XP_GLJ25-28_v4_P3D_MANUAL_En_01.pdf
Rev. 02 - 07/24/2023

XP GATES LEARJET 25/28 v4.0 FLIGHT MANUAL

ADD-ON CLASSIC BUSINESS JET
for Lockheed Martin® Prepar3D®

RELEASE NOTES

GLJ MODEL 25/28 V4 ADDON

In this manual, the **GLJ Model 25/28 v4** addon refers to either the **GLJ Model 25 v4** addon or the **GLJ Model 28 v4** addon for Prepar3D. These are **two different products** that are sold separately, or together in a special bundle. Please visit our website for more details and pricing information.

PREPAR3D V5.4

The **GLJ Model 25/28 v4** addon for Prepar3D v5.4 is a native version that is not compatible with other versions of Prepar3D. New addon versions for future versions of Prepar3D may become available later. **Make sure that you download and install the correct addon version for your simulation platform.**

PREPAR3D V6

At the time of this writing, Lockheed Martin announced the release of **Prepar3D v6**. Our GLJ Model 25/28 v4 addon for Prepar3D v5.4 is not compatible with Prepar3D v6. We are working hard to make the addon fully compatible and a **patch** will be released soon (free for registered users). Software updates are listed at the bottom of each product page on our website. Registered users must login to their Xtreme Prototypes online account to download patches.

MSFS 2020

Our GLJ Model 25 and GLJ Model 28 addons for **Microsoft Flight Simulator 2020** are currently in production and will be released as **new products** at a later date. Visit our website regularly for new product announcements and pricing information.

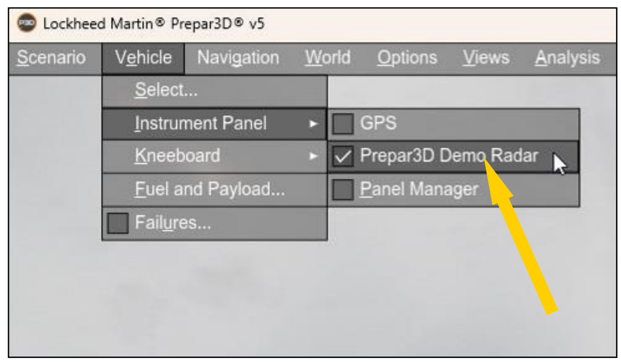
Please note that Xtreme Prototypes has ceased producing new addons for FSX.

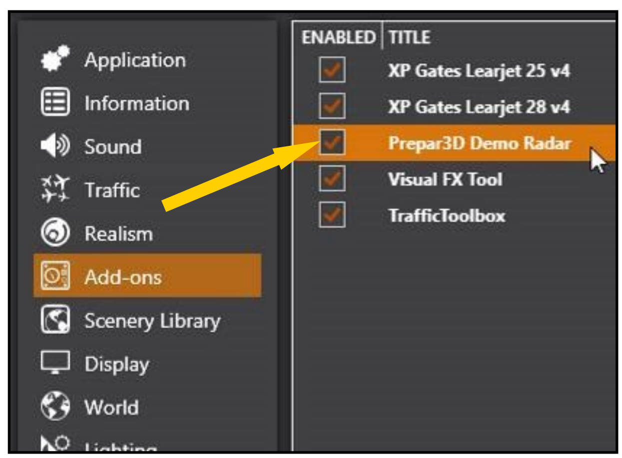
PREPAR3D DEMO RADAR INSTALLATION

For users who don't have access to a third-party weather radar and as an alternative to the dummy radar screen that is installed by default in the virtual cockpit of the GLJ Model 25/28 v4 addon, we have included a custom add-on package for installing the **monochrome Prepar3D demo radar** that comes with the Prepar3D SDK.

Note: *The Prepar3D Demo Radar addon is supplied "**as is**" **for demonstration purposes only**. The radar comes with the Prepar3D SDK as an example to demonstrate the radar capabilities available through the PDK. We do not pretend that it is a full featured replacement for a genuine third-party weather radar system. Please refer to the Prepar3D SDK for more information about the demo radar (under PDK Samples, "Radar Panel Callback Sample"). Please note that some existing third-party addons may no longer be compatible with the latest versions of Prepar3D or might have new features that were not available at the time of this writing. Xtreme Prototypes cannot provide technical assistance for third-party add-on software and is not responsible for changes in third-party software that would prevent the GLJ Model 25/28 v4 add-on aircraft or the third-party software from performing or being used, including the discontinuation of such third-party software.*

RELEASE NOTES





You will find the **Prepar3D Demo Radar** add-on package folder (“**XP_Prepar3D_Radar**”) in the “**Extras**” folder of the GLJ Model 25/28 v4 add-on package folder.

(The GLJ Model 25/28 v4 add-on package folder was copied to your “**Prepar3D v5 (or later) Add-ons**” folder (normally located in your Windows “Documents” folder) when you first installed the GLJ Model 25/28 v4 addon on your computer.)

Panel configuration files (“**panel.cfg**”) for adding the Prepar3D Demo Radar to the virtual cockpit (along with other third-party addons, if required) are included in the “**Custom_Panels_**” folders, in the GLJ Model 25/28 v4 add-on package folder (refer to appendix 2, pages 2-5, for the location of the preconfigured “panel.cfg” files).

To install the Prepar3D Demo Radar, proceed as follows:

1. Copy the “**XP_Prepar3D_Radar**”add-on package folder from the “**Extras**” folder to your “**Prepar3D v5 Add-ons**” folder.

2. Select the “**panel.cfg**” file that best suits your needs from the “**Custom_Panels_**” folders, and copy the selected “panel.cfg” file to the aircraft’s **panel** folder (refer to appendix 2, pages 5-6, for the location of the aircraft’s panel folder).

The “panel.cfg” configuration file will also install the Prepar3D demo radar as a “popup” gauge/window, available from “Prepar3D > Top Menu Bar > Vehicle > Instrument Panel > **Prepar3D Demo Radar**” (see top right).

After the “**XP_Prepar3D_Radar**” add-on package is copied to your “Prepar3D v5 Add-ons” folder, a dialog will pop up the next time you launch the simulator asking if you’d like **to enable** the **Prepar3D Demo Radar** addon. Click **Yes** to enable the addon.

To remove the Prepar3D Demo Radar from your computer, **remove (or delete)** the “XP_Prepar3D_Radar” add-on package folder from the “Prepar3D v5 Add-ons” folder. You can also leave the add-on package folder in your “Prepar3D v5 Add-ons” folder and **unselect** the Prepar3D Demo Radar addon on the “Prepar3D > Top Menu Bar > Options > General > **Add-ons**” page (recommended, see above).

RELEASE NOTES

After the radar is removed from the “Prepar3D v5 Add-ons” folder, you will need to select another “**panel.cfg**” file that best suits your needs from the “**Custom_Panels_**” folders, and copy the selected “panel.cfg” file to the aircraft’s **panel** folder (see 2, previous page).

Note: *The “control gauge” that acts as the interface between the buttons and knobs of the generic radar 3D model in the virtual cockpit and the Prepar3D Demo Radar (“**controls_radar_P3D.xml**”) is already preinstalled in the GLJ Model 25/28 v4 add-on package’s “Gauges” folder. You don’t need to copy it. Refer to appendix 2, pages 13 and 19 to 27, for more information about the “control gauges”.*

Refer to appendix 2 for more details about “**Adding Third-Party Addons, Systems and Gauges**” to the cockpit of the GLJ Model 25/28 v4 add-on aircraft. For more information about **installing third-party radars**, refer to appendix 2, page 13.

Customizing the virtual cockpit of the GLJ Model 25/28 v4 for third-party addons, systems and gauges may require some research and experimentation on your part.

Don’t be discouraged if your third-party radar does not work as expected the first time you install it. Configuration errors are frequent and may prevent your radar or the GLJ Model 25/28 v4 addon from functioning properly. If necessary, check all the changes you have made. We always recommend making copies of the original files and folders before making any change.

Note: *File and/or folder names may vary from one Prepar3D version to another. For simplicity and standardization with our own add-on packages, our custom Prepar3D Demo Radar add-on package (folder and file) structure differs from the one suggested by Lockheed Martin in the SDK. Either is good. We also changed the name of the Prepar3D Demo Radar add-on package to “**XP_Prepar3D_Radar**” to avoid confusion with other installed addons. Xtreme Prototypes add-on packages all have the prefix “**XP_**”. You may have to modify the aircraft’s “panel.cfg” file depending on your version of Prepar3D and the third-party radar gauge you wish to install in the future (radar name may be different). See appendix 2, page 13.*

Known Issue: *During our early tests in Prepar3D v5, we have noticed that the Prepar3D Demo Radar, when installed in the virtual cockpit, might have interfered with some of the instrument tooltips, and with how the tooltips were displayed. We still don’t know what might have caused the issue and we have informed Lockheed Martin about it.*

How to Operate the Prepar3D Demo Radar

The radar requires avionics and AC power to function. Make sure the Main Battery Switches [8-9, fig. 5-30] (or the Generator Switches [6, 11, fig. 5-30]) are **ON**, the Inverter Switches [10, 12, fig. 5-29] are **ON** and the Radio Master Switch (avionics) [14, fig. 5-29] is **ON**.

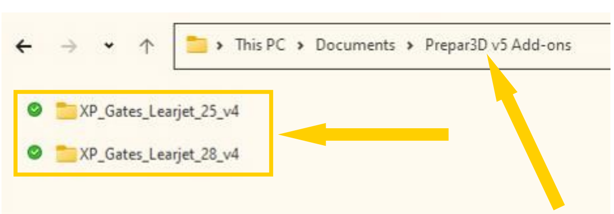
The radar is turned off when the Mode Selector Knob [2, fig. 5-26] is set to the **OFF** position or if there is no AC power (inverters **OFF**). A blank screen will appear on top of the radar gauge when it is off. With AC power on, the radar is turned on when the Mode Selector Knob is set to any other position, and the blank screen is removed from the radar gauge. This is hardcoded in the radar 3D model and cannot be changed.

- **RANGE function:** RANGE buttons on the radar 3D model
- **SWEEP function:** GAIN knob on the radar 3D model
- **ZOOM function:** MAP buttons on the radar 3D model
- **FREEZE IMAGE function (ON/OFF):** HOLD button on the 3D model
- **TRACK CURSOR function (ON/OFF):** Either TRACK button on the 3D model

Note: *These settings can be changed in the radar "control gauge" (see previous page). We do not recommend editing the radar control gauge, unless you are familiar with XML gauge programming and Lua scripting.*

SOFTWARE INSTALLATION

For version 4, we wanted to keep things as simple as possible. The GLJ Model 25/28 v4 add-on aircraft will be installed as a single and unique "**add-on package**" to be copied to your your "**Prepar3D v5 (or later) Add-ons**" folder, normally located in your Windows "**Documents**" folder.

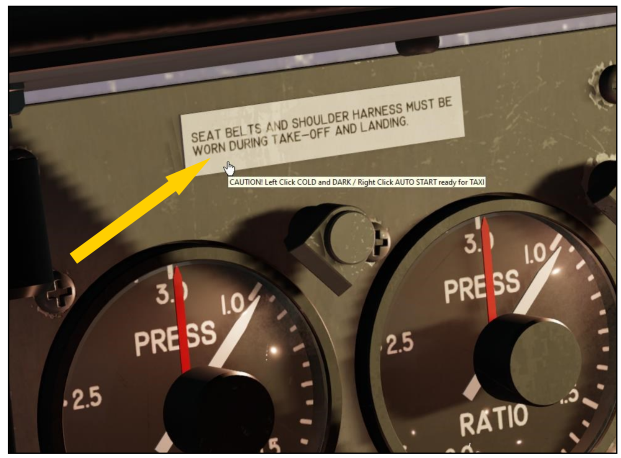


This is the method of installation recommended by Lockheed Martin. The package provides a centralized list of all the add-on components necessary to load the add-on aircraft in the simulator.

