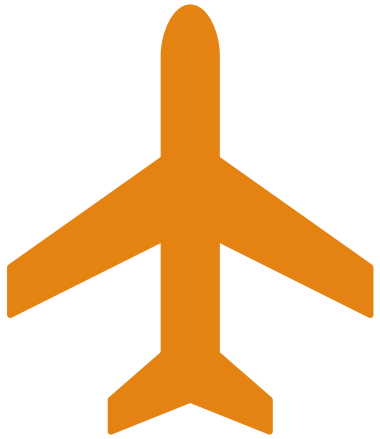


VFR FLIGHT PLANNING

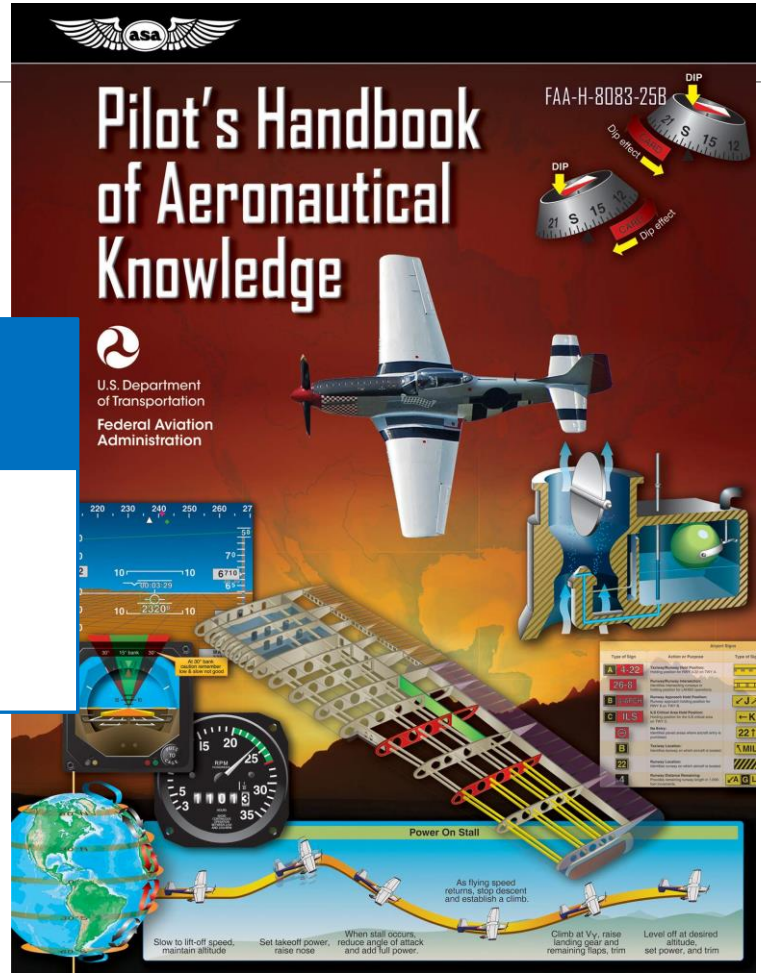
Lesson Outline

LESSON OBJECTIVE

To determine that the student exhibits proficient knowledge of the elements related to navigation and flight planning by describing the elements on the following slide.

LESSON SOURCE(S)

Pilot's Handbook of Aeronautical Knowledge
FAA-H-8083-25



Lesson Outline

LESSON ELEMENTS	TIMEFRAME	EQUIPMENT/TOOLS
Terms Used in Navigation Features on Aeronautical Charts Using Current Aeronautical Charts Method of Plotting a Course Pilotage and Dead Reckoning Radio Navigation Diversion to an Alternate Lost Procedures Computation of Fuel Consumption Using a Navigation Log The Go/No-Go Decision Filing a Flight Plan	60 Minutes *approximately* Discuss Objectives Present and Review Material Student Questions Conclusion and Quiz	Lesson Presentation Whiteboard and Markers FAA Sources and References

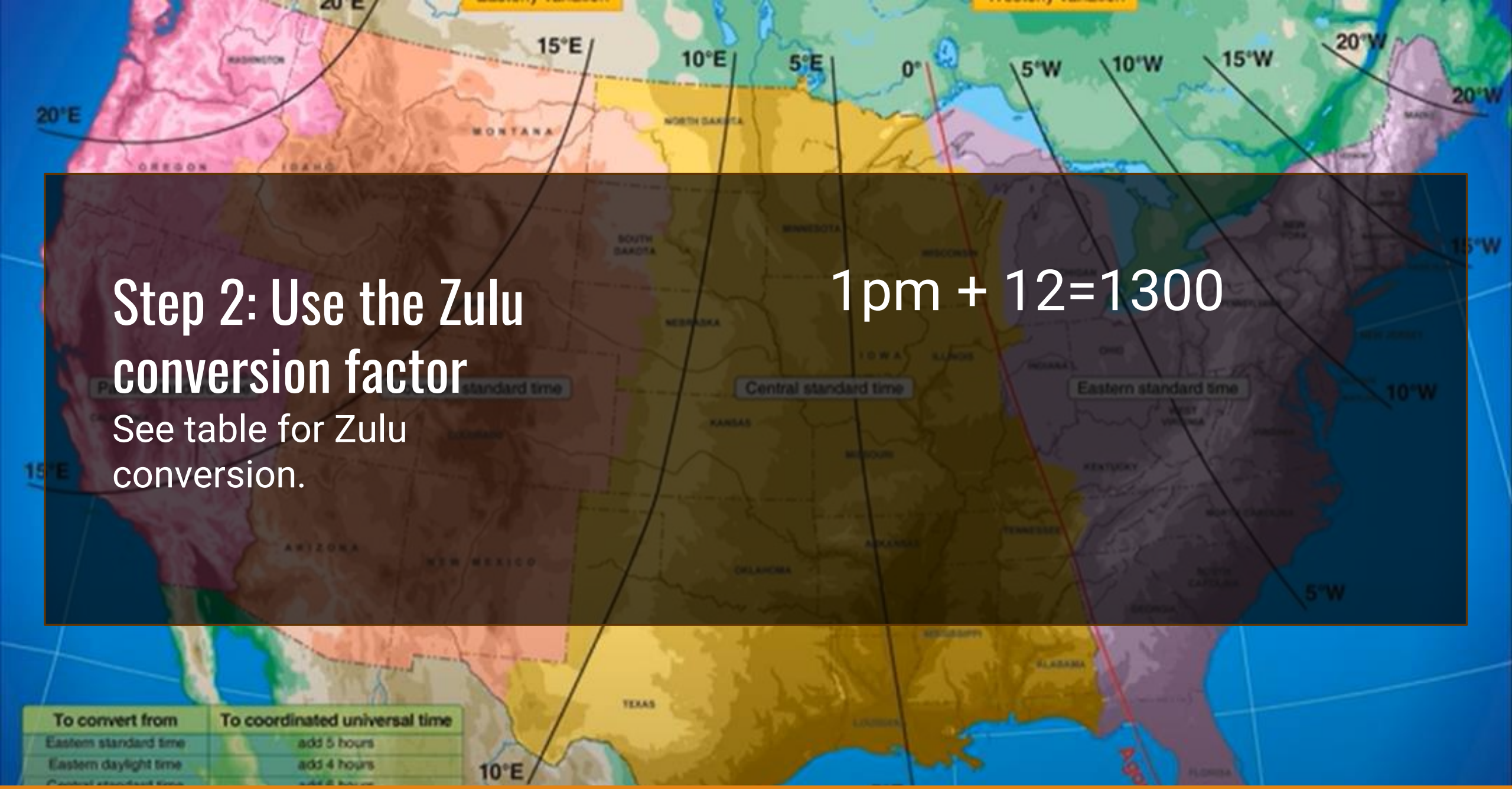
Lesson Outline

INSTRUCTOR ACTIONS	STUDENT ACTIONS	COMPLETION STANDARDS
Present Objectives and Standards Teach Lesson from Presentation Ask and Answer Student Questions Assign Homework Check Student's Post Lesson Quiz	Participate in Lesson Take Notes Ask and Respond to Questions Pass the Post Lesson Quiz	Student is able to understand and differentiate between the different lesson elements. Student is further able to apply this acquired knowledge in flight training/flight operation scenarios effectively and appropriately.


Easterly variation
Westerly variation
20°E
15°E
10°E
5°E
0°
5°W
10°W
15°W
20°W
Central standard time
Eastern standard time
To convert from
To coordinated universal time
add 5 hours

ZULU Time


Step 1: Convert local time to a 24-hour time
2:00 PM eastern standard time becomes 14:00. Anytime before 12 noon will just be the same number, so you can practically skip this step.
1pm + 12=1300
To convert from
To coordinated universal time
Eastern standard time
add 5 hours
Eastern daylight time
add 4 hours
Central standard time
Eastern standard time
Pacific standard time
Mountain standard time
MONTANA
NORTH DAKOTA
SOUTH DAKOTA
MINNESOTA
NEBRASKA
IOWA
KANSAS
MISSOURI
OKLAHOMA
ARKANSAS
TEXAS
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
OREGON
IDAHO
15°E
10°E
5°E
0°
5°W
10°W
15°W
20°W
20°E



Step 2: Use the Zulu conversion factor

See table for Zulu conversion.

1pm + 12=1300

UTC - 10 HOURS

HST = HAWAIIAN STANDARD TIME

UTC - 9 HOURS

ALST = ALASKAN STANDARD TIME

UTC - 8 HOURS

PST = PACIFIC STANDARD TIME

ALDT = ALASKAN DAYLIGHT TIME

UTC - 7 HOURS

PDT = PACIFIC DAYLIGHT TIME

MST = MOUNTAIN STANDARD TIME

UTC - 6 HOURS

MDT = MOUNTAIN DAYLIGHT TIME

CST = CENTRAL STANDARD TIME

UTC - 5 HOURS

CDT = CENTRAL DAYLIGHT TIME

EST = EASTERN STANDARD TIME

UTC - 4 HOURS

EDT = EASTERN DAYLIGHT TIME

AST = ATLANTIC STANDARD TIME

TO FIND UNIVERSAL TIME, SIMPLY ADD THE CORRESPONDING NUMBER OF HOURS (BASED ON TIMEZONE) TO YOUR LOCAL TIME

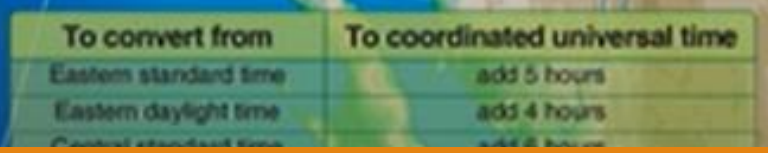
Step 2: Use the Zulu conversion factor

See table for Zulu conversion.

1pm + 12 = 1300

1300 + 5(standard) = 1800 Zulu

1300 + 4(eastern daylight)



To convert from	To coordinated universal time
Eastern standard time	add 5 hours
Eastern daylight time	add 4 hours

"162252Z." In a typed weather report like this, the first two numbers refer to the date of the month the report was taken (August 16th).

Next is the Zulu time; 2252Z. Working backward from our conversion above, 2252Z minus four hours is 18:52 on the 24-hour clock, which is 6:52 PM EDT. (August 16th is Eastern Daylight Savings Time in Georgia)

```
KATL 162252Z 33009KT 10SM FEW055 BKN140 BKN200 28/19 A2991 RMK AO2 SLP118 T02780189 $
```

Features on Aeronautical Charts

An aeronautical chart is the road map for a pilot flying under VFR. The chart provides information that allows pilots to track their position and provides available information that enhances safety. The three aeronautical charts used by VFR pilots are:

VFR Sectional Chart

Sectional charts are the most common charts used by pilots today. The charts have a scale of 1:500,000 (1 inch = 6.86 nautical miles (NM) or approximately 8 statute miles (SM)). The charts provide an abundance of information, including airport data, navigational aids, airspace, and topography.

Terminal Area Chart (TAC)

VFR terminal area charts are helpful when flying in or near Class B airspace. They have a scale of 1:250,000 (1 inch = 3.43 NM or approximately 4 SM). These charts provide a more detailed display of topographical information and are revised semiannually.

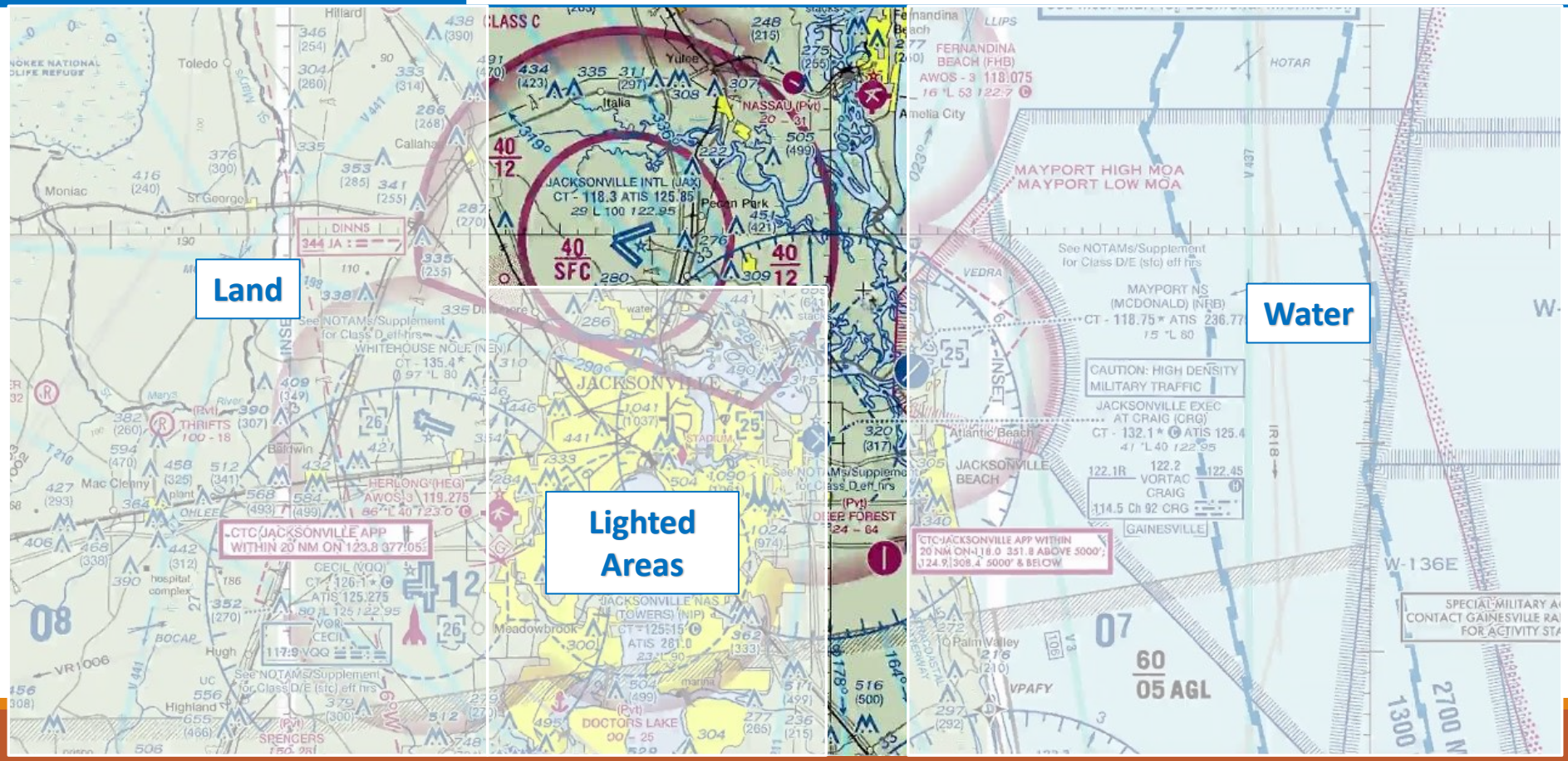
World Aeronautical Chart (WAC)

These charts have a size and scale convenient for navigation by moderate speed aircraft. They are produced at a scale of 1:1,000,000 (1 inch = 13.7 NM or approximately 16 SM). These charts are similar to sectional charts, and the symbols are the same except there is less detail due to the smaller scale.

Features on Aeronautical Charts

VFR Sectional Chart

If there is a simple you do not recognize, you can always look it up on the FAA Aeronautical Chart User Guide.



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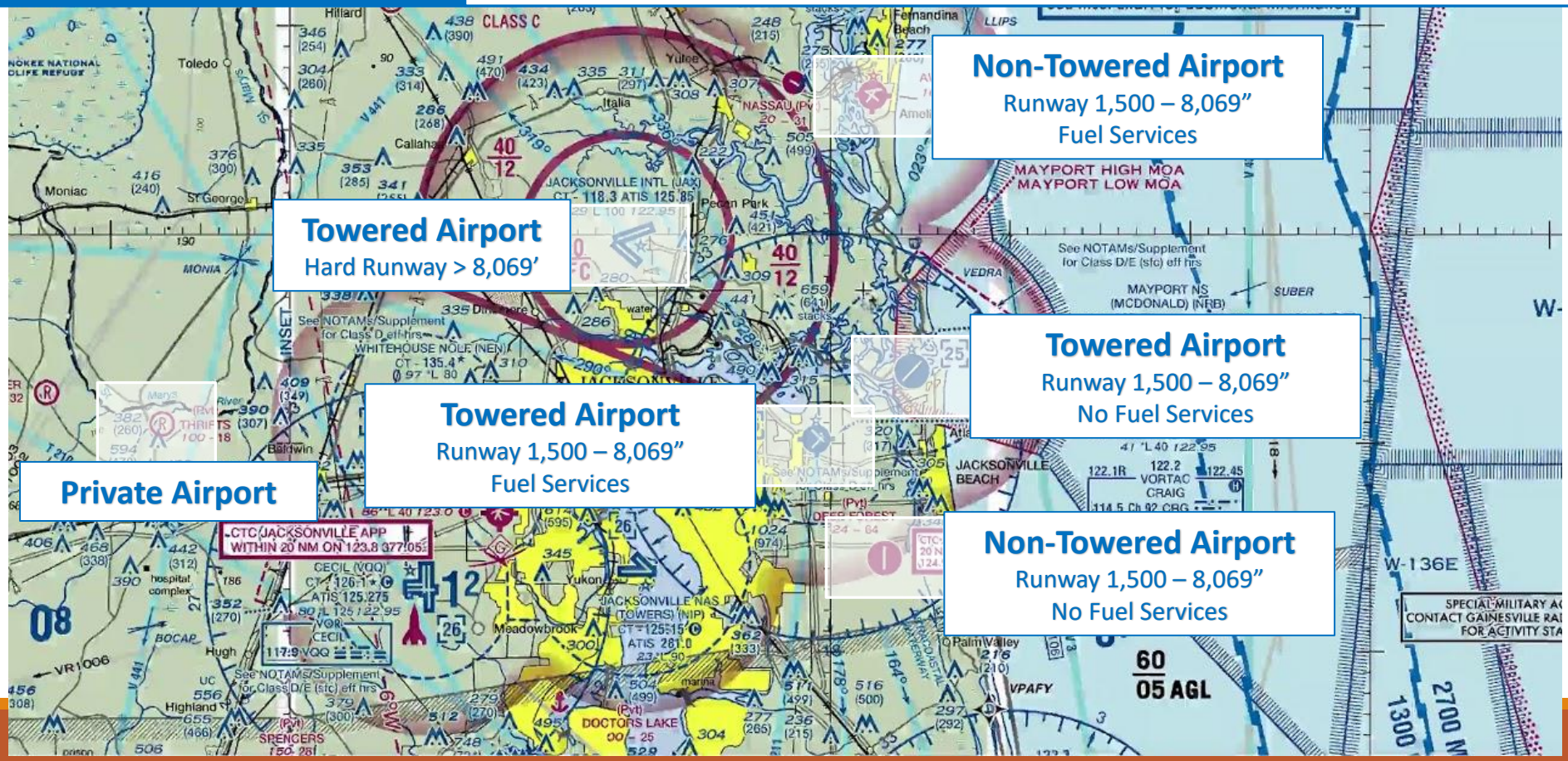

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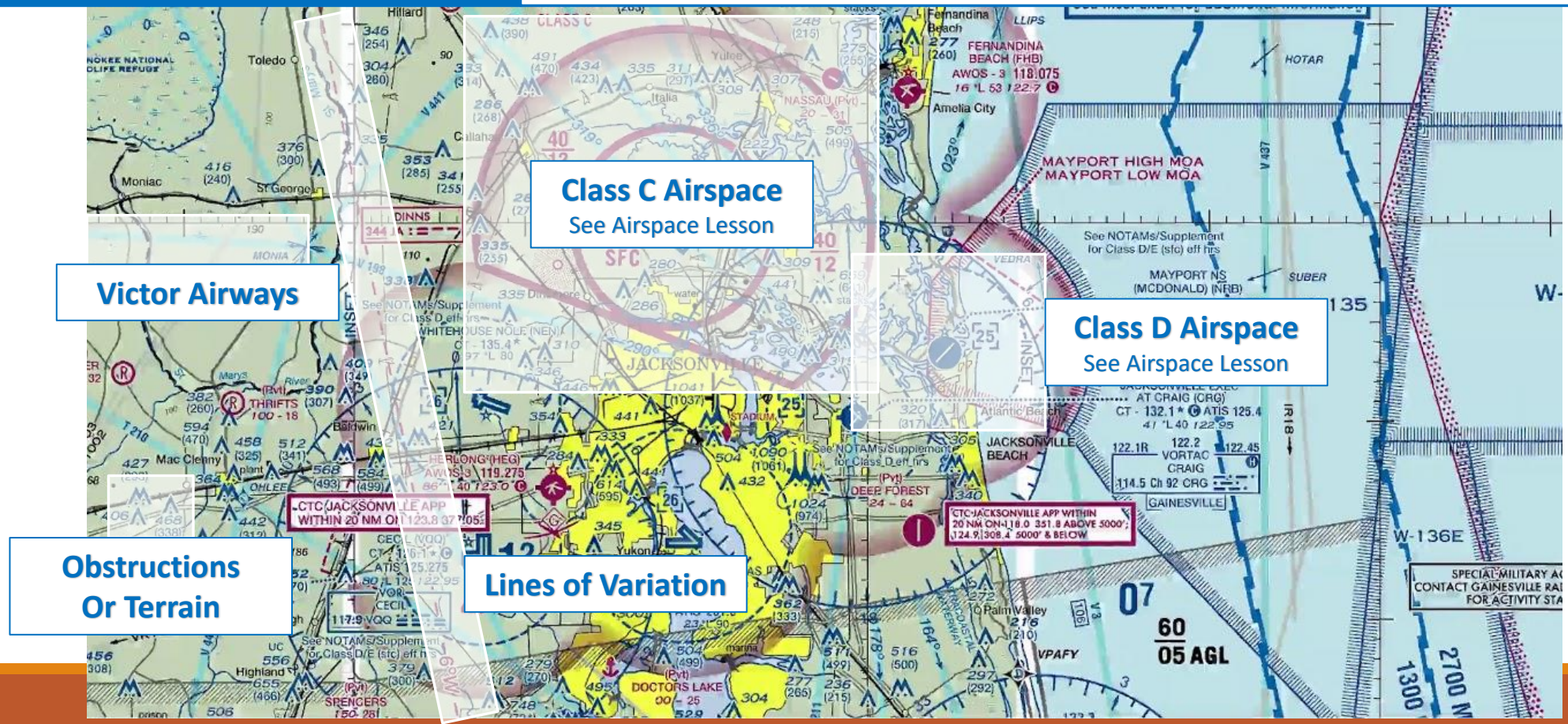

