



Cessna Citation CJ4 Model 525C
Operator's Guide (0.9.0)

**THIS GUIDE IS INTENDED FOR USE IN FLIGHT SIMULATION ONLY. NOT FOR
USE IN REAL WORLD AVIATION.**

1 - INTRODUCTION	1
CURRENT VERSION	1
CONTACT	1
INSTALLATION	1
KNOWN ISSUES	2
Default Livery Conflicts	2
Flight Plan Synchronization Between the Game and FMS	2
Other Known Issues	2
Common Fixes	3
SIMBRIEF	3
2 - LIMITATIONS	1
WEIGHT LIMITS	1
SPEED LIMITS	1
WIND LIMITS	1
ENGINE LIMITS	1
APPROACH TYPES	1
3 - NORMAL PROCEDURES	1
CHECKLISTS	1
ENGINE START	1
TAKEOFF AND LANDING V-SPEEDS	1
TAKEOFF PROCEDURE	2
CLIMB PROCEDURE	3
CRUISE PROCEDURE	3
DESCENT PROCEDURE	4
APPROACH AND LANDING	4
4 - WEIGHT AND BALANCE	1
5 - FLIGHT MANAGEMENT SYSTEM	1
MOD SET	1
STATUS	1
POS INIT	2
FPLN (ACT FPLN)	2
LEGS	3
CUSTOM WAYPOINTS	5
DIRECT TO	6
FROM LEGS	6
FROM DIR	6

NEAREST AIRPORTS	6
HOLDS	7
EXITING THE HOLD	8

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

1 - INTRODUCTION

This is a guide for the Working Title CJ4 Mod. It contains some necessary information regarding normal procedures and avionics including the Collins Pro Line 21 suite. It will be updated as necessary to include all current, working features.

The Working Title Team are strictly volunteers who all share a passion for flying. Aside from software engineers, the team is composed of real-world pilots with ratings from Private to Airline Transport, including several members with experience on the actual Cessna CJ4 and similar types.

Thank you for your support!

CURRENT VERSION

CURRENT VERSION: 0.9.0

You can always find your current version in the FMS by going to **IDX>NEXT(PAGE 2)>ABOUT**

The latest version of the CJ4 Mod can be found here:

<https://github.com/Working-Title-MSFS-Mods/fspackages/releases>

The Working Title CJ4 is compatible with both the default NAVBLUE data or the Beta version of Navigraph for MSFS. (No special modifications are required for compatibility with Navigraph)

CONTACT

If you would like to contribute, or file a bug report please do so here:

<https://github.com/Working-Title-MSFS-Mods/fspackages>

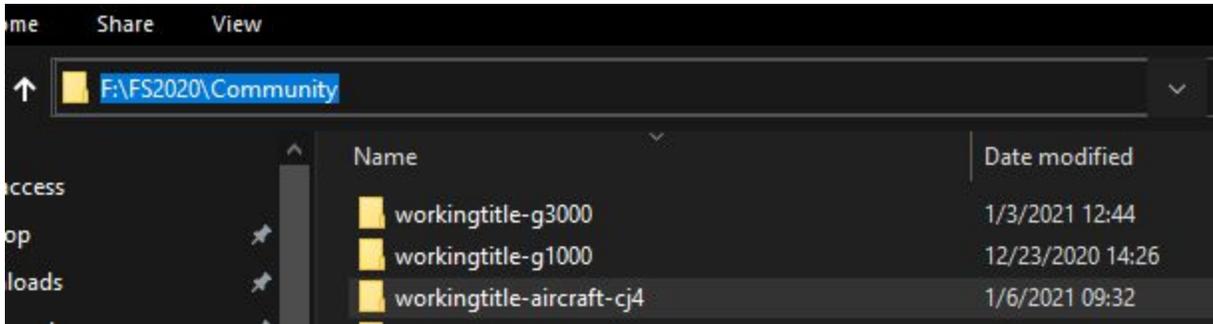
If you are filing a bug report, please be sure to include as much information, including pictures and video if possible, in order for us to track down and replicate the problem.

Our Discord can be found here: <https://discord.gg/cmxCRJX8jG>

INSTALLATION

Installation is easy, simply copy the workingtitle-aircraft-cj4 folder inside the zip file to your MSFS Community folder. Ensure you are downloading the workingtitle-aircraft-cj4-v0.X.X.zip and NOT the Source Code!

Important: We recommend that you fully delete any previous workingtitle-aircraft-cj4 folder before copying this release.



(Your installation path may differ.)

KNOWN ISSUES

Default Livery Conflicts

The alternate default liveries that now ship with MSFS are not compatible with the CJ4 yet at this time. They currently ship with panel.cfg files that do not include our FADEC module. Please use the standard livery or a known compatible 3rd party or community livery. Compatible liveries can be found in #media in our discord or here:

<https://docs.google.com/spreadsheets/d/1-FZh5ZNXsSoHZFRcvkQwa-PHuBSk1QRTt7eYvx7Q4xU/edit?usp=sharing>

Flight Plan Synchronization Between the Game and FMS

- You can still "file" your flight plan to ATC by entering it in the world map of MSFS and it will remain visible to ATC/VFR.
- To load the plan into the FMS you can either enter it manually or use the *FPLN RECALL (GAME/SB)* option in *IDX -> PAGE2 -> ROUTE MENU*
- Due to the increased accuracy and capabilities of the FMC managed flight plan, you may find that the sync to the game does not always work as expected or does not reflect the FMC flight plan.

Other Known Issues

- Some external applications that use the GPS/Flight plan SimVars may not function correctly or as expected.
- Loading and saving flights can have bad results.
- Custom liveries can render FADEC inoperative if they ship with a panel.cfg. You must uninstall them or remove their panel.cfg from the livery folder. This is a limitation of the Asobo livery system.
- Autopilot modes cannot be triggered via keybindings or controllers and must currently be triggered in the cockpit with the mouse.
- TOD sometimes will flash on the PFD during an approach.
- Sometimes a heading to altitude instruction on takeoff will display further than the first RNAV fix on an RNAV departure procedure; in these cases the workaround is to cross-check the DP chart and

remove the erroneous waypoint either by deleting the heading to altitude fix or dropping the first RNAV fix onto the magenta line in the LEGS page.

- Due to sim autopilot bank rate limitations, the aircraft may overshoot on certain RNP approaches with tight turns. If you encounter this, we recommend hand-flying the approach with the given lateral and vertical guidance.
- Sometimes when turning more than 90 degrees onto an approach segment, VNAV might give a NOPATH condition because it sees that you are too high. Engage FLC or VS and descend down and it should recapture the path.
- The FMS now builds turn anticipation into direct-to course projection. However, you will still encounter some overshoot beyond 90 or so degrees.
- If for whatever reason, you find that VNAV is not behaving as expected, try and turn it off and on again.
- FADEC CRU mode producing higher N1 at high altitudes than CLB mode - Current FADEC limitation.
- Squawk, TA/RA Mode and IDENT not currently available for use on VATSIM or IVAO and must come from pilot client (vPilot or equivalent).

For a more complete list of issues being tracked, please visit our GitHub page:

<https://github.com/Working-Title-MSFS-Mods/fspackages/issues>

Common Fixes

- **Blank Cockpit with no interior** - Check that you are using the latest version of the Mod found at the top. 0.8.2 or earlier is no longer compatible with the current version of MSFS.
- **Throttle doesn't move but still functions** - Incompatible livery, see above. Use default livery or one from the known list of working ones in #Media discord channel.
- **Engines not starting/shutting off randomly** - Rogue mixture axis bound to hardware - check hardware binds.

SIMBRIEF

Configuring the FMC for Simbrief import.