Refer to section 2 for more information about adding and removing add-on packages.

"COLD AND DARK" AND "AUTO-START" SEQUENCERS

The white seatbelt label located in the upper center section of the main instrument panel [10, fig. 5-17a; 6, fig. 5-17b] is a hot spot for initiating a "**Cold and Dark**" reset cycle or an "**Auto Start**" sequence.



In version 4, we have separated the scripts for the **Cold and Dark Reset** and **Auto Start Sequence** into distinct XML gauges that can be edited by the user. If you are familiar with RPN scripting and with how XML gauges are created for Prepar3D, **you can add or remove procedures** that are performed automatically when the scripts are executed. We recommend editing these "reset" gauges only if you know what you are doing. Please make backup copies of the gauges before modifying their content. The gauges are in the "Gauges" folder inside the add-on package's main "Content" folder. Depending on the addon you have purchased, the gauges are:

- resets_GLJ25_basic.xml
- resets_GLJ25_GTN750_x2.xml
- resets_GLJ28_basic.xml
- resets_GLJ28_GTN750_x2.xml

See section 6, pages 9-11, for more details.

THANK YOU FOR PURCHASING YOUR SOFTWARE LICENSE!

Xtreme Prototypes is a small independent add-on aircraft developer, and we depend largely on your feedback and support to create better products. Contributions from our users, in the form of software license purchases, allow us to pursue our mission. By doing so, you are contributing to the making of unique high quality addons for serious desktop pilots. In addition, your license gives you access to free personalized online technical support, patches, and rebates on selected products.

This manual is to be used in conjunction with the Xtreme Prototypes GLJ Model 25/28 v4 addon only. It is part of a software package, and it is subject to the terms and conditions of the end-user software license agreement (see section 1, page 18).

You are authorized to print a copy of this manual for your own use, in conjunction with the Xtreme Prototypes GLJ Model 25/28 v4 add-on software for which you obtained a license.

Xtreme Prototypes GLJ Model 25 v4 for Prepar3D
Xtreme Prototypes GLJ Model 28 v4 for Prepar3D

All images are unaltered, actual screenshots captured in Lockheed Martin Prepar3D v5, except where otherwise noted.

Xtreme Prototypes virtual aircraft models are artistic interpretations inspired by real-world models and prototypes. They are in no way intended to represent real aircraft or to be used as training tools for professional pilots. There are significant differences between the models and the real aircraft.

For historical accuracy and educational purposes, portions of this manual are inspired by the original Gates Learjet 25/28 flight manuals published during the 1970s by Gates Learjet Corporation, and from other sources. Xtreme Prototypes is not affiliated with Bombardier Learjet, Bombardier Aerospace, Gates Corporation or any other company, entity or organization related to the development of the Lear Jet/Learjet 20 Series aircraft from 1960s-1980s.

Xtreme Prototypes addons and manuals for the general public are considered edutainment software and shall not be used for real-world pilot training.

Software features, online content, prices, and release dates are subject to change without notice.

WELCOME ABOARD!

Welcome to version 4 of our GLJ Model 25/28 addon, our definitive and most advanced, study-level Gates Learjet 20 Series business jet simulator for Lockheed Martin Prepar3D!

This release contains many new features and improvements over previous versions, including revised exterior/interior 3D models with additional animations, new PBR materials and textures, 20 new liveries, new aircraft interiors, instrument panel dynamic light effects, dimmable cockpit and cabin lights, over 40 visual effects, more than 120 sound effects including new cockpit and cabin sounds, a new sound system, new Learjet custom aircraft systems including a fully simulated anti-ice system with visual effects, and two different cockpit configurations with support for third-party GPS/GNS/GTN systems and radars.

Nicknamed “fighters in civilian clothing” because of their sleek design and amazing performance, the classic Lear Jet/Learjet 20 Series aircraft were the first true executive jets and redefined business aviation during the 1960s and 70s, flying high above the weather at transonic speeds. Their capabilities earned them a place among the extreme aircraft, setting record after record.

With the longer-range Gates Learjet Model 25D came a longer cabin, increased seating capacity, more flexible loading options, greater fuel capacity and a rather sleek-looking stretched fuselage.

The Gates Learjet Model 28 along with its longer-range sister ship, the Model 29, represented the epitome of the straight-turbojet executive aircraft in the late 1970s and early 80s. With a fuselage based on the acclaimed Model 25, it had a new wing dubbed the “Longhorn” that replaced the traditional tip tanks with upswept winglets, the first ever on a jet, which provided a dramatic reduction of induced drag, therefore stretching range and enhancing climb performance.

In February 1979, former NASA astronaut Neil Armstrong and Learjet test pilot Pete Reynolds set five world records for altitude gain and sustained altitude in a business jet when their Model 28 climbed from the ground to nearly 50,000 feet in about 12 minutes.

Both airplanes are fast, slim, sexy, comfortable, and capable of maneuvers you would never attempt with another civilian aircraft. According to some real-world pilots, their performances as general aviation business jets are simply unequaled, even by today’s standards!

The Xtreme Prototypes GLJ Model 25/28 v4 is a next generation addon optimized for the latest versions of Prepar3D and designed to take advantage of the new and more powerful gaming computers and graphics cards that are available today. Nothing was spared in our efforts to reproduce the different instrument panels, carefully modeling and animating each mechanical device with all the necessary moving parts. Except for the LCD screens and the new radio's VFD displays, no flat 2D gauges are used in this model. Everything you see is modeled in full 3D!

The result is a unique addon that strives to bring you not only the actual feeling of flying a high-performance aircraft now equipped with modern avionics, but also the spirit of maneuvering such a vehicle at times where large LCD screens and powerful computers didn't exist, and where pilots needed to know how to fly and navigate with minimal resources and rely on their own experience, abilities, and judgment.

We believe our GLJ Model 25/28 v4 addon is the most advanced, detailed, and faithful classic Learjet simulation you can find.

Becoming one of our users makes you an important member of our development team. Version 4 of our GLJ Model 25/28 addon is the product of the many ideas, comments, and suggestions we received from desktop pilots like you from around the world since version 1 of our 20 Series business jet addons was launched back in 2009.

We wish to express our gratitude to all our users, followers, reviewers, test pilots, ex-Learjet employees, partners, and friends for their contribution to the making and success of this extreme aircraft simulator. Thank you for your continuous support!

Xtreme Prototypes

The development team at Xtreme Prototypes
July 2023

Important

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- At the time of this writing, Lockheed Martin announced the release of **Prepar3D v6**. Our GLJ Model 25/28 v4 addon for Prepar3D v5.4 is not compatible with Prepar3D v6. We are working hard to make the addon fully compatible and a **patch** will be released soon (free for registered users). Software updates are listed at the bottom of each product page on our website. Registered users must login to their Xtreme Prototypes online account to download patches.

- The XP GLJ Model 25 and 28 addons for **Microsoft Flight Simulator 2020** are currently in production and will be released as **new products** at a later date. Visit our website for new product announcements. Please note that Xtreme Prototypes has ceased producing new addons for FSX.

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SECTION 1

ABOUT THE REAL 20 SERIES

Up until the 1960s, business executives flew around in piston-powered propeller aircraft. These vehicles were usually conversions from World War II light bombers and transporters. Although many of them were faster, hot-rodded versions of the originals, as airlines adopted turbine power many executives were now considering commercial travel to save time and gain the comfort of flying above the weather in a pressurized cabin.

William Powell "Bill" Lear (1902-1978) recognized this as a market opportunity and became focused on providing businesspeople with personal jet-propelled transportation worldwide. As an inventive entrepreneur, Lear was already providing converted WWII machines to the market he coveted so he understood what his customers needed. Nothing other than a high-performance jet would do.

Lear's son, Bill Jr., who was working in Switzerland at the time, came across a jet fighter aircraft design which he thought would serve as a base for the new jet's design. The Swiss P-16, as it was then known, had an aerodynamic configuration that served the purpose well and so the Swiss American Aircraft Corporation was founded. The new executive aircraft would be called the SAAC-23.

After the initial honeymoon, the working culture of the Americans and the Swiss seemed irreconcilable, so Lear swiftly decided to move the entire operation to Wichita, Kansas, and changed the name of the company to Lear Jet Corporation. After months of 24/7 shifts, the small company saw its efforts rewarded on September 15th, 1963, when the first Lear Jet Model 23 was rolled out. Less than a month later, N801L, the world's first civilian private jet, took off for a successful first flight, and on July 1st, 1964, the Model 23 was awarded its FAA certification.

Although the new aircraft promised to take the executive market by storm, cash flow difficulties threatened the project. Lear's response was to sell Lear Jet Corporation stock to the public. The company became public in November 1964.

During the next couple of years, a few accidents earned the small jet the reputation of a difficult aircraft to fly. These accidents were later blamed on insufficient pilot training and insufficient systems redundancy. Lear Jet Corporation responded with the Model 24 which although similar to the Model 23 now had airline-style systems with the appropriate redundancy to remain safe in all weather conditions. Pilot training programs were also put in place to ease the transition for private pilots moving up from propeller airplanes.

Such aeronautical successes were not enough unfortunately to counter persistent financial problems within the corporation as sales declined amid a general economic recession. Instead of shutting down the company until the economy recovers, Bill Lear decided to sell out his ownership to another company. In 1967, the Gates Rubber Company, headed by Charles C. Gates, became the controlling shareholder of Lear Jet Corporation. With the backing of such solid ownership, Lear Jet could now concentrate on its development.

Under Gates ownership, the company changed its name to the Gates Learjet Corporation. The 20 Series continued to be developed into state-of-the-art precision flying machines, becoming better, more luxurious, and easier to fly. The Xtreme Prototypes GLJ Model 25/28 v4 addon is inspired by the Learjet 20 Series aircraft of the Gates era.

In the late 1960s, as Learjet's customers' needs evolved and grew, so did the aircraft they came to love. With the Model 25, and later the longer-range Model 25D with greater fuel capacity, came a longer cabin, increased seating capacity and more flexible loading options, not to mention a rather sleek-looking stretched fuselage.

The Model 25's shape became synonymous with flying coolness and would remain so to this day, were it not for the aging CJ610 turbojet engine. Nonetheless, improved versions of the power plant gave the 20 Series yet another increase in performance.

Gates ownership saw the transition from straight turbojet to more efficient turbofan power. Up to then, the 20 Series aircraft were all powered by the ubiquitous General Electric CJ610-8A engine, a simple, lightweight, and powerful single-spool turbojet derived from the military GE J85 engine.

The CJ610 engine gave the 20 Series an astonishing climb performance and high-altitude cruise. It was however very noisy and fuel-thirsty, so it was no surprise that in the wake of the 1973 fuel crisis, a new engine, the Gar-

rett TFE731-2 turbofan, was chosen. Although slightly less spirited than the CJ610 it replaced, the TFE731 offered far better range, less noise, and less air pollution.

The Garrett-powered Learjets became known as the 30 Series and warranted yet another fuselage stretch. Models 35 and 36 were presented to the public in mid-1973.

During the 1970s, the Learjet 20 Series aircraft continued to be developed and sold, as many operators preferred their simplicity and performance.

In august 1977, a new aircraft emerged from the Gates Learjet hangar. It had a new wing dubbed the “Longhorn” that replaced the traditional tip tanks of the Model 25 with upswept winglets which provided a dramatic reduction of induced drag, therefore stretching range with no increase in fuel, and enhancing climb performance. It was known as the Model 28, and along with its longer-range sister ship, the Model 29, represented the epitome of the straight-turbojet executive aircraft. Both aircraft received their FAA certification in January 1979 and became the first production aircraft to sport winglets.

The Learjet Model 28 was essentially a Model 25 with a new long-span wing. The Model 29 was identical to the Model 28 but stored an extra 100 gallons of fuel in the fuselage tank for additional range at the expense of two passenger seats.

