_02: Brightness Effect on HUD
- FY15_SSI_LEDPHA_03: See and Avoid (with NVGs)
- FY15_SSI_LEDPHA_04: Ice & Snow formation on obstruction lighting – Non-Airport Property
- FY15_SSI_LEDPHA_05: Stroboscopic Effect
- FY15_SSI_LEDPHA_06: Loss of Sight of LED Airport Lighting

In Conclusion

- LED lighting presents a new paradigm in aviation that affects:
 - The FAA
 - The industry
 - The traveling public
- We will continue working with Industry and FAA and other government agency to ensure the highest degree of safety is maintained