- Use Simbrief to create a flight plan and generate an OFP
- The Simbrief BETA Airframe can be found here: <https://bit.ly/3IFM0d3>
- Make note of your **PILOT ID**, a 5 or 6 digit number (XXXXXX), which appears in the Optional Entries section of the flight planning (Dispatch Options) page.

The screenshot shows a configuration panel with several sections:

- Profiles and Registration:** Climb Profile (240/64), Cruise Profile (MCR), Descent Profile (2000FPM), Fuel Factor (P00), Registration (N525WT), Fin Number (254), SELCAL Code (NONE), ATC Callsign (ZZZ1000).
- Optional Entries:** (fields are automatically calculated, but can be overridden)
 - Sched Time Enroute: 01:05
 - Departure Rwy: 28L
 - Arrival Rwy: 16L
 - Taxi Out / Taxi In: 20 / 08
 - Extra Fuel: 0.0 KG
 - Altitude: AUTO
 - Passengers: AUTO
 - Cargo: 0.0
 - ZFW: AUTO
 - Captain Name: D G
 - Pilot ID:** (highlighted with a red box)
- Dispatch Remarks:** A text area with the instruction: "CUSTOM DISPATCHER REMARKS - SEPARATE EACH REMARK WITH A NEW LINE".

- Load up the aircraft (you can start at a gate, parking position, anywhere you like).
- On the FMC, press **IDX** to open the INDEX page and go to PAGE 2.
- Click to open **MOD SET**
- Enter your PILOT ID in the scratchpad (**should be a 6-digit number**)
- Press the **LSK L2** button next to the - - - - - under SIMBRIEF PILOT ID header - this will turn **GREEN** if it has been accepted - this is now stored in the simulator and will remain persistent even after simulator restarts (you can skip these initial steps for future imports)
- Press **IDX** to open the INDEX page and go to PAGE 2
- Click to open **ROUTE MENU**
- You should see **FPLN RECALL** highlighted with your PILOT ID under it in green.
- Click **FPLN RECALL** and your flight plan should import; you will be returned to the **FPLN** PAGE and will be prompted to hit **EXEC** to finalize the new flight plan



THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

2 - LIMITATIONS

The real CJ4 is only rated for operation on 'paved surfaces' (runways), however because of the magic of MSFS, feel free to take off and land anywhere you'd like.

WEIGHT LIMITS

Maximum Ramp Weight	17,230lbs
Maximum Takeoff Weight (MTOW)	17,110lbs
Maximum Landing Weight (MLDW)	15,660lbs
Zero Fuel Weight (ZFW)	12,500lbs

SPEED LIMITS

M_{MO} (Above 27,884 feet)	Mach 0.77 (indicated)
V_{MO} (Between 8000 and 27,884 feet)	305 KIAS
V_{MN} (Below 8000 feet)	260 KIAS

Maximum Flap Extended Speed - V_{FE}

15 Degrees	200 KIAS
30 Degrees	160 KIAS

Maximum landing gear extended speed - V_{LE}	200 KIAS
Minimum speed for sustained icing conditions	160 KIAS

WIND LIMITS

Maximum landing tailwind	10 KTS
Maximum demonstrated crosswind	25 KTS

ENGINE LIMITS

Maximum N1(%)	104.4%
Maximum sustained TO power	5 minutes total per engine start/stop cycle

APPROACH TYPES

The CJ4 is certified for CAT I ILS or LPV/WAAS approaches with no less than 200' AGL minimums. BARO minimums must be used for all CAT I, LPV and other approaches.

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

3 - NORMAL PROCEDURES

CHECKLISTS

Full checklists have been implemented on the MFD – you can access them from the **UPR MENU** or the **CKLIST** button on the panel below the left MFD. This SOP is not a replacement for the checklists.

A PDF Version of the checklist is available here courtesy of Discord user SeeBread:

https://cdn.discordapp.com/attachments/767761280366805022/792995990659399700/WT_CJ4_Checklist.pdf

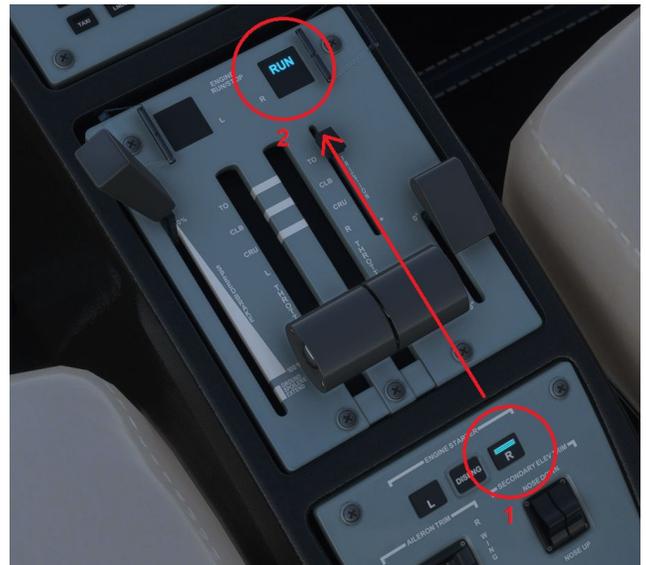
ENGINE START

Starting the engines in the CJ4 is a very simple task. Once the BATTERY is on, it requires no other configuration other than simply pressing the L or R ENGINE STARTER button and then without delay, pressing the L or R ENGINE RUN/STOP switch. Once the ENGINE STARTER button has been pressed, the **STOP** indication under the button guard will disappear and once pressed, will switch to **RUN** indicating that the start process has been initiated.

Monitor the MFD for the following indications:

1. **STARTER** indication on the MFD.
2. N2 will begin to rise followed slowly by N1 and ITT.
3. At 12% N2, **IGN** will be displayed next to the ITT indicator.
4. After the ignition sequence begins, N1 and ITT will continue to rise before stabilizing at approx. 25% N1, 600°C ITT and the **IGN** indication will extinguish.

Repeat the process for the other engine.



TAKEOFF AND LANDING V-SPEEDS

The **FMS PERF** pages provide for takeoff and landing V-Speeds, and these can be pushed to the PFD from the FMS on the relevant pages. A departure and arrival runway must be selected through the **DEP/ARR** button on the FMS prior to attempting to use the respective **PERF** page in the FMS.

These V-Speeds are influenced by flap settings, weight and other parameters that can be set in the FMS. V_{APP} and V_{REF} do not account for any gust or wind factor on approach. If you are landing in windy, gusty or

icing conditions, you can add a safety margin to your V_{APP} and V_{REF} speeds by pressing the **REFS MENU** above the PFD and manually adjusting any of the V-Speeds.

V-Speeds set by the FMS will be colored **MAGENTA** and those manually set or adjusted will be **CYAN** on the PFD.

DO NOT add more than 20 kts to the V_{REF} or V_{APP} speeds. A standard wind/gust factor addition of half the headwind component plus the gust value (not to exceed 20kts) is recommended.

NOTE: Be sure to complete the **PERF INIT** page and set up the weights according to how the aircraft is loaded, otherwise your V-Speeds will be inaccurate - *these do not calculate based on sim weights, but rather what the pilot inputs - just like the real aircraft!*

TAKEOFF PROCEDURE

The recommended takeoff procedure is in addition to completing the checklists.

Takeoff can be performed from either a rolling takeoff, without stopping after entering the runway, or as a static takeoff. For a static takeoff, hold the brakes and release them as the engine begins to spool up. Performance is generally not affected whether performing a static or rolling takeoff. For shorter airstrips, a static takeoff is preferred to ensure enough runway remains within the safety margins.

- (When entering runway) Enable **TOGA** - This will command a 10 degree pitch up attitude on the Flight Director and a path straight ahead. The FMA (scoreboard) will show **TO TO**.

