Map Reading, Navigation & Flight Planning

Don Henry GGC 21 Jan 26

TP876E Study and Reference Guide

- SECTION 2: NAVIGATION AND RADIO THEORY

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Methods of Navigation

- Boeing B-17 Flying Fortress Pilot Training Manual Revised 1 May 1945

  - Navigation is the art of determining geographic positions by means of (a) pilotage, (b) dead reckoning, (c) radio, or (d) celestial navigation, or any combination of these four methods. By any one or combination of methods the navigator determines the position of the airplane in relation to the earth.

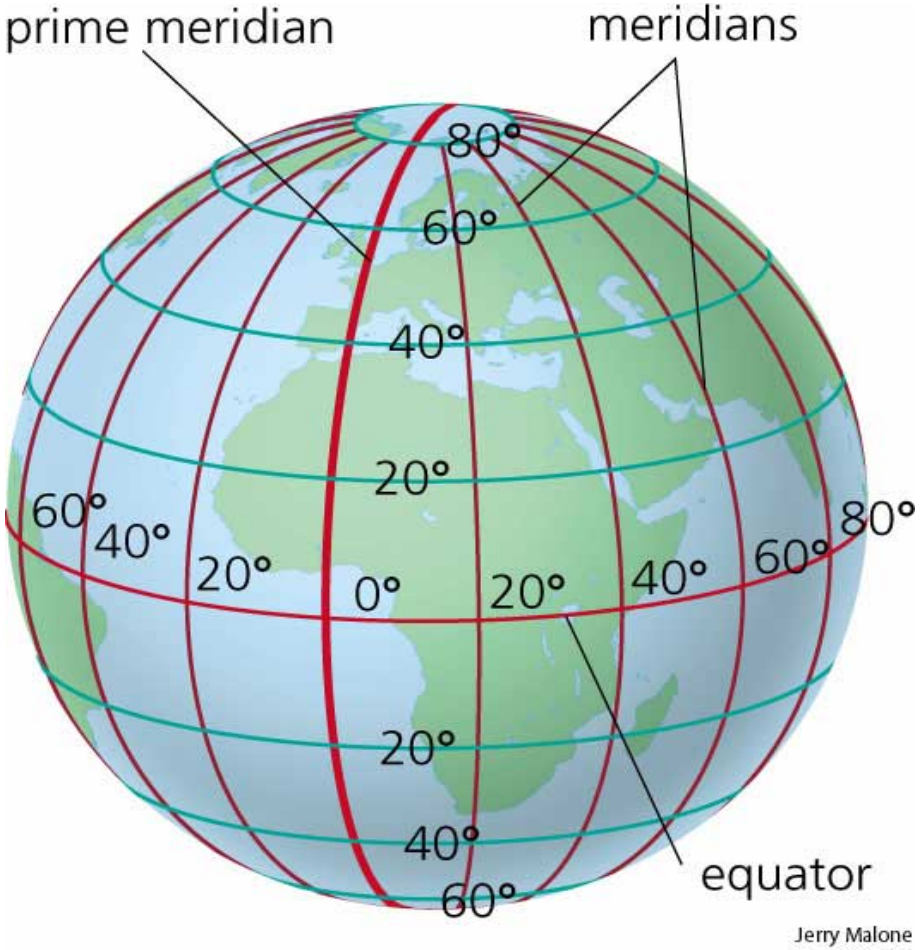
Building Blocks for Navigation

- Standardized Measurement of Time
- Standardized System of Coordinates / References
- Standardized Measurement of Distance
- Standardized Displays

Standardized Measurement of Time

- Coordinated Universal Time (UTC) is the time standard used in all aviation to eliminate any confusion about time zones and daylight savings time.
- Always stated using the 24 hr clock
- Used for:
  - Flight plans
  - Air traffic control clearances.
  - Weather forecasts
  - Maps
- UTC for Ottawa is Eastern Standard Time + 5 hours or Eastern Daylight Savings Time + 4 hours

Standardized System of Coordinates / References



The Meridians – Latitude & Longitude

- True Meridians: Lines joining the geographic poles of the Earth

Latitude & Longitude

- Latitude is the angle north or south between a point and the Equator (Zero). Lines of constant latitude are called parallels. Zero to 90 Degrees.

- Longitude is the angle east or west between a point and the Prime Meridian (The Royal Observatory, Greenwich, England). Zero to 180 Degrees.

- Example:
  - Ottawa 45 Degrees 19 Minutes North , 75 Degrees 40 Minutes West or 45.3166 Degrees North, 75.6666 Degrees West
  - Canberra 35 Degrees 18 Minutes South, 149 Degrees 07 Minutes East or 35.3082 Degrees South, 149.1244 Degrees East

Standardized Measurement of Distance

- Nautical Mile (NM)
  - Defined as the meridian arc length corresponding to one minute (1/60 of a degree) of latitude. Today the international nautical mile is defined as exactly 1,852 metres
    - 1 nautical mile per hour – 1 Knot
- Statue Mile (SM)
  - The English unit of length equal to 5,280 English feet, or 1,760 yards. The statute mile was standardized in 1959 as 1,609 metres
    - 1 mile per hour – 1 Mph
- Kilometer (KM)
  - A unit of length in the International System of Units, equal to 1,000 metres.
    - 1 kilometre per hour – 1 kph

Standardized Displays

Making our round world flat

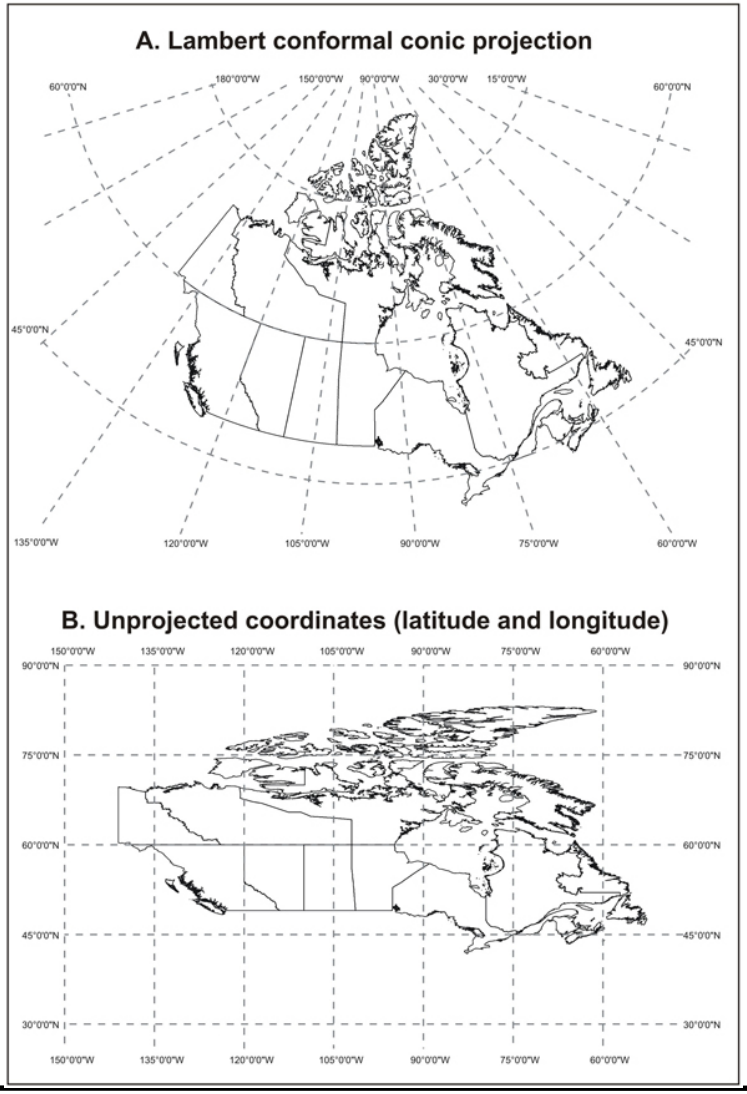
Mapping

- The Earth's surface cannot be flattened without distorting geometrical properties, such as area, shape, distance and direction.

