FIRST YEAR AVIATION ORIENTATION SESSION

HOSTED BY THE

UW AVIATION SOCIETY

IN PARTNERSHIP WITH

UNIVERSITY OF WATERLOO

WATERLOO WELLINGTON FLIGHT CENTRE

INTRODUCTION

RYAN WONG

- 4th Year Science and Aviation
- Flight Instructor

BEN LU

- UW Graduate (Geography and Aviation)
- Flight Instructor

UW AVIATION SOCIETY

TODAY'S SCHEDULE

- Ground School Sample
  - Theory of Flight
- 30 Minute Break
- Flight Centre Indoctrination
- Q&A Session

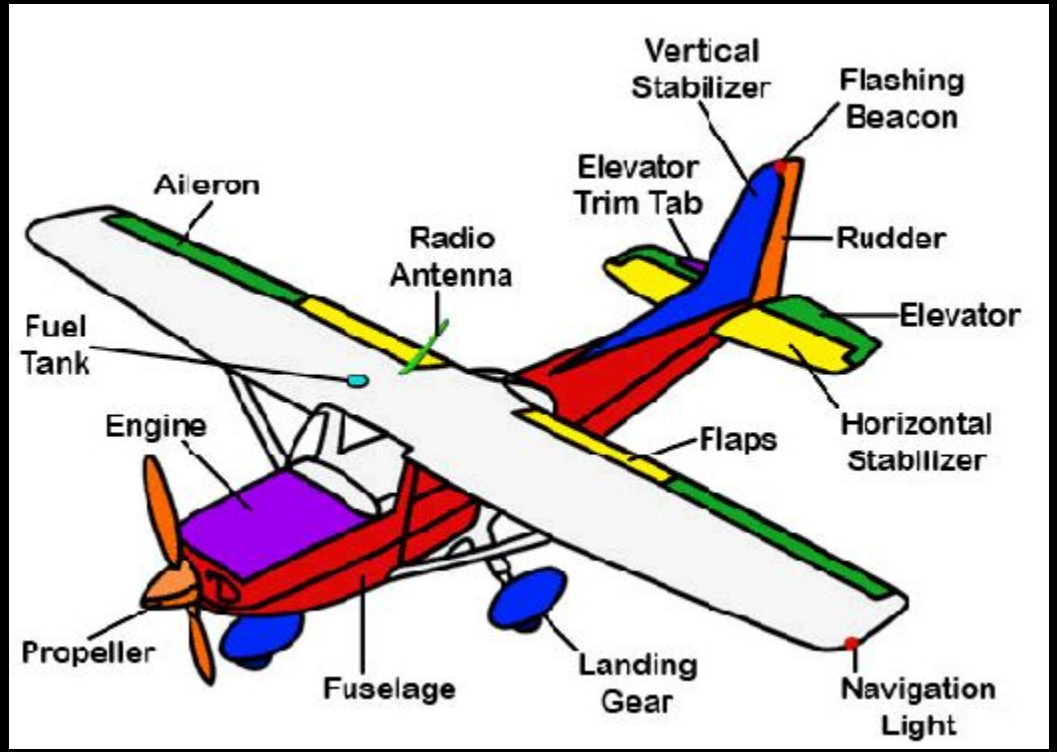
UW AVIATION SOCIETY

THEORY OF FLIGHT

THEORY OF FLIGHT

- Parts of the airplane
- Four Forces
- Airfoil Design
- Airplane Axes

UW AVIATION SOCIETY



UW AVIATION SOCIETY

THE FOUR FORCES

- Lift
  - Force that keeps the airplane in the air, produced by the wings
- Weight
  - Gravitational pull on the aircraft through the Centre of Gravity (CG)
- Thrust
  - Force produced by the propellers by pushing air backwards
- Drag
  - Air resistance to the forward motion

UW AVIATION SOCIETY

THE FOUR FORCES

FIG 03-01

Guided Flight Discovery Private Pilot Manual

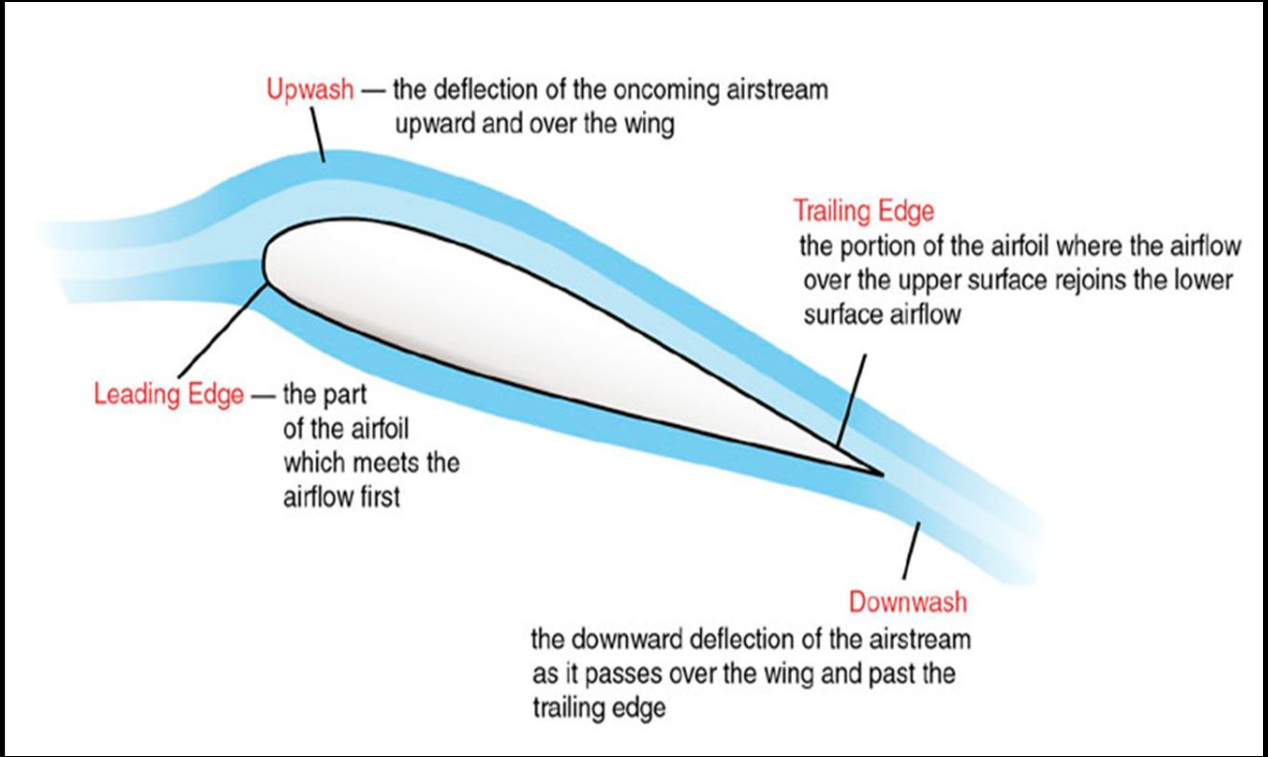
UW AVIATION SOCIETY

THE FOUR FORCES

- Thrust = Drag
- Lift = Weight
  - Only weight passes through C of G
- Force Couples
  - 2 forces equal and opposite but not passing through the same point
- Equilibrium
  - 2 force couples are balanced

UW AVIATION SOCIETY

LIFT



UW AVIATION SOCIETY

LIFT

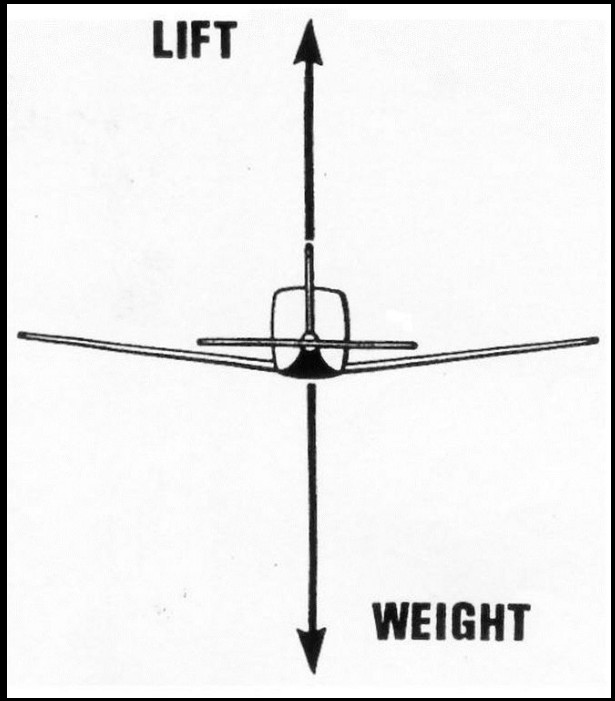
Newton's 3 Laws:

- Object in motion remains in motion unless acted on by another force
- A force must be applied to alter the state of motion: F=MA
- For every force there is an equal and opposite reaction

