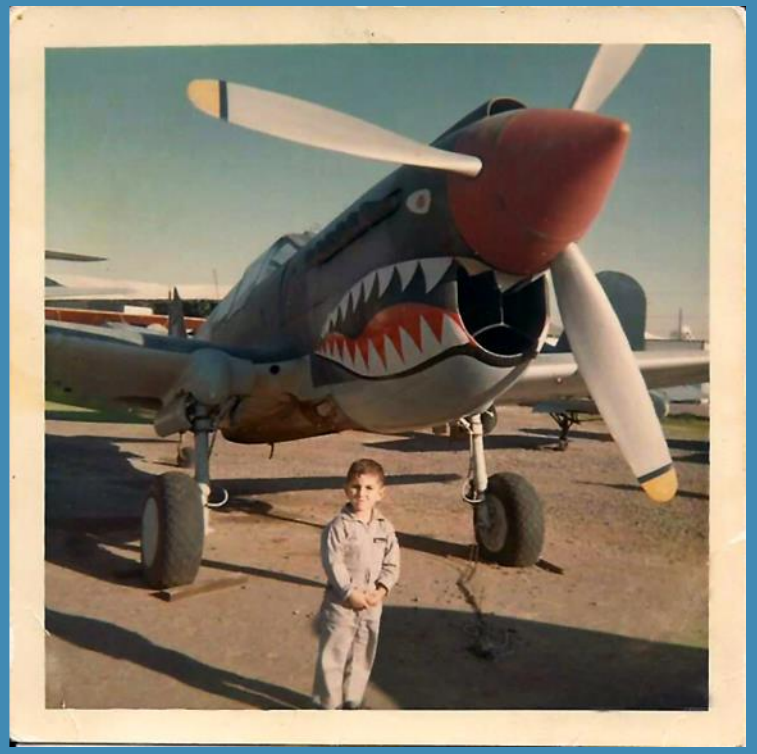
MAKING NIGHT FLYING SAFER

WHO AM I?



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Aviation Journalist – 10 Year Contributing Editor for Plane & Pilot, Flying Magazine

Adjunct Professor of Aviation at OCC

Aircraft Owner- 40 Years flying

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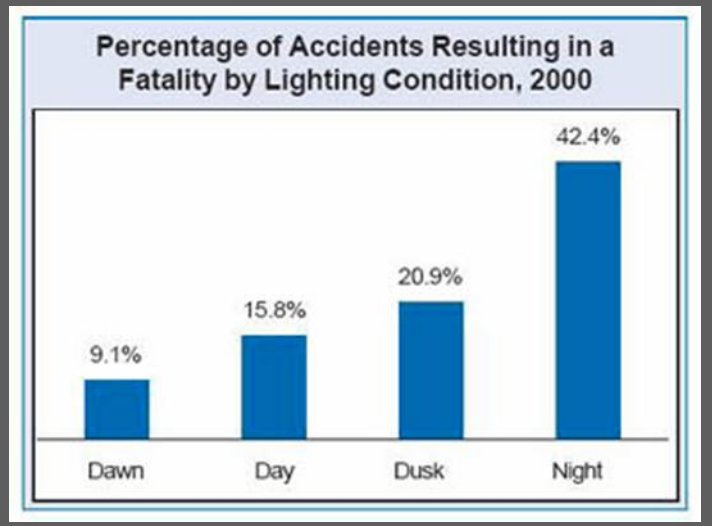
DO YOU FLY AT NIGHT?

Let's learn together

- STATISTICS:
  - 5% of GA flying is at night
  - 20% of GA accidents at night
  - 30% of GA fatalities
  - Night flying is 5 x more dangerous than day

	Total Accidents	Fatal Accidents	% of Accident Fatal
Night, Dark	466	146	31%
Night, Bright	42	8	19%



Night is 5 x more dangerous than day flying

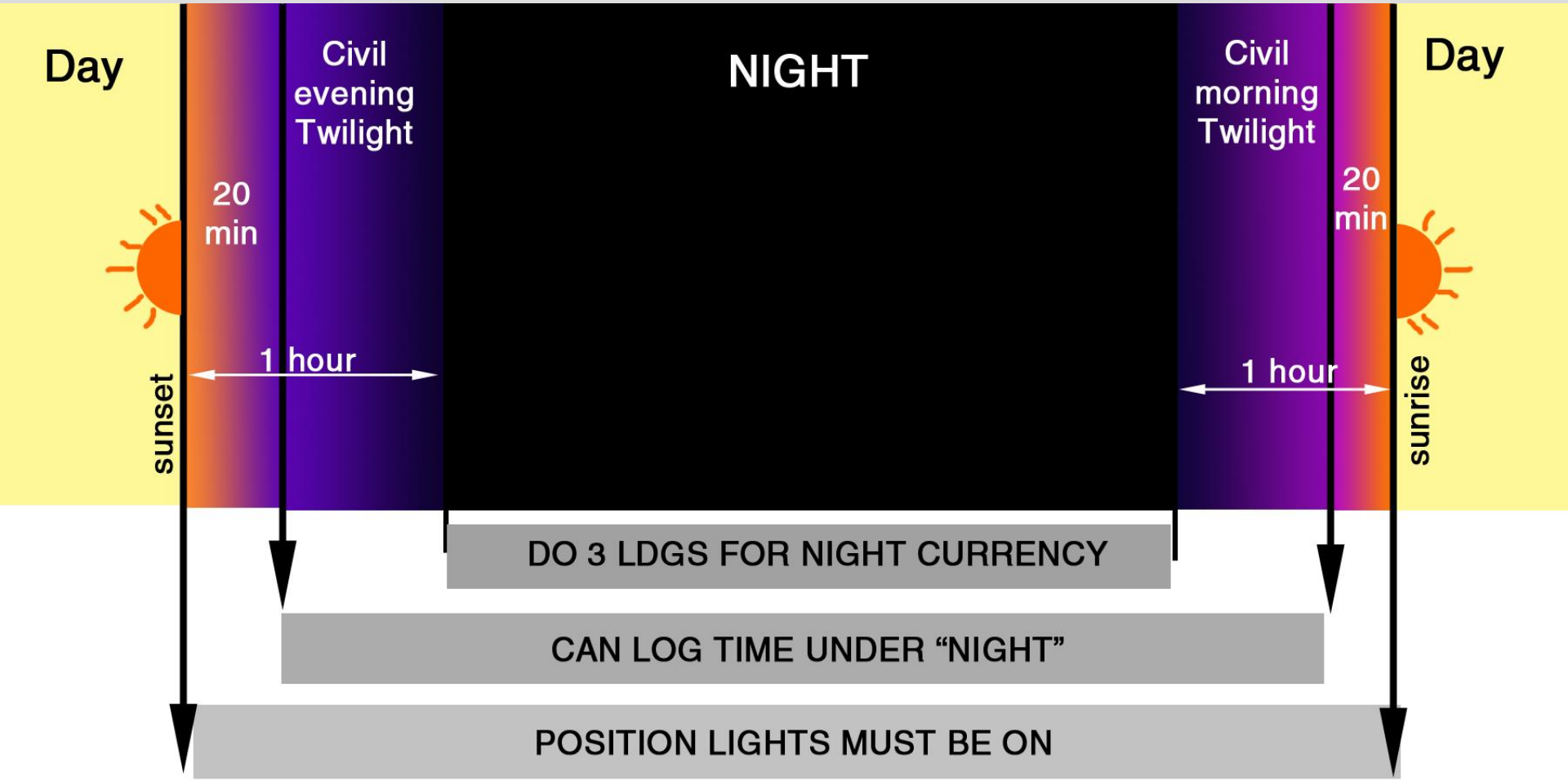
Landings are 3 x more hazardous than takeoffs