On February 21, 1979, former NASA astronaut Neil Armstrong, who at the time was a board member of the Gates Learjet Corporation, and Learjet test pilot Pete Reynolds set five world records for altitude gain and sustained altitude in a business jet when their Model 28 climbed from the ground to nearly 50,000 feet in about 12 minutes.

Unfortunately, both models were unsuccessful commercially although they were appealing to customers with a requirement for good altitude performances. Only five Learjet 28s and four Learjet 29s were constructed before production ceased in 1982. Both types were subsequently replaced by the Learjet 31 in the late 1980s, the first Learjet to incorporate tail-mounted “Delta Fins” in addition to the “Longhorn” wing of the Model 28/29.

The end of the 1970s saw the turbofan taking over the market and the 20 Series was gradually abandoned. At the end of the 1980s, many airports around the world had banned the 20 Series aircraft due to noise restrictions. Today, a few remain in marginal use, some as cargo aircraft and some in service in countries where altitude considerations predominate.

In the 1980s, development continued with the Model 55, essentially a Learjet with a larger fuselage and a stand-up cabin and later, trans-continental range.

By the end of the decade, ownership of the company had changed hands a few times, eventually being acquired by Montreal-based Bombardier Aerospace in 1990. The Model 60, an improved version of the Model 55, was rolled out the same year.

By mid-1990s, Learjet was totally integrated into Bombardier's operations which made the Canadian company the world's third largest aircraft manufacturer. Under Bombardier ownership, the 40 Series came to life with the Bombardier Learjet Model 45, a technologically advanced, roomy, and efficient aircraft for the new millennium, entirely designed with computers. Then came the models 70, 75 and 85.

The development of the Model 85 was canceled in October 2015 for financial reasons as Bombardier decided to concentrate its operations on its C Series (ultimately sold to and developed by Airbus and known as the A220) and Global 7000/8000 aircraft instead.

In February 2021, Bombardier announced the end of production of all Learjet aircraft but that the company would continue to support the Learjet fleet into the future. It delivered its final Learjet, a Model 75, in March 2022 after more than 60 years of production. Nevertheless, the longevity of this aircraft family is a testimony to Bill Lear's original vision and the way it forever changed business travel. It is estimated that more than 2,000 Learjets remain in service today.

WHAT'S NEW IN VERSION 4?

New Features

- New exterior/interior 3D models with more details and additional animations
- New PBR materials and textures (see definition of PBR on page 1-16)
- 20 new aircraft variations, inspired by actual and/or fictitious liveries
- New aircraft interiors:
  - New interior colors
  - A detailed rear baggage compartment with curtain and props
  - Foldable cabin seats
  - Animated cabin tables with props
  - Animated cabin cabinet doors with props
  - A cabin refrigerator with light, animated door and props
  - Animated cabin window blinds
  - A cabin TV (customizable)
  - A cabin toilet with animated seat cover, vanity, and door
  - Sheepskin pilot seat covers (optional)

- New cockpit and cabin props: sunglasses, headsets, drinks and cups, snacks
- New cockpit and cabin hot spots (miscellaneous functions)

■ New cockpit and cabin dynamic light effects

Note: *Cockpit and cabin environment lights, panel instrument lights, panel post lights and flood lights are true dynamic lights, like in the real world – no textures with static light maps are used to artificially produce illumination effects, like in most legacy addons.*

- New 2-intensity ceiling lights (off/low/high)
- New 2-intensity map lights (off/low/high)
- Dimmable backlit panels (0-100% brightness)
- Dimmable annunciators and other panel lights (0-100% brightness)
- Dimmable landing gear status lights (0-100% brightness)
- New 2-intensity instrument lights and post lights with independent controls for captain/center/copilot instrument panels (off/low/high)

■ A fully simulated anti-ice system with ice effects on the windshield, windows, and exterior aircraft surfaces

■ A revised annunciator panel (changes mainly related to the new anti-ice system and battery temperature)

■ A revised electrical system

■ A new sound system

■ 90 new cockpit and cabin sound effects

■ New and/or revised visual effects

■ A revised and updated 320-page flight manual (printable PDF format, requires Adobe Acrobat Reader)

Modifications, Improvements, and Fixes

■ A new Prepar3D "Add-on" method of installation (makes addons easier to manage)

■ 2-position switches in the cockpit no longer respond to mouse wheel movements

■ The volume of the cockpit and cabin sound effects can be adjusted by moving the "**Cockpit**" cursor on the "Prepar3D > Top Menu Bar > Options > General > **Sound**" page, under "**Volume Levels**".

■ The beta "SPD P" autopilot speed control mode from the previous addon version was removed from the AFCS because of unsolvable stability issues and software limitations in Prepar3D. "Speed Hold by Pitch" and "Flight Level Change" speed control modes are not natively supported in Prepar3D and were not available in most Learjet 20 Series aircraft.

■ A paint kit for users to create their own PBR aircraft liveries - Requires some knowledge of Physically Based Rendering (PBR) textures and of the paint tools needed to create them (see appendix 3).

■ A revised and updated 320-page flight manual (printable PDF format, requires Adobe Reader)

■ A revised method for installing third-party addons and gauges (GPS, GNS, GTN, radar and transponder, including the Prepar3D demo radar from the Prepar3D SDK)

Note (1): *Fixes, modifications, improvements, and new features are subject to change without notice. Please refer to the "Release Notes" for last minute changes. Some functionalities may differ from those in the real aircraft due to software limitations in Prepar3D.*

Note (2): *The **XP GLJ Model 25 v4** addon and the **XP GLJ Model 28 v4** addon are two **different products** that can be purchased separately or together in a special bundle.*

Note (3): *Optional GNS, GTN, radar and special transponder addons are not included and must be purchased separately from third-party vendors/developers (Prepar3D GPS,*

demo radar and transponder are included). Some third-party add-on software may no longer be compatible with the latest versions of Prepar3D. ***Please contact the developer for support. Xtreme Prototypes cannot provide technical assistance for third-party addons.***

Note (4): *The GNS 530 3D model in the virtual cockpit is preprogrammed for the default GPS 500 that comes with Prepar3D. The weather radar model shows a dummy radar screen by default but is also compatible with the demo monochrome radar gauge that comes with the Prepar3D SDK (Prepar3D demo radar is included, see "Release Notes"). Navigation system and radar 3D models are user-programmable and are compatible with most third-party add-on software. Pre-configured panels for the most popular third-party addons are included. Detailed instructions are provided in appendix 2 for adding third-party addons and gauges to the cockpit of the GLJ Model 25/28 v4 add-on aircraft. Experimentation may be required.*

XP GLJ MODEL 25/28 V4 ADDON DESCRIPTION

Nicknamed “fighters in civilian clothing” because of their sleek design and amazing performance, the classic Learjet 20 Series aircraft were the first true executive jets and redefined business aviation during the 1960s and 70s, flying high above the weather at transonic speeds.

With the longer-range Gates Learjet Model 25D, by which this addon is inspired, came a longer cabin, increased seating capacity, more flexible loading options, greater fuel capacity and a rather sleek-looking stretched fuselage.

The Gates Learjet Model 28 along with its longer-range sister ship, the Model 29, represented the epitome of the straight-turbojet executive aircraft in the late 1970s and early 80s. With a fuselage based on the acclaimed Model 25, it had a new wing dubbed the “Longhorn” that replaced the traditional tip tanks with upswept winglets, the first ever on a jet, which provided a dramatic reduction of induced drag, therefore stretching range and enhancing climb performance.

Note: *The* ***XP GLJ Model 25 v4*** *addon and the* ***XP GLJ Model 28 v4*** *addon are two* ***different products*** *that can be purchased separately or together in a special bundle.*

General Features

20 aircraft variations inspired by actual and fictitious models and liveries* (Model 25):

- (AUS) Gray, White and Black (fictitious tail number VH-KVXP)
- (BRA) Green, Yellow and Blue (fictitious tail number PR-KBHXP)
- (CAN) White (fictitious tail number C-QLXP)
- (CAN) White, Turquoise and Red (fictitious tail number C-KJVXP)
- (CHE) White, Red and Gold (fictitious tail number HB-KEZXP)
- (CHL) Blue, Gray and Yellow (fictitious tail number CC-KFGXP)
- (DEU) White, Gray and Turquoise (fictitious tail number D-GFXP)
- (FRA) White, Blue and Red (fictitious tail number F-QAXP)
- (GBR) White, Blue and Red (fictitious tail number G-AGXP)
- (MEX) White, Brown and Black (fictitious tail number XA-KZXP)
- (NASA Research) White and Blue (fictitious tail number N617XP)
- (US Army) Green Camo (fictitious tail number 68076XP)
- (USA Charter) Red, White and Blue (fictitious tail number N256XP)
- (USA Demo) White, Black, Gray and Red (fictitious tail number N25XP)
- (USA) Black, Orange and White (fictitious tail number N384XP)
- (USA) Gray, Green and Gold (fictitious tail number N542XP)
- (USA) Red, White, Blue and Gold (fictitious tail number N958XP)
- (USA) White, Black and Gold (fictitious tail number N67XP)
- (USA) White, Blue and Gold (fictitious tail number N269XP)
- (USA) White, Gray and Red (fictitious tail number N278XP)

20 aircraft variations inspired by actual and fictitious models and liveries* (Model 28):

- (AUS) Gray, White and Black (fictitious tail number VH-GAXP)
- (BRA) Green, Yellow and Blue (fictitious tail number PR-VZAXP)
- (CAN) White (fictitious tail number C-DZXP)

- (CAN) White, Turquoise and Red (fictitious tail number C-FKVXP)
- (CHE) White, Red and Gold (fictitious tail number HB-VEAXP)
- (CHL) Blue, Gray and Yellow (fictitious tail number CC-PBVXP)
- (DEU) White, Gray and Turquoise (fictitious tail number D-BAXP)
- (FRA) White, Blue and Red (fictitious tail number F-BZXP)
- (GBR) White, Blue and Red (fictitious tail number G-KVXP)
- (MEX) White, Brown and Black (fictitious tail number XA-VCXP)
- (NASA Experimental) White, Red, Orange and Yellow (fictitious tail number N266XP)
- (NASA Research) White and Blue (fictitious tail number N816XP)
- (US Army) Green Camo (fictitious tail number 68095XP)
- (USA Charter) Red, White and Blue (fictitious tail number N142XP)
- (USA) Black, Orange and White (fictitious tail number N270XP)
- (USA) Gray, Green and Gold (fictitious tail number N233XP)
- (USA) Red, White, Blue and Gold (fictitious tail number N826XP)
- (USA) White, Black and Gold (fictitious tail number N46XP)
- (USA) White, Blue and Gold (fictitious tail number N128XP)
- (USA) White, Gray and Red (fictitious tail number N158XP)

**: All liveries are imaginary, though some may be inspired by actual airplane liveries. Any match with actual tail numbers is a pure coincidence. See appendix 8.*

Flight Model Features

Optimized, pilot-tested, 20 Series flight dynamics to simulate the performance of a high-powered civilian jet aircraft, within the present limitations and capabilities of the available simulation platforms:

- Two General Electric CJ610-8A single-spool turbojet engines (2,950-pound static thrust at sea level)
- Service ceiling: 45,000 ft.
- Absolute ceiling: 51,000 ft.
- Maximum speed: 359 KIAS
- Maximum Mach: Mach 0.82 (at 24,000 ft.)