UW AVIATION SOCIETY

LIFT

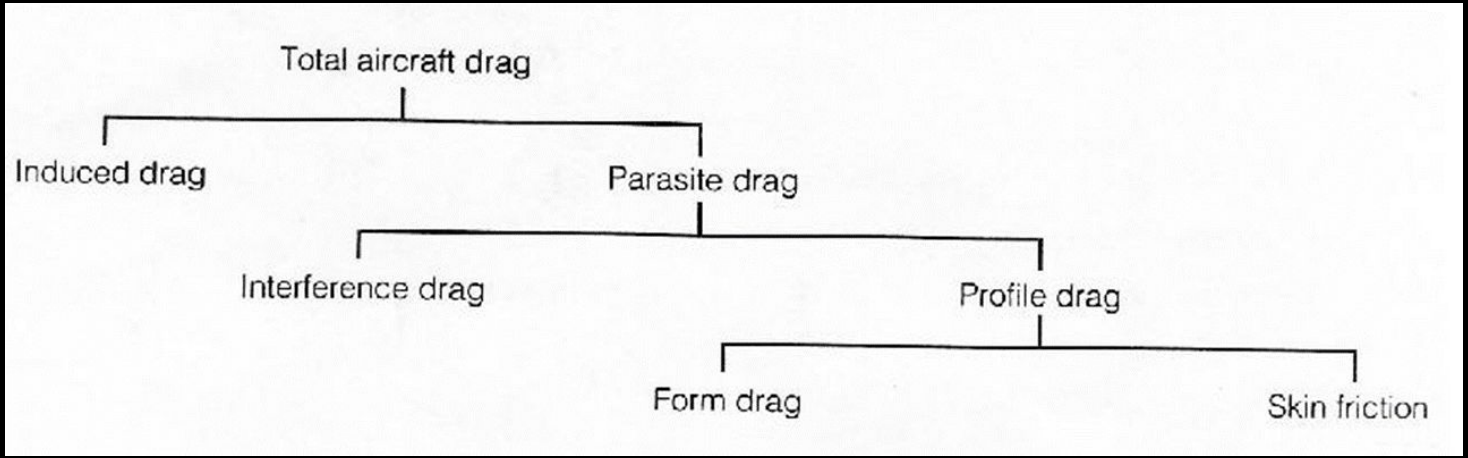
- Created by a combination of relatively lower pressure over top of wing and equal and opposite reaction to downwash
- Lift always acts perpendicular to relative airflow and 90° to the wing span



UW AVIATION SOCIETY

DRAG

- Resistance to forward motion



UW AVIATION SOCIETY

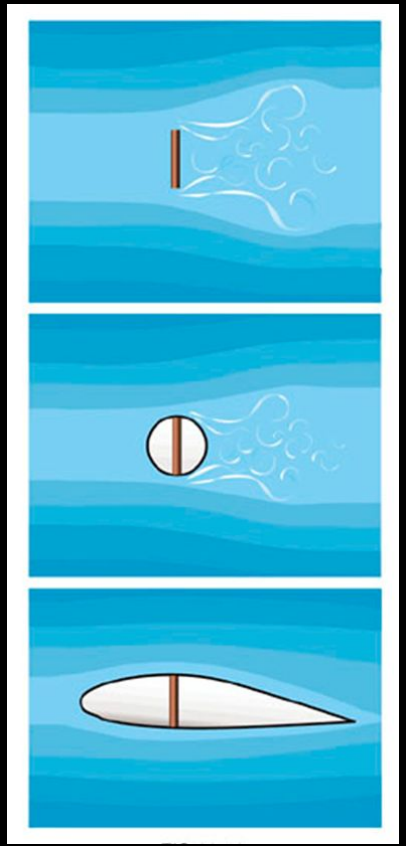
PARASITE DRAG

Produced by parts of aircraft that does not produce lift

Two types: Profile and Interference Drag

Profile drag is the total of:

- Form drag
- Skin Friction



UW AVIATION SOCIETY

REDUCING PARASITE DRAG

- Form Drag
  - Streamlining
  - Reducing frontal area of the aircraft
  - Retractable undercarriage
- Skin Friction
  - Clean aircraft
  - Wax
  - Flush rivets
- Interference Drag
  - Landing gear fairings
  - Streamlined design (rounded fuselage)

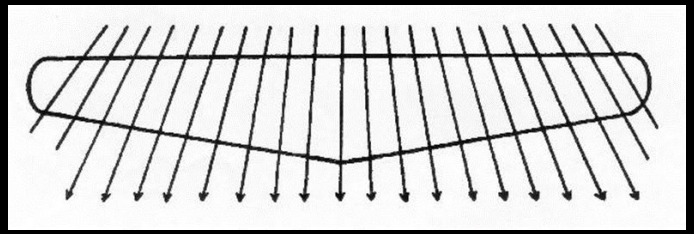
UW AVIATION SOCIETY

INDUCED DRAG

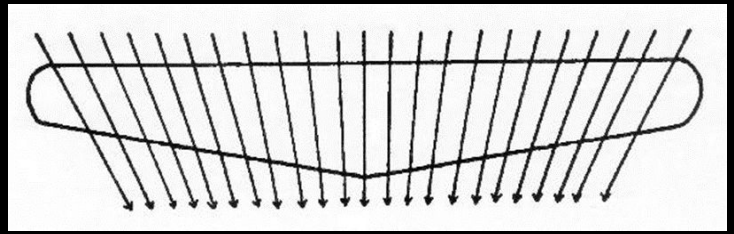
Drag created by parts of the aircraft that produce lift

- Wings
- Horizontal Stabilizer

LOWER SURFACE > HIGHER PRESSURE > AIRFLOW OUTWARDS



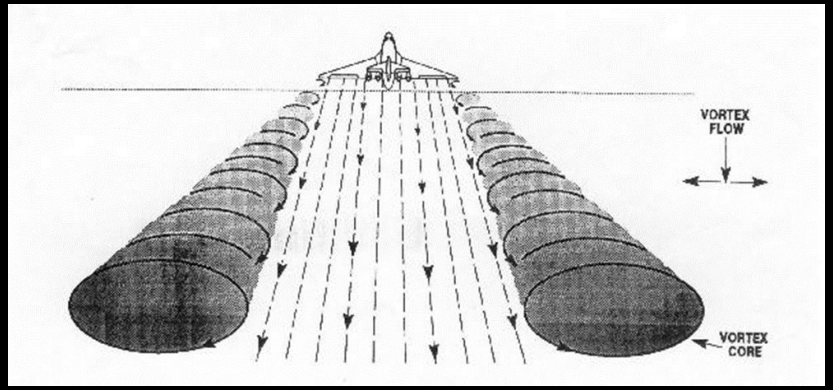
UPPER SURFACE > LOWER PRESSURE > AIRFLOW INWARDS



UW AVIATION SOCIETY

WINGTIP VORTICES

- Clockwise around left wingtip
- Counter-clockwise around right wingtip
- Drifts down and out behind aircraft

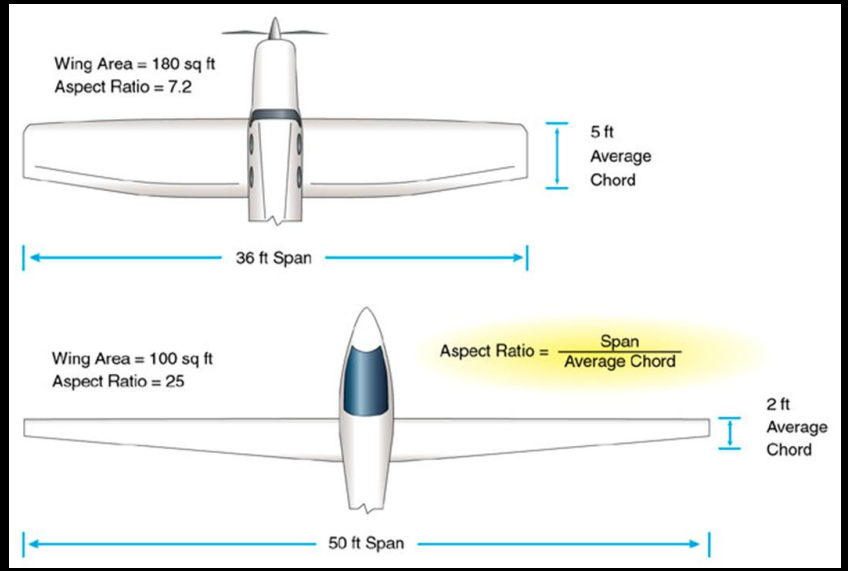


UW AVIATION SOCIETY

REDUCING INDUCED DRAG

Aspect Ratio

- Ratio of the span to mean chord
- Higher aspect ratio means lower induced drag



UW AVIATION SOCIETY

REDUCING INDUCED DRAG

Winglets

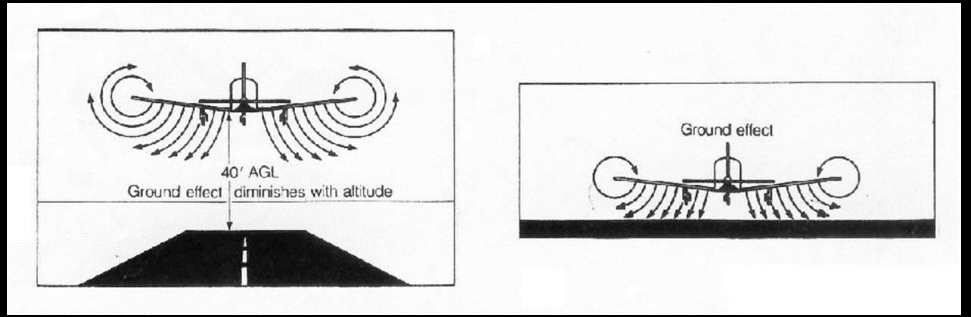
- Reduce airflow around wingtip
- Increases effective wingspan
- Increases effective aspect ratio