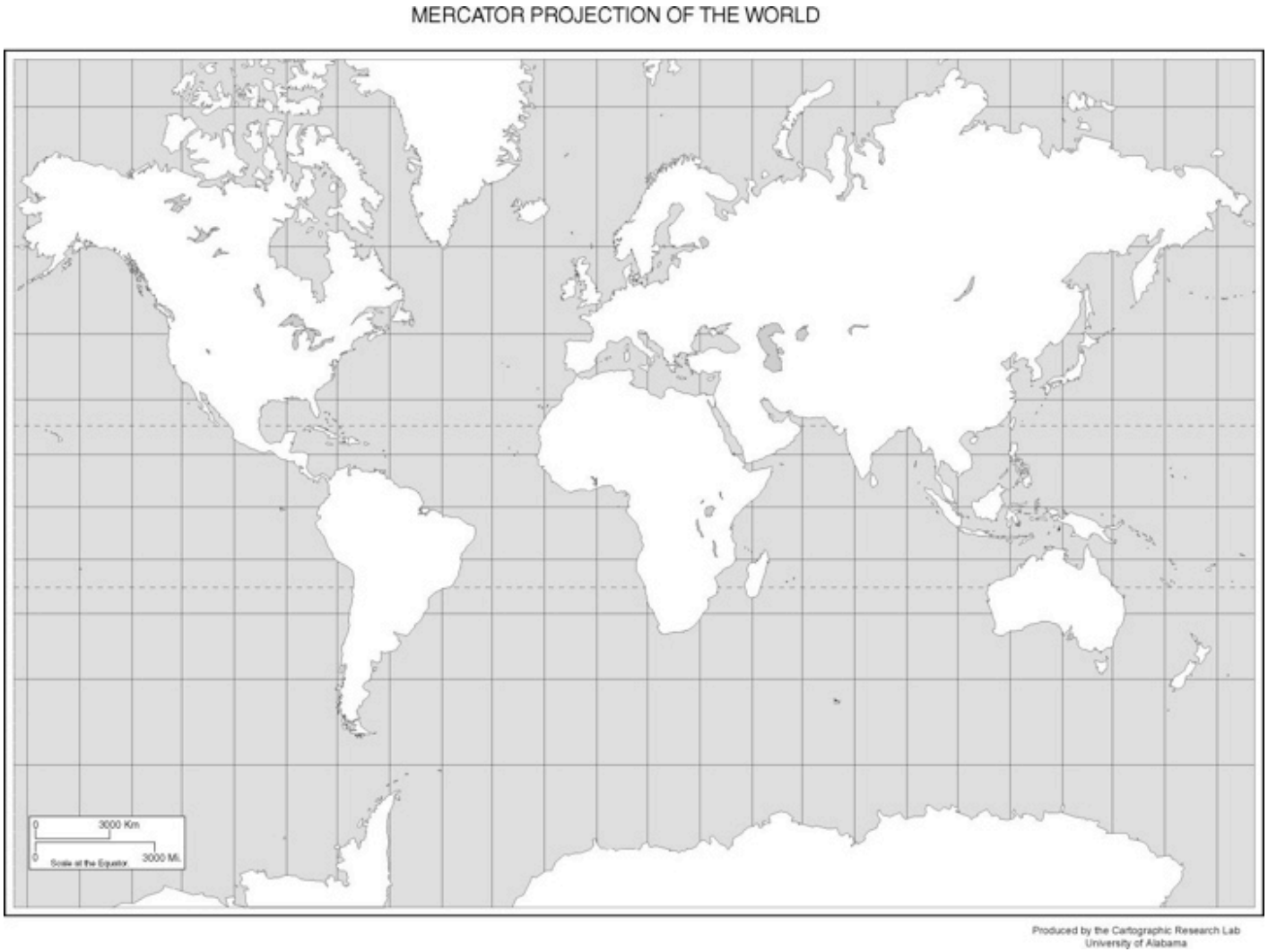
- These spatial properties can be preserved individually (at least locally) and in certain combinations on map projections. However, the four basic properties of area, shape, distance and direction cannot all be held true simultaneously. Therefore, it is important to select a projection having the properties that are suited to the mapping situation.
  - Source – Statistics Canada

- The type of projection defines the distortion

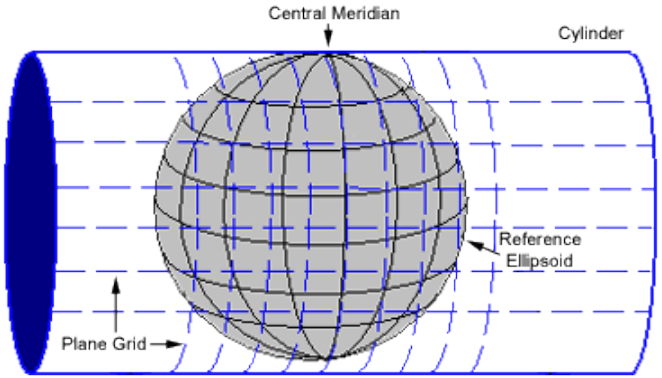
The Projection Defines the Distortion

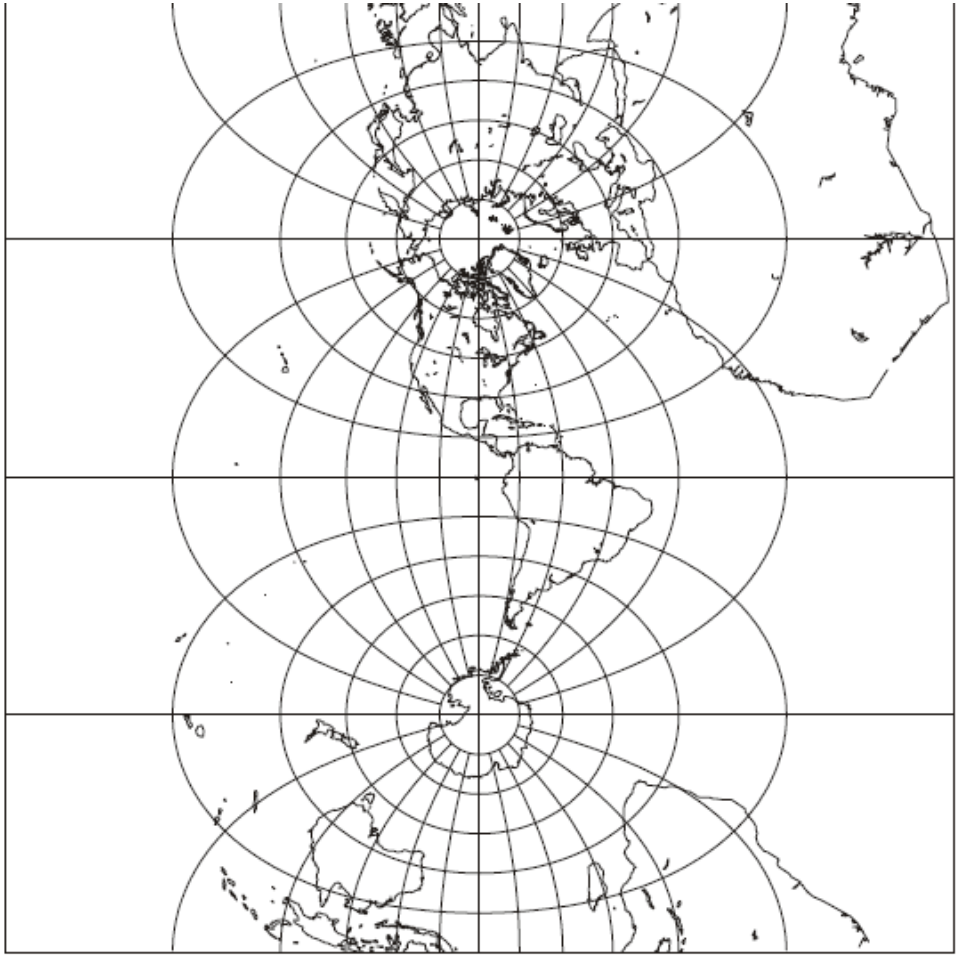


Mercator Projection



Transverse Mercator Projection



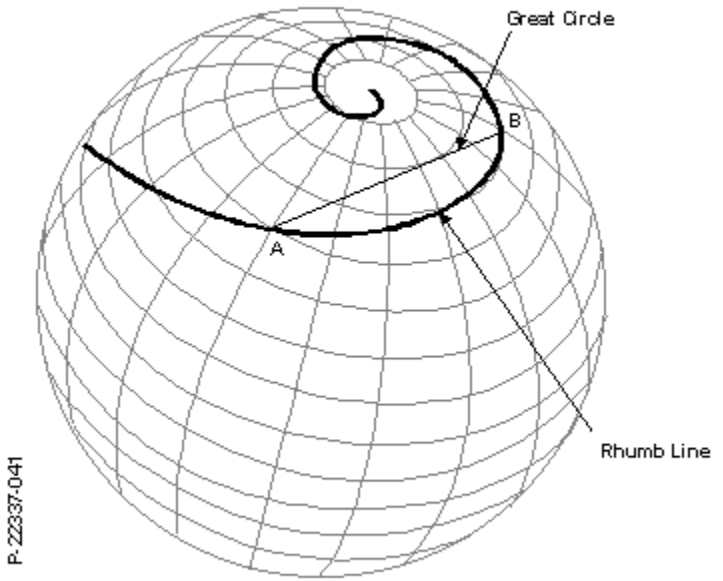


Mercator Projection

- Meridians and parallels are straight. Cardinal points are all constant.
- A straight line of latitude drawn between two points on the chart will represent a Rhumb line.
- In terms of measuring distance, this projection is relatively precise in the equatorial regions

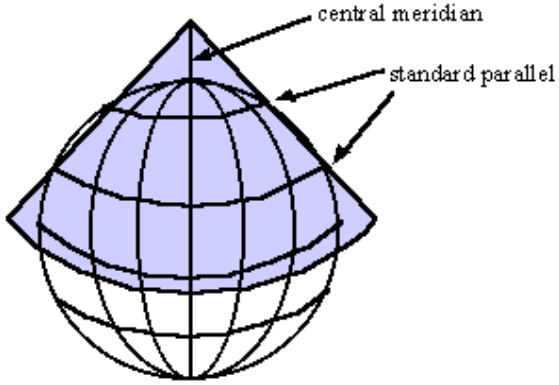
Rhumb Line

- A Rhumb Line is a path of constant bearing, which crosses all meridians at the same angle.
- Used in Maritime navigation as it's easier to follow a constant compass bearing than to be continually adjusting the bearing, as is needed to follow a great circle.
- Important to note that Rhumb Lines are straight lines on a Mercator Projection map
- Rhumb Lines are generally longer than great-circle routes.
  - London to New York is 4% longer along a Rhumb Line than along a great circle