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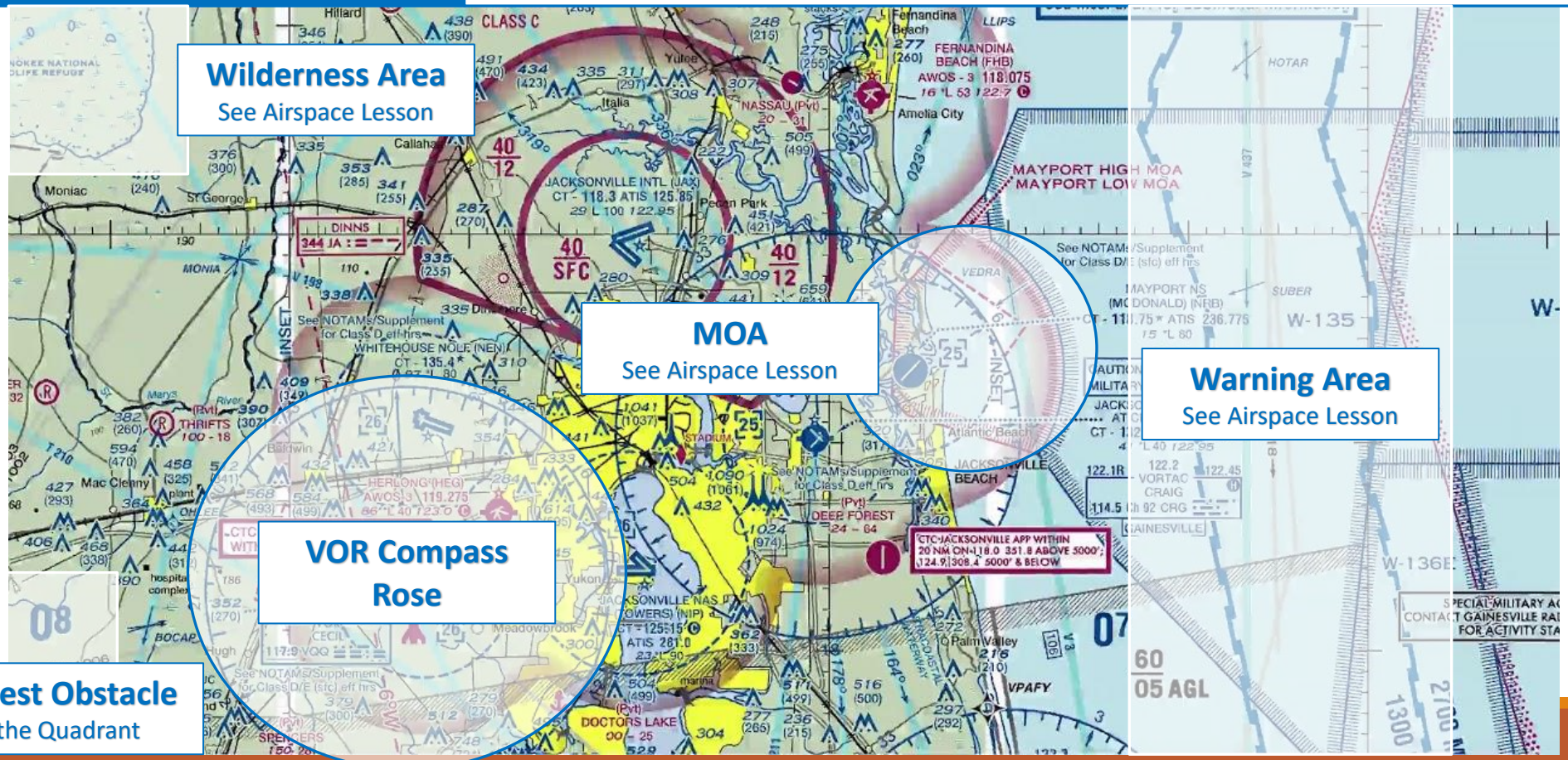

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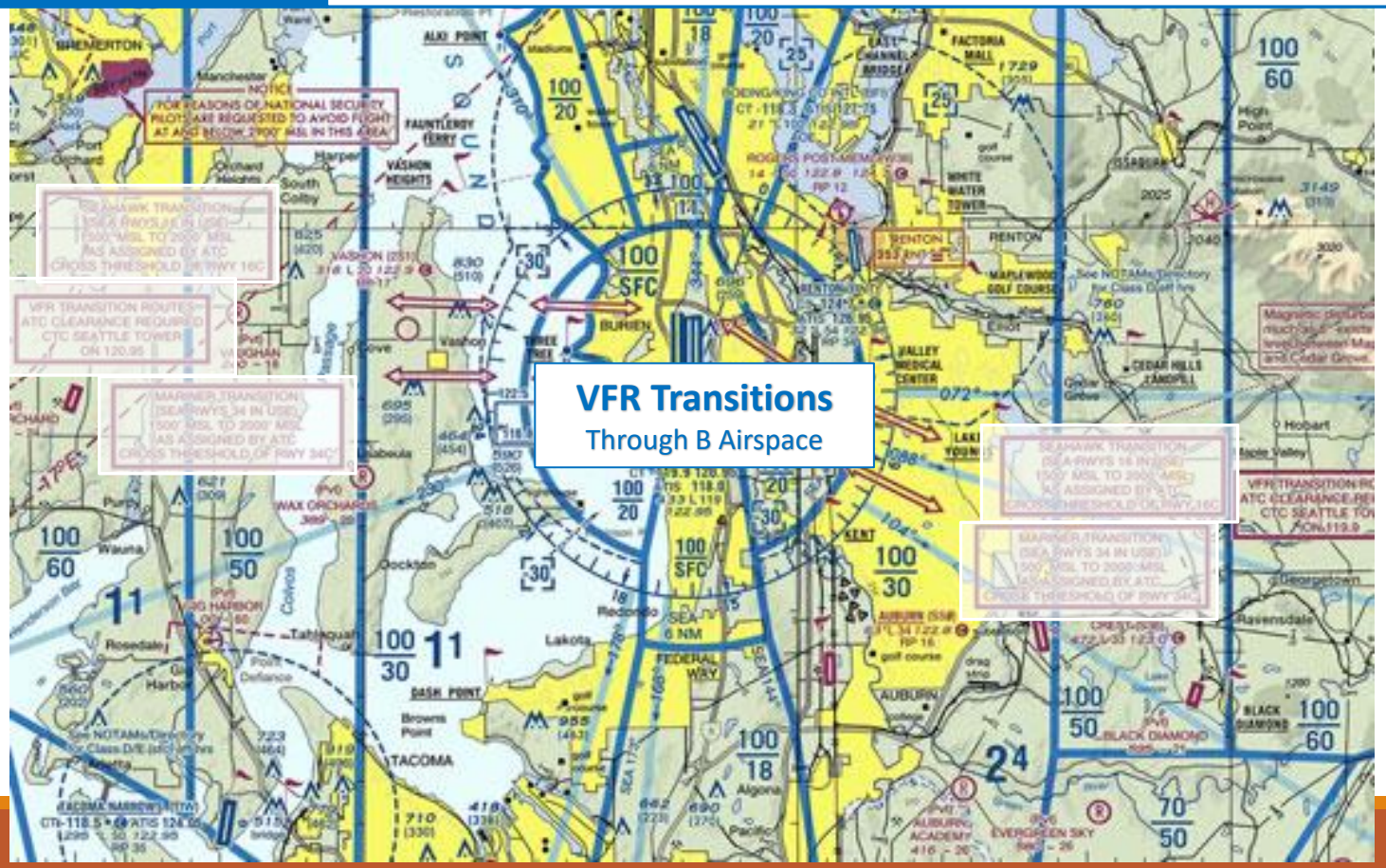
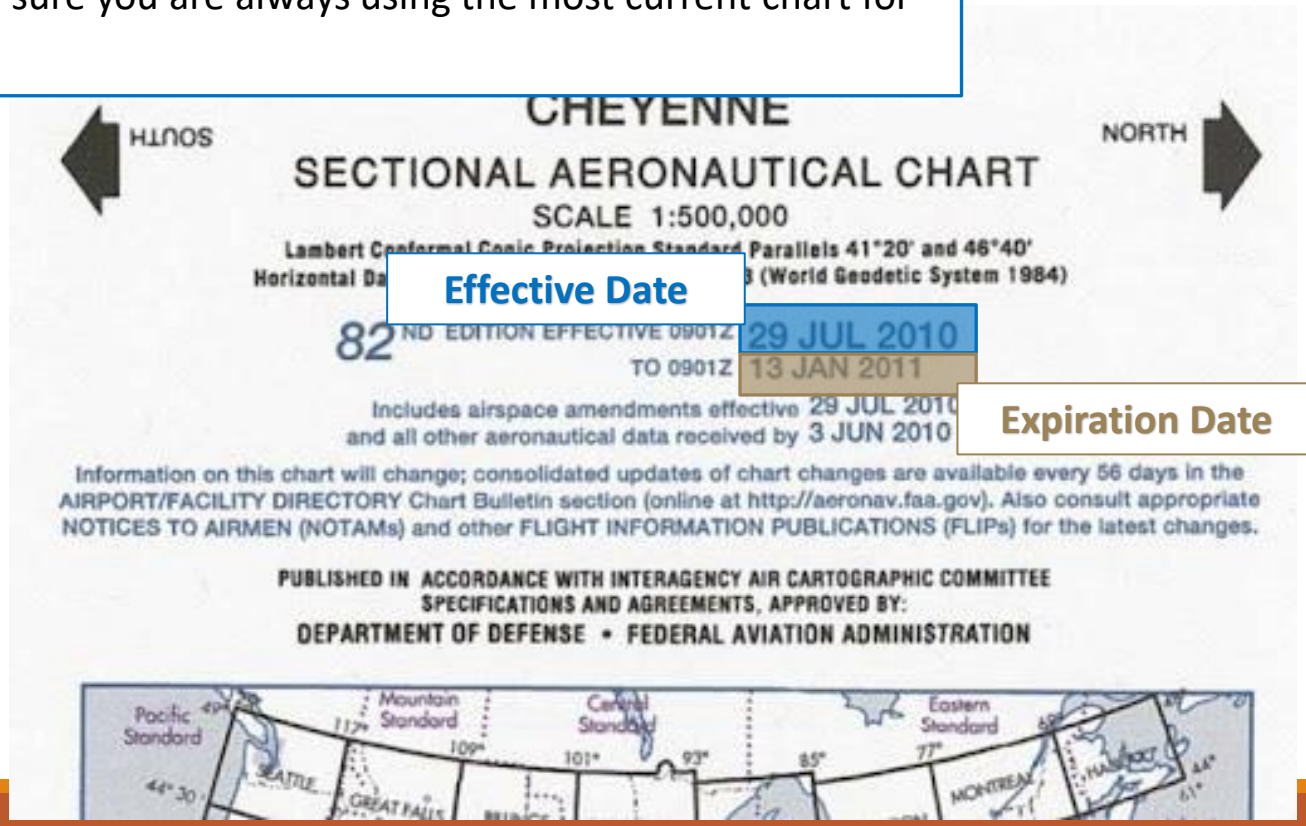


Features on Aeronautical Charts

VFR Sectional Chart

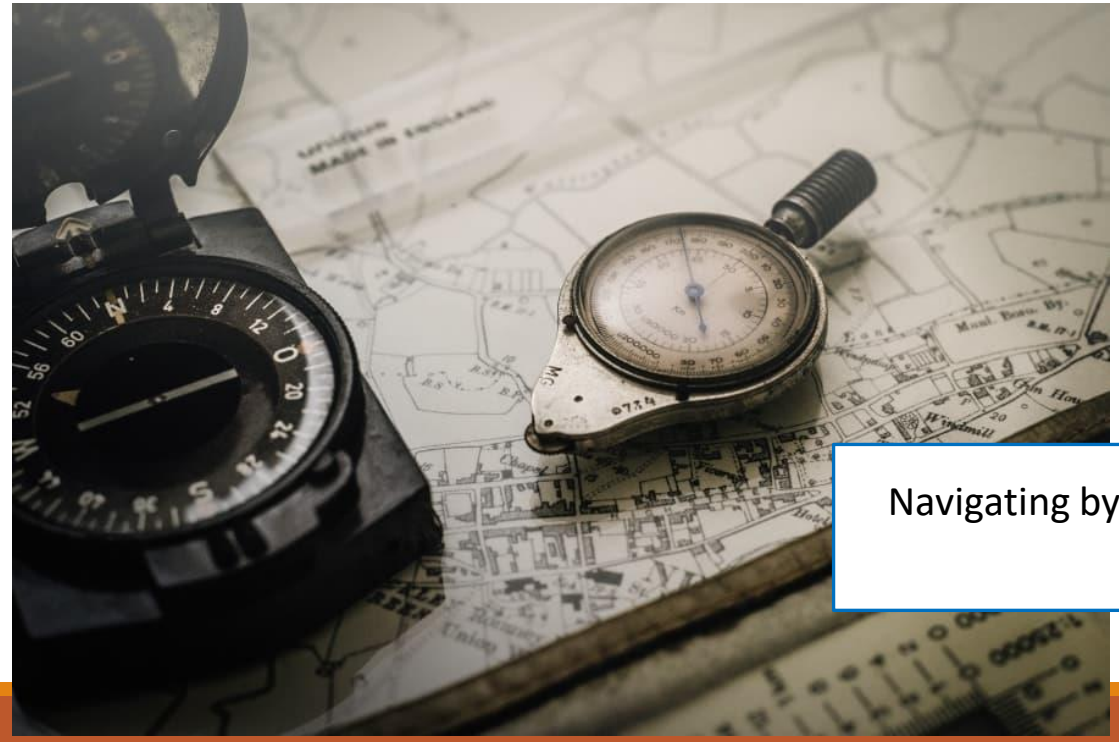
It is highly important to make sure you are always using the most current chart for the area.



Creating a Flight Plan and Nav Log

Pilotage

Navigating by reference to visible landmarks and checkpoints.



Dead Reckoning

Navigating by computations of direction and distance from a known position and by using radio navigation aids.

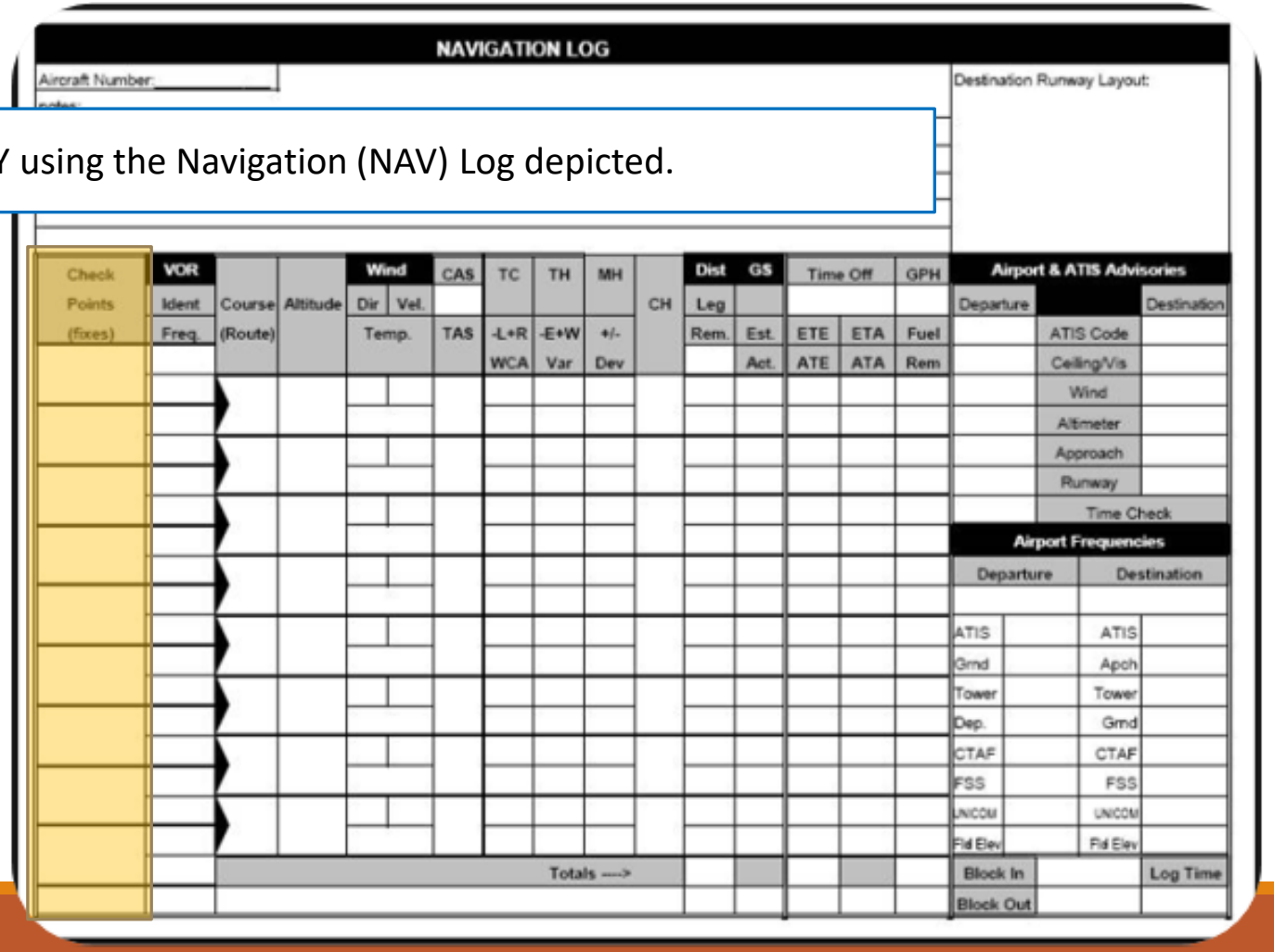
Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY using the Navigation (NAV) Log depicted.

Selecting the Checkpoints (Fixes)

The first step is to select the checkpoints (fixes) we will use along our route of flight. Checkpoints should be prominent and easy to see from the airplane (pilotage).



Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

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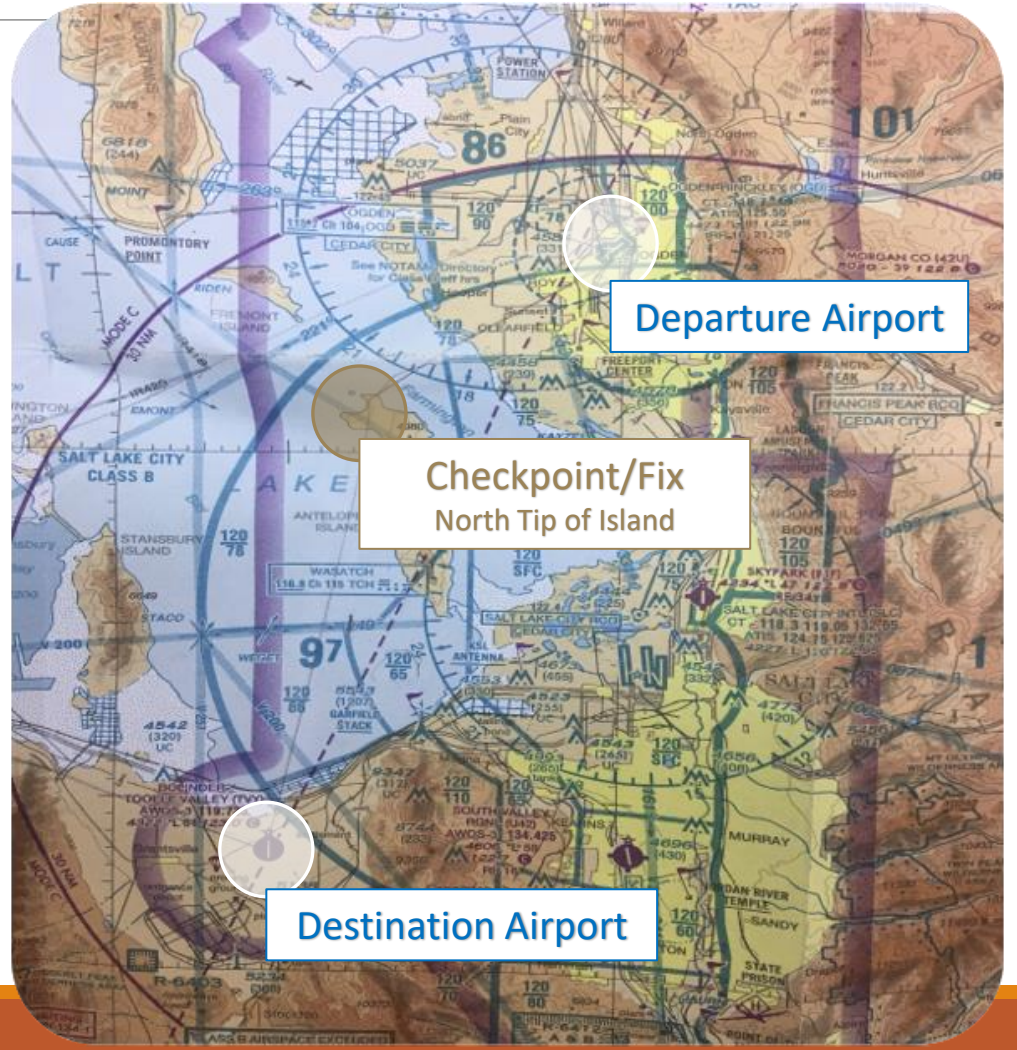

Creating a Flight Plan and Nav Log

Completing the NAV Log

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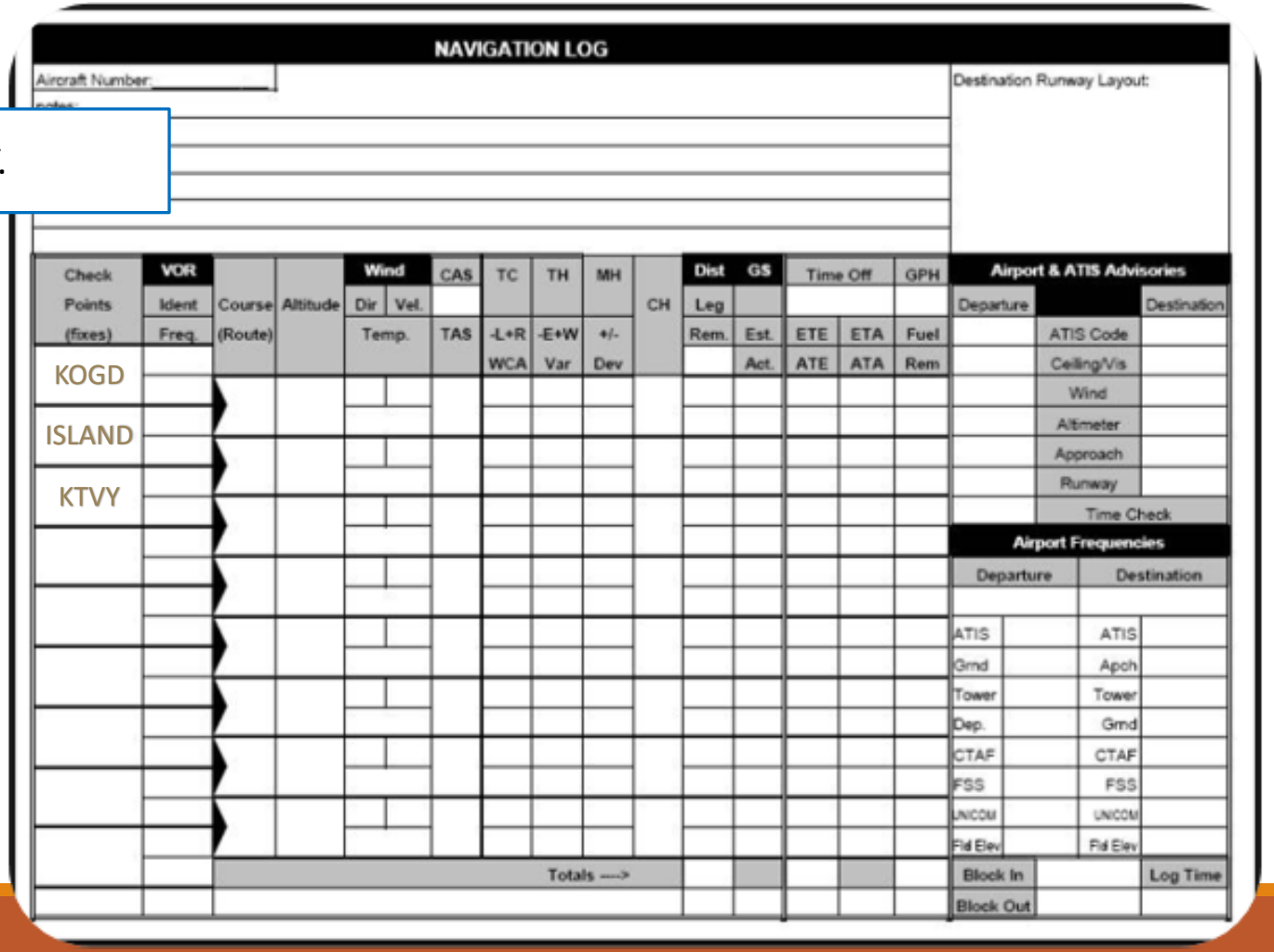


NAVIGATION LOG

Aircraft Number:

Destination Runway Layout:

Check Points (fixes)	VOR Ident / Freq.	Course (Route)	Altitude	Wind Dir / Vel. Temp.	CAS / TAS	TC / -L+R WCA	TH / -E+W Var	MH / +/- Dev	CH	Dist Leg / Rem.	GS Est. / Act.	Time Off	ETE / ATE	ETA / ATA	GPH / Fuel Rem
KOGD															
ISLAND															
KTVY															
		Totals ---->													

Airport & ATIS Advisories		
Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies			
Departure		Destination	
ATIS		ATIS	
Grnd		Apch	
Tower		Tower	
Dep.		Grnd	
CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	

Block In		Log Time
Block Out		

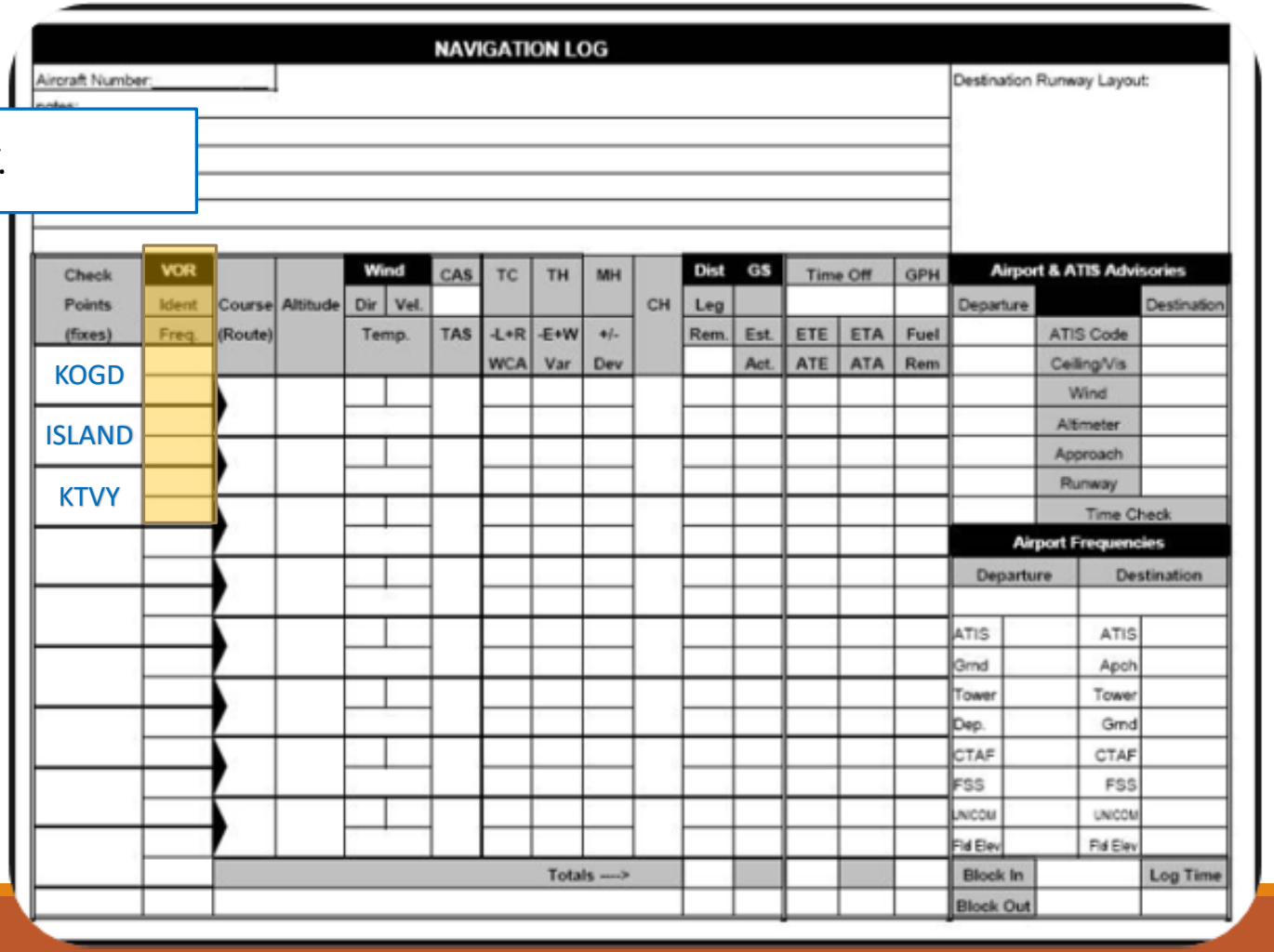
Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Navigation Aids

We can then use the VFR Sectional Chart to select VORs and other navigation aids that would be helpful to us along our route of flight.



