

# UNIT 5

## THE FACILITIES IN AIRSIDE AREA



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  - 2.3 Taxiway lighting system
  
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4. Airfield Signage

# 1. Runway system

## 1.1 Definition of runway

Runway is a defined rectangular area on land aerodrome prepared for aircraft landing and take off (Civil Aviation Authority of Singapore, 2011; ICAO, 2016).



**RUNWAY**

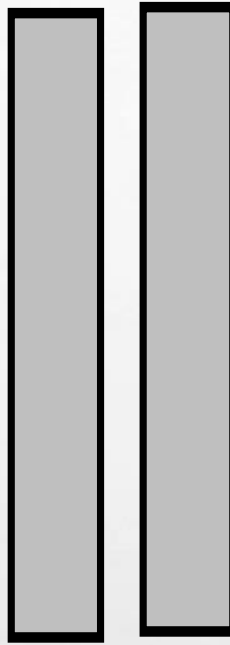
## 1. Runway system

### 1.2 Runway configurations

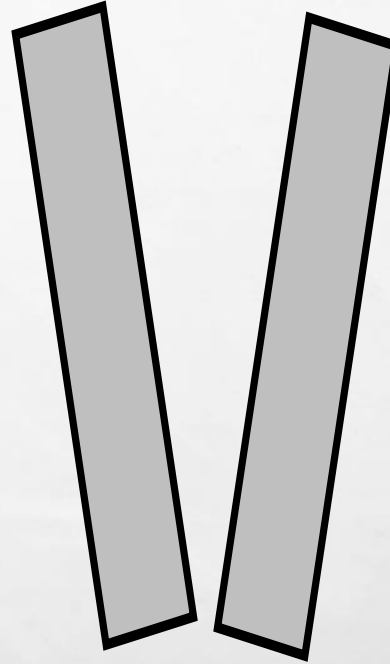
There are 3 main runway configurations;

- parallel runways
- Open-V runways
- intersecting runways

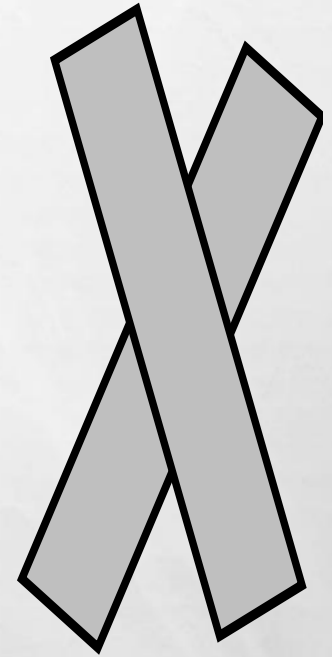
Each runway separation is at least 3,000 ft  
Recommend 5,000 ft



Parallel Runways



Open-V Runways



Intersecting Runways

**Figure:** Three types of runway configurations.

# Runway marking

## 3 types of runway marking

1. visual or basic marking  
(Aircraft operation use visual approach, clear visibility)
2. non-precision instrument  
(Use air navigation facilities with horizontal guidance)
3. precision instrument. Use air navigation facilities with horizontal and vertical guidance