The great circle is a straight line and the Rhumb line is a spiral curve

Lambert Conformal Conic Projection



Lambert Conformal Conic;
Johann Heinrich Lambert; 1772

Lambert Conformal Conic Projection

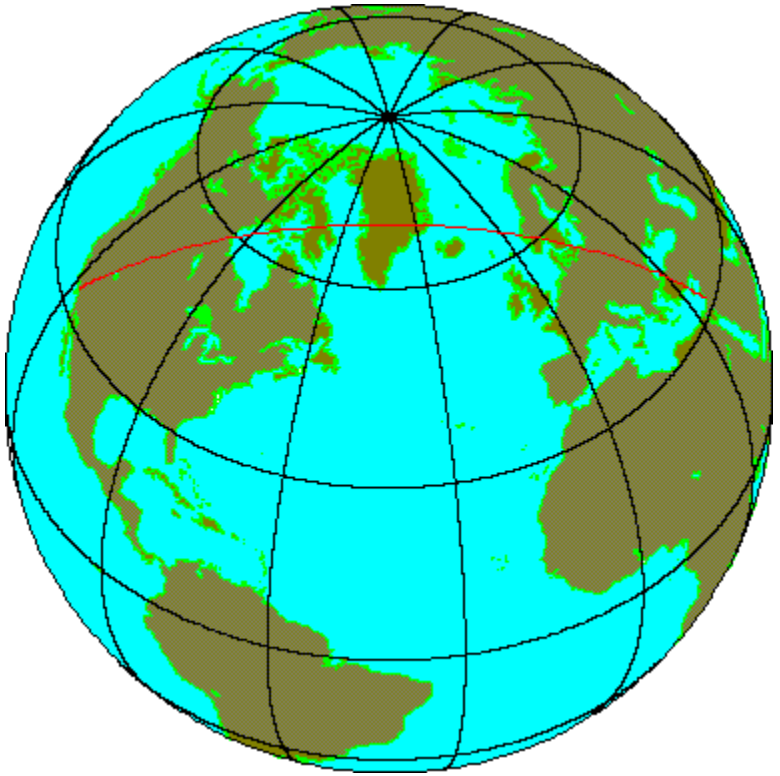
- A Lambert conformal conic projection is a conic map projection, which is often used for aeronautical charts.

- In essence, the projection seats a cone over the sphere of the Earth and projects conformally onto the cone. The cone is unrolled, and the parallel touching the sphere is assigned unitary scale. The parallel is called the reference parallel or standard parallel.

- Pilots favour these charts because a straight line drawn on a Lambert Conformal conic projection approximates a great-circle route between two end points.

Great Circle

- A circle on the surface of the earth that whose plane passes through the centre of the earth.
- Only one Great Circle can be drawn between two points.
- The arc of the Great Circle between these two points is the shortest distance.
- A Great Circle does not cross the meridians at the same angle



Remember

- For Aviators the shortest distance between two points is not a straight line, it's a great circle

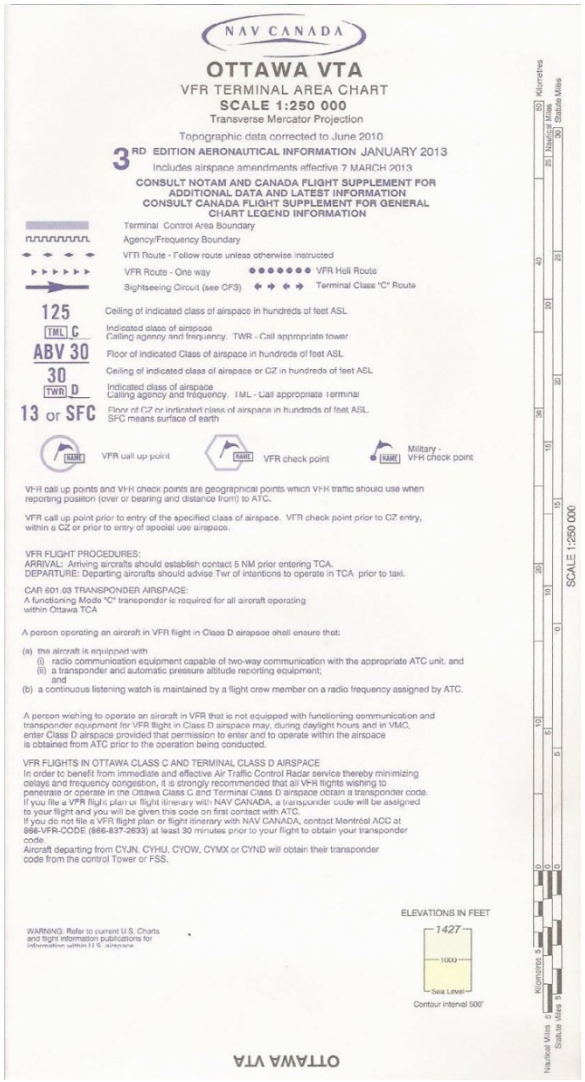
Aeronautical Charts

Name	Flight Rule	Projection	Scale
VFR Navigation (VNC)	VFR	Lambert Conformal Conic	1:500,000
World Aeronautical Chart	VFR	Lambert Conformal Conic	1:1,000,00
VFR Terminal Area	VFR	Transverse Mercator	1:250,000
Enroute LO	IFR	Lambert Conformal Conic	Various
Enroute HI	IFR	Lambert Conformal Conic	Various
Terminal Area	IFR	Lambert Conformal Conic	Various

Know Your Map

- Check and understand before using any map:
  - Date
  - Type
  - Scale
  - Topography
  - Symbols
  - Lat & Long – Reference Latitude
  - Variation
  - Frequencies
  - Airspace Restrictions
  - Hazards
  - Reporting Points
  - Aerodrome

Example Ottawa VFR Terminal Area (VTA)



NAV CANADA

OTTAWA VTA

VFR TERMINAL AREA CHART

SCALE 1:250 000

Transverse Mercator Projection

Topographic data corrected to June 2010

3RD EDITION AERONAUTICAL INFORMATION JANUARY 2013

Includes airspace amendments effective 7 MARCH 2013

CONSULT NOTAM AND CANADA FLIGHT SUPPLEMENT FOR ADDITIONAL DATA AND LATEST INFORMATION
CONSULT CANADA FLIGHT SUPPLEMENT FOR GENERAL CHART LEGEND INFORMATION

Terminal Control Area Boundary
Agency/Frequency Boundary
VFR Route - Follow route unless otherwise instructed
VFR Route - One way
VFR Heli Route
Sightseeing Circuit (see CFS)
Terminal Class "C" Route

125 — Ceiling of indicated class of airspace in hundreds of feet ASL

TML C — Indicated class of airspace; Calling agency and frequency. TWR - Call appropriate tower

ABV 30 — Floor of indicated Class of airspace in hundreds of feet ASL

30 / TWR D — Ceiling of indicated class of airspace or CZ in hundreds of feet AGL; Indicated class of airspace; Calling agency and frequency. TML - Call appropriate Terminal

13 or SFC — Floor of CZ or indicated class of airspace in hundreds of feet ASL. SFC means surface of earth

NAME VFR call up point
NAME VFR check point
NAME Military - VFR check point

VFR call up points and VFR check points are geographical points which VFR traffic should use when reporting position (over or bearing and distance from) to ATC.

VFR call up point prior to entry of the specified class of airspace. VFR check point prior to CZ entry, within a CZ or prior to entry of special use airspace.

VFR FLIGHT PROCEDURES:
ARRIVAL: Arriving aircrafts should establish contact 5 NM prior entering TCA.
DEPARTURE: Departing aircrafts should advise Twr of intentions to operate in TCA prior to taxi.

CAR 601.03 TRANSPONDER AIRSPACE:
A functioning Mode "C" transponder is required for all aircraft operating within Ottawa TCA

A person operating an aircraft in VFR flight in Class D airspace shall ensure that:

(a) the aircraft is equipped with
(i) radio communication equipment capable of two-way communication with the appropriate ATC unit, and
(ii) a transponder and automatic pressure altitude reporting equipment; and
(b) a continuous listening watch is maintained by a flight crew member on a radio frequency assigned by ATC.

A person wishing to operate an aircraft in VFR that is not equipped with functioning communication and transponder equipment for VFR flight in Class D airspace may, during daylight hours and in VMC, enter Class D airspace provided that permission to enter and to operate within the airspace is obtained from ATC prior to the operation being conducted.

VFR FLIGHTS IN OTTAWA CLASS C AND TERMINAL CLASS D AIRSPACE
In order to benefit from immediate and effective Air Traffic Control Radar service thereby minimizing delays and frequency congestion, it is strongly recommended that all VFR flights wishing to penetrate or operate in the Ottawa Class C and Terminal Class D airspace obtain a transponder code. If you file a VFR flight plan or flight itinerary with NAV CANADA, a transponder code will be assigned to your flight and you will be given this code on first contact with ATC.
If you do not file a VFR flight plan or flight itinerary with NAV CANADA, contact Montréal ACC at 866-VFR-CODE (866-837-2633) at least 30 minutes prior to your flight to obtain your transponder code.
Aircraft departing from CYJN, CYHU, CYOW, CYMX or CYND will obtain their transponder code from the control Tower or FSS.