NOTE: The TOGA button is normally found on the sides of the throttle but is currently INOP in the sim. The workaround is a shortcut we mapped to the FIRE BOTTLE directly under L ENG FIRE button - click to enable it. It can also be bound to a key or hardware switch.

AUTO THROTTLE TO GA Shift + Ctrl + g

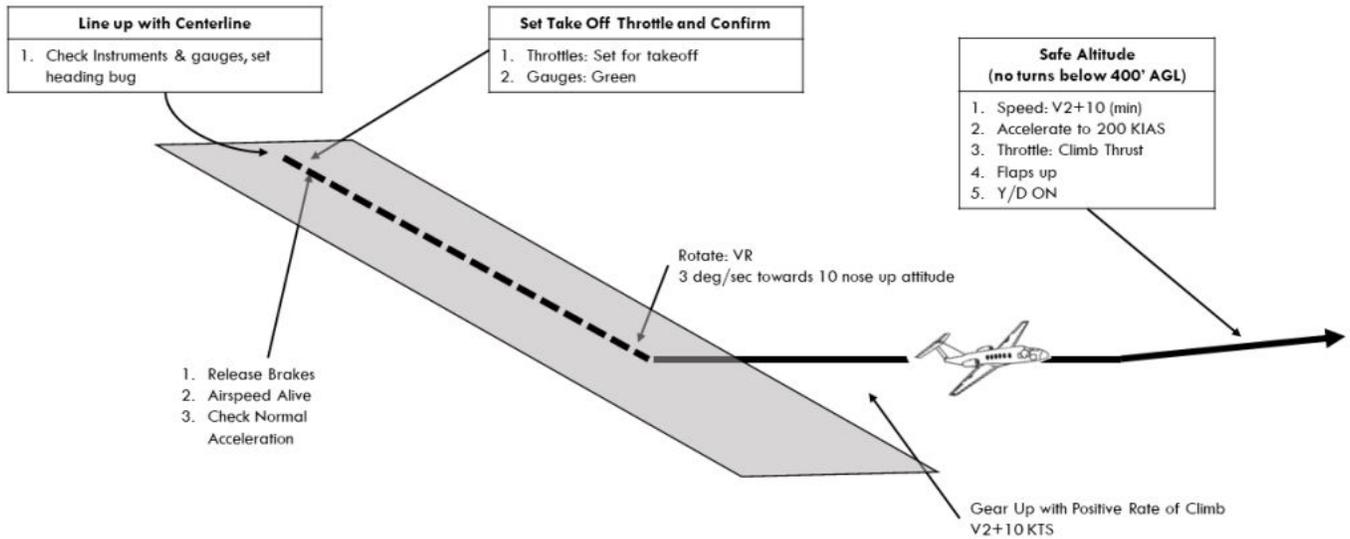


- Advance throttle to **TO** (Take Off) detent (full forward).
- After rotation, increase pitch to 10° nose up and trim accordingly.
- Retract gear and set FLAPS 0 after accelerating through $V_2 + 10$.
- Engage the Yaw Damper (**YD**) after retracting flaps.
- Passing 1,000' AGL, reduce power to **CLB** setting detent (FADEC will automatically manage power during the entire climb).
- Set target initial climb altitude with the **ALT** knob on the FGP (Flight Guidance Panel).
- Engage **FLC** mode and set target speed to 240 KIAS (AP will automatically switch to M0.64 when passing roughly FL300).
- Engage **HDG** or **NAV** mode depending on departure procedure.

Manage pitch angle to accelerate smoothly and when passing about 200 KIAS, you can enable the Autopilot (**AP**) – this is a personal choice, some will prefer to fly manually to 240 KIAS and then engage the **AP** to avoid having **FLC** pitch down for acceleration, others may wish to turn things over to the **AP** sooner. Anything above 200kts should work fine for **FLC**, the aircraft will reduce climb to reach 240 KIAS, then pitch up to maintain that speed through the climb.

NOTE: Minimum Autopilot (AP) or Yaw Damper (YD) engagement altitude after takeoff or go around is 300' AGL.

NOTE: Real-world procedures limit FADEC in **TO Mode** to 5 minutes maximum *per flight*.



CJ4

Normal Take Off

CLIMB PROCEDURE

Climb should be conducted at **240 KIAS/M0.64** - monitor Mach and IAS and after the crossover, maintain M0.64 (switched automatically). The newly implemented FADEC will manage climb power all the way to cruising altitude. You can expect climb rates in the 3,000-5,000 fpm range below 20,000' and in the 2,000-3,000 fpm range in the 20,000s. In the FL300s, you can expect climb rate to be around 2,000 fpm decreasing with altitude.

CRUISE PROCEDURE

Upon reaching cruise altitude you can use the throttle to set power to maintain your desired cruise speed, up to M_{MO}/V_{MO} . In the real aircraft any setting up to, but not including the CLB detent, can be used for cruise. There is no detent for CRU or auto-throttle.

Monitor fuel flow, range and time to reserve on the **PERF** pages.

DESCENT PROCEDURE

Descent can be conducted on a 3° flight path; this rate of descent can be estimated by multiplying your ground speed by 5, so at ground speed of 450 kts, a rate of descent of 2,250 fpm would give you ~3° descent. You can elect to descend faster, rates of up to 3000 fpm can be used, especially from cruise altitude.

Top Of Descent (TOD) can be calculated roughly for a 3° flight path by taking the difference between your current altitude and landing altitude, multiplying by 3 and dividing by 1000. So, for example, if you're cruising at 45,000' and you're landing in Denver at about 5,000', then $45000 - 5000 = 40000$; $40000 \times 3 = 120000$; $120000 / 1000 = 120$. So start descent 120 NM from Denver.

You can elect to use either FLC or VS to manage your descent; VS mode will allow you to more accurately target your descent to arrive at altitude constraints, but you need to constantly monitor your power settings and speed. Alternatively you can use FLC to descend by setting a target speed not above Vne/Mmo and then adjusting your power settings to achieve the target rate of descent.

Allow time to slow to 250 KIAS by 10,000' and it is not recommended to exceed a 3° descent below 250 KIAS. 3° at 250 KIAS is 1,250 fpm.

APPROACH AND LANDING

Program your approach into the FMS after checking destination weather and, when appropriate, confirming the expected approach from ATC. Attempting to change the approach after an approach has been initiated can result in FMS anomalies and will force you to return to the IAF if flying in LNAV mode.

If flying an ILS approach, use the FMS IDX -> NEXT PAGE -> ARR DATA page to check inbound ILS course and ILS frequency and then confirm the proper ILS frequency is set in the TUN page for NAV1.

Use the PERF FMS page to access the APPROACH REFS page; you will need to enter arrival weather data, such as wind, temperature (degrees C), and altimeter setting (inHG), as well as have an approach and runway selected in DEP/ARR in order for the APPROACH REFS page to work. Once page 1 is completed, hit NEXT to get page 2, where you can send your Vref and Vapp speeds to the PFD. Use the PFD REFS MENU to make any manual adjustments to the approach speeds to account for wind or gust factor.

Slow to 200 KIAS or less prior to initiating the approach and slow to no greater than 160 kts by FAF. For a precision approach it is recommended to be at Vapp by the FAF.

If flying an ILS, LOC or VOR approach, use the NAV button above the PFD to swap the selected navigation source to LOC1 or VOR1 (depending on approach type) once established on, or when manually intercepting, the final approach course.

When the AP is in NAV mode and a LOC or VOR is tuned on the PFD, the AP will follow guidance from that nav source. Prior to reaching the glideslope intercept altitude, press the APPR button to activate approach mode on the autopilot.

The Autopilot and Yaw Damper (YD) must be disengaged no lower than 200' AGL.

When crossing the runway threshold, pull the power smoothly back to idle and initiate flare and landing.