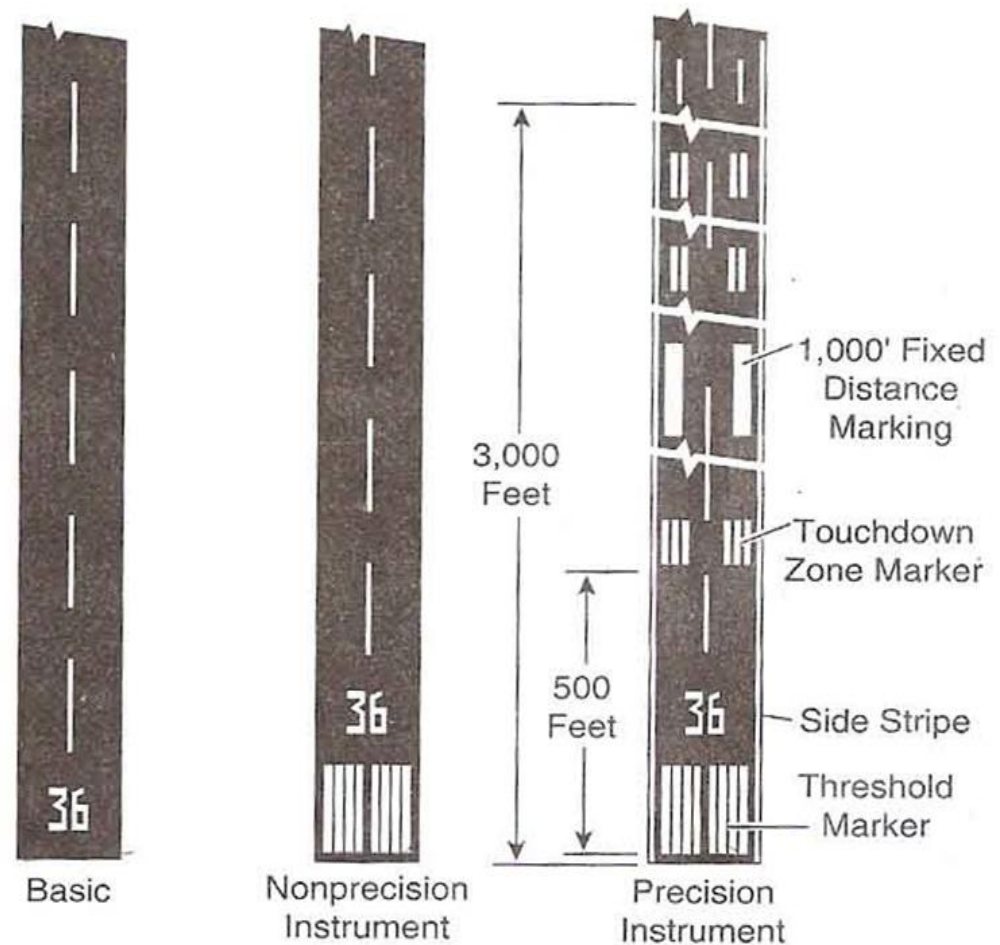
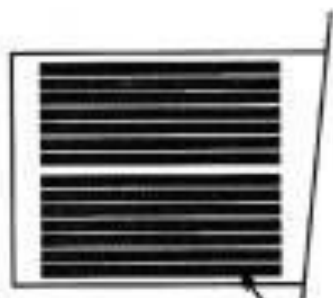
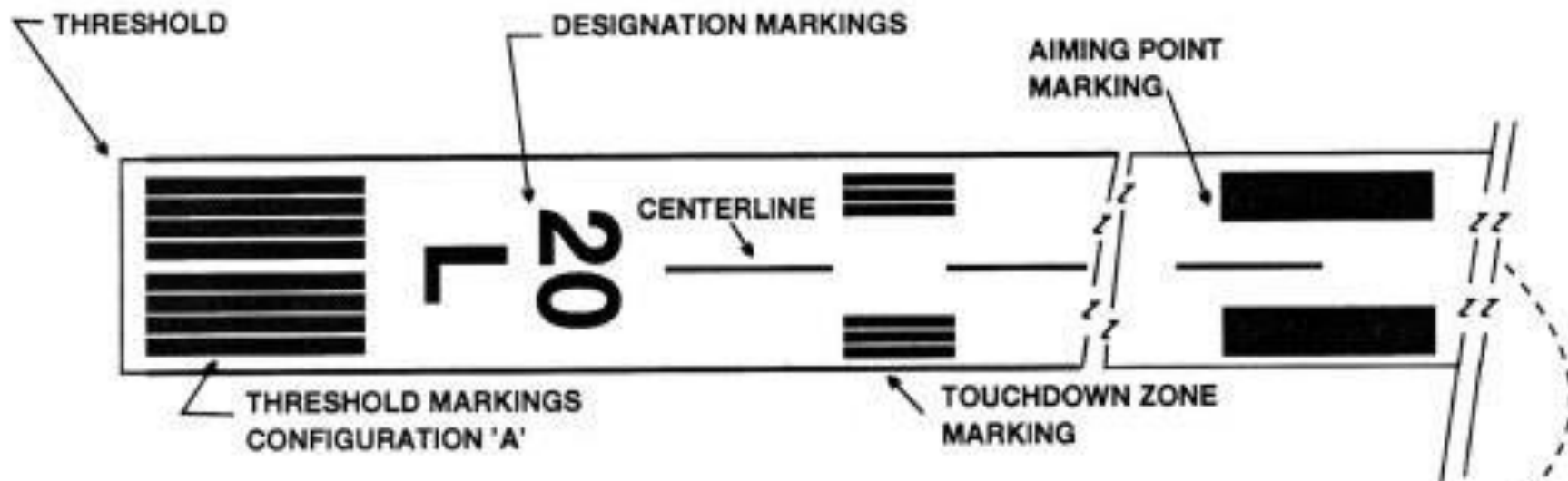
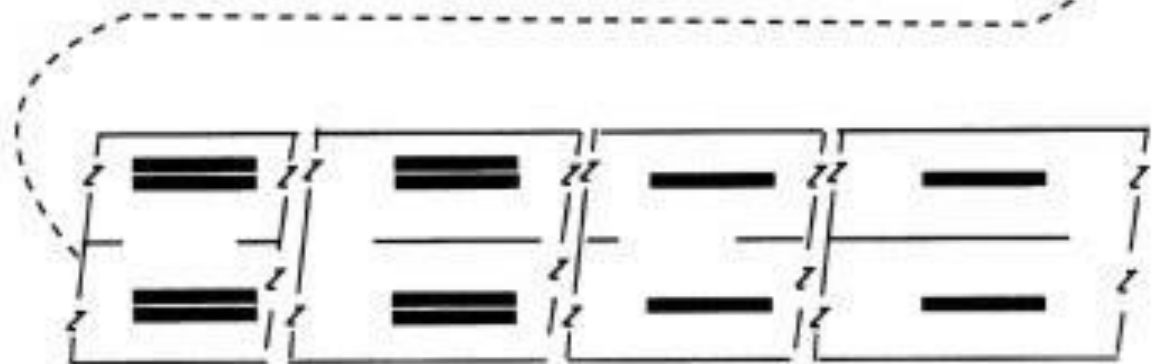