ELEVATIONS IN FEET

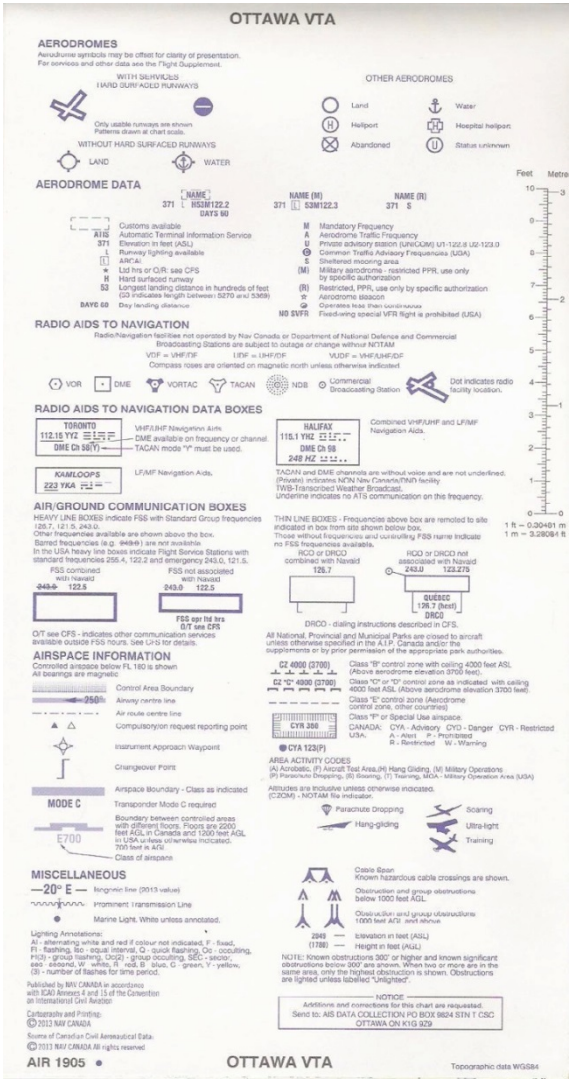
1427
1000
Sea Level
Contour interval 500'

WARNING: Refer to current U.S. Charts and flight information publications for information within U.S. airspace

SCALE 1:250 000

Kilometres 0 5 10 15 20 25 30 35 40 45 50 55 60
Nautical Miles 0 5 10 15 20 25 30
Statute Miles 0 5 10 15 20 25 30 35 40 45 50

OTTAWA VTA



OTTAWA VTA

AERODROMES
Aerodrome symbols may be offset for clarity of presentation.
For services and other data see the Flight Supplement.

WITH SERVICES
HARD SURFACED RUNWAYS
Only usable runways are shown.
Patterns drawn at chart scale.

WITHOUT HARD SURFACED RUNWAYS
LAND
WATER

OTHER AERODROMES
Land
Water
Heliport
Hospital heliport
Abandoned
Status unknown

AERODROME DATA
NAME
371 L H53N122.2
DAYS 60
NAME (M)
371 L S3M122.3
NAME (R)
371 S

Customs available
AIS Automatic Terminal Information Service
371 Elevation in feet (ASL)
L Runway lighting available
L ARCAL
Ltd hrs or O/R: see CFS
H Hard surfaced runway
53 Longest landing distance in hundreds of feet (53 indicates length between 5270 and 5369)
DAYS 60 Day landing distance
M Mandatory Frequency
A Aerodrome Traffic Frequency
U Private advisory station (UNICOM) U1-122.8 U2-123.0
Common Traffic Advisory Frequencies (CTAF)
S Sheltered mooring area.
(M) Military aerodrome - restricted PPR, use only by specific authorization
(R) Restricted, PPR, use only by specific authorization
Aerodrome beacon
Operates less than continuous
NO SVFR Fixed-wing special VFR flight is prohibited (USA)

RADIO AIDS TO NAVIGATION
Radio/Navigation facilities not operated by Nav Canada or Department of National Defence and Commercial Broadcasting Stations are subject to outage or change without NOTAM
VDF = VHF/DF UDF = UHF/DF VUDF = VHF/UHF/DF
Compass roses are oriented on magnetic north unless otherwise indicated.
VOR DME VORTAC TACAN NDB Commercial Broadcasting Station Dot indicates radio facility location.

RADIO AIDS TO NAVIGATION DATA BOXES
TORONTO
112.15 YYZ
DME Ch 58(Y)
VHF/UHF Navigation Aids.
DME available on frequency or channel.
TACAN mode "Y" must be used.
KAMLOOPS
223 YKA
LF/MF Navigation Aids.
HALIFAX
115.1 YHZ
DME Ch 98
248 HZ
Combined VHF/UHF and LF/MF Navigation Aids.
TACAN and DME channels are without voice and are not underlined.
(Private) indicates NON Nav Canada/DND facility
TWB-Transcribed Weather Broadcast.
Underline indicates no ATS communication on this frequency.

AIR/GROUND COMMUNICATION BOXES
HEAVY LINE BOXES indicate FSS with Standard Group frequencies 126.7, 121.5, 243.0.
Other frequencies available are shown above the box.
Barred frequencies (e.g. 243.0) are not available.
In the USA heavy line boxes indicate Flight Service Stations with standard frequencies 255.4, 122.2 and emergency 243.0, 121.5.
FSS combined with Navaid: 243.0 123.5
FSS not associated with Navaid: 243.0 122.5
FSS opr hd hrs O/T see CFS
THIN LINE BOXES - Frequencies above box are remoted to site indicated in box from site shown below box.
Those without frequencies and controlling FSS name indicate no FSS frequencies available.
RCO or DRCO combined with Navaid: 126.7
RCO or DRCO not associated with Navaid: 243.0 123.275
QUEBEC 126.7 (Navaid) DRCO
O/T see CFS - indicates other communication services available outside FSS hours. See CFS for details.
DRCO - dialling instructions described in CFS.

AIRSPACE INFORMATION
Controlled airspace below FL 180 is shown
All bearings are magnetic
Control Area Boundary
250 Airway centre line
Air route centre line
Compulsory/on request reporting point
Instrument Approach Waypoint
Changeover Point
Airspace Boundary - Class as indicated
MODE C Transponder Mode C required
E700 Boundary between controlled areas with different floors. Floors are 2000 feet AGL in Canada and 1200 feet AGL in USA unless otherwise indicated. 700 feet is AFE.
Class of airspace
CZ 4000 (3700) Class "B" control zone with ceiling 4000 feet ASL (Above aerodrome elevation 3700 feet).
CZ "C" 4000 (3700) Class "C" or "D" control zone as indicated with ceiling 4000 feet ASL (Above aerodrome elevation 3700 feet).
Class "E" control zone (Aerodrome control zone, other countries)
CYR 350 Class "R" or Special Use airspace.
CANADA: CYA - Advisory CYD - Danger CYR - Restricted
USA: A - Alert P - Prohibited R - Restricted W - Warning
CYA 123(P)

AREA ACTIVITY CODES
(A) Aerobatic, (F) Aircraft Test Area,(H) Hang Gliding, (M) Military Operations (P) Parachute Dropping, (S) Soaring, (T) Training, MOA - Military Operation Area (USA)
Altitudes are inclusive unless otherwise indicated.
(CZOM) - NOTAM file indicator.
Parachute Dropping
Hang-gliding
Soaring
Ultra-light
Training

MISCELLANEOUS
—20° E— Isogonic line (2013 value)
Prominent Transmission Line
Marine Light, White unless annotated.
Lighting Annotations:
Al - alternating white and red if colour not indicated, F - fixed, Fl - flashing, Iso - equal interval, Q - quick flashing, Oc - occulting, Fl(3) - group flashing, Oc(2) - group occulting, SEC - sector, exp - expand, W - white, R - red, B - blue, G - green, Y - yellow, (3) - number of flashes for time period.
Cable Span
Known hazardous cable crossings are shown.
Obstruction and group obstructions below 1000 feet AGL.
Obstruction and group obstructions 1000 feet AGL and above.
2049 Elevation in feet (ASL)
(1788) Height in feet (AGL)
NOTE: Known obstructions 300' or higher and known significant obstructions below 300' are shown. When two or more are in the same area, only the highest obstruction is shown. Obstructions are lighted unless labelled "Unlighted".

Feet Metres
1 ft – 0.30481 m
1 m – 3.28084 ft

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NOTICE
Additions and corrections for this chart are requested.
Send to: AIS DATA COLLECTION PO BOX 9824 STN T CSC
OTTAWA ON K1G 3Z9

AIR 1905 •
OTTAWA VTA
Topographic data WGS84

Online

Recreational Aviation is turning to online resources

www.skyvector.com
www.rocketroute.com
www.fltplan.com
www.foreflight.com

Gliding Specific Apps and Tools

www.tophat.com
www.xcsoar.com
www.Oudie.com

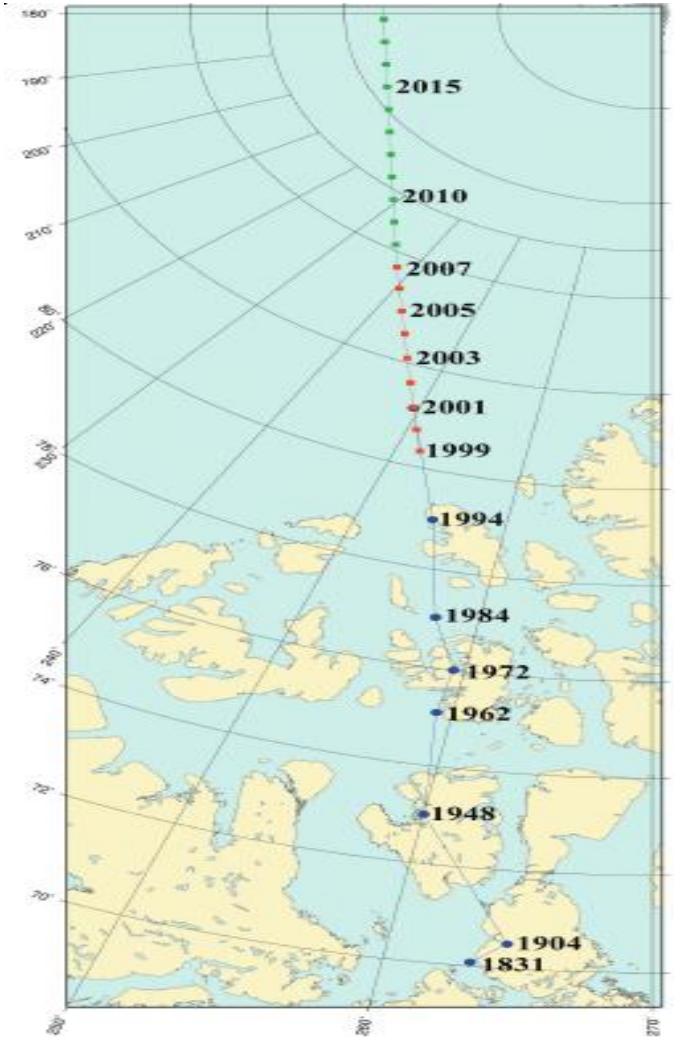
Magnetic Compass

True North vs Magnetic North

Problems caused by the Magnetic Compass

- Wandering poles
- Variation
- Deviation
- Residual Deviation
- Errors caused by acceleration & turning

