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RUNWAY EDGE LIGHTS

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The first runway lighting appeared in 1930 at Cleveland Municipal Airport (now known as Cleveland Hopkins International Airport) in Cleveland, Ohio. A line of lights on an airfield or elsewhere to guide aircraft in taking off or coming in to land or an illuminated runway is sometimes also known as a flare path. Runway Edge Lights are used to outline the edges of runways during periods of darkness or restricted visibility conditions. These light systems are classified according to the intensity they are capable of producing:

High Intensity Runway Lights (HIRL)

Medium Intensity Runway Lights (MIRL)

Low Intensity Runway Lights (LIRL)

The HIRL and MIRL systems have variable intensity controls, whereas the LIRLs normally have one intensity setting. Runway Edge Lights are white, except on instrument runways where yellow replaces white on the last 2,000 feet or half the runway length, whichever is less, to form a caution zone for landings. The lights marking the ends of the runway emit red light toward the runway to indicate the end of runway to a departing aircraft and emit green outward from the runway end to indicate the threshold to landing aircraft.

Many airports have lighting that help guide planes using the runways and taxiways at night or in rain or fog.

On runways, green lights indicate the beginning of the runway for landing, while red lights indicate the end of the runway. Runway edge lighting consists of white lights spaced out on both sides of the runway, indicating the edge. Some airports have more complicated lighting on the runways including lights that run down the centerline of the runway and lights that help indicate the approach (an Approach Lighting System, or ALS). Low-traffic airports may use Pilot Controlled Lighting to save electricity and staffing costs.

Along taxiways, blue lights indicate the taxiway's edge, and some airports have embedded green lights that indicate the centerline.

The edge lights must be arranged such that:

the minimum distance between lines is 75 ft (23 m), and maximum is 200 ft (61 m);

the maximum distance between lights within each line is 200 ft (61 m);

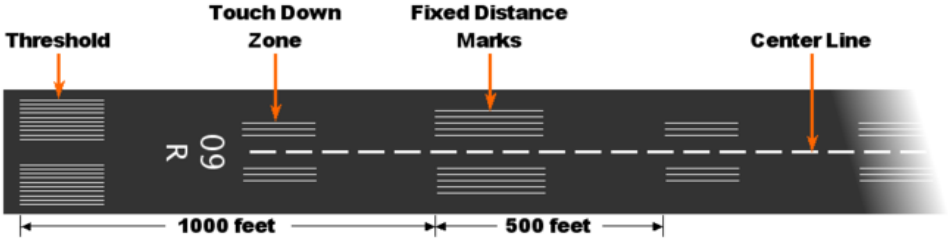
the minimum length of parallel lines is 1,400 ft (427 m);

the minimum number of lights in the line is 8.

An Approach lighting system, or ALS, is a lighting system installed on the approach end of an airport runway and consisting of a series of light bars, strobe lights, or a combination of the two that extends outward from the runway end. ALS usually serves a runway that has an instrument approach procedure (IAP) associated with it and allows the pilot to visually identify the runway environment and align the aircraft with the runway upon arriving at a prescribed point on an approach.

Typically the lights are controlled by a control tower, a Flight Service Station or another designated authority. Some airports/airfields (particularly uncontrolled ones) are equipped with Pilot Controlled Lighting, so that pilots can temporarily turn on the lights when the relevant authority is not available. This avoids the need for automatic systems or staff to turn the lights on at night or in other low visibility situations. This also avoids the cost of having the lighting system on for extended periods. Smaller airports may not have lighted runways or runway markings. Particularly at private airfields for light planes, there may be nothing more than a windsock beside a landing strip.

There are runway markings and signs on any runway. Larger runways have a distance remaining sign (black box with white numbers). This sign uses a single number to indicate the thousands of feet remaining, so 7 will indicate 7,000 ft (2,134 m) remaining. The runway threshold is marked by a line of green lights.



There are three types of runways:

Visual Runways are used at small airstrips and are usually just a strip of grass, gravel, asphalt or concrete. Although there are usually no markings on a visual runway, they may have threshold markings, designators, and centerlines. Additionally, they do not provide an instrument-based landing procedure; pilots must be able to see the runway to use it. Also, radio communication may not be available and pilots must be self-reliant.

Non-precision instrument runways are often used at small- to medium-size airports. These runways, depending on the surface, may be marked with threshold markings, designators, centerlines, and sometimes a 1,000 ft (305 m) mark (known as an aiming point, sometimes installed at 1,500 ft (457 m)). They provide horizontal position guidance to planes on instrument approach via Non-directional beacon (NDB), VHF unidirectional range (VOR), Global Positioning System, etc.

Precision instrument runways, which are found at medium- and large-size airports, consist of a blast pad/stopway (optional, for airports handling jets), threshold, designator, centerline, aiming point, and 500 ft (152 m), 1,000 ft (305 m)/1,500 ft (457 m), 2,000 ft (610 m), 2,500 ft (762 m), and 3,000 ft (914 m) touchdown zone marks. Precision runways provide both horizontal and vertical guidance for instrument approaches.

Runway End Identifier Lights are installed at many airports to provide rapid and positive identification of the approach end of a particular runway. The system consists of a pair of synchronized flashing lights located laterally on each side of the runway threshold. REILs may be either unidirectional or unidirectional facing the approach area.

The Precision Approach Path Indicator (PAPI) can be seen to the right of the runway. The greater number of red lights visible means that the aircraft is below the glideslope. Each box of lights is equipped with an optical apparatus that splits light output into two segments, red and white. Depending on the angle of approach, the lights will appear either red or white to the pilot. Ideally, a pilot would aim for an even split of red and white. The FAA standard for the PAPI is the same as the ICAO's standard Visual Approach Slope Indicator.

The Visual Approach Slope Indicator (VASI) is a system of lights on the side of an airport runway threshold that provides visual descent guidance information during the approach to a runway. These lights may be visible from up to eight kilometers (five miles) during the day and up to 32 kilometers (20 miles) or more at night. Instrument Approach Procedure charts (or *approach plates*) are published for each ILS approach, providing pilots with the needed information to fly an ILS approach during instrument flight rules (IFR) operations, including the radio frequencies used by the ILS components or navaids and the minimum visibility requirements prescribed for the specific approach.

An Instrument landing system (ILS) is a ground-based instrument approach system that provides precision guidance to an aircraft approaching and landing on a runway, using a combination of radio signals and, in many cases, high-intensity lighting arrays to enable a safe landing during instrument meteorological conditions (IMC), such as low ceilings or reduced visibility due to fog, rain, or blowing snow.