Figure ;Runway marking according to types of runway.  
Source: [www.google.com](http://www.google.com) [Retrieved on August 25, 2016]

# Runway marking details



THRESHOLD MARKINGS CONFIGURATION 'B'  
NUMBER OF STRIPES  
RELATED TO RUNWAY  
WIDTH - SEE TEXT

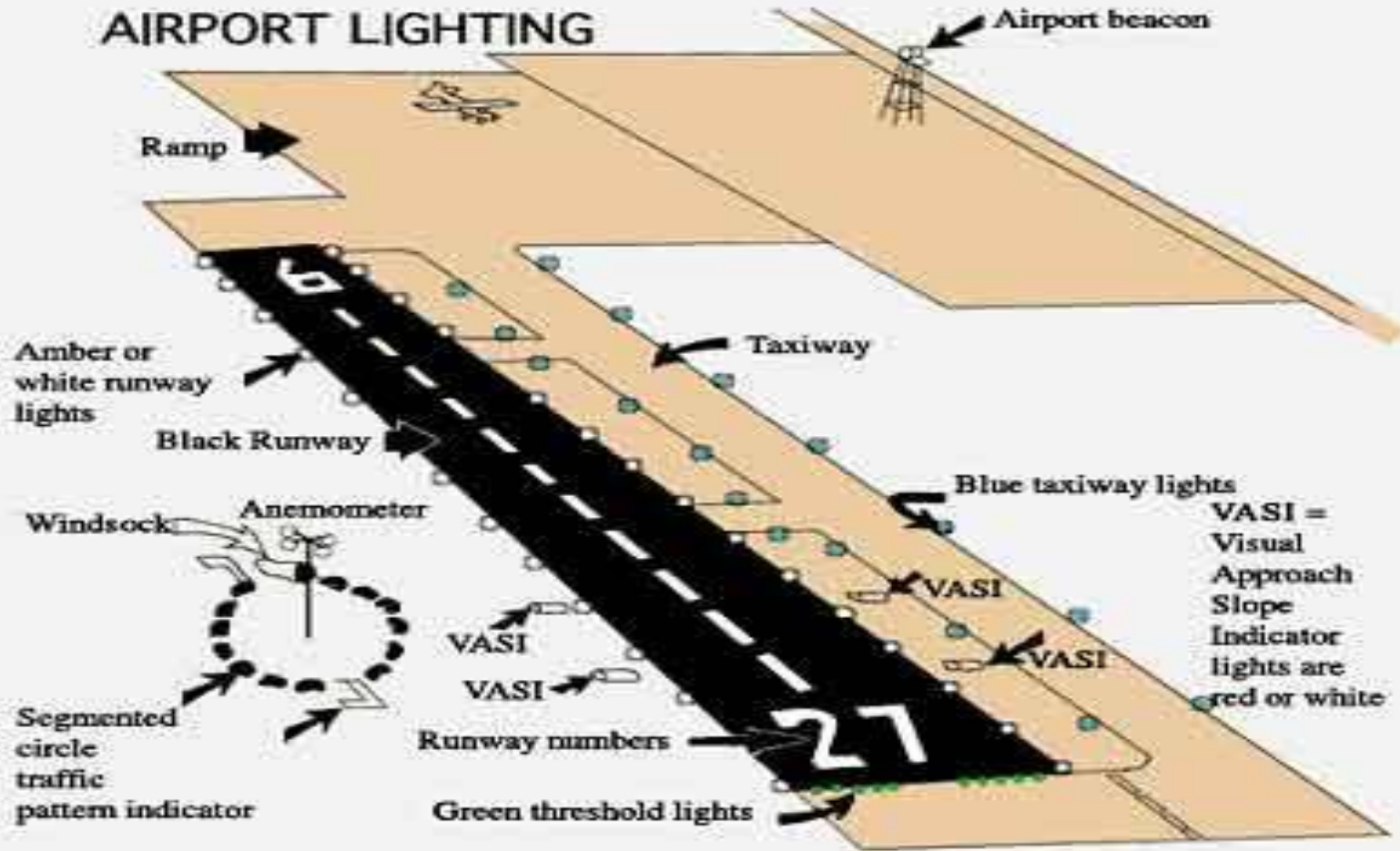


## 1. Runway system

- THE LIGHTING SYSTEM IN THE AIRFIELD HELPS PILOT TAKEOFF AND LANDING SAFELY DURING THE NIGHT TIMES AND POOR VISIBILITY. GENERALLY, THE AIRFIELD LIGHTING SYSTEM CONSISTS OF RUNWAY LIGHTING, TAXIWAY LIGHTING, APPROACH LIGHTING SYSTEMS.
- VISUAL GLIDESLOPE INDICATORS: THE LIGHTING SYSTEM LOCATED NEAR BOTH SIDES OF RUNWAY TO ASSIST AIRCRAFT WITH VISUAL BASED ALIGNMENT VERTICALLY ON APPROACH TO LAND. THE COMMON USE ARE;