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KOGD															
ISLAND															
KTVY															
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Airport & ATIS Advisories		
Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies			
Departure		Destination	
ATIS		ATIS	
Grnd		Apch	
Tower		Tower	
Dep.		Grnd	
CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	

Block In		Log Time
Block Out		

Creating a Flight Plan and Nav Log

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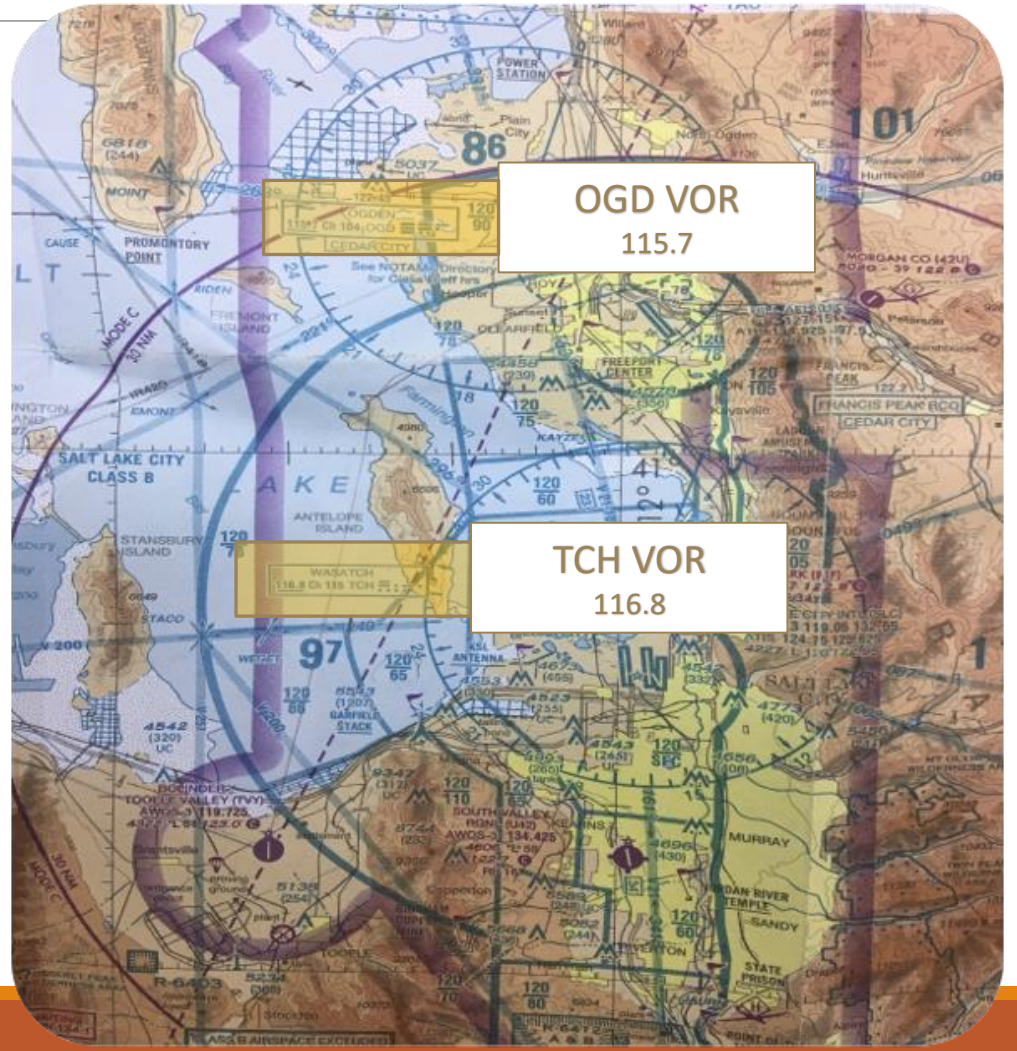

Creating a Flight Plan and Nav Log

Completing the NAV Log

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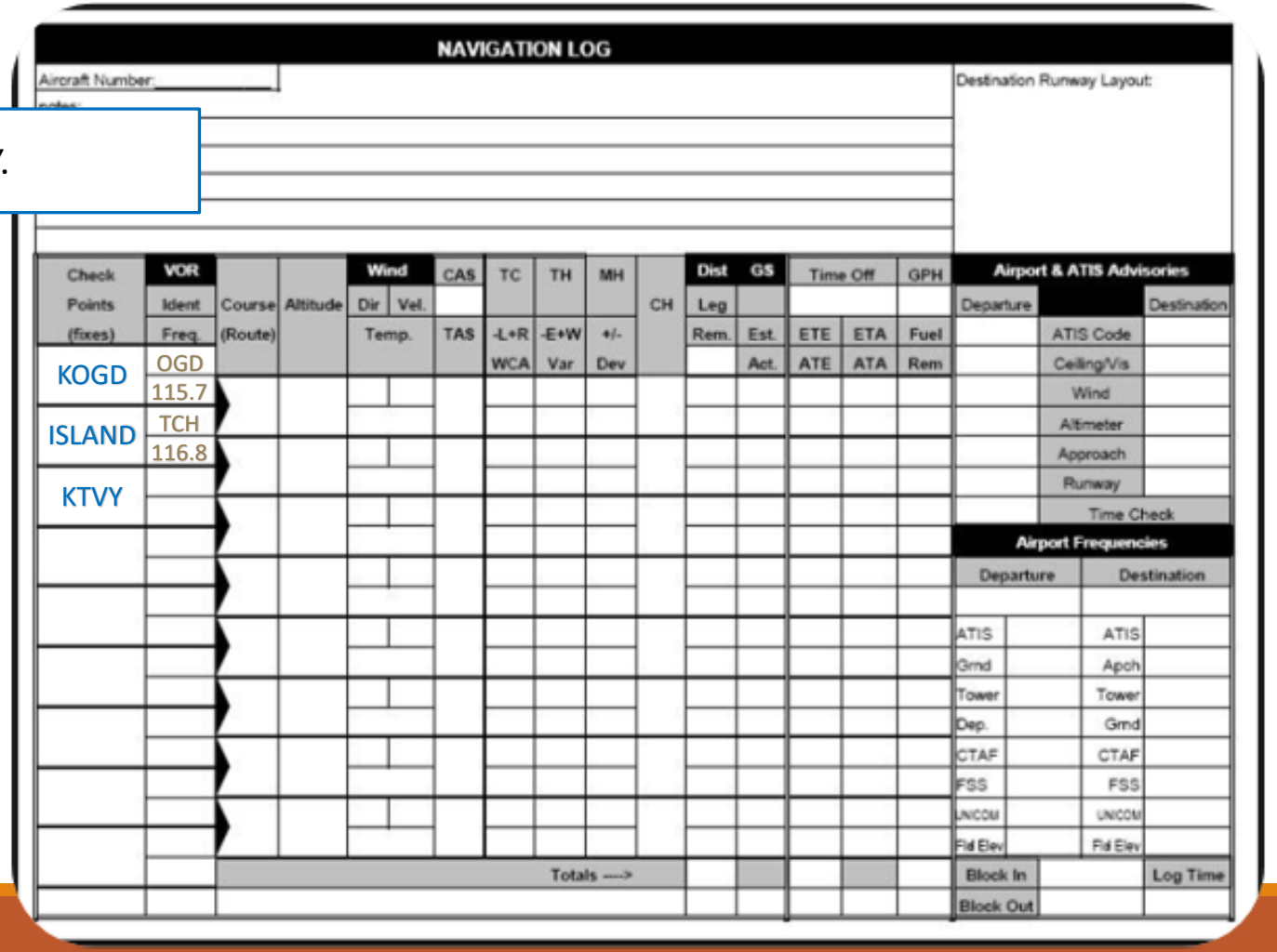

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KOGD	OGD 115.7														
ISLAND	TCH 116.8														
KTVY															
		Totals ---->													

Airport & ATIS Advisories		
Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies			
Departure		Destination	
ATIS		ATIS	
Grnd		Apch	
Tower		Tower	
Dep.		Grnd	
CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	

Block In		Log Time
Block Out		

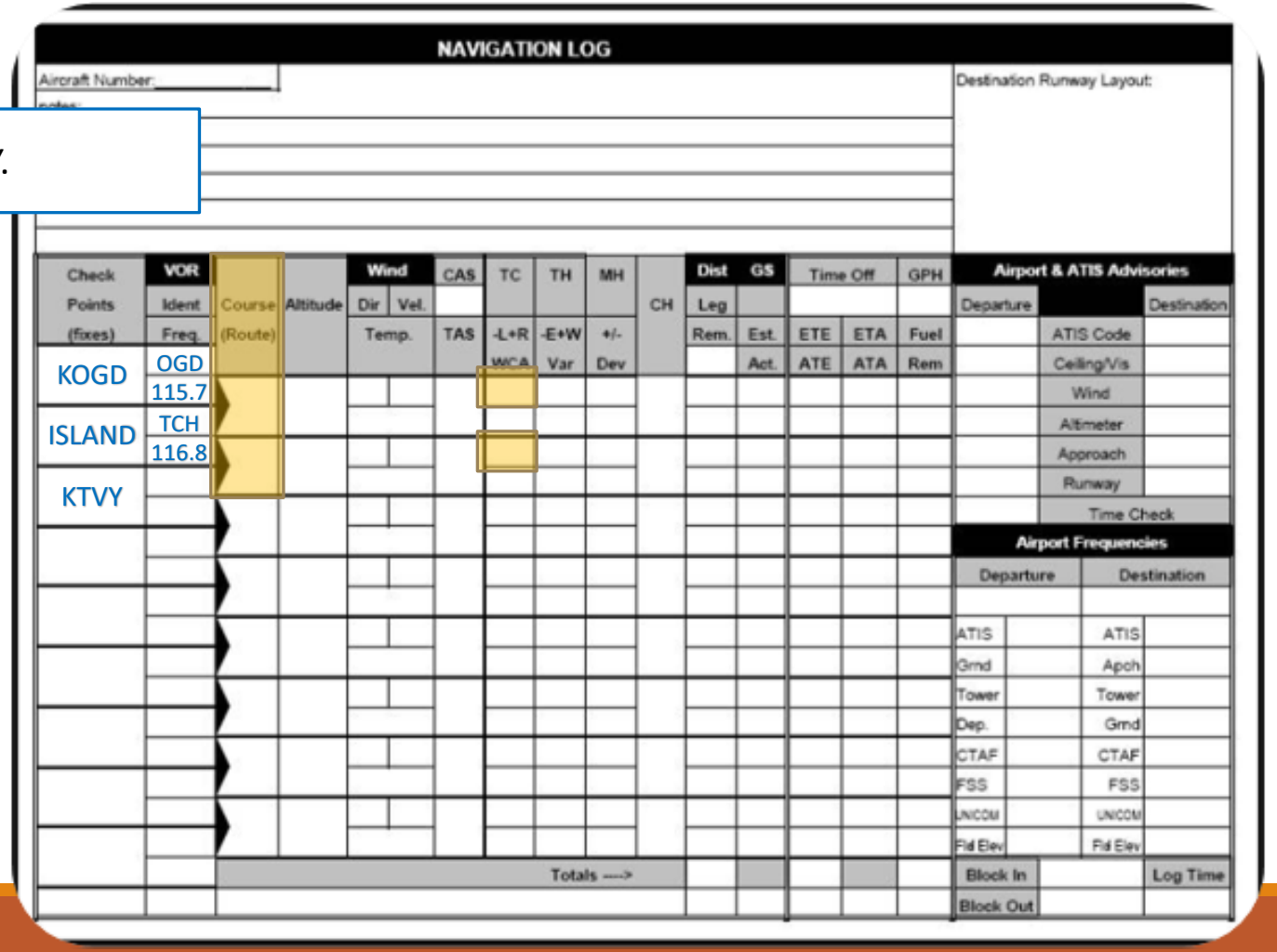
Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Plotting the Course

Next we will use our plotter to draw straight lines between our fixes and plot our True Courses between them.



Creating a Flight Plan and Nav Log

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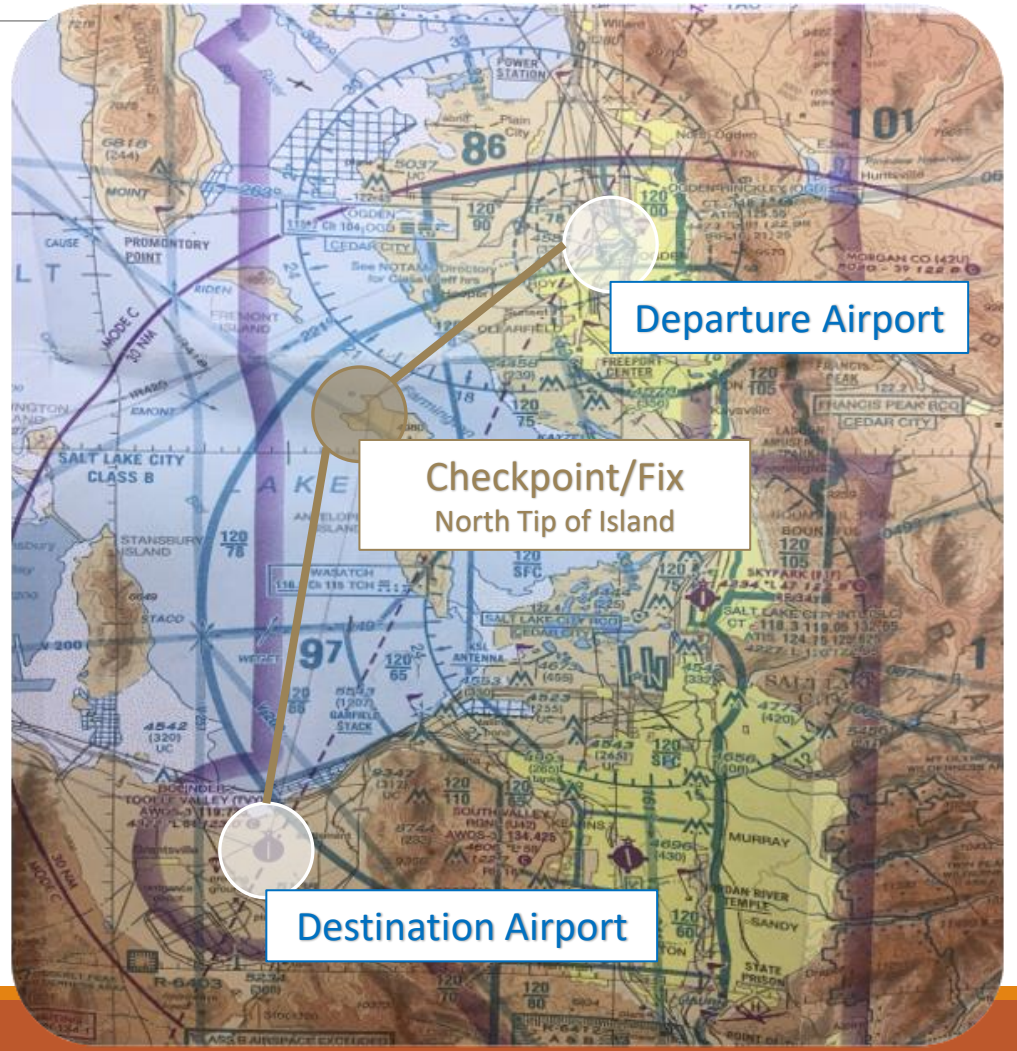


Creating a Flight Plan and Nav Log

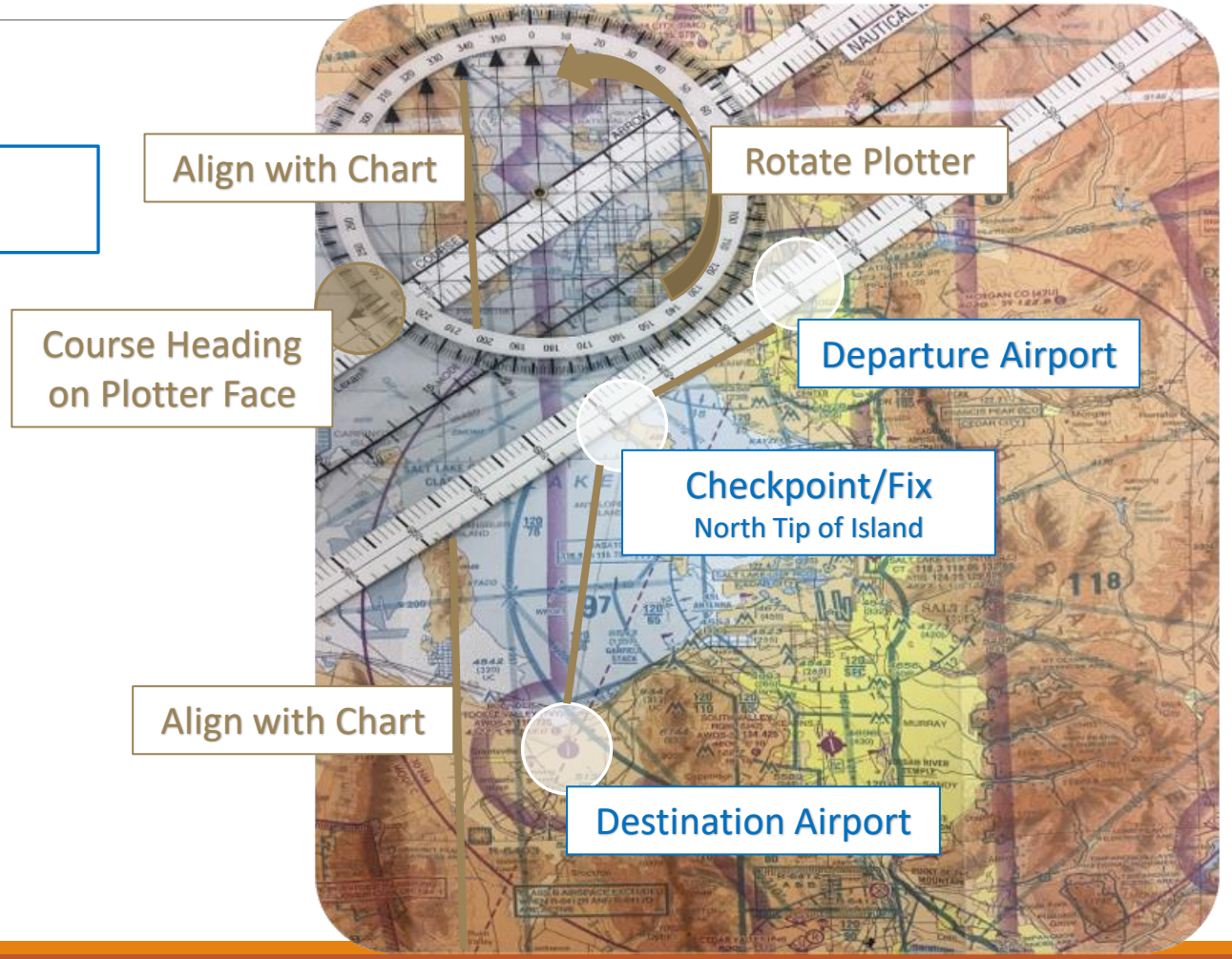
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Plotting the Course

After drawing our course lines, we will use the plotter to determine our course headings.

1. Align the plotter edge with the course line drawn.
2. Rotate the face of the plotter so the arrows parallel the quadrangle lines on the Sectional Chart.
3. The course heading is then read off the plotter face.
4. In this example, the course heading is 233.