UW AVIATION SOCIETY

REDUCING INDUCED DRAG

Ground effect

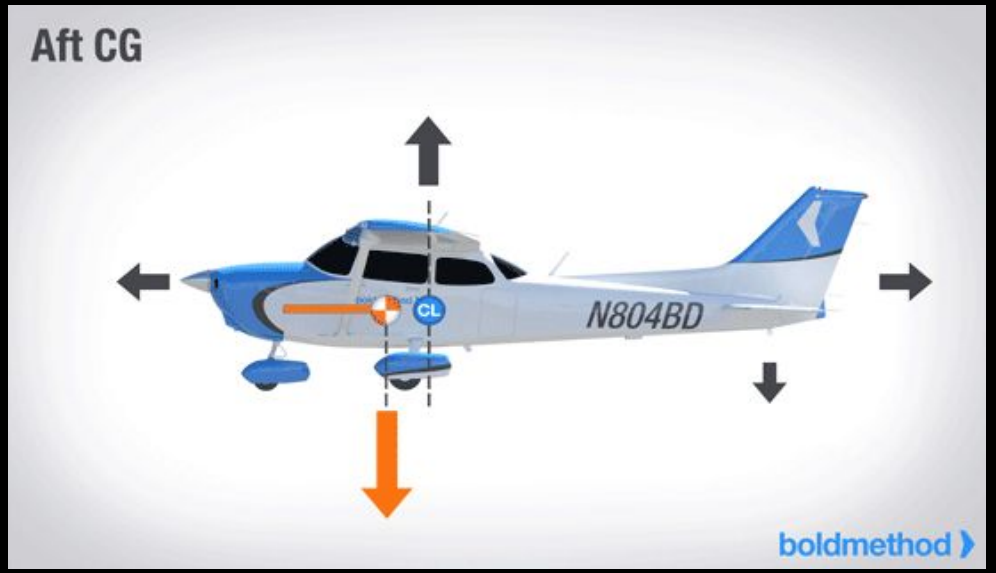
- Reduces intensity of wingtip vortices
- Allows aircraft to be airborne at lower airspeeds
- Ground effect dissipates above the height of one wingspan



UW AVIATION SOCIETY

WEIGHT

- Weight of the aircraft
- Acts through the center of gravity
- Always points towards the center of the earth



UW AVIATION SOCIETY

THRUST

Force that provides forward motion of aircraft

UW AVIATION SOCIETY

AIRFOIL DESIGN

Airfoil: A device capable of producing lift from aerodynamic reactions with the air

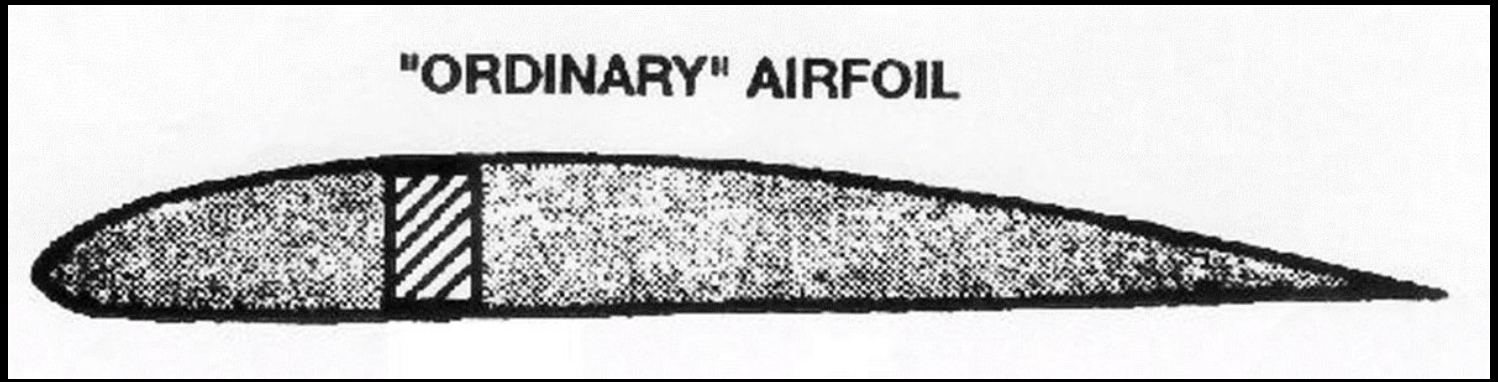
Two types of airfoils:

- Conventional
- Laminar

UW AVIATION SOCIETY

CONVENTIONAL AIRFOIL

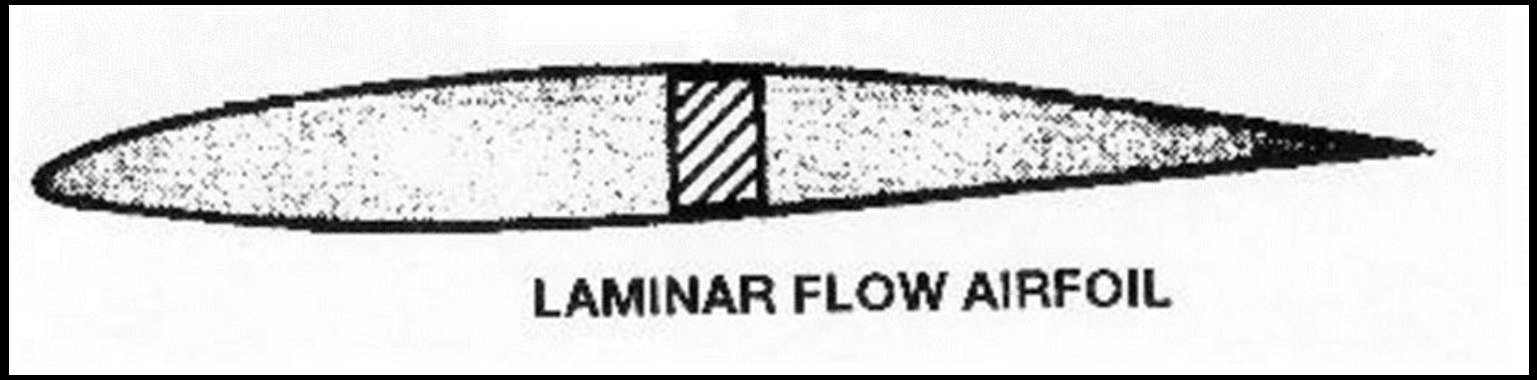
- High lift/low speed applications
- Thickest part is about 25% from leading edge



UW AVIATION SOCIETY

LAMINAR AIRFOIL

- Maximum camber is at 50% of the chord
- Symmetrical in shape
- Used for higher speed aircraft



UW AVIATION SOCIETY

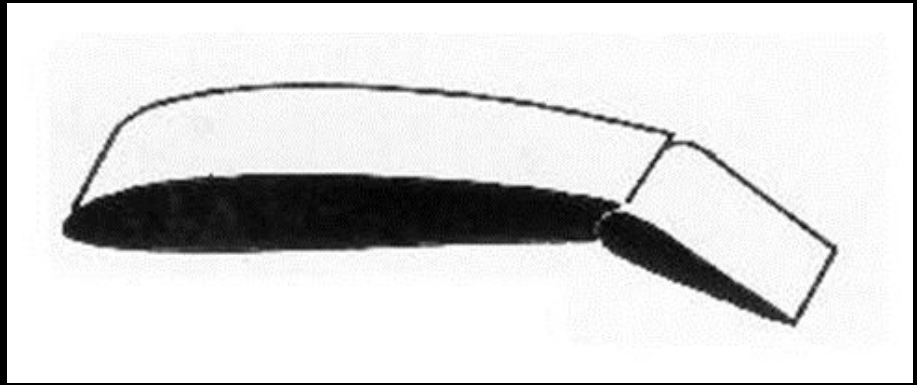
AIRFOIL TERMS AND DESIGN

Planform: Shape of the wing as seen from above

UW AVIATION SOCIETY

FLAPS

- “High-lift Device” used to increase camber of wing
- Used to increase lift and maintain positive control at lower airspeeds



UW AVIATION SOCIETY

FLAPS

Advantages:

- Steep approach angles without increasing airspeed
- Better forward visibility
- Improved take-off performance
- Slower landing speeds

UW AVIATION SOCIETY

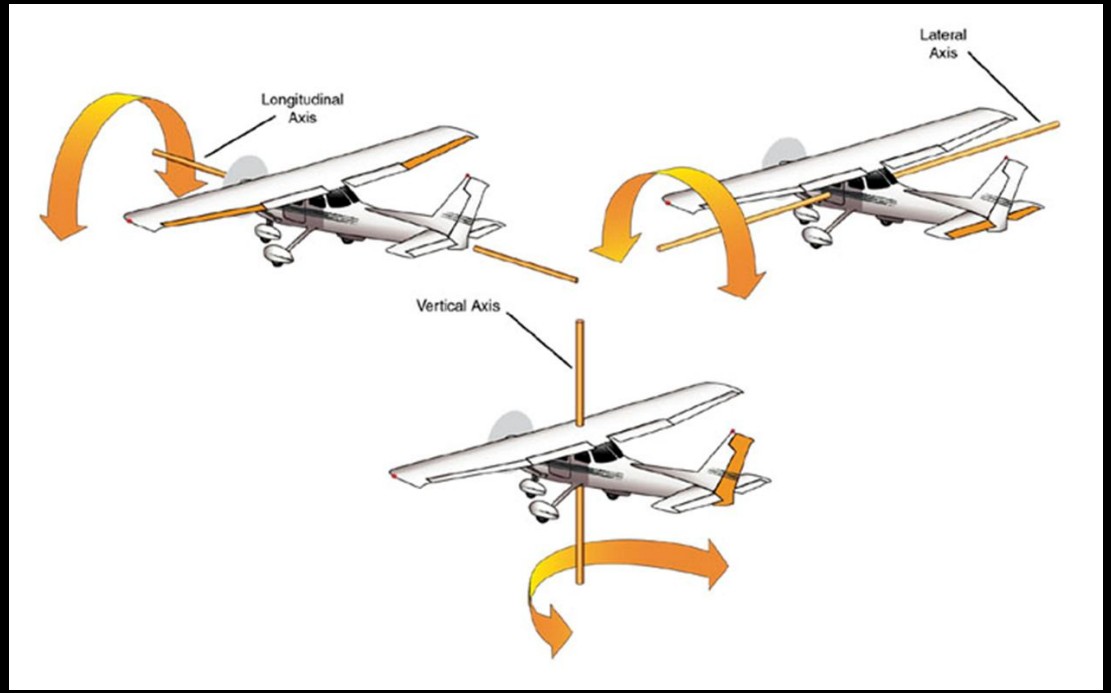
FLAPS

Disadvantages

- Full flaps on x-wind conditions are not recommended
  - Weather vane effect and decreased aileron effectiveness
- Could weaken airframe if deployed at too high an airspeed

