



VICTORIA FLYING CLUB

Contact Information

- Stephan Heinemann
- SMS: +1 (250) 891-5446
- Email: stephan.heinemann@hotmail.com
- Bookings, Questions



VICTORIA FLYING CLUB

Night Flying

- Review Instrument Flying and Human Limitations
- Definition and Motivation
- **Night Flying**
 - Requirements
 - Taxi, Take-Off, Approach and Landing, Circuits
 - Cross Country
- Summary and Questions
- Pre-Flight Briefing



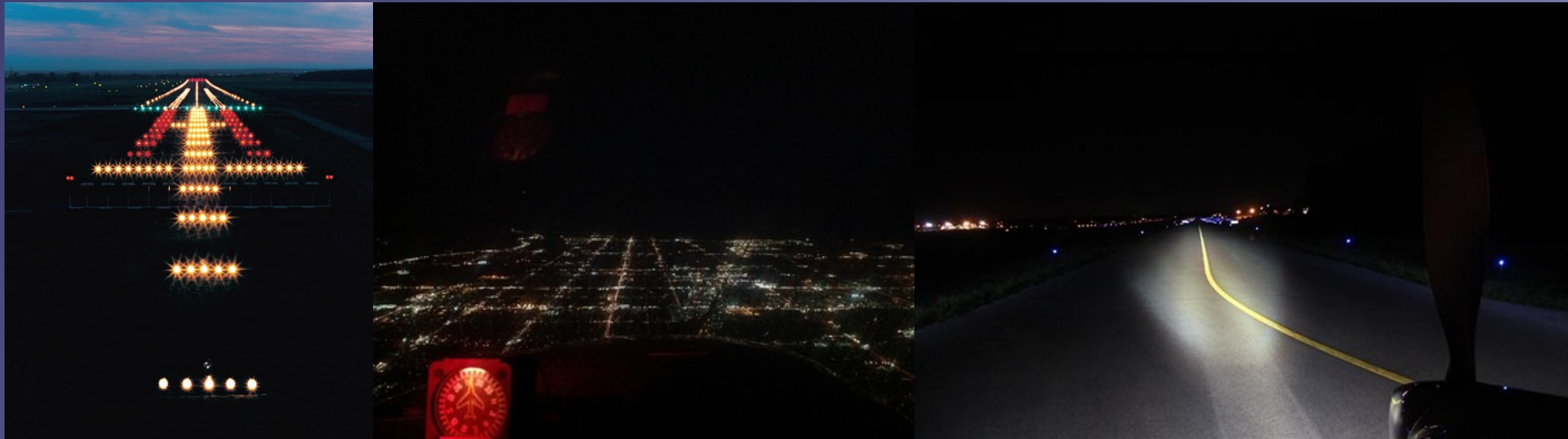
Review Instrument Flying and Human Limitations

- What types of illusions can affect human perception and how?
- Why does the attitude indicator provide a better indication of attitude than the airspeed indicator or altimeter?
- What are the errors that can be expected with gyroscopic instruments and how can they be overcome?
- Which gyroscopic instruments are electrically driven and which are driven by vacuum?



