

Airport Lighting Aids - Ground Lesson

Attention

Four red...we might end up dead.

Objective

To understand what all the lighting around the airport means as it is there to help us.

Schedule

Ground instruction – 10 minutes

Reference Material

FAA AIM
ASA Prepware

Material

Precision Approach Path Indicator (PAPI)

The precision approach path indicator (PAPI) uses light units similar to the VASI but are installed in a single row of either two or four light units. These lights are visible from about 5 miles during the day and up to 20 miles at night. The visual glide path of the PAPI typically provides safe obstruction clearance within plus or minus 10 degrees of the extended runway centerline and to 3.4 NM from the runway threshold. Descent, using the PAPI, should not be initiated until the aircraft is visually aligned with the runway. The row of light units is normally installed on the left side of the runway and the glide path indications are as depicted. Lateral course guidance is provided by the runway or runway lights. In certain circumstances, the safe obstruction clearance area may be reduced by narrowing the beam width or shortening the usable distance due to local limitations, or the PAPI may be offset from the extended runway centerline. This will be noted in the Chart Supplement U.S. and/or applicable NOTAMs.



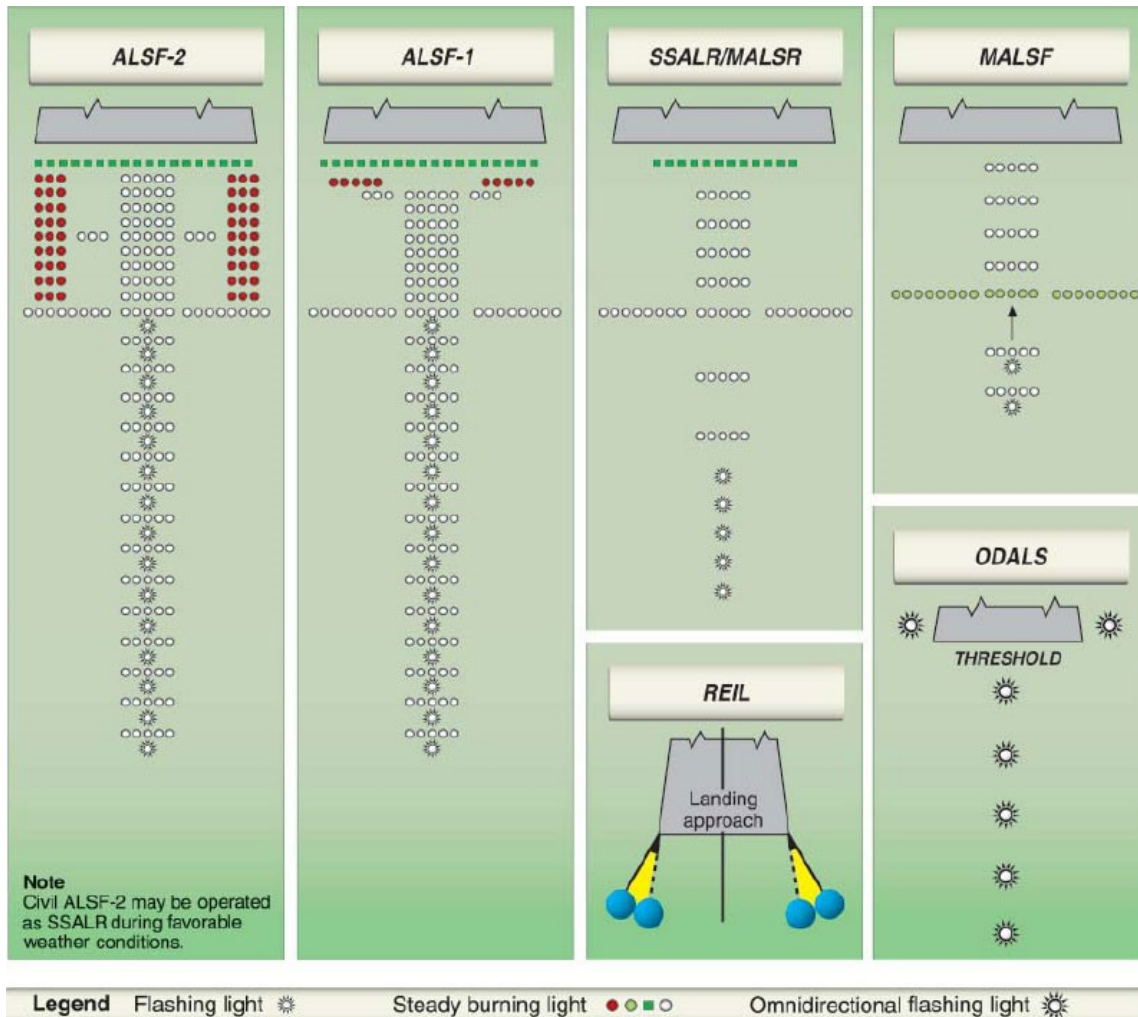
Figure 1 – PAPI lights

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Approach Light Systems (ALS)

ALS provide the basic means to transition from instrument flight to visual flight for landing. Operational requirements dictate the sophistication and configuration of the approach light system for a particular runway.

