

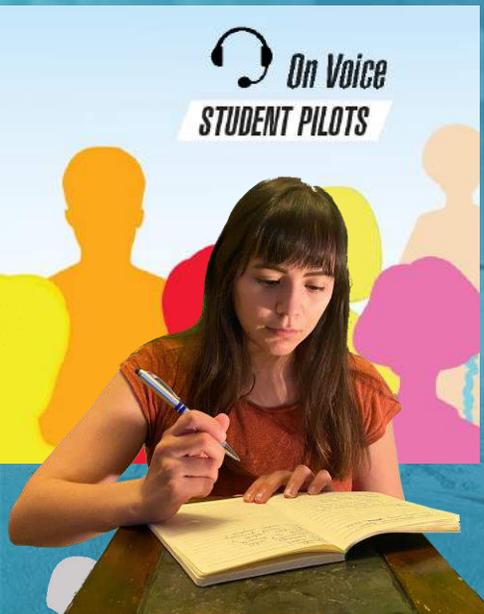


# Learn To Fly

## Intermediate Lesson 5



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Pilot IRL and Course Designer

STUDENT JAYNE



# Introductions

Instructor

Students

Airplane

Airfield



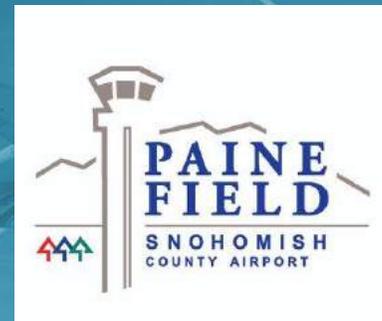
Howard  
ForderLearnToFly  
Pilot IRL



Microsoft Flight Simulator  
Community Manager



Cessna 172 G1000



KPAE, Everett, WA

All graphics and sounds are original or royalty paid. These lessons are made specifically for Jayne @Microsoft by Howard Forder.

