



VICTORIA FLYING CLUB

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VICTORIA FLYING CLUB

Pilot Navigation

- Review Navigation (Groundschool)
- Definition and Motivation
- **Pilot Navigation**
- Summary and Questions
- Pre-Flight Briefing



Review Navigation

- What information is required to prepare a cross-country flight and where can it be obtained?
- What elements of a navigation log are filled in before and during the flight, respectively.
- What is the purpose of flight planning and preparation and how does it relate to the actual flight?
- What is a flight plan and itinerary, respectively?



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Definition and Motivation

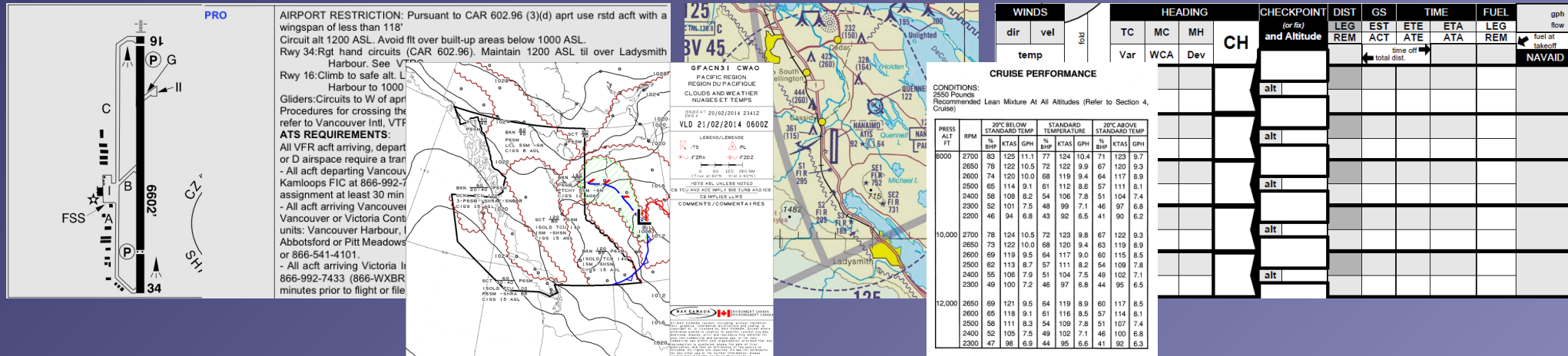


- *The process or activity of accurately ascertaining one's position and planning while following a route.*
- **Essential skill** to safely and efficiently travel from departure to destination
- Navigation **planning** establishes a level of **situational awareness** including potential options *before the flight*
- Supports **decision making** *during the flight*



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Preparation



- **Charts, CFS, Weather** (SWC, GFA, FD, METAR, TAF, AIRMET, SIGMET, PIREP), **NOTAM, W&B, Performance, Navigation Log, Flight Plan, FIC Briefing & Flight Planning**
- **Aircraft** (CoR, CoA, W&B, Insurance, Journey Log, POH, Checklists), **Survival Equipment**
- **Pilot** (License, Ratings, Medical), *IMSAFE*



Navigation Log

WINDS		fold	HEADING				CHECKPOINT (or fix) and Altitude	DIST	GS	TIME		FUEL	gph flow fuel at takeoff NAVAID
dir	vel		TC	TH	MH	CH		LEG REM	EST ACT	ETE ATE	ETA ATA	LEG REM	
temp			WCA	Var	Dev								
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Navigation Log (Route)

[illegible]



Navigation Log (Aircraft)

[illegible]



Navigation Log (Weather)

[illegible]