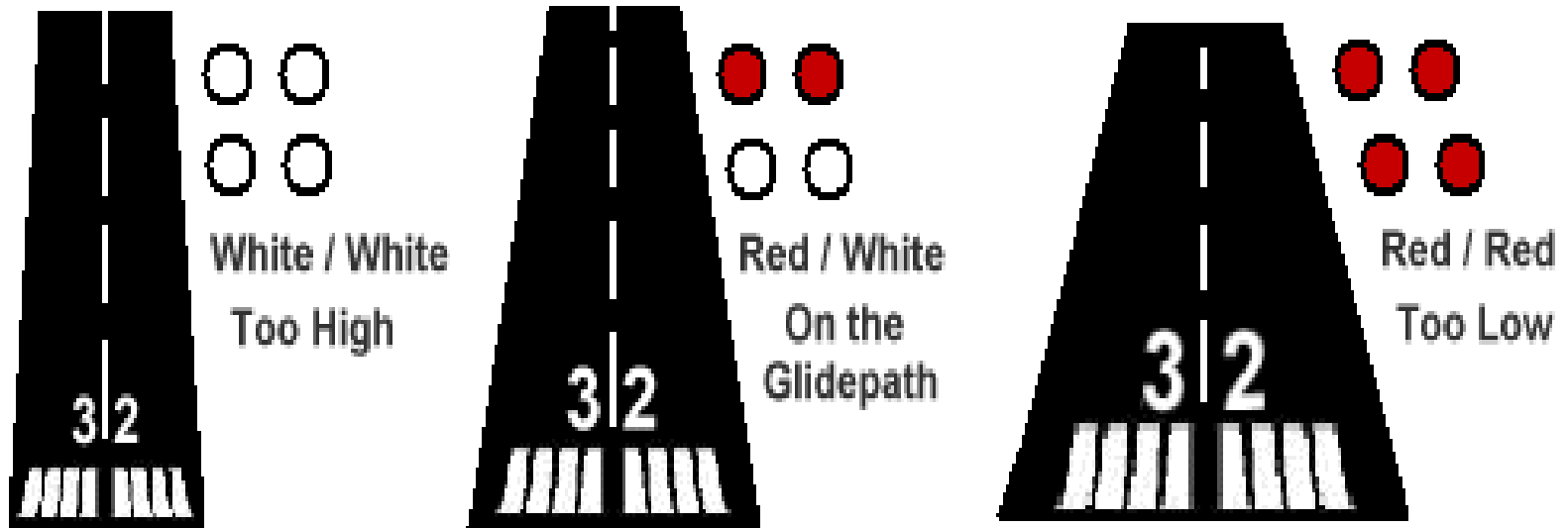


# 1. Runway system : Airport Lighting



## Visual Approach Slope Indicator Systems (VASIS)

a system of light intended to provide visual descent guidance during aircraft's approach to a runway.



# VASIS



If both light bars are white, you are too high.



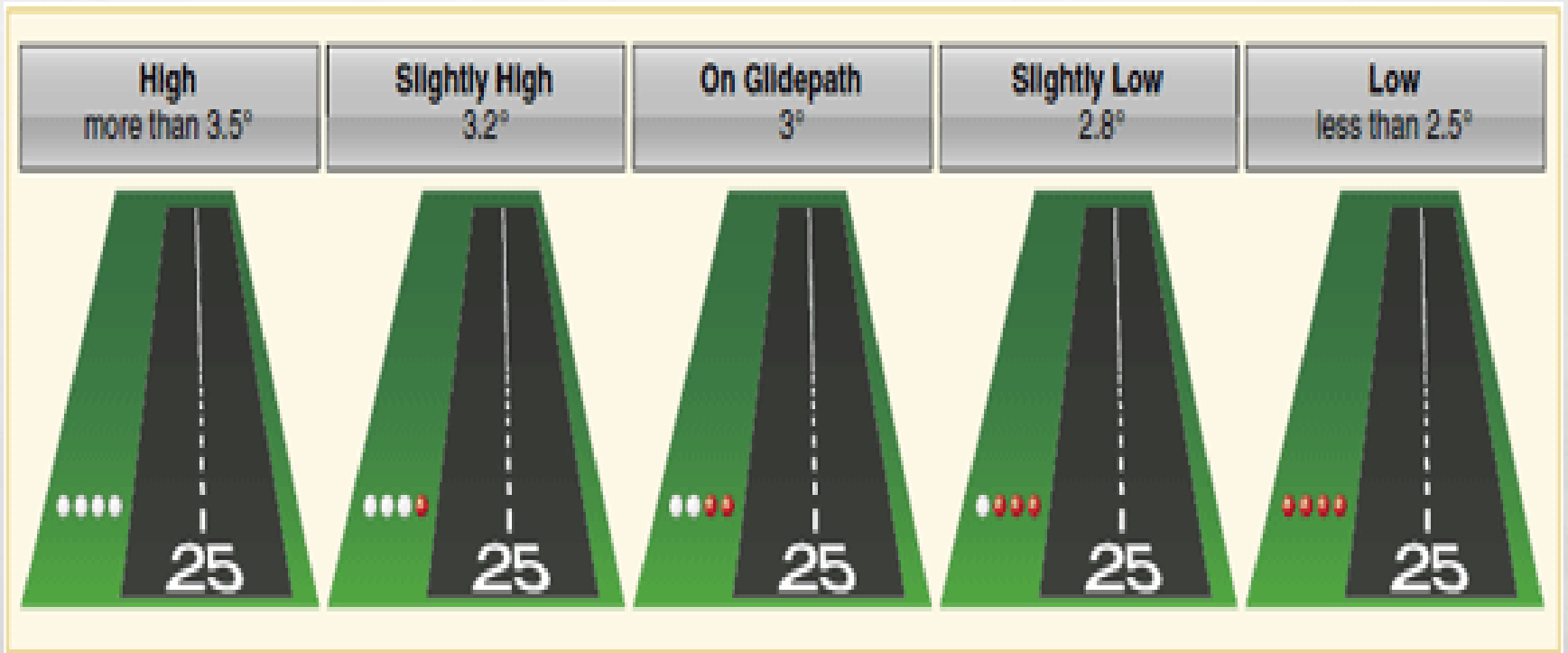
If you see red over red, you are below the glidepath.