Creating a Flight Plan and Nav Log

Completing the NAV Log

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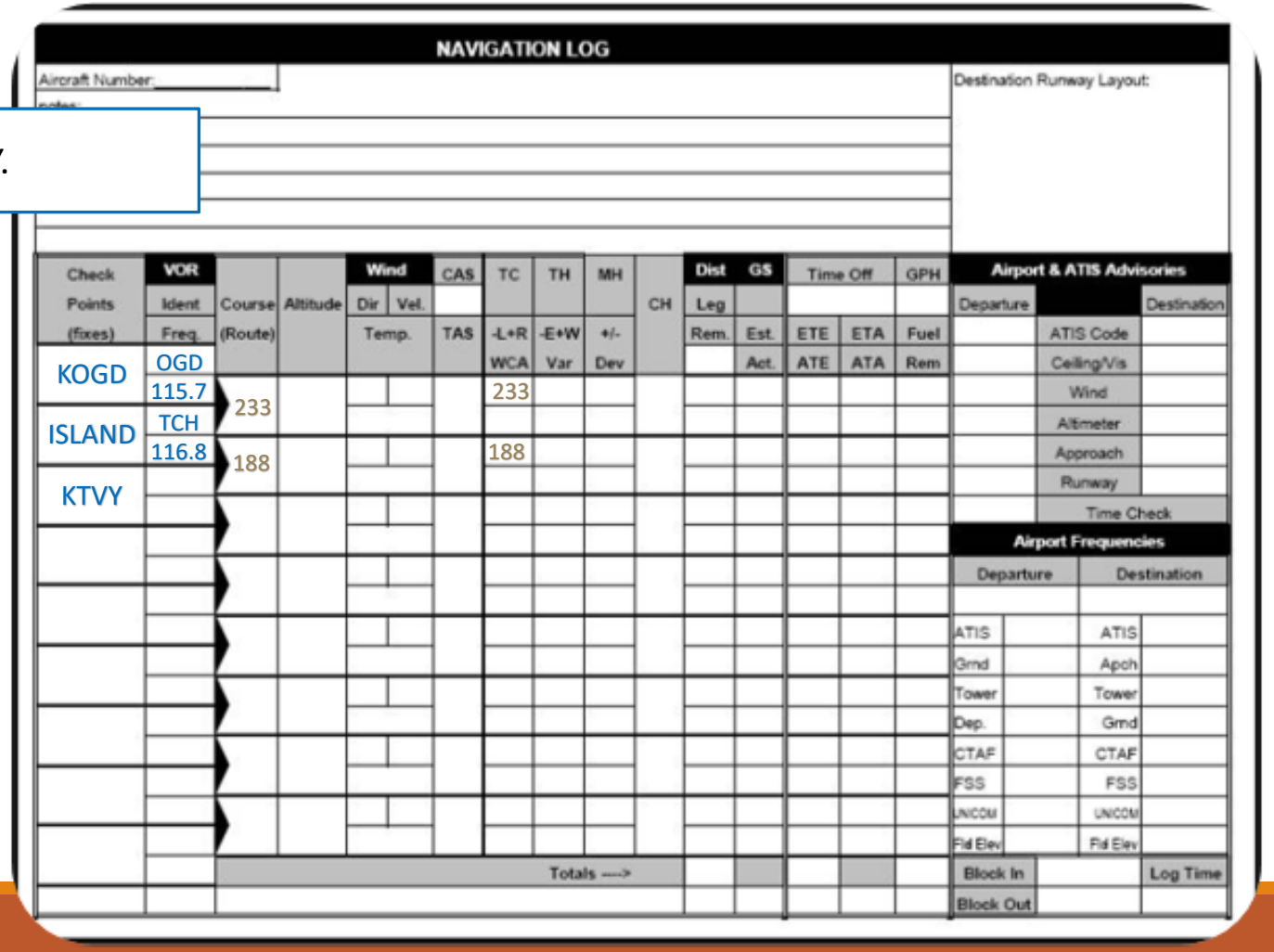

NAVIGATION LOG

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KOGD	OGD 115.7	233				233								
ISLAND	TCH 116.8	188				188								
KTVY														
		Totals ---->												

Airport & ATIS Advisories		
Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies			
Departure		Destination	
ATIS		ATIS	
Grnd		Apch	
Tower		Tower	
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CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	

Block In		Log Time
Block Out		

Creating a Flight Plan and Nav Log

Completing the NAV Log

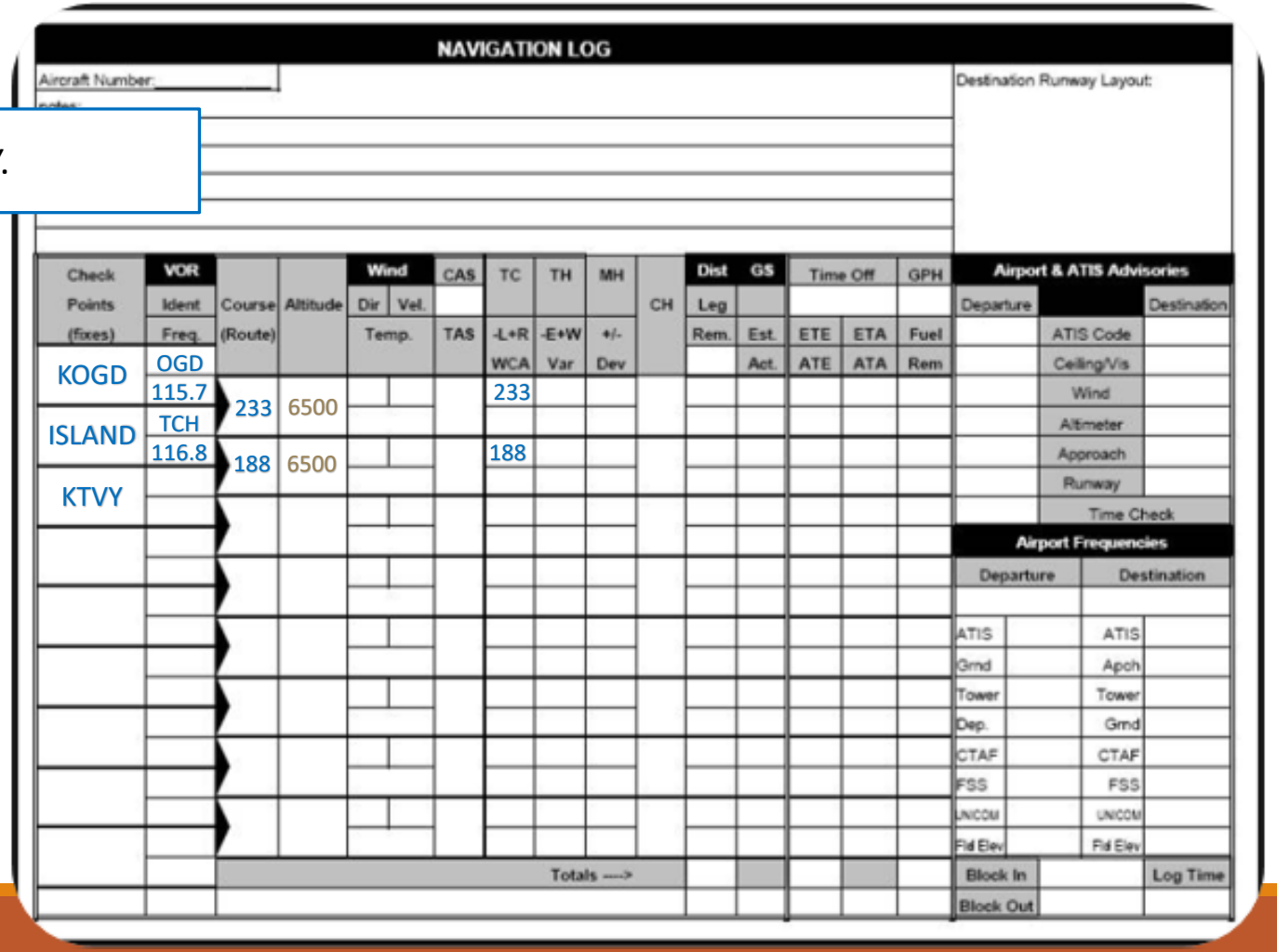
For our example, we will plan a flight from KOGD to KTVY.

Selecting Altitudes

We will then select our cruising altitude(s). We need to pick an altitude that is sufficient to: clear terrain, takes airspace into consideration, and complies with the VFR Cruising Altitude Rules below:

<u>For course headings between:</u>

- 000-179 = Odd Altitudes plus 500’
- 180-359 = Even Altitudes plus 500’



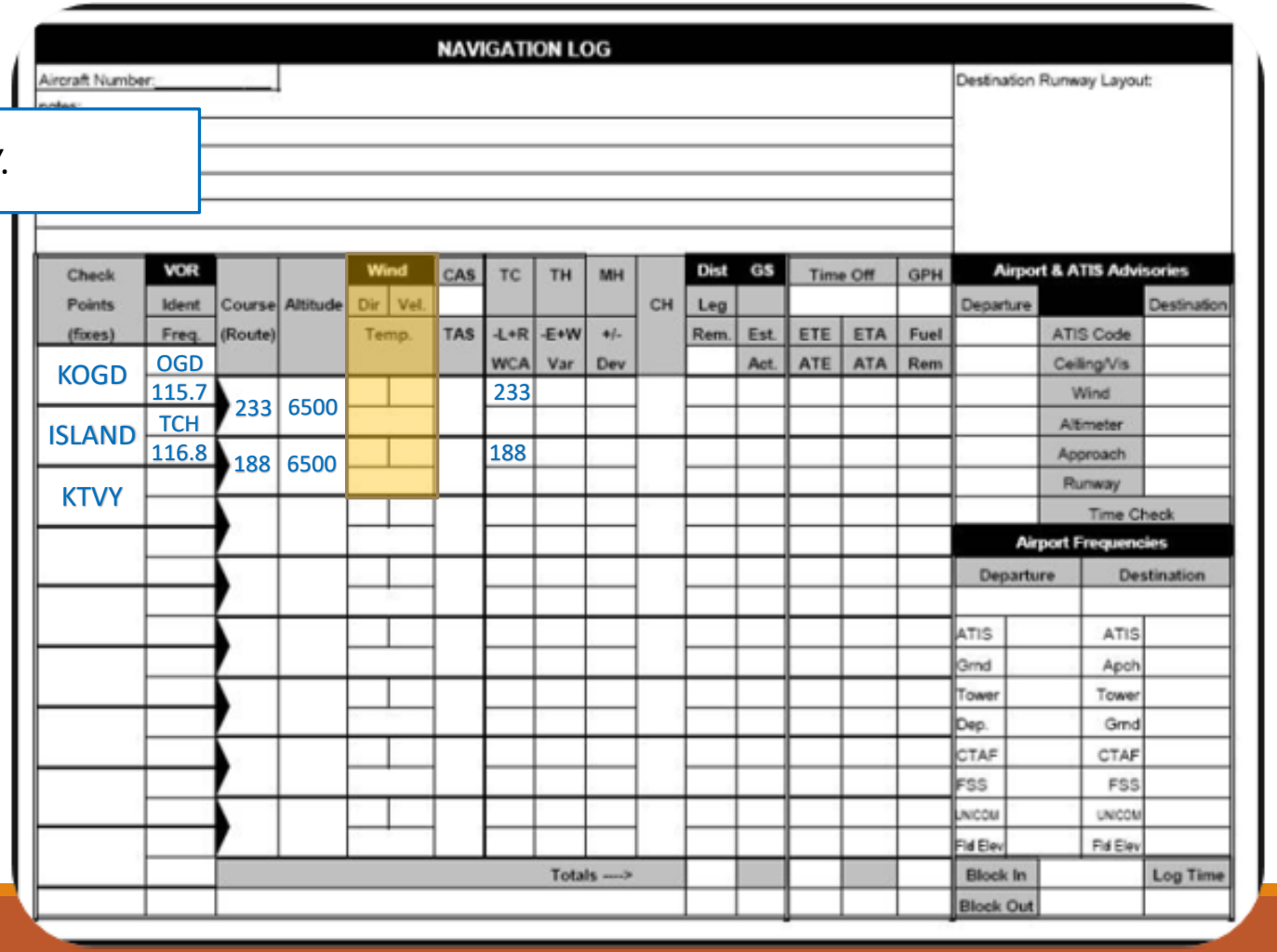
Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Winds and Temperatures Aloft

Now we must figure out the temperatures and wind directions and velocities at our cruising altitudes. There are many different sources in which pilots can find this information but today we are going to use aviationweather.gov.



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KOGD	OGD 115.7	233	6500			233										Departure / Destination
ISLAND	TCH 116.8	188	6500			188										ATIS Code
KTVY																Ceiling/Vis
																Wind
																Altimeter
																Approach
																Runway
																Time Check
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																Departure / Destination
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																UNICOM / UNICOM
																Fld Elev / Fld Elev
		Totals ---->														Block In / Log Time
																Block Out

Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Winds Aloft

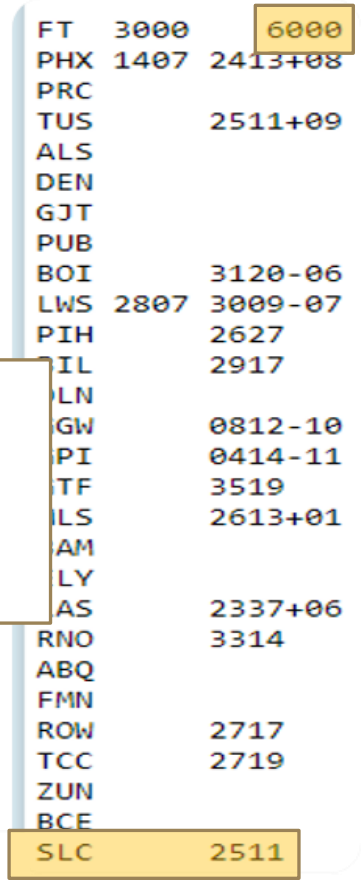
As can be seen from the Winds Aloft report, the winds for today are 250@11 knots. The temperature is omitted because 6,500’ MSL is within 2,000’ of ground level.

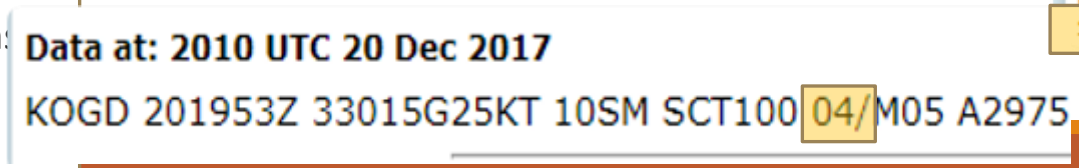
Temperatures Aloft

Because the temperature has been omitted, we will use the temperature from a local reporting station and figure the temperature at our cruising altitude using standard temperature lapse rate.

Temperature Lapse Rate

The temperature at KOGD is 4C and the standard lapse rate is -2C per 1,000’ altitude gain. This means the temp at 6,500’ should be 0C since 6,500’ is 2,000’ AGL.





Creating a Flight Plan and Nav Log

Completing the NAV Log

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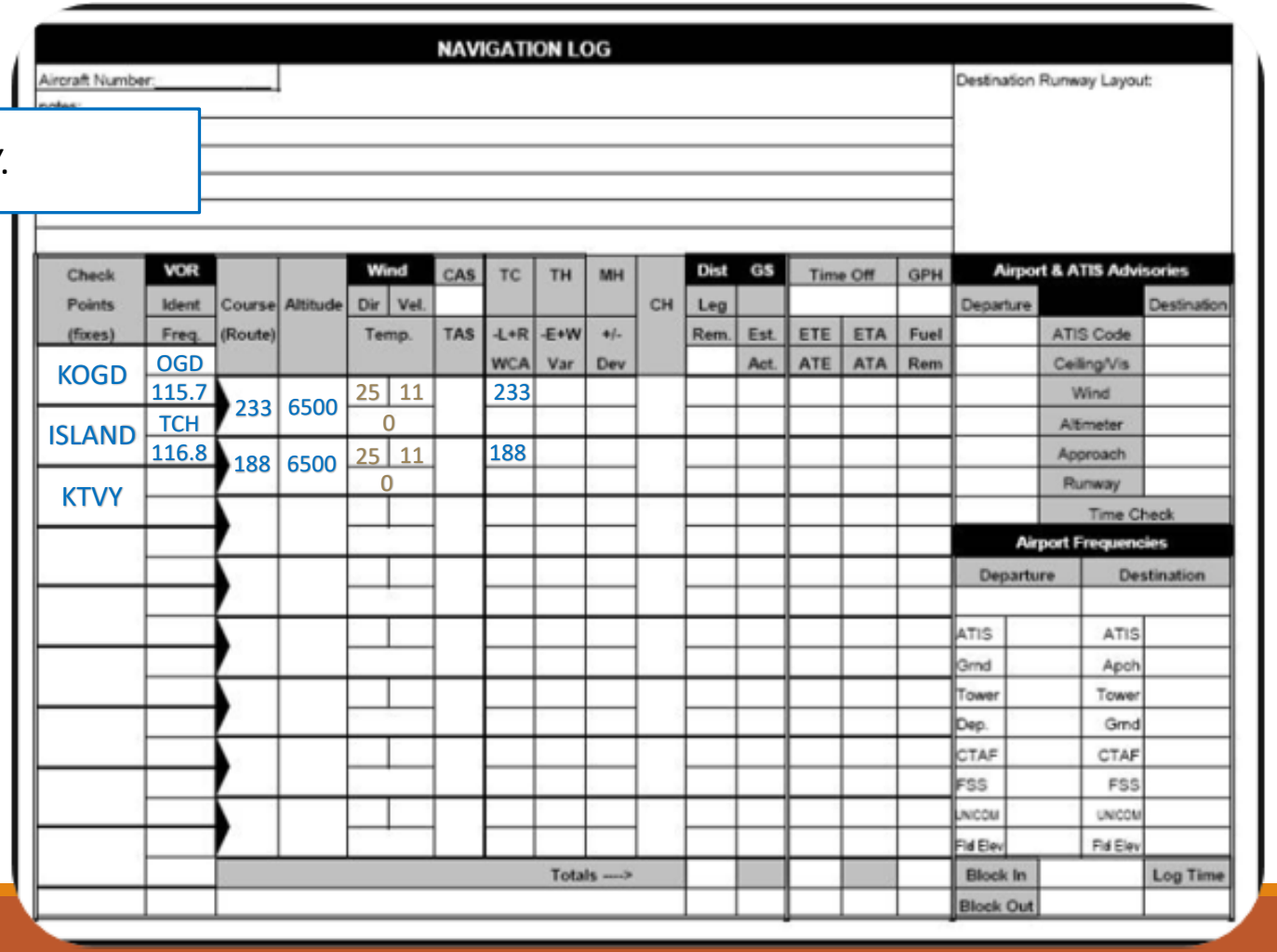
Winds and Temperatures Aloft

Now we must figure out the temperatures and wind directions and velocities at our cruising altitudes. There are many different sources in which pilots can find this information but today we are going to use aviationweather.gov.



NAVIGATION LOG

Aircraft Number:

Destination Runway Layout:

Check Points (fixes)	VOR Ident / Freq.	Course (Route)	Altitude	Wind Dir / Vel. / Temp.	CAS / TAS	TC / -L+R WCA	TH / -E+W Var	MH / +/- Dev	CH	Dist Leg / Rem.	GS Est. / Act.	Time Off	ETE / ATE	ETA / ATA	GPH / Fuel Rem
KOGD	OGD 115.7	233	6500	25 11 0		233									
ISLAND	TCH 116.8	188	6500	25 11 0		188									
KTVY															
		Totals ---->													

Airport & ATIS Advisories		
Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies			
Departure		Destination	
ATIS		ATIS	
Grnd		Apch	
Tower		Tower	
Dep.		Grnd	
CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	
Block In			Log Time
Block Out			

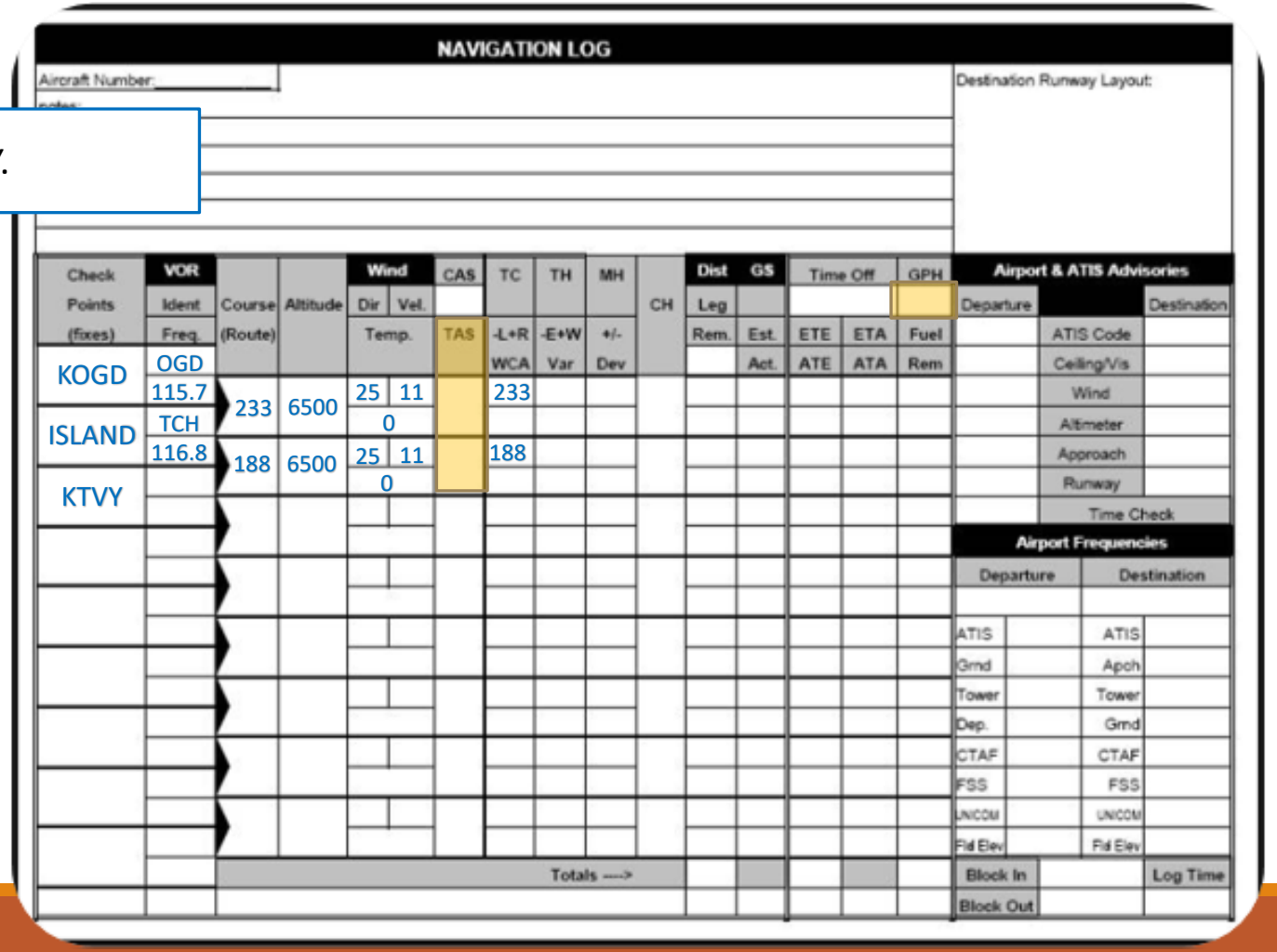
Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring True Airspeed

Now we must figure our True Airspeed. This is done by using the Cruise Performance Chart found in the aircraft's POH. With this chart we will also figure our Fuel Burn in gallons per hour.



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KOGD	OGD 115.7													
	TCH	233	6500	25 11 0		233								
ISLAND	116.8													
		188	6500	25 11 0		188								
KTVY														
		Totals ---->												

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Block In			Log Time
Block Out			

Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring True Airspeed

Today we will use the 6,000’ performance numbers since they are closest to our cruising altitude of 6,500’. We will be cruising at 2300RPM.

Figuring Standard Temperature Deviation

Standard Temperature at Sea Level is 15C and the Standard Lapse Rate is -2C per 1,000’. This means the standard temperature at 6,000’ is 3C. However, we know the temperature is actually 0C, meaning we are 3C colder than standard temperature. With this knowledge, we will select to use the Standard Temperature column as it is closest.