Wandering North Pole



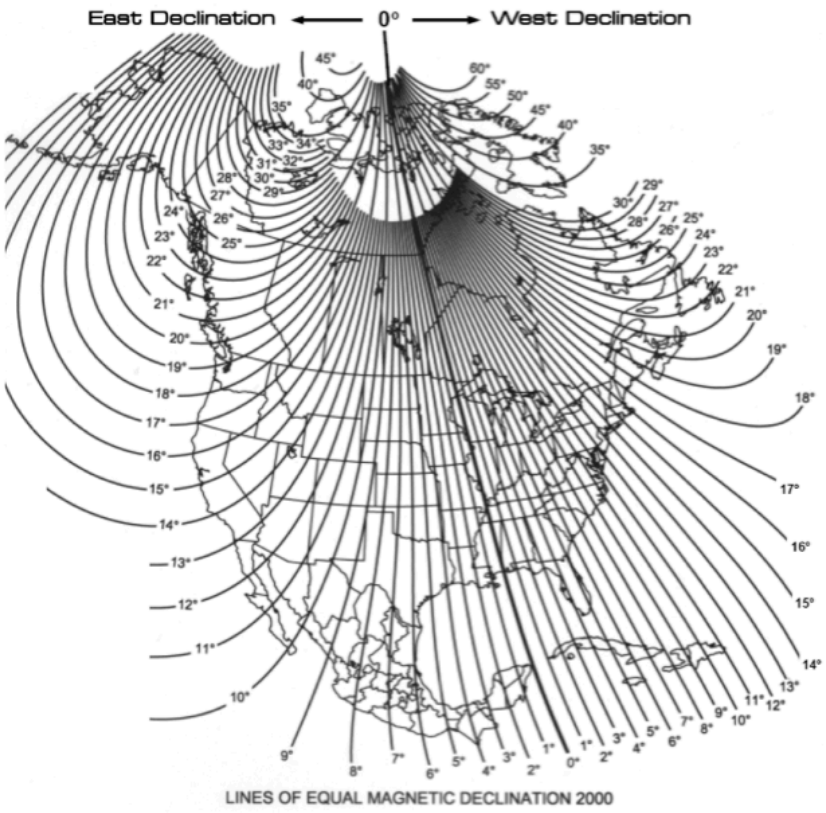
- Magnetic North is not a fixed point, it's been wandering for centuries.
- Shift in poles means magnetic North now east of grid North for first time in 220 years
  - Huffington Post UK | Posted:20/01/2014

More Definitions

- Magnetic Meridians: Lines joining both magnetic poles. The magnetic line in which the compass lies.
- Compass North: The direction a magnetic compass points.
- Isogonic lines: Lines drawn on a chart joining points of the same declination
- Agonic lines: (only two) Lines joining points of no declination.

Magnetic Variation / Declination

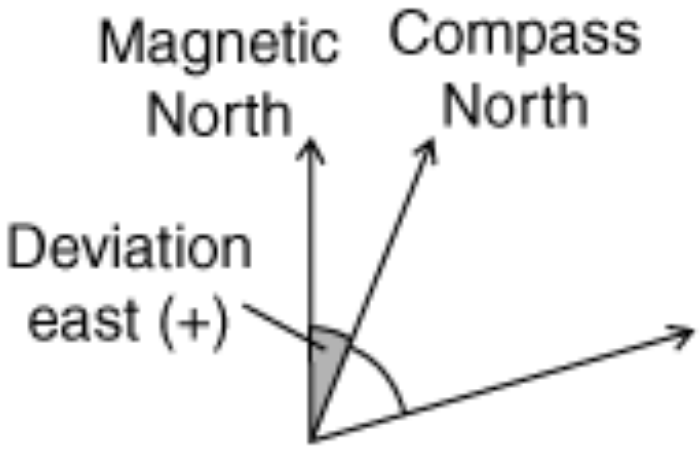
- Magnetic North Pole is not at the same location as the True North Pole therefore magnetic meridians do not coincide with the true meridians.
- The angle between the true meridian and the magnetic meridian is called the Magnetic Variation (Magnetic Declination).



Converting from True to Magnetic Headings

- Remember this meme:
  - Variation West, magnetic heading best. Variation East, magnetic heading least
- Pendleton AF to Ottawa Int'l
  - From the map we have a bearing of 247 ° True
  - Average Variation on our route is 14° W
  - Variation West, magnetic best means 247 + 14 = fly a heading of 261 ° Magnetic
- Pendleton AF to Hawksbury
  - Compass heading 082° Magnetic
  - Average Variation on our route is 14° W
  - Variation West, magnetic best means 082° – 14° = map bearing is 068° True

Magnetic Deviation



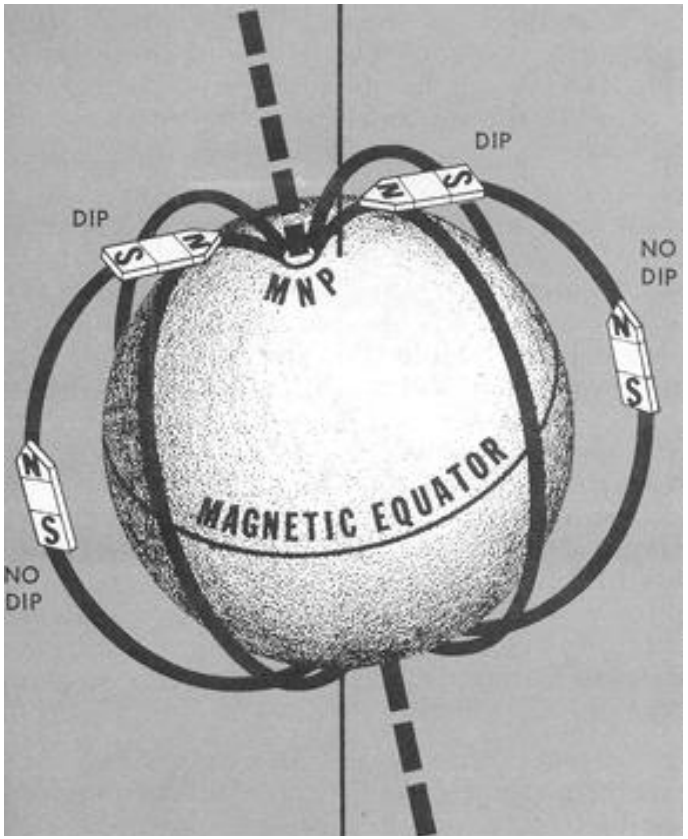
- The angle through which the compass needle is deflected from the magnetic meridian is called Magnetic Deviation.
- It is due to magnetic fields associated with the airframe and the equipment installed in your aircraft.

Correcting For Magnetic Deviation

- Corrections are applied by maintenance technicians when performing a compass swing.
- Any Magnetic Deviation left over after a compass swing is recorded on a compass deviation card.
- Magnetic Deviation west, compass best

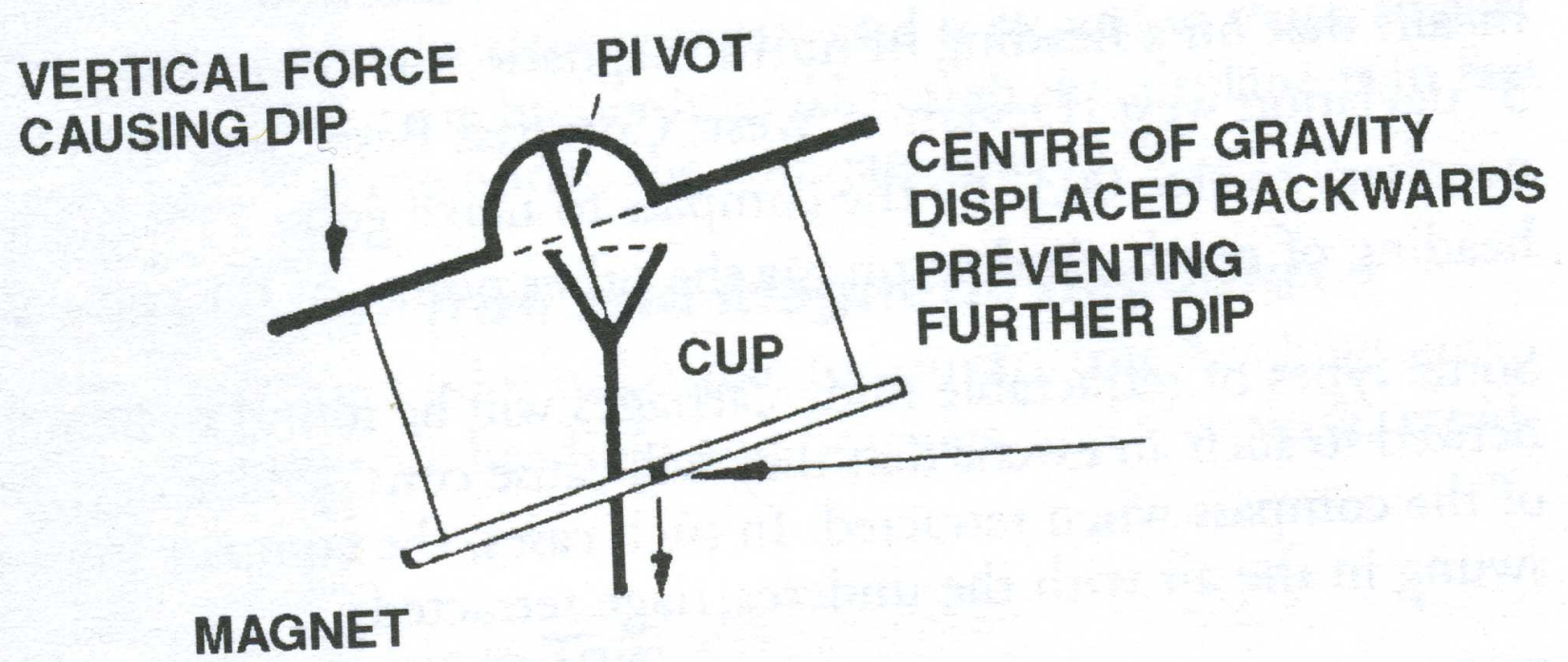
Magnetic Dip

- The Earth's magnetic lines of force gradually become vertical at the poles.
- The line between the horizontal and the plane of the magnet lies in under the influence of force called the magnetic inclination or dip.