ALS are a configuration of signal lights starting at the landing threshold and extending into the approach area a distance of 2400–3000 feet for precision instrument runways and 1400–1500 feet for nonprecision instrument runways. Some systems include sequenced flashing lights which appear to the pilot as a ball of light traveling towards the runway at high speed (twice a second).



ALSF—Approach light system with sequenced flashing lights

SSALR—Simplified short approach light system with runway alignment indicator lights

MALSR—Medium intensity approach light system with runway alignment indicator lights

REIL—Runway end identification lights

MALSF—Medium intensity approach light system with sequenced flashing lights (and runway alignment)

ODALS—Omnidirectional approach light system

Figure 2 - Approach Light Systems

Visual Approach Slope Indicator (VASI)

VASI installations may consist of either 2, 4, 6, 12, or 16 light units arranged in bars referred to as near, middle, and far bars. Most VASI installations consist of 2 bars, near and far, and may consist of 2, 4, or 12 light units. Some VASIs consist of three bars, near, middle, and far, which provide an additional visual glide path to accommodate high cockpit aircraft.

Two-bar VASI installations provide one visual glide path which is normally set at 3 degrees. Three-bar VASI installations provide two visual glide paths. The lower glide path is provided by the near and middle bars and is normally set at 3 degrees while the upper glide path, provided by the middle and far bars, is normally 1/4 degree higher. This higher glide path is intended for use only by high cockpit aircraft to provide a sufficient threshold crossing height. Although normal glide path angles are three degrees, angles at some locations may be as high as 4.5 degrees to give proper obstacle clearance. Pilots of high performance aircraft are cautioned that use of VASI angles in excess of 3.5 degrees may cause an increase in runway length required for landing and rollout.

The basic principle of the VASI is that of color differentiation between red and white. Each light unit projects a beam of light having a white segment in the upper part of the beam and red segment in the lower part of the beam. The light units are arranged so that the pilot using the VASIs during an approach will see the combination of lights shown below.

The VASI is a system of lights so arranged to provide visual descent guidance information during the approach to a runway. These lights are visible from 3–5 miles during the day and up to 20 miles or more at night. The visual glide path of the VASI provides safe obstruction clearance within plus or minus 10 degrees of the extended runway centerline and to 4 NM from the runway threshold. Descent, using the VASI, should not be initiated until the aircraft is visually aligned with the runway. Lateral course guidance is provided by the runway or runway lights. In certain circumstances, the safe obstruction clearance area may be reduced by narrowing the beam width or shortening the usable distance due to local limitations, or the VASI may be offset from the extended runway centerline. This will be noted in the Chart Supplement U.S. and/or applicable notices to airmen (NOTAM).

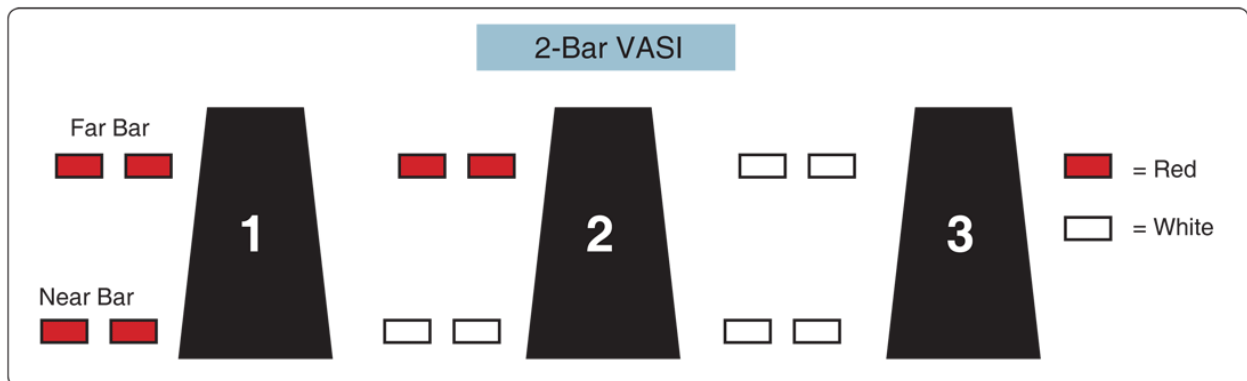


Figure 134. 2-BAR VASI.