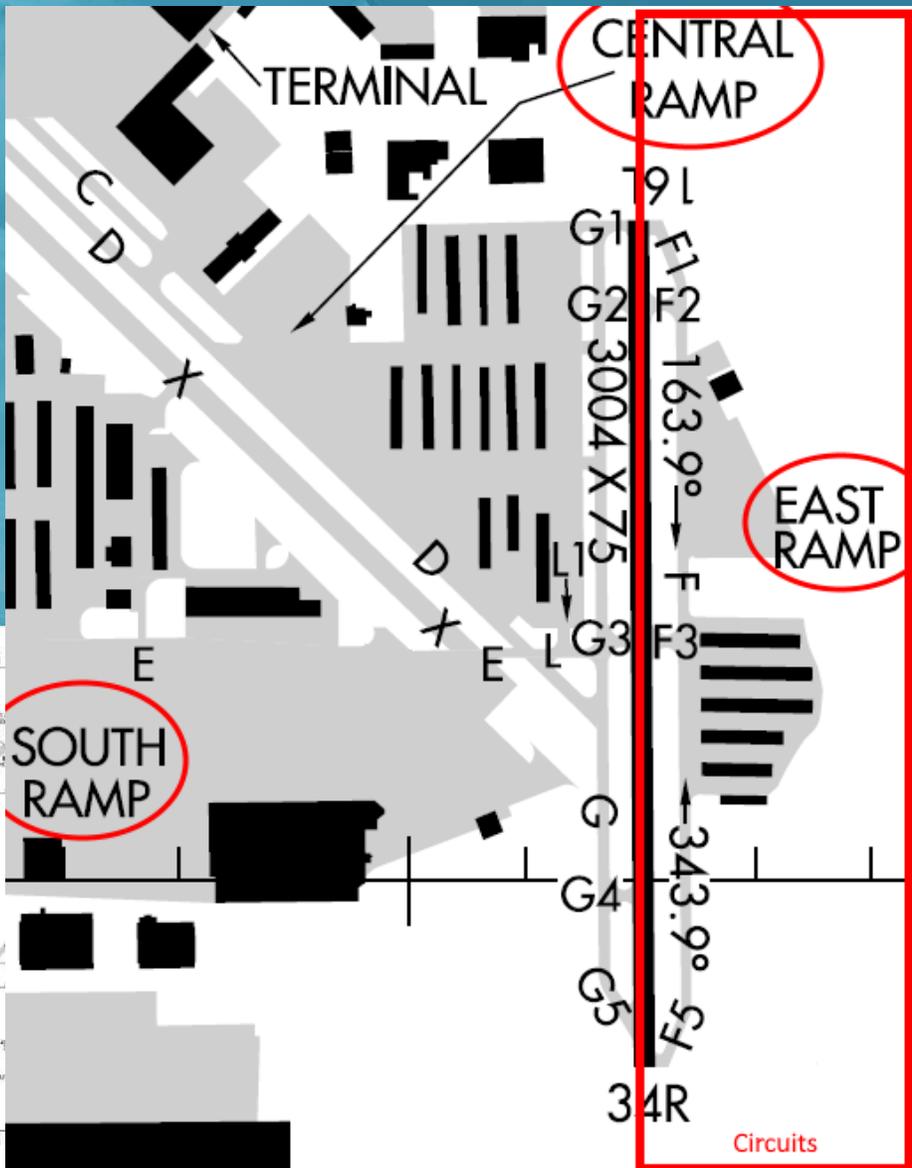


# Flight

# Preparation

Ensure you grab your student training materials kit with the links in chat. Includes your new checklists.

- One link for a group of materials:
- !studentkit2**
- !Checklist172**
- !material -URL** for online material online



# Previous Assignment

1. Read the G1000 manual.
2. Make a few flight plans of places you wish to fly for later in Little Nav Map.
3. Practice entering flight plans with the World Map and the G1000 buttons.

How did it go?

Problems?

Suggestions?

Observations?



# Intermediate Lesson 5

# This Lesson

## G1000 Autopilot Functions



## The G1000 Autopilot Panel:

1. Autopilot in the G1000 can help us to be more accurate in our flight envelope during our journeys.
2. Pushing the AP button is the easy part. Setting up your airplane so autopilot can take over is the skill we must learn.



# The Autopilot Panel with the Garmin G1000

In our Cessna 172 G1000 we have the same function buttons on both bezels.





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# The Autopilot Panel

5

The Autopilot controls in the Xcub.

