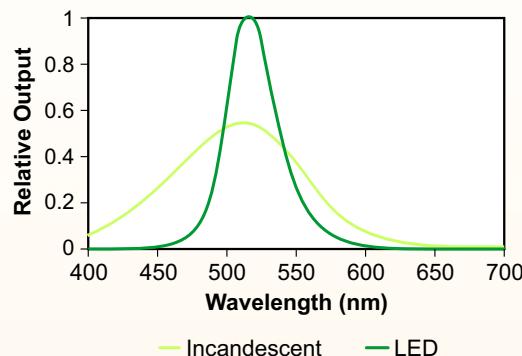


LED Airfield Lighting and Human Factors

Light-emitting diodes (LEDs) differ from incandescent light sources in several ways that are relevant to energy and maintenance requirements of airfield lighting systems. They have higher luminous efficacy and when designed properly, have longer useful operating lives; both factors make LEDs attractive candidates for airfield lighting.



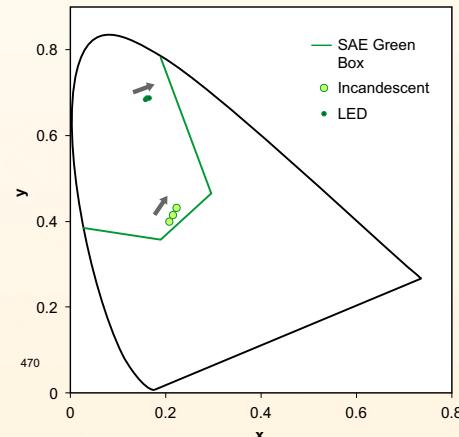
A green LED spectral distribution is narrower than that of a filtered green incandescent signal light.

The photometric, colorimetric and temporal characteristics of LEDs also differ from those of incandescent light sources, and these can have important implications for the appearance of runway and taxiway lighting systems. For example, colored LED sources have much narrower spectral distributions than filtered incandescent lights of the same nominal color.

In a paper presented at the Transportation Research Board (TRB) Annual Meeting in 2017, the LRC reviewed experimental and analytical investigations designed to assess the implications of LEDs in terms of the following human factors impacts: color identification, brightness and glare, visibility in fog and haze, response to onset of flashing lights, and stroboscopic effects such as the phantom array.



Overall, this review of experimental evidence suggests that in addition to their reduced energy use and maintenance requirements, LED airfield lighting can be advantageous in comparison to incandescent lighting systems used to delineate airport runways and taxiways. The LRC's paper was selected by TRB as a Practice-Ready Paper, defined as one in which "...research results presented and discussed make a contribution to the solution of current or future problems or issues for practitioners."



The narrower spectral distribution of green LED signal lights results in much smaller shifts in chromaticity than incandescent lights exhibit in hazy atmospheres. Arrows indicate the direction of chromaticity shifts through increasing volumes of haze.

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Full publication

A copy of the paper, "Human factors impacts of light emitting diode airfield lighting," may be downloaded from <http://docs.trb.org/prp/17-05226.pdf>



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