



## Cross Country Academics

### Before Planning the flight:

- Can I get there? – Weather: Foreflight, SkyVector, aviationweather.gov, 1800wxbrief.com
- Can I land there? – NOTAMS – Foreflight, <https://notams.aim.faa.gov/notamSearch/>
- Can I takeoff there and get back? – NOTAMS, Fuel Service, Weather

### Questions:

- What's the difference in VFR Navigation versus IFR Navigation?
- What is Pilotage versus Dead-Reckoning?
- What are some variables we have to account for in navigation?
- How do we determine what compass heading to fly on a given day?

**Pilotage** – flying “point to point” navigation from visible points on the ground – zig-zag

**Dead (Ded) Reckoning** – “Deduced” position based on heading, speed, time on a straight line

### Variables in straight line Navigation – we must account for these in our planning

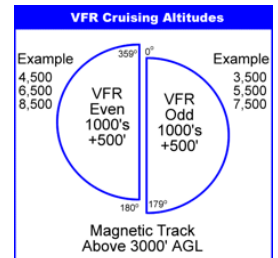
- Magnetic Variation – difference in true north and magnetic north – varies
  - o Isogonic Lines – dashed-magenta lines of variation on the map
  - o “East is Least, West is Best” – Ocala is 6W, so +6 degrees
- Winds – affect our heading to maintain a constant course
- Compass error – slight magnetic interference due to avionics in the cockpit

### Definitions – TC, MC, MH, CH, TH

- True Course (TC) – Course measured on the Map with a Plotter
- Magnetic Course (MC) – True Course +/- Magnetic Variation (Mag Var)
- Magnetic Heading (MH) – True Course +/- Mag Var +/- Winds
- Compass Heading (CH) – True Course +/- Mag Var +/- Winds +/- Compass error
- True Heading (TH) – True Course +/- Winds (exists, but not really used or useful)

### Draw the line on the Map and Gather XC Data

- Record the TC - read the plotter along the course and a line of longitude
- Record the MC – add or subtract the Mag Var (isogonic line on map)
- Determine the cruise altitude for your flight
  - o Between 2500'-9500' feet based on weather, distance, winds, fuel
  - o Odd versus Even Altitude? What is it based on? “Magnetic Course”
- Record the forecast winds for the cruise altitude – Foreflight, 1800wxbrief.com



### Flight Computer Calculations

- Using the POH, determine the Cruise TAS (kts) based on Altitude and Power setting
- Record TAS and record estimated fuel burn – gal/hr based on POH table
- Calculate and record the Wind Correction Angle (WCA)
- Calculate and record the ground speed
- Record the MH – TC+MagVar+WCA

### Choose Ground Reference Points along the Route and build the Data Card

- Record (name) **points** right or left of course, easy to see, 7-13nm spacing – (column 2)
- KOCF is the first point so first line will be – KOCF 0 nm 2 min 2.0 gal (STTO, ground ops/climb)
- Measure and record **distance** between points – (column 3)
- Calculate and record **time** between points using back side of flight computer – (column 4)

**VOR Setup**


- Record where the TC line on the map crosses the OCF VOR Compass Rose (~ 301 deg for KCTY)
- We'll set this in the VOR during ground ops for backup navigation

**Fuel Planning**

- Use appx 1.5 gallons for Start-Taxi-Takeoff (STTO fuel in column 6 line 1)
- Calculate using the POH the fuel used for climb – record in Column 6 line 2
- Calculate and record **fuel burn** of each leg based on cruise fuel flow from POH – (column 6)
- Sanity Check - you can estimate total fuel burn (start+climb+cruise) at approximately
  - o 9 gal per hour – 172
  - o 13 gal per hour – SR-20

**Weight and Balance – Weight x ARM = Moment**

- Use the template out of the POH
- Follow the lines to choose the correct moment based on weight
- Add up the columns and check with the flight envelope diagram
- What's the difference in Utility versus Normal category?

	TC		TAS		
	MC		Fuel Burn		
	MagVar				
	Cruise Alt				
	Cruise Winds				
	MH		VOR		
Point	Mag Hdg	Distance	Time between	Elapsed time	Fuel Used
KOCF		0	0	2+00	1.5
<b>Totals</b>					