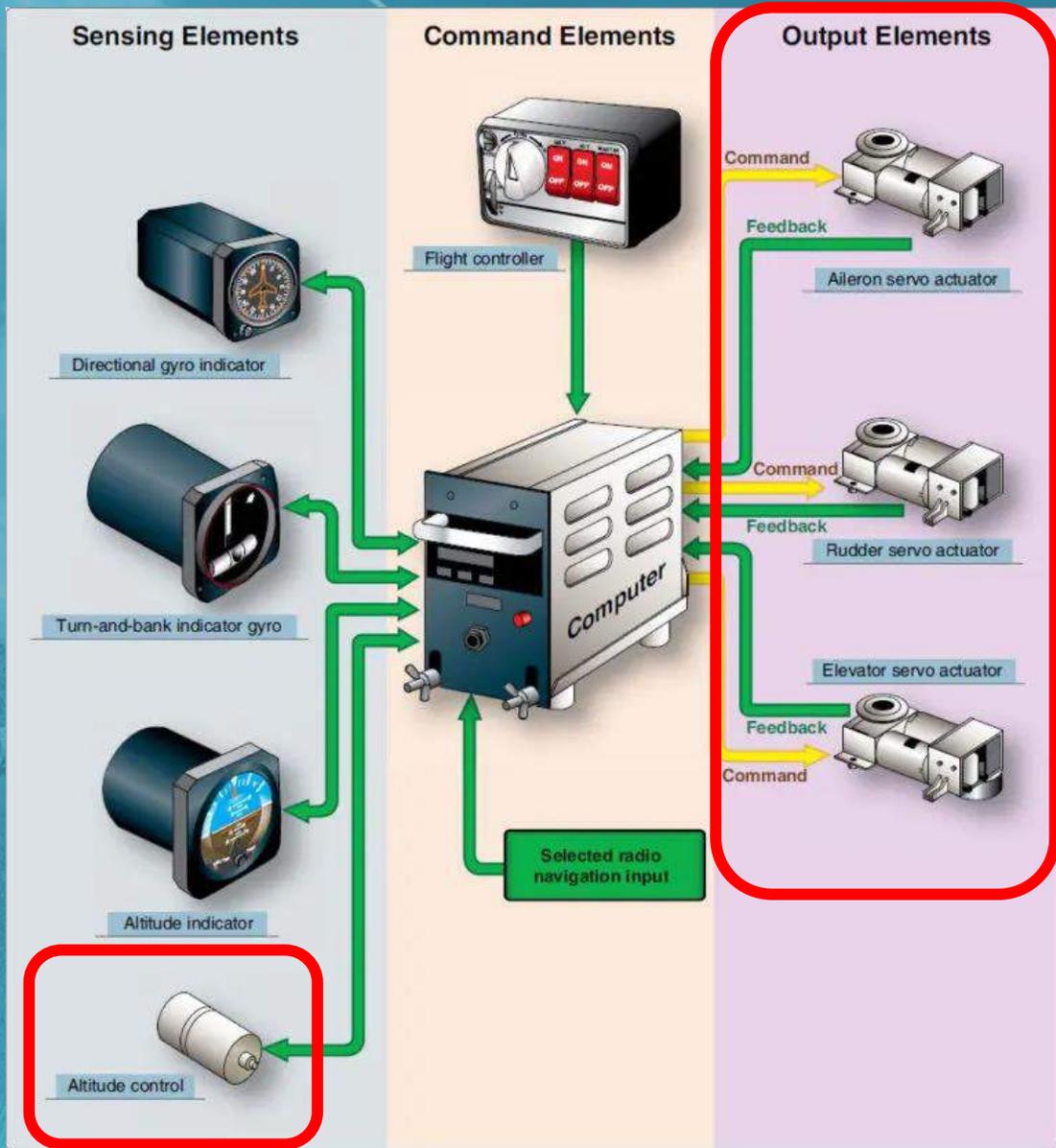
Similar functions: Note:

1. The DN/UP wheel.
2. The LVL button.
3. The IAS button.



# How Autopilot Works

5



All autopilot systems have “servos” that move our various surfaces to adjust the attitude of our airplane. (hydraulic or electric motors)

We need to tell autopilot which instruments to follow and it will send directions to the servos to move those surfaces.

# How Control Surfaces Move

We already know from our POH that our control surfaces are controlled by manual input or electrical motors.

If we were to put autopilot motors on those same lines, we could let the computer control the airplane.

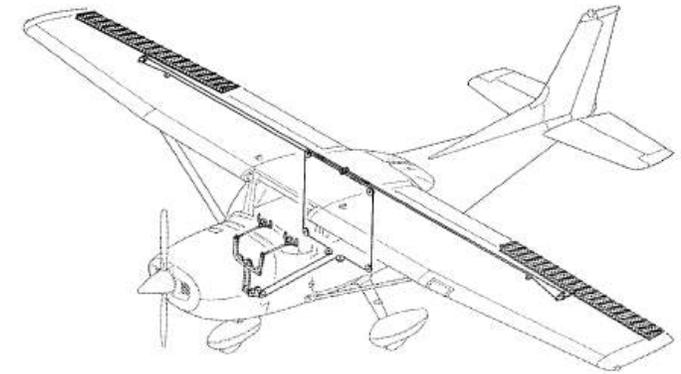
Here we see the yoke controlling the ailerons and the rudder pedals controlling the rudder and wheel.