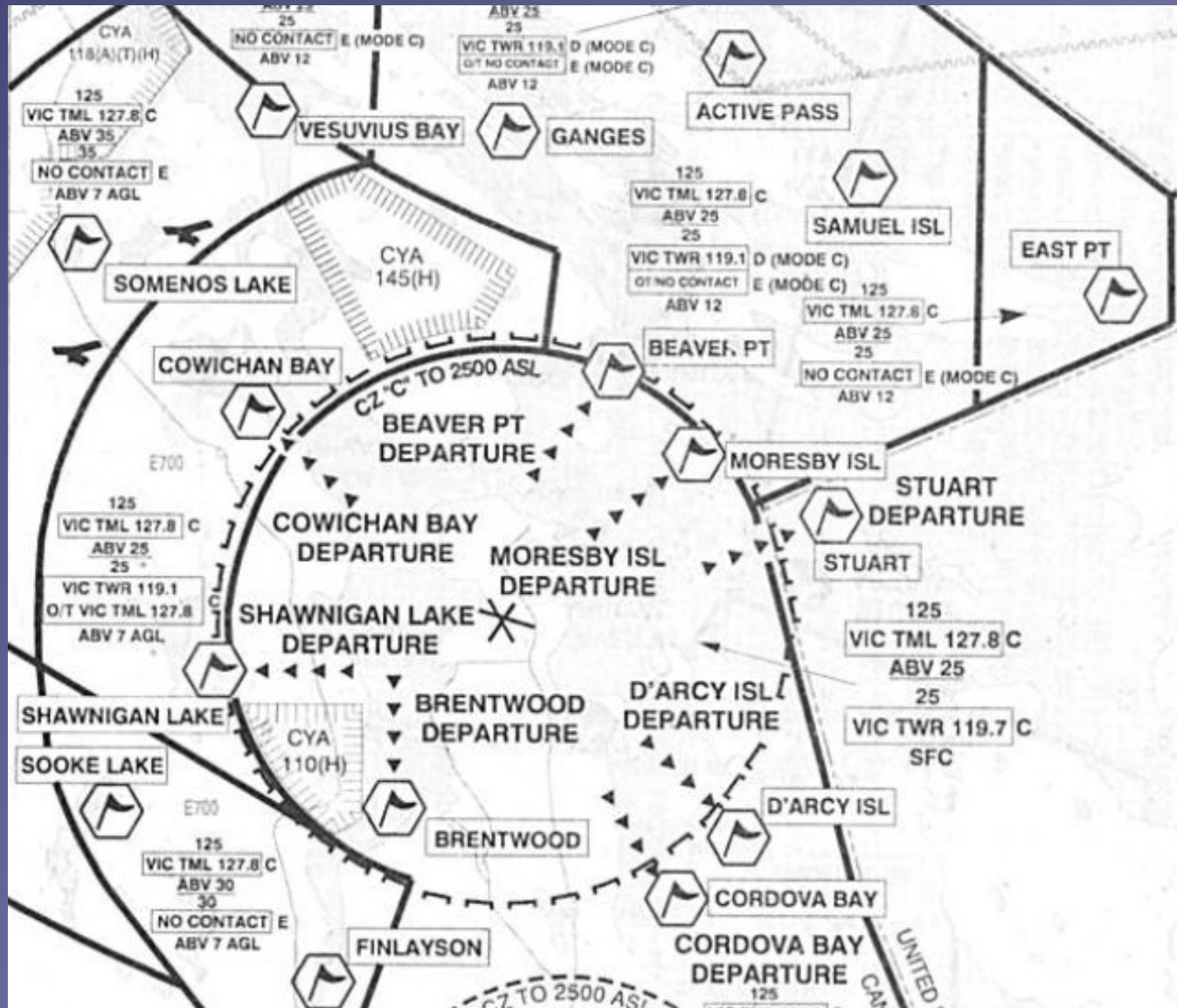
Navigation Log (Calculation)

[illegible]



