



## When is “night”?

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- Flying around: after civil twilight
- Landing: one hour after sunset to one hour before
- Good news: air tends to be much smoother at night
- Better news: unairconditioned plane much more comfortable at night

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## No Special Rating!

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- Mexico: Illegal to fly VFR at night
- Canada: requires additional training and rating
- U.S.: Private includes 3 hours of night training, 10 night takeoffs/landings, a 100 nm cross-country flight (minimum: out and back 50 nm)

To carry passengers, three takeoffs and landings at night within the preceding 90 days.

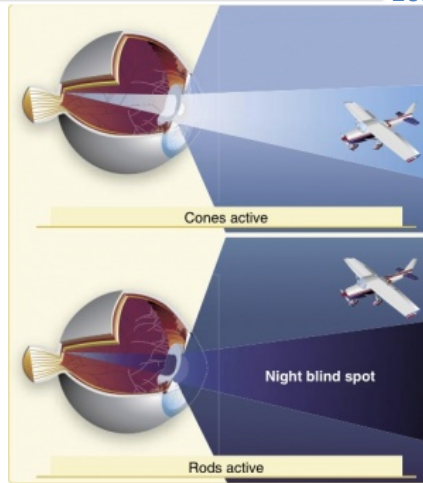
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## Night Vision

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- Rods 10,000 times more sensitive to light than cones
  - Rods primary receptors for night vision
  - Look 5° to 10° off center to view objects at night
  - Scan slowly with peripheral vision
- Can take ~30 minutes to fully adapt to darkness
  - Avoid bright lights before and during flight
  - Use red lighting (flashlights)
  - However, this distorts colors and washes out the color red



Source: Public Domain

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## Night Flying – Head Light

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Looking very fashionable with red head light...

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## Night Illusions

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- In a country of 325 million, a lot of bright lights on the ground; may look like aircraft
- Visual autokinesis: stare at light and it will appear to move
- “Black-hole” illusion when runway is surrounded by dark water or woods
- Bright runway lights make runway seem closer (so you’ll be too high); use VASI or PAPI or ILS and standard power and airspeed settings

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## 91.205 - Instrument and Equipment Requirements

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- VFR night:
  - Everything required during day operations plus...
  - Position lights (green, red, white)
  - Red or white anti-collision lights
  - Landing light if operated for hire
  - Adequate electrical source
  - Spare set of fuses

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## 91.205 (VFR Day reminder)

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- Airspeed indicator, altimeter, magnetic compass
- Tachometer, oil pressure, oil temperature, manifold pressure (for turbocharged engines)
- Fuel gauge, landing gear position indicator
- red or white anti-collision lights (after 3/11/1996)
- seat belt (built after 7/18/1978: shoulder harness in front)
- ELT (if required by 91.207)

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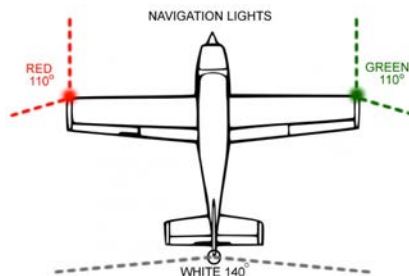
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## 91.209 - Aircraft Lights

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- Sunset to sunrise:
  - Must have lighted position lights
  - Must operate anti-collision lights if equipped
    - Unless they interfere with ground personnel



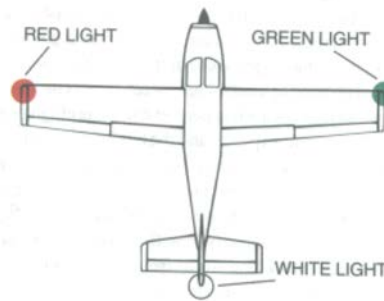
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## Navigation Lights

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- Aircraft lighting at night (at the same altitude):
  - Steady red and flashing red: crossing to the left
  - Steady white and flashing red: flying away
  - Steady red and green: approaching head-on
- Red light on the *port* side (think “*port* wine”)