Recent night experience prevents accidents

- 75% of visual resources are lost
- CFIT
- Engine failure
- Electrical failure
- Spatial disorientation
- Illusions
- Physiological problems
- Wx is invisible

3 FAR DEFINITIONS OF "NIGHT"

- FAR 1.1: "The time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time."
- FAR 61.57: The "period beginning 1 hour after sunset and ending 1 hour before sunrise."
- FAR 91.209: "During the period from sunset to sunrise."



FAR 91.205- REQUIRED EQUIPMENT AT NIGHT

- DAY VFR equipment + "FLAPS"
- **F** – Fuses (or circuit breakers)
- **L** – Landing light (for commercial use only)
- **A** – Anti-collision lights* (red beacon and/or "strobes")
- **P** – Position lights ("nav" lights)
- **S** – Source of electrical power (battery, generator)

*If your aircraft was registered after March 11th 1996, anti-collision lights are required all the time. Yet for night they are required for all aircraft registered after August 11th 1971. 91.209 lets PIC determine when to operate anti-collision lights.

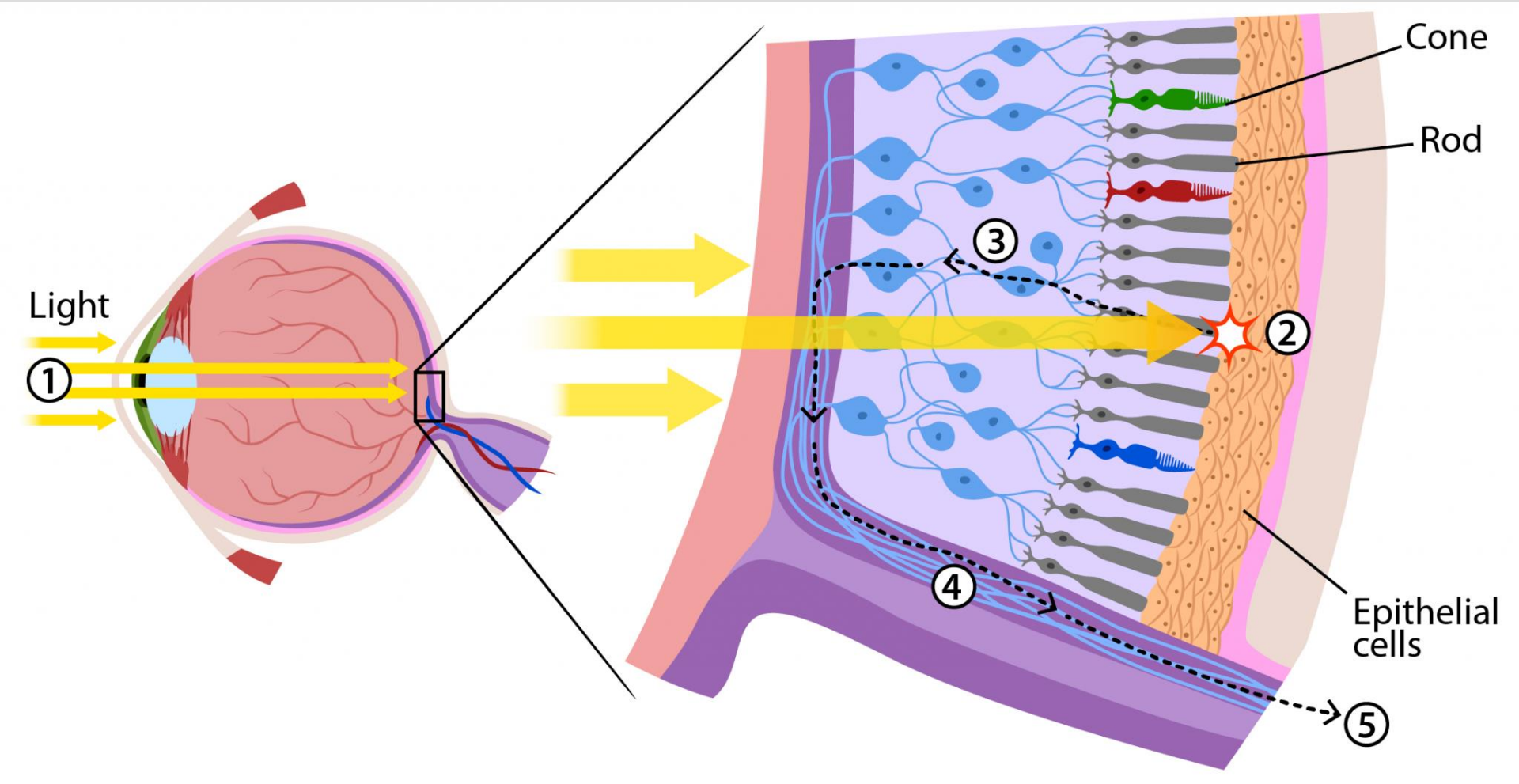
NIGHT CURRENCY

- FAR 61.57(b), to carry passengers between 1 hour after sunset and ending 1 hour before sunrise, you need to make at least 3 takeoffs and landings to a full stop in the preceding 90 days during the period beginning 1 hour after sunset and ending 1 hour before sunrise.