UW AVIATION SOCIETY

AIRPLANE AXES



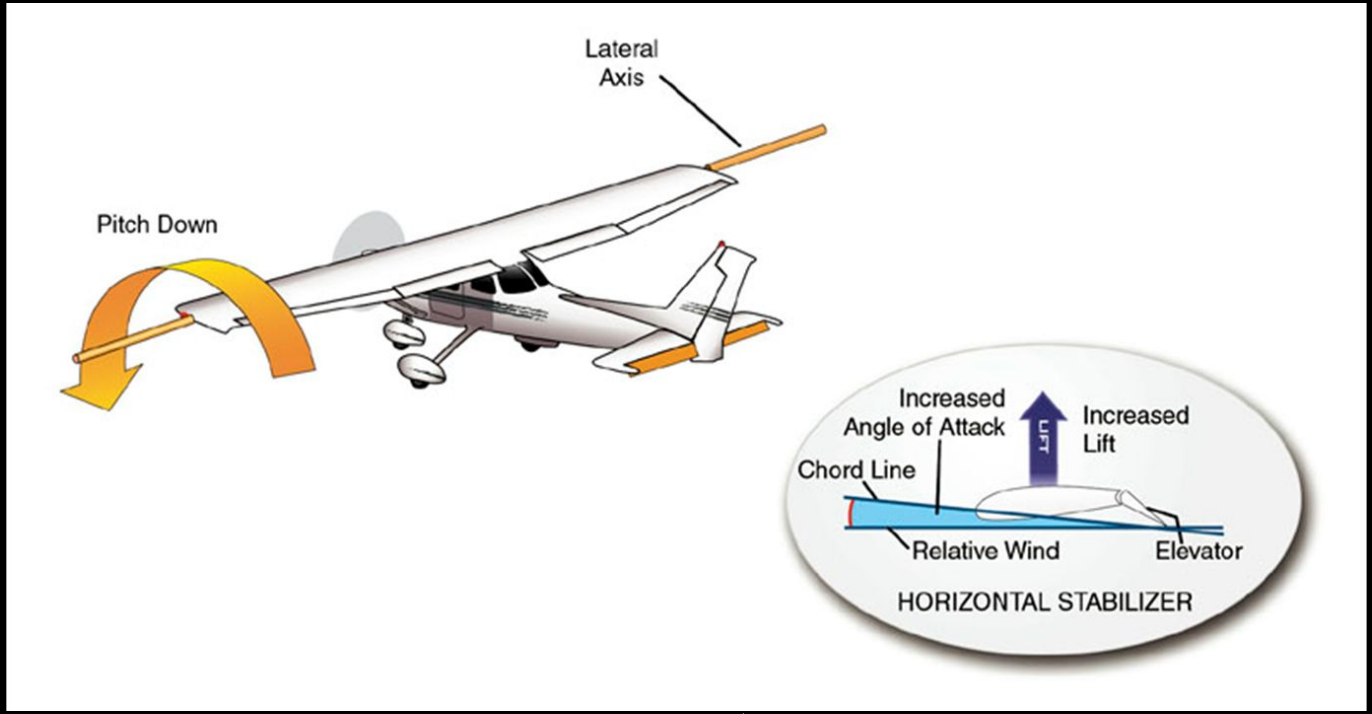
UW
AVIATION SOCIETY

AIRPLANE MOVEMENTS

Axis	Movement	Control Surface	Control Input
Longitudinal	Roll	Aileron	Yoke (Left & Right)
Lateral	Pitch	Elevator	Yoke (Forward & Aft)
Vertical	Yaw	Rudder	Rudder Pedals

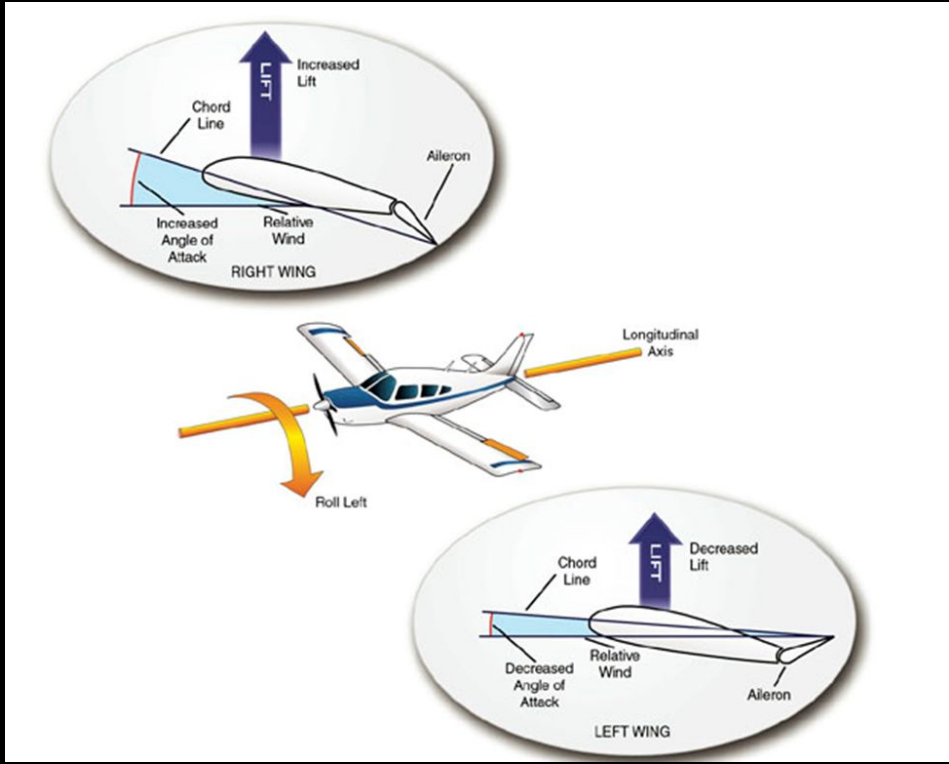
UW AVIATION SOCIETY

PITCH



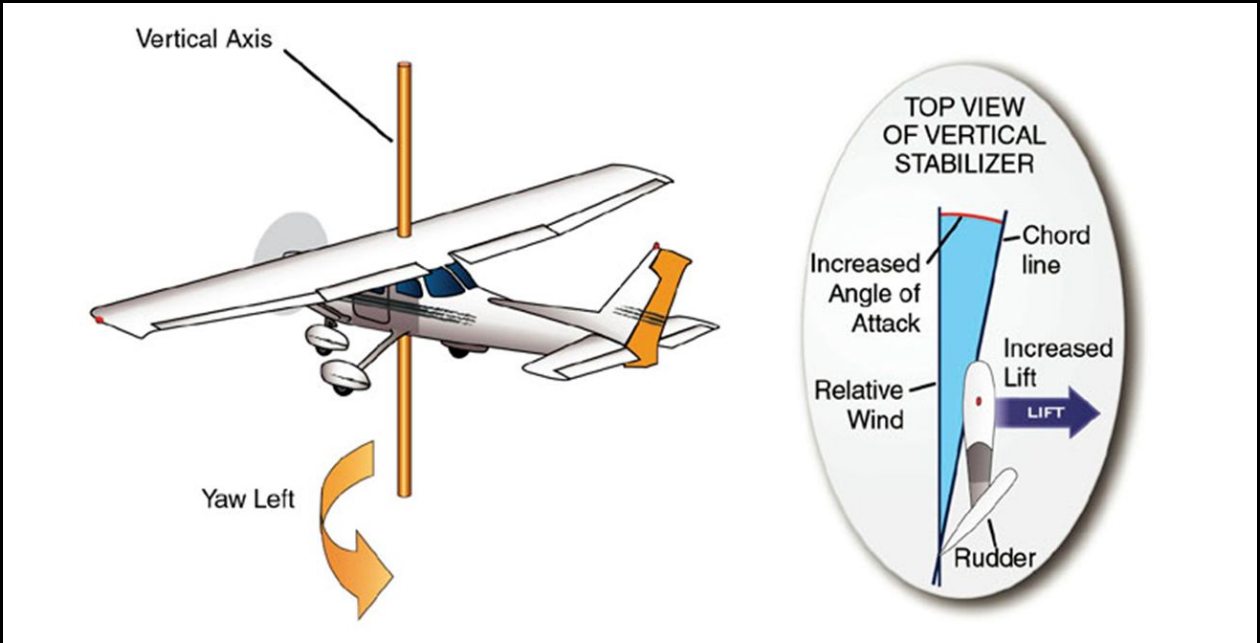
UW AVIATION SOCIETY

ROLL



UW AVIATION SOCIETY

YAW



UW
AVIATION SOCIETY

QUESTIONS?

UW AVIATION SOCIETY

FLIGHT CENTRE INDOCTRINATION

BEHAVIOUR AT THE FLIGHT CENTRE

Act Professional

Wear your Uniform

Be courteous to others

If you need help, don’t hesitate to ask

Remember that when you’re wearing your uniform, you are wearing the flight centre’s image.

