VICTORIA FLYING CLUB

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Straight-and-Level Flight

- Review Attitudes and Movements
- Definition and Motivation
- **Straight Flight**
- **Level Flight**
- **Magnetic Compass**
- Summary and Questions
- Pre-Flight Briefing

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Attitudes and Movements Review

- What attitudes are displayed and how can they be established, maintained and recovered?

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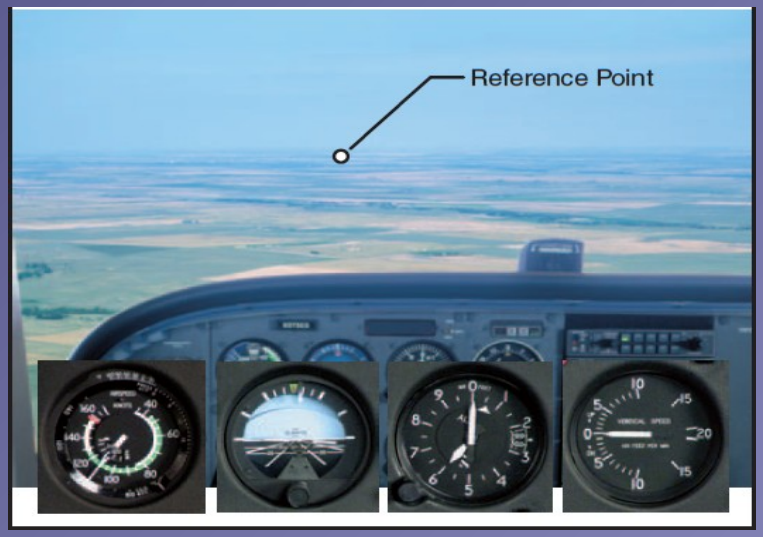
Straight-and-Level Flight



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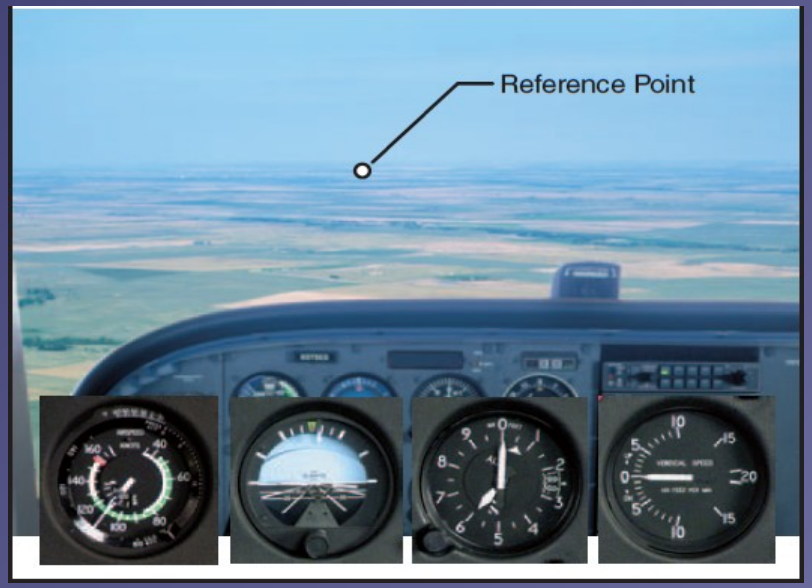
Straight Flight



- Maintain *constant* **heading** (horizon and reference point)
- Control **roll** and **yaw** to keep **wings level** in *coordinated flight*
- Check **attitude indicator** (bank attitude), **heading indicator** and **turn coordinator**
- Straight flight is *not* necessarily level flight (**variable altitude**)

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Level Flight

- Maintain *constant* **altitude** (attitude and power)
- Control **pitch** and **power** to maintain **altitude** in *coordinated flight*
- Check **attitude indicator** (pitch attitude), **RPM** (power setting), **altitude indicator** and **vertical speed indicator**
- Level flight is *not* necessarily straight flight (**variable heading**)

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Level Flight – Attitude and Power

- *Attitude plus power equals performance*
- **Less power** requires **more nose-up** (less nose-down) attitude (and vice versa) to *maintain* altitude at **lower constant airspeed**
- **More power** requires **less nose-up** (more nose-down) attitude (and vice versa) to *maintain* altitude at **higher constant airspeed**
- **Trim** is used to compensate control forces at different settings

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Power Changes

- **Decrease** Power / Reducing Airspeed:
  - **Throttle back** smoothly to estimated setting
  - Anticipate and **prevent yaw**
  - Apply **back-pressure** to raise nose
  - Readjust power setting
  - **Trim** to compensate control forces
- **Increase** Power / Increasing Airspeed:
  - **Advance throttle** smoothly to estimated setting
  - Anticipate and **prevent yaw**
  - Apply **forward-pressure** to lower nose
  - Readjust power setting
  - **Trim** to compensate control forces

