



Airports

NEXT



Flight safety is dependent on the proper airport markings and your knowledge of these markings.

LEARN MORE

You must have a thorough understanding of the airport markings and lighting systems, which ensure the safe and orderly movement of aircraft on the airport, to issue control instructions.



Purpose

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This lesson covers airports, including areas of an airport and the different types of airport marking and lighting aids, and their use.



Objectives

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At the end of this lesson, you will be able to identify:

1. Areas of an Airport
2. Airport Markings
3. Airport Lighting

You will meet the objectives in accordance with the following references:

- FAA Order JO 7110.65
- Aeronautical Information Manual (AIM)





Airports

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Airport Definition

An airport is an area on land or water that is used or intended to be used for the landing and takeoff of aircraft and includes its buildings and facilities, if any.

Airports contain movement and non-movement areas.

JO 7110.65, Pilot/Controller Glossary.





Airports

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Movement Areas

Movement areas are:

- Runways
- Taxiways
- Other selected areas of an airport/heliport

Movement areas are used for:

- Takeoff and landing of aircraft
- Taxiing
- Hover taxiing
- Air taxiing

At those airports/heliports with a tower, specific approval for entry onto movement areas must be obtained from Air Traffic Control (ATC).

JO 7110.65, Pilot/Controller Glossary





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Non-movement Area

Non-movement areas are taxiways and apron (ramp) areas on the airport which are not under the control of ATC.

[LEARN MORE](#)

- Taxiways not visible from the tower
- Apron (ramp) areas used for:
 - Loading and unloading passengers or cargo
 - Parking
 - Refueling
 - Maintenance
 - With regard to seaplanes, a ramp is used for access to the apron from the water.

Reference: JO 7110.65, Pilot/Controller Glossary



Airport Markings

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General

Airport markings are used on runway and taxiway surfaces to identify a specific runway, runway threshold, centerline, hold line, etc.

AIM, Chap. 2

NOTE: Not all airport markings will be taught in this lesson. The markings covered in this lesson reflect current FAA recommended standards.



Airport Markings

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Pavement Markings

Colors of pavement markings identify airport areas as follows:

AIM, Chap. 2

| COLOR | AIRPORT AREA |
|--------|---|
| White | Runways and landing areas (including heliports) |
| Yellow | Taxiways, closed and hazardous areas, and holding positions |



Airport Markings

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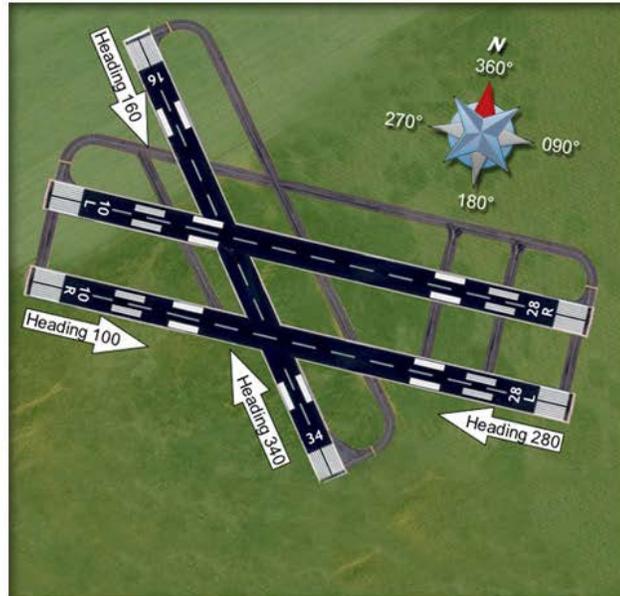
NEXT

Runway Designators

Runway designators identify runways by a number, or a number and letter determined with respect to the direction (heading) of approach.

- Each runway has two designators, one at each end.
- Each runway number is determined by the runway centerline's magnetic direction (3 digits), rounded to the nearest 10 degrees.
 - 5's and higher are rounded up.
 - Example: The magnetic direction 275 is rounded up to 280 degrees.
 - 4's and lower are rounded down.
 - Example: The magnetic direction 163 is rounded down to 160 degrees.
- Only the first two numbers are used.
 - Example: The magnetic direction 337 is rounded up to 340 degrees. The runway designator would be 34.
 - Exception - leading zeros are dropped
 - Example: A runway aligned with a magnetic direction of 060 degrees is labeled as Runway 6.

AIM, Chap. 2





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Runway Designators

- 360° and 000° are the same
- In ATC, 000° is not used

Examples:

004 degrees = 360 = RWY 36

030 degrees = 030 = RWY 03 = RWY 3 (leading zero dropped)

086 degrees = 090 = RWY 09 = RWY 9 (leading zero dropped)

115 degrees = 120 = RWY 12

244 degrees = 240 = RWY 24

356 degrees = 360 = RWY 36

AIM, Chap. 2





Airport Markings

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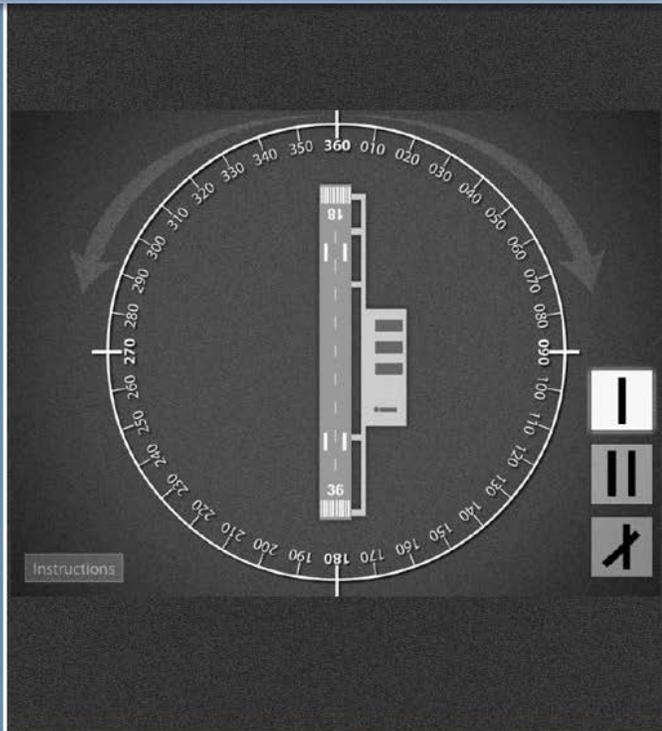
Runway Designators

Single runways are identified by numbers only.