Upon landing, deploy the spoilers and use brakes as needed to slow the aircraft. The CJ4 does not have thrust reversers.

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

4 - WEIGHT AND BALANCE

Maximum Takeoff Weight (MTOW)	17,110lbs / 7,761kg
Basic Operating Weight (BOW)	10,280lbs / 4,663kg
Useful Load	6,830lbs / 2,894kg
Baggage Capacity	1,040lbs / 472kg
Fuel Capacity	5,762lbs / 2,614kg

The current, revised flight model provides seating for 7 passengers and 2 crew members. The lavatory seat is not able to be loaded at this time.

PILOT CO-PILOT



BAGGAGE RR

DISPLAY FUEL AS		GAL	LB
^ FUEL		75.00%	
LEFT MAIN	75.00%	322.50 gal	
RIGHT MAIN	75.00%	322.50 gal	
^ PAYLOAD		66.20%	
PILOT		170.00 lb	
CO-PILOT		170.00 lb	
MENU.PAYLOAD.PASSENGER_1		170.00 lb	
MENU.PAYLOAD.PASSENGER_2		170.00 lb	
MENU.PAYLOAD.PASSENGER_3		170.00 lb	
MENU.PAYLOAD.PASSENGER_4		170.00 lb	
MENU.PAYLOAD.PASSENGER_5		170.00 lb	
MENU.PAYLOAD.PASSENGER_6		170.00 lb	
MENU.PAYLOAD.COUCH		0.00 lb	
MENU.PAYLOAD.CABINET_FL		50.00 lb	
MENU.PAYLOAD.CABINET_FR		50.00 lb	
MENU.PAYLOAD.BAGGAGE_RR		200.00 lb	
Empty Weight / -		10,280 LB /	-
Fuel / Max Allowable Fuel		4,321 LB /	5,762 LB
Payload / Max Payload		1,660 LB /	2,509 LB
Total / Max Takeoff Weight		16,261 LB /	17,110 LB

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

5 - FLIGHT MANAGEMENT SYSTEM

The CJ4 features a Collins FMS-3200 as part of the Pro Line 21 Suite of avionics. Not all functions are currently available in MSFS at the moment. Some are just not implemented and may be at a later date, and others are just not possible or relevant in some cases. They will be grayed out in the FMS if they currently have no function.

These sections on the FMS will cover many of the basic operations but will not cover every detail, especially if it is not relevant to the simulation environment. It is an ongoing, work in progress.

MOD SET

This page on the FMS contains a number of user defined settings which will persist after each load. The **MOD SET** can be accessed via **IDX>NEXT>MOD SET**

CABIN LIGHTS - Turns the rear cabin lights to either **OFF**, **DIM**, or **ON** state.

SIMBRIEF PILOT ID - Input user PILOT ID for Simbrief import - MUST BE A 5 or 6-DIGIT NUMBER

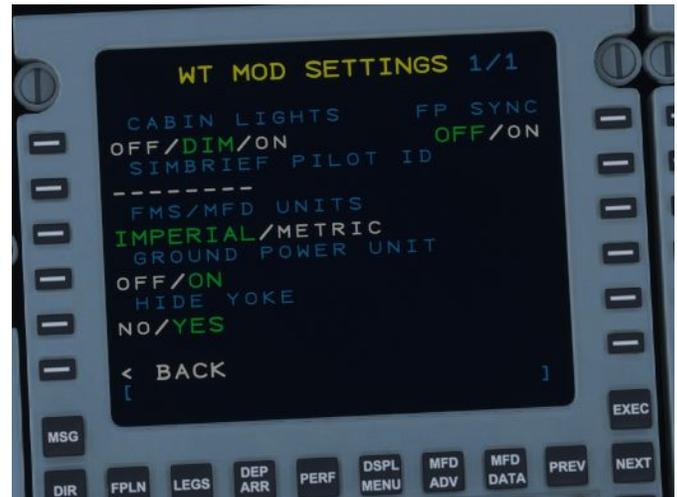
FMS/MFD UNITS - Toggles the FMS display and MFD between IMPERIAL and METRIC units.

NOTE: DOES NOT CHANGE THE PFD UNITS - That must be done through the **PFD MENU**.

GROUND POWER UNIT - Applies ground power to the aircraft - **WHERE AVAILABLE**. To receive power, you must be at a designated parking spot within MSFS that has ground power available to it.

HIDE YOKE - Applies a persistent setting to show or hide the yokes in the cockpit.

FP SYNC - Synchronizes to the MSFS flight plan from your FMS flight plan when toggled **ON**. The MSFS planner is fragile so this may lead to undesirable consequences.



STATUS

When the FMS first powers on, you will be presented with this **STATUS** screen.

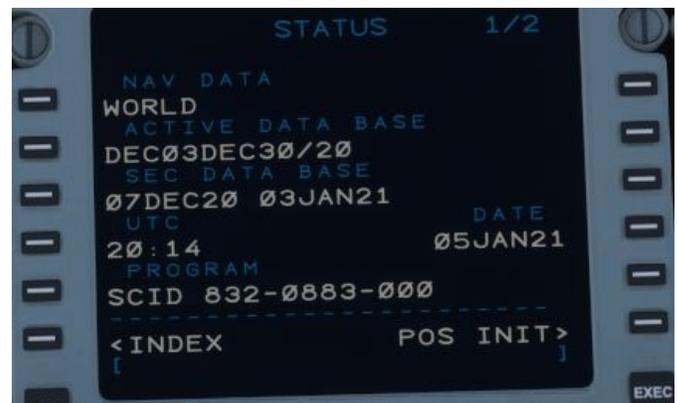
ACTIVE DATA BASE - Displays the active navigation database.

SEC DATA BASE - Displays the secondary navigation database.

NOTE: Both the **ACTIVE** and **SEC** databases do not update with revisions from Navigraph. They are hard-coded from ASOBO data at the moment.

UTC - Displays current UTC time.

DATE - Displays current date.



POS INIT

The **POS INIT** display allows you to initialize where the aircraft is currently. Many features of this page are not yet functional or even required presently for navigation; the sim knows the position of the aircraft at all times. Unlike the real unit, once the user enters an airport of **ORIGIN**, the rest of the fields will auto-populate.

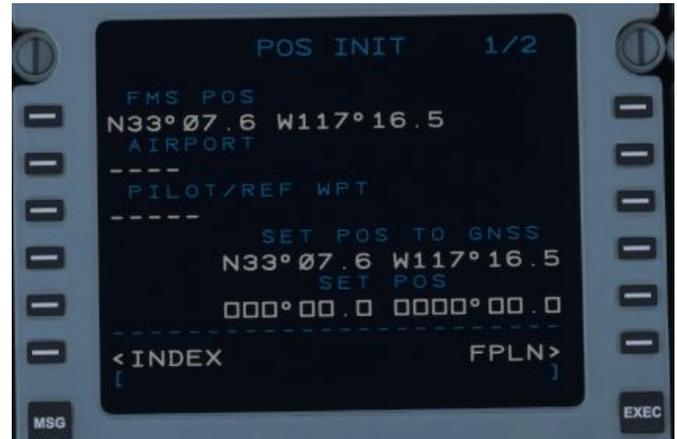
FMS POS - Displays coordinates of the aircraft's current FMS position.

AIRPORT - NOT IMPLEMENTED

PILOT REF/WPT - Allows for a reference airport to be entered.

SET POS TO GNSS - Displays current GPS position.

SET POS - Allows the user to set the current position of the aircraft - *input to this field currently has no effect on aircraft position.*



PERF INIT

PERF INIT is short for Performance Initialization. This is where initial aircraft performance is input into the FMS for calculating takeoff and landing performance data such as v-speeds and required lengths.