PRESSURE ALTITUDE FT	RPM	20°C BELOW STANDARD TEMP			STANDARD TEMPERATURE			20°C ABOVE STANDARD TEMP		
		% BHP	KTAS	GPH	% BHP	KTAS	GPH	% BHP	KTAS	GPH
2000	2500	- - -	- - -	- - -	75	116	8.4	71	115	7.9
	2400	72	111	8.0	67	111	7.5	63	110	7.1
	2300	64	106	7.1	60	105	6.7	56	105	6.3
	2200	56	101	6.3	53	100	6.1	50	99	5.8
	2100	50	95	5.8	47	94	5.6	45	93	5.4
4000	2550	- - -	- - -	- - -	75	118	8.4	71	118	7.9
	2500	76	116	8.5	71	115	8.0	67	115	7.5
	2400	68	111	7.6	64	110	7.1	60	109	6.7
	2300	60	105	6.8	57	105	6.4	54	104	6.1
	2200	54	100	6.1	51	99	5.9	48	98	5.7
	2100	48	94	5.6	46	93	5.5	44	92	5.3
6000	2600	- - -	- - -	- - -	75	120	8.4	71	120	7.9
	2500	72	116	8.1	67	115	7.6	64	114	7.1
	2400	64	110	7.2	60	109	6.8	57	109	6.4
	2300	57	105	6.5	54	104	6.2	52	103	5.9
	2200	51	99	5.9	49	98	5.7	47	97	5.5
	2100	46	93	5.5	44	92	5.4	42	91	5.2
8000	2650	- - -	- - -	- - -	75	122	8.4	71	122	7.9
	2600	76	120	8.6	71	120	8.0	67	119	7.5
	2500	68	115	7.7	64	114	7.2	60	113	6.8
	2400	61	110	6.9	58	109	6.5	55	108	6.2
	2300	55	104	6.2	52	103	6.0	50	102	5.8
	2200	49	98	5.7	47	97	5.5	45	96	5.4
10,000	2650	76	122	8.5	71	122	8.0	67	121	7.5
	2600	72	120	8.1	68	119	7.6	64	118	7.1
	2500	65	114	7.3	61	114	6.8	58	112	6.5
	2400	58	109	6.5	55	108	6.2	52	107	6.0
	2300	52	103	6.0	50	102	5.8	48	101	5.6
	2200	47	97	5.6	45	96	5.4	44	95	5.3
12,000	2600	68	119	7.7	64	118	7.2	61	117	6.8
	2500	62	114	6.9	58	113	6.5	55	111	6.2
	2400	56	108	6.3	53	107	6.0	51	106	5.8
	2300	50	102	5.8	48	101	5.6	46	100	5.5
	2200	46	96	5.5	44	95	5.4	43	94	5.3

Creating a Flight Plan and Nav Log

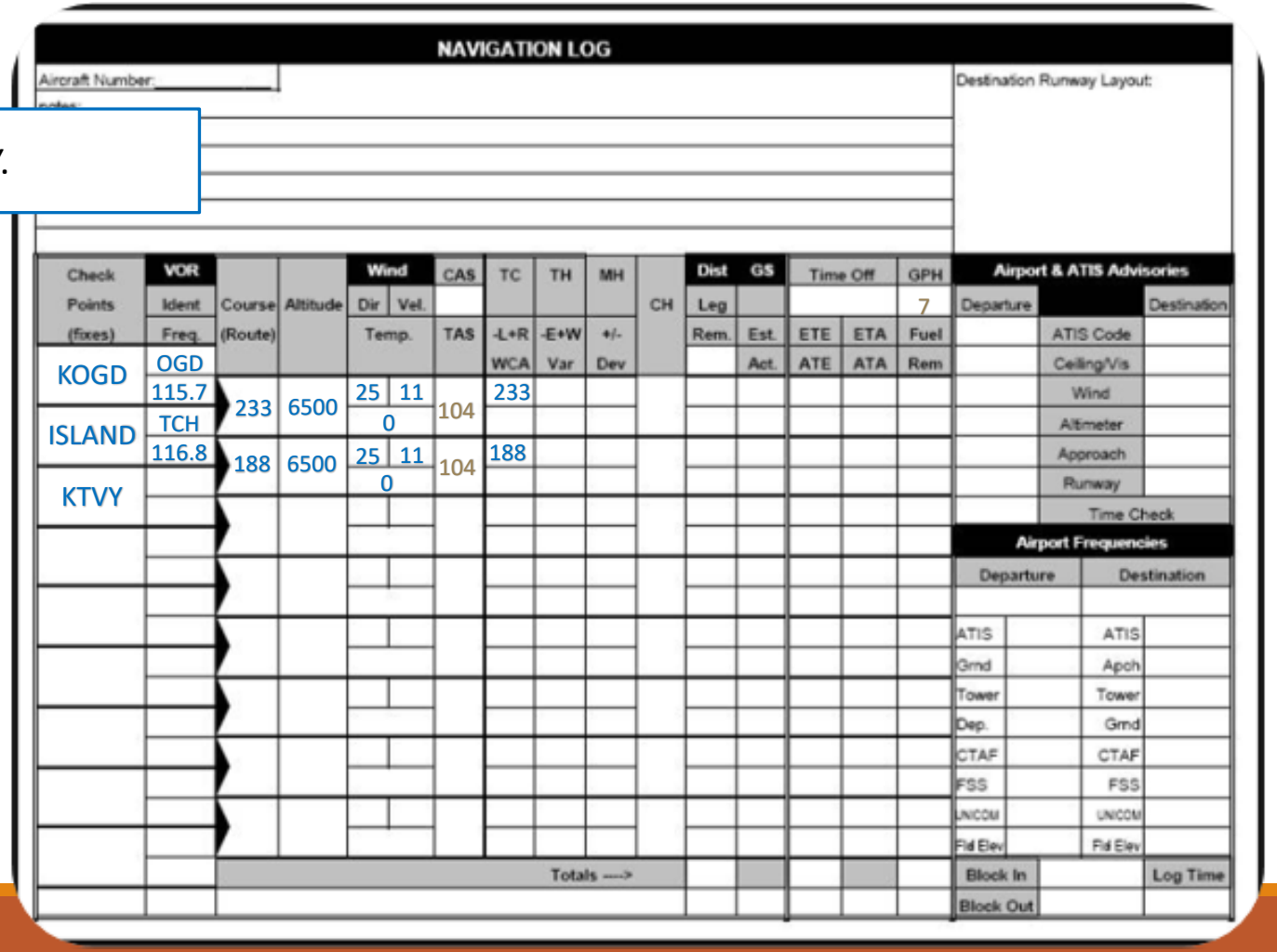
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring True Airspeed

Now we must figure our True Airspeed. This is done by using the Cruise Performance Chart found in the aircraft's POH. With this chart we will also figure our Fuel Burn in gallons per hour.

Notice we have rounded up on our Fuel Burn from 6.2GPH to 7GPH. This is to help us err on the side of caution and to make our fuel burn calculations easier (when we get to that point).



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KOGD	OGD													
	115.7	233	6500	25 11 0	104	233								
ISLAND	TCH													
	116.8	188	6500	25 11 0	104	188								
KTVY														
		Totals ---->												

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	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies			
Departure		Destination	
ATIS		ATIS	
Grnd		Apch	
Tower		Tower	
Dep.		Grnd	
CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	
Block In			Log Time
Block Out			

Creating a Flight Plan and Nav Log

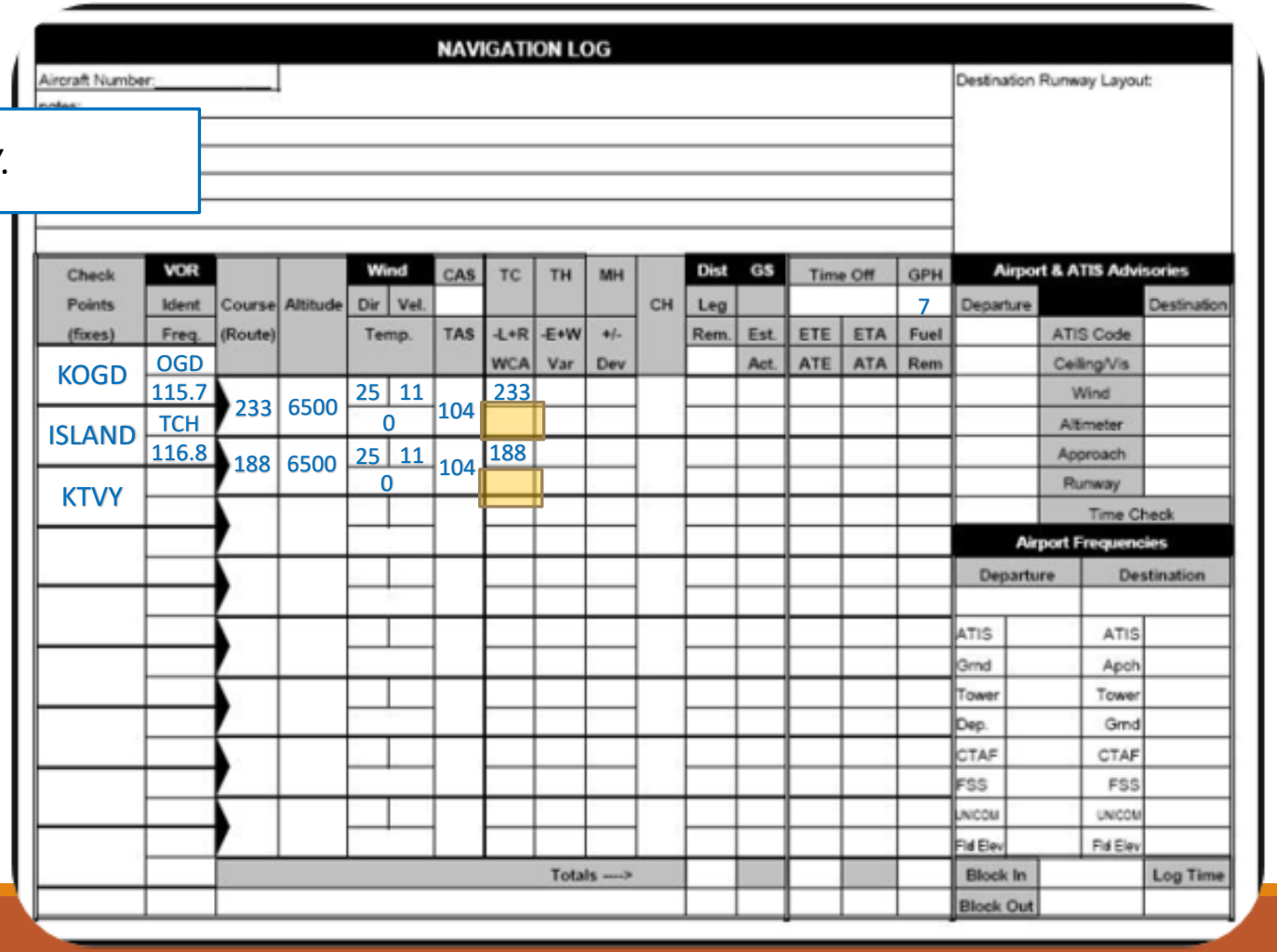
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring True Heading

Now we must figure our True Heading by taking our True Course and correcting it for the wind direction and velocity. This is done using the "back side" of the E6B.

- True Course = Our measured course in relation to True North.
- Wind Correction Angle = The heading corrections we must make for wind direction and velocity to maintain our desired course.



Creating a Flight Plan and Nav Log

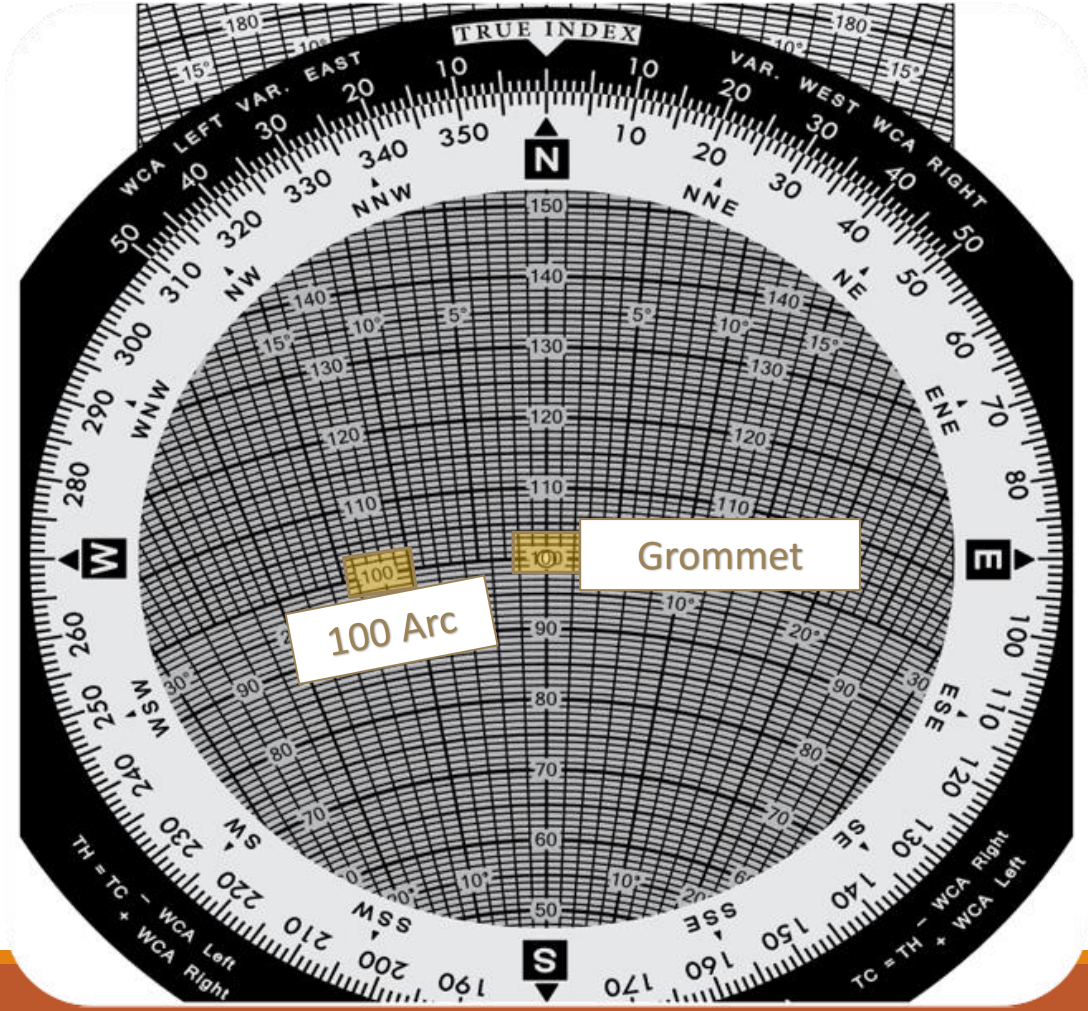
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring True Heading

Using the E6B, Step One:

- Slide the E6B so that the grommet is over the 100 arc line.



Creating a Flight Plan and Nav Log

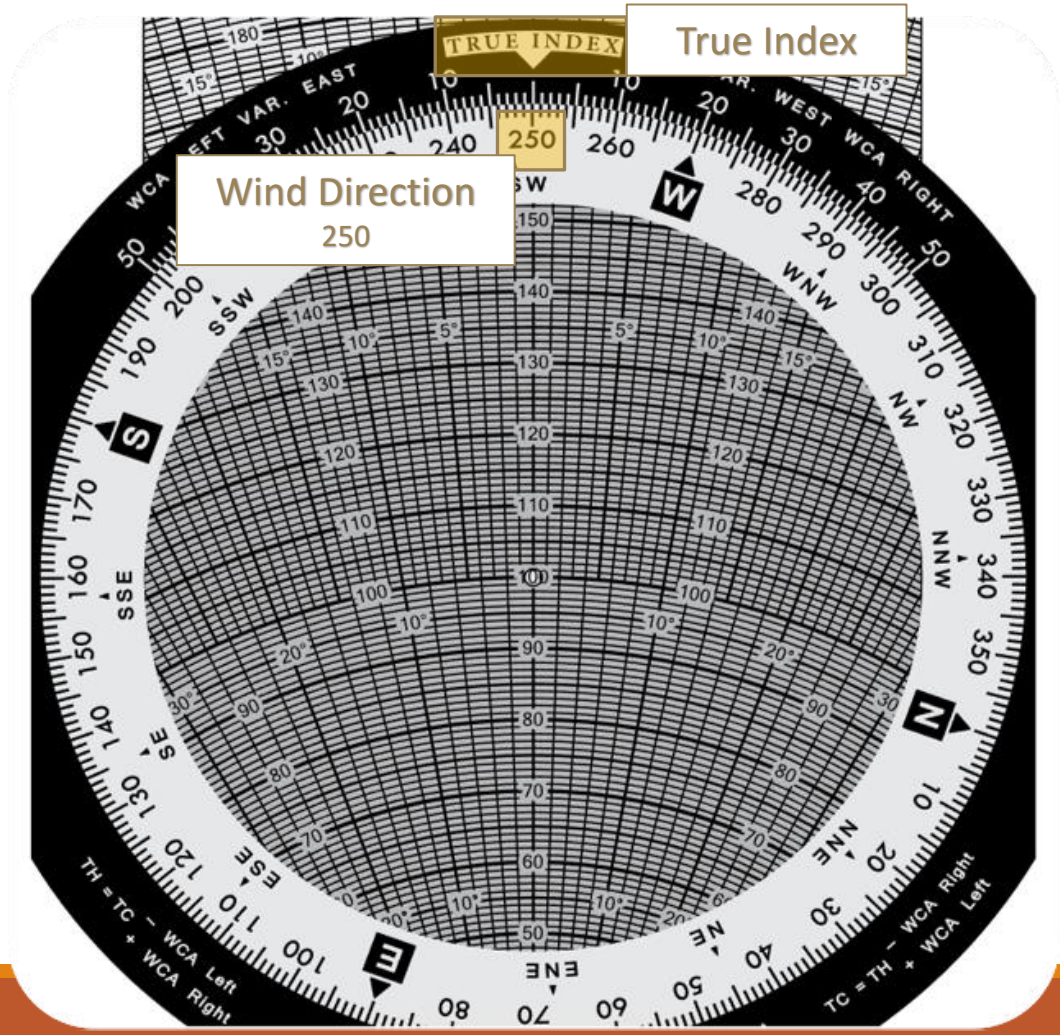
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring True Heading

Using the E6B, Step Two:

- Twist the face to set the wind direction under the True Index Line.



Creating a Flight Plan and Nav Log

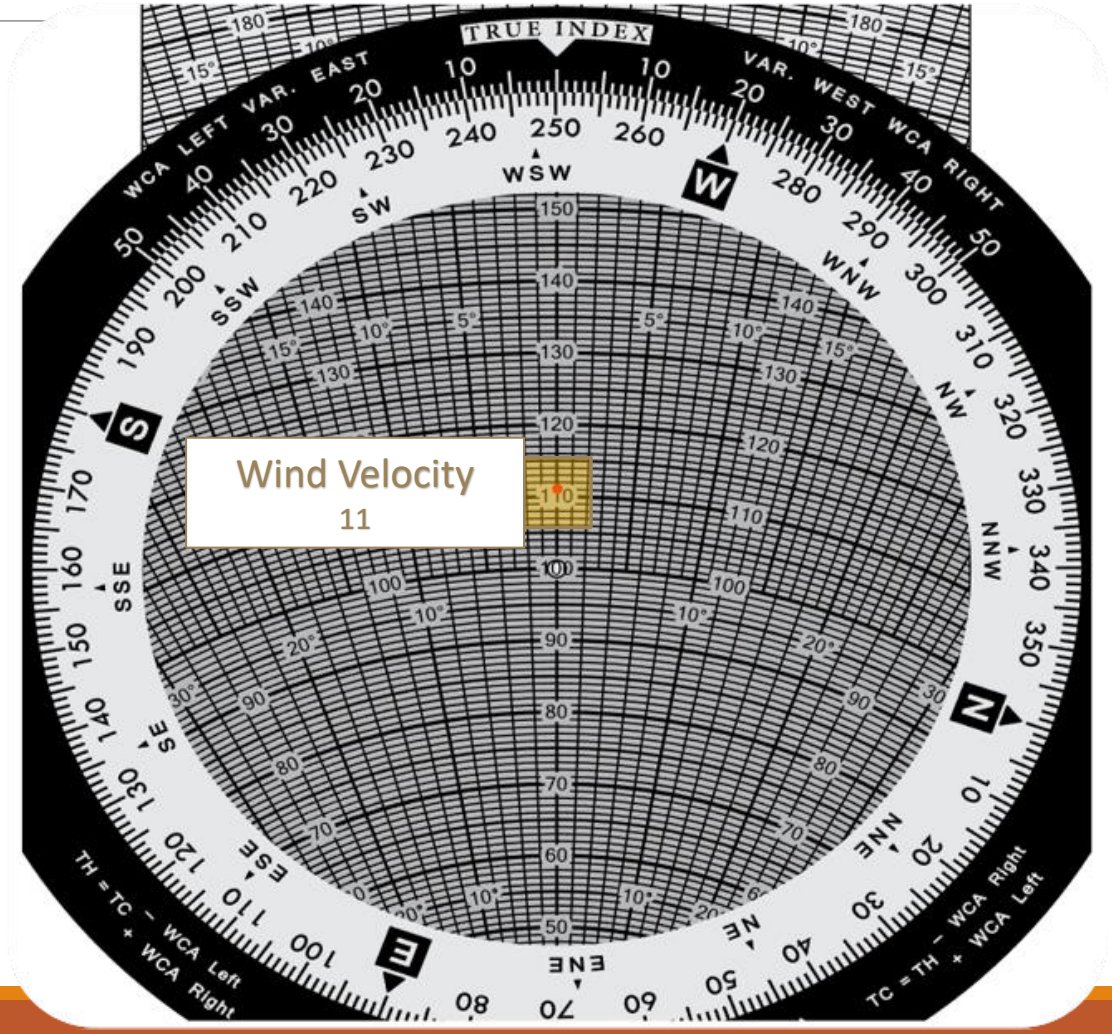
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring True Heading

Using the E6B, Step Three:

- Mark the wind velocity up from the grommet.



Creating a Flight Plan and Nav Log

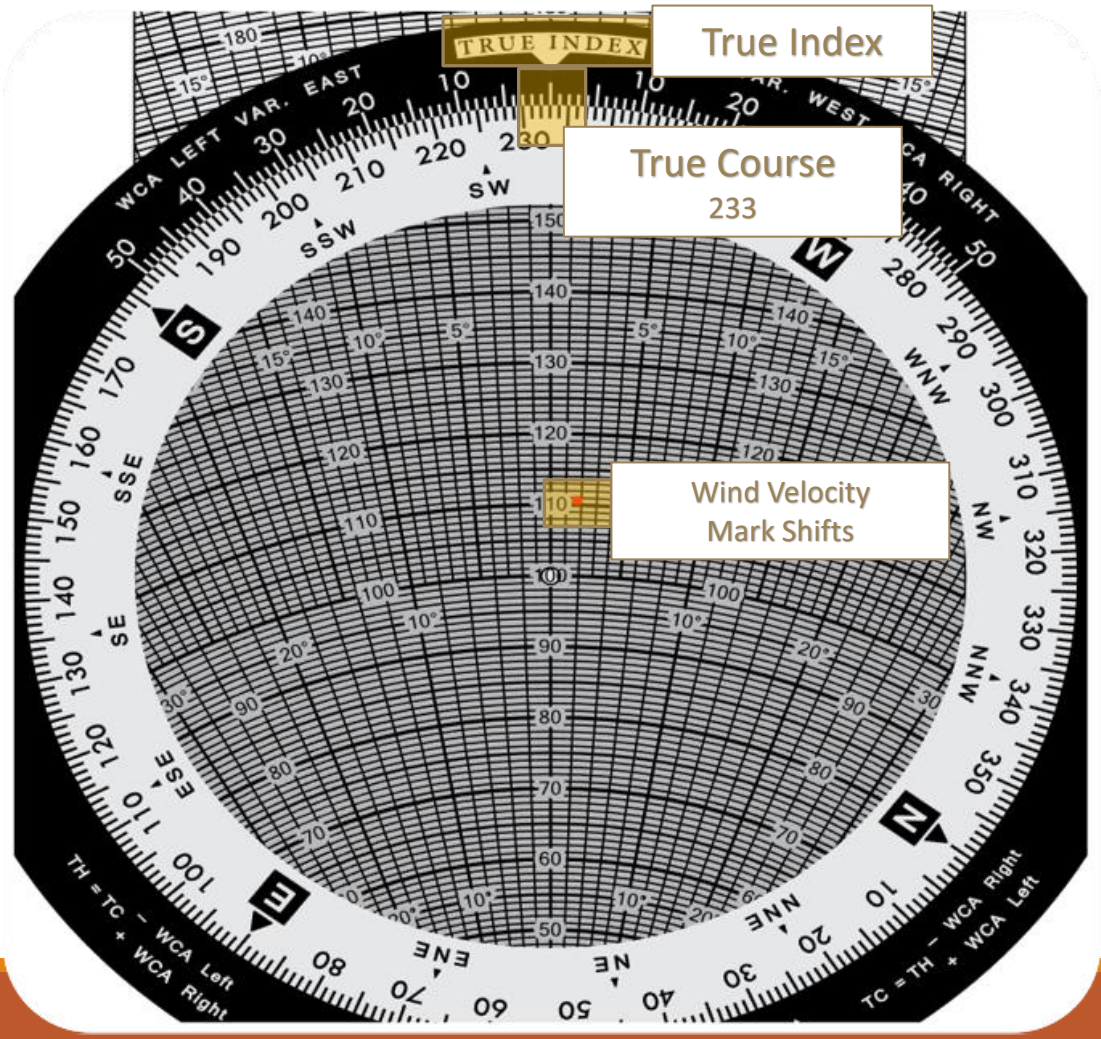
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring True Heading

Using the E6B, Step Four:

- Twist the face to set the True Course under the True Index Line.