- Parallel runways use a supplemental letter in the order shown from left to right, when viewed from the direction of approach.
 - Two runways: L, R
 - Three runways: L, C, R
- If an airport has more than three parallel runways, they will not all have the same numbers, even if they are all aligned on the same magnetic heading.
 - Four runways: L, R, L, R

Example: If all four runways are aligned on a magnetic heading of 176 degrees, two runways would be labeled 18 Left and 18 Right, but the other two would be labeled 17 Left and 17 Right for identification purposes.

AIM, Chap. 2





Airport Markings

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Runway Centerlines

Runway centerlines provide alignment guidance during takeoffs and landings.

Runway centerlines consist of a line of uniformly spaced stripes and gaps.

AIM, Chap. 2



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Runway threshold markings

| NUMBER OF STRIPES | RUNWAY WIDTH |
|-------------------|--------------|
| 4 | 60 feet |
| 6 | 75 feet |
| 8 | 100 feet |
| 12 | 150 feet |
| 16 | 200 feet |

Runway Threshold Markings

Runway threshold markings identify the beginning of the runway that is usable for landing.

Runway threshold markings are stripes of uniform dimension aligned along the runway and placed at the approach end of the runway.

- The stripes are placed symmetrically on either side of the runway centerline.
- The number of stripes appears in one of two configurations.
 - Configuration A has eight stripes, with the number of stripes unrelated to runway width.
 - Configuration B has 4 to 16 stripes, with the number of stripes related to runway width according to the table above.

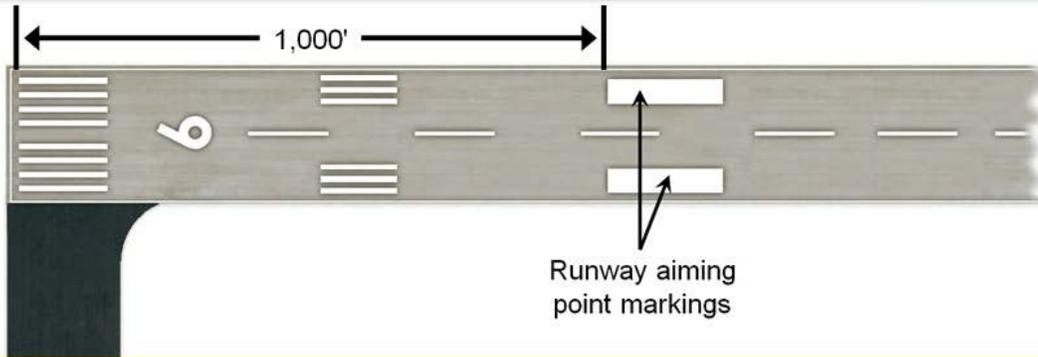
AIM, Chap. 2



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Runway Aiming Point Markings

The runway aiming point markings serve as a visual aiming point for landing aircraft.

- Marked by two broad rectangular white stripes, one on each side of the runway centerline
- Positioned approximately 1,000 feet from landing threshold

AIM, Chap. 2

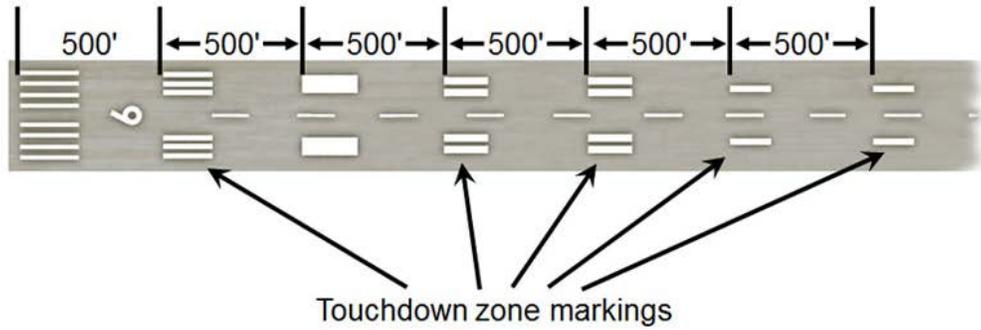




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Runway Touchdown Zone Markings

Runway touchdown zone markings identify the touchdown zone for landings.

Runway touchdown zone markings consist of pairs of three, then two, and then one rectangular bar(s) on each side of the runway centerline, 500 feet apart.

- Includes the runway aiming point markings

AIM, Chap. 2





Airport Markings

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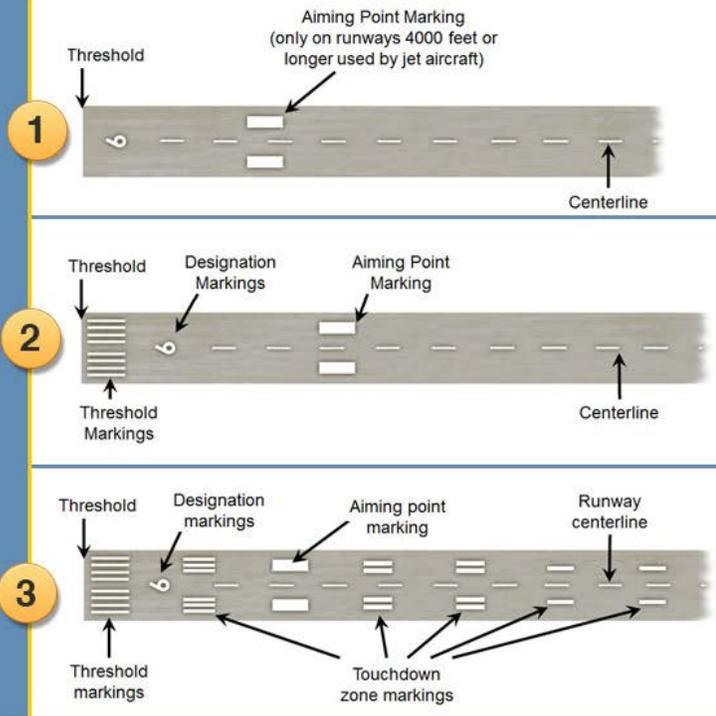
NEXT

Approaches and Runway Markings

Runway markings are determined by the type of approach available for the runway.

- 1. No instrument approach (Visual Runway)
- 2. Nonprecision instrument approach
- 3. Precision instrument approach

AIM, Chap. 2



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Airport Markings

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Shoulder markings

Runway side stripes

Shoulder markings

Runway sides

Midpoint of runway

Runway Side Stripes and Shoulder Markings

Runway side stripes extend down the full length of the runway pavement area.

- Provide visual contrast with the surrounding terrain or shoulders
- Are marked by continuous white stripes along each side of the runway

LEARN MORE

Runway shoulder markings **may** supplement the runway side stripes.

- Identify pavement areas adjacent to the runway sides that are not intended for use by aircraft.
 - Shoulder stripes are yellow.
 - They are at 45-degree angles to the runway.

NOTE: Some markings, such as shoulder markings, are not used at all airports.

Reference: AIM Chap. 2

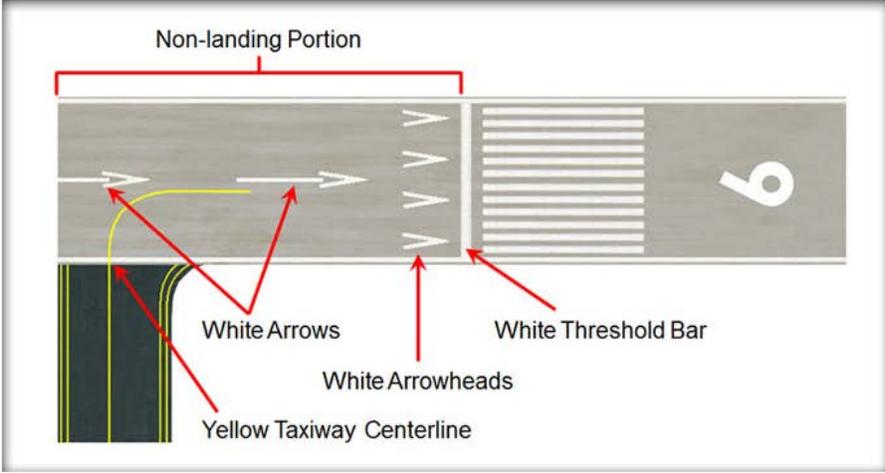


AIR TRAFFIC BASICS | Lesson 3: Airports

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Airport Markings

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Displaced Threshold

A displaced threshold is a threshold located at a point on the runway other than the designated beginning of the runway.

- Reduces the length of runway available for landings

LEARN MORE

The portion of the runway that extends from the beginning of the runway to the displaced threshold is not available for landing, termed the non-landing portion. It is available for:

- Takeoffs in either direction
- Landing rollouts from the opposite direction

Displaced threshold markings are on the non-landing portion of the runway.

- A 10-foot wide white threshold bar is positioned perpendicular to the centerline across the width of runway at the point of displacement.
- Four white arrowheads with uniform spacing are located adjacent to the threshold bar, pointing in the direction of landing.
- White arrows are located along the centerline in the area between the beginning of the runway and the displaced threshold.
- Yellow taxiway centerline markings may extend into the displaced area.

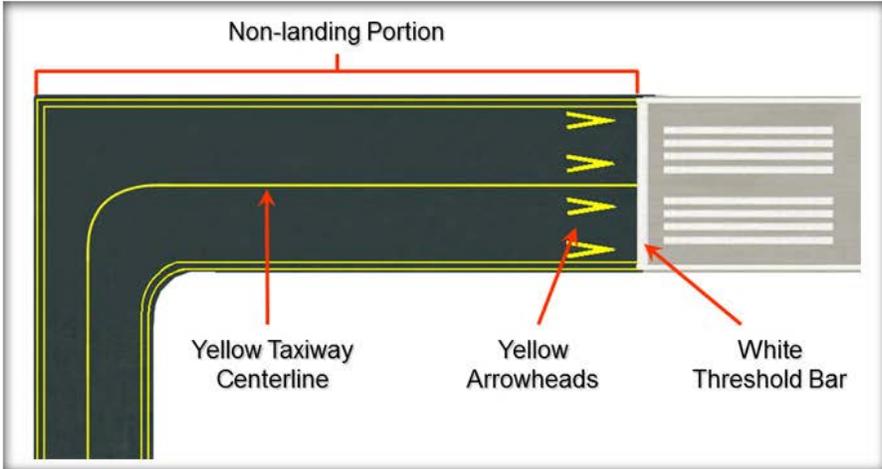
Reference: AIM, Chap. 2



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Airport Markings

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Relocated Threshold

A relocated threshold closes a set portion of the approach end of a runway and shortens the departure lengths for both runways and the roll out length of the opposite direction runway.

[LEARN MORE](#)

- The threshold may be relocated due to construction, maintenance, or other activities.
- Normally a Notice to Airmen (NOTAM) is issued by the airport operator as to the duration of the relocation.
 - Closing can vary from a few hours to several months.

Runway markings used to identify the relocated thresholds vary.

- One common practice is to use a 10-foot wide white threshold bar across the width of the runway.
- Runway lights between the old threshold and relocated threshold will not be illuminated.
- Runway markings may or may not be obliterated, removed, or covered.

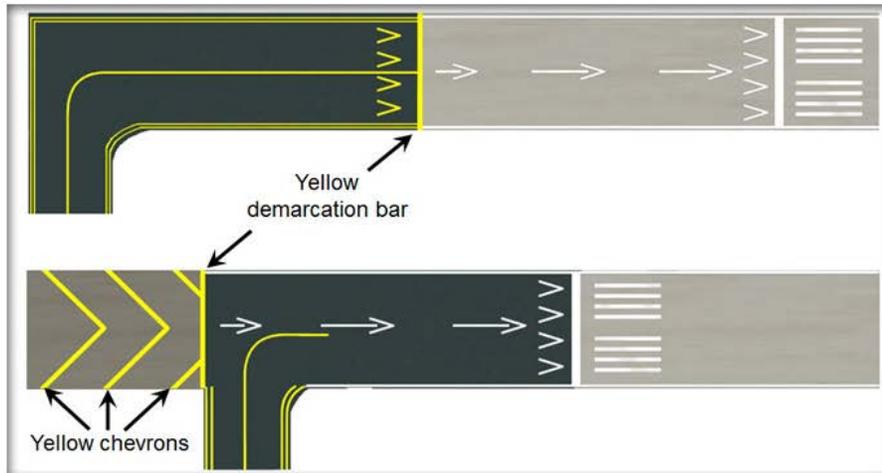
Reference: AIM, Chap. 2



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Demarcation Bar and Chevrons

A demarcation bar delineates a runway with a displaced threshold from a blast pad, stopway, or taxiway that precedes the runway.

- The demarcation bar is three feet wide and yellow.

Chevrons are used to show pavement areas aligned with the runway that are unusable for landing, takeoff, and taxiing.

- Chevrons are large yellow arrows that extend across the unusable extension of the runway.

AIM, Chap. 2



Airport Markings

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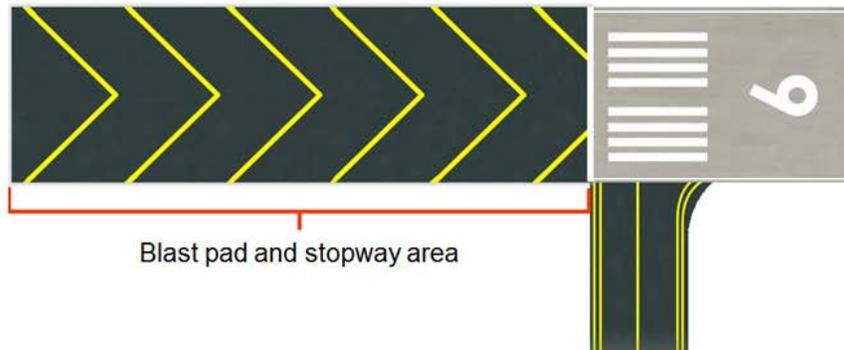
Blast Pads and Stopways

The blast pad and stopway area is any surface or area extending beyond the usable runway which appears usable, but which is not intended for use in normal operations.

- A blast pad is a hard-surfaced area designed to limit blowing debris during engine runup.
- A stopway is an overrun area past the end of the runway that is used for decelerating an aircraft during an aborted takeoff.

Blast pad and stopway areas are marked with large yellow chevrons pointing in the direction of the threshold.

AIM, Chap. 2





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Airport Markings

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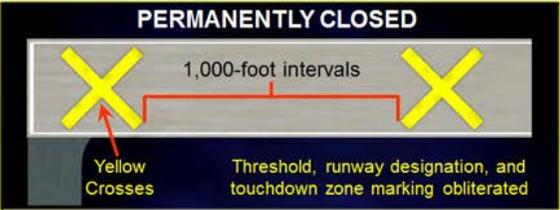
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Closed Runway and Taxiway

A closed runway or taxiway is one which is unusable and may be hazardous even though it may appear usable.

- During permanent closings:
 - Lighting circuits are disconnected
 - Yellow crosses are placed at each end of the runway and at 1,000-foot intervals
 - Threshold, runway designation, and touchdown zone markings are obliterated

PERMANENTLY CLOSED



Yellow Crosses Threshold, runway designation, and touchdown zone marking obliterated

TEMPORARILY CLOSED



Yellow crosses at ends only

LEARN MORE

- During temporary closings:
 - Yellow crosses are placed only at each end of the runway.
 - A raised lighted yellow cross may be placed on each runway end.
- Temporarily closed taxiways are usually treated as hazardous areas:
 - No aircraft may enter.
 - The taxiway is blocked with barricades.
 - As an alternative to barricades, a yellow cross may be installed at each entrance to the taxiway.

Reference: AIM, Chap. 2



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Runway Location Signs

Runway signs provide visual cues for aircraft in the vicinity of, or on, the runway.

Two types of runway signs are considered in this lesson.

- Runway location signs
- Distance remaining signs

Runway location signs assist a pilot in confirming the designation of the runway that the aircraft is on.

- Marked by a black background with a yellow inscription and a yellow border

AIM Chapter 2

FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC BASICS | Lesson 3: Airports

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Airport Markings

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Runway Distance Remaining Signs

Runway distance remaining signs provide visual cues along the side(s) of the runway and indicate how much of the landing runway remains.



LEARN MORE

- Distance remaining signs may be installed along one or both sides of the runway.
- They display distance remaining in numbers in thousands of feet.
- They are marked by a black background with white numerals.
- The last sign, with the numeral “1,” is placed at least 950 feet from the runway end.

Reference: AIM, Chap. 2



Airport Markings

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Mandatory Instruction Signs

These signs have a red background with a white inscription.

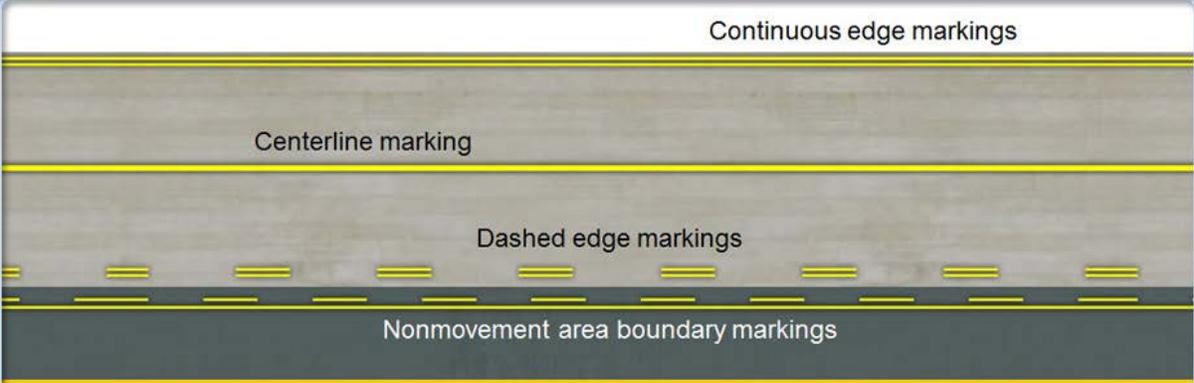
- They are used to denote an entrance to a runway or critical area, and areas where an aircraft is prohibited from entering.
 - Typical mandatory signs and applications are:
 - Runway holding position
 - Runway approach area holding position
 - ILS critical area holding position
 - No entry sign

AIM, Chap. 2

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Airport Markings

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Continuous edge markings

Centerline marking

Dashed edge markings

Nonmovement area boundary markings

Taxiway Markings

Taxiway markings provide visual cues for aircraft taxiing along a designated path.

The types of taxiway markings considered are:

- Taxiway centerline markings
- Taxiway edge markings
- Taxiway shoulder markings
- Geographic position markings
- Non-movement area boundary marking



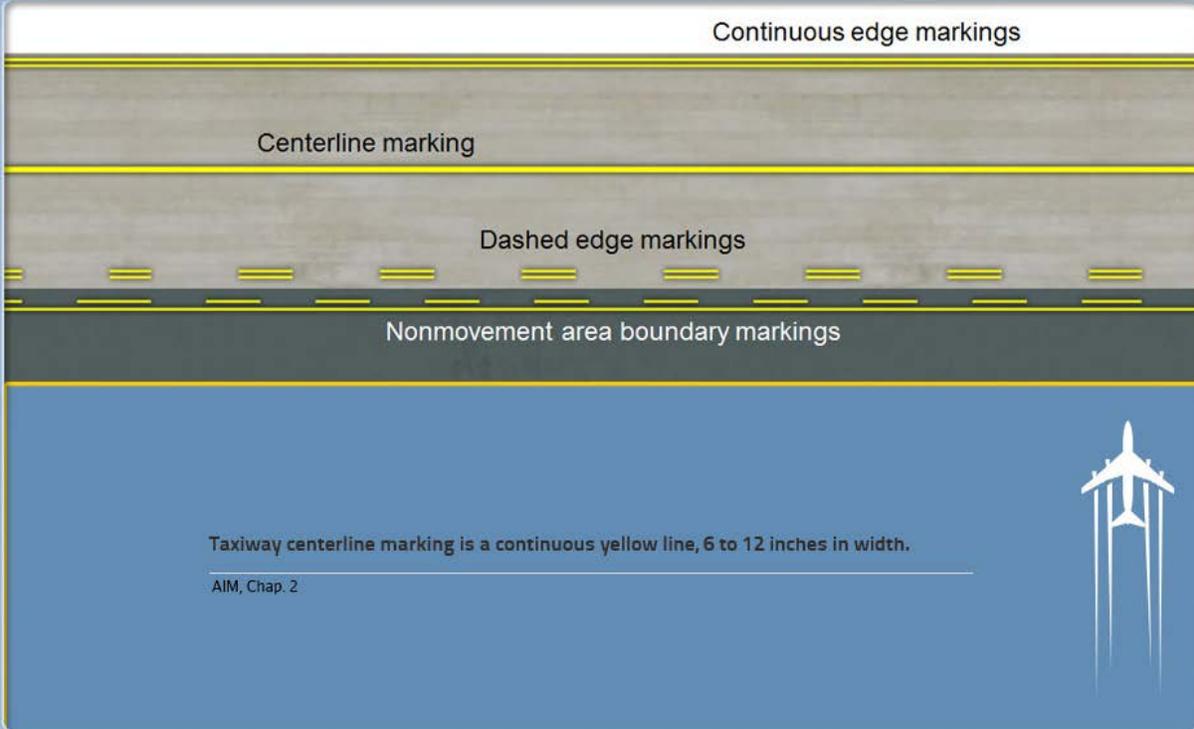


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Continuous edge markings

A diagram showing four types of taxiway markings on a grey surface. From top to bottom: 1. Continuous edge markings: two parallel solid yellow lines. 2. Centerline marking: a single solid yellow line. 3. Dashed edge markings: two parallel dashed yellow lines. 4. Nonmovement area boundary markings: a solid yellow line on a dark grey background.

Centerline marking

Dashed edge markings

Nonmovement area boundary markings

Taxiway centerline marking is a continuous yellow line, 6 to 12 inches in width.

AIM, Chap. 2

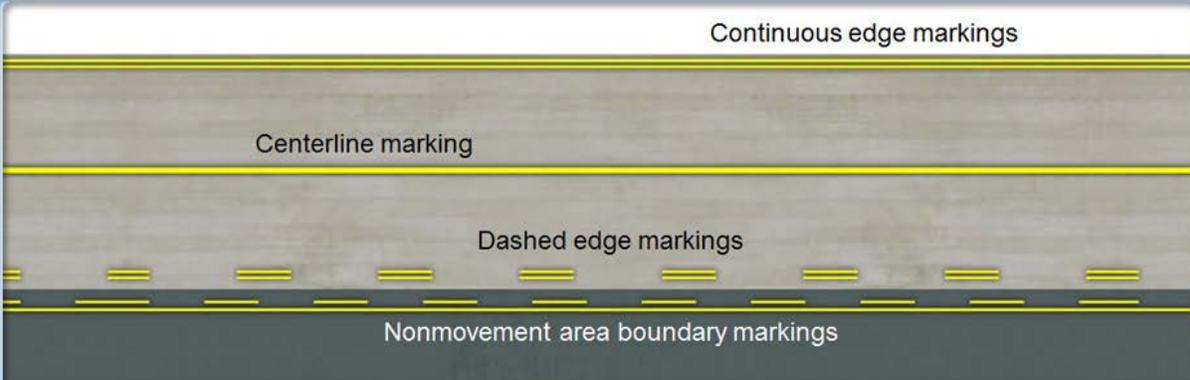
A white silhouette of an airplane flying upwards, positioned in the bottom right corner of the diagram area.



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- Taxiway edge markings are primarily used when the taxiway edge does not correspond with the edge of the pavement.
 - Two types of markings are used depending on whether the aircraft is supposed to cross the taxiway edge.
 - Continuous yellow, double lines define the taxiway edge from the shoulder, or other abutting paved surface not intended for use by aircraft.
 - Lines are 6 inches in width and spaced 6 inches apart.
 - Dashed yellow, double lines define the edge of a taxiway or taxi lane where adjoining pavement is intended for use by aircraft. Example: Apron.
 - Lines are 6 inches in width, spaced 6 inches apart, and 15 feet in length with 25-foot gaps.

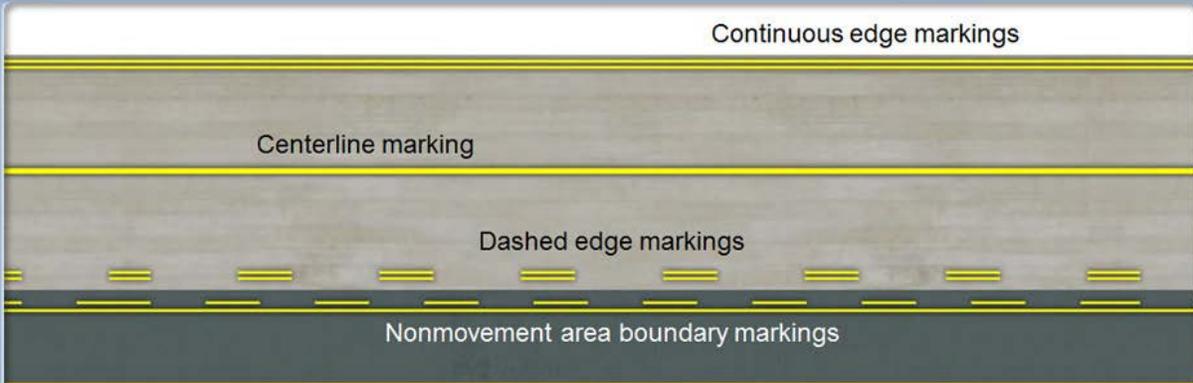




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Non-movement Area Boundary Marking

- Delineates the movement area from the non-movement area
- Consists of one dashed and one solid yellow line
- Solid line is on the non-movement area side



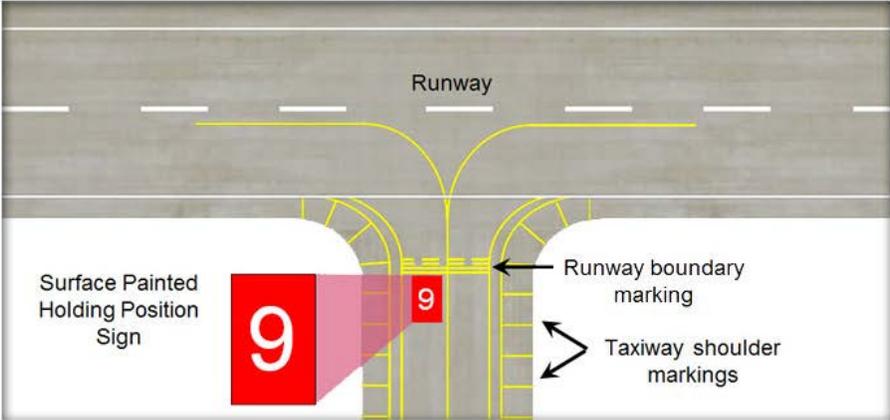


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Airport Markings



The diagram shows a top-down view of an airport pavement. At the top is a runway with white dashed centerline and solid edge lines. Below the runway is a taxiway. A yellow line marks the boundary between the runway and the taxiway. To the left of the taxiway is a holding position sign, which is a red rectangle with a white number '9'. Yellow dashed lines on the taxiway indicate taxiway shoulder markings. Labels with arrows point to the 'Surface Painted Holding Position Sign', the 'Runway boundary marking', and the 'Taxiway shoulder markings'.

Holding Signs/Taxiway Markings

In the above graphic:

- Taxiway shoulder markings indicate that the pavement is not intended for use by aircraft and may be unable to support an aircraft.
 - They are yellow.

[LEARN MORE](#)

- The surface painted holding position sign is an example of a mandatory instruction sign.
 - They have a red background with white text.
 - ♦ The one in this graphic indicates that the aircraft shall hold short of Runway 9.

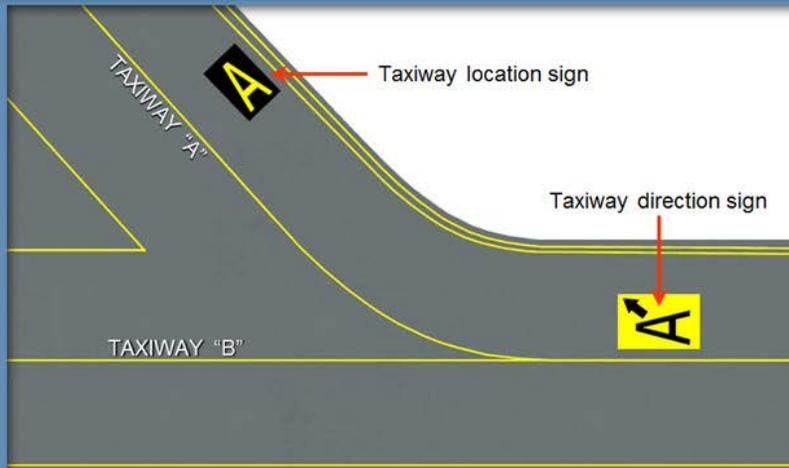
Reference: AIM, Chap. 2



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Surface-Painted Taxiway Signs

Both types of taxiway signs may be surface-painted on the taxiway when other signs are impractical, or to supplement those signs.

- They are painted on the right side of the centerline.

AIM, Chap. 2

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Airport Markings

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Taxiway Location Sign Taxiway Direction Sign

Taxiway Signs

Taxiway signs provide visual cues for aircraft taxiing along a designated path, and are usually located along the side of the taxiway.

LEARN MORE

- Taxiway location signs indicate which taxiway the aircraft is on.
 - They are marked by a black background with a yellow inscription and a yellow border.
- Taxiway direction signs indicate the direction the aircraft must turn in order to get to the desired taxiway.
 - They are marked by a yellow background with a black inscription.
 - They always have an arrow.

Reference: AIM, Chap. 2



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Taxiway Signs

Combinations of taxiway location and direction signs can be used.

AIM, Chap. 2



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Civil Heliports



Hospital Heliports



Closed Heliports

Helicopter Landing Areas

The markings of heliport landing areas indicate their use.

The letter 'H' in the markings is oriented to align with the intended direction of approach.

- Civil heliports have a white H.
- Hospital heliports have a red H inside a large red outlined cross.
- Closed heliports have a yellow X through the H.

AIM, Chap. 2

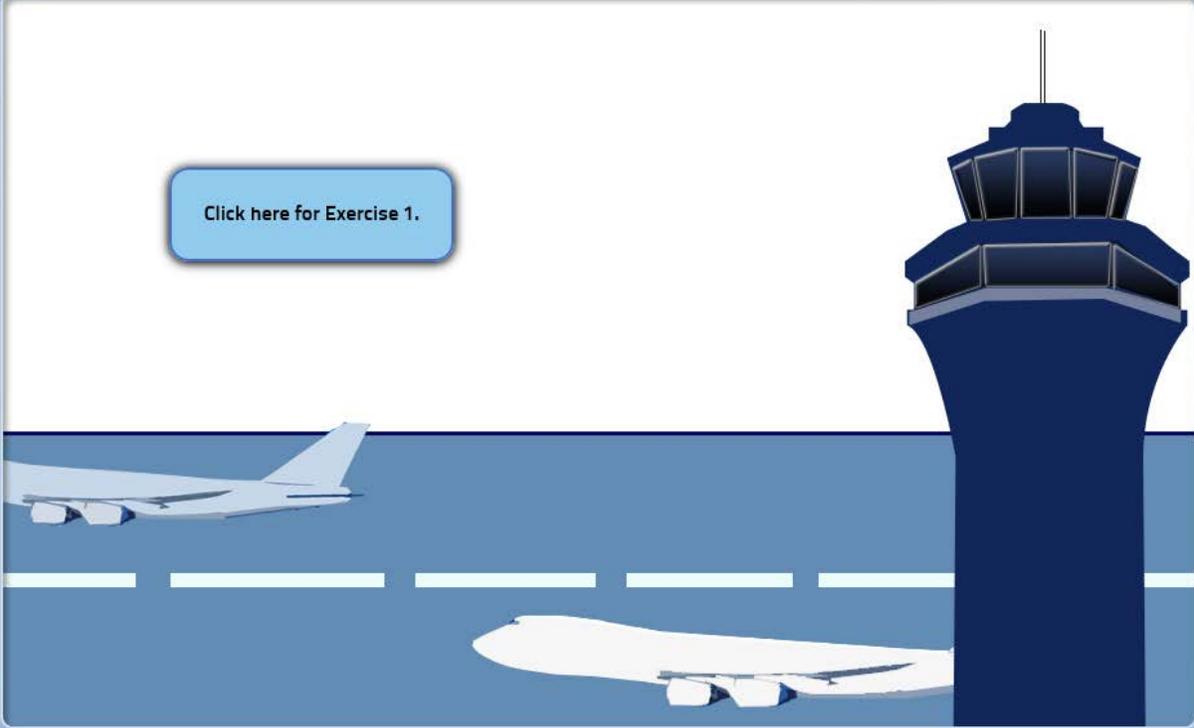


Exercise 1: Airport Markings

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Click here for Exercise 1.





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Airport Lighting

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Airport Beacons

Rotating airport beacons help the pilot identify the type of airport.

- Can be on top of the control tower or some other tall structure located on the airport
- Flashes, or appears to flash, at regular intervals

A combination of colors identifies the type of airport as follows:

NOTE: Not all types of airport lighting will be taught in this lesson.

Types of Airport Beacons

| TYPE OF AIRPORT | COLORS | LIGHT FLASHES |
|-----------------------|---|---|
| Lighted land airport | Flashing white to green repeating |   |
| Lighted water airport | Flashing white to yellow repeating |   |
| Lighted heliport | Flashing white to yellow to green repeating |    |
| Military airport | Two quick white flashes followed by a green flash and repeating |    |

[LEARN MORE](#)

The rotating beacon is turned on at night or during restricted weather conditions.

- Operation of the rotating beacon during the day often indicates that the surface visibility is less than 3 statute miles and/or the ceiling is less than 1,000 feet.

Reference: AIM, Chap. 2



Airport Lighting

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Runway Lights

There are three types of runway lights:

- Runway End Identifier Lights (REIL)
- Runway Edge Light System
- In-Runway Lighting

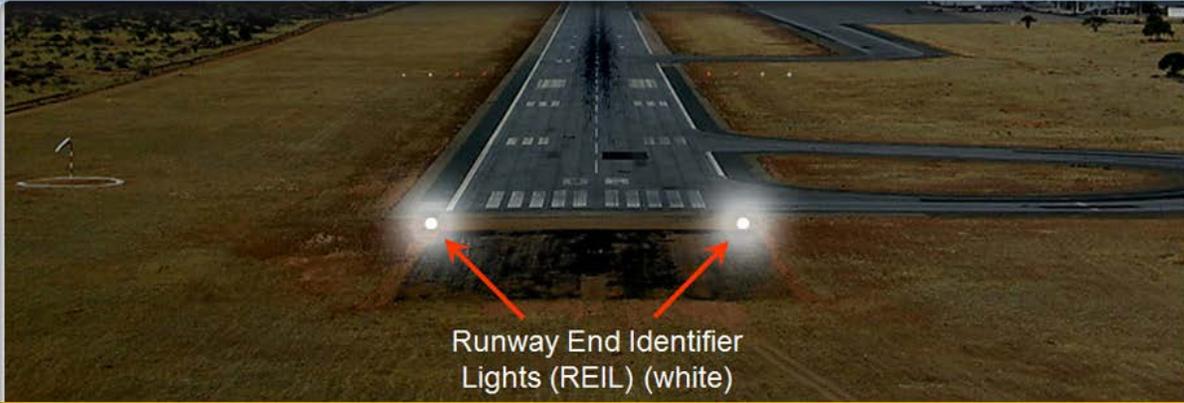
AIM, Chap. 2



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Runway End Identifier Lights (REIL) (white)

Runway End Identifier Lights (REIL)

Runway End Identifier Lights (REILs) consist of a pair of synchronized white flashing strobe lights located laterally on each side of the runway threshold facing the incoming traffic.

REILs identify a runway:

- Surrounded by a preponderance of other lighting
- Which lacks contrast with the surrounding terrain
- During reduced visibility

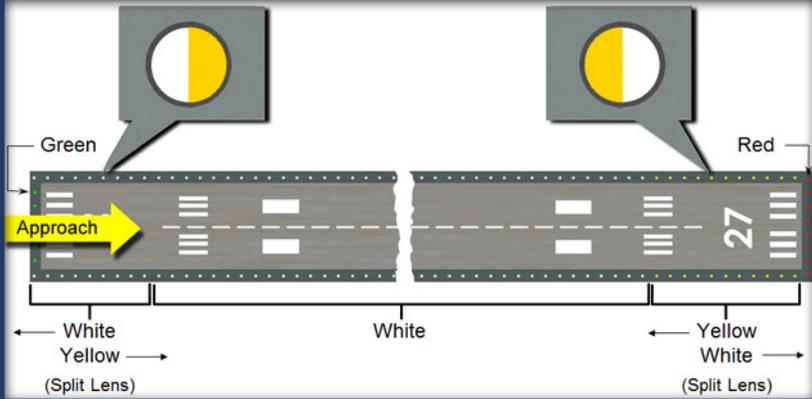
AIM, Chap. 2


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Runway Edge Light System

The runway edge light system outlines all edges of runways.

- Classified according to their intensity or brightness capability

Runway edge lights are white except:

- For runways with approved instrument approaches
 - Yellow replaces white on the last 2,000 feet or half of the runway length, whichever is less.

LEARN MORE

Threshold lights marking the ends of the runway emit:

- Red light toward the runway to indicate the end of the runway
- Green light outward from the runway to indicate the landing threshold

Reference: AIM, Chap. 2



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In-Runway Lighting

There are two types of in-runway lighting:

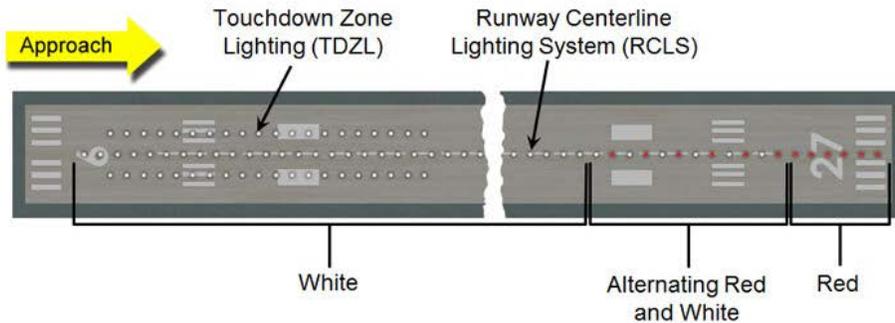
1. Touchdown Zone Lighting (TDZL) consists of two rows of lights; one on either side and parallel to the runway centerline lights.

- Starts 100 feet from the landing threshold
- Extends to 3,000 feet from the threshold or midpoint of the runway, whichever is less

2. Runway Centerline Lighting System (RCLS) consists of lights spaced at 50-foot intervals.

- White until last 3,000 feet
- Then white alternating with red for the next 2,000 feet
- All red the last 1,000 feet

AIM, Chap. 2

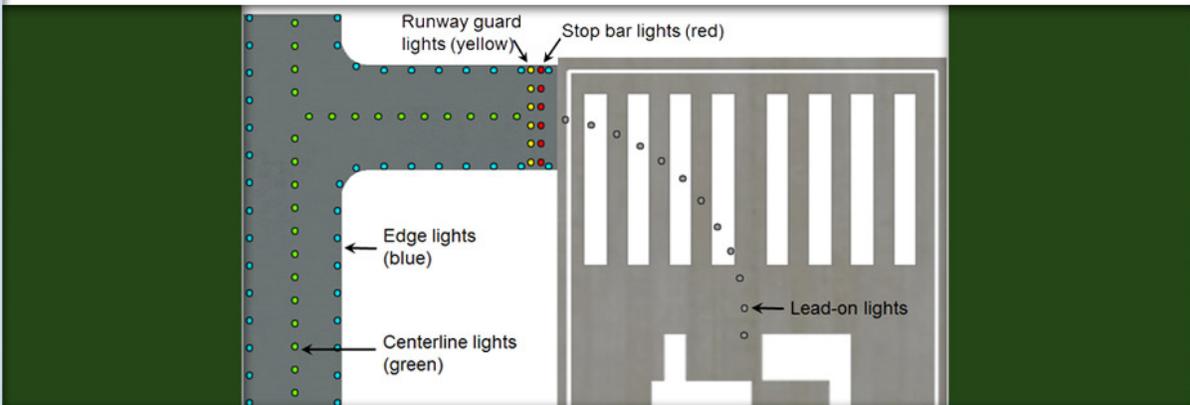



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Taxiway Lights

Taxiway edge lights outline the edges of taxiways during periods of darkness and restricted visibility.

- Taxiway edge lights emit a blue light.

Taxiway centerline lights are used to facilitate ground traffic under low visibility.

- Taxiway centerline lights emit a steady green light.

Runway guard lights are installed at holding positions to further attract attention in low visibility conditions. They consist of:

- A row of in-pavement yellow lights across a taxiway (some locations may use a pair of elevated flashing lights on either side of the taxiway)

AIM, Chap. 2



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Airport Lighting

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Taxiway Lights

Stop bar lights are used to confirm the ATC clearance to enter or cross the active runway in low visibility conditions.

- They consist of a row of red, unidirectional in-pavement lights installed across the entire taxiway at the runway holding position, and elevated steady-burning red lights on each side.
- They are operated in conjunction with the taxiway centerline lead-on lights which extend from the stop bar toward the runway.
- Following the ATC clearance to proceed, stop bar lights are turned off and lead-on lights are turned on.
- The stop bar and lead-on lights are automatically reset by a sensor or backup timer.

AIM, Chap. 2



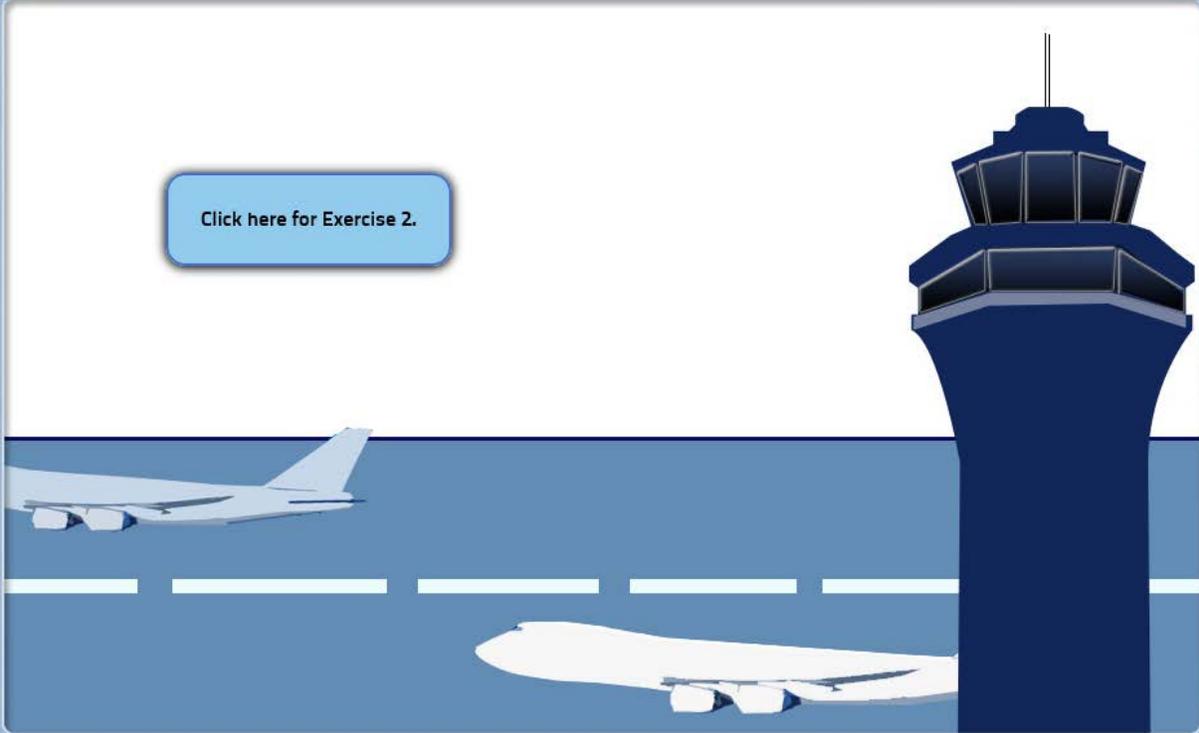


Exercise 2: Airport Lighting

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[Click here for Exercise 2.](#)





Conclusion

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Lesson Summary



This lesson covered:

- Airports
- Airport Markings
- Airport Lighting