UW AVIATION SOCIETY

ORIENTATION DAY

Date: January 11th 2019

Location: Waterloo Wellington Flight Centre

Time:

What to Wear:

Arrive 30 minutes prior to start time

UW AVIATION SOCIETY


Summit Fuel Services
Waterloo Wellington Flight Centre
Car Rental
Region of Waterloo International Airport
Hammond Aviation
General Parking
Cadet Youth Development Centre
Township 99 Rd
Woolwich St S
Fountain St N
Flightpath Charter Airways Inc
Township 99 Rd
Woolwich St S
Grand River
Map
Google
Imagery ©2019 Google, Imagery ©2019 CNES / Airbus, Maxar Technologies, Map data ©2019
Canada
Terms

ORIENTATION DAY

You'll be meeting your assigned flight instructors

You'll be shown how to:

- Do a walk-around
- Check the weather
- Check aircraft documents
- Share your school schedules with your instructor
- Use Flight Schedule Pro and Fleetcaptain
- Check in and out aircraft for your flight at dispatch

UW AVIATION SOCIETY

ORIENTATION DAY

2 Hour ground school and preparatory ground instruction after meeting your instructors

Bring

- Laptop
- Notebook
- Pens/Pencils

UW AVIATION SOCIETY

GROUND SCHOOL KIT

What's Included:

- Pilot Logbook
- E6B Flight Computer
- From the Ground Up Textbook
- Flight Training Manual 4th Edition
- Douglas Protractor
- Aerocourse Meteorology Textbook
- Toronto VNC
- ICAO Chart Ruler
- Ground School Kit Bag
- POH of the Aircraft you're flying

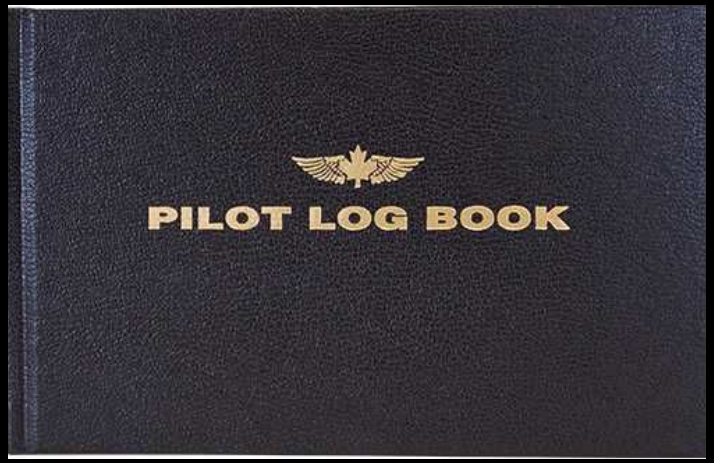
Total amount needed to pay:

$287.00+HST=$342.31

UW AVIATION SOCIETY

PILOT LOGBOOK

Used to log flight hours



Students tend to forget to log their hours, and then it becomes a problem when you need to sign off your licenses

A good practice is to log your flight hours right after your flight

UW AVIATION SOCIETY

E6B FLIGHT COMPUTER

Calculates and convertes various things

Used mainly for your cross countries

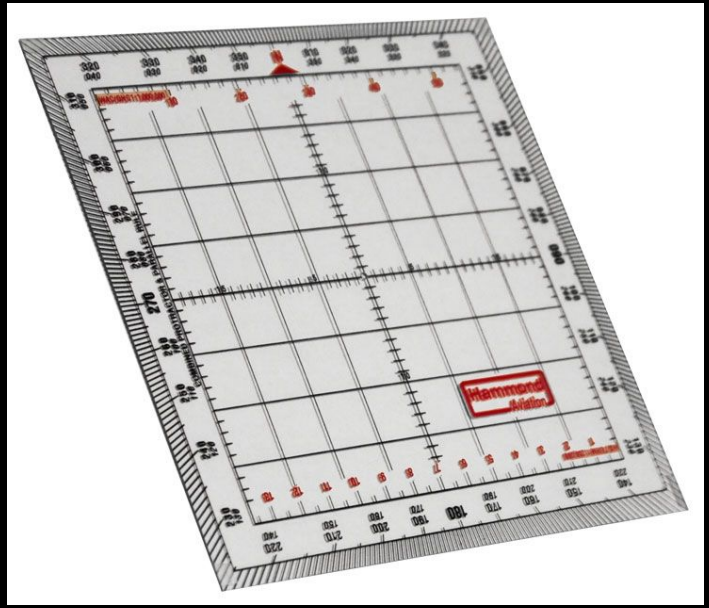
You'll learn how to use it during your ground school

UW AVIATION SOCIETY

DOUGLAS PROTRACTOR

Used to find headings on your VNC/VTA

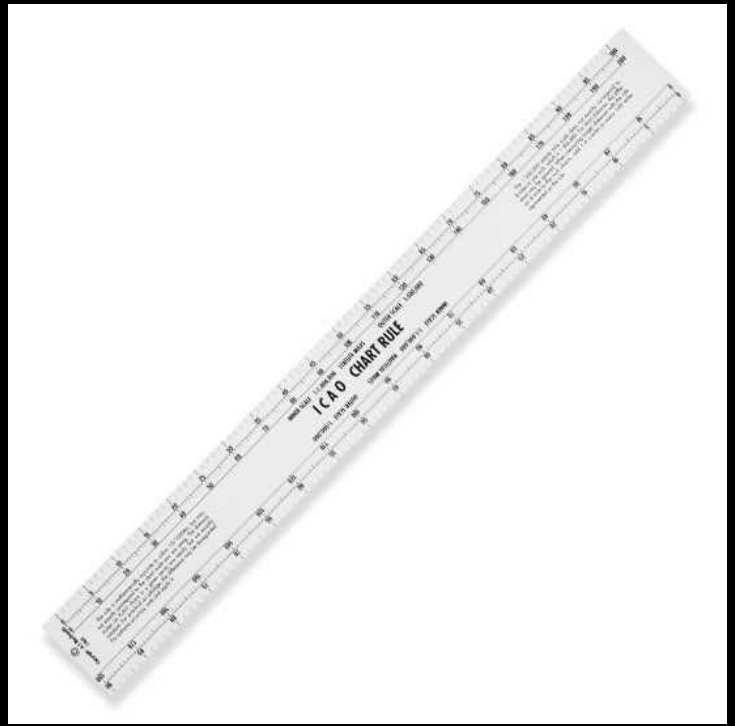
Used for Cross Countries



UW AVIATION SOCIETY

ICAO CHART RULER

Used to find distances on your VNC/VTA



UW AVIATION SOCIETY

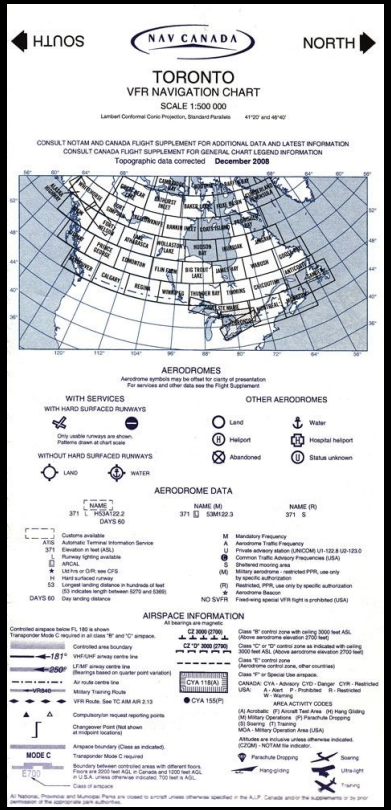
VFR NAVIGATION CHART (VNC)

An aeronautical map that is sectioned to different areas across Canada.

Used mainly for diversions and cross country

You'll be using the Toronto VNC

<u>Challenge</u>
When you get your VNC, open it up and find Waterloo. You'll be flying around the area during the first few months of your training.

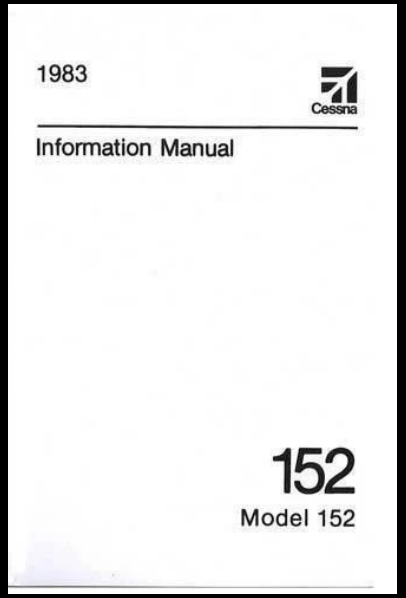


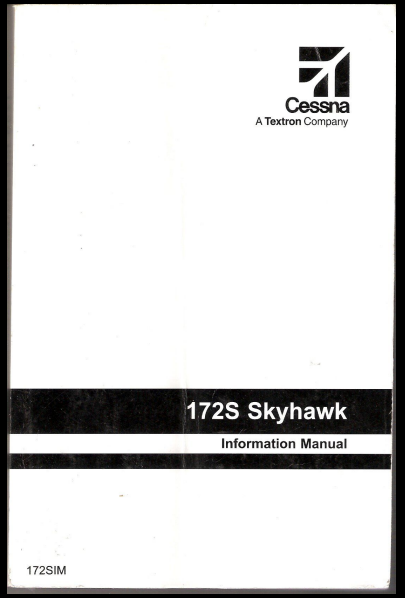
PILOT OPERATING HANDBOOK (POH)

Contains all the information required to know about the aircraft.