Creating a Flight Plan and Nav Log

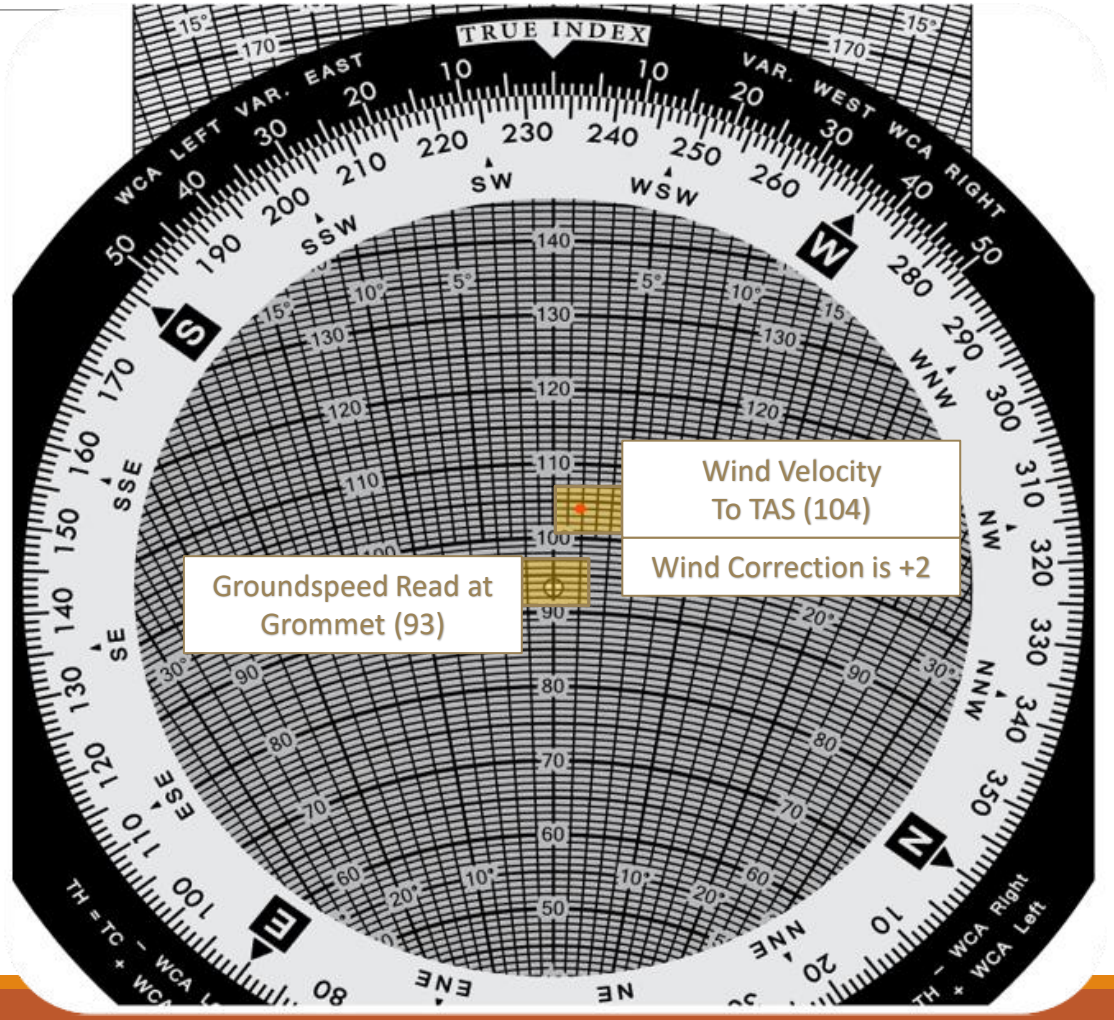
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring True Heading

Using the E6B, Step Five:

- Slide the wind velocity mark to the True Airspeed we calculated earlier.
- Groundspeed then reads under the grommet.
- Wind Correction Angle:
  - If Mark is to the Right of Center:
    - Add Wind Correction to True Course
  - If Mark is to the Left of Center:
    - Subtract Wind Correction



Creating a Flight Plan and Nav Log

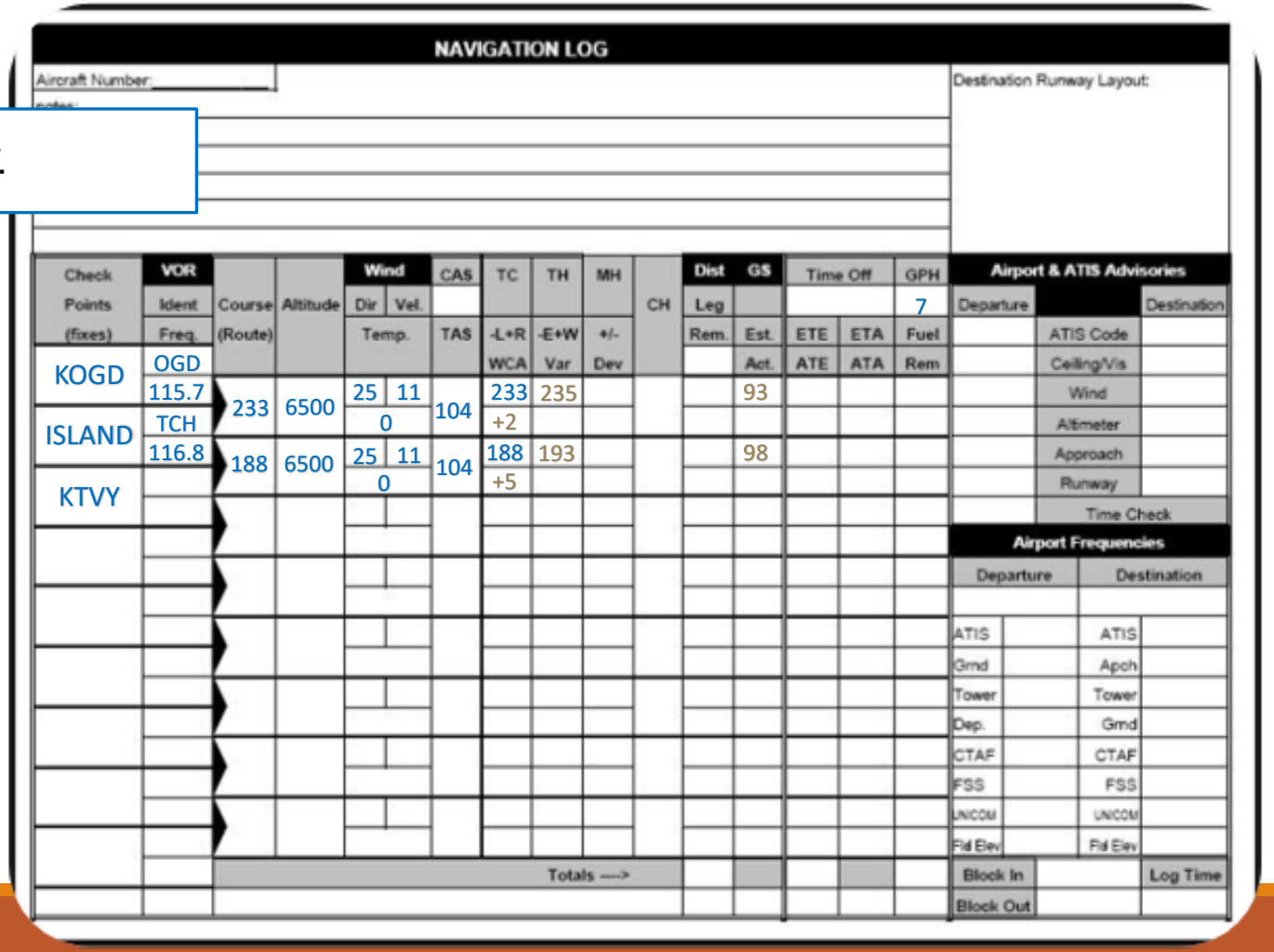
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring True Heading

The next step is simple. We will then add or subtract our wind correction angles from our True Course to obtain our True Headings.

- 233 + 2 = 235
- 188 + 5 = 193



NAVIGATION LOG

Aircraft Number:

Destination Runway Layout:

Check Points (fixes)	VOR Ident / Freq.	Course (Route)	Altitude	Wind Dir / Vel. / Temp.	CAS / TAS	TC / -L+R / WCA	TH / -E+W / Var	MH / +/- / Dev	CH	Dist Leg / Rem.	GS Est. / Act.	Time Off ETE / ETA / ATE / ATA	GPH Fuel / Rem
KOGD	OGD												7
	115.7	233	6500	25 11 0	104	233 +2	235				93		
ISLAND	TCH 116.8	188	6500	25 11 0	104	188 +5	193				98		
KTVY													
		Totals ---->											

Airport & ATIS Advisories		
Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies			
Departure		Destination	
ATIS		ATIS	
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Tower		Tower	
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Fld Elev		Fld Elev	

Block In		Log Time
Block Out		

Creating a Flight Plan and Nav Log

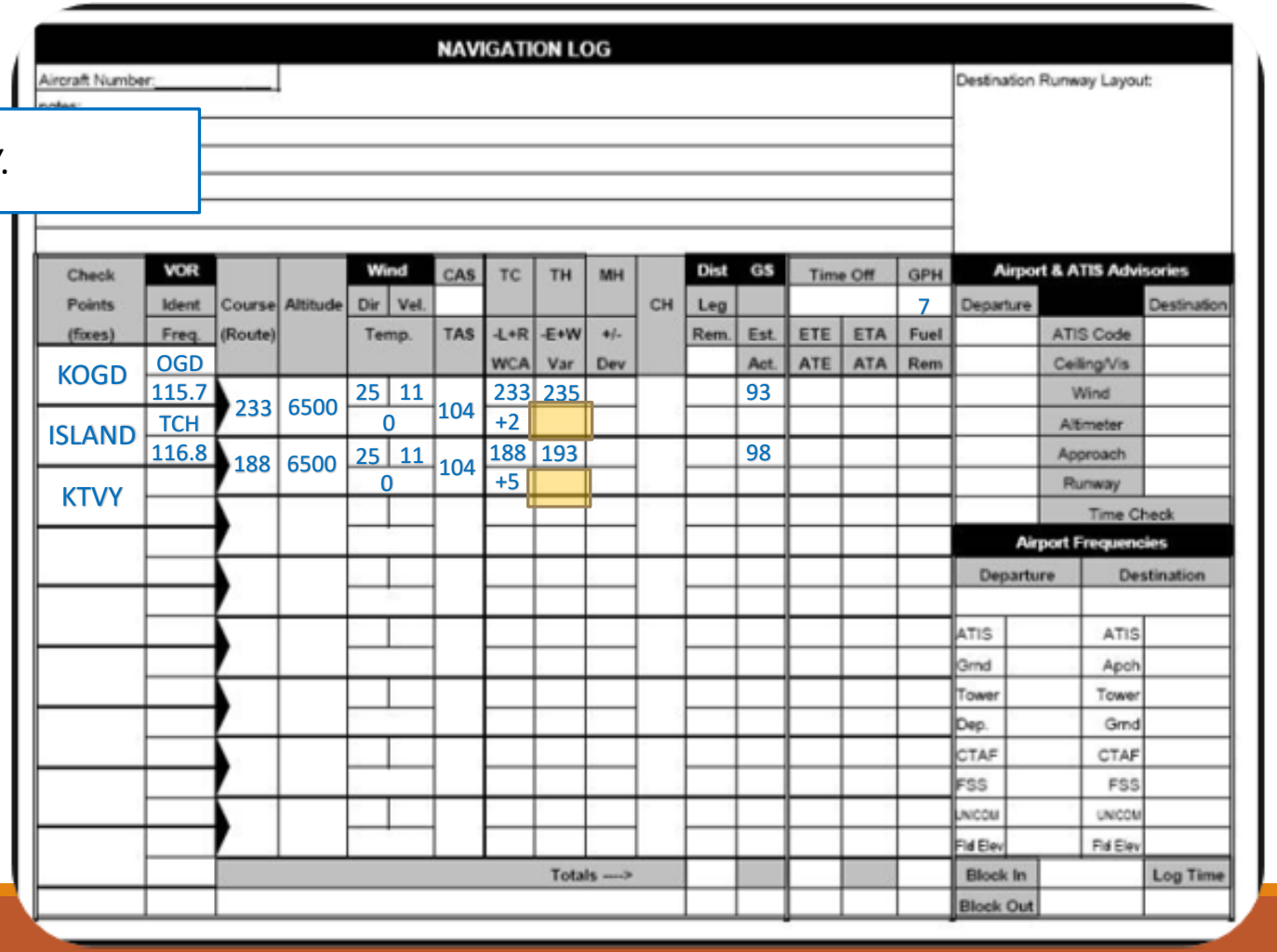
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring Magnetic Heading

We now have a course created in relation to True North (our True Heading). However, as pilots we fly Magnetic Headings. This means we must correct our True Headings to Magnetic Headings using East and West Variation lines on the VFR Sectional Chart.

- East Variation will be subtracted from our TH.
- West Variation will be added to our TH.



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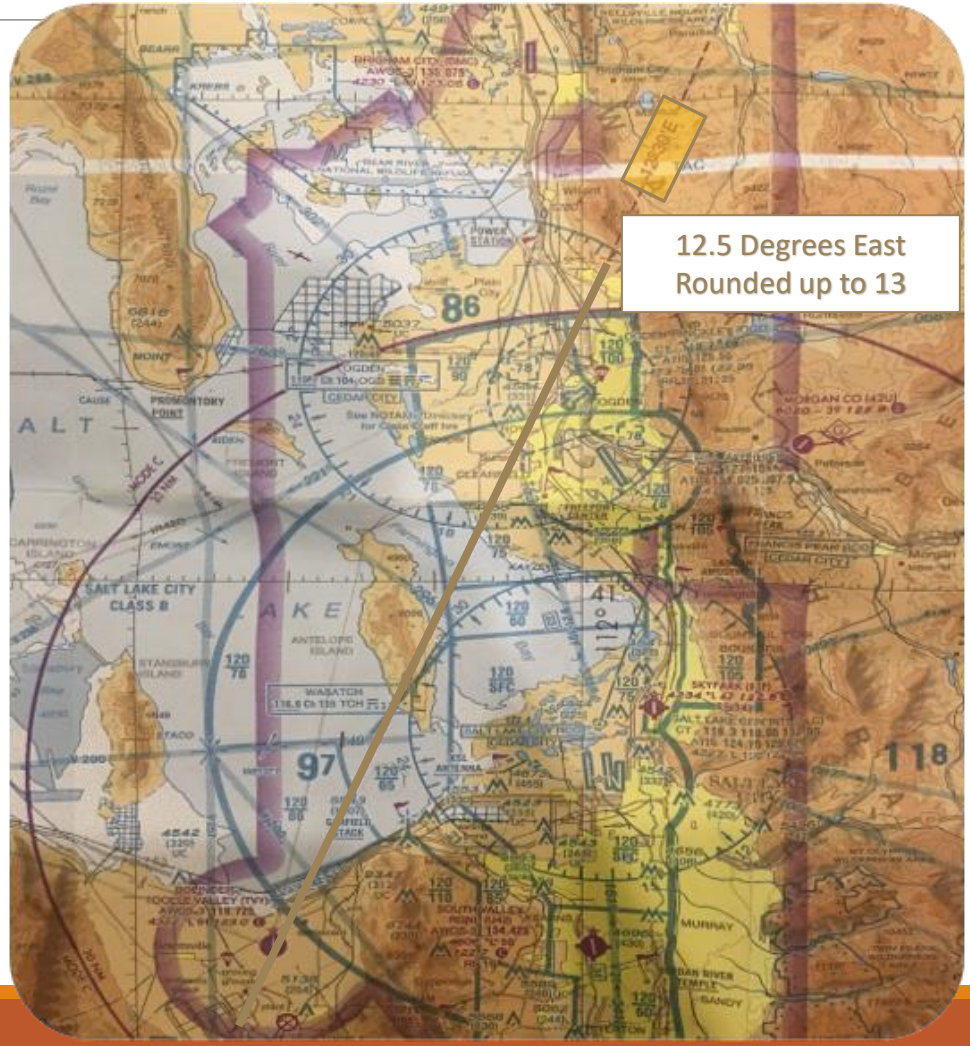

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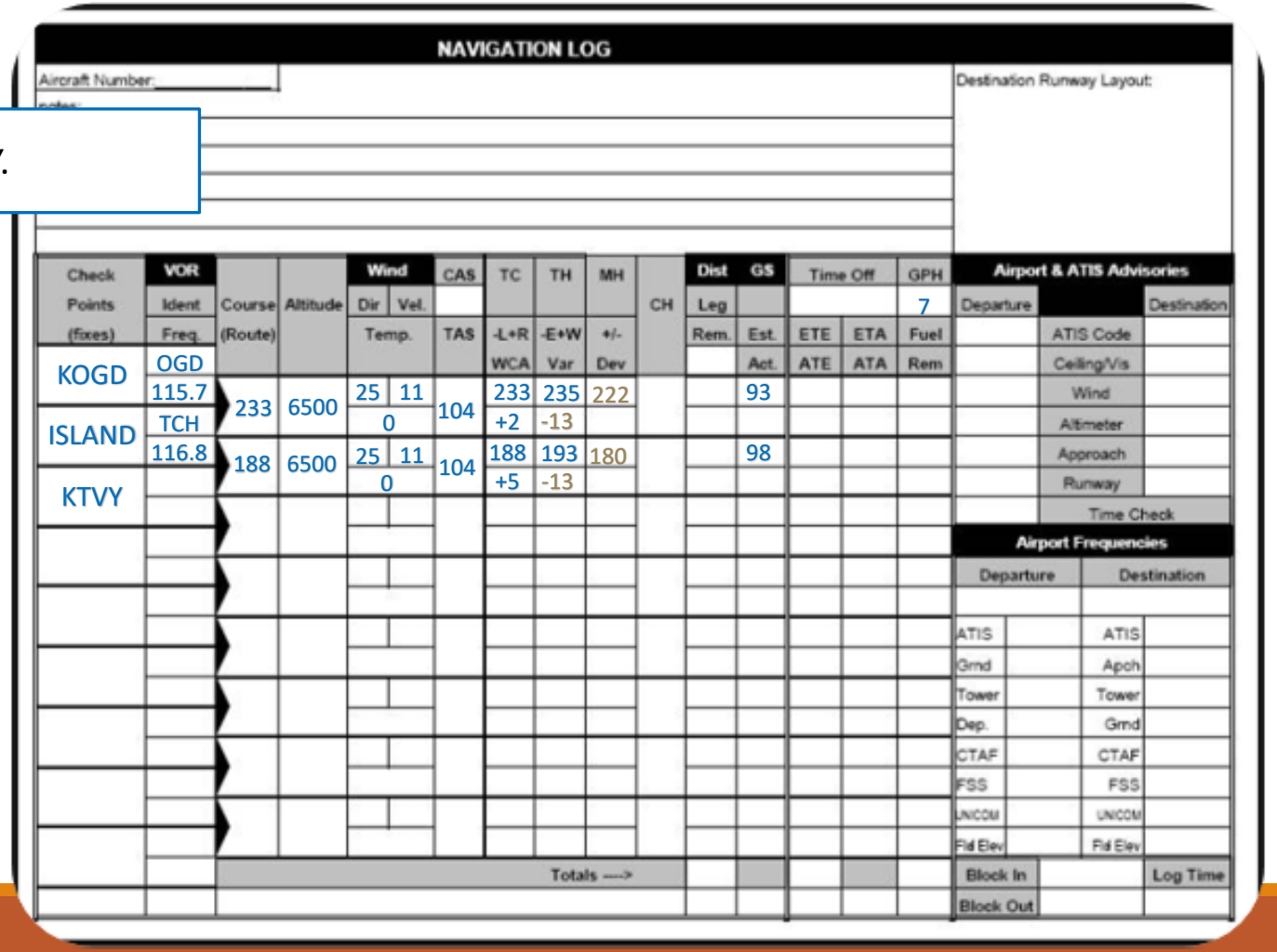

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KOGD	OGD													7
	115.7	233	6500	25 11 0	104	233 +2	235 -13	222			93			
ISLAND	TCH													
	116.8	188	6500	25 11 0	104	188 +5	193 -13	180			98			
KTVY														
		Totals ---->												

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FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	
Block In			Log Time
Block Out			

Creating a Flight Plan and Nav Log

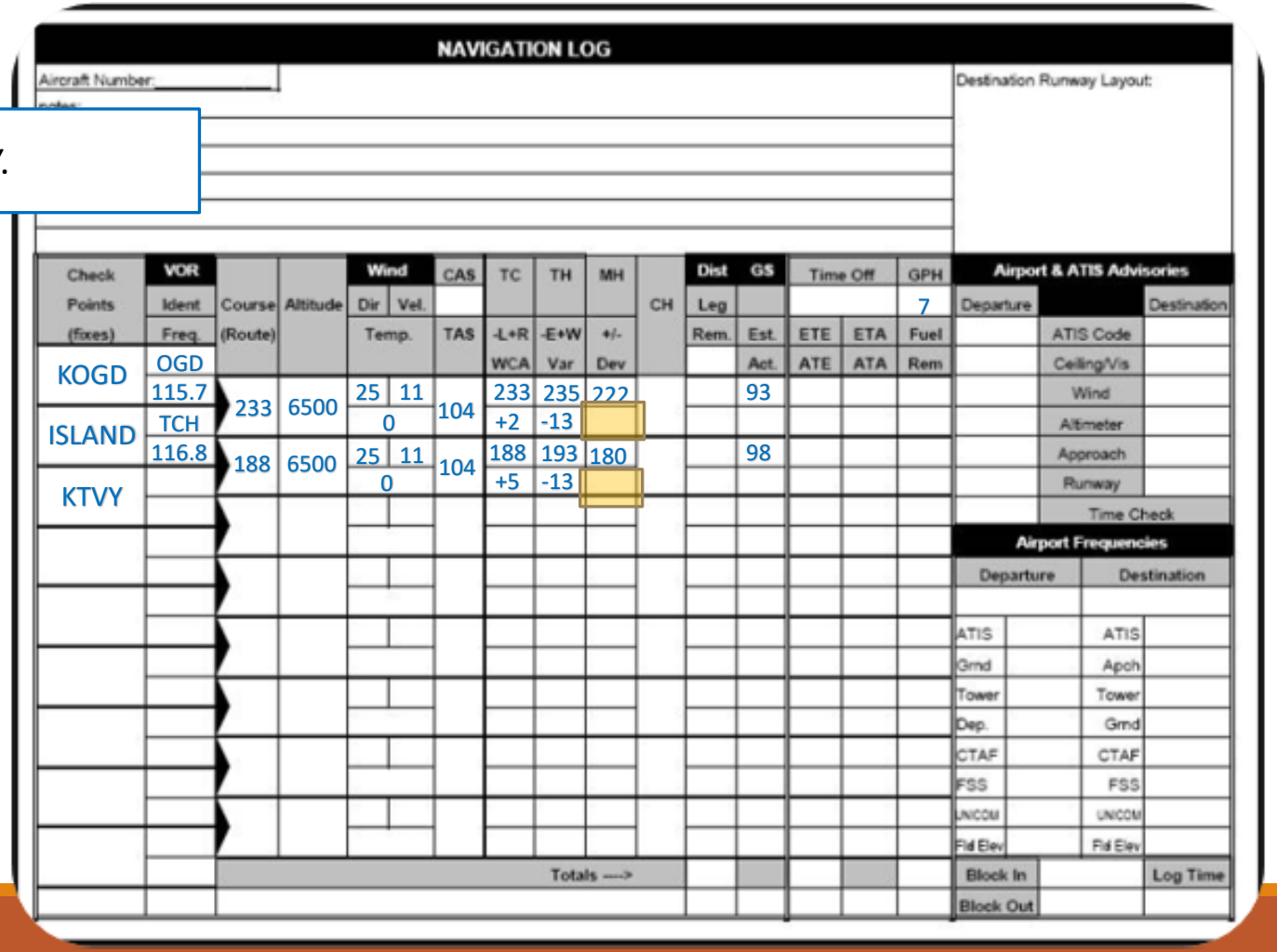
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring Compass Heading

The last course correction we need to make is to get our Compass Heading. This is done by taking our Magnetic Heading and adjusting it for the Magnetic Deviation of our airplane.

- Magnetic Deviation = Varies by airplane and is corrected through the use of the Compass Deviation Card. It is caused by the Electro-Magnetic Fields of the aircraft.