Magnetic Dip

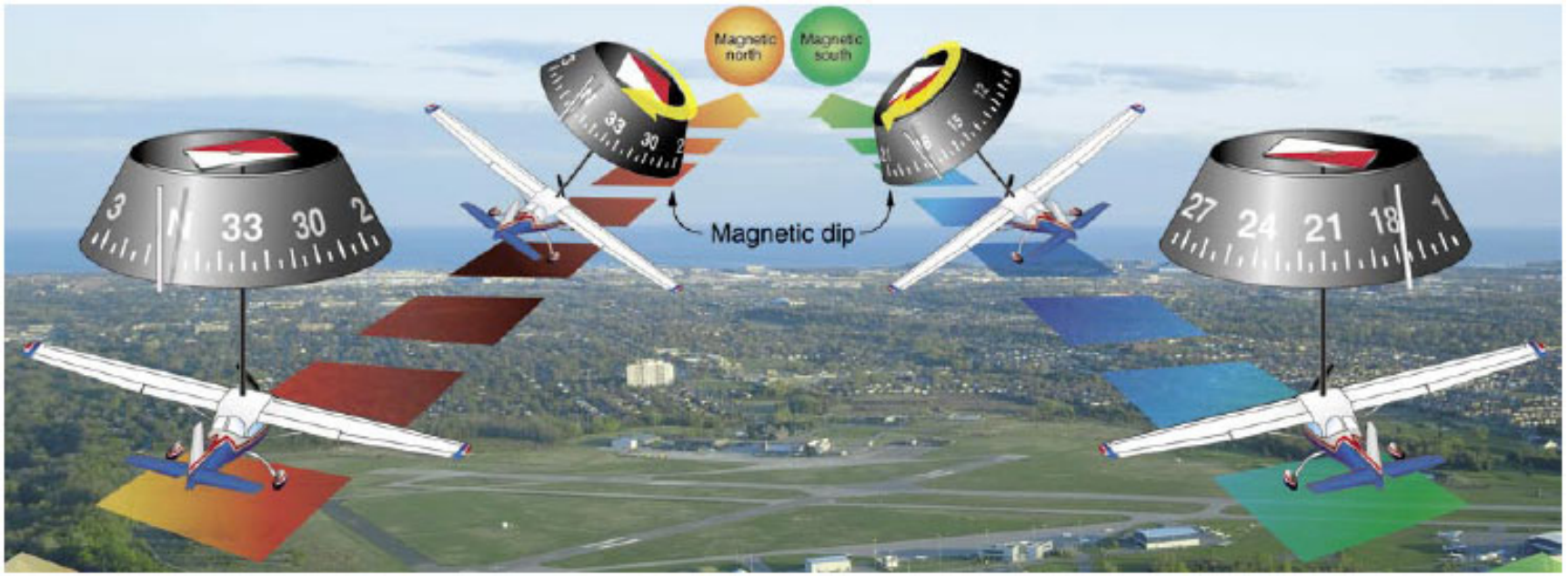
- When lines of magnetic force are not horizontal, they cause a compass to dip.



Inducing Errors into your compass

- Acceleration – Deceleration Error
- On east and west headings, acceleration causes the compass to register a turn towards the north.
- On east and west headings, deceleration causes the compass to register a turn towards the south.

Inducing Errors into your compass



- North Turning Error
- Due to magnetic dip, the North-seeking end of the magnet system will rotate towards the inside of the turn in the northern hemisphere.
- The compass is sluggish in the northerly quadrant.
- The compass is lively in the southerly quadrant

Let's Get Practical

Using What you Know

More Definitions

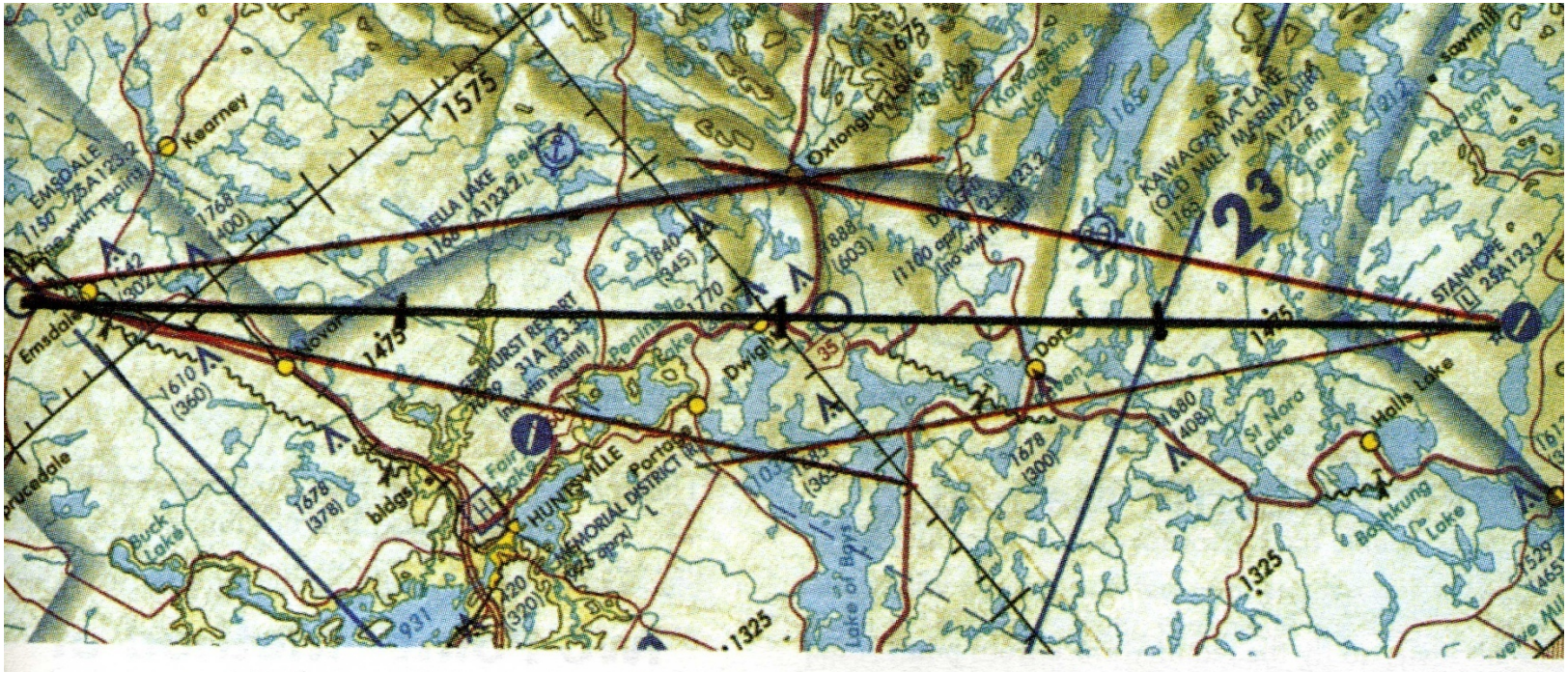
- Track: The direction the airplane intends to travel over the ground.
- Track made good: The actual path travelled by the airplane over the ground.
- Heading: The angle between the longitudinal axis of the airplane and a meridian (true or magnetic)
- Airspeed: The speed of the airplane relative to the air.
- Ground Speed: Speed of the airplane relative to the ground
- Bearing or azimuth: The clockwise angle between a meridian (true or magnetic) and a direction (to a beacon or visual target.
- Drift: the angle an airplane drifts away from its track due to wind.

Plotting your Course

- Plan your route noting alternate landing sites, obstacles, hazards, landmarks, frequencies, airspace restrictions, safety altitudes

- Mark your route using 6 minute or 12 minute intervals. Indicate headings accounting for your expected drift and variation.