HUMAN FACTORS

Our Body's Limitations

VISION



RODS vs. CONES

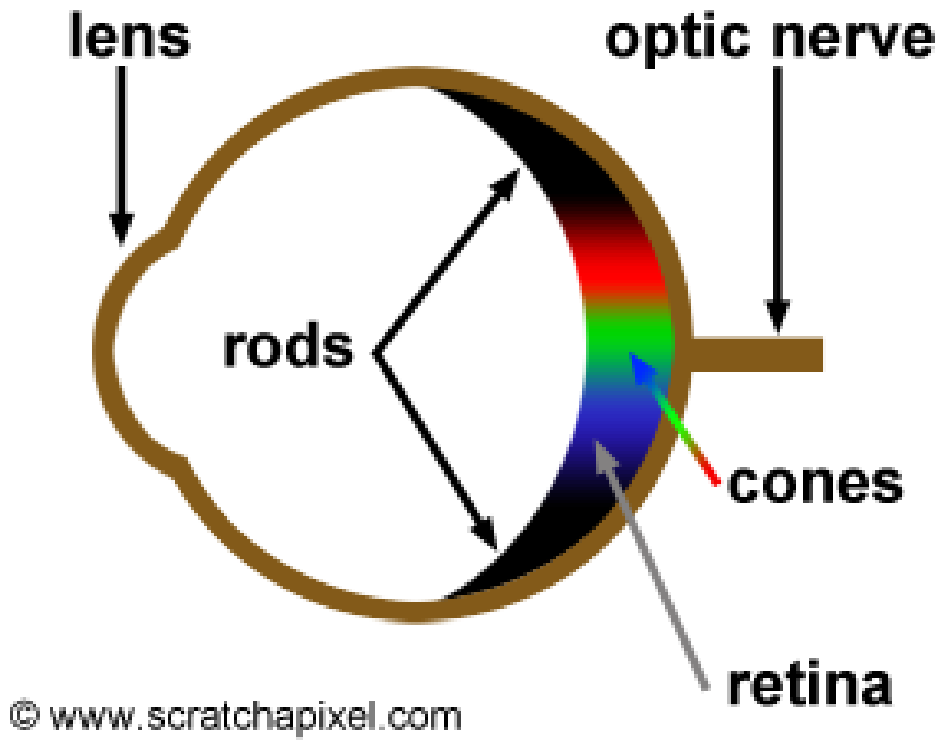
VISION

CONES:

- Daylight vision
- Perceive color & fine detail
- Concentrated near the center (the fovea)
- Low sensitivity
- Fewer in number than cones

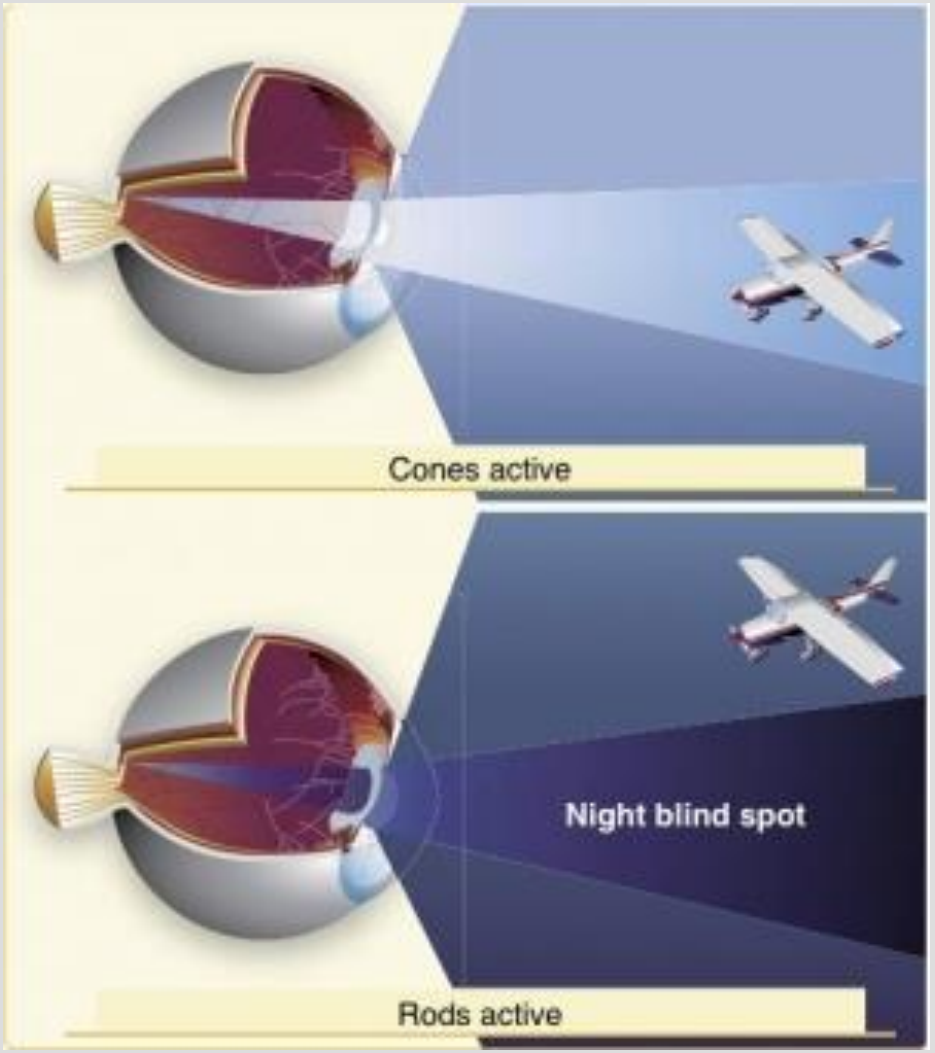
RODS:

- Night vision
- 10,000 times more sensitive to light
- Outer regions of retina
- Black & white only
- Low resolution
- Create Rhodopsin
- Outnumber cones 20:1



NIGHT BLIND SPOT

- Due to rod distribution, no vision in center
- Look off to one side (15° 0ff)
- Scan area in 10° slices

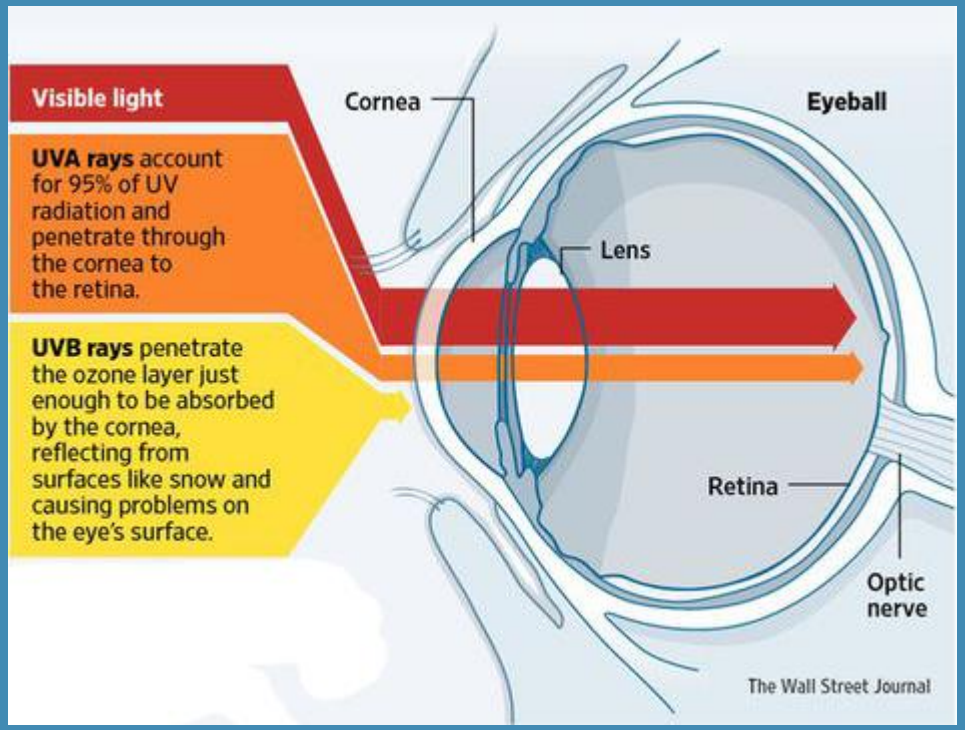


OXYGEN AT NIGHT

- Eyes have highest oxygen consumption of all tissues at night
- At 8,000', 25% of visual sharpness lost
- Loss increases with age, smoking, alcohol, drugs, diabetes
- Eyes more sensitive to hypoxia than any other tissue
- Use O2 above 5000' at night

OXYGEN DEFICIENCY

Drugs
Exhaustion
Alcohol
Tobacco
Hypoglycemia
(low blood sugar)



VITAMIN A DEFICIENCY/ UV RAYS

- Vitamin A critical to night vision
- Deficiency shows within 30 days as vision loss
- UV damage from cheap or no sunglasses
- Both impair night vision dramatically

VISUAL ILLUSIONS

- Lack of light cause our brains to perceive signals differently at night
- False Horizon
- Autokinesis
- Black Hole Approach
- Spatial Disorientation

TIPS

- 30 Minutes to adapt to night – (no white light)
- Dim screens
- Use oxygen above 5,000’
- Look at objects off-center
- Use PAPIs/VASIs
- Use green or red lights in the cockpit
- Consume lots of Vitamin A
- Extra rest before night flight
- Bring in-flight snacks to regulate blood sugar
- Quit smoking
- Wear GOOD sunglasses during day

RISK MITIGATION

How do we counter night flying problems?

COCKPIT

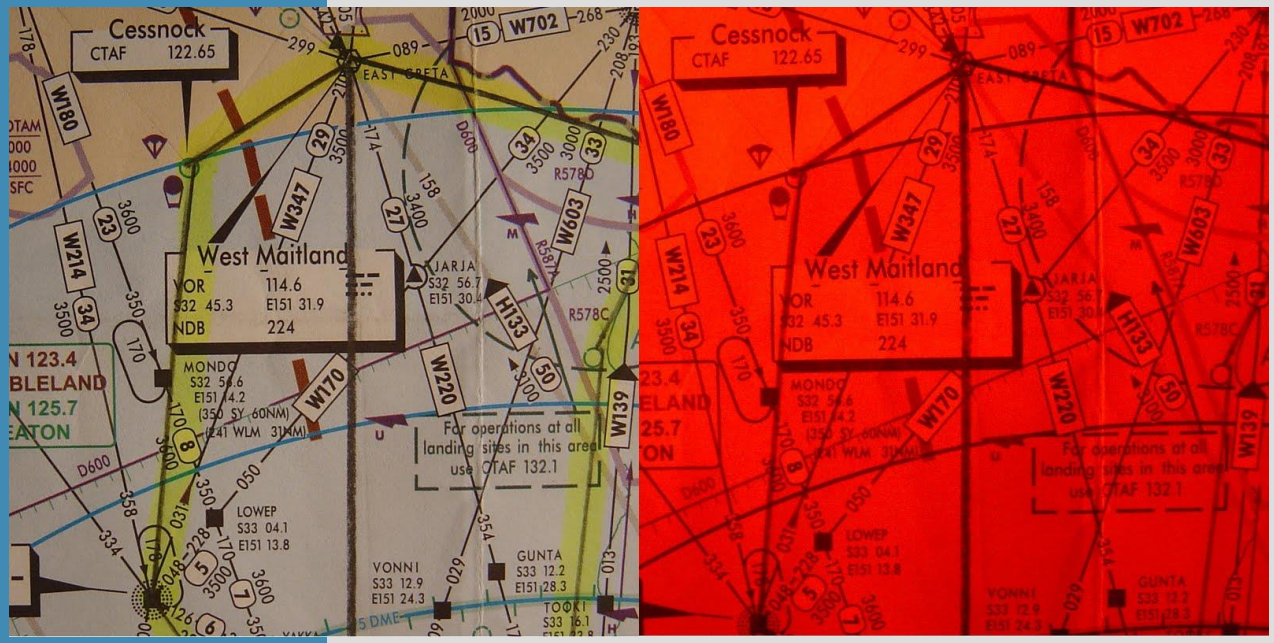
- Flashlights, LEDs, headlamps
- Use Velcro
- Cockpit organization
- Use Foreflight or other EFB
- Extra batteries
- Carry multiple/combination
- Handheld radio