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Definition and Motivation

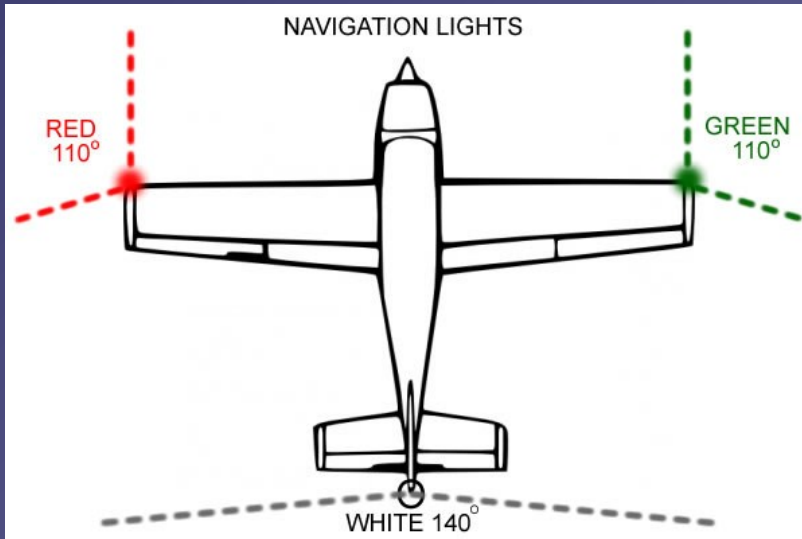


- Flying at night – *SS+30* and *SR-30*, or $>6^\circ$ below horizon
- **Night VFR** – Visual Meteorological Conditions (VMC)
- *Reduced visual cues* and *increased* chance of **illusions**
- *Increased instrument reliance* necessary



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Aircraft and Equipment Requirements



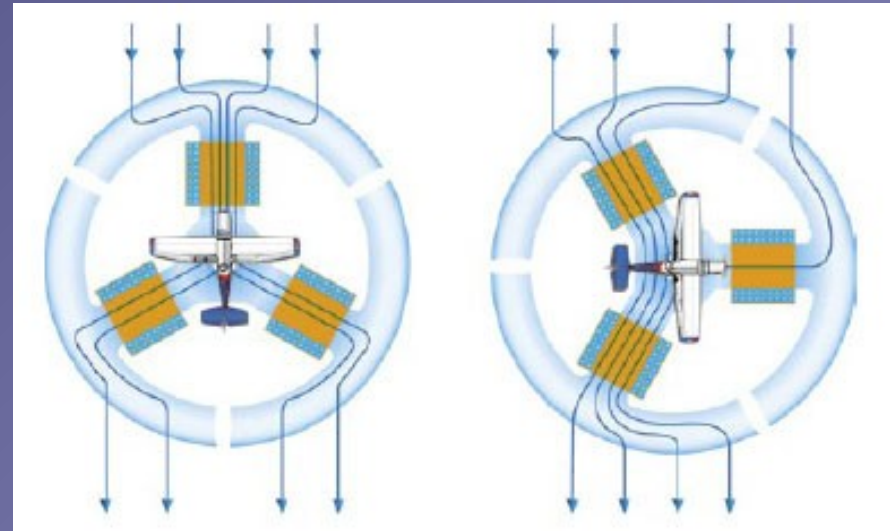
CARS 625.16



- **Interior** Lighting – cabin, panel, instruments, screens
- **Exterior** lighting – beacon, position, landing, taxi, strobe
- **Flashlight** – reading and backup light, dimmable red



Instrumentation Requirements



- Airspeed indicator, magnetic compass, tachometer, oil pressure and temperature, fuel level indicators, **barometric altimeter**, **turn and slip indicator** or **turn coordinator**
- **Spare fuses** – *at least **one** or **50%*** for each rating whichever is greater
- Outside aerodrome circuit: **stabilized magnetic** (slaved / flux valve) or **gyroscopic direction indicator** (NDA non-magnetic)