SECTION 7  
AIRPLANE AND SYSTEM DESCRIPTION

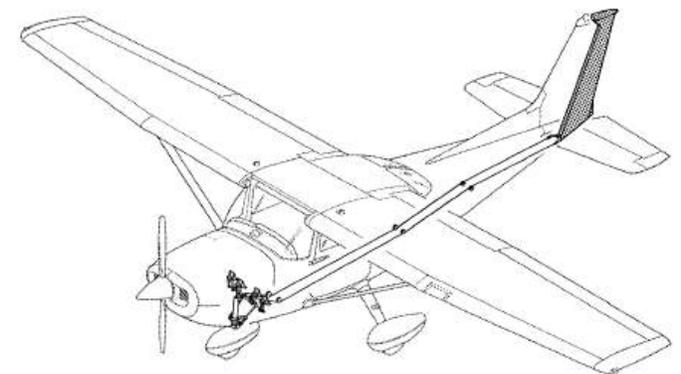
CESSNA  
MODEL 172S NAV III  
GFC 700 AFCS

## FLIGHT CONTROLS AND TRIM SYSTEM

03100



Aileron Control System

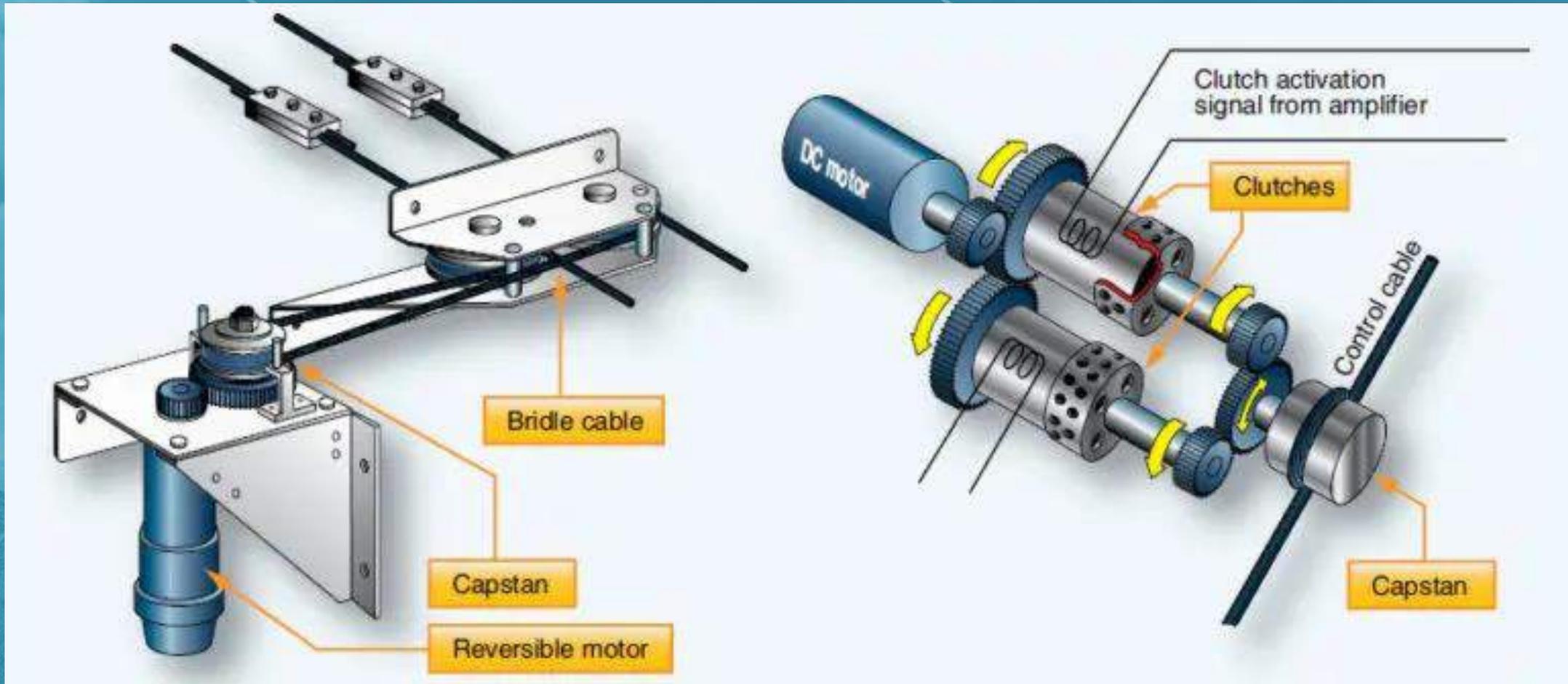


Rudder Control System

Figure 7-1 (Sheet 1 of 2)

# How Control Surfaces Move

5



We need to tell autopilot which instruments to follow and it will send directions to the servos to move those surfaces.



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# The Autopilot Panel



Pushing the AP button engages the autopilot.

The default mode is ROL and PIT.  
(pitch and roll stabilized)





# Autopilot Indications



Horizontal information (direction)

AP Status (on/off)

Vertical information

On deck (armed)  
This one is  
ALTS: Selected Altitude Capture

The default mode is ROL and PIT.  
(pitch and roll stabilized)

Anything in **Green** is active.  
Anything in **White** is standing-by.



# AP ROLL & PITCH

The default mode is ROL and PIT.  
(pitch and roll stabilized)  
It will hold your bank angle and your pitch steady.





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# The Autopilot Panel



Pushing HDG tells autopilot to “follow the heading bug”

Pitch is not affected.

Sync and adjust the bug with the HDG dial.





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# The Autopilot Panel



Pushing NAV tells autopilot to “follow selected NAV aid, VOR1, VOR2 or GPS.”

Select with CDI softkey. Adjust with the CRS dial.





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# The Autopilot Panel



Pushing ALT tells autopilot to “stay at current altitude”

Each of these buttons are toggles, on or off.





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# The Autopilot Panel



Turn the ALT dials to set a target altitude.

Then we can tell autopilot how to get there with the VS or FLC buttons.

It won't manage your throttle.



# Climbing to Desired Altitude



Set the desired Altitude first.

The VS button for Vertical Speed set and then use the UP button to set the desired vertical speed to get there.



# Descending to Desired Altitude

5



Set the desired Altitude first.

The VS button for Vertical Speed set and then use the DN button to set the desired vertical speed to get there.



# Climbing with Constant Airspeed 5



Set the desired Altitude first.

The FLC button for Flight Level Change and then use the UP and DN buttons to set the desired airspeed.



# Descending with Constant Airspeed



Set the desired Altitude first.

The FLC button for Flight Level Change and then use the UP and DN buttons to set the desired airspeed.



# Throttle Control



Remember: Autopilot will not control your throttle. You have to manage it as you would manually.

# Autopilot Gone Wrong!

5

There is a special white “collar” around the circuit breaker for the Autopilot circuits.

Pulling this circuit breaker stops autopilot from controlling your airplane.