FLIGHT PLANNING

- Choose route based on airports
- Zig-Zag- no “GPS direct”
- MEFs (1k-2k above)
- Choosing an altitude
- Bring airport diagrams
- Fuel planning (chart supplement- green book)
- NOTAMS (1800wxbrief.com)

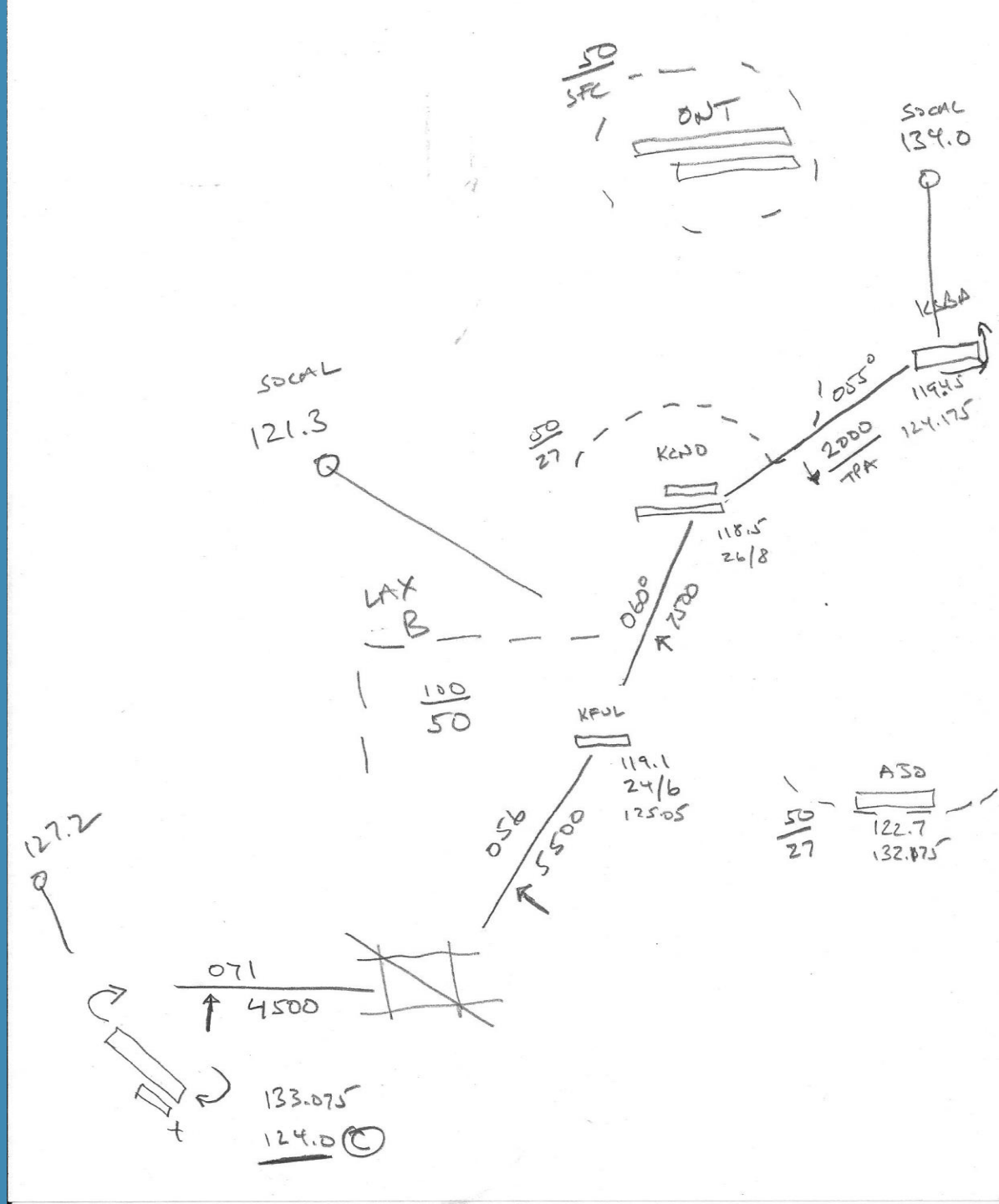
CHARTS

- Problems marking a chart
- Mark routes with Sharpie & highlighter
- Write down FREQs for Departure, destination and enroute (lights?)
- What if automation fails?