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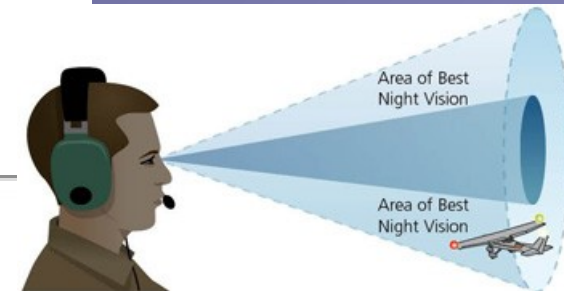
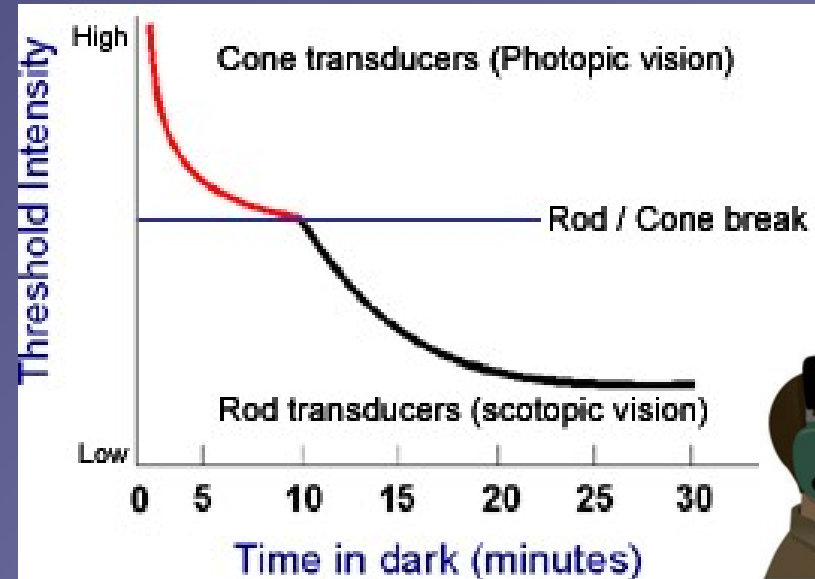
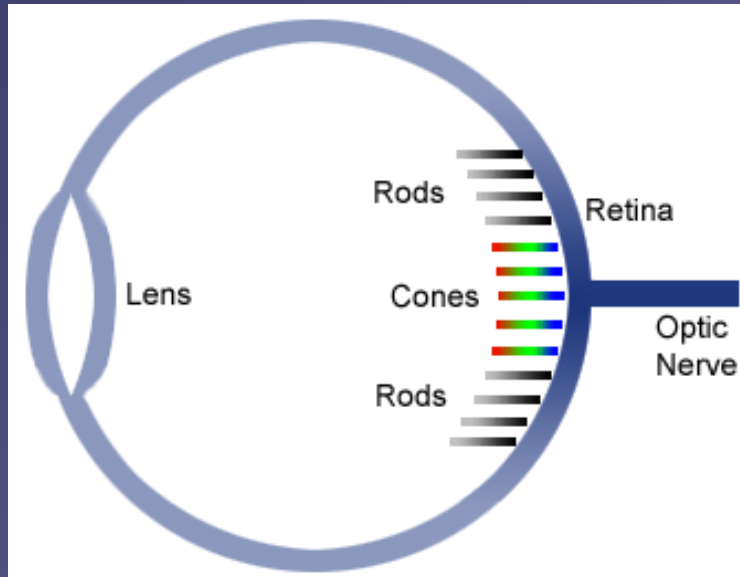
Airport Lighting



- **Approach** – different types depending on category
- **Runway** – **threshold**, edge, center, landing zone
- **Taxiway** – **edge**, **center**, **protection**, **holding**
- **Obstructions** – **steady**, flashing
- **ARCAL, Reflectors** – check CFS for airport lighting



Human Limitations



- Darkness adaptation takes approximately **30 min**
- Red light helps to preserve adaption
- Strobe, landing and apron lighting may interfere
- Sensory Illusions and vertigo may occur
- Coriolis, head-up, head-down, black hole, autokinetic ...



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Traffic and Environment



- **Peripheral scanning** for effective traffic avoidance
- **Strobe** and **position** lights for recognition and orientation
- Inadvertant flight into **clouds** – maintain VMC at night