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Figure 3 – 2 Bar VASI

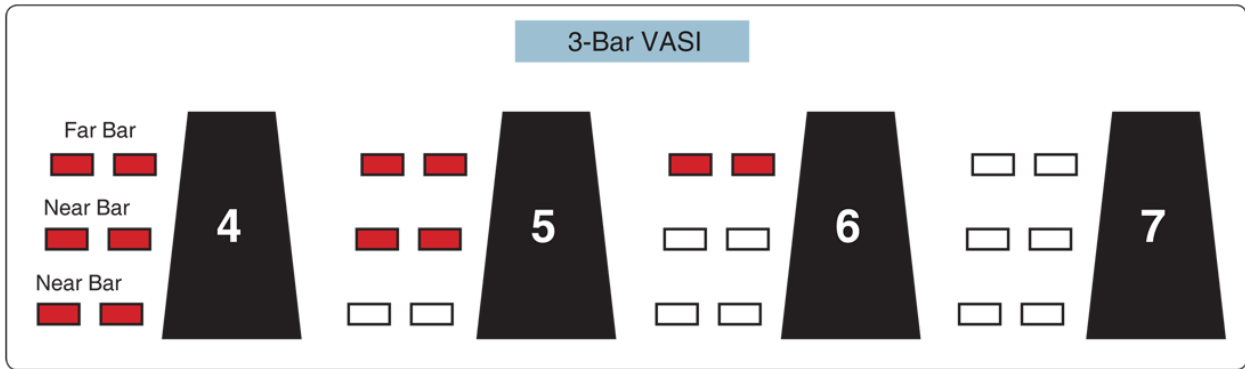


Figure 135. 3-BAR VASI.

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Figure 4 – 3 Bar VASI

Tri-color VASI

Tri-color visual approach slope indicators normally consist of a single light unit projecting a three-color visual approach path into the final approach area of the runway upon which the indicator is installed. The below glide path indication is red, the above glide path indication is amber, and the on glide path indication is green. These types of indicators have a useful range of approximately one-half to one mile during the day and up to five miles at night depending upon the visibility conditions.

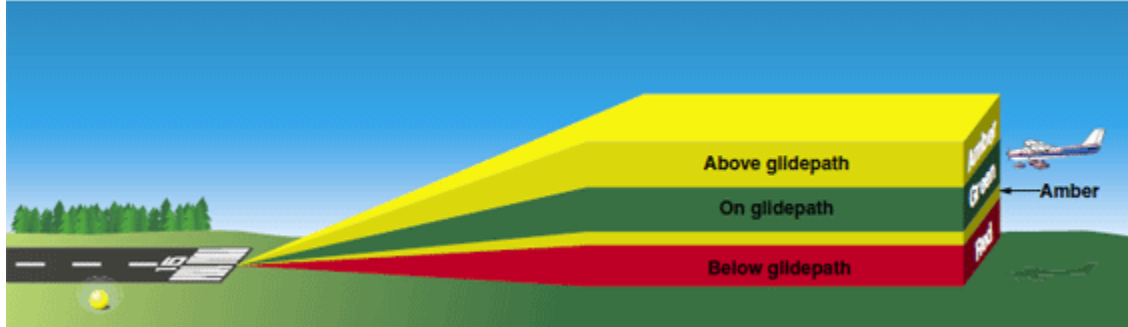


Figure 5 - Tri Color VASI

Runway End Identifier Lights (REIL)

REILs are installed at many airfields 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 omnidirectional or unidirectional facing the approach area.

They are effective for:

- Identification of a runway surrounded by a preponderance of other lighting.
- Identification of a runway which lacks contrast with surrounding terrain.
- Identification of a runway during reduced visibility.

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Runway Edge Light Systems

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 or brightness they are capable of producing: they are the High Intensity Runway Lights (HIRL), Medium Intensity Runway Lights (MIRL), and the Low Intensity Runway Lights (LIRL). The HIRL and MIRL systems have variable intensity controls, whereas the LIRLs normally have one intensity setting.

The runway edge lights are white, except on instrument runways 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.



Taxiway Lights

Simply put, all taxiways are surrounded by blue lights. Make sure to stay on pavement between blue lights from the runway to the ramp