## Airport Lighting: Beacons

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- On at night or weather less than VFR minimums (“field is IFR”)
- Civilian airport: alternating **white** and **green**
- Military airport: sequencing **white, white, green**
- Not on airplane test:
  - Heliport: green, yellow, white
  - Water airport: white, yellow

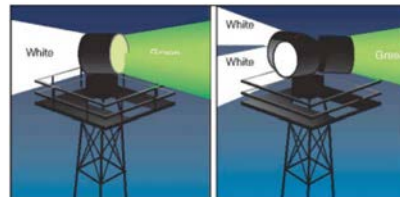


Figure 12-5. Airport rotatina beacons.

Source: Public Domain

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## Airport Lighting: Taxiway/Runway

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- Taxiway lights
  - Blue lights indicate edge of taxiway
- Runway lights
  - White lights indicate edge of runway (yellow for last 2,000' on IFR runway)
  - Different lighting schemes for instrument runways
    - Threshold lights (green at near end, red at far end)
    - Approach light bars
    - Runway end identifier lights (white strobes)



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## KLWM PAPI Story

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## KLWM PAPI – 2<sup>nd</sup> time around

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## Big Runways at Big Airports

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- Bright lights in the touchdown zone
- Centerline lighting: white until 3,000' remaining, then red/white until 1,000' remaining, then red.
- Lead-Off lights, green and yellow, to the taxiway





# Pilot-Controlled Lighting

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At non-towered airports or after-hours at big airports... the lights are off and maybe nobody's home.

Published "PCL" frequency, usually the control tower or CTAF.

Key (click) the microphone 5 times to turn on lights for 15 minutes.



Key Mike	Function
7 times within 5 seconds	Highest intensity available
5 times within 5 seconds	Medium or lower intensity (Lower REIL or REIL off)
3 times within 5 seconds	Lowest intensity available (Lower REIL or REIL off)

Source: Public Domain

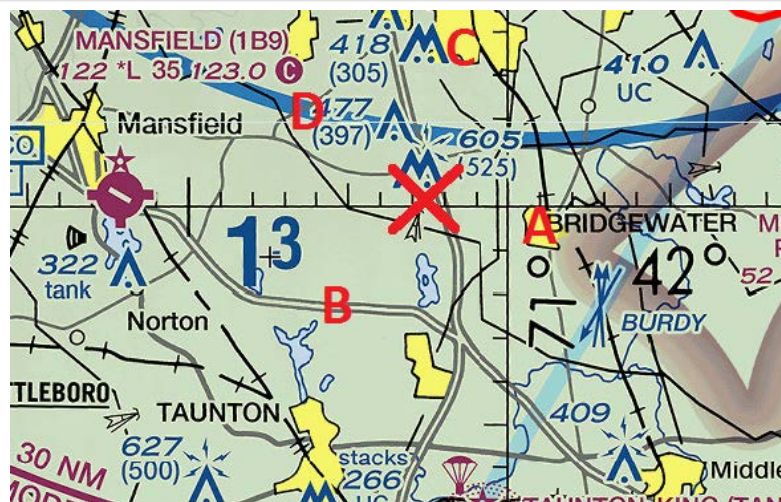
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# Discussion

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## Advice

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- Try to take off before civil twilight; gives you time to adjust to the world of darkness
- Americans are not smarter than Mexicans: Treat any non-local night flight as an instrument flight. Use IFR approach to find the correct runway at the correct airport ([alternative](#))
- Choose a big airport as your destination
- Ballistic parachute is comforting at night

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## Questions?

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## JFK, Jr: A night flight gone wrong

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- New Jersey to Martha's Vineyard in a 6-seat Piper Saratoga (36 hours in type)
- Departure delayed due to waiting for passenger
- No instrument rating
- Rejected CFI's offer to copilot
- Elected to fly over Long Island Sound (dark) rather than from Walmart to Walmart along the Connecticut shore
- Did not seek VFR Advisories from ATC
- Hazy (but legal VMC) conditions plus dark water = no visual horizon

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