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KOGD	OGD													7
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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

Creating a Flight Plan and Nav Log

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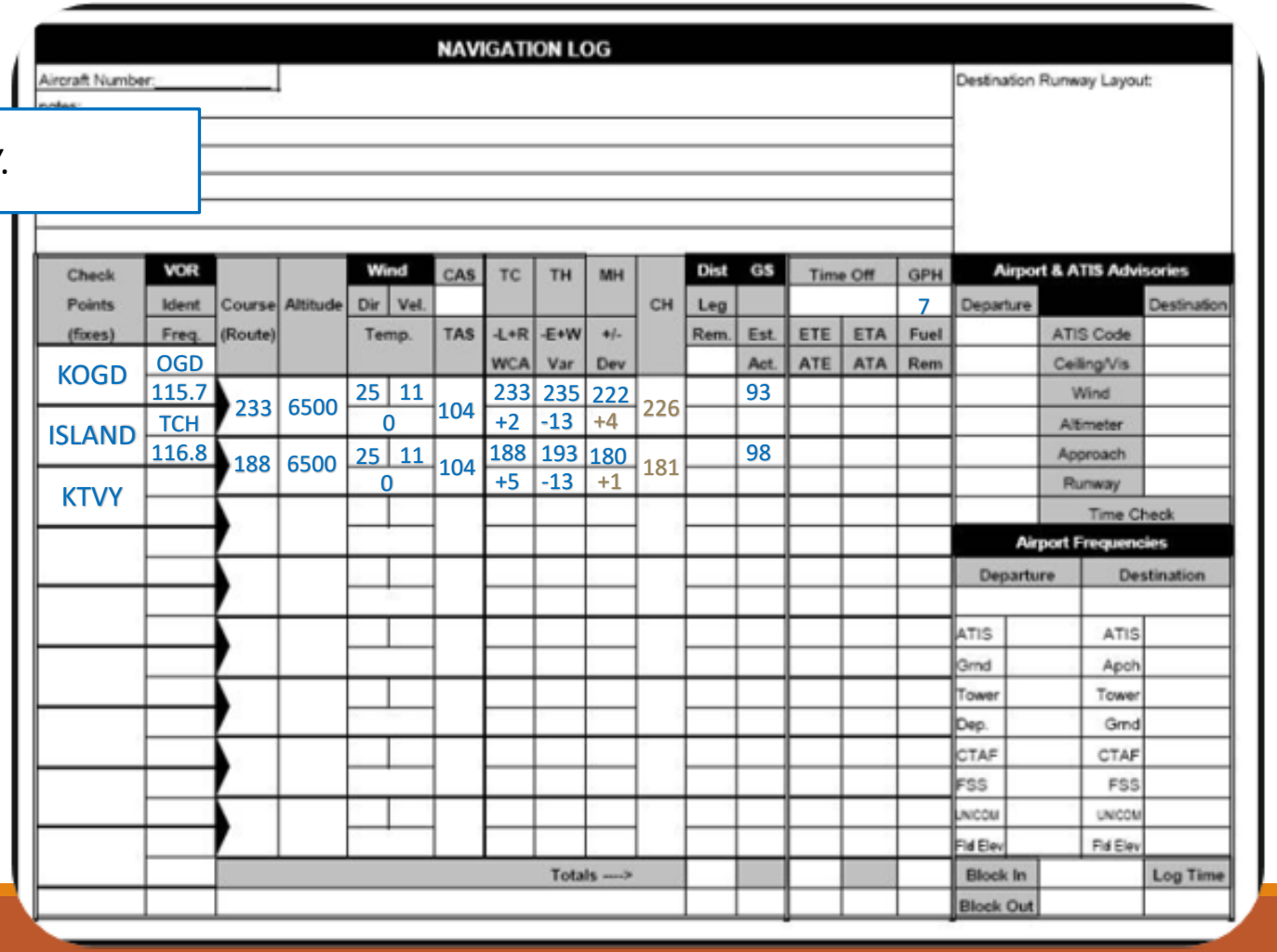

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KOGD	OGD													7
	115.7	233	6500	25 11 0	104	233 +2	235 -13	222 +4	226		93			
ISLAND	TCH													
	116.8	188	6500	25 11 0	104	188 +5	193 -13	180 +1	181		98			
KTVY														
		Totals ---->												

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CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	

Block In		Log Time
Block Out		

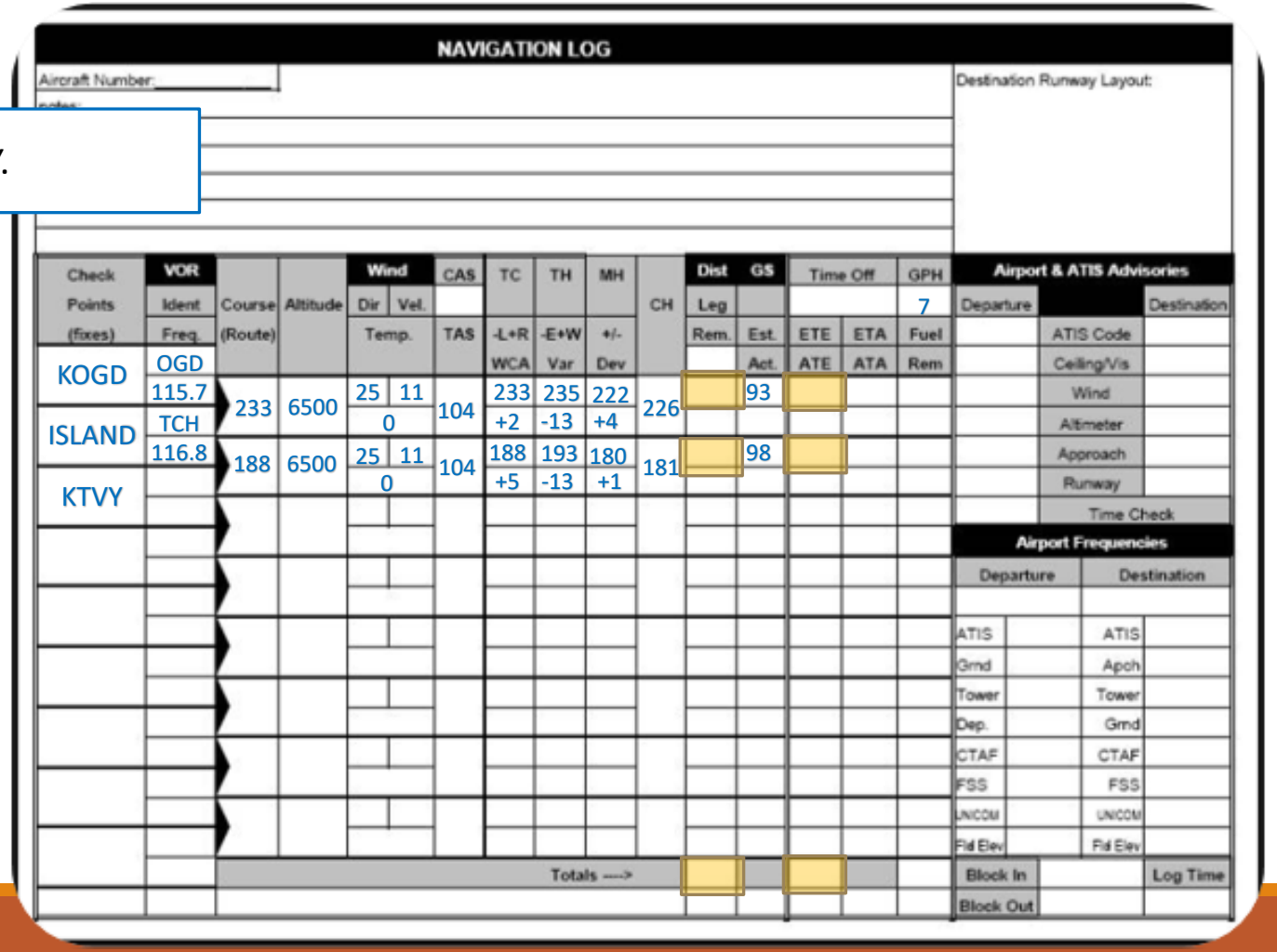
Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Time and Distance

Now that our course corrections are finished, we must make our time and distance calculations. First, we will measure the distances between our fixes (using the plotter) and then we will use the “Front Side” of the E6B to figure our time calculations.



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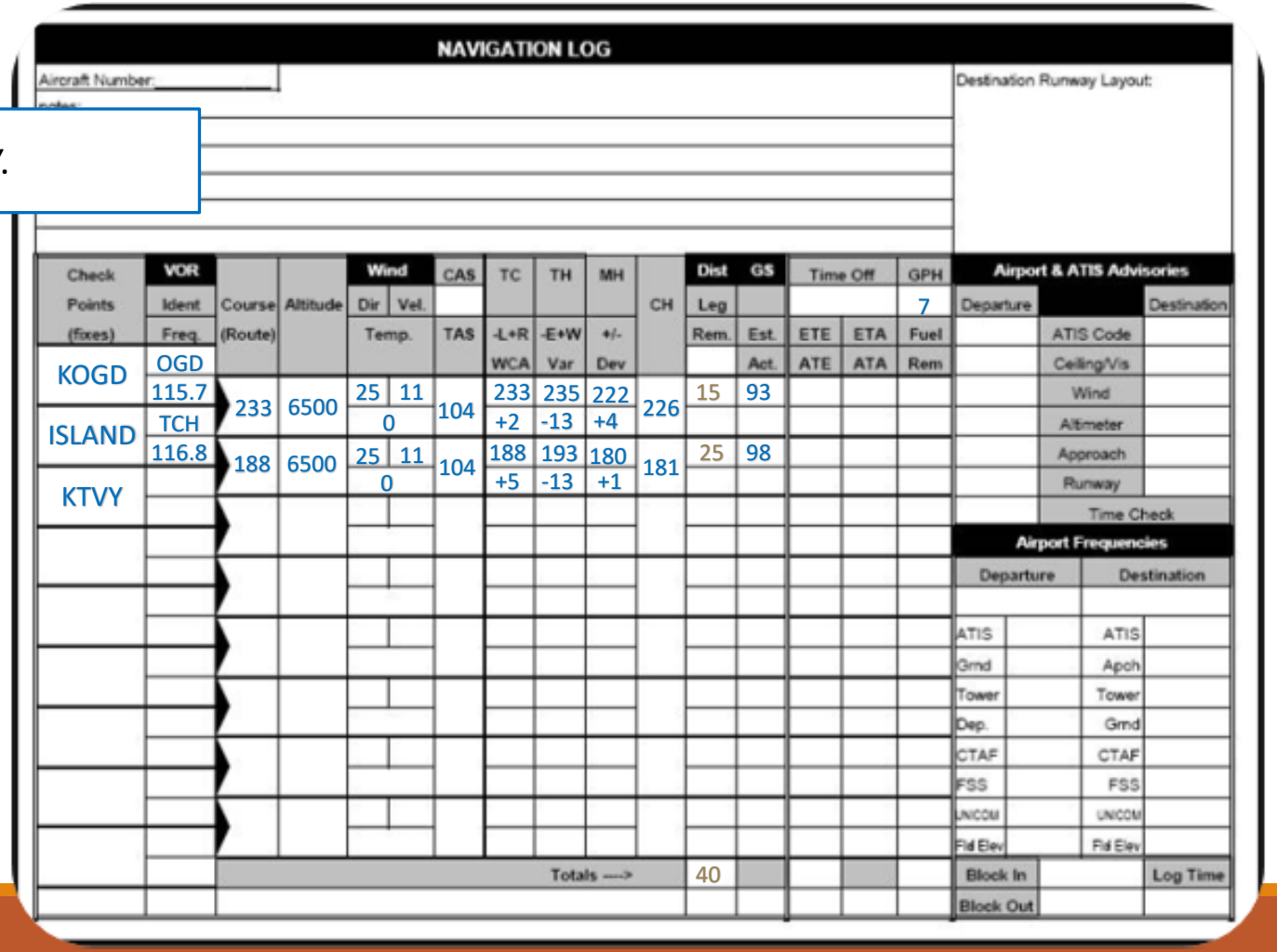


NAVIGATION LOG

Aircraft Number:

Destination Runway Layout:

Check Points (fixes)	VOR Ident / Freq.	Course (Route)	Altitude	Wind Dir / Vel. / Temp.	CAS / TAS	TC / -L+R WCA	TH / -E+W Var	MH / +/- Dev	CH	Dist Leg / Rem.	GS Est. / Act.	Time Off / ETE / ATE	ETA / ATA	GPH 7 / Fuel Rem	Airport & ATIS Advisories
KOGD	OGD														Departure / Destination
	115.7	233	6500	25 11 0	104	233 +2	235 -13	222 +4	226	15	93				ATIS Code
ISLAND	TCH														Ceiling/Vis
	116.8	188	6500	25 11 0	104	188 +5	193 -13	180 +1	181	25	98				Wind
KTVY															Altimeter
															Approach
															Runway
															Time Check
															Airport Frequencies
															Departure / Destination
															ATIS / ATIS
															Grnd / Apch
															Tower / Tower
															Dep. / Grnd
															CTAF / CTAF
															FSS / FSS
															UNICOM / UNICOM
															Fld Elev / Fld Elev
		Totals ---->								40					Block In / Log Time
															Block Out

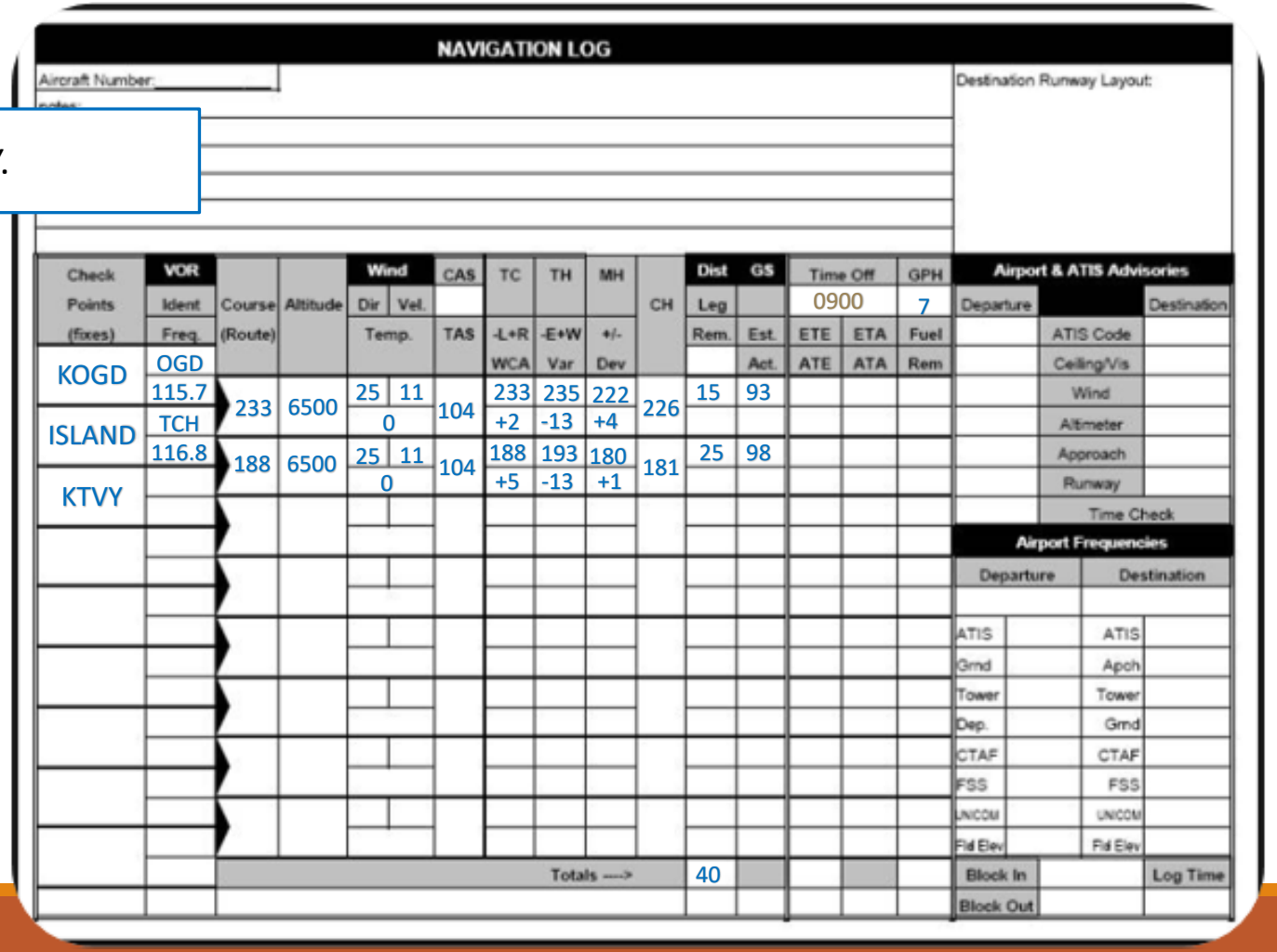
Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Time and Distance

Now that our course corrections are finished, we must make our time and distance calculations. First, we will measure the distances between our fixes (using the plotter) and then we will use the “Front Side” of the E6B to figure our time calculations.



NAVIGATION LOG

Aircraft Number:

Destination Runway Layout:

Check Points (fixes)	VOR Ident / Freq.	Course (Route)	Altitude	Wind Dir / Vel. / Temp.	CAS / TAS	TC / -L+R / WCA	TH / -E+W / Var	MH / +/- / Dev	CH	Dist Leg / Rem.	GS Est. / Act.	Time Off 0900 / ETE / ATE	ETA / ATA	GPH 7 / Fuel / Rem
KOGD	OGD													
	115.7	233	6500	25 11 / 0	104	233 / +2	235 / -13	222 / +4	226	15	93			
ISLAND	TCH													
	116.8	188	6500	25 11 / 0	104	188 / +5	193 / -13	180 / +1	181	25	98			
KTVY														
		Totals ---->								40				

Airport & ATIS Advisories		
Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies			
Departure		Destination	
ATIS		ATIS	
Grnd		Apch	
Tower		Tower	
Dep.		Grnd	
CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	
Block In			Log Time
Block Out			

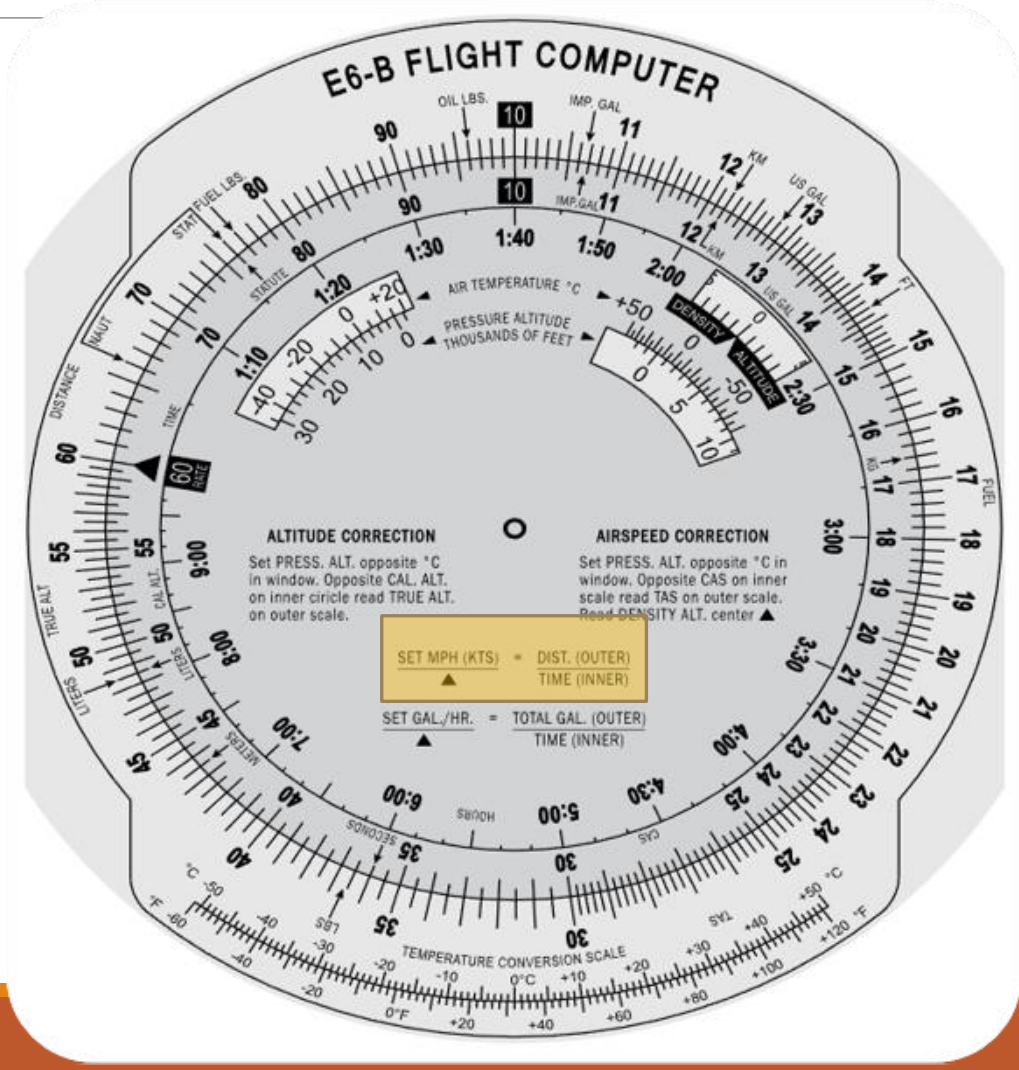
Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Figuring ETE and ETA

Now that we know our Groundspeed and Distances between our fixes. We can use the “Front Side” of the E6B to figure out our ETEs and ETAs for our route of flight. Instructions on completing these calculations are listed right on the E6B face.



Creating a Flight Plan and Nav Log

Completing the NAV Log

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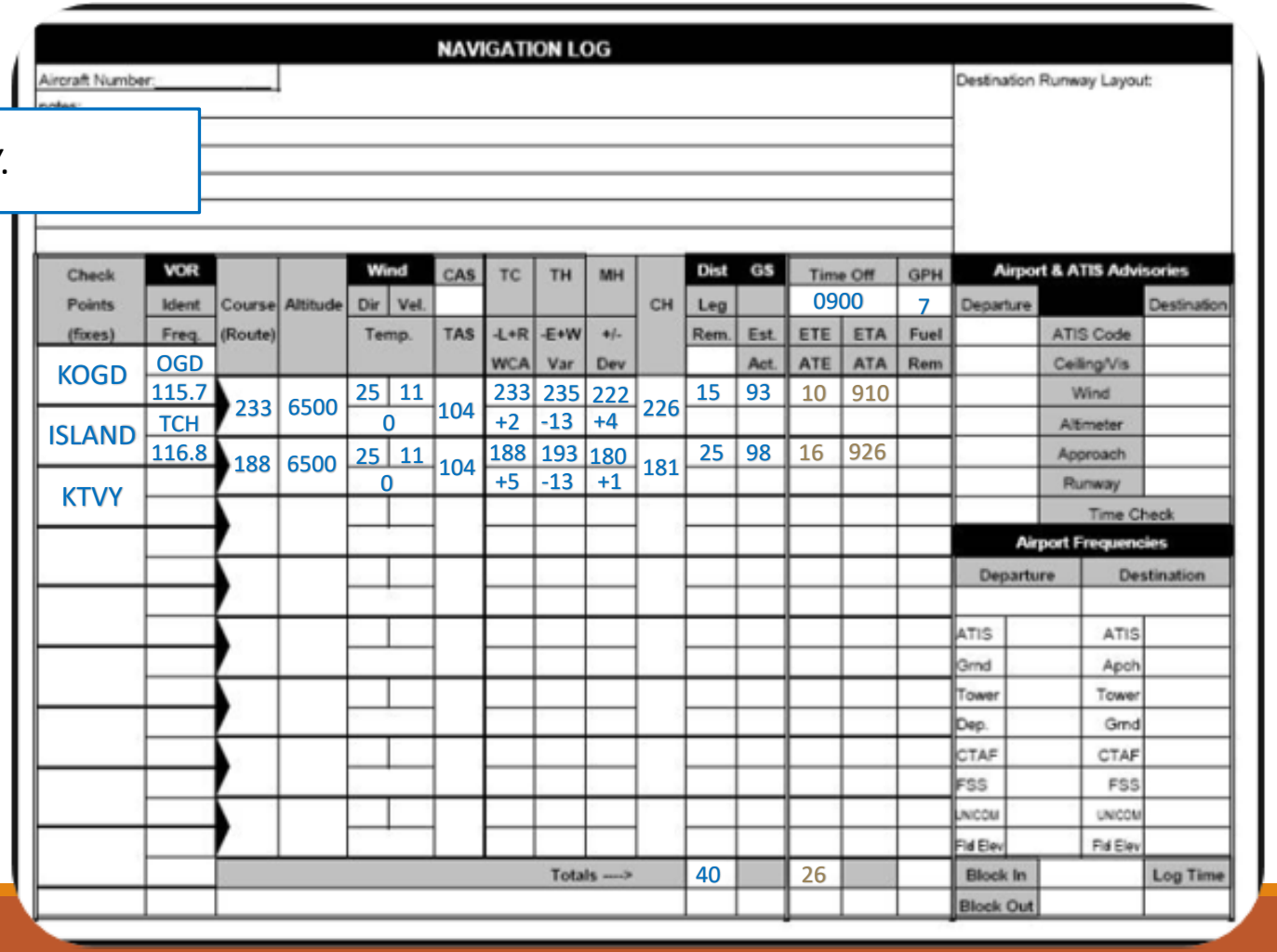
Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Time and Distance

Notice we have rounded to the next highest number on our times. This is to err on the side of caution and help to simplify the following mathematical calculations.