If the far bar is red and the near bar is white, you are on the glidepath. The memory aid "red over white, you're all right," is helpful in recalling the correct sequence of lights.

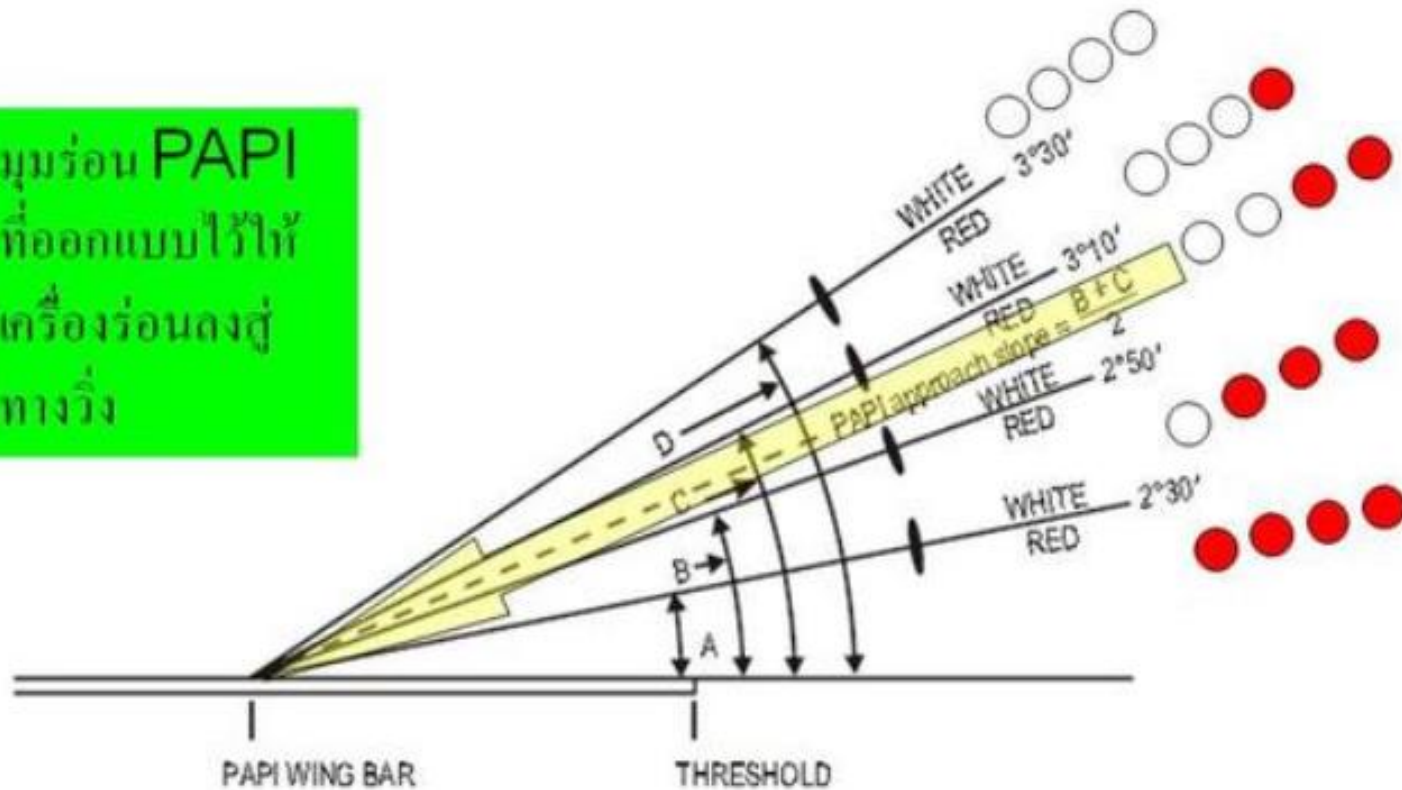
# PAPI

Precision approach path indicator (**PAPI**): using similar light as VASI, but installed in a single row of two or four lights.