Draw ten degree drift lines



Reading your Chart

- Orient the chart to your heading
- Go from landmarks on the map to landmarks on the ground (NEVER the other way around)
- Pick landmarks that will give you a good cross-fix; one off the nose, one of the right wing and one off the left wing.
- Mark your location and compare to your anticipated location (6'/12'marks)
- Adjust and repeat

Estimating heading and ground speed

- Determine the Wind Correction Angle, heading and ground speed using tables

Headwind component (for ground speed)						Crosswind component (for WCA)					
	Wind speed					Wind speed					
	5	**10**	**15**	**20**	**30**	**5**	**10**	**15**	**20**	**25**	**30**
0°	-5	-10	-15	-20	-30	0	0	0	0	0	0
15°	-5	-10	-15	-20	-30	1	2	4	5	6	7
30°	-4	-9	-13	-17	-25	2	5	7	10	12	15
45°	-3	-7	-10	-14	-21	3	7	10	14	17	21
60°	-2	-5	-7	-10	-15	4	9	13	17	21	25
75°	-1	-2	-4	-5	-7	5	10	15	20	25	30
90°	0	0	0	0	0	5	10	15	20	25	30
105°	1	2	4	5	7	5	10	15	20	25	30
120°	2	5	7	10	15	4	9	13	17	21	25
135°	3	7	10	14	21	3	7	10	14	17	21
150°	4	9	13	17	25	2	5	7	10	12	15
165°	5	10	15	20	30	1	2	4	5	6	7
180°	5	10	15	20	30	0	0	0	0	0	0
	5	**10**	**15**	**20**	**30**	**5**	**10**	**15**	**20**	**25**	**30**
Ground Speed = TAS + value shown						WCA = value shown / TAS x 60					

Estimating heading and ground speed

- If the calculated WCA exceeds 10° the inbuilt crab problem becomes apparent and a small additional calculation to derive a more accurate ground speed has to be made.

WCA	10°	15°	20°	25°	30°
Reduction	2%	3%	6%	10%	12%

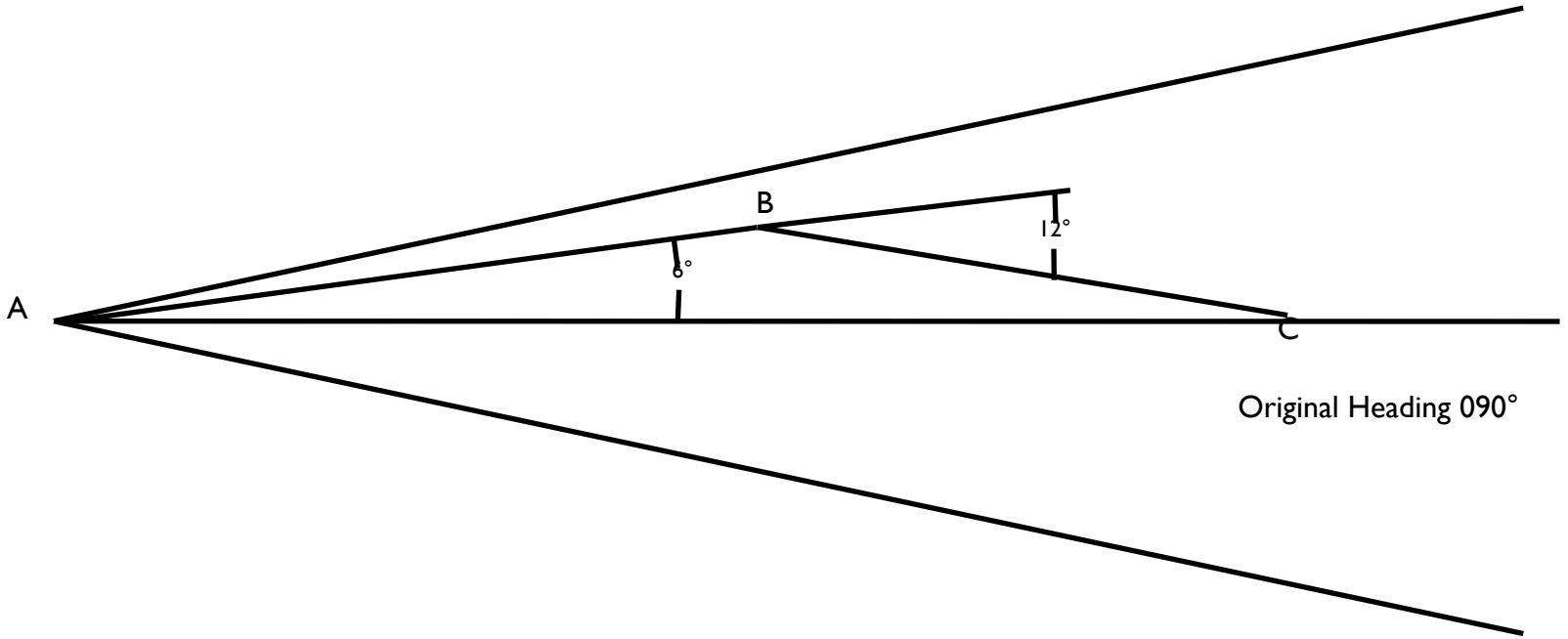
Planning Problems

- Example 1. The track required is 090°, the wind velocity is 060°/15 knots and TAS is 70 knots.
- Example 2. The track required is 300°, the wind velocity is 075°/15 knots and TAS is 70 knots.
- Example 3. The track required is 360°, the wind velocity is 075°/20 knots and TAS is 70 knots.

Correction Methods

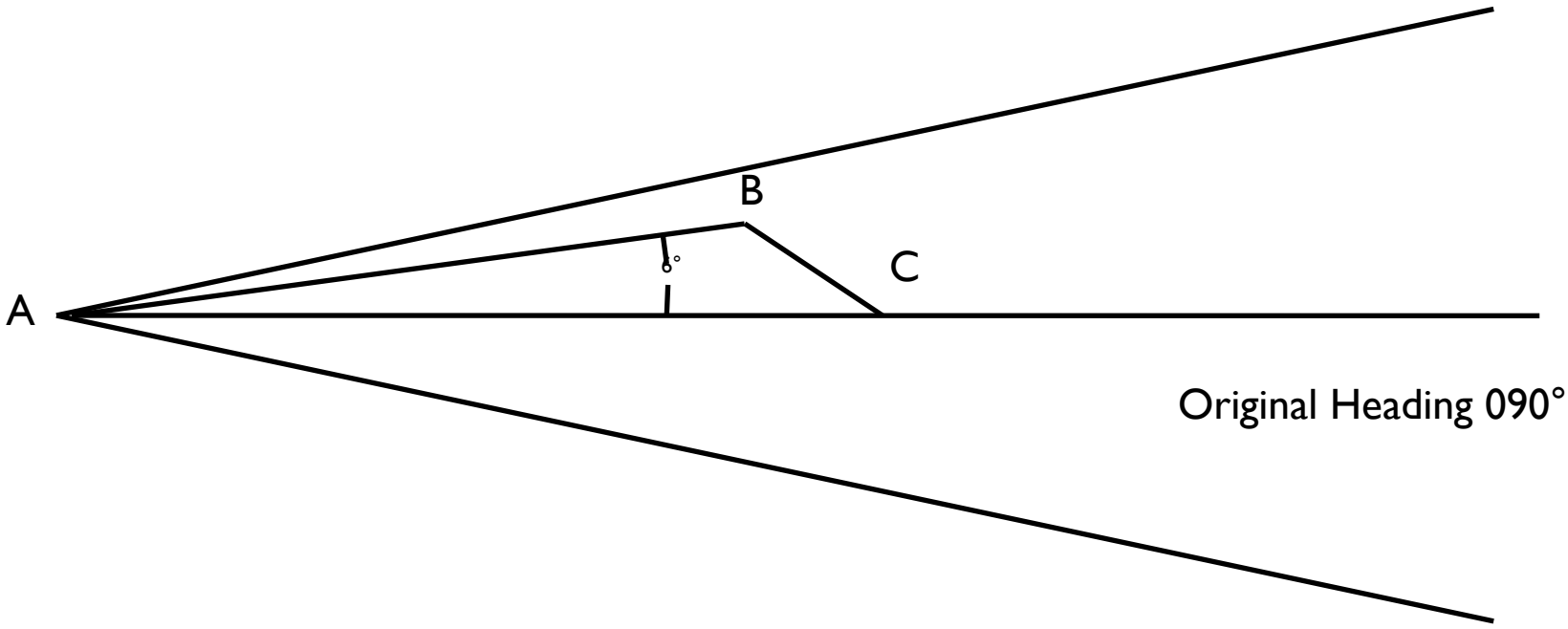
- Double track error
- Visual Alteration
- Opening and Closing Angle
- “Two-point”
- “One-in-sixty” Rule
- Attempt a Fred Noonan

Double Track Error Method



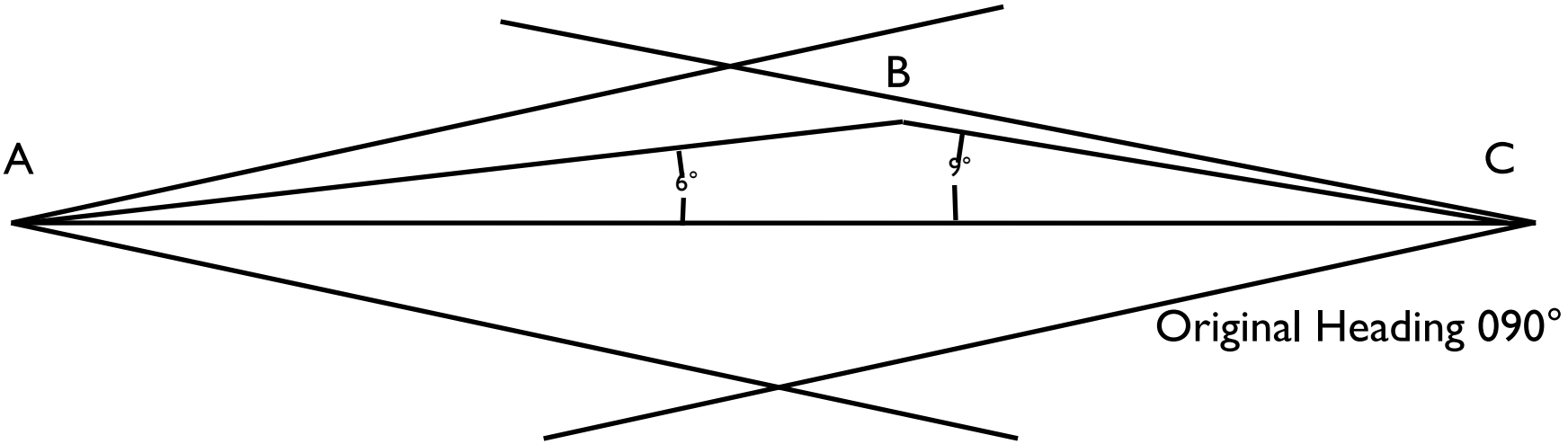
- Locate point B on the map and estimate the track error (6˚)
- At B make correction of double the track error: 090˚ + (2 X 6˚) = 102˚
- Fly from B to C in the same time you flew from A to B.
- At C, fly with a new heading of 096˚