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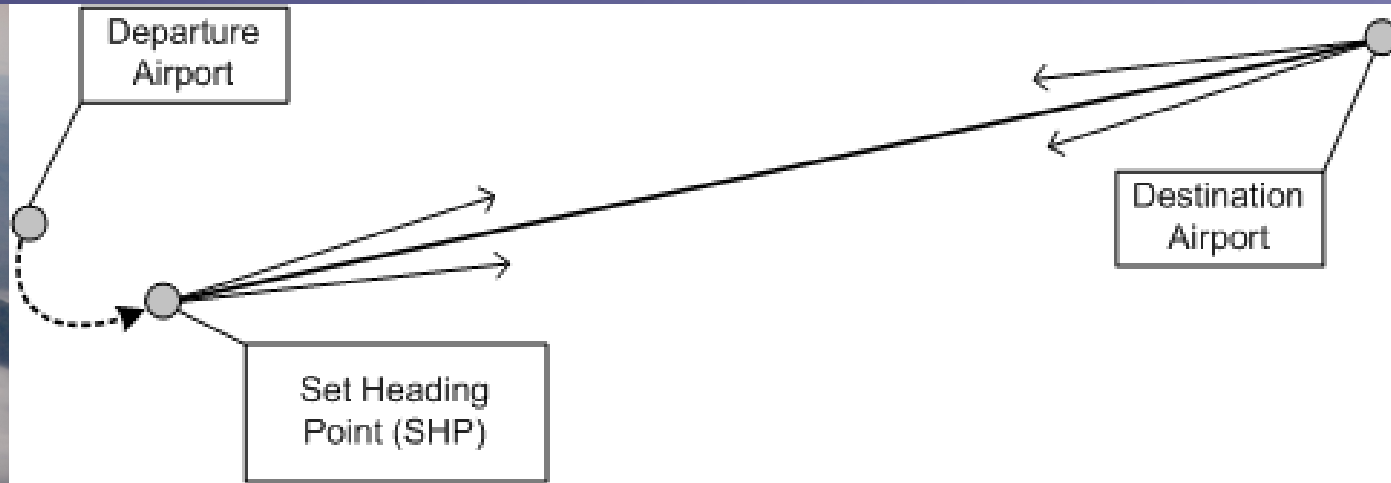
Victoria Standard VFR Departures





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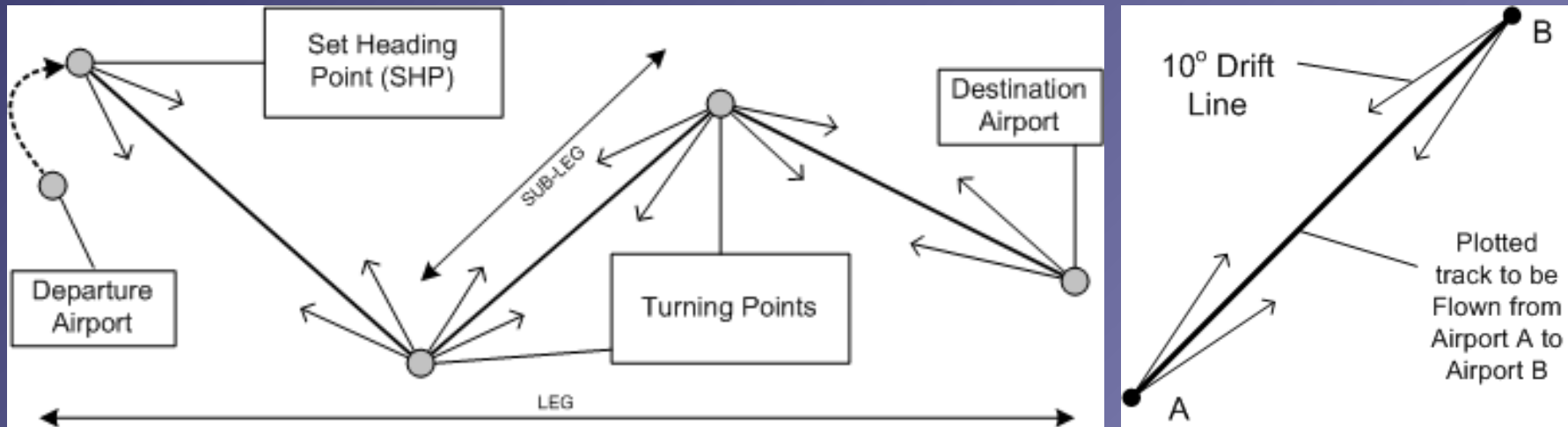
Geographic Point Procedure