# PAPI ไฟบอกมุมร่อน

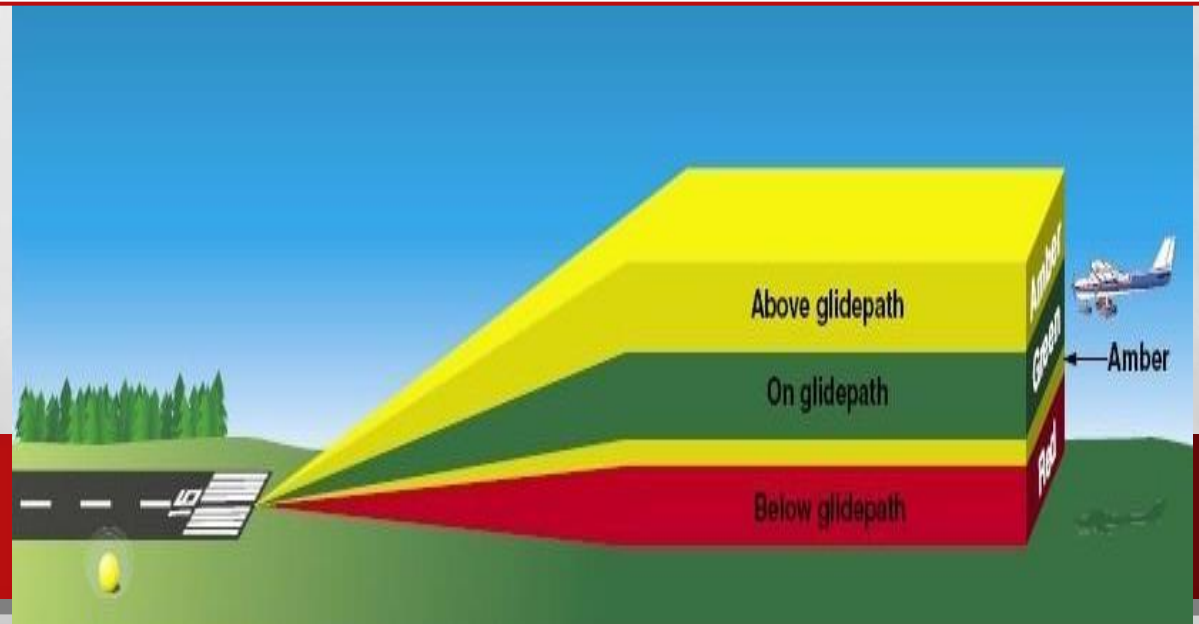
มุมร่อน PAPI  
ที่ออกแบบไว้ให้  
เครื่องร่อนลงสู่  
ทางวิ่ง



## TRI Color

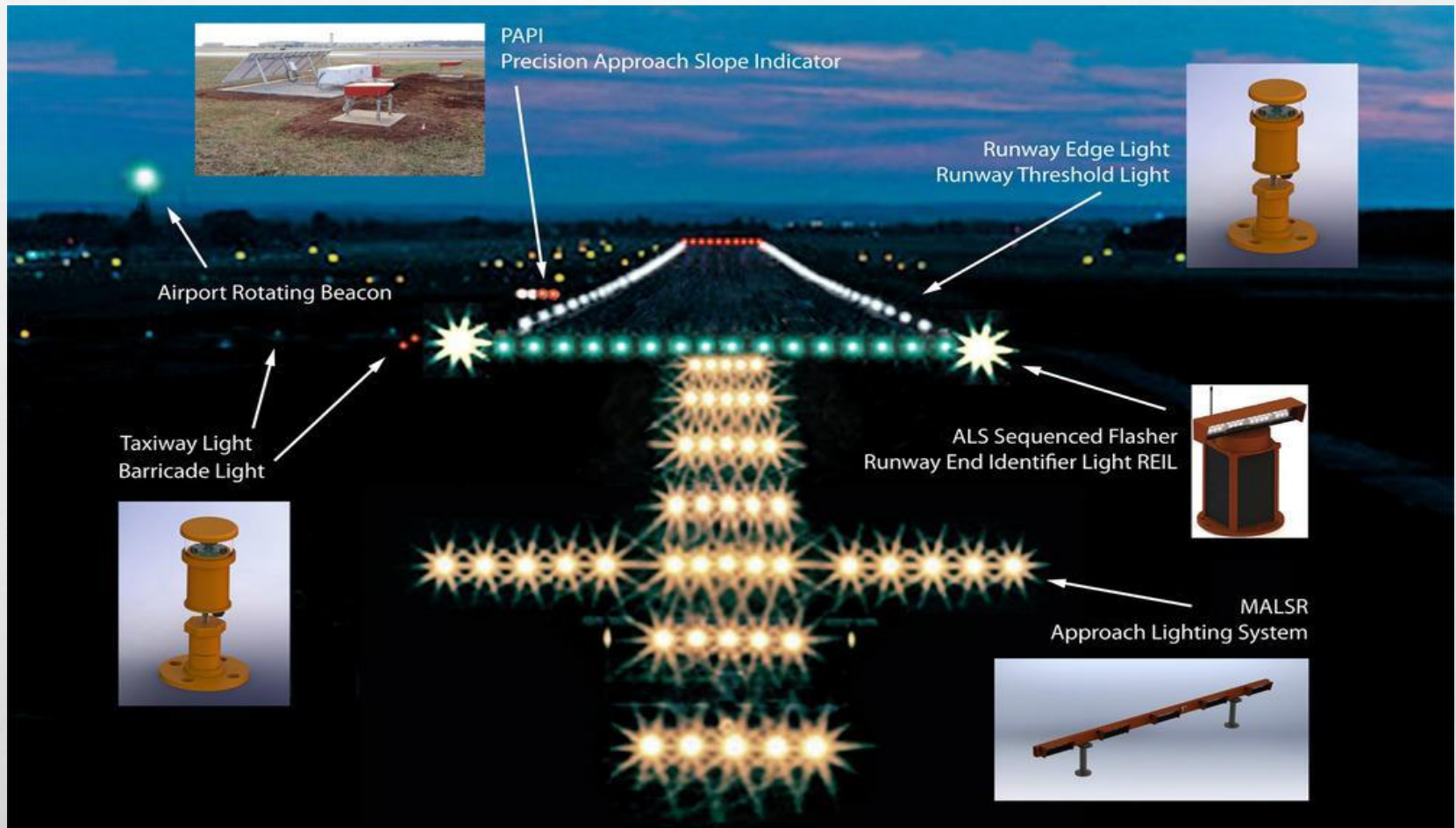
Tricolor visual approach slope indicators: a system of three color of lights consist of red light indicate below glide, slightly below and above glide indicate by amber, and on glide indicate by green color