20 Series Aircraft Systems

The following Learjet 20 Series aircraft systems are simulated to conform as closely as possible to the operation of the real airplane, within the present limitations and capabilities of the available simulation platforms:

- Flight controls
- Stall/overspeed warning systems with stick nudger/puller and stick shaker
- Electrical system
- Cockpit and cabin lighting systems with independent controls and dimmers, including emergency lighting (see details on page 1-12)
- Emergency batteries *(not available in Prepar3D, APU used to simulate emergency batteries instead)*
- Ground power unit (Prepar3D GPU)
- Hydraulic system (including functional electric auxiliary hydraulic pump)
- Landing gear, anti-skid system, differential brakes
- Fuel system (including cross-feeding, and wingtip tanks fuel jettison system on the Model 25)
- CJ610-8A power plant
- Fire detection and suppression system
- Pneumatic (high pressure), bleed air, pressurization, and environmental control systems
- Air conditioning and cabin temperature (H-valve) system
- Anti-ice system (fully simulated, with ice effects on the windshield, windows, and exterior aircraft surfaces)
- Automatic flight control system (AFCS) with autopilot, flight director, dual yaw damper, and speed/Mach hold systems modes *(the Lear J.E.T. autopilot is retrofitted to be fully functional in GPS mode and compatible with the Prepar3D autopilot)*
- RVSM system, complete with digital altimeters/altitude preselectors (ADDUs) with blue VFD display, analog standby altimeter, and control panel
- Caution and warning system (annunciator panel)
- Avionics, radios, and classic navigation systems: COM1, COM2, NAV1, NAV2, ADF1, ADF2, transponder, DME, marker beacons
- Programmable GNS 530, GTN 750, generic weather radar, and transponder models *(Optional third-party GNS/GTN navigation systems and radars are not included and must be purchased separately. Prepar3D GPS and demo radar are included.)*
- Ground proximity warning system (GPWS)
- Emergency gear extension system
- Crew and passenger oxygen system
- Main entry door (fully animated)

Aircraft Exterior 3D Model Features

Two high resolution, fully animated exterior 3D models, inspired by the real aircraft (optimized for the latest versions of Lockheed Martin Prepar3D):

- 4096 x 4096 high resolution PBR textures *(see definition of PBR on page 1-16)*
- High resolution decals and markings
- Unique livery for each aircraft variation
- Movable aerodynamic control surfaces:
  - Movable horizontal stabilizer
  - Elevator
  - Ailerons with trim and balance tabs
  - Flaps
  - Vertical stabilizer/rudder with trim tab
  - Spoilers
- Fully animated landing gear, complete with flexible hoses, landing and taxi lights, anti-

skid system, snubbers, and more

- Fully animated passenger and crew door (lower and upper sections)
- Detailed CJ610-8A power plant with animated (compressor and turbine) blades and inlet guide vanes
- Fully animated and highly detailed thrust reverser on both engines
- Dynamic lights with real projected light beams:
    - Independent left/right 2-intensity landing and taxi lights
    - Animated rotating beacon lights (belly, tail)
    - Right wing inspection light
    - Recognition lights (Model 25 only, optional on the left wingtip tank)
    - Navigation lights (wing, tail)
    - Strobe lights (wing, tail)
- Animated stall vanes on the nose
- Optional nose boom with animated vanes
- Three user-selectable pilots (with headset and optional sunglasses)
- Functional ground power unit (GPU) supplying 28 VDC to the aircraft during maintenance, training, or preflight procedures (with animation, lights, smoke, and sound)
- Clickable hot spots on the exterior model (miscellaneous functions; see [fig. 3-5], section 3, page 8):
    - GPU visible/invisible (left wingtip tank aileron on the Model 25, left winglet leading edge on the Model 28)
    - Crew present/absent (steps on the lower portion of the passenger and crew door)
    - Pilot selection (pilot’s shirts)
    - Pilot’s sunglasses (windshield defog outlets)
    - Cabin and entry lights (cabin wall switches)
    - Passenger and crew door open/closed (door handles)
    - Remove before flight items installed/removed (nose gear door)
    - Left recognition light installed/removed (wingtip tank nose cone, Model 25 only)

Aircraft Interior
3D Model Features

- Two high resolution, VR-ready virtual cockpits** with different panel configurations, full-3D animated gauges, switches, knobs, levers, light indicators, and flight instruments with tooltips:
  - **Basic Configuration:** New radios with yellow VFD displays (COM/NAV/ADF/XPDR) are installed on the main instrument panel to replace the original sets with analog displays from the 1960s. A user-programmable GNS 530 and a weather radar are also installed*.
  - **GTN750 Configuration:** Features modern avionics including two user-programmable GTN 750 (GPS/COM/NAV/XPDR) multifunction display systems, a user-programmable weather radar, an ADF radio and a transponder with yellow VFD displays*.
- Full 3D integration of the GPS/GNS/GTN, radar and transponder, programmable to meet most users' needs. Screens, buttons, and knobs can be programmed by users to integrate most third-party addons*. Experimentation may be required (see appendix 2):
  - Fully animated 3D model of a **generic GNS 530**, compatible with the Prepar3D GPS 500 and most third-party GNS 530 addons
  - Fully animated 3D model of a **generic GTN 750**, compatible with most third-party GTN 750 addons
  - Fully animated 3D model of a **generic weather radar**, compatible with most third-party weather radars, also compatible with the monochrome demo radar that comes with the Prepar3D SDK
  - Fully animated 3D model of a **transponder** with a front VFD display, compatible with the Prepar3D transponder and most third-party transponder addons supporting C mode of operation and other features

**: Optional third-party GNS/GTN navigation systems, radars and transponders are not included and must be purchased separately. Prepar3D GPS, demo radar and transponder are included.*

- Highly detailed full 3D instrument panels:
  - Captain's panel
  - Center panel
  - Copilot's panel
  - Annunciator panel

- Thrust reverser control panel
- Center pedestal

■ 4096 x 4096 high resolution PBR textures

■ Advanced cockpit lighting system:

- 2-intensity ceiling lights (off/low/high)
- 2-intensity map lights (captain's, copilot's, controlled independently, off/low/high)
- 2-intensity glareshield yellow flood lights (captain's side, copilot's side, controlled independently, off/low/high)
- Dimmable backlit panels (0-100% brightness)
- Dimmable annunciators and other panel lights (0-100% brightness)
- Dimmable landing gear status lights (0-100% brightness)
- New 2-intensity instrument lights and post lights with independent controls for captain/center/copilot instrument panels (off/low/high)
- Cockpit/cabin emergency lighting

Note: *Cockpit and cabin environment lights, panel instrument lights, panel post lights and flood lights are true dynamic lights, like in the real world - no textures with static light maps are used to artificially produce illumination effects, like in most legacy addons.*

■ Animated control columns and yokes (hidable, user-selectable), with functional autopilot remote buttons

■ Stick nudger/puller and stick shaker with animation and sound

■ Animated rudder pedals with differential brakes

■ Retrofitted radios with yellow digital VFD displays and standby frequencies: COM1, COM2, NAV1, NAV2, ADF1, ADF2, ATC/XPDR

■ RVSM system, complete with digital altimeters/altitude preselectors (ADDUs) with blue VFD display, analog standby altimeter, and control panel

■ Automatic flight control system (AFCS) with autopilot, flight director, yaw damper and speed/Mach hold systems modes *(the Lear J.E.T. autopilot is retrofitted to be fully functional in GPS mode and compatible* *with the Prepar3D autopilot)*

- NAV1 or GPS/GNS/GTN navigation modes
- DME head
- Ground proximity warning system (GPWS)
- Lear engine sync spinner
- Analog and digital clocks with stopwatch
- Lear Jet Stereo "Jetstar 8" 8-track tape player that can play up to four user's personalized stereo music tracks *(a tribute to the inventive genius of Bill Lear)*
- Oxygen valves and fan control knob
- Pilot seats with adjustable/retractable armrests
- Optional sheepskin pilot seat covers
- Animated sun visors (foldable, slidable)
- Hidable throttle quadrant
- Thrust reverser subthrottles
- The Learjet 25 models have a black leather interior with dark honey beech wood cabinets
- The Learjet 28 models have a gray leather interior with light gray birch wood cabinets
- Front and rear cabin curtains (open or closed, switchable)
- Rear baggage compartment with props
- Foldable passenger seats (animated)
- Animated cabin tables with props
- Animated cabin cabinet doors with props
- Cabin refrigerator with light, animated door and props
- Animated cabin window blinds
- Cabin TV (customizable)
- Cabin toilet with animated seat cover, vanity with animated drawers, and door (open or closed, switchable)
- Cabin lighting system (ceiling lights, signs, entry lights, refrigerator blue light, passenger reading lights with individual switches)

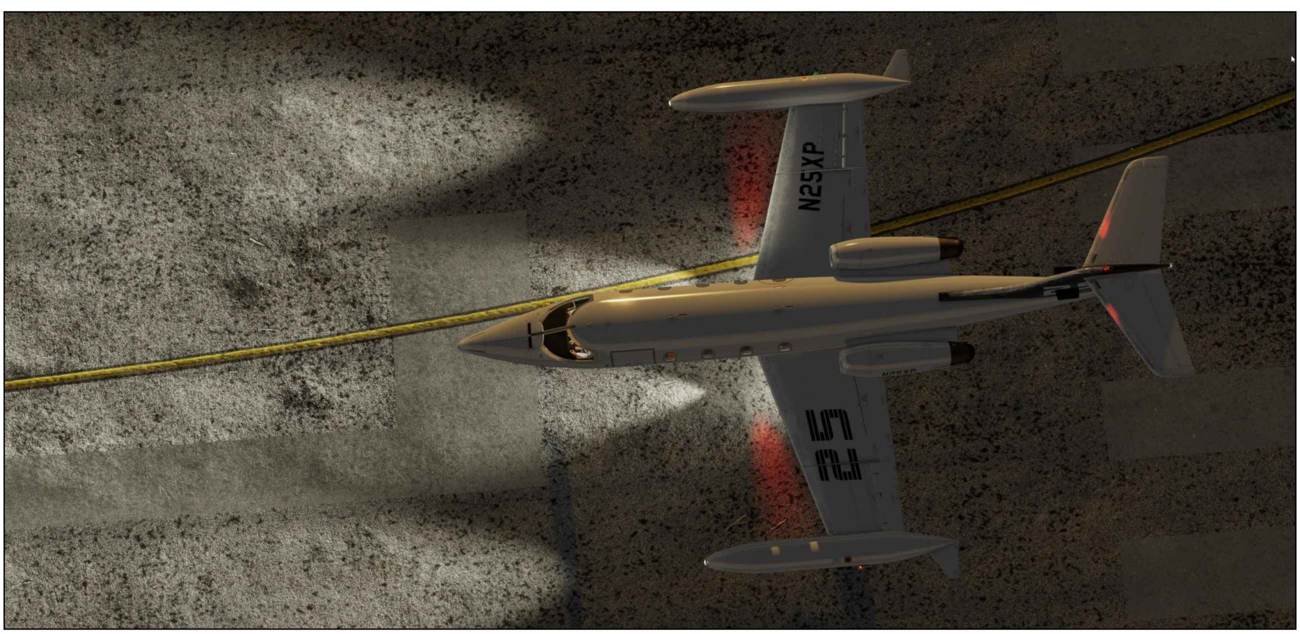
***: Xtreme Prototypes next generation addons no longer include 2D panels found in legacy products. They are replaced by full 3D virtual cockpits. No flat 2D gauges to represent 3D flight instruments are used in this model.*

Dynamic Lights and Visual Effects

- Cockpit/cabin lights: panel yellow flood lights, ceiling lights, map lights, instrument lights, panel post lights, passenger reading lights, entry lights

  Note: *Cockpit instruments and all interior objects are illuminated with real dynamic lights for a more natural look (no static light maps are used to simulate cockpit illumination). See section 6, page 7.*

- Aircraft lights, some animated: landing, taxi, recognition (Model 25), navigation, strobes, rotating beacon, wing inspection
- Engine startup flames and smoke
- Engine contrail
- GPU lights
- GPU startup smoke
- Wing vortices and vapor trails
- 40 visual effects in total



Sound Effects

- 20 Series 3D sound set, including starter and engine sounds recorded from the real aircraft and positioned in the 3D space
- Over 80 additional cockpit stereo sound effects, many from the real aircraft: switches, knobs and levers, pneumatic valves, blower fan, alerts and horns, Learjet unique brake sounds, GPU engine, cabin tables, cabinet doors, toilet seat, curtains and doors, foldable seats
- More than 120 sounds in total

Miscellaneous

- Prepar3D "Add-on" method of installation (makes addons easier to manage)
- "Cold and Dark" cockpit reset cycle and "Auto Start" sequence
- Custom sound system for playing cockpit sounds and music
- 15 interior camera views
- 5 exterior camera views
- A 320-page flight manual (printable PDF format, requires Adobe Reader)
- A paint kit for users to create their own PBR aircraft liveries – Requires some knowledge of physically based rendering (PBR) textures and of the paint tools needed to create them (see appendix 3).