- Fly departure to **Set Heading Point**
- 5 T's – *Time, Turn, Throttle (Mixture), Tune, Talk*
- Enter **Actual Time Over (ATO)** into navigation log
- Establish planned **heading** – heading indicator
- Crosscheck **visual** angle, **chart** and **navigation log**



Flying Legs

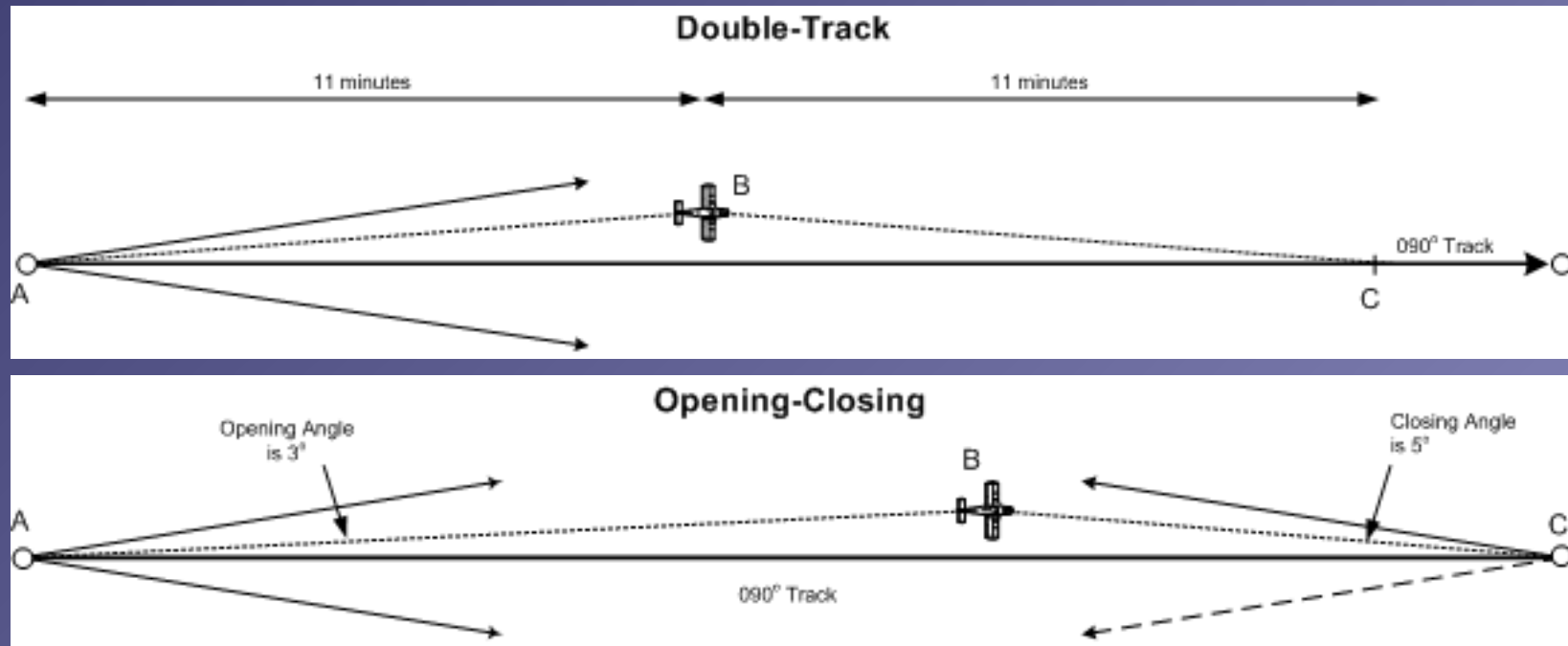


- Update **ETA** and *next* **ETO** at each waypoint
- Maintain *accurate* **heading** and observe **track**
- Correct **drift** as required – update heading
- Check **groundspeed** – update ETA and next ETO
- Perform **OPS / cockpit checks** every **15 / 30 min**



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Track Error Corrections



- Visual Alteration Method
- Double Track Error Method
- Opening Closing Angle Method
- Drift Compensation Method