BOW - Basic Operating Weight. This is the weight of the aircraft WITHOUT passengers, baggage or fuel.

PASS/WT - Number of passengers (including pilots) and their weight. At this time, only the number of passengers can be modified.

CARGO - Weight of all cargo and baggage. This includes the cabinets and baggage from the load manager.

SENSED FUEL - The current sensed fuel amount in the aircraft. If the amount is changed, you will need to re-access the PERF INIT page before it will refresh.

CRZ ALT - Planned cruising altitude for the flight. Can be entered as a whole number (20000) or a FL (FL45).

ZFW - Zero Fuel Weight. This is the weight of the aircraft WITH passengers and cargo - excludes fuel. You can enter a ZFW independent of filling out the information in the left-hand column if it is calculated elsewhere. There FMS does not care about CG. It assumes that the aircraft is loaded within the limits and only uses the gross weights to perform v-speed and required length calculations. Hitting CLR on ZFW will restore the values for BOW, PASS/WT and CARGO.

GWT - Gross WeighT. This is the present, total weight of the aircraft with passengers, cargo, and fuel.



TAKEOFF

The TAKEOFF REF page is where the second part of performance calculations receives variables in order to determine v-speeds and takeoff lengths.

PAGE 1/3

RWY ID - Departure runway as selected from the DEPART page. **This MUST be selected before v-speeds will calculate!**

RWY WIND - Runway wind. Will automatically display the headwind and crosswind components as derived from **WIND** in **LSK 1R** (ie. **H4 L1**). See *LIMITATIONS* for maximum component values.

RWY LENGTH - Runway length of the departing runway based off the **RWY ID**.

RWY SLOPE - NOT IMPLEMENTED

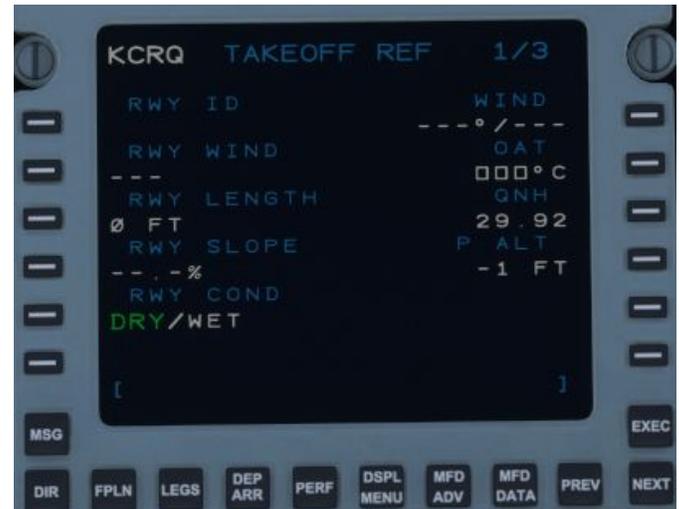
RWY COND - Runway condition. Allows for the selection between DRY/WET. A **WET** runway leads to a longer takeoff distance required.

WIND - Winds should be input from a magnetic reporting source such as audible ASOS or ATIS. Must be input as a 1-3 digit direction followed by a speed in knots (ie. **240/6, 5/10**). Leaving this field blank, the FMS assumes winds calm.

OAT - Outside Air Temperature in degrees Celsius.

QNH - Current altimeter reading.

P ALT - Pressure Altitude. Automatically calculated based on elevation, temperature and pressure.



PAGE 2/3

A/I - Anti-Ice. Toggles A/I OFF or ON. Slightly increases **TOFL**.

NOTE: MSFS does not currently model degraded performance when anti-ice is on.

T/O FLAPS - Take off flaps. Selectable between 0 and 15. Flaps 15 is almost always used for take off. Flaps 0 is used when the aircraft is heavy and the departure location is hot and high.

TOW/GWT/MTOW - Displays Takeoff Weight (TOW), Gross Weight(GWT), and Maximum Takeoff Off Weight (MTOW). Takeoff weight is currently GWT-100.

TOFL/ RWXX - Displays the required takeoff field length (TOFL) and the length of the set takeoff runway. TOFL is calculated from the start of the take off roll until the aircraft reaches 35' above the runway.

V1 - Speed after which a take off should not be aborted.

VR - Rotation Speed.

V2 - Safe speed for single-engine operation following an engine failure.

VT - Single-engine enroute climb speed. Always 140 KIAS.



Once all performance data has been input, v-speeds should appear in the right-hand column. To get them to display on the PFD, press the **SEND** button. A message IN PROGRESS will appear followed by COMPLETE once the process has finished and they will appear in **MAGENTA** on the PFD below the speed tape.

PAGE 3/3

Displays takeoff weight and limits.

FPLN (ACT FPLN)

The ACT FPLN page is where you begin when building out your flight plan. It is advisable to not program a STAR or approach until the enroute portion of the plan has been completed as this will prevent the entering of airways.

The flight plan in this example is: *KCRQ/24 PADRZ2.CHKNN LAX J1 AVE.ROBIE5 KSJG and ILS30L vectors-to-final.*

ORIGIN - Origin airport in 3 or 4 letter ICAO code.
Cannot be modified once airborne.

DIST - Direct distance from ORIGIN to DEST.

DEST - Destination airport in 3 or 4 letter ICAO.

ROUTE - NOT IMPLEMENTED

ALTN - NOT IMPLEMENTED

ORIG RWY - NOT IMPLEMENTED

VIA - If a SID is programmed from the **DEP/ARR** page, it will appear here. Otherwise, it will always be **DIRECT**

NOTE: Will not take user input on **PAGE 1 only**.

TO - If a SID is programmed, the exit-point of the SID will appear here on page 1. If not, input the first waypoint after the departure runway.

FLT NO - Allows user to enter a flight number.

SEC FPLN=(NOT IMPLEMENTED)

NOTE: In rare circumstances, it's possible that some airports will display as NOT IN DATABASE when in fact they are. To remedy this, simply hit CLR and reenter the airport into **ORIGIN** or **DEST**.

VIA (PAGE 2+) - After page 1 of the **ACT FPLN** page, **VIA** is used to enter airways to connect two points. Current operation dictates that you must enter the airway first using the LEFT **LSKs** and then connect it to an exit using the opposite RIGHT **LSK**. Airways



on page 2 will now connect from a STAR exit on page 1.

TO(PAGE 2+) - Similar to **VIA**, waypoints from the scratch pad are entered under the **TO** column using the RIGHT LSKs. They must be defined waypoints such as a VOR, NDB, intersection, or airport.

NOTE: Custom waypoints will not be accepted here; they must be entered on the **LEGS** page.

LEGS

After entering your flight plan, check the **LEGS** page to verify that all waypoints and altitude constraints are correct.

The **ACT LEGS** page lists all the waypoints in a flight plan in the **left** column. The **right** column, shown as `---/-----` lists the speed and altitude constraints for the waypoint in the **left** column.

`---/` The first 3-dashes *before* the `/` are **SPEED** constraints. Because the CJ4 does not have an autothrottle, these are for advisory purposes only; the aircraft will not adhere to them.
`/-----` The last 5-dashes *after* the `/` are **ALTITUDE** constraints.

Valid formats for constraints:

- 250/ or 250=Sets speed constraint to 250 KIAS
- 250/18000= Sets a speed constraint of 250 and an altitude constraint of FL180.
- 18000= Sets an altitude constraint of FL180
- FL200= Sets an altitude constraint of FL200
- 18000B= Altitude **AT or BELOW** FL180
- 9000A= Altitude **AT or ABOVE** 9000
- 10000A17000B=**AT or ABOVE** 10000 but **AT or BELOW** 17000.

NOTE: You can enter a speed constraint without a `/` up to 499 before it assumes it's an altitude. Entering 500 or higher will place it after the `/`. If you like to add an altitude constraint below 500, you must put a `/` before it.

