

## FAA Competition for Universities 2014

Out of 150 million takeoffs and landings in the U.S. between 2010 and 2012, 3070 reported runway incursions occurred. A runway incursion is any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for landing or takeoff. Although the error rate is slim, with approximately 20 runway incursions for every one million operations, and only one serious runway incursion for every five million operations, these rates can be reduced and incursions can be prevented, thus saving time, money and potentially, lives.

The current form of communication between pilots and air traffic controllers is a radio communication system. Within this system, pilots must switch between different radio frequencies to communicate effectively throughout flight. Pilots can only rely on their situational awareness and the audible information that they receive from air traffic controllers. Any form of miscommunication can lead to a failure to comply with ATC instructions by pilots, which is a major cause of runway incursions.

Developing status lights along the runways will help avoid possible incursions due to miscommunication. The light system will be a visual cue for pilots. This system will be a colored coded model, alerting pilots as to the current use of the runway. The runway edge lights will be utilized in this system. When the runway edge lights are alternating green and amber emissions, then that means that the runway is currently being used for landing, and should not be crossed. When the lights are only green, the runway is being used for a take-off, and should not be crossed. If the edge lights are their usual amber color, then the runway is being used for taxiing, and can be crossed in accordance with ATC instructions. This system should help to alert pilots and airport runway drivers of the current runway use.