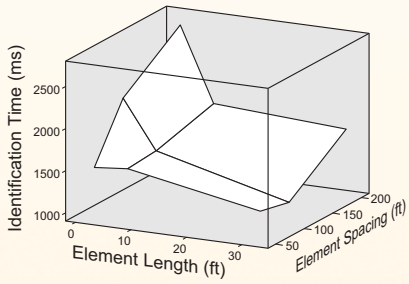
Evaluating the Benefits of Linear Airfield Delineation

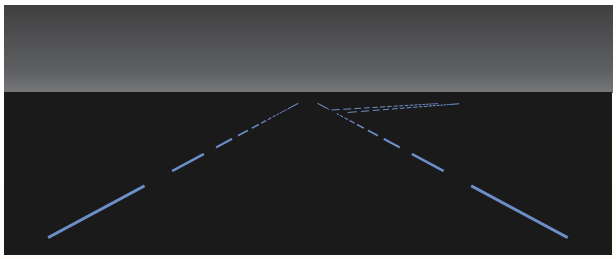
Airport runways and taxiways are illuminated by a plethora of light sources varying in color and intensity and many pilots anecdotally report seeing a “maze” of lights and colors as they taxi along the airfield. Situational awareness is critical, though, especially at intersections between runways and taxiways, because collisions between aircraft can be disastrous.

In recent decades, roadway transportation agencies have investigated the use of linear delineation elements such as tubular sources as ways to enhance visual information when approaching curves and potential conflict points on the road. The results of those investigations suggest that there are benefits to more continuous delineation compared to the intermittent visual information provided by roadside delineators every few hundred feet. In a series of simulation experiments, the LRC tested whether similar approaches might be beneficial for airfield lighting along runways and taxiways.



Experimental results show how different combinations of the length and spacing of linear lighting elements will affect identification times.

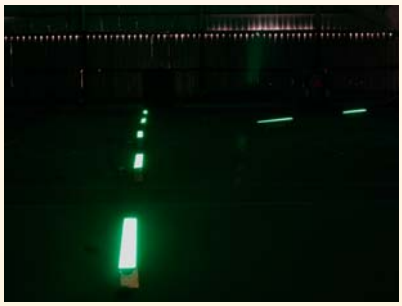
Initial experiments used static images of taxiway intersections to measure how long study participants took to identify the configuration geometry. The length of elements and spacing between them were varied and the results suggested that linear elements could result in shorter identification times than discrete point sources. A preliminary model for trading off length and spacing of lighting elements was developed.



Simulated image of linear elements delineating the edges of a taxiway intersection.

Further experiments using simulations with dynamic animations of a pilot’s view when approaching an intersection, and using a full-scale mock-up with actual lighting elements, were all consistent with the preliminary model, providing important validation.

The LRC is currently supporting FAA’s evaluation of linear lighting elements in more complex visual simulations of actual airports and in real-world operational trials at a small general aviation airport.



Linear lighting elements were evaluated in a full-scale, darkened, indoor area to simulate airfield delineation conditions.

Sponsor

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