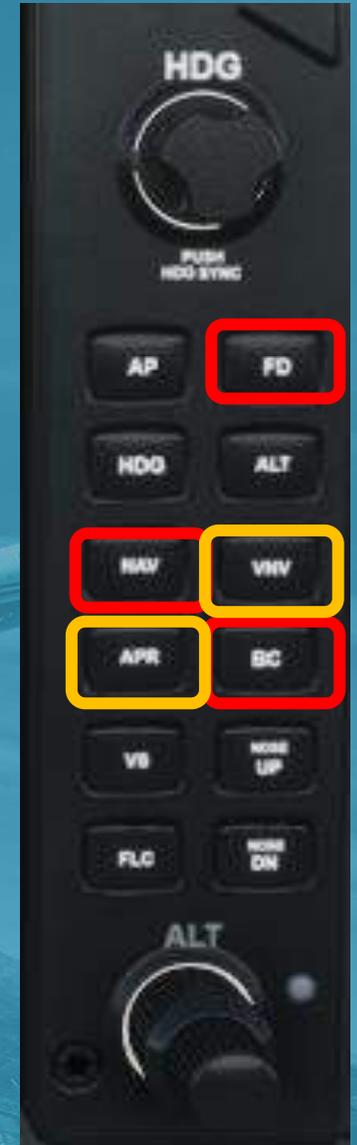


This doesn't work in the sim but good to know. If AP problems, recycle the white avionics power switches or red Masters.



# The Other Buttons

1. FD is the Flight Director which shows the pilot visual clues to follow or what the AP is doing.
2. The NAV button is used to track GPS, VOR1 or VOR2 and will be used in the next lesson.
3. APR is Approach (in an instrument course.)
4. BC is for ILS Back Course and used in the next lesson (similar to ILS without slope guidance)
5. VNAV is for Vertical Navigation (in an instrument course. (departures and arrivals)



# The Flight Exercise

1. On the ground, set the desired altitude with the ALT (or ALT SEL) dial. (3000)
2. Normal take off and head to the practice area.
3. Once headed to the practice area, press the HDG dial to sync the heading bug. (not the HDG button)
4. Turn on AP and observe PIT and ROL.
5. Press HDG button and observe bug follow.
6. Press VS and UP 5 times to set +500 fpm and give full power for the climb (if not already)
7. Use the FLC functions once at altitude and mind your throttle.



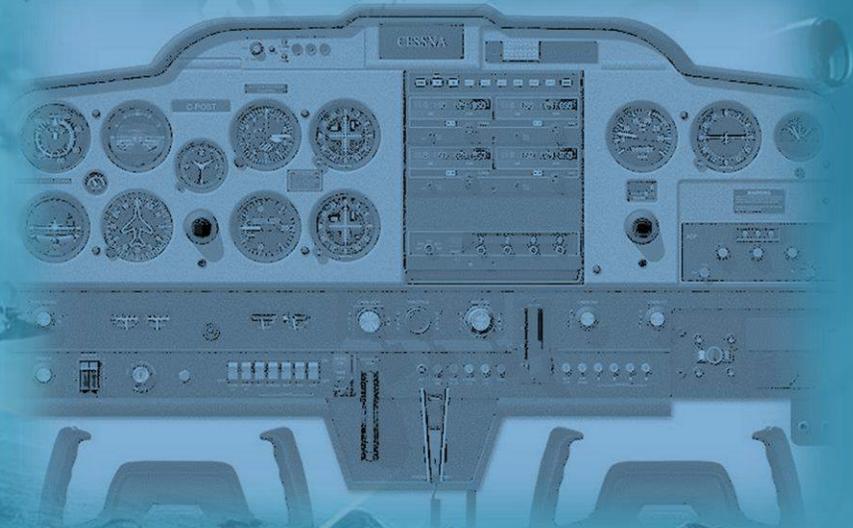
# Any Questions Before Departure?



# Lesson Briefing

YOUR CONTROL

# Let's go Flying!

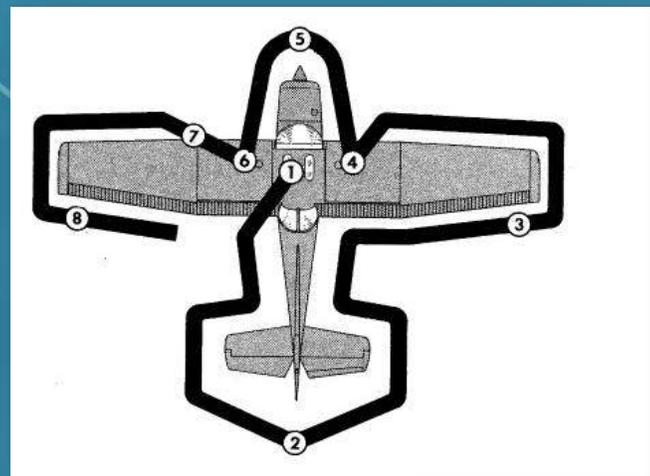


A 3<sup>rd</sup> party free download to pass control of the airplane back and forth.