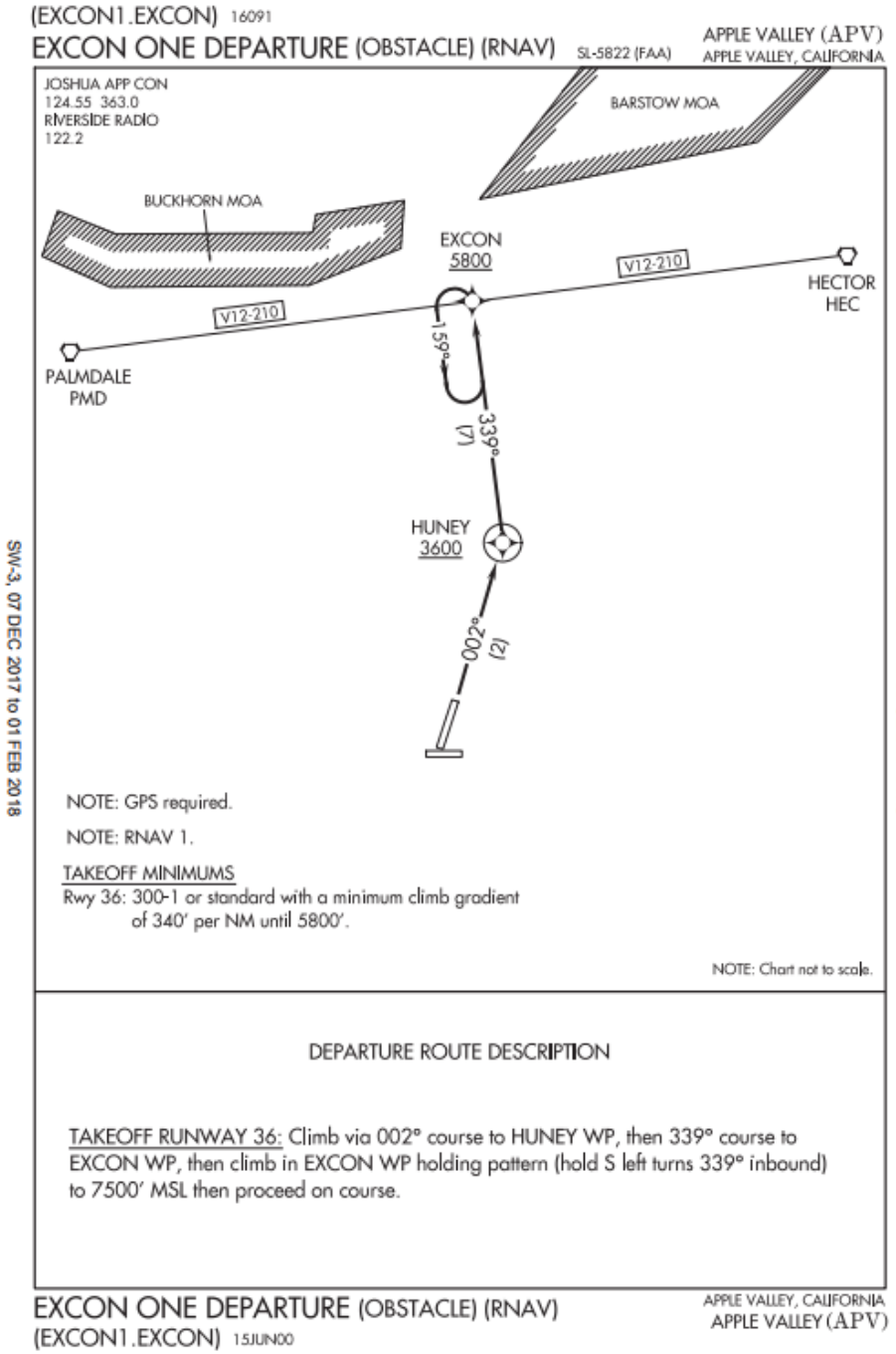
MUD MAPS

- Schematic version of your flight and nothing else
- Can revert to chart
- Easy to see
- Familiarizes you with route
- Freqs, altitudes, headings, turns, etc