NAVIGATION LOG

Aircraft Number:

Destination Runway Layout:

Check Points (fixes)	VOR Ident / Freq.	Course (Route)	Altitude	Wind Dir / Vel. / Temp.	CAS / TAS	TC / -L+R / WCA	TH / -E+W / Var	MH / +/- / Dev	CH	Dist Leg / Rem.	GS Est. / Act.	Time Off 0900 / ETE / ATE	ETA / ATA	GPH 7 / Fuel / Rem
KOGD	OGD													
	115.7	233	6500	25 11 0	104	233 +2	235 -13	222 +4	226	15	93	10	910	
ISLAND	TCH													
	116.8	188	6500	25 11 0	104	188 +5	193 -13	180 +1	181	25	98	16	926	
KTVY														
		Totals ---->								40		26		

Airport & ATIS Advisories

Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies

Departure		Destination	
ATIS		ATIS	
Grnd		Apch	
Tower		Tower	
Dep.		Grnd	
CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	

Block In		Log Time
Block Out		

Creating a Flight Plan and Nav Log

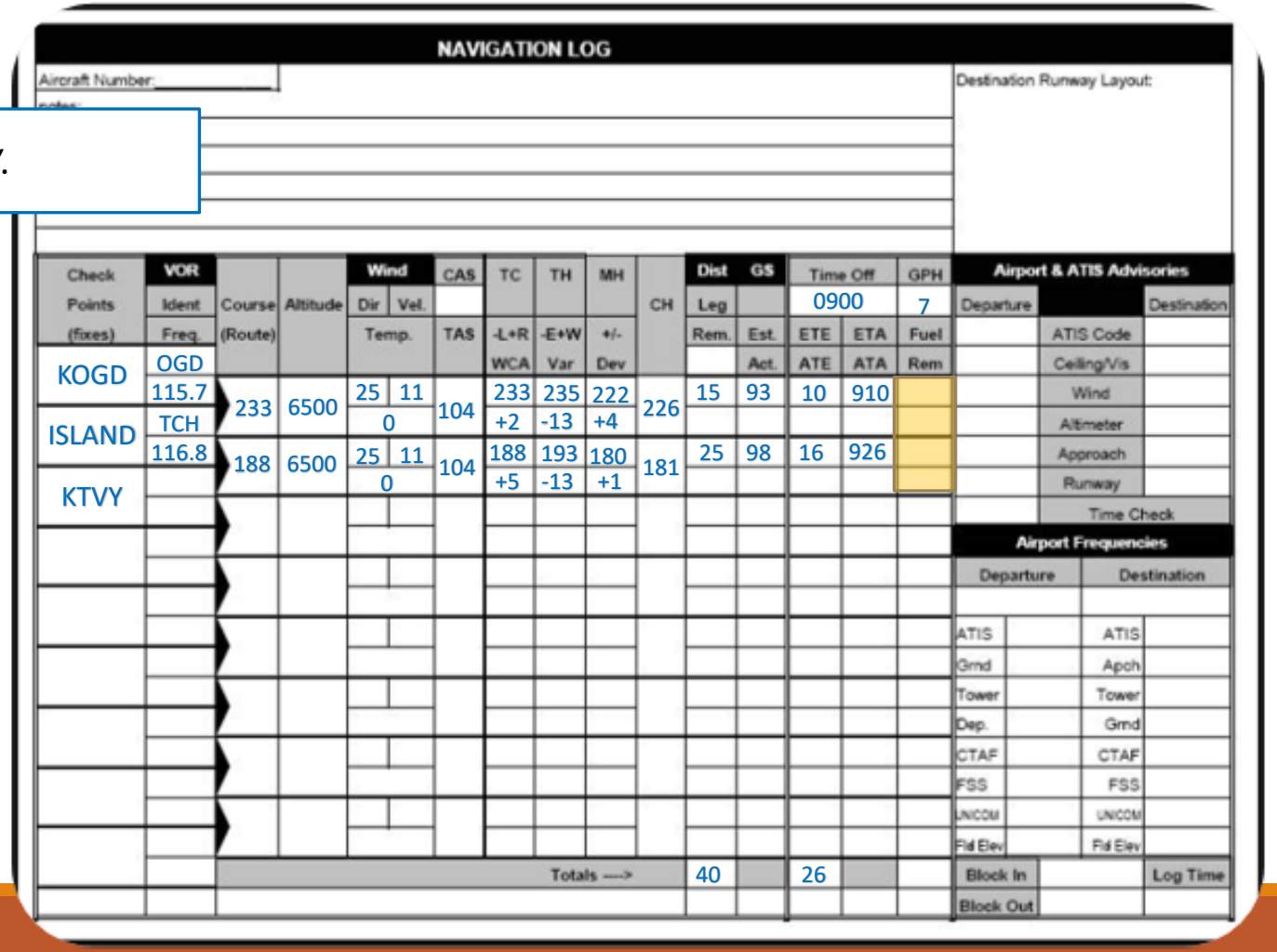
Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Calculating Fuel Burn

The final calculation we need to make on our NAV Log is for Fuel Burn. We must be sure to follow the VFR Fuel Requirements found in the FARs.

- Day = Destination + 30min at Normal Cruise
- Night = Destination + 45min at Normal Cruise



NAVIGATION LOG

Aircraft Number:

Destination Runway Layout:

Check Points (fixes)	VOR Ident / Freq.	Course (Route)	Altitude	Wind Dir / Vel. / Temp.	CAS / TAS	TC / -L+R / WCA	TH / -E+W / Var	MH / +/- / Dev	CH	Dist Leg / Rem.	GS Est. / Act.	Time Off 0900 / ETE / ATE	ETA / ATA	GPH 7 / Fuel / Rem
KOGD	OGD													
	115.7	233	6500	25 11 / 0	104	233 / +2	235 / -13	222 / +4	226	15	93	10	910	
ISLAND	TCH													
	116.8	188	6500	25 11 / 0	104	188 / +5	193 / -13	180 / +1	181	25	98	16	926	
KTVY														
										40		26		

Totals ---->

Airport & ATIS Advisories		
Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies			
Departure		Destination	
ATIS		ATIS	
Grnd		Apch	
Tower		Tower	
Dep.		Grnd	
CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	
Block In			Log Time
Block Out			

Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

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- Night = Destination + 45min at Normal Cruise

Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Calculating Fuel Burn

The final calculation we need to make on our NAV Log is for Fuel Burn. We must be sure to follow the VFR Fuel Requirements found in the FARs.

- Day = Destination + 30min at Normal Cruise
- Night = Destination + 45min at Normal Cruise

Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Calculating Fuel Burn

For this example, we will assume we have 50 gallons of usable fuel on board. At a fuel burn of 7GPH that means we will definitely meet the VFR Fuel Requirements listed in the FARs.

- Usable Fuel = The amount of fuel available for flight planning purposes. This number will differ from total fuel on board.

NAVIGATION LOG

Aircraft Number:

Destination Runway Layout:

Check Points (fixes)	VOR Ident / Freq.	Course (Route)	Altitude	Wind Dir / Vel. / Temp.	CAS / TAS	TC / -L+R / WCA	TH / -E+W / Var	MH / +/- / Dev	CH	Dist Leg / Rem.	GS Est. / Act.	Time Off 0900 / ETE / ATE	ETA / ATA	GPH 7 / Fuel / Rem
KOGD	OGD													
	115.7	233	6500	25 11 / 0	104	233 / +2	235 / -13	222 / +4	226	15	93	10	910	1.1
ISLAND	TCH													48.9
	116.8	188	6500	25 11 / 0	104	188 / +5	193 / -13	180 / +1	181	25	98	16	926	1.4
KTVY														47.5
		Totals ---->								40		26		2.5

Airport & ATIS Advisories		
Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies			
Departure		Destination	
ATIS		ATIS	
Grnd		Apch	
Tower		Tower	
Dep.		Grnd	
CTAF		CTAF	
FSS		FSS	
UNICOM		UNICOM	
Fld Elev		Fld Elev	
Block In			Log Time
Block Out			

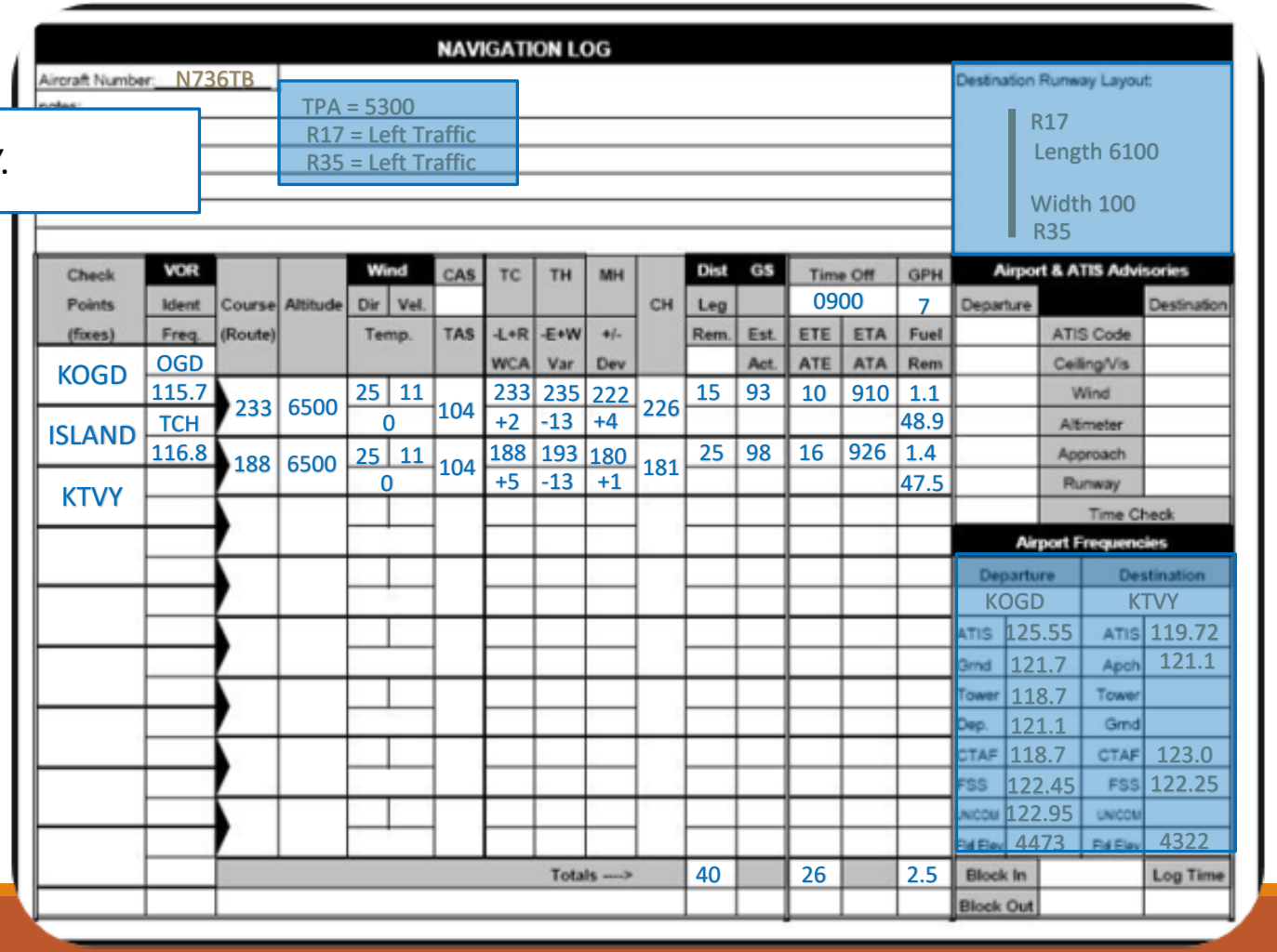
Creating a Flight Plan and Nav Log

Completing the NAV Log

For our example, we will plan a flight from KOGD to KTVY.

Airport Frequencies

With our calculations complete, we can now fill out the airport frequencies and information on our NAV Log so they are in a handy and easily accessible place for our flight.



NAVIGATION LOG

Aircraft Number: N736TB

TPA = 5300
R17 = Left Traffic
R35 = Left Traffic

Destination Runway Layout:
R17
Length 6100
Width 100
R35

Check Points (fixes)	VOR Ident / Freq.	Course (Route)	Altitude	Wind Dir / Vel. / Temp.	CAS / TAS	TC / -L+R / WCA	TH / -E+W / Var	MH / +/- / Dev	CH	Dist Leg / Rem.	GS Est. / Act.	Time Off 0900 / ETE / ATE	ETA / ATA	GPH 7 / Fuel / Rem
KOGD	OGD													
	115.7	233	6500	25 11 / 0	104	233 / +2	235 / -13	222 / +4	226	15	93	10	910	1.1 / 48.9
ISLAND	TCH													
	116.8	188	6500	25 11 / 0	104	188 / +5	193 / -13	180 / +1	181	25	98	16	926	1.4 / 47.5
KTVY														
						Totals ---->				40		26		2.5

Airport & ATIS Advisories

Departure		Destination
	ATIS Code	
	Ceiling/Vis	
	Wind	
	Altimeter	
	Approach	
	Runway	
	Time Check	

Airport Frequencies

Departure		Destination	
KOGD		KTVY	
ATIS	125.55	ATIS	119.72
Grnd	121.7	Apch	121.1
Tower	118.7	Tower	
Dep.	121.1	Grnd	
CTAF	118.7	CTAF	123.0
FSS	122.45	FSS	122.25
UNICOM	122.95	UNICOM	
Fld Elev	4473	Fld Elev	4322

Block In		Log Time
Block Out		

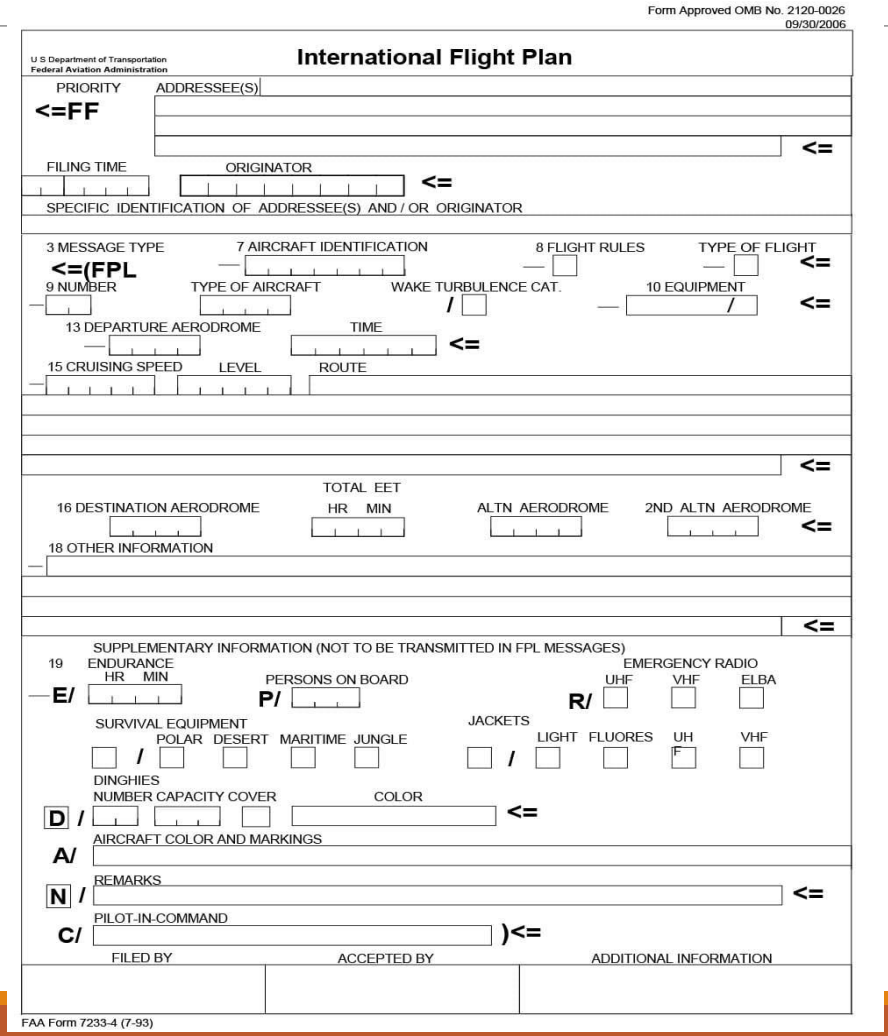
Creating a Flight Plan and Nav Log

Completing the Flight Plan

We can now complete our VFR Flight Plan Form.

Filing, Opening, and Closing

The flight plan can be filed through some aviation apps and services. You can also call 1-800-WX-BRIEF to file. Once airborne, you can contact the Flight Service Station (FSS) in your area to open your flight plan. Be sure to close your flight plan prior to or upon landing at your destination.



Form Approved OMB No. 2120-0026
09/30/2006

U S Department of Transportation
Federal Aviation Administration

International Flight Plan

PRIORITY <=FF
ADDRESSEE(S) <=
FILING TIME
ORIGINATOR <=
SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND / OR ORIGINATOR

3 MESSAGE TYPE <=(FPL
7 AIRCRAFT IDENTIFICATION
8 FLIGHT RULES
TYPE OF FLIGHT <=
9 NUMBER
TYPE OF AIRCRAFT
WAKE TURBULENCE CAT. /
10 EQUIPMENT / <=
13 DEPARTURE AERODROME
TIME <=
15 CRUISING SPEED
LEVEL
ROUTE <=

16 DESTINATION AERODROME
TOTAL EET HR MIN
ALTN AERODROME
2ND ALTN AERODROME <=
18 OTHER INFORMATION <=

SUPPLEMENTARY INFORMATION (NOT TO BE TRANSMITTED IN FPL MESSAGES)
19
ENDURANCE HR MIN E/
PERSONS ON BOARD P/
EMERGENCY RADIO R/ UHF VHF ELBA
SURVIVAL EQUIPMENT / POLAR DESERT MARITIME JUNGLE
JACKETS / LIGHT FLUORES UHF VHF
DINGHIES
NUMBER CAPACITY COVER COLOR D / <=
AIRCRAFT COLOR AND MARKINGS A/
REMARKS N / <=
PILOT-IN-COMMAND C/)<=

FILED BY | ACCEPTED BY | ADDITIONAL INFORMATION

FAA Form 7233-4 (7-93)

Flight Diversion

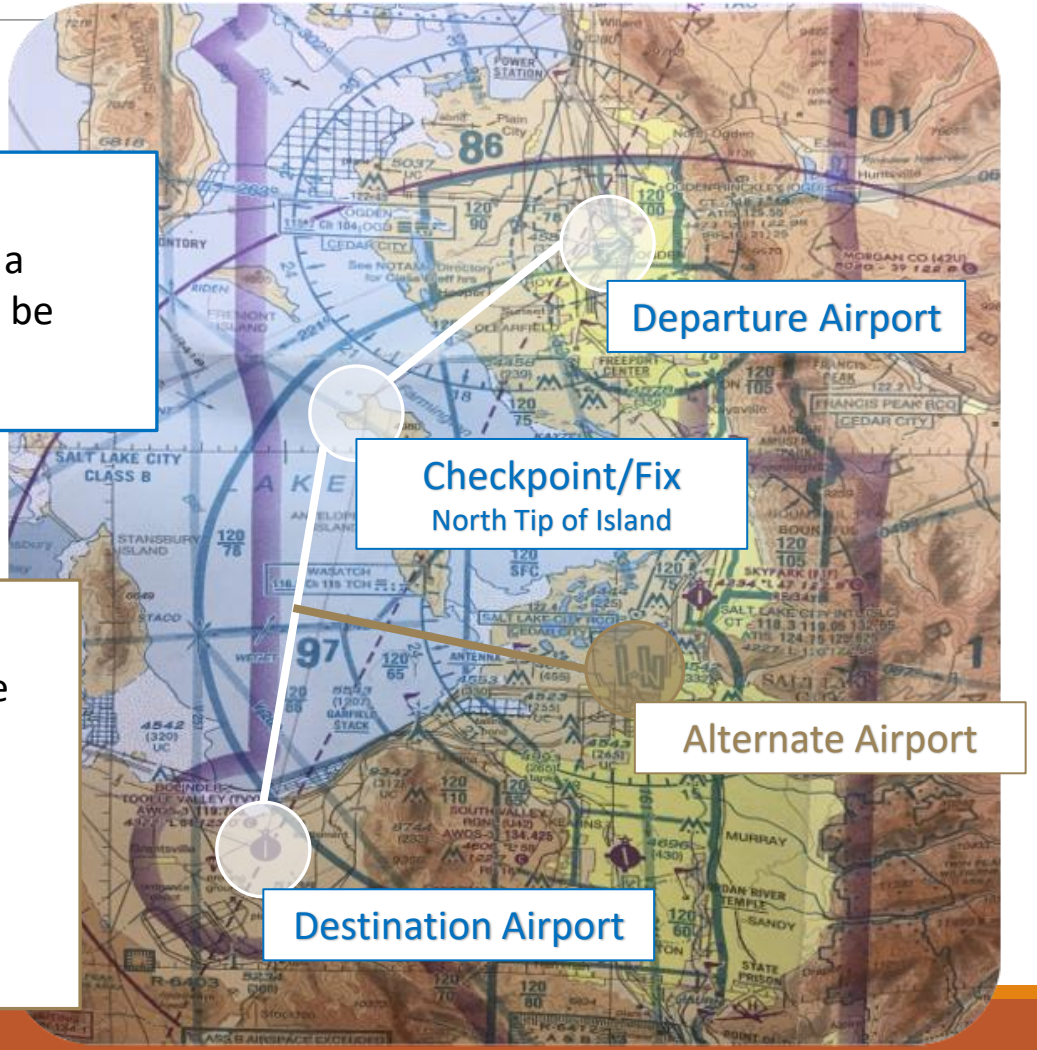
Diverting to an Alternate

There may come a time when a pilot is not able to make it to the planned destination airport. This can be the result of unpredicted weather conditions, a system malfunction, or poor preflight planning. In any case, the pilot needs to be able to safely and efficiently divert to an alternate destination.

Alternate Calculations in Flight

To do this effectively (and maintain positive control of the aircraft) requires practice. The pilot must make rough mathematical calculations in flight for the following:

- Approximate Heading to Alternate
- Approximate Distance to Alternate
- Approximate Time to Alternate
- Required Fuel to Reach Alternate

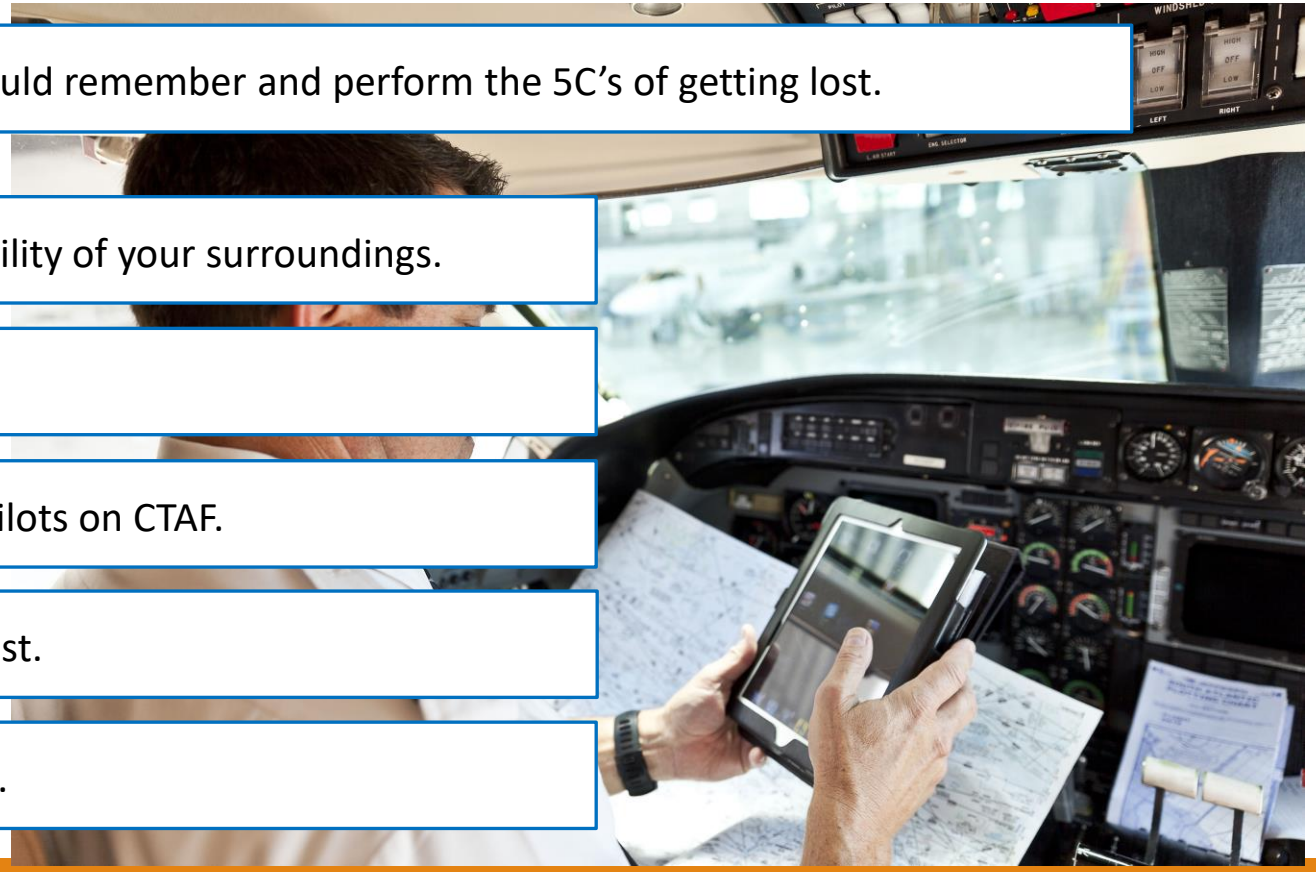


Lost Procedures

Remember the 5 C's

If a pilot is ever to get lost on a cross country flight, he/she should remember and perform the 5C's of getting lost.

Climb	To a higher altitude for better visibility of your surroundings.
Conserve	Conserve fuel flow (lean it out).
Call	For assistance from ATC or other pilots on CTAF.
Confess	To yourself and ATC that you are lost.
Comply	With any instructions given by ATC.



Lesson Summary

In this lesson we discussed various term used in navigation and flight planning, features on aeronautical charts, completing a flight plan with calculations and a Nav Log, filing, opening, and closing a VFR Flight Plan, diversion to an alternate airport, and procedures pilots should follow if they are to get lost in flight.