Any value, up to 499, that appears with a `/` after it (**300/**) will become a **SPEED** constraint. Any value with a `/` before it (**/25000**) will become an **ALTITUDE** constraint.



SEQUENCE=AUTO/INHIBIT - When in **AUTO**, the FMS will automatically advance to the next waypoint and activate the next leg segment. If toggled with **LSK 1L** to **INHIBIT**, the aircraft will not advance to the next waypoint in the sequence.

NOTE: If the **AP** remains in FMS **NAV** mode with **INHIBIT** selected, the aircraft will continuously circle back to the last waypoint it crossed in **MAGENTA**.

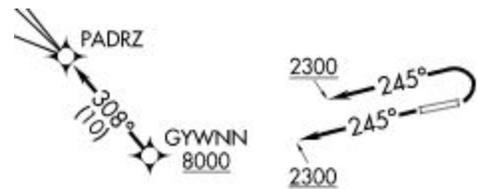
Above each waypoint are two sets of numbers. The first number is the leg track bearing and the second number is the distance between waypoints. In the last image above, GILRO is 351° from SNS and 23.0NM. Another way to understand it is that to go from GILRO to JENES, you would fly 304° for 15.0NM.

Several other special waypoints may also appear in the **LEGS** page:

(VECT) = A radar vector heading from the previous waypoint. The pilot is expected to switch the **AP** to **HDG** mode and receive radar vectors from ATC.

(2299)= An altitude constraint to cross at, at or above, or at or below. A number in (XXXX) is usually created for departures where an altitude constraint is required but not colocated with a waypoint.

Example: Above, the STAR says "fly HDG 245 to 2300, expect vectors to GYWNN." From **RW24** to (VECT) is a 245° heading with a **(2299)** altitude constraint. (The graphical STAR actually depicts 2300 or above.)



Page 1 of **ACT LEGS** depicts our departure runway, and the first several waypoints of our selected STAR. **LSK 1L** and **2L**, on page 1, have very special properties. Above, we see **RW24**, our departure runway, as the **FROM** fix. Placing any waypoint on **LSK 1L**, this **FROM** spot, will activate the next leg from that waypoint. The other special spot is **LSK 2L**, the **TO** fix. This always depicts which waypoint the aircraft is currently going to. In the above example, the waypoint the aircraft is going direct-to is **(2299)**. As the aircraft passes the **TO** fix, it becomes the **FROM** fix. When a manual direct-to is initiated, the FMS creates a new **FROM** fix, (**DIR**). This enables the aircraft to calculate a new course by drawing a line between the two points that the **AP** can follow or intercept. More information on **DIRECT-TO** operation is listed in the section below.

CUSTOM WAYPOINTS

The Working Title CJ4 now features the ability to add custom waypoints. To add a custom waypoint:

- Select the **LEGS** page.
- Enter the waypoint into the scratchpad.
- Press the **LSK LEFT** where you would like the waypoint to appear.

NOTE: Custom waypoints will not be accepted here; they must be entered on the **LEGS** page.

The following formats are acceptable to be entered into the scratchpad:



NOTE: The NAME at the end of a custom fix is optional.

Latitude and Longitude:

Format: N/SDDMM.MMW/EDDDMM.MM/NAME

Example: N4412.55W00405.25

Example: N44W00405

Example: 4404N*

*2-Digit latitude must always come before 2-digit longitude!

Format: FIXBEARING/DIST/NAME

FIX=Name of the FIX (IE. CHKNN, OCN)

BEARING=Bearing FROM the FIX (090)

DISTANCE=Distance FROM the FIX in NM (15)

NAME=Custom name of waypoint if desired.

Example: OCN090/15/WP1

Along Track Offset - This is useful if you need to hold a certain distance from a fix along an airway or arrival procedure, or comply with an altitude restriction.

Format: FIX/DISTANCE/NAME

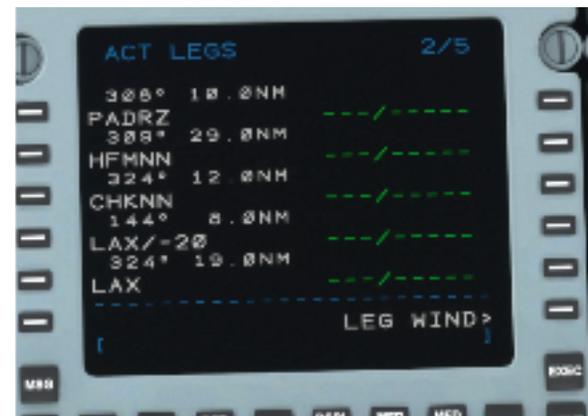
Example: LAX/-10 Would enter a waypoint along your route 10nm BEFORE LAX

Example: LAX/10 Would enter a waypoint along your route 10nm AFTER LAX

SHORTHAND LAT/LONG

N = North & West	Must be 5 characters long
E = North & East	Position of the letter indicates the hundreds value of the longitude
S = South & East	
W = South & West	Shorthand entries can not be named

3394N = 33N 094W	33N15 = 33N 115W
1244E = 12N 44E	12E67 = 12N 167E
3351W = 33S 51W	33W14 = 33S 114W
5456S = 54S 56E	54S17 = 54S 117E



DIRECT TO

There are two ways to initiate a direct-to a waypoint. It is **not possible to go direct-to a vector (VECT)**.

FROM LEGS

The first and most common method is to select the fix you wish to go direct-to from the **ACT LEGS** page. You can select any waypoint on any of the **LEGS** pages. In this case, we'll go direct-to GYWNN on PAGE 1/4. Select GYWNN on **LSK 5L**. It will then copy to the scratch pad. Then, select **LSK 2L**, the current (2299) fix. **EXEC** the command and the aircraft will now go direct to **GYWNN**.



FROM DIR

The second method is from **DIR** on the FMC keypad. Press the **DIR** button to bring up the **ACT DIRECT-TO** page. Select the fix you wish to go direct-to, cycling through pages as necessary. In this case, GYWNN again on PAGE 1. Click **LSK 2L** to select GYWNN. It will then bring you to the **MOD LEGS** page with the waypoint already placed in **L2**. Hit **EXEC** to confirm and the aircraft will now go direct to **GYWNN**.



NEAREST AIRPORTS

You can also go direct-to a nearby airport. From the **DIR** page, select **NEAREST AIRPORTS**. You will then be presented with a screen that lists your ORIGIN, your DESTINATION and the 3 nearest airports within a 200NM radius based on editable runway length. Default is 3000 but it will accept any value between 0 and 19999'. Select the airport you wish to go direct-to following the steps listed in above.



HOLDS

Another important feature of the FMS-3200 is the **HOLD** function.

To initiate a hold, press **IDX>HOLD**. You will then be taken to the **ACT LEGS** page. Find the page which contains the fix which you would like to hold at, or enter it manually. For this scenario, ATC requests that we hold as published, present altitude, on the arrival at ROBIE, 1 minute legs and an EFC time of 21:45z. The inbound course as listed on the ROBIE5 arrival chart is 308° with right-hand turns. Press **LSK 4L (1)** to bring ROBIE into the scratchpad. Once in the scratchpad, press **LSK 6L (2)** to initiate the **HOLD** set up process.



You will then be taken to a screen that says **MOD FPLN HOLD**

FIX=Current fix you are creating the hold on.

QUAD/RADIAL= (NOT IMPLEMENTED)

INBD CRS/DIR=The inbound course to the FIX followed by the turn direction of the holding pattern, **L** or **R**. Only a 3-digit radial (001°- 360°) plus a direction will be accepted by the FMS.

Examples: 308/R, 090/L, 008/R

LEG TIME=Time in minutes for inbound/outbound legs.