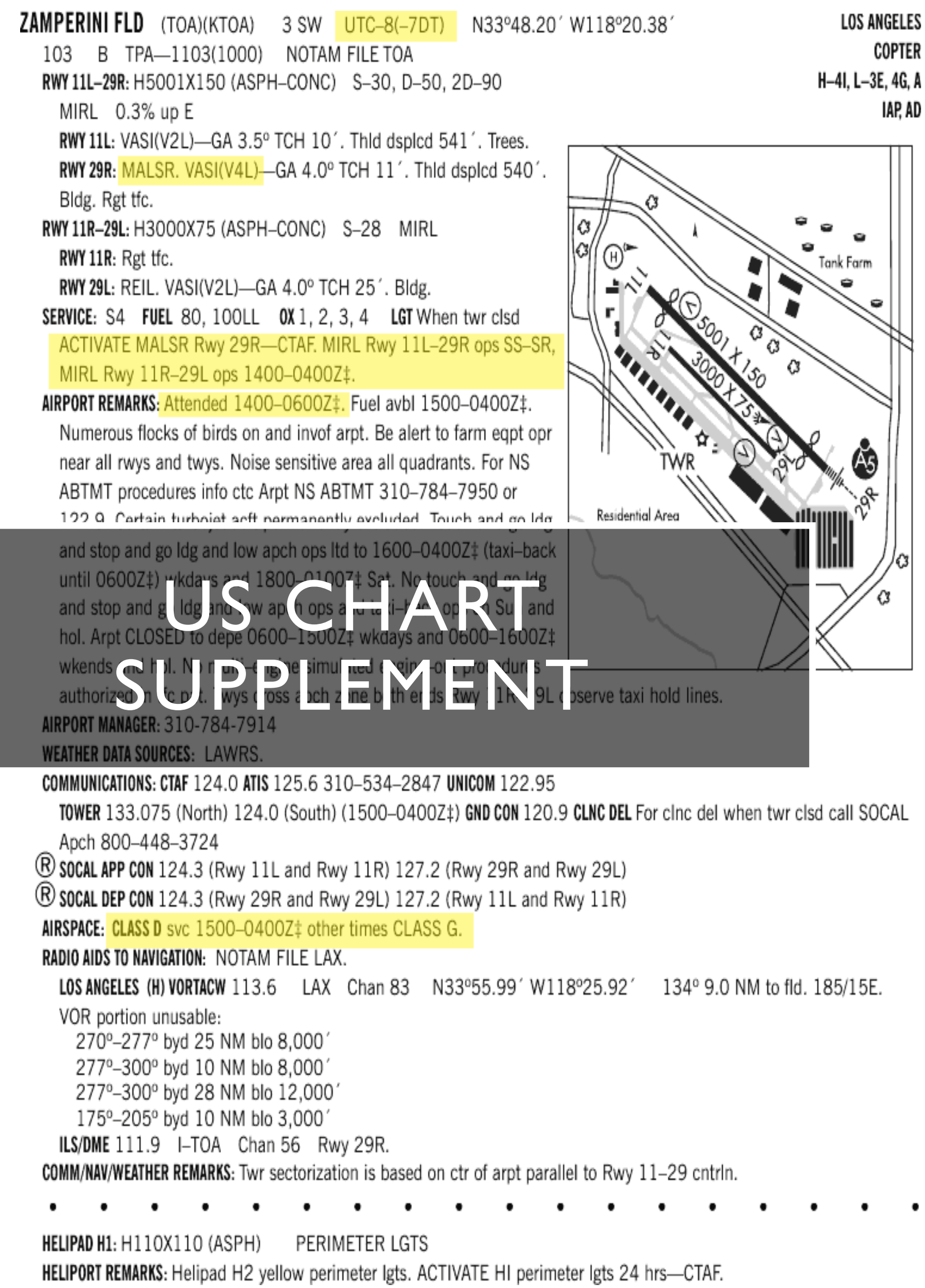
OBSTACLE DEPARTURE PROCEDURE

- Keeps IFR traffic clear of obstacles
- Does NOT require clearance to fly
- Graphical and textual representation
- More info: AIM 5-2-8
- Printed by Jeppesen, EFB's or FAA at
- https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dtpp/



US CHART SUPPLEMENT

- Look up Destination AND Departure Airport
- Lighting (runway, PCL,etc)
- Check NOTAMS for inop lighting systems
- Obstacles
- Tower/FBO hours
- Call ahead for local info


ZAMPERINI FLD (TOA)(KTOA) 3 SW UTC–8(–7DT) N33°48.20′ W118°20.38′ LOS ANGELES
103 B TPA—1103(1000) NOTAM FILE TOA COPTER
RWY 11L–29R: H5001X150 (ASPH-CONC) S–30, D–50, 2D–90 H–4I, L–3E, 4G, A
MIRL 0.3% up E IAP, AD
RWY 11L: VASI(V2L)—GA 3.5° TCH 10′. Thld dsplcd 541′. Trees.
RWY 29R: MALSR. VASI(V4L)—GA 4.0° TCH 11′. Thld dsplcd 540′. Bldg. Rgt tfc.
RWY 11R–29L: H3000X75 (ASPH-CONC) S–28 MIRL
RWY 11R: Rgt tfc.
RWY 29L: REIL. VASI(V2L)—GA 4.0° TCH 25′. Bldg.
SERVICE: S4 FUEL 80, 100LL OX 1, 2, 3, 4 LGT When twr clsd ACTIVATE MALSR Rwy 29R—CTAF. MIRL Rwy 11L–29R ops SS–SR, MIRL Rwy 11R–29L ops 1400–0400Z‡.
AIRPORT REMARKS: Attended 1400–0600Z‡. Fuel avbl 1500–0400Z‡. Numerous flocks of birds on and invof arpt. Be alert to farm eqpt opr near all rwys and twys. Noise sensitive area all quadrants. For NS ABTMT procedures info ctc Arpt NS ABTMT 310–784–7950 or 122.9. Certain turbojet acft permanently excluded. Touch and go ldg and stop and go ldg and low apch ops ltd to 1600–0400Z‡ (taxi-back until 0600Z‡) wkdays and 1800–0100Z‡ Sat. No touch and go ldg and stop and go ldg and low apch ops and taxi-back ops Sun and hol. Arpt CLOSED to depe 0600–1500Z‡ wkdays and 0600–1600Z‡ wkends and hol. No multi-engine simulated engine out procedures authorized ... observe taxi hold lines.
AIRPORT MANAGER: 310-784-7914
WEATHER DATA SOURCES: LAWRS.
COMMUNICATIONS: CTAF 124.0 ATIS 125.6 310–534–2847 UNICOM 122.95
TOWER 133.075 (North) 124.0 (South) (1500–0400Z‡) GND CON 120.9 CLNC DEL For clnc del when twr clsd call SOCAL Apch 800–448–3724
Ⓡ SOCAL APP CON 124.3 (Rwy 11L and Rwy 11R) 127.2 (Rwy 29R and Rwy 29L)
Ⓡ SOCAL DEP CON 124.3 (Rwy 29R and Rwy 29L) 127.2 (Rwy 11L and Rwy 11R)
AIRSPACE: CLASS D svc 1500–0400Z‡ other times CLASS G.
RADIO AIDS TO NAVIGATION: NOTAM FILE LAX.
LOS ANGELES (H) VORTACW 113.6 LAX Chan 83 N33°55.99′ W118°25.92′ 134° 9.0 NM to fld. 185/15E.
VOR portion unusable:
270°–277° byd 25 NM blo 8,000′
277°–300° byd 10 NM blo 8,000′
277°–300° byd 28 NM blo 12,000′
175°–205° byd 10 NM blo 3,000′
ILS/DME 111.9 I–TOA Chan 56 Rwy 29R.
COMM/NAV/WEATHER REMARKS: Twr sectorization is based on ctr of arpt parallel to Rwy 11–29 cntrln.
HELIPAD H1: H110X110 (ASPH) PERIMETER LGTS
HELIPORT REMARKS: Helipad H2 yellow perimeter lgts. ACTIVATE HI perimeter lgts 24 hrs—CTAF.