POHs are aircraft specific, as in the POH that comes with the ground school kit should only be used as reference and study material

The aircraft specific POH follows the aircraft all the time it goes up flying





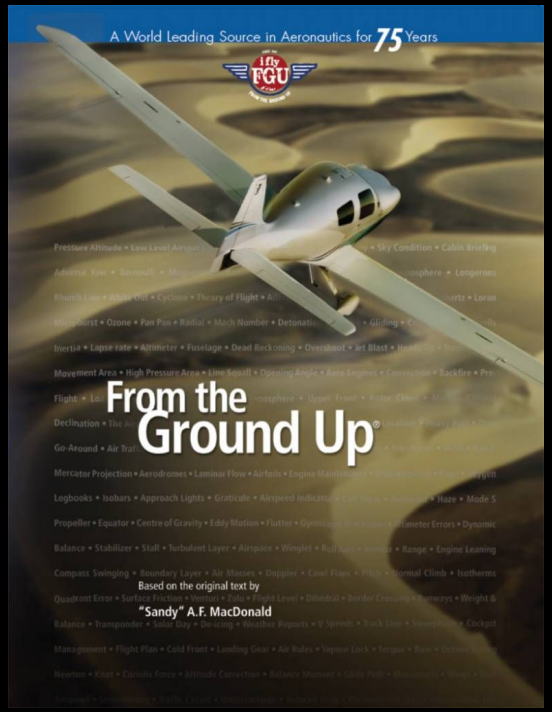
UW AVIATION SOCIETY

FROM THE GROUND UP (FTGU)

Includes all the materials required to know for your PPL Written Exam

Good source of information to read before ground school and revision for your written.

Use this in conjunction with the ground school slides to help enhance your understanding



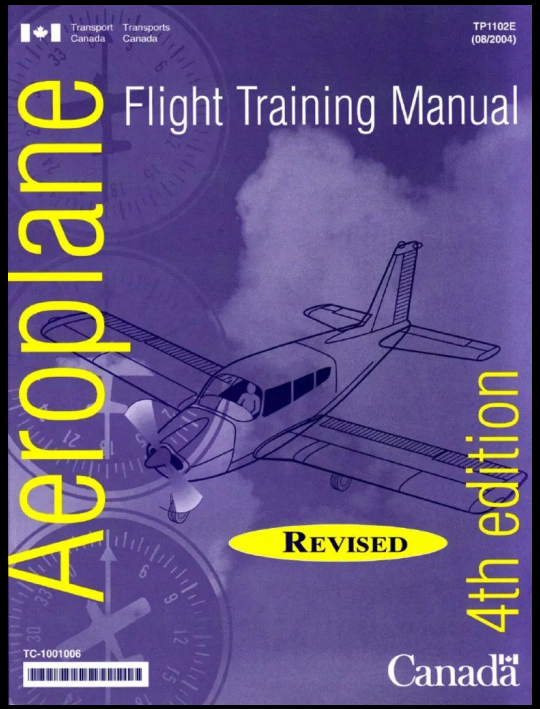
UW AVIATION SOCIETY

FLIGHT TRAINING MANUAL (FTM)

Includes all the exercises that would be taught in your Preparatory Ground Instruction Class (Flight Lab)

It is best to read the exercise before it is taught in class

Good revision material for pre flight lessons, progress rides and flight tests.



UW AVIATION SOCIETY

AERONAUTICAL INFORMATION MANUAL (AIM)

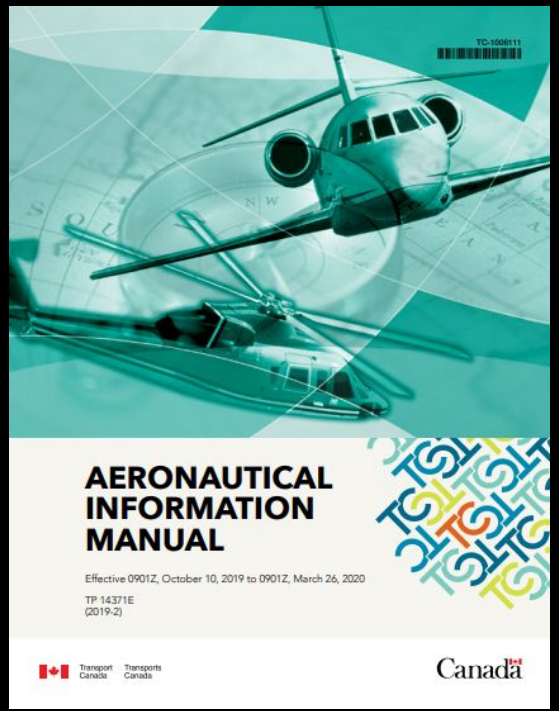
Contains current information on air laws, procedures and airmanship.

Updates roughly every 6 months:

- March and October

Electronic version is Free of Charge

To find the electronic copy of AIM, simply find Aeronautical Information Manual in Google



UW AVIATION SOCIETY

HEADSETS

It costs $10.00 to rent a headset per hour

It is recommended that you buy your own

You can buy a headset at the Pilot Shop or elsewhere such as Avworld in Mississauga (near Pearson)

Different Headsets have different costs and features, so whichever one you get is up to you

UW AVIATION SOCIETY

HEADSETS

David Clark H10-13.4 Headset

Price: $429.00 at the Pilot Shop

Features:

- Traditional 2-Pin setup for cockpits
- Static noise reduction up to 23 Decibels
- Noise cancelling microphone
- Volume control

UW AVIATION SOCIETY

HEADSETS

Bose A20 Aviation Wireless Headset

Price: $1235.99 on the Bose website

Features:

- 30% more noise reduction (dynamic)
- Some models have Bluetooth
- Control module to control volume level, mix and mute settings
- Customizable audio prioritization

UW AVIATION SOCIETY

KNEEBOARD

Kneeboard is used to help you write notes inflight by giving you a hard surface

Straps over your thigh

UW AVIATION SOCIETY

WHAT TO BRING TO YOUR FLIGHT

A Pen/Pencil

Kneeboard with a piece of paper

Your Radio License and Student Pilot Permit

Medical

Headset

Sunglasses

POH of your aircraft

UW AVIATION SOCIETY

AIRCRAFT DOCUMENTS

Documents Required for any flight

A - Airworthiness
R - Registration
O - P ‘O’ H
W - Weight and Balance
J - Journey Log
I - Insurance
L - Licenses
I - Intercept Orders (Not required if you memorised it)

UW AVIATION SOCIETY

PREFLIGHT INSPECTION

Must be done prior to walkaround

Can be found on the top left corner of the Normal Checklist

It’s good to memorize, but please use the Read and Do method

When checking for fuel level, if it’s outside the range of the fuel suggested by Fleetcaptain, tell dispatch immediately

UW AVIATION SOCIETY

WALKAROUND

It doesn't matter if you fly a C152 or C172, the walkaround is generally the same

Before you do your walkaround:

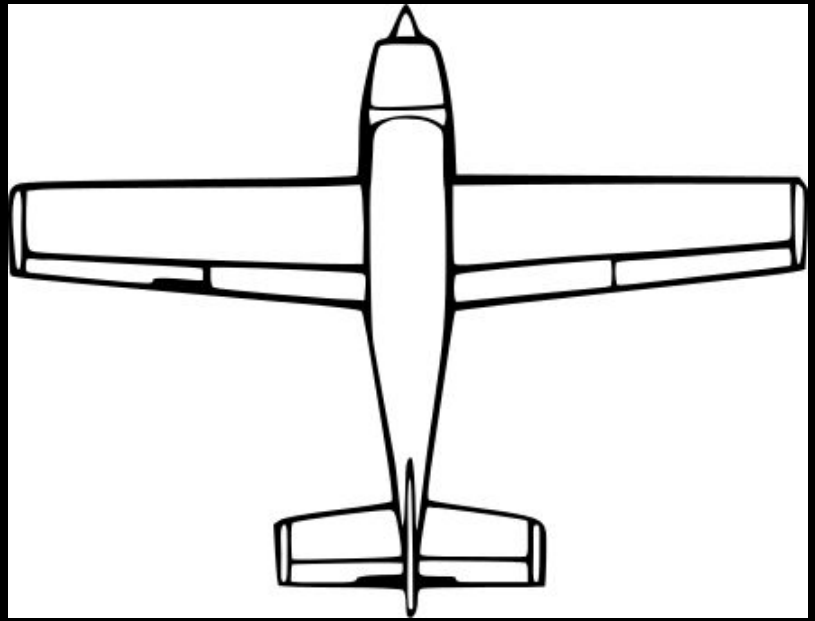
- Find your instructor
- File for a flight at Fleetcaptain
- Grab documents from Dispatch when ready
- Check Documents
- Grab a fuel can on your way out to your plane
- Preflight Inspection (on white checklist)

CESSNA 172S

PREFLIGHT INSPECTION	
Cowl plugs/pitot cover	remove/stow
Fire Extinguisher	secure/charged
First Aid Kit	stowed
Control Locks	removed & stowed
Trim	full travel/set takeoff
Flight Controls	free & correct
Electrical Equipment	off
Avionics Master	off
Magnetos	off
Master Switch	on
Beacon	on/check
Landing/Nav Lights	on/check/off
Avionics Master	on/check fan
Avionics Master	off
Fuel	check quantity
Fuel Shutoff Valve	on (push in)
Flaps	down in stages
Master Switch	off

