

Patuxent River Navy Flying Club



Headings and Winds

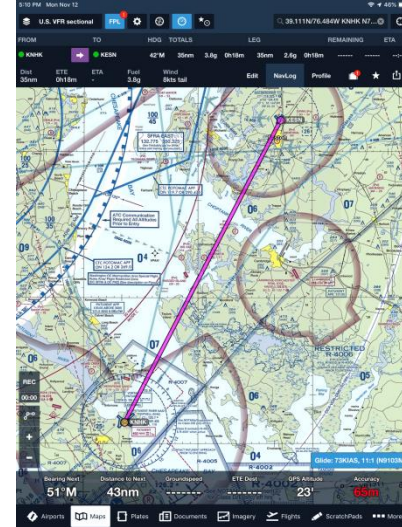
PRNFC

PO BOX 332

PATUXENT RIVER MD 20670

(301) 342-1110

Different Headings



027 °

- **True Course (TC)** – the course measured on the chart
 - Measured from True North
- **True Heading (TH)** – TC corrected for the effects of wind
 - “Written in True, spoken in Mag”
- **Magnetic Heading (MH)** – TH corrected for magnetic variation
 - In planning, “East is least; West is best”
- **Compass Heading (CH)** – MH corrected for compass deviation

NCEP Wind Aloft Forecast Level: high Forecast: 06 Region: bos
(Extracted from FBUS31 KWNO 121958)

FD1US1

DATA BASED ON 121800Z

VALID 130000Z FOR USE 2000-0300Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
BDL	2115	2522+01	2531-05	2537-08	2662-18	2689-27	761242	762453	764663
BGR	2618	2817-08	2832-10	2848-13	2873-24	2883-35	784444	786553	778061
CAR	2819	2932-11	2935-14	2943-16	2874-27	2890-39	795046	787752	784459
PWM	2416	2822-05	2735-06	2741-12	2770-21	2880-32	773543	774454	776762
EMI	1816	2240+04	2445-01	2445-04	2445-15	2586-25	750139	751250	752462

For	N	30	60	E	120	150
Steer	0	27	56	85	116	148
For	S	210	240	W	300	330
Steer	181	214	244	274	303	332