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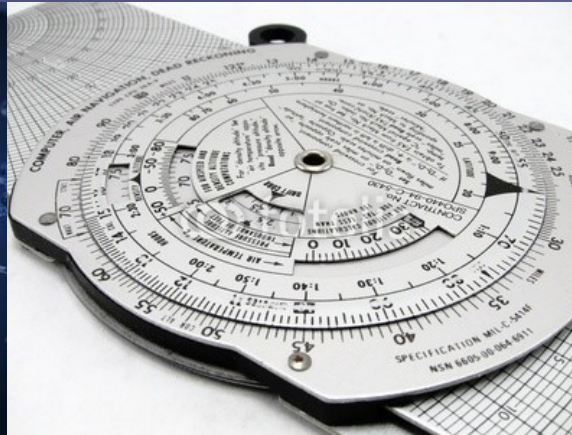
1 in 60 Rule





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Groundspeed Check



- **30 NM, 30 min** → **60 kts**
- **30 NM, 15 min** → **120 kts**
- **30 NM, 20 min** → **90 kts**
- **10 NM, 5 min** → **120 kts**
- **5 NM, 2.5 min** → **120 kts**





E6B GS Check and ETA Update

- GS Check:
 - **Distance** in **NM** on the outside ring **over**
 - **Time** in **min/hours** on the inside ring
 - Read **Speed** in **knots** on the outside ring **over** 60
- ETA / ETO Update:
 - **Speed** in **knots** on the outside ring **over** 60
 - Read **Time** in **min/hours** on the inside ring **under**
 - **Distance** in **NM** on the outside ring



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OPS / Cockpit Checks

Magnetic Compass



Heading Indicator



*Fuel, Oil,
Vacuum, Current*

- Assure **navigation**al performance
- Check **power plant**, **fuel** and **electrical** systems
- **Magnetic Compass, Heading Indicator** – Cross Check
- **Engine Instruments** (Fuel, Oil) – Check
- **No Discharge** (Ammeter) – Check



- Required for **advisory, control** and **alerting** service
- Required for all flights beyond **25 NM** of departure
- **Filing** with **FIC** at least **30 min** before departure
- **Closing** with **FSS** in-flight, control tower or FIC
- **SAR** times (**1 / 24 h** after ETA or as specified)



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Diversions



- *Circle, Circle, Line, Heading, Distance, Time*
- *Make a call and you'll be fine*
- **Fuel** (reserve) required and **weather** for alternate
- Consider **departure aerodrome** and **reciprocal track**
- Use physical features for **visual navigation** (roads, rivers)
- Support with **all means of navigation** (GPS, VOR, NDB)



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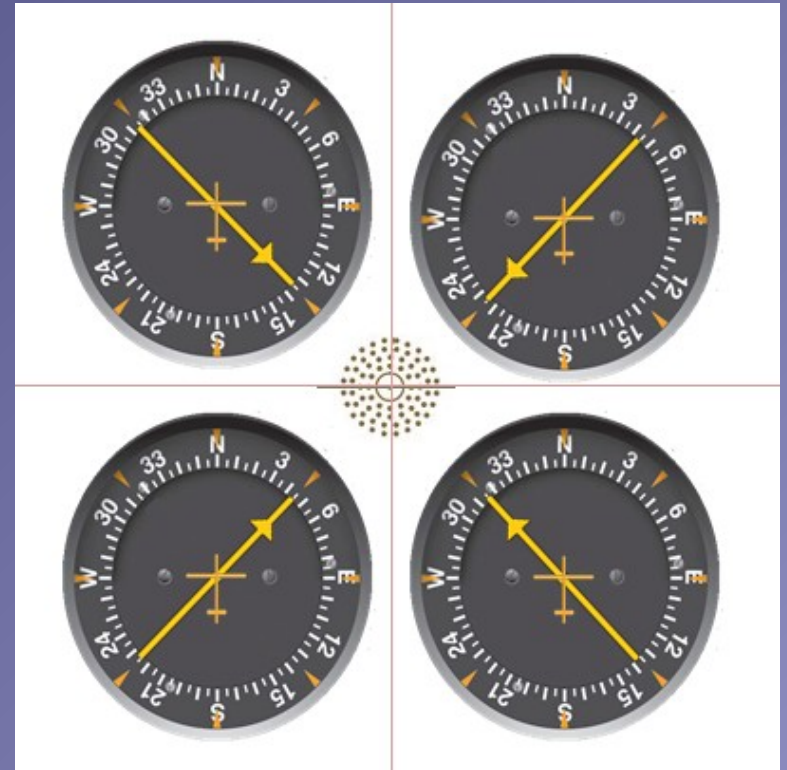
Diversions