While Jayne and Howard head out to the airplane please direct your questions in chat to her fellow students on live mics.

They will convey your questions upon their return.

# The Walkaround (pre-flight inspection)



Jayne has done the runup too to save us some time in the stream.

See lesson 1 for full runup.

SECTION 4  
NORMAL PROCEDURES

CESSNA  
MODEL 172S NAV  
GFC 700 AF

**BEFORE TAKEOFF** (Continued)

5. A/P TRIM DISC Button - PRESS (if installed) (verify autopilot disengages and aural alert is heard)
6. Flight Director - OFF (if installed) (push FD button on either PFD or MFD bezel)
7. Elevator Trim Control - SET FOR TAKEOFF
8. Throttle Control - 1800 RPM
  - a. MAGNETOS Switch - CHECK (RPM drop should exceed 150 RPM on either magneto or 50 RPM difference between magnetos)
  - b. VAC Indicator - CHECK
  - c. Engine Indicators - CHECK
  - d. Ammeters and Voltmeters - CHECK
9. Annunciators - CHECK (verify no annunciators are shown)
10. Throttle Control - CHECK IDLE
11. Throttle Control - 1000 RPM or LESS
12. Throttle Control Friction Lock - ADJUST
13. COM Frequency(s) - SET
14. NAV Frequency(s) - SET
15. FMS/GPS Flight Plan - AS DESIRED

**NOTE**

Check GPS availability on AUX-GPS STATUS page. No announcement is provided for loss of GPS2.

16. XPDR - SET

# Intermediate Lesson 5

## Autopilot functions in the Cessna 172 G1000

# Review Lesson



### POST FLIGHT

- (1) Review Lesson, re-brief as necessary.
- (2) Assign reading for next lesson

Autopilot functions  
Garmin G1000 Manual

!Manual (FAA online docs)