UW AVIATION SOCIETY

WALKAROUND



UW AVIATION SOCIETY

6 PACK INSTRUMENTS

UW AVIATION SOCIETY

WEATHER CHECKING

- Should be done before heading to the airport
- If you’re unsure about the weather, don’t hesitate to text your instructor
- Your instructor may be flying
- If they don’t reply, head to the airport anyway
- Usually your instructor would text you ahead of time if weather isn’t good enough

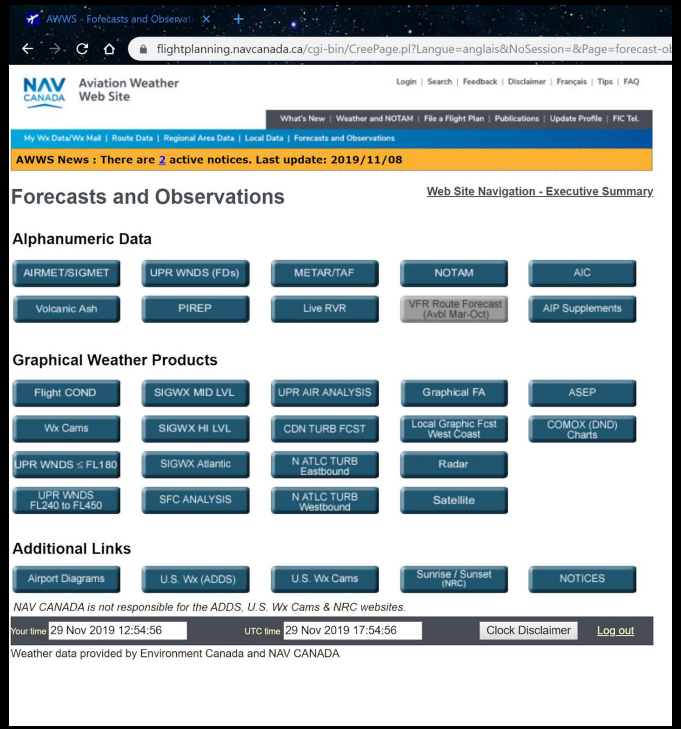
UW AVIATION SOCIETY

WEATHER CHECKING

Weather could be found at:
flightplanning.navcanada.ca/cgi-bin/CreePage.pl?Langue=anglais&NoSession=&Page=forecast-observation&TypeDoc=html

or

plan.navcanada.ca/wxrecall



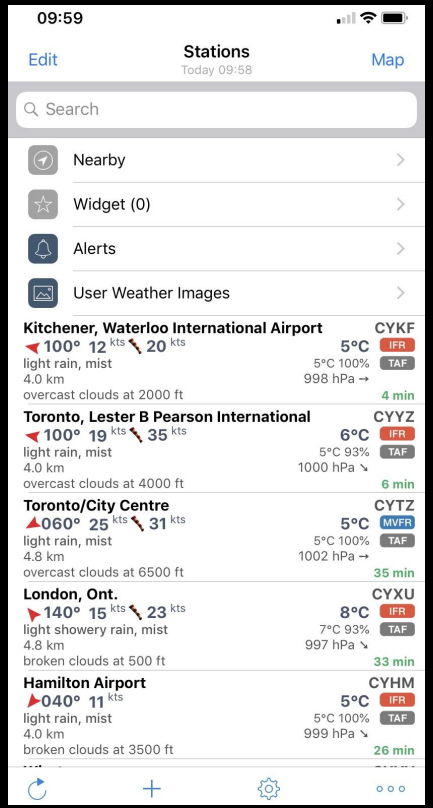
UW AVIATION SOCIETY

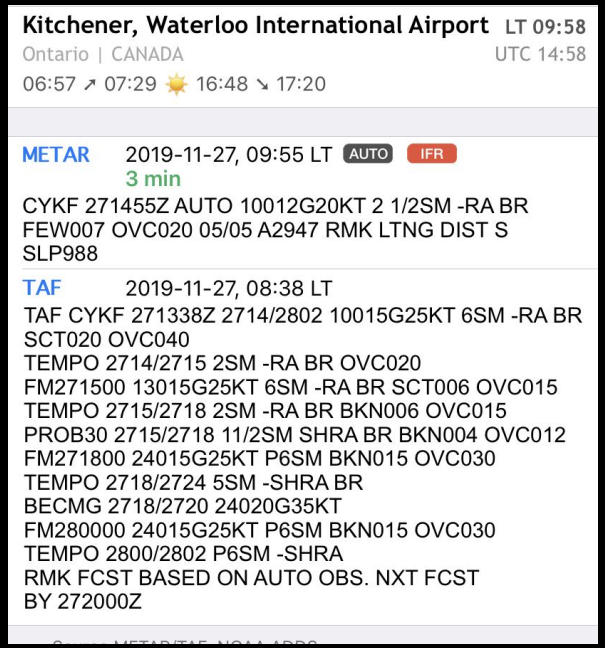
WEATHER CHECKING

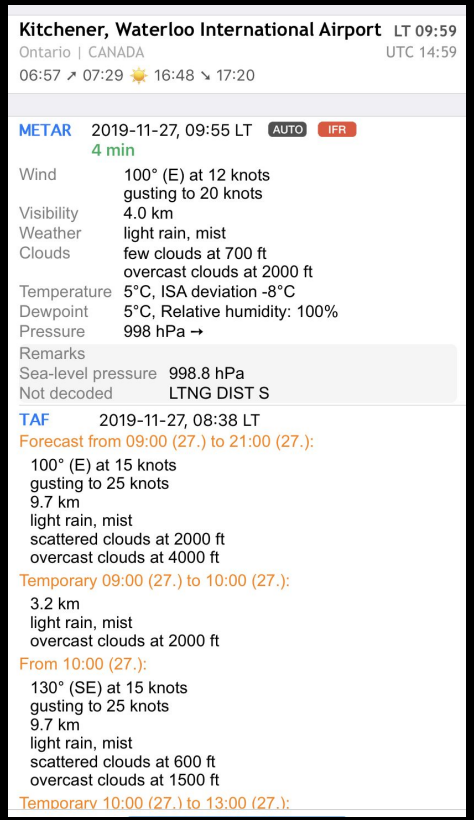
- There is an app on iOS and Android called AeroWeather
- You can add any airports that has a weather reporting station
- You can choose between Raw or Decoded data
- Most importantly, it’s free of charge!

UW AVIATION SOCIETY

WEATHER CHECKING







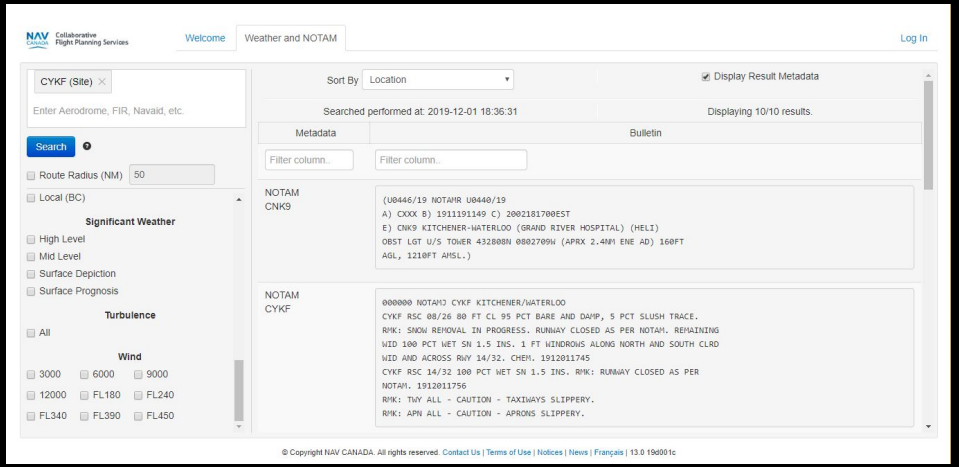
UW AVIATION SOCIETY

NOTAMS

Stands for Notice to Airmen

Can be found at
plan.navcanada.ca/wxrecall

You will also learn how to read NOTAMs
during the course of your training



UW AVIATION SOCIETY

FLIGHT STATUS

Can be found on: twitter.com/wwfcstatus

No restrictions: Everyone can fly

Student no XC: Students are not allowed to go on Solo Cross Country

Student Circuits Only: Students are only allowed to fly circuits

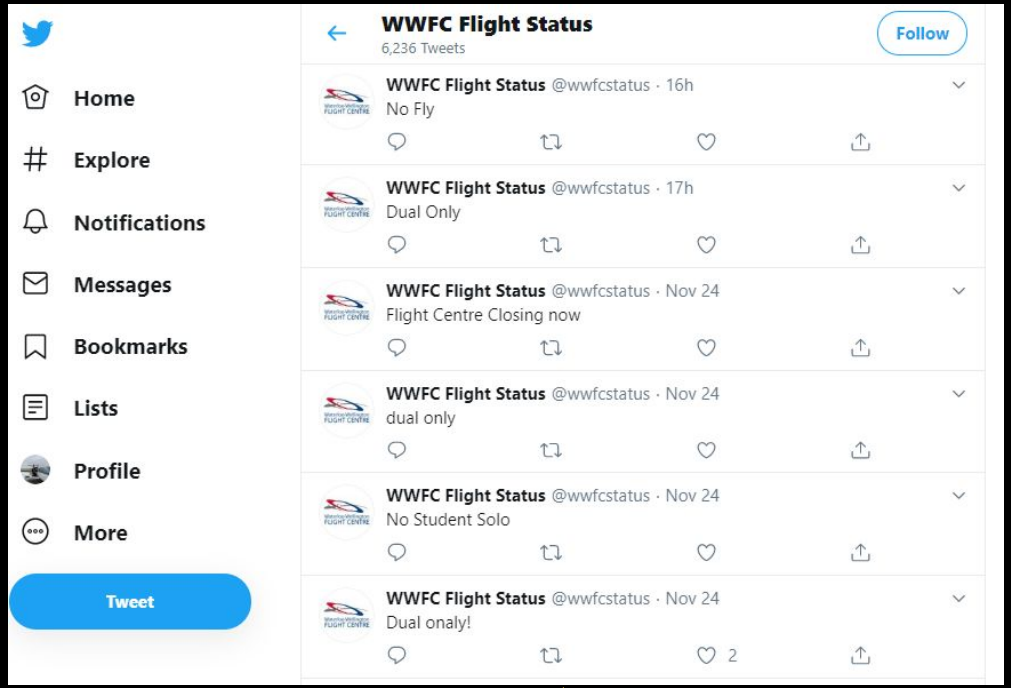
Student No Solo: Students are not allowed to go solo