ขณะรักษามุมร่อนลงให้ตรงตามแนวสัญญาณบอกมุมร่อนหรือ (Glide Path) สายตานักบินจะอยู่สูงพอดีกับเส้นสีเหลืองตามรูป จึงทำให้มองเห็นโคมไฟ PAPI 2 ดวงเหนือเส้นเหลืองเป็นสีแดง ขณะที่มองเห็นโคมไฟ PAPI ดวงที่อยู่ต่ำกว่าเส้นเหลืองเป็นสีขาว นั่นคือเห็นไฟ PAPI ขาว 2 ดวงแดง 2 ดวง





# 1. Runway system







## 2. Taxiway system

### 2.1 Definition of taxiway and taxiway planning criteria

Taxiway is a path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome to other areas, ex. from runway to terminal.



**TAXIWAY**

## 2. Taxiway system

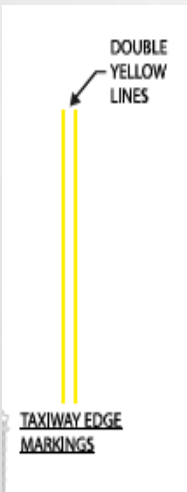
The taxiways are planned base on these following criteria:

- Landed aircraft should not interfere with aircraft taxiing to takeoff.
- Taxi routes should be short distance between aircraft parking areas and runways.
- Taxiway should be connected various point along runways so that aircraft can leave runways quickly.
- The high-speed exit taxiways should be designed connect the runways in order to permit higher turnoff speeds clearing the runway faster, typically high-speed exit taxiways are 30-45 degree angle connecting to runway.
- Should not cross an active runway (runway in use).

## 2. Taxiway system

### 2.3 Taxiway lighting system

Taxiways lighting includes taxiway edge lights, taxiway centerline lights, clearance bar lights, runway guard lights, and stop bar lights .



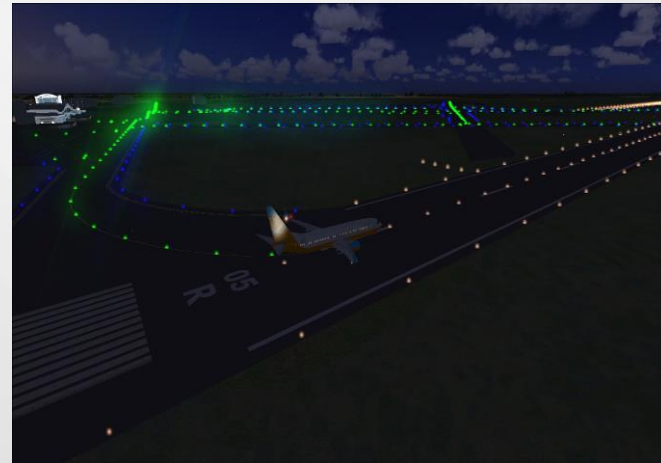
Taxiway Edge Marking



Taxiway Edge Light



Runway Guard Light



# TAXIWAY EDGE LIGHT

Indicate edges of taxiway during night time and poor visibility. They are blue colour, remind pilot its taxiway not runway no take off here



### **3. Navigational aids (NAVAIDS), Air Traffic Control Management, and weather reporting facilities located on airfields.**

#### **3.1 Navigational aids (NAVAIDS)**

There are various types of navigational aids in use and located on airfields. It helps the aircraft to fly between locations and approach for landing especially in poor weather conditions.