LEG DIST=Distance in NM for inbound/outbound legs.

NOTE: You can either fill out the LEG TIME or LEG DISTANCE, it is NOT possible to define both simultaneously. Defining one will define the other based on current groundspeed.

Example: 1.0 MIN LEG TIME = 2.3 NM LEG DIST

Example: 4.0 NM LEG DIST = 2.0 MIN LEG TIME

ENTRY=Automatically selected based on the incoming course to the hold FIX from. Possible options are **DIRECT** (Direct), **TEARDP** (Teardrop), or **PARALL** (Parallel) - these cannot be modified by the user.

HOLD SPEED=Selectable to FAA or ICAO. Will determine MAX KIAS based on present altitude. Advisory only. See *FAA or ICAO hold limits for more information.*



FIX ETA=Estimated time of arrival to the hold fix. If you are already established in the hold, it is the time to complete a lap to cross the fix again.

EFC TIME=Expect Further Clearance Time. Advisory only.

NEW HOLD=Reinitiates the **HOLD** creation process for additional holds if required.

When the hold is configured as required, press **EXEC** to insert it into the flight plan. The hold FIX will be duplicated and **HOLD AT** will appear ABOVE it.

To delete a hold, press the **CLR** button and then the corresponding **LSK** on the left side of the FMS to delete.

EXITING THE HOLD

To exit a hold, you may press **LEGS>EXIT HOLD**. The FMC will then note EXIT ARMED. You may also exit the hold from

FPLN HOLD. If you wish to stay in the hold, you can cancel the hold exit from both **LEGS** and **FPLN HOLD**.



NOTE - Upon arming a hold exit, the plane may immediately exit if it has already passed abeam the hold fix. From elsewhere in the hold pattern, the FMS will direct the plane to turn to the inbound leg. This turn cannot be canceled. However, if **CANCEL HOLD** is pressed, the plane will continue to fly the holding pattern after passing the hold fix.

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

6 - AUTOPILOT OPERATION

LIMITATIONS

Minimum engage height after takeoff	300ft AGL
Minimum disengage height during approach	200ft AGL
Yaw damper	Must be engaged after liftoff, disengaged before touchdown

FLIGHT GUIDANCE PANEL



Fig 6.1 - Flight Guidance Panel

FD

The **FD** button on the FGP enables or disables the flight director on the PFD. The flight director will now give appropriate lateral guidance even when the autopilot is disengaged, as of 0.9.0. The co-pilot independent flight director is not currently modeled.

VS

The **VS** button on the FGP enables or disables the Vertical Speed Hold mode of the Flight Guidance System. In this mode, the plane will adjust pitch to meet the desired vertical speed. The vertical speed can be selected using the vertical speed/pitch wheel, indicated by the **DOWN** and **UP** indications to the right of the wheel.

VNAV

The **VNAV** button on the FGP enables or disables VNAV. VNAV in the climb phase is an over-the-top mode that commands altitude captures at programmed restrictions in the flight plan while still climbing using the underlying selected vertical mode (**VS** or **FLC**). VNAV in the descent phase may be used as an over-the-top mode similar to the climb phase, but also provides a calculated descent path using the defined Flight Path Angle to meet the arrival and approach restrictions if no other vertical mode is selected. The default descent flight path angle is 3°. More details are available later in this chapter in the dedicated VNAV Operations section.

FLC

The **FLC** button on the FGP enables or disables Flight Level Change mode of the flight guidance system. In this mode, the plane will adjust pitch to keep the selected FLC airspeed. As such, the aircraft will increase pitch to slow, and decrease pitch to gain speed. The selected speed can be changed using the knob labeled

SPEED. Pressing the **SPEED** knob will toggle the speed hold between IAS and Mach hold modes. The selected speed bug **will not** be visible on the PFD unless FLC is the active vertical mode.

NOTE - The Cessna Citation CJ4 is not equipped with an autothrottle. Selecting FLC will not automatically adjust the throttle to meet the desired airspeed. Airspeed in FLC is controlled **only** by plane pitch angle. It is the pilot's responsibility to select the correct throttle setting for the desired climb or descent rate.

NAV

The **NAV** button on the FGP enables or disables FMS or radio LNAV. If the currently selected navigation source is the FMS, the FGS will command the aircraft to follow FMS guidance via the flight plan. However, if the currently selected navigation source is either NAV1 or NAV2, then the FGS will follow the selected nav radio. Changing the selected radial course to the nav source can be accomplished using the **CRS1** (for NAV1) and **CRS2** (for NAV2) knobs on the FGP. Pressing either knob will select a course that takes the aircraft directly to the tuned nav source.

½ BANK

The ½ **BANK** button will engage or disengage ½ Bank mode, which limits the maximum bank of the aircraft. Normal maximum bank is 30°, and ½ bank is 15°.

HDG

The **HDG** button on the FGP enables or disables the Heading Hold mode of the FGS, which commands the plane to follow the currently selected FGP heading. The selected FGP heading can be changed using the knob on the FGP labeled **HDG**. Pressing the HDG select knob will synchronize the selected heading to the current airplane heading.

APPR

The **APPR** button on the FGP enables or disables the Approach mode of the FGS. The Approach mode is a unique mode in that it controls both the **APPR** lateral mode and the **GS** or **GP** vertical modes. Enabling approach mode during an ILS approach will activate **APPR** and arm **GS**, while enabling approach mode during a RNAV approach will activate **APPR** and arm **GP**. The armed vertical mode will become active when the ILS glideslope or RNAV glide path have been captured and the FGS is providing active vertical guidance.

NOTE - Automatic NAV to NAV transfer functionality is currently not yet modeled. You must manually select the ILS nav source using the **NAV↓** button on the Display Control Panel (DCP) above the PFD if you are flying an ILS approach using **APPR** and **GS**. Failure to do so may result in the autopilot being unable to capture the ILS.

The approach briefing should include a check of the FMC TUNE page, to ensure that the right ILS frequency has been tuned for the approach before activating **APPR**.

B/C

The **B/C** button on the FGP enables or disables ILS backcourse approach mode. This mode will direct the FGS to fly the backcourse of the tuned ILS navigation source. **B/C** mode does not apply to RNAV approaches.

ALT

The **ALT** button on the FGP enables or disables altitude hold mode on the FGS. This mode directs the aircraft to hold the selected FGP altitude. The selected altitude can be changed with the **ALT** knob. Pressing the **ALT** knob will synchronize the selected altitude with the current altitude.

YD

The **YD** button on the FGP enables or disables the aircraft yaw damper. The yaw damper is always engaged if the autopilot is engaged.

AP

The **AP** button on the FGP enables or disables the autopilot (FGS). Enabling the autopilot will immediately command the aircraft to follow the selected FGS modes.

YD/AP DISC

The **YD/AP DISC** breaker bar forcibly disconnects the FGS from commanding the aircraft control surfaces. This bar is only used in emergency scenarios when the autopilot cannot be disengaged via normal means. Pressing the bar back in reconnects the FGS.

FLIGHT GUIDANCE SYSTEM DISPLAY (SCOREBOARD)

The Flight Guidance System display is located at the top of the pilot and co-pilot Primary Flight Displays (PFD). This display annunciates the status of the FGS and what FGS modes are armed and/or currently active, reflecting the mode selections of the pilot as pressed on the Flight Guidance Panel (FGP).