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Taxiing at Night

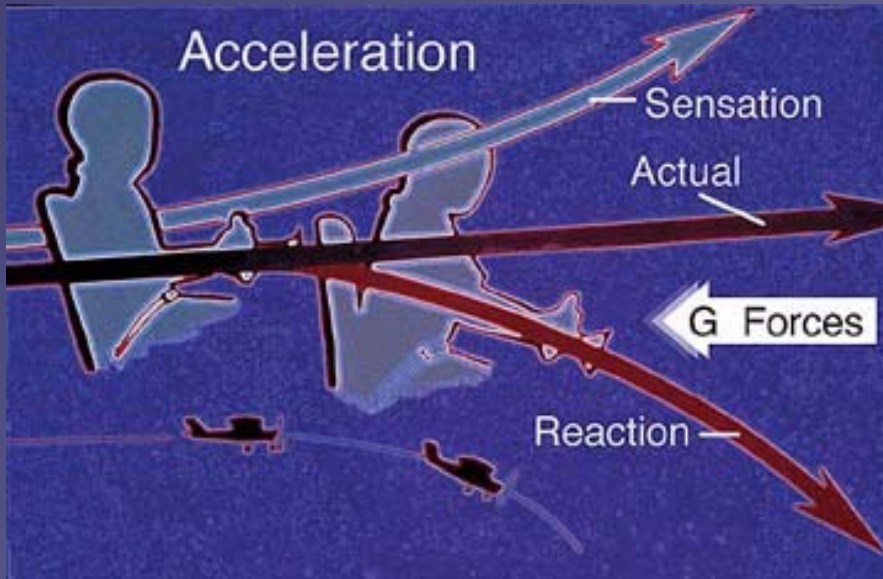


- **Taxi** lights **on** *during taxi* and **off** *when holding*
- **Strobe** lights remain **off** *before take-off* and *after landing*
- **Beacon** and **position** lights remain **on** *at all times*
- Follow **lighted signs** and observe **clearance limits**
- Blue **edge**, **green** and **yellow** center, **red** holding lights
- Use **light distance** as reference for *appropriate taxi speed*



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Take-Off at Night



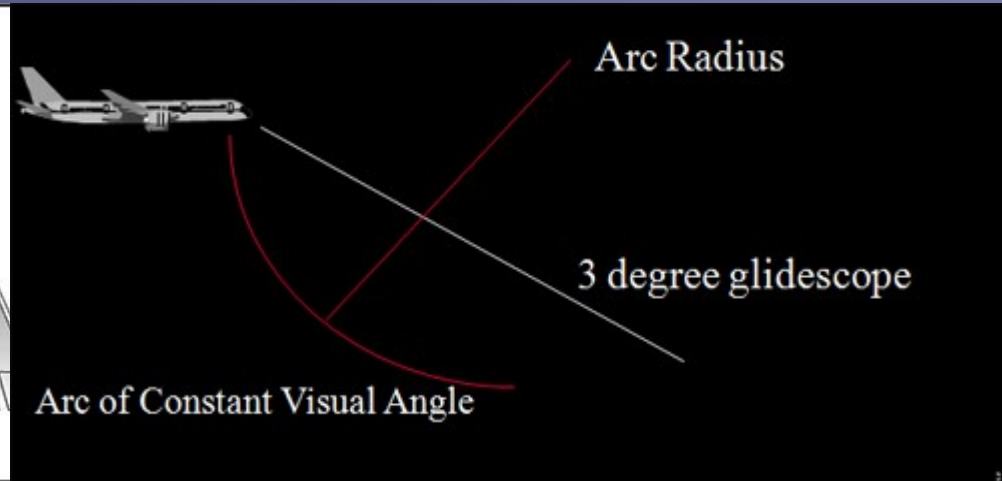
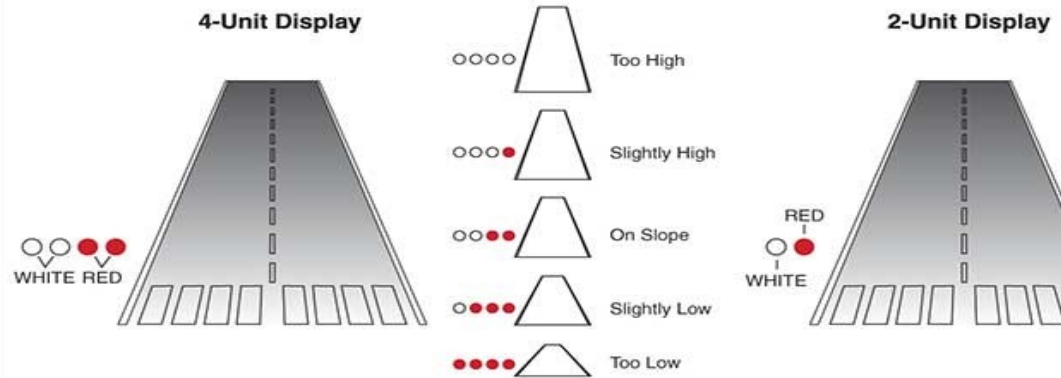
- **Sparse references** and possible **sensory illusions**
- **Head-up illusion** may lead to wrong pitch attitude
- Strobe light and head movements may lead to **vertigo**
- Trust **attitude** and **airspeed** indicator during initial climb
- Crosscheck *any* visual references with **instruments**



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Approach and Landing at Night

PAPI: From the Pilot's View









- **Black hole illusion** and **reduced depth perception**
- Crosscheck *any* visual references with **instruments**
- Reference approach lighting, **PAPI / VASI** and **ILS**
- Request or adjust (**ARCAL**) for *appropriate intensity*
- Reduced depth perception and lights may lead to higher **flare**



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Circuit at Night



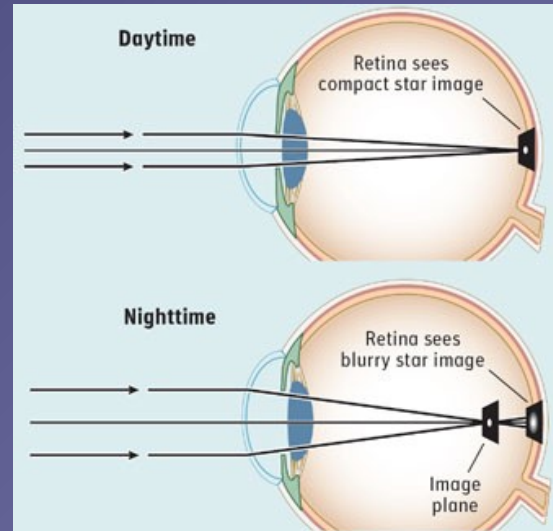
LIGHT GUN SIGNALS			
COLOR AND TYPE OF SIGNAL	MOVEMENT OF VEHICLES, EQUIPMENT AND PERSONNEL	AIRCRAFT ON THE GROUND	AIRCRAFT IN FLIGHT
STEADY GREEN 	Cleared to cross, proceed or go	Cleared for takeoff	Cleared to land
FLASHING GREEN 	Not applicable	Cleared for taxi	Return for landing (to be followed by steady green at the proper time)
STEADY RED 	STOP	STOP	Give way to other aircraft and continue circling
FLASHING RED 	Clear the taxiway/runway	Taxi clear of the runway in use	Airport unsafe, do not land
FLASHING WHITE 	Return to starting point on airport	Return to starting point on airport	Not applicable
ALTERNATING RED AND GREEN 	Exercise Extreme Caution!!!!	Exercise Extreme Caution!!!!	Exercise Extreme Caution!!!!

- Maintain **separation** to other aircraft (lights)
- Maintain **situational awareness** at all times
- Perform standard **communication** and **checks**
- Be aware of and review **NORDO** operations



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Cross Country at Night



- Controlled Flight into Terrain (CFIT), inadvertent flight into IMC
- **Night myopia** – periodically change focus distance
- **Visual hypoxia** – reduced night vision at **5000'** and above
- **Night VFR minima** – **3 SM** visibility, **1000'** obstacle clearance
- Always plan for **alternate** or be prepared for **diversion**
- Include **all means of navigation** – NDB, VOR, GPS



Summary / Quiz

- How can the head-up illusion become dangerous during a night take-off and how can it be overcome?
- What external aircraft lighting is to be used how?
- How can you determine that you are on the correct approach path during a night approach?
- How can the black-hole illusion become dangerous during a night approach and how can it be overcome?



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Pre-Flight Briefing

- Exercise
- Training Area
- Departure and Arrival Procedures
- Weather Briefing / NOTAMs
- Aircraft and Documents
- Time and Fuel Requirements



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Night Flying (Ex. 25, LP.)

- Objective
- Review
- Motivation
- Howto
- Summary / Questions
- Preflight Briefing