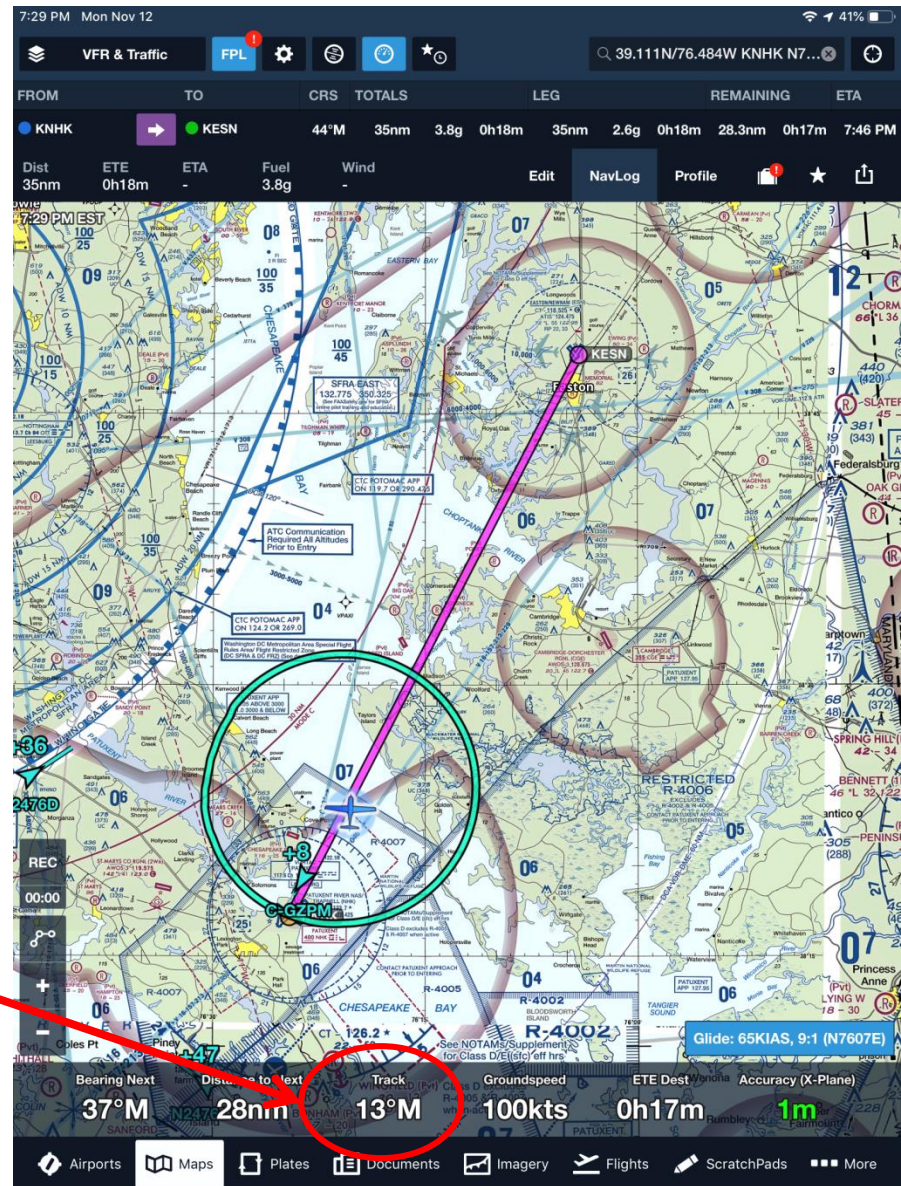


One More Heading

Magnetic Track (MT) –
Actual ground track corrected for magnetic variation. It depicts the effects of wind, but doesn't compute the heading correction for winds

- Example in ForeFlight
- “Course” in E6B App

Magnetic Track



Setting the Directional Gyro

We want the Directional Gyro (DG) to show us Magnetic Heading, not Compass Heading.

- DG error is precession, not affected by heading, but is affected by time and maneuvers.
- Compass error is not affected by time or past maneuvering, but is affected by heading.

Given a DG that doesn't precess too much, we want it to be accurate on any heading. Therefore we must remove compass deviation when setting the DG.

If the aircraft's Mag Compass says 245°, what do we set in the DG?

- Deviation at 240 is +4°
- Reverse the sign of deviation and add to the CH. $245 + (-4^\circ) = 241^\circ$

Many DGs have been sent in for repair because their owners set CH, not MH and constantly saw errors!

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What about winds?

While ForeFlight and web-based planners like SkyVector provide predicted in-flight winds for their Magnetic Headings, forecasts can be wrong.

- If you plan far enough into the future, the National Weather Service will not have predicted the winds, so they'll be zero.
- Fast moving fronts are difficult to predict and sometimes the predictions are just wrong.
- Your departure time may be significantly different than your estimate when you did your flight planning, so the actual winds will likely be different than the old forecast.

So what, your time of arrival is just a little different, right?

- Yes, but in extreme cases you may not have enough fuel. Or, you go too fast (burning lots of fuel) and get there early only to have to wait for a ride.

How do you know if the actual in-flight winds are different than planned?

Figure it out! (Requires an in-flight GPS-connected app.)

1. Observe indicated airspeed and correct to calibrated airspeed. There's a chart in the POH. At cruise speed, it's usually minimal.
2. Observe outside air temperature.
3. Observe pressure altitude. Set the altimeter to 29.92.
4. Calculate true airspeed (TAS).
5. Observe magnetic heading off DG or correct CH to MH.
6. Observe magnetic track (course) from ForeFlight (or similar app).
7. Observe ground speed from ForeFlight (or similar app).
8. Calculate winds (the wind direction will be in magnetic, not true like you planned).
9. Adjust planning as necessary. Proficiency with E6B required.

E6B App Screenshots

4:09 PM Mon Nov 12 46%

Sporty's E6B
Flight Computer 00:00:00

Actual True Airspeed ⓘ

Pressure Altitude (Ft)	4670	Indicated Temp. (°C)	6
Calibrated Airspeed (Kts)	105		

Results

True Airspeed (Kts)	112	Mach Number	0.17
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4:10 PM Mon Nov 12 46%

Sporty's E6B
Flight Computer 00:00:00

Wind Speed and Direction ⓘ

Course	283	True Airspeed (Kts)	112.28
Groundspeed (Kts)	68	Heading	300

Results

Wind Direction	323	Wind Speed (Kts)	51.3
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Summary

- **Sometimes your exact MH isn't important. But sometimes, like when you are flying cross country legs using dead reckoning or when flying an NDB approach it's critical.**
- **Winds are a big deal in slow flying airplanes. Knowing how to correct for them is the mark of a competent pilot.**