Note (1): *Software features, prices and release dates are subject to change without notice. Please refer to the "Release Notes" for last minute changes. Some functionalities may differ from those in the real aircraft due to software limitations in Prepar3D.*

Note (2): *The **XP GLJ Model 25 v4** addon and the **XP GLJ Model 28 v4** addon are two **different products** that must be purchased separately or together in a special bundle.*

Note (3): *Optional GNS, GTN, radar and special transponder addons are not included and must be purchased separately from third-party vendors/developers (Prepar3D GPS, demo radar and transponder are included). Some third-party add-on software may no longer be compatible with the latest versions of Prepar3D. **Please contact the developer for support. Xtreme Prototypes cannot provide technical assistance for third-***

party addons.

Note (4): *The GNS 530 3D model in the virtual cockpit is preprogrammed for the default GPS 500 that comes with Prepar3D. The weather radar model shows a dummy radar screen by default but is also compatible with the demo monochrome radar gauge that comes with the Prepar3D SDK (Prepar3D demo radar is included, see "Release Notes"). Navigation system and radar 3D models are user-programmable and are compatible with most third-party add-on software. Preconfigured panels for the most popular third-party addons are included. Detailed instructions are provided in appendix 2 for adding third-party addons and gauges to the cockpit of the GLJ Model 25/28 v4 add-on aircraft. Experimentation may be required.*

WHAT ARE PBR TEXTURES?

The Xtreme Prototypes GLJ Model 25/28 v4 addon features all new **PBR materials and textures**. Physically based rendering (or PBR) is a method of shading and rendering that provides a more accurate representation of how light interacts with surfaces. The results are 3D models that look almost real under different lighting conditions.

Please refer to appendix 3 for information on how to create your own PBR aircraft liveries for your GLJ Model 25/28 v4 addon.

PROJECT SCOPE

The Xtreme Prototypes GLJ Model 25/28 v4 addon is inspired by a series of real-world aircraft known in the 1970s as the Lear Jet/Learjet 20 Series (models 23 to 29). The package strives to recreate the general look and feel of the original aircraft for the desktop pilot's enjoyment.

While we regard this addon as a real mini aircraft simulator rather than just a game, we do not pretend that it is one hundred percent historically or technically accurate, or that it faithfully reproduces all the systems and flight characteristics of the real aircraft (which would be impossible in Prepar3D). Nevertheless, we've always paid attention to details, and we did our best to make sure we provide our users with the best flight simulation experience they can get within the limitations of the currently available simulation platforms.

This manual contains detailed information for the installation and operation of the Xtreme Prototypes GLJ Model 25/28 v4 addon on your simulation platform. Nearly all 20 Series systems that can be reproduced in Lockheed Martin Prepar3D are simulated, unless otherwise noted.

Note: *There are differences between the virtual model and the real aircraft. Xtreme Prototypes addons and manuals for the general* *public are considered edutainment software and **shall not be used for real-world pilot training**.*

GIVE THE MANUAL A CHANCE

The operation of the Xtreme Prototypes GLJ Model 25/28 v4 addon for Prepar3D is very similar to the operation of the real aircraft by which it is inspired. For proper operation and enhanced realism, it is suggested that users read the present flight manual and follow the procedures in section 8 very carefully.

This addon strives to bring you not only the actual feeling of flying a high-performance aircraft now equipped with modern avionics, but also the spirit of maneuvering such a vehicle at times where large LCD screens and powerful computers didn't exist, and where pilots needed to know how to fly and navigate with minimal resources and rely on their own experience, abilities, and judgment.

While this addon allows for comprehensive procedural IFR flight, anyone who has some experience with the simulator's default jet aircraft can fly the GLJ Model 25/28 v4 addon. It is up to you, the desktop pilot, to decide which level of complexity you want to achieve.

If you're feeling overwhelmed by the cockpit of your new business jet addon, we suggest giving the manual a chance as it was written with non-experienced pilots in mind. The addon is quite rewarding once mastered, but as with most things in life, practice makes perfect!

A WORD ABOUT PIRACY

Piracy is not a victimless crime!

Developing professional, high quality addons for the latest simulation platforms has become challenging and very complex. It requires the contribution of a dedicated and passionate team of artists, programmers, technicians, engineers, and pilots. These products are costly to develop and require many months of research and hard work. They are aimed at a relatively limited market of serious flight simulation enthusiasts.

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FOR
XTREME PROTOTYPES GLJ MODEL 25 V4 ADD-ON AIRCRAFT FOR PREPAR3D
AND
XTREME PROTOTYPES GLJ MODEL 28 V4 ADD-ON AIRCRAFT FOR PREPAR3D

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GETTING STARTED

SECTION 2

The **Xtreme Prototypes GLJ Model 25/28 v4** is an add-on software package that requires **Lockheed Martin Prepar3D v5.4** (or later*) to be installed on your computer. The software is not a stand-alone product and cannot be used without the underlying simulation platform.

MINIMUM SYSTEM REQUIREMENTS

Xtreme Prototypes next generation addons are designed to take advantage of the new and more powerful gaming computers that are available today. **Increased performance will be noticed on more powerful systems.**

- **Flight Simulation Platform:** Lockheed Martin Prepar3D v5.4 (or later*)
- **Operating System:** Microsoft Windows 10/11 or later, 64 bits (Windows 11 recommended)**
- **Computer Memory (RAM):** 16 GB or better recommended**
- **Processor:** Quad Core 3.0 GHz (Octa Core 3.7 GHz or better recommended)**
- **Hard Drive Space:** Downloaded compressed zip file size approx. 3 GB; addon size approx. 12 GB when fully installed
- **Graphics Card:** A high-end graphics card with at least 8 GB GDDR5 or better is highly recommended. Prepar3D v5.4 (or later*) requires a DirectX 12-compatible graphics card. Make sure you have the latest driver for your graphics card.
- **Graphics:** DirectX 12 (required by Prepar3D)**
- **Other:** Monitor, wheel mouse, game controller (joystick or yoke), pedals (optional), sound card and speakers, Adobe Acrobat Reader, Adobe Photoshop (optional, required for using the paint kit). A wheel mouse is required to actuate 3-position switches and knobs.

***:** *New addon versions may become available for future versions of Prepar3D (see "Release* *notes" at the beginning of this manual). Make sure you download and install the correct addon version for your version of Prepar3D.*

***: Refer to the Prepar3D documentation for more information about minimum system requirements.*

Notice for FSX Users

- Please note that Xtreme Prototypes has ceased producing new addons for FSX. The GLJ Model 25/28 addon for Microsoft Flight Simulator 2020 is currently in production and will be released as a new product at a later date.

Important

- In this manual, the **GLJ Model 25/28 v4** addon refers to either the **XP GLJ Model 25 v4** addon or the **XP GLJ Model 28 v4** addon. These are two **different products** that are sold separately, or together in a special bundle. Each addon is included in a single add-on package.

- The addon version for Prepar3D v5.4 is a native version that is not compatible with other versions of Prepar3D. New addon versions for future versions of Prepar3D may become available later (see "Release Notes"). Make sure that you download and install the correct addon version for your simulation platform.

- This addon is not compatible with Microsoft Flight Simulator 2020. A new version for MSFS 2020 is currently in production.

- This addon is not compatible with Microsoft Flight Simulator X.

- This addon is not compatible with Microsoft Flight Simulator 2004.

DOWNLOADING YOUR ADDON

Our products are available for download only. At this time, you should have downloaded the compressed **zip file** that contains the **setup program** for the GLJ Model 25/28 v4 addon from our website, and received your personal **activation key** by email.

***Note:** Please contact us if you did not receive your activation key by email or were unable to download your addon's zip file after your order was processed.*

Make sure that you have downloaded the correct zip file for your version of Prepar3D. Depending on which addon you purchased, the currently available zip files are:

- "**XP_GLJ25v4_P3Dv5.zip**" (contains the installer for the GLJ Model 25 v4 addon for Prepar3D v5)

  or

- "**XP_GLJ28v4_P3Dv5.zip**" (contains the installer for the GLJ Model 28 v4 addon for Prepar3D v5)

Other zip files for future versions of Prepar3D may be added later. Because of significant differences between the different versions of Prepar3D, the zip files are not interchangeable.

Each compressed zip file weighs approximately 3 GB and is usually downloaded to your Windows "**Downloads**" folder.

Possible Download Issues

- The GLJ Model 25/28 v4 addon is contained in a **single compressed zip file**. Normally, it should not take more than about 10 minutes to download the zip file over a reliable high-speed Internet connection. If you don't have a high-speed Internet connection or experience intermittent connection issues, you may be timed out or disconnected while downloading your addon.

- If you are not able to download your addon after several attempts, we recommend using another and better Internet connection. If you don't have access to another connection and still cannot download your addon, please contact us for assistance.

- We recommend using your Internet browser to download your addon. Do not use a third-party download manager or you may experience problems that have been reported by some users.

- Some antivirus programs may prevent you from downloading your addon. Make sure your antivirus does not interfere with your downloads. Some antiviruses won't allow you to download zip files. You can disable your antivirus program temporarily while downloading your addon to solve this issue. Don't forget to reactivate your antivirus after the file is downloaded.

You can download your addon again at any time by logging in to your account on our website. You may download your addon a limited number of times. After that, you will need to contact us for assistance.

The replacement of lost downloaded files and activation keys is not guaranteed.

Please make backup copies and save your activation key in a safe place.

Extracting the Installer from the Zip File

1. To extract the installer from the downloaded zip file, **right click the zip file** and select "**Extract All...**".

Depending on which addon you purchased, the installers are:

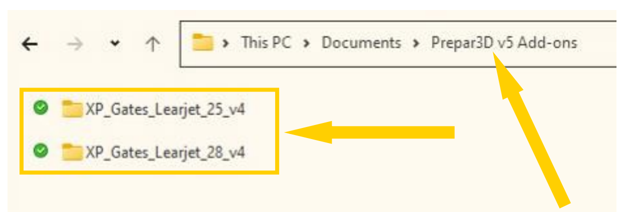
- "**XP_GLJ25v4_P3Dv5_setup.exe**" (to install the GLJ Model 25 v4 addon for Prepar3D v5)

- "**XP_GLJ28v4_P3Dv5_setup.exe**" (to install the GLJ Model 28 v4 addon for Prepar3D v5)

Note: *New installers for future versions of Prepar3D may be added later. See "Release Notes".*

SOFTWARE INSTALLATION

For version 4, we wanted to keep things as simple as possible. The GLJ Model 25/28 v4 add-on aircraft will be installed as a single and unique "**add-on package**" to be copied to your your "**Prepar3D v5 (or later) Add-ons**" folder, normally located in your Windows "**Documents**" folder.



This is the method of installation recommended by Lockheed Martin. The package provides a centralized list of all the add-on components necessary to load the add-on aircraft in the simulator.

Your **name**, **email address** and **activation key** are required to install and activate the GLJ Model 25/28 v4 addon. Your personal activation key is unique and was sent to you by email moments after you purchased your user license from our website.

Note: *Please contact us if you did not receive your activation key by email after your order was processed.*

Tip

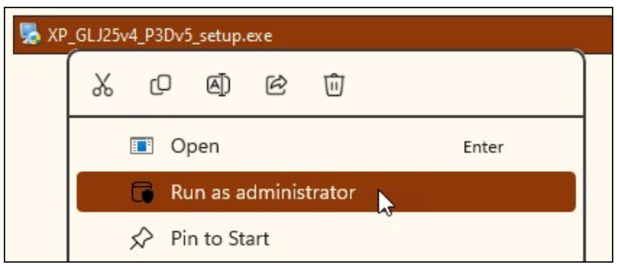
- Version 4 will not replace previous versions of the software, if installed on your computer. However, we always recommend removing previous versions from your computer before installing a new version.

Installation

1. If Prepar3D is currently running, please **close the program** before proceeding with the installation.

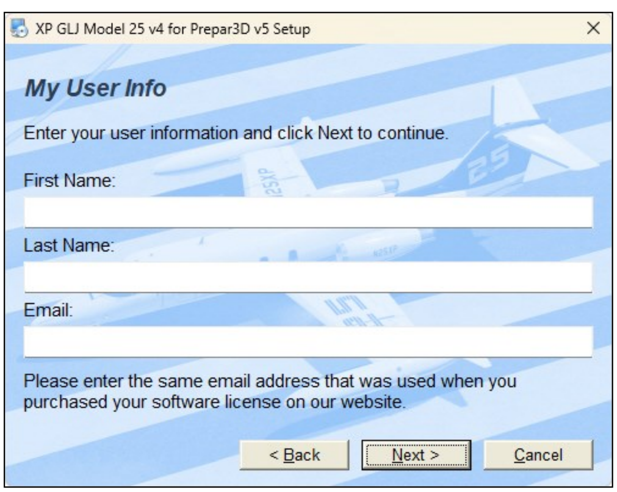
2. Make sure you have selected the **correct installer** for your version of Prepar3D.

3. **Right-click the installer file.** We always recommend to run the setup program as "**administrator**" to avoid possible installation issues.



4. Click "**Run as administrator**". Due to the large size of the compressed single setup file, it might take a few seconds before the first setup screen opens.

5. **Follow the instructions that appear on the screen.** Enter your user information and personal activation key when asked.



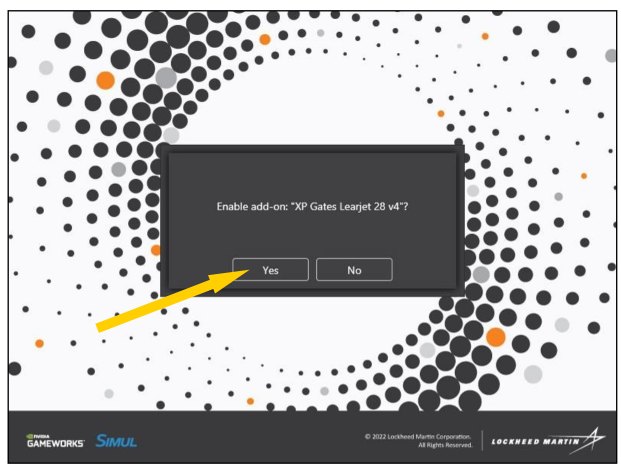
   You must accept the end-user license agreement and enter your full name, email address, and activation key before you can install and use your new addon.

6. The installer should detect your "**Prepar3D v5 (or later)**" installation automatically. If not, please enter the correct path. If the wrong path is entered, the addon will not be installed properly. **Prepar3D v5 (or later) is required to install the GLJ Model 25/28 add-on aircraft.**

7. **Please confirm the path to your "Prepar3D v5 (or later) Add-ons"** folder. The GLJ Model 25/28 add-on aircraft package will be copied to this folder. If the wrong path is entered, the addon will not be installed properly.

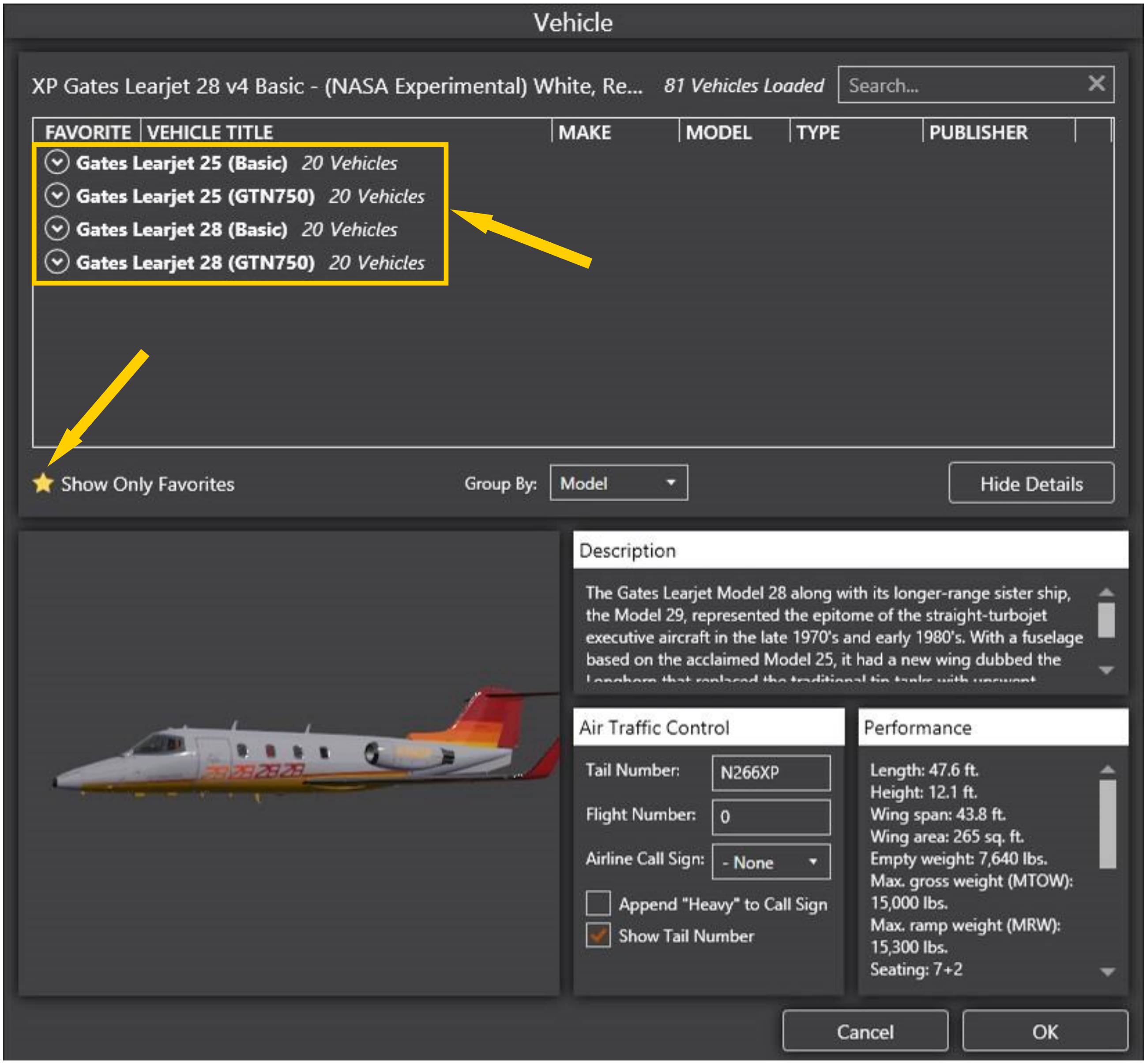
8. **Click "Next" when ready to install.** The installer will copy the GLJ Model 25/28 add-on aircraft package to your "Prepar3D v5 (or later) Add-ons" folder. You may install both the GLJ Model 25 v4 and the GLJ Model 28 v4 addons on the same computer. **Repeat the above procedures for each addon you want to install.**

Checking the Installation



After the add-on package is copied to your "Prepar3D v5 (or later) Add-ons" folder, a dialog will pop up the next time you launch the simulator asking if you'd like **to enable** the GLJ Model 25/28 v4 addon.

1. Click **Yes** to enable the addon.



The GLJ Model 25/28 v4 addon consists of **20 different variations** of the Gates Learjet Model 25/28 for each of the two available virtual cockpits (**Basic** and/or **GTN750**).

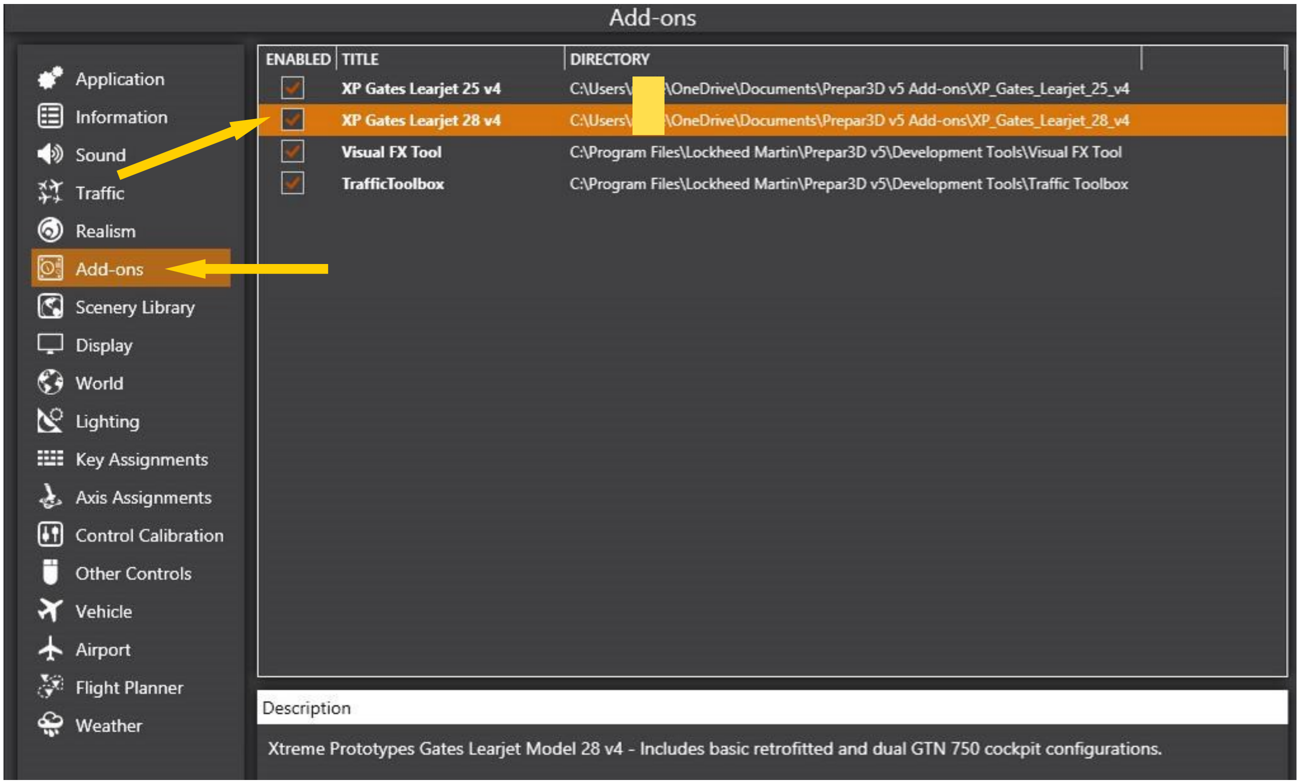
All aircraft variations will be available on the "Prepar3D > Top Menu Bar > Options > General > **Vehicle**" page (see below).

Note: *The "**Show Only Favorites**" option on the "Prepar3D > … > **Vehicle**" page may prevent some aircraft variations from being displayed. You may need to uncheck this option. You may also select only the aircraft variations that you want to fly as your favorites. This will speed up loading time when selecting a vehicle.*

Removing the Addon

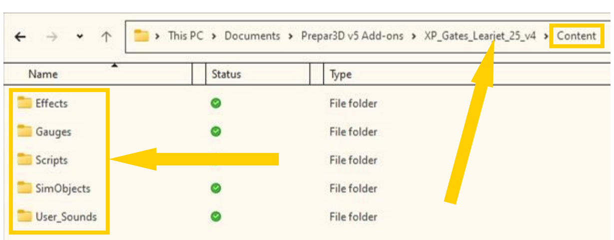
You can manage your addons on the "Prepar3D > Top Menu Bar > Options > General > **Add-ons**" page (see next page).

Method 1 (recommended): You can leave the add-on package folder in your "Prepar3D v5 (or later) Add-ons" folder and **unselect** the GLJ Model 25/28 v4 addon on the "Prepar3D > Top Menu Bar > Options > General > **Add-ons**" page. This will **disable** the addon but the software will not be deleted. To re-enable the addon, re-select the GLJ Model 25/28 v4 addon on the "Add-ons" page.



Method 2 (not recommended): To remove the GLJ Model 25/28 v4 software entirely from your computer, simply remove (delete) the Add-on Package folder from your "Prepar3D v5.3 (or later) Add-on" folder. You will need to re-run the setup program in the future should you wish to reinstall the addon.

File Structure



The GLJ Model 25/28 v4 aircraft models, textures, panels, scripts, sounds, gauges, systems, and configuration files are stored in a single **add-on package folder** in your "Prepar3D v5 (or later) Add-ons" folder, normally located in your Windows "Documents" folder.

CUSTOMIZATION

The GLJ Model 25/28 v4 addon comes with **two different virtual cockpits** and **20 aircraft variations** for each cockpit.

Preconfigured instrument panels for adding third-party addons (GPS, GNS, GTNs, radars, transponders) are also included. Refer to appendix 2 for complete instructions and information about adding **your third-party addons** to the cockpits of the GLJ Model 25/28 v4 add-on aircraft.

Refer to appendix 3 for information about creating **your own aircraft variations and liveries** (PBR textures) for the GLJ Model 25/28 v4 addon.

ABOUT PERFORMANCE

Because there are as many computer systems as they are users, it is impossible to recommend unique settings that would fit all systems. However, as a rule of thumb, if Prepar3D is running properly on your computer, and assuming that your computer meets the minimum system requirements or better, you should be able to install and fly the GLJ Model 25/28 v4 addon without major issues.

Frame rate may vary depending on your hardware and several factors such as your graphics options, the complexity of the scene (especially with add-on sceneries), installed third-party addons, etc. For example, it is normal for the frame rate to drop over high-density sceneries such as big cities or airports (with any aircraft). Also, it is normal for the exterior model to cause a slightly lower frame rate because it contains not only the exterior parts but also some of the interior parts that are visible from the outside views such as the seats, cabin lights, instrument panels, etc.

The GLJ Model 25/28 v4 addon is a **complex aircraft simulator** (not a toy). The custom aircraft systems that were developed for this addon are responsible for thousands of calculations at each computer cycle. These systems, combined with the new high-resolution models and PBR textures, hundreds of cockpit animations, third-party software, and some of the visual and sound effects, may affect your frame rate on slower processors and graphics cards, depending on your simulation platform's configuration and settings.

The GLJ Model 25/28 v4 addon requires a powerful computer to run. It cannot be compared to the stock aircraft that come with your simulation platform nor to third-party addons with limited functionalities and systems, low resolution textures and 3D models, flat 2D gauges, or a single glass cockpit.

It is always a dilemma for developers (and users) to manage quality and details vs performance. We've decided to invest in quality, systems, and features as we expect computer systems to evolve and to become more powerful in the future. More recent gaming computers equipped with high-end graphics cards and a powerful CPU will allow for higher frame rates.

You may need to tweak your simulator's settings to improve performance. You can try moving all the cursors to their middle position to see if it makes a difference. Combining aggressive settings with a next generation addon such as the GLJ Model 25/28 v4 may affect performance, depending on your system.

The graphics card is often the weakest component in a given system. Unless you own one of the latest generation high-end graphics cards, we always recommend **limiting your frame rate to 30 fps**. This will free other computer resources for other tasks. 30 fps (standard NTSC video frame rate) is enough for flight simulation and should improve performance on slower systems.

Adjust your simulation platform's display, weather, world, and traffic options to fix most performance issues or upgrade your computer with a better CPU, more memory and a high-end graphics card.

Regarding which computer to buy for flight simulation, we would recommend a reliable desktop computer equipped with a high-end graphics card. There are computer systems made especially for 3D gaming. SSD drives are recommended because they are faster and more reliable than mechanical drives. Don't hesitate to invest in the best graphics card you can afford. It makes all the difference. Most modern gaming computers have the necessary processing power, motherboard, graphics hardware, and RAM to run the latest simulation platforms.

Most of our tests were performed in Prepar3D v5.4 running on Windows 11 Pro (64-bit) in a 1920 x 1200 simulation window, with an ultra-wide screen resolution of 3840 x 1600:

- Dell Alienware Aurora 12 Gaming Computer
- Intel (8 Cores) 11th Gen i9-11900KF CPU @ 3,50 GHz (no overclocking)
- 128 GB RAM
- NVIDIA GeForce RTX 3090 (24GB G DDR6X)

Refer to the documentation included with your simulation platform for more information about minimum system requirements and how to optimize your settings for the best overall performance.

Remember that third-party addons such as complex gauges, systems, sceneries, and airports may affect performance and frame rate. Use moderation when adding components to your simulation platform and refer to the documentation included with your addons for optimal installation and settings.

Important

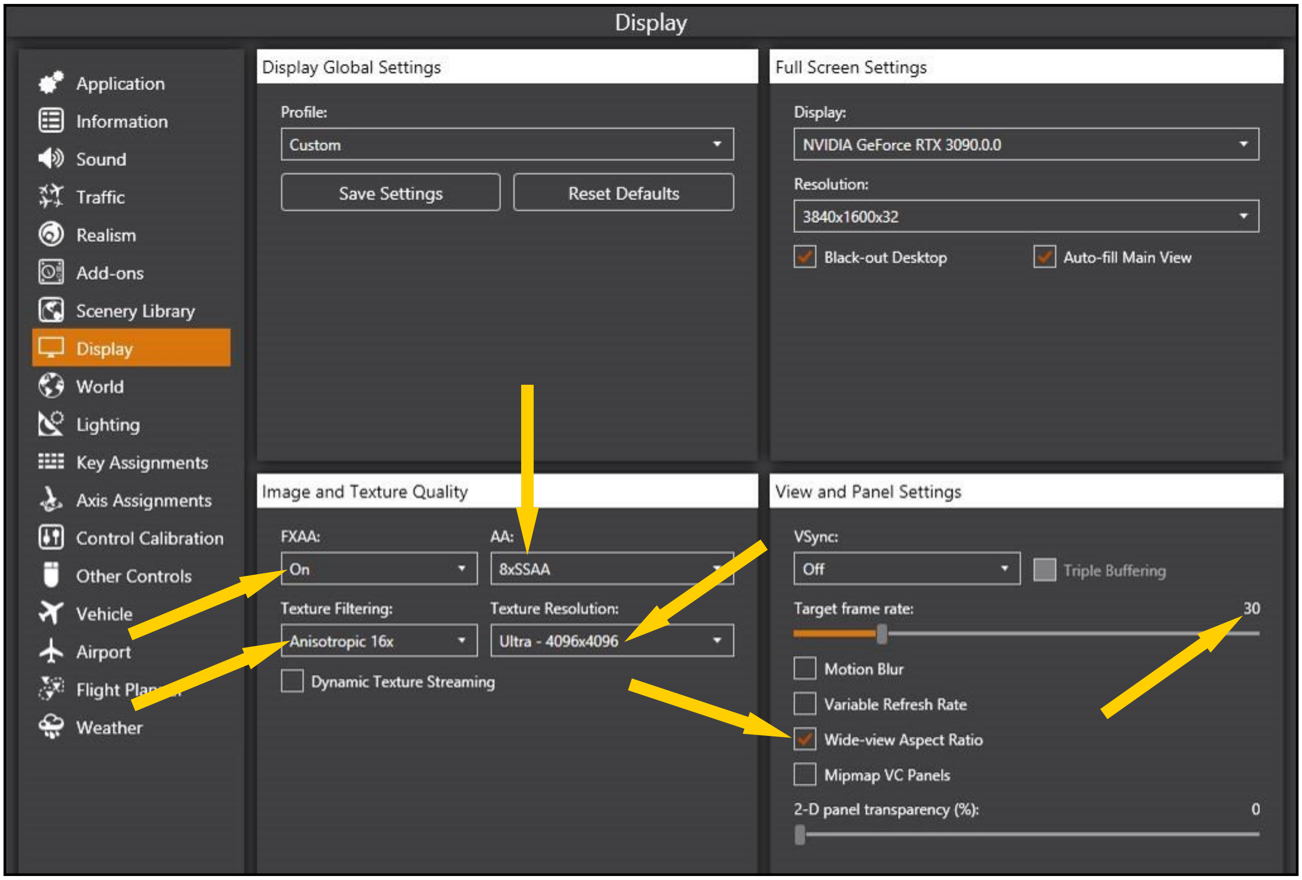
- Make sure you have the latest driver for your graphics card and operating system.
- Make sure your simulation platform is the only graphic-intensive program running on your computer when flying your addon. This could greatly affect performance.
- Make sure your antivirus program is not scanning your system while flying your addon. This could also affect performance.

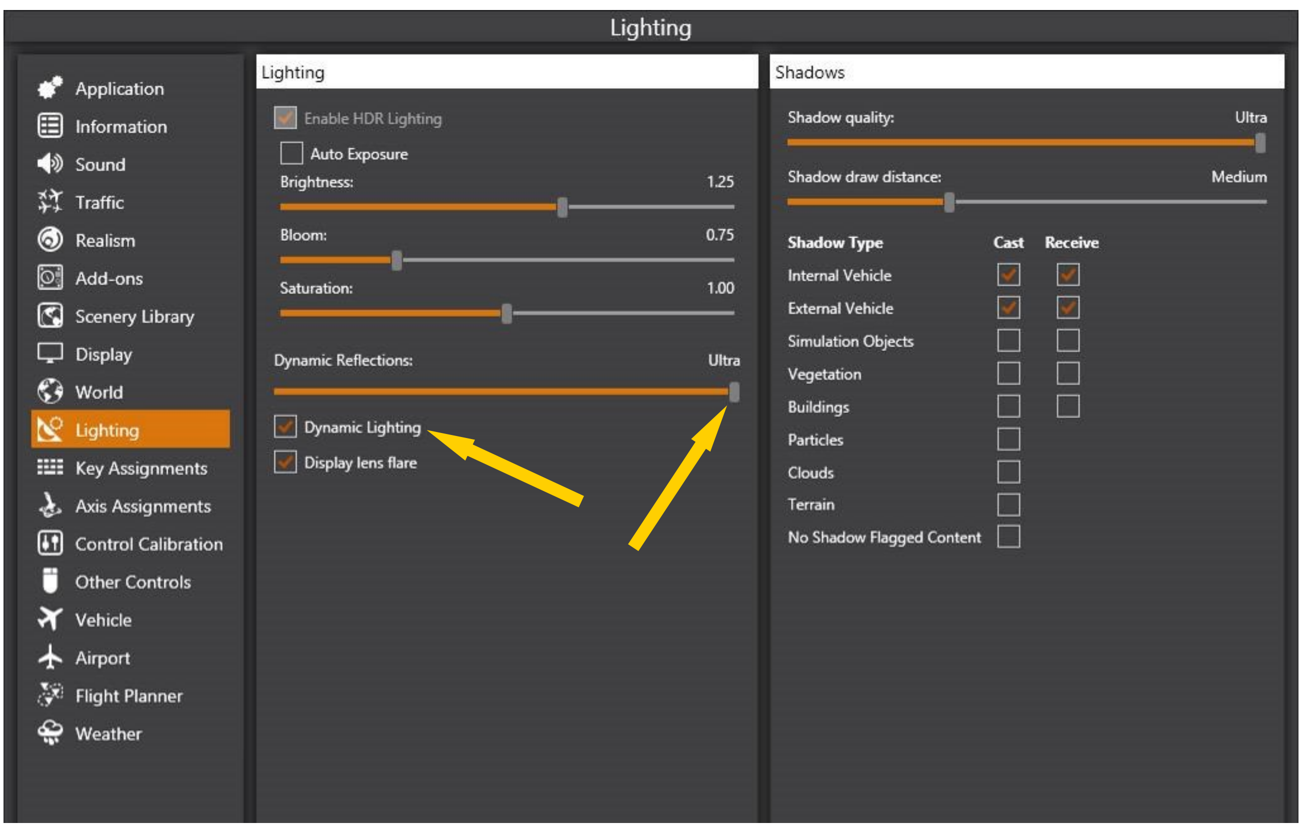
RECOMMENDED SETTINGS

Lockheed Martin Prepar3D is a **professional simulation platform** for education and training that requires a powerful computer and a high-end graphics card to run. We do not recommend flying the GLJ Model 25/28 v4 addon in Prepar3D if you don't have the minimum system requirements (see page 2-1).

Practical Considerations

1. Prepar3D v5.4 (or later) requires **DirectX 12** and a DirectX 12-compatible graphics card.
2. Advanced lighting options on the "Prepar3D > Top Menu Bar > Options > General… > **Lighting**" page such as **Shadows** and **HDR Lighting**, may dramatically affect performance and reduce the frame rate. We recommend moderation when setting these options, especially on slower systems.
3. PBR textures require **Dynamic Reflections** to be set to **Ultra.**
4. **Dynamic Lighting** must be turned **ON** (checked). The GLJ Model 25/28 v4 addon for Prepar3D features exterior/interior dynamic lights with projected light beams, fully compatible with the latest versions of Prepar3D.
5. The GLJ Model 25/28 v4 addon uses ultra crisp, 4096 x 4096, high-resolution PBR textures. For optimal graphics quality, make sure the **Texture Resolution** is set to "**Ultra – 4096x4096**" on the "Prepar3D > Top Menu Bar > Options > General… > Display > **Image and Texture Quality**" page.
6. The textures on the exterior model use mipmaps (optimized sequences of images with progressively lower resolution to increase rendering speed and reduce artifacts when the model is viewed at a distance). We recommend **Anisotropic 16x** Texture Filtering.
7. If you have a widescreen monitor and feel you are too close to the main panel in the virtual cockpit even after zooming out or moving the pilot's seat aft, you can set


Display
Application
Information
Sound
Traffic
Realism
Add-ons
Scenery Library
Display
World
Lighting
Key Assignments
Axis Assignments
Control Calibration
Other Controls
Vehicle
Airport
Weather
Display Global Settings
Profile:
Custom
Save Settings
Reset Defaults
Full Screen Settings
Display:
NVIDIA GeForce RTX 3090.0.0
Resolution:
3840x1600x32
Black-out Desktop
Auto-fill Main View
Image and Texture Quality
FXAA:
On
AA:
8xSSAA
Texture Filtering:
Anisotropic 16x
Texture Resolution:
Ultra - 4096x4096
Dynamic Texture Streaming
View and Panel Settings
VSync:
Off
Triple Buffering
Target frame rate:
30
Motion Blur
Variable Refresh Rate
Wide-view Aspect Ratio
Mipmap VC Panels
2-D panel transparency (%):
0


Lighting
Application
Information
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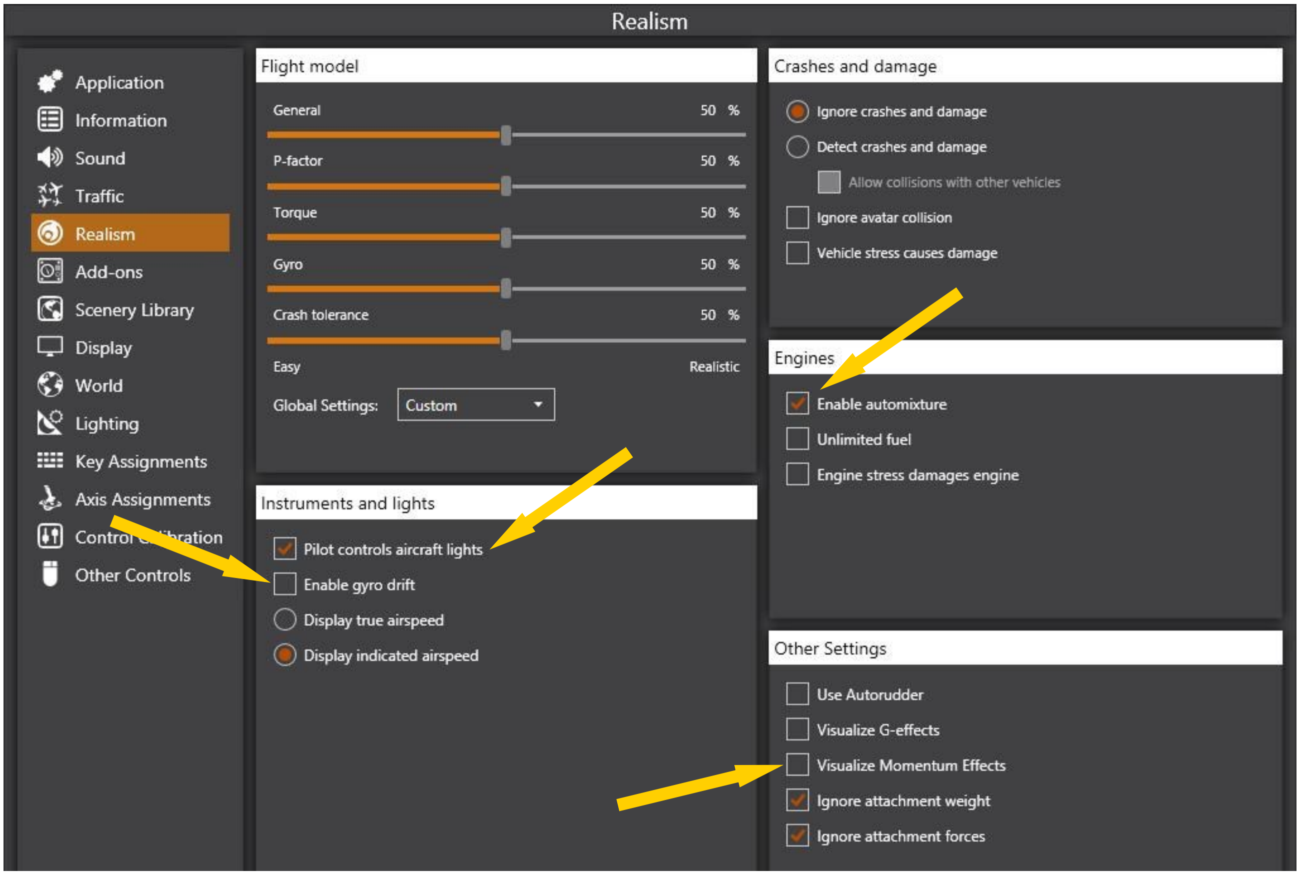
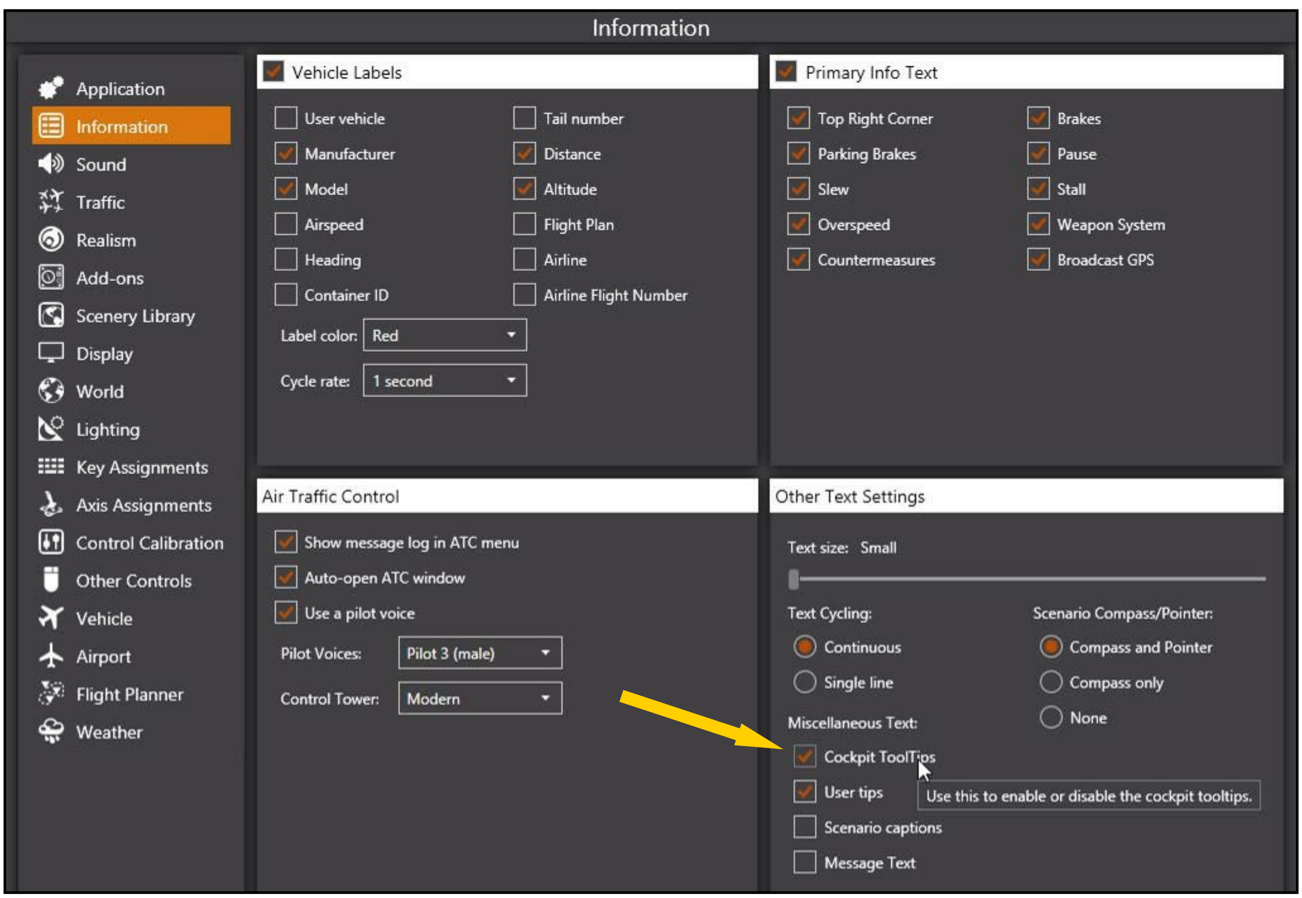
Realism
Add-ons
Scenery Library
Display
World
Lighting
Key Assignments
Axis Assignments
Control Calibration
Other Controls
Vehicle
Airport
Flight Planner
Weather
Lighting
Enable HDR Lighting
Auto Exposure
Brightness:
1.25
Bloom:
0.75
Saturation:
1.00
Dynamic Reflections:
Ultra
Dynamic Lighting
Display lens flare
Shadows
Shadow quality:