# Summary Questions

1. How do autopilot systems fly the plane?





# Summary Questions

2. What are the concerns when using FLC and VS autopilot functions?





# Summary Questions

3. What is the difference between FLC, IAS and VS?





# Summary Questions

4. There is a HDG button and an HDG dial.  
What is the difference between them?





# Summary Questions

5. What happens when you push the AP button and no other buttons?





# Summary Questions

6. When should you turn off autopilot?





# Summary Questions

7. What is the function of the FD button?



# Homework

## Assignment

1. Read the Garmin G1000 manual (google search)
2. Practice using each of the buttons we learned today.



# Intermediate Lesson 5

# Next Lesson

## G1000 NDBs & VORs & ILS



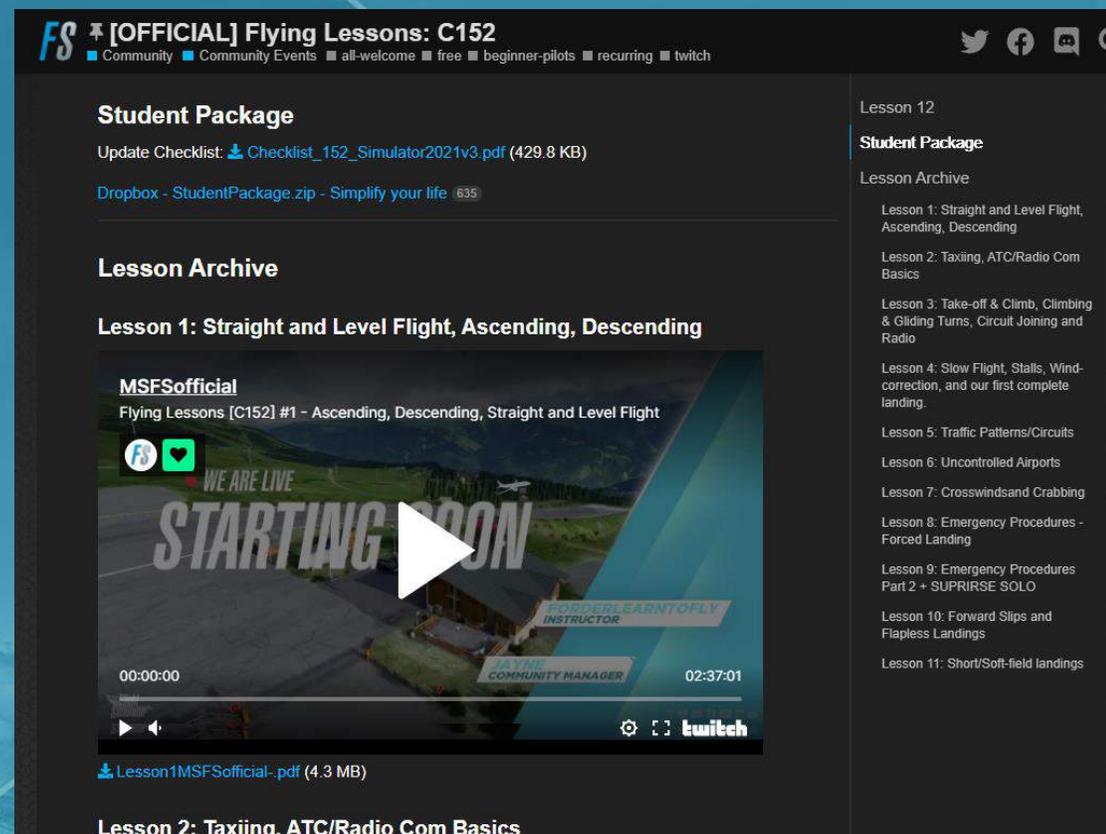
# The Student HUB

Come join the discussions and continue the conversation on the student hub for this lesson series with Jayne and Forder.

Add your thoughts, your knowledge and your enthusiasm for learning a deeper understanding of flight using Microsoft Flight Simulator.

New Xbox Flyers welcome.

We welcome CFIs, real-life student pilots, flight enthusiasts and those new to flight simulation.



**FS** [OFFICIAL] Flying Lessons: C152  
Community Community Events all-welcome free beginner-pilots recurring twitch

### Student Package

Update Checklist: [Checklist\\_152\\_Simulator2021v3.pdf](#) (429.8 KB)  
[Dropbox - StudentPackage.zip - Simplify your life](#) 635

### Lesson Archive

#### Lesson 1: Straight and Level Flight, Ascending, Descending

**MSFSofficial**  
Flying Lessons [C152] #1 - Ascending, Descending, Straight and Level Flight

WE ARE LIVE  
**STARTING SOON**

00:00:00 02:37:01  
twitch

[Lesson1MSFSofficial-.pdf](#) (4.3 MB)

#### Lesson 2: Taxiing, ATC/Radio Com Basics

Lesson 12  
**Student Package**  
Lesson Archive

- Lesson 1: Straight and Level Flight, Ascending, Descending
- Lesson 2: Taxiing, ATC/Radio Com Basics
- Lesson 3: Take-off & Climb, Climbing & Gliding Turns, Circuit Joining and Radio
- Lesson 4: Slow Flight, Stalls, Wind-correction, and our first complete landing.
- Lesson 5: Traffic Patterns/Circuits
- Lesson 6: Uncontrolled Airports
- Lesson 7: Crosswinds and Crabbing
- Lesson 8: Emergency Procedures - Forced Landing
- Lesson 9: Emergency Procedures Part 2 + SURPRISE SOLO
- Lesson 10: Forward Slips and Flapless Landings
- Lesson 11: Short/Soft-field landings



# Learn To Fly

## Intermediate Lesson 5



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