Visual Alteration Method



- At B estimate the track error: 6°
- If you see a visual reference (C) that is on the intended track, you can fly straight to it
- At C, fly with a new heading of 156°

Opening and Closing Angles Method



- At B estimate the track error: 6°
- At B also estimate the closing angle: 9°
- The new heading is the original heading, plus the closing angle, plus compensation for the drift: 090°+ 9°+ 6° = 105°

1-in-60 Rule Method

- The 1-in-60 rule of thumb can be used to determine track error, given distance travelled and distance off track.
- Pinpoint the aircraft's position, estimate the distance off track and the distance travelled along the leg.
- The track error equals the distance off track [DO] divided by the distance travelled [DT] × 60; Track Error = DO/DT × 60.
- To regain the required track double the Track Error and when the required track is reached, or the time has elapsed, subtract half the error and take up the new heading.
- Example: Original Heading 090° and after 24 minutes flight, we pinpoint our position at point B. Point B is 3 nm north of required track and 22 nm from the departure point. Therefore Track Error = 3/22 × 60 = 8°. The new heading to steer is 090 + (2 x 8°) = 106° for the next 24 minutes (or until track is regained) then steer 098°.

Other Steps in Flight Planning

- Meteorological Information
- NOTAMS
- Documents to be Carried in Aircraft
- Filing a Flight Plan
- Weight and balance

These are not listed in a prescribed order

Documents to be Carried in Aircraft

- Certificate of Airworthiness (owner)
- Certificate of Registration (owner)
- Operator's Handbook (owner)
- Aircraft Weight and Balance (owner)
- Proof of Insurance coverage (owner)
- Personnel License (pilot), Radio license (owner), Radio operator's license (pilot), Medical Certificate (pilot)
- Journey Logbook (if it is planned that the aircraft will land and shut down at any location other than the point of departure) (pilot)

Flight Plan or a Flight Itinerary

- Requirement to File a Flight Plan or a Flight Itinerary CAR 602.73
- (1) Subject to subsection (3), no pilot-in-command shall operate an aircraft in IFR flight unless an IFR flight plan has been filed.

- (2) No pilot-in-command shall operate an aircraft in VFR flight unless a VFR flight plan or a VFR flight itinerary has been filed, except where the flight is conducted within 25 nautical miles of the departure aerodrome.

Filing A Flight Plan

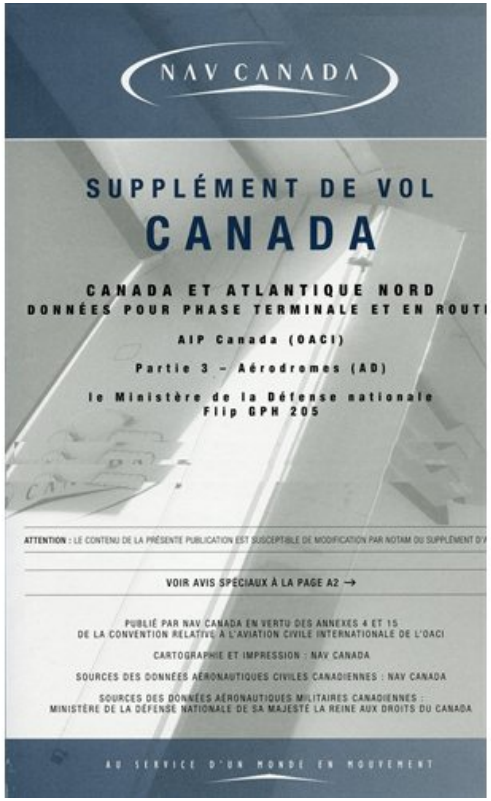
- Filing of a Flight Plan or a Flight Itinerary: CAR 602.75
- (1) A flight plan shall be filed with an air traffic control unit, a flight service station or a community aerodrome radio station.

- (2) A flight itinerary shall be filed with a responsible person, an air traffic control unit, a flight service station or a community aerodrome radio station.

- (3) A flight plan or flight itinerary shall be filed by
  - (a) sending, delivering or otherwise communicating the flight plan or flight itinerary or the information contained therein; and
  - (b) receiving acknowledgement that the flight plan or flight itinerary or the information contained therein has been received.

Canada Flight Supplement

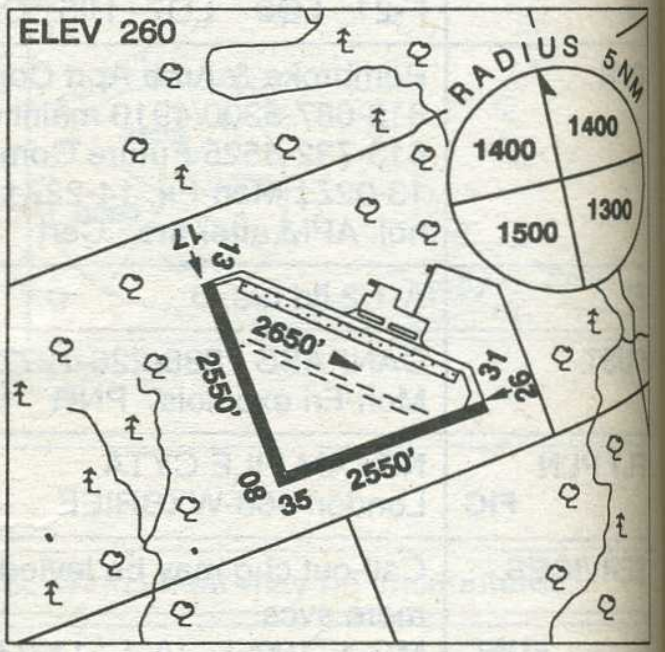
- Supplement to the Aeronautical Information Manual (AIM)
- Updated every 56 days.
- 6 Sections:
  - General,
  - Aerodrome and Facility Directory,
  - Planning,
  - Radio Navigation and Communication,
  - Military Flight Data & Procedures,
  - Emergency.



Aerodrome and Facility Directory

PENDLETON ON CNF3

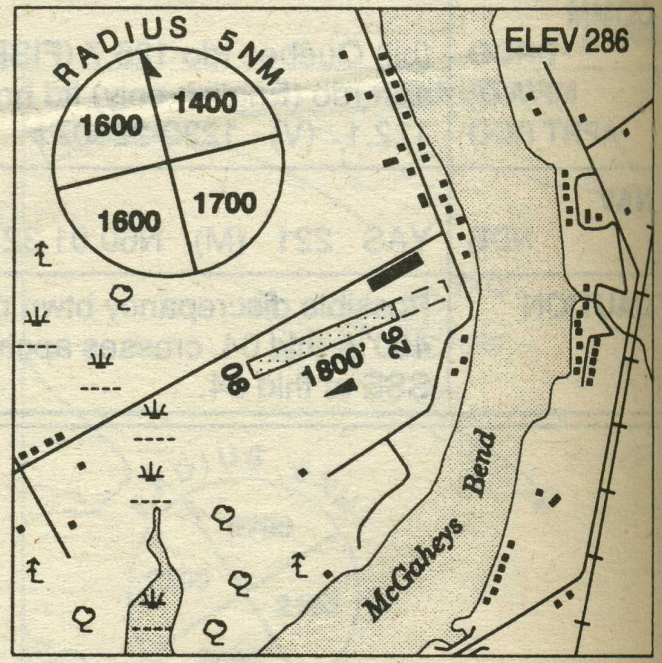
REF	N45 29 10 W75 05 46 3NW 15°W UTC-5(4) Elev 260′ A5002 F-21
OPR	Gatineau Gliding Club 613-673-5386 Reg Aprt attended Sat-Sun only
PF	B-1 C-2,4,5 D-3,6
FLT PLN **FIC**	(bil) NOTAM FILE CYND Québec 866-WXBRIEF or 866-GOMÉTÉO
RWY DATA **RCR**	Rwy 13/31 2650x100 turf Rwy 08/26 2550x100 old asphalt, 30' ctr x 2500' new asphalt/gravel Rwy 17/35 2550x100 old asphalt Opr No win maint. All old asphalt sfcs exc 30' strip rwy 08/26 rough. Use turf rwys beside each old asphalt sfc (same length/width).
COMM **ATF**	unicom Sat-Sun O/T tfc 123.3 5NM 3300 ASL
PRO	Extensive glider activity.



Aerodrome and Facility Directory

KARS / RIDEAU VALLEY AIR PARK ON CPL3

REF	N45 06 W75 38 3S 14°W UTC-5(4) Elev 286′ A5000 A5002 F-21
OPR	Larry Rowan 613-489-2332 Reg PPR
PF	C-1,2,4,5 D-3,6
FLT PLN **FIC**	(bil) NOTAM FILE CYND Québec 866-WXBRIEF or 866-GOMÉTÉO
RWY DATA **RCR**	Rwy 08/26 1800x100 turf Opr No win maint. May be soft in spring.
COMM **ATF**	tfc 123.4 5NM 3300 ASL
PRO	Glider activity in area.



Questions