

AERONAUTICAL CHARTING FORUM
Charting Group
Meeting 13-01 – April 24-25, 2013

RECOMMENDATION DOCUMENT

FAA Control # ACF-CG RD 13-01-265

Subject: Incompatibility Issues Between the Enhanced Vision System and Night Vision Goggles with Light Emitting Diodes (LEDs)

Background/Discussion:

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.

LED light has different characteristics than incandescent light, even in human natural vision. The effects these characteristics have on night and day low visibility operations are currently inadequately understood and may be significant. The effect of LED lighting on pilots who possess certain color vision deficiencies has also not been fully researched and may constitute a substantial safety risk. However, it is in the field of technology-assisted vision systems that the greatest disparities exist between incandescent and LED technologies. Enhanced Flight Vision Systems (EFVS), which rely primarily on the infrared portion of the EM spectrum, are currently unable to sense LED-based light. Similarly, night vision goggle/device (NVG/NVD) systems using Class B filters are also currently unable to sense LED light. These systems provide significant safety and/or operational benefits to a substantial and growing segment of NAS users. It would be contrary to the stated mission of the FAA for these operational benefits to be lost or for safety to be compromised by integration of these two technologies without hazard/risk analysis and mitigations.

The most troubling aspect of LED lighting concerns is that they are often being discovered through voluntary disclosure programs such as the Aviation Safety Reporting System (ASRS). This strongly suggests that not all of the unintended consequences of LED lighting implementation have been discovered.

[Reference: ACF RD [09-02-218 – Incompatibility Issues between the Enhanced Flight Vision System \(EFVS\) and Light Emitting Diodes \(LEDs\)](#)]

Recommendations:

We are recommending the incorporation of “negative symbology” in the Airport Facility Directory, US Terminal Procedures, VFR charts, and approach plates, on all airports and facilities that have installed LED lights. The symbol should show location of obstacles that currently have LED lights for obstacle avoidance. The charting symbol must show location of all towers greater than 250’ AGL obstructions that currently have LED lights.

Comments:

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MEETING 13-01: Jon Brackin, AFS-240, briefed the topic. (This topic was discussed previously at the ACF, but was closed as a charting issue due to the lack of obstacle and airport LED source.) Jon [presented a detailed briefing](#) on the proliferation of LED lighting since passage of the [Energy Independence and Security Act of 2007](#), in January 2007. In short, the result is that towers and other obstructions, as well as airport lighting at a number of airports, are now lit with LEDs and cannot be seen with utilization of certain vision enhancement systems/equipment.

Jon announced that AFS-240 has been working to begin documenting the location of towers and the type lighting being used to illuminate them.

Jon commented that the U.S. Army (out of the Army's Aviation Center in Fort Rucker, AL) conducts an obstacle flight check, approximately once a week, to document the location of towers and obstacles that are illuminated by LEDs.

Valerie Watson, AJV-3B, asked Jay Jackson, AJV-22, who serves as a manager in the FAA's Obstacle Evaluation group, whether his team was collecting lighting data (LED, incandescent, etc.) for the obstacles they publish and maintain. Jay responded that at this time, there is no place in the obstacle database for this information.

Jon stated that he would like to see all towers and wind turbines that are using LEDs that are 200ft or more AGL be charted on VFR Charts.

Rick Fecht, AJV-321, commented that on FAA VFR Charts, obstacles over 200 ft AGL with high intensity and/or dual lighting are charted as "lighted", but at this time there is no source indicating which are lighted with LEDs.

Valerie summarized the subject and stated that the group realizes the importance of the issue, but because there is no source for LED lighting at present, the charting offices cannot accommodate the publication of LED-lit obstacles or airports.

John Brackin stated that when a source for LED lighting is ultimately established, he will return to the group with specific charting recommendations.

STATUS: CLOSED