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Navigational Aids



- GPS – map and direct to (mounted, portable)
- VOR – radial inbound or outbound, fix
- NDB – bearing to station



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Low-Level Navigation



- *Restricted field of view* and *limited navigational cues*
- Requires *accurate tracking* and *timing*
- Remain clear of **obstacles** – look outside
- Use **shorelines**, **rivers**, **roads**, **railways**
- Consider **precautionary landing** or **special VFR**



Navigational Assistance

- *Steady heading* – crosscheck MC and HI
- Navigation **errors** – heading, drift, landmarks
- **Circle of uncertainty** – last known position
- Watch to **ground to map** versus map to ground
- Proceed to **major landmarks**, consider **climb**
- Request **assistance** – Vectors, DF Steer
- Consider GPS, VOR, NDB for support (CFIT)
- Declare emergency if necessary (7700, ELT)



Summary / Quiz

- What preparation items need to be completed before commencing a cross-country flight?
- Which elements of a navigation log are filled in during the flight and why is an up-to-date log necessary?
- What are the problems associated with attempting to obtain a ground speed check within a few minutes after setting heading?
- What track error correction methods are available to you and how can they be used?



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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



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Pilot Navigation (Ex. 23,

LP. 3, (4), 5, (6, 7, 20, 22, 24), 26)

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



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Charts

- VNC, VTA, WAC
- Route Selection, Chart Preparation
- Markings and Folding
- Drift Lines, Angles



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Departure, Destination, Alternate

- CFS



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Route and Altitude

- Distance, Economy, Weather / Wind, Navigation Aids, Comfort, Oxygen, Performance Limitations, Gliding Distance



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NOTAM



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Weather

- GFA, SWC, FD
- METAR, TAF, SIGMET, AIRMET, PIREP
- Briefing, FIC
- Current Situation and Forecast



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Navigation Log

- Log Keeping
- Time Off and Flight Plan Opening Time
- Set Heading Time
- Compass Headings and Waypoint Times
- ETA for Waypoints and Destination
- ATA (Time Over) for Waypoints and Destination
- Revised GS and ETA



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Flight Plan / Itinerary

- SAR times (long versus short plans, roundtrips)



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Documents

- CoR, CoA, W&B, Insurance, Journey Log, MEL
- License, Medical, IMSAFE
- POH, Checklists, Charts



Departure, Enroute and Arrival

- Overhead, Geographic Point, En-Route Climb
- GUMPS, OPS Checks, Ground Speed Check
- Position Reports, PIREPs
- Map/Chart Reading:
 - Orientation, Anticipation, Confirmation, Pin-Pointing
- Desired, Actual Track / Error, Angles (10-25NM)
- Double Track Error Method, Visual Alteration, Opening Closing Angle Method, Drift Compensation Method
- Lookout / Scanning and Traffic Awareness (Crew, Systems, Weather)



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Diversion

- Situational Awareness and Decision Making
- Online Planning
- Priority: Aviate, Navigate, Communicate, Manage
- Circle, Circle, Line, Heading, Distance, Groundspeed, Time – You'll Be Fine (Consider Leg-Size)
- Reciprocal Track and Wind Correction
- Estimations: Track, Distance, Groundspeed, Time, Heading
- Multiples of 60KIAS, Multiples of leg section
- Communication (FSS)
- Circle of Uncertainty, Low-Level Navigation
- Emergency Procedures, Triangles