- Double your day VFR minimums
- NOTAMS
- 1800wxbrief.com
- New Graphical Forecast
- Temp/Dew Point
- Clouds are a main concern
- Look at moon phases and fly during bright nights

PROFICIENCY

- 90 days not enough
- Practice, practice, practice
- Flying skills must be in top condition
- No passengers unless night flights within 14 days
- Instrument skills are CRITICAL

SLOW DOWN

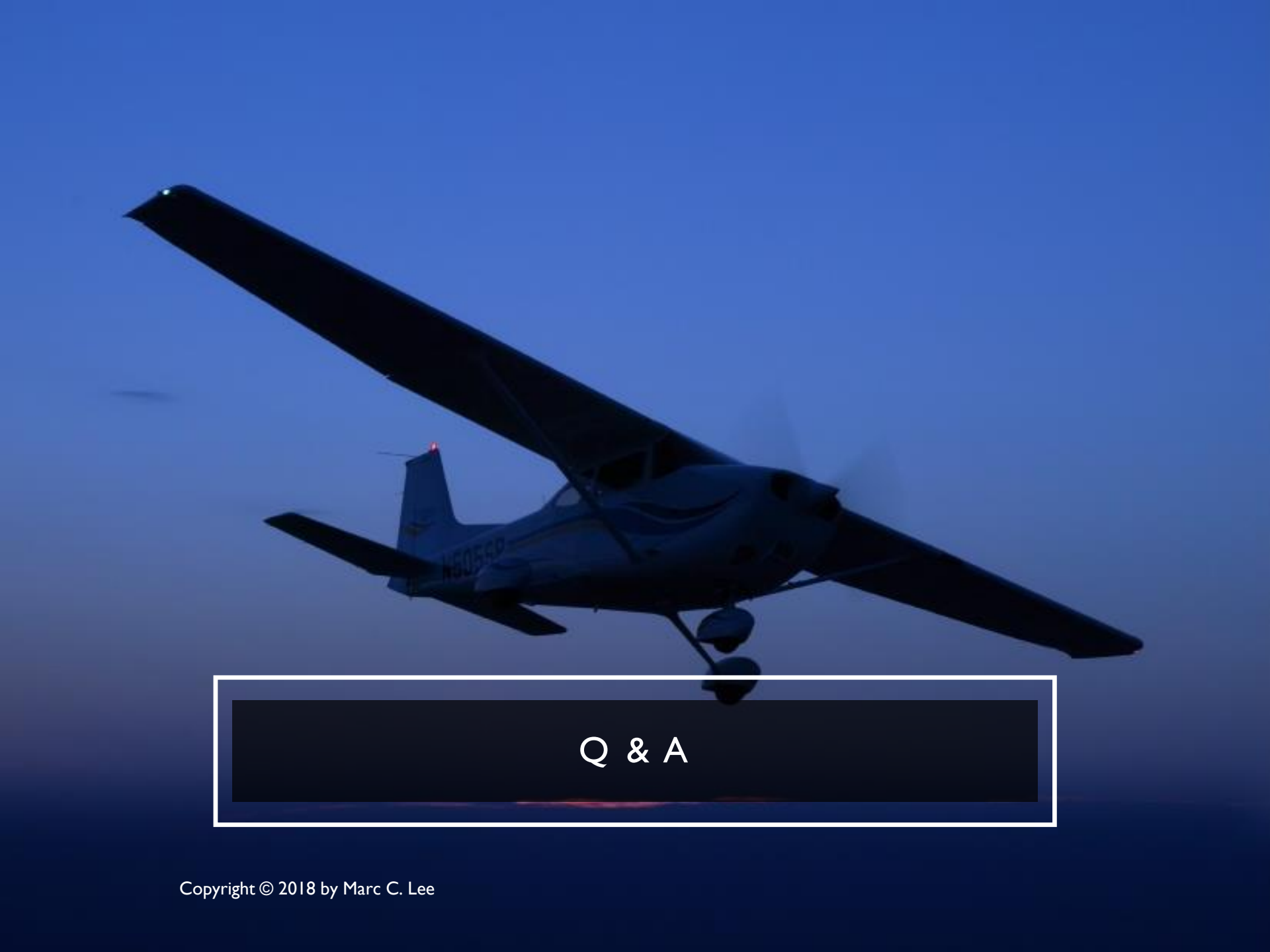
10 MISTAKES JFK JR MADE

- Get there-it is
- Stress
- New aircraft
- Low solo time – low night time
- Weather- never got current Wx
- No instructor though his offered
- No right-seater
- No radio, no flight following
- No autopilot
- Never altered plans


NTSB
NTSB
TAIL
NOSE
RIGHT WING

25 TIPS

1. Always, always, always use flight following at night
2. Carry a hand-held COM radio
3. Plan a route that zig-zags from airport to airport (or landing areas like open roads). Don't use "direct-to."
4. Plan a higher cruise altitude than normal. An extra 2000 feet buys you 2-3 minutes
5. Use oxygen above 5000'. The visual difference is huge
6. Bring snacks and drinks to keep your mind awake
7. Use 1-hour fuel reserves (for ALL your flying). Period
8. Scan for traffic and airports in 10-degree slices. Use peripheral vision
9. Mark your course on an actual chart. Learn the MEFs. Use "mud maps"
10. Depart "semi-IFR." Look at IFR departure procedure for that airport and follow it
11. Bring multiple flashlights and a headlamp. Use Velcro to stick them close by
12. Use green instead of red light. Bring portable LED lights and place them around cockpit
13. Use a powerful LED flashlight with focusable beam to see ice on wings
14. To see fuel contamination at night: place sample against white paper or fuselage. Shine light sideways
15. Double-check altimeter and note even slight elevation errors
16. Climb at Vy to 1000' then cruise climb for better visibility ahead
17. When planning, consider the moon phase (show in Aeroweather or https://www.timeanddate.com/moon/phases/. Fly at full-moon
18. If lights begin disappearing or "blinking" ahead, something is blocking them
19. At night over dark, rural areas, pilots tend to fly lower than in daylight. Use your altimeter and know terrain elevations. This is "black-hole" illusion
20. Light up like a Christmas tree – Turn on strobes only at takeoff
21. Don't fly at night if you are uncomfortable with your instrument flying skills
22. You will not see clouds at night. Period. KNOW YOUR FORECAST and use FSS for current conditions
23. Obstacles (like towers and cranes) become invisible at night. Know your NOTAMs and chart
24. Use ILS glideslope on your approaches, if you have it. Otherwise ALWAYS follow PAPI/VASI
25. If it's hazy or misty, turn runway lights to full intensity (7 clicks)
26. Invest in some kind of terrain-awareness display (foreflight on your phone or iPad, etc.) & use it!
27. Set a defined "descent point." Don't "wing" it
28. SLOW DOWN- all phases



Q & A