Active Lateral Mode	Autopilot/YD Status	Active Vertical Mode
LNV1	AP ←	VS 2000 GS
Armed Lateral Mode	Active FGS Side	Armed Vertical Mode

Fig 6.2 - FGS Display Layout

Active Lateral Mode

The currently active lateral guidance mode being followed by the FGS. Valid modes are:

- **ROLL** - Commands the plane to roll to level

	<ul style="list-style-type: none">● HDG - The plane will follow the selected heading from the FGP● LNV1 - The plane will follow the flight path directed by the FMS flight plan● NAV - The plane will follow the selected nav radio source● APPR - The plane will follow the selected approach● TO - The plane will follow the runway heading
Armed Lateral Mode	The currently armed but not yet active lateral guidance mode. Valid modes are the same as the above modes.
Autopilot/YD Status	The current status of the autopilot and yaw damper. The yaw damper is always engaged if the autopilot is engaged. <ul style="list-style-type: none">● AP - The autopilot is engaged● YD - The yaw damper is engaged* *YD will not be annunciated when AP is engaged
Active FMS Side	The currently active FGS side (pilot side or copilot side). If the active side points towards the pilot position, the annunciation will be green, else it will point away and be white. <i>Currently the active side is always the pilot side.</i>
Active Vertical Mode	The currently active vertical guidance mode being followed by the FGS. Some vertical modes will be preceded by a V if VNAV is currently enabled. Valid modes are: <ul style="list-style-type: none">● PITCH - The plane will follow the selected FGP pitch● FLC - The plane will adjust pitch to meet the selected FGP airspeed● VS - The plane will follow the selected FGP vertical speed● ALT - The plane has captured and will remain at the selected or VNAV directed altitude● ALTC - The plane is currently capturing the selected or VNAV selected altitude● ALTS - The plane will capture the FGP selected altitude when reached● ALTV - The plane will capture the VNAV directed altitude when reached● PATH - The plane will descend along the calculated VNAV path● NOPATH - The plane is unable to automatically descend along the calculated VNAV path because the plane is too far above the path● TO - The plane will be directed to a 10° nose-up pitch● GS - The plane will follow the selected and tuned ILS approach glideslope● GP - The plane will follow the RNAV approach descent glide path

Armed Vertical Mode

The currently armed but not yet active vertical guidance mode. Valid modes are the same as the above modes.

VNAV OPERATION

The VNAV mode of operation provides vertical navigation that respects the flight plan defined altitude restrictions during the climb, cruise, and descent phases of flight. Flight plan altitude restrictions are automatically loaded when a departure, arrival, or approach procedure are selected on the FMC **DEP/ARR** pages, and may also be entered by the pilot into the FMC **LEGS** page manually.

NOTE - The CJ4 FMC does not operate the same as an airliner style FMC for VNAV operations. The FMC will display **only** loaded or entered altitude restrictions and **will not** populate anticipated altitude crossings at each fix. This is normal operation, and VNAV will still fly the calculated path.

There is no need to populate altitude restrictions for each fix.

VNAV will automatically determine if you are in the climb or descent phase by looking at the current flight plan segment.

VNAV CLIMB

In VNAV climb (climbing to the selected altitude with VNAV engaged), VNAV will not calculate a climb path. The climb rate is at the pilot's discretion, and is managed using **VS** (indicated by **VVS** while in VNAV) or **FLC** (indicated by **VFLC** while in VNAV). However, VNAV will look at the programmed climb altitude restrictions and will select an altitude to hold at to maintain those restrictions.

Because the climb rate is at the pilot's discretion, **AT OR ABOVE** restrictions are up to the pilot to meet. VNAV will hold altitude for **AT** and **AT OR BELOW** restrictions.

VNAV DESCENT

In VNAV descent, the default vertical guidance mode (with no other vertical modes selected) is **PATH**. VNAV Path calculates 1 or more descent segments to fly, taking into account programmed altitude restrictions, based on the Flight Path Angle defined in FMC **VNAV SETUP**. VNAV Path will split the descent into multiple segments in the case where a level-off at a restriction altitude is required during a leg of the descent.

Each VNAV descent segment is preceded by a Top Of Descent (TOD) marker in green on the PPOS and PLAN PFD/MFD map displays. The TOD marker will appear on the map no later than when the aircraft is within ~20NM from the calculated top of descent for the current descent segment. It is normal to encounter multiple level-offs with TODs during a planned descent.

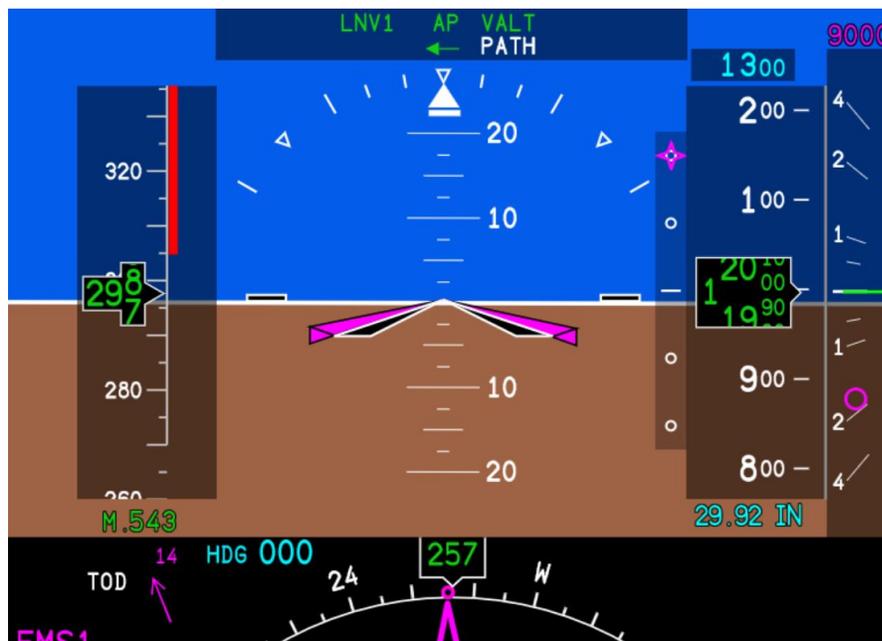
VNAV PATH

When the aircraft is within 1000ft of the calculated VNAV descent path, VNAV will automatically arm **PATH** with the FGS. This informs the pilot that when the descent path is captured, that **PATH** will become the active vertical guidance mode, and that the plane will follow the calculated descent path. Vertical guidance will continue to track the calculated descent path, leveling off for programmed altitude restrictions as necessary. If the pilot selected altitude is to be captured, the armed vertical mode will be **ALTS**. If the VNAV target altitude is to be captured, then the armed vertical mode will be **ALTV**.

If the aircraft is above the capture range of the path during a planned descent segment, **NOPATH** will appear in the armed vertical mode slot. This indicates that VNAV cannot capture the path from above from the current position, and the pilot will need to descend to the path using **VS** or **FLC** modes.

VNAV does not adjust or actuate the aircraft engine throttle. It is up to the pilot to manage the aircraft horizontal speed manually with throttle control.

VNAV DISPLAY



Vertical Deviation Indicator

The vertical deviation indicator, appearing to the left of the altitude tape, indicates the amount of deviation from the calculated VNAV descent path. The magenta snowflake indicates the aircraft's current vertical deviation from the path.

VNAV Target Altitude

The VNAV target altitude indication, a magenta altitude that

	<p>appears above the vertical speed bar, shows the next programmed restriction in the plan. This restriction will appear if the selected altitude is under the restriction, indicating to the pilot that the restriction is taking precedence over the lower selected altitude.</p>
Vertical Speed Advisory Pointer	<p>The vertical speed advisory pointer appears as a magenta donut in the vertical speed bar, and shows the minimum vertical speed required to meet the next programmed restriction, if the descent was to be immediately initiated.</p>
PFD TOD Alert	<p>A TOD alert will appear on the upper left of the bottom half of the PFD display when the plane is within 1000ft vertical deviation of the next TOD. The TOD alert will flash approximately 5-10 seconds before the descent is initiated to alert the pilot to an impending vertical speed change that will require throttle management.</p>