Dual Only: Only dual flights with an instructor are allowed

*Students = Non-PPL/Non-Night Rated (flying at night)

UW AVIATION SOCIETY

FLIGHT STATUS



UW AVIATION SOCIETY

WINTER WEATHER CLOTHING

Keep yourself warm in the plane. Also, you might make a landing other than Waterloo so it’s best to keep yourself warm

Jackets

Sweater

Boots (bring onboard)

Gloves

Beanie (up to you)

UW AVIATION SOCIETY

CESSNA 152 COCKPIT LAYOUT

CESSNA 172S COCKPIT LAYOUT

STANDARD OPERATING PROCEDURES (SOP)

A set of Standardized rules that you should follow to ensure a smooth learning experience.

The flight centre is currently adopting a set of SOPs for all aircraft. You'll be using these SOPs when you start your training.

These includes procedures, briefings, checklists and call-outs

UW AVIATION SOCIETY

TAXI

Definition
The movement of aircraft on the ground under its own power

How do you control direction?
The use of rudder pedals

How do you maintain centerline?
By keeping the taxi line under your right leg

UW AVIATION SOCIETY

TAXI

Centreline

A guide for aircraft

Nose wheel should be sat on top of the centreline

Follow the centreline at all times

UW AVIATION SOCIETY

TAXI

Hold Short Line

A Stop sign for aircraft

Never go past this line unless directed by ATC.

Used mostly at runway entrances and intersections

UW AVIATION SOCIETY

TAXI

Runway Direction Sign

A sign to signify which runway is beyond the hold short line

Use this to make sure you're at the right runway

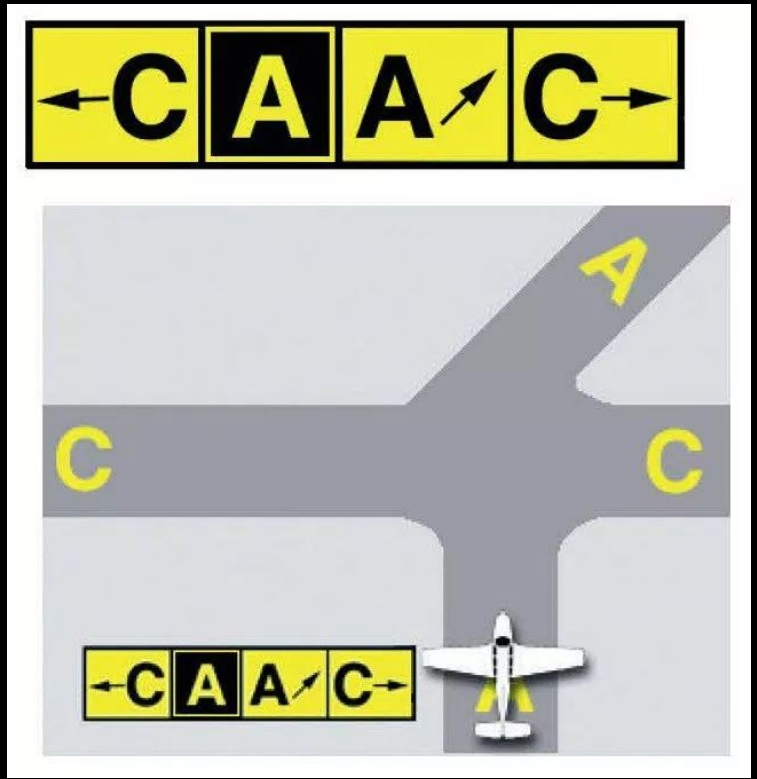
UW AVIATION SOCIETY

TAXI

Destination and Location Sign

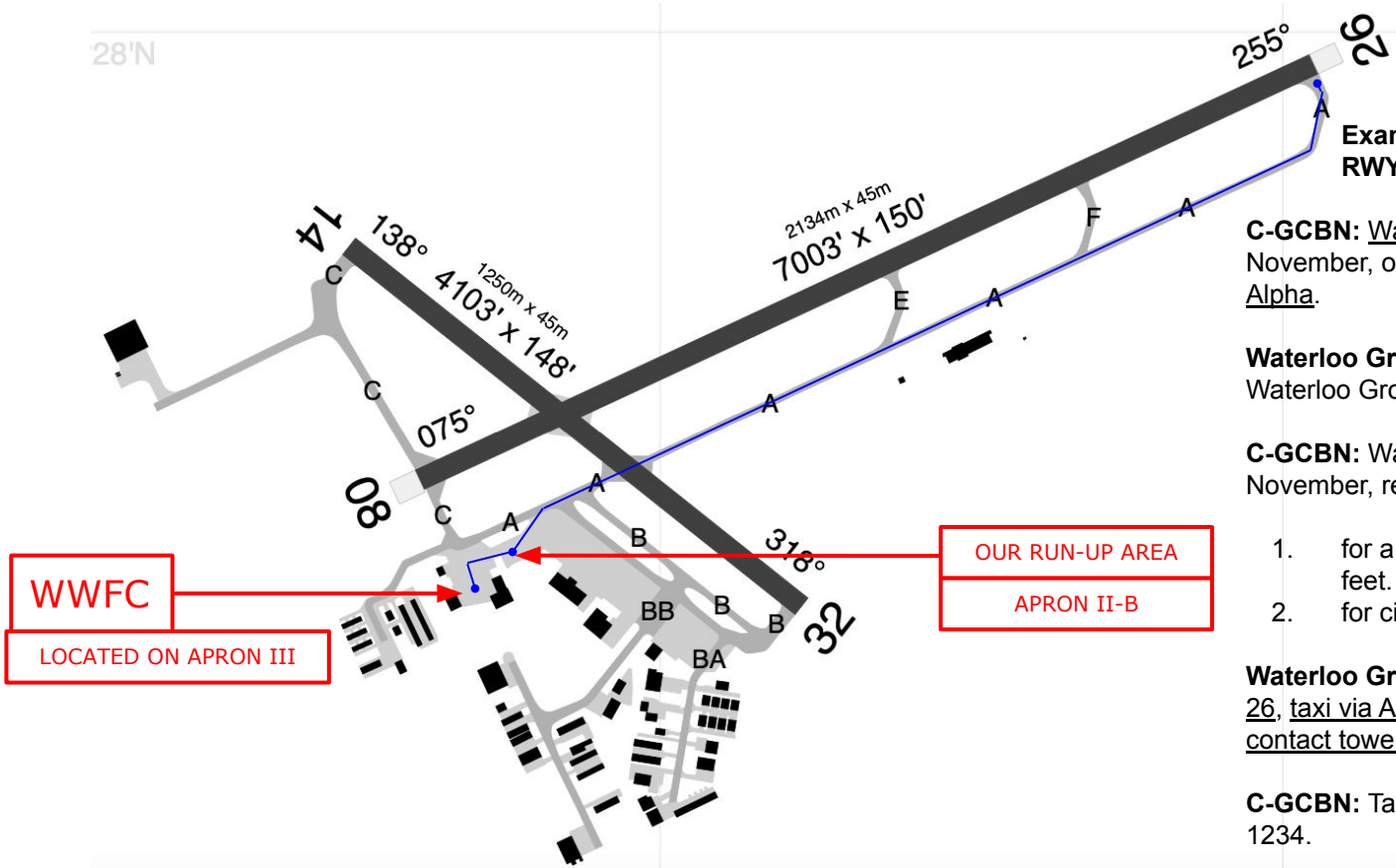
A sign to show what taxiway you're on and where a branched off taxi line leads to.

It might seem confusing at first but you should get the hang of it pretty quickly.



UW AVIATION SOCIETY

TAXI



Example of radio transmissions for taxi to RWY 26, aircraft: C172S (GCBN):

C-GCBN: Waterloo Ground, Golf Charlie Bravo November, on Apron Two Bravo, with information Alpha.

Waterloo Ground: Golf Charlie Bravo November, Waterloo Ground.

C-GCBN: Waterloo Ground, Golf Charlie Bravo November, requesting taxi to the active

1. for a local *[Insert Direction]* departure at ____ feet.
2. for circuits.

Waterloo Ground: Charlie Bravo November, runway 26, taxi via Alpha, cross runway 32, squak 1234, contact tower holding short.

C-GCBN: Taxi via Alpha, cross runway 32, squak 1234.

GROUND SCHOOL COURSES BREAKDOWN

- AVIA101: PPL
- AVIA102: Cross Country Planning (2 weeks)
- AVIA203: CPL, Night Rating
- AVIA204: CPL, Complex Aircraft
- AVIA205: Glass Cockpit, Cross Border Flight (2 weeks)
- AVIA306: IFR, Multi Engine
- AVIA307: IATRA, IFR Scenarios
- AVIA408: No classes

UW AVIATION SOCIETY

QUESTIONS?

UW AVIATION SOCIETY

Kahoot Time!

UW AVIATION SOCIETY

THANKS FOR COMING!