1. Very-high- frequency omnidirectional range radio beacons (VOR) is the ground-based electronic navigational aid.
2. Instrument Landing Systems (ILS) is common use by aircraft for both oblique and vertical guidance on approach to runways.
3. Air traffic control and surveillance facilities located on the airfield. It is to control and facilitate the safe and efficient movement of aircraft around the airport's airfield.

## 3. Navigational aids (NAVAIDS), Air Traffic Control Management, and weather reporting facilities located on airfields.

### **3.1 Navigational aids (NAVAIDS)**

**3.1.1 Very-high- frequency omnidirectional range radio beacons (VOR)**

**3.1.2 Instrument Landing Systems (ILS)**

**3.1.3 Air traffic control and surveillance facilities located on the airfield.**

**3.1.4 Airport surveillance radars (ASR);** are used to control air traffic. Its antennas scan 360 degrees of aircraft location within 60 nautical miles of the airport.



### **3. Navigational aids (NAVAIDS), Air Traffic Control Management, and weather reporting facilities located on airfields.**

#### 3.2 Air Traffic Control Management

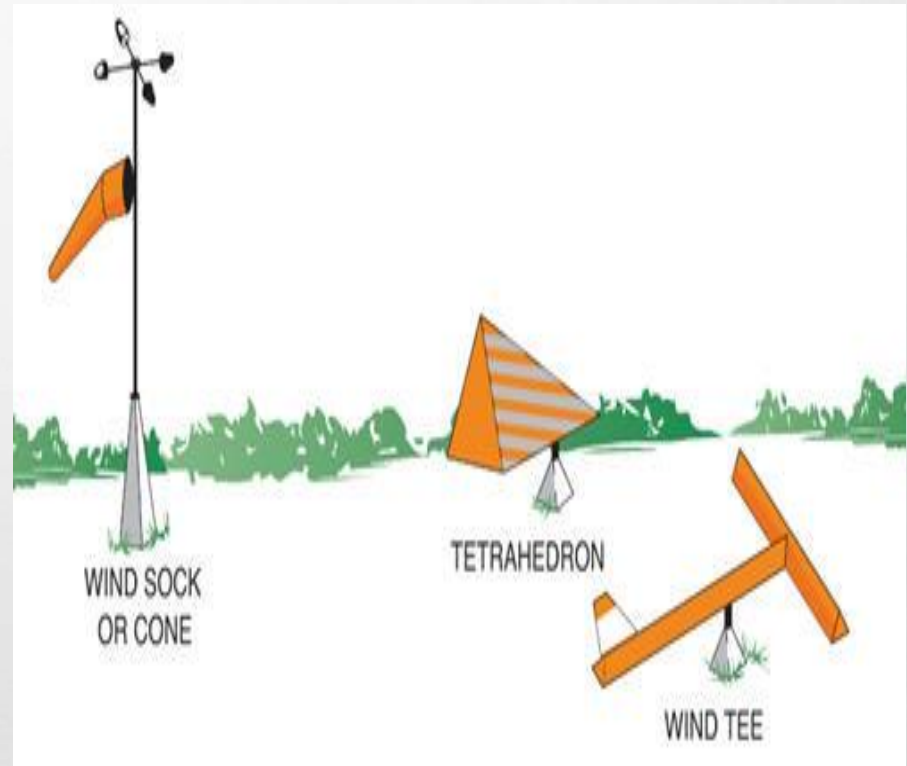
Air traffic control (ATC) is a service provided by ground-based controllers who direct the aircraft on the ground and through controlled airspace. The air traffic controller also can provide advisory services to the airplane in non-controlled airspace. **The main objectives of ATC are to prevent collisions, organize and expedite the flow of traffic, and provide information as well as other support for the pilots.**

### 3. Navigational aids (NAVAIDS), Air Traffic Control Management, and weather reporting facilities located on airfields.

Wind indicators might be the simplest system that report meteorological conditions.

There are three common wind indicators;

- wind socks
- win tees
- tetrahedrons



## Airfield Signage

There are 6 main types of signs on airfields.

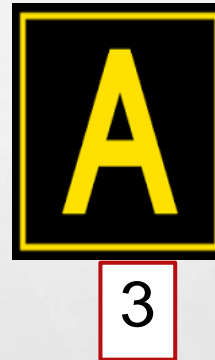
- mandatory signs (1,2)
- location signs (3)
- direction signs (4)
- destination signs
- information signs
- runway distance remaining signs

1= No entry

2= Runway holding position which runway to enter

3= Aircraft is on taxiway A

4= Runway 27-33



## Airfield Signage

There are 6 main types of signs on airfields.

- mandatory signs
- location signs
- direction signs,
- destination signs (5)
- information signs
- runway distance remaining signs (6)

5= To ramp facilities or to military facilities  
6= Runway remaining 10,000 feet





1. You are approaching a runway hold line
2. A low visibility taxi route
3. You have just exited a runway
4. I am not sure

**Quiz**