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Straight-and-Level Flight

- Maintain **heading** and **altitude** in close tolerances
- *Restrained* use of all three flight controls
- Control **roll** and **yaw** to maintain **heading**
- Control **pitch** and **power** to maintain **altitude**
- Maintain *coordinated flight*
- Level flight at different power settings (airspeeds) is required for **separation** with other traffic
- Pitch and power affect the aerodynamic and economic **performance** of the aircraft (range and endurance)

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Magnetic Compass

- **Acceleration Error**
  - **A**ccelerate **N**orth **D**ecelerate **S**outh (ANDS)
- **Turning Error**
  - **U**ndershoot **N**orth **O**vershoot **S**outh (UNOS)
- Reliable *only* in straight unaccelerated flight
- Readings in straight-and-level, straight-climbing or -descending provided *constant* airspeed
- Average readings in turbulent air
- Adjust heading indicator every ***15 min***

Summary / Quiz

- What parameter is to be kept constant in straight flight?
- What references and instruments are available to maintain straight flight?
- How is straight flight maintained using the flight controls?
- What parameter is to be kept constant in level flight?
- What references and instruments are available to maintain level flight?
- How is level flight maintained using the flight controls?
- How do power changes affect straight-and-level flight?
- What are the errors of the magnetic compass?

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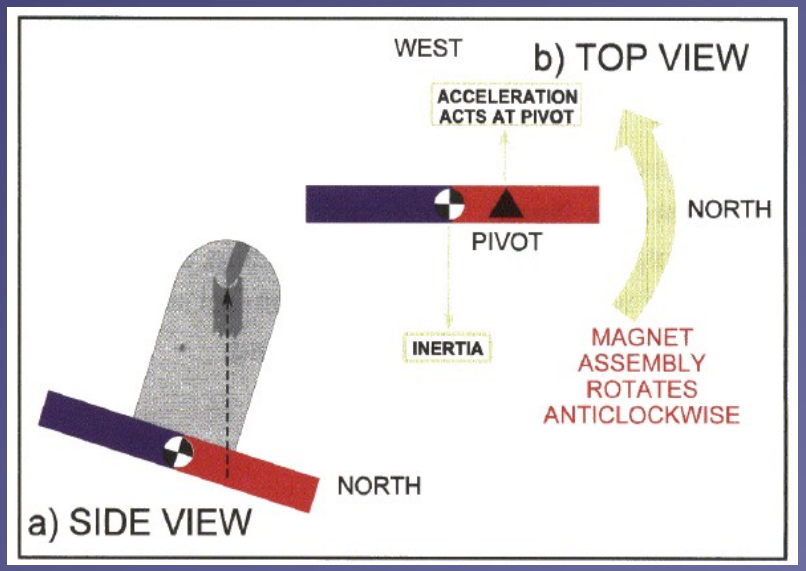
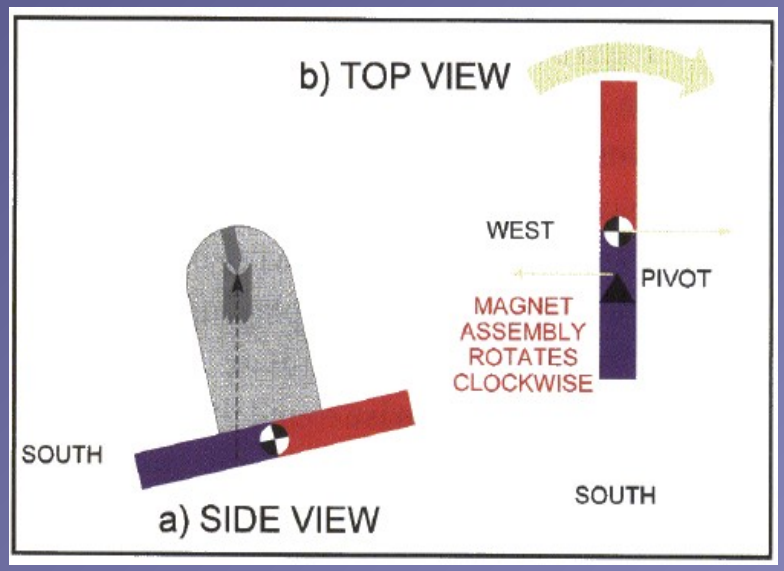
Pre-Flight Briefing

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

Magnetic Dip





- Magnetic dip is the reason for dip errors (acceleration / deceleration, turning)
- Magnetic dip shifts the **pivot** point away from the magnet's **center of gravity**

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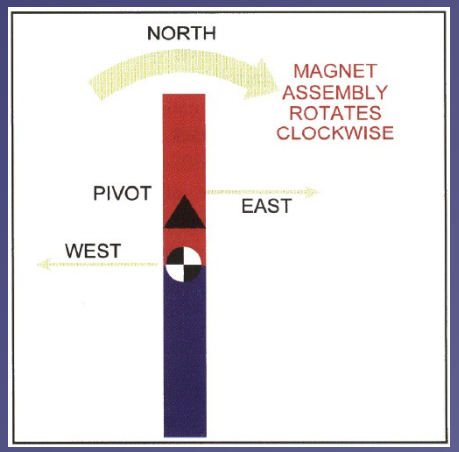
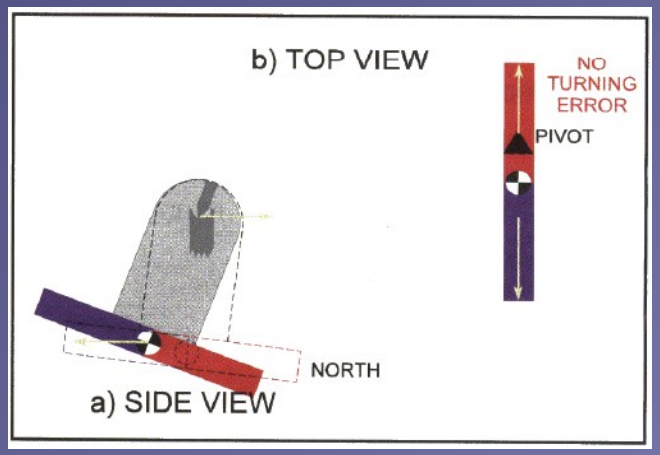
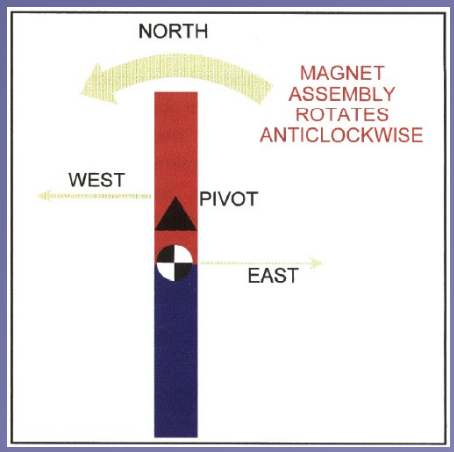
Acceleration/Deceleration Errors







- **A**ccelerate **N**orth **D**ecelerate **S**outh (**ANDS**)
- Opposite behavior on the southern hemisphere
- *More* pronounced on easterly / westerly headings
- *Less* pronounced on northerly / southerly headings

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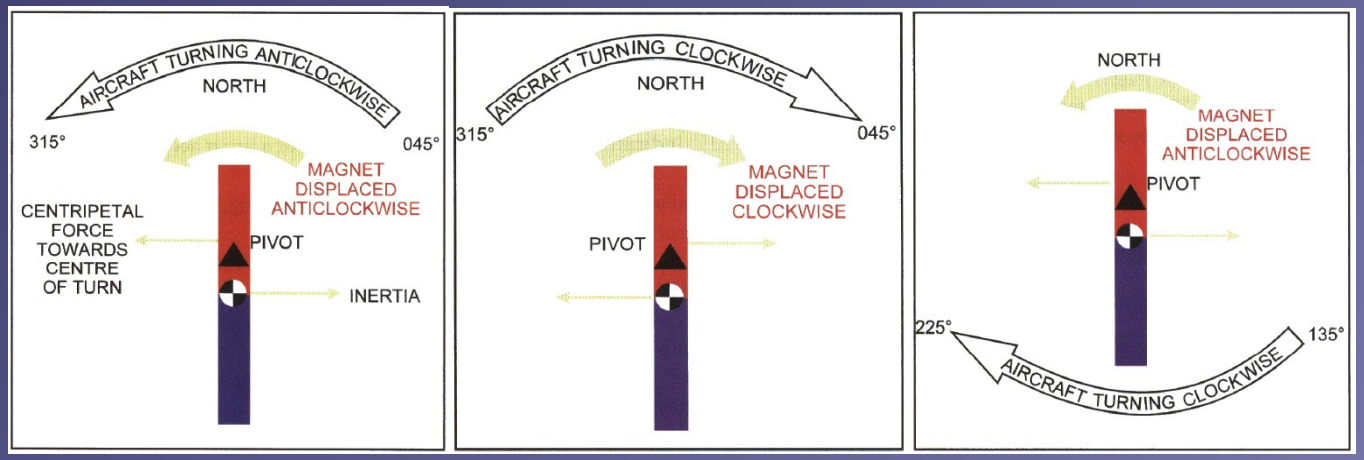
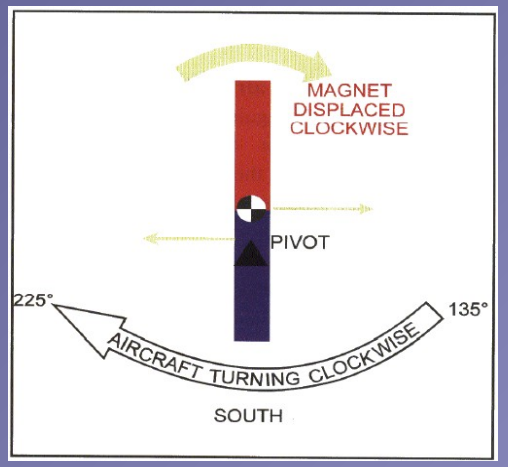
Turning Errors





- **U**ndershoot **N**orth **O**vershoot **S**outh (**UNOS**)
- Opposite behavior on the southern hemisphere
- *More* pronounced on northerly / southerly turns
- *Less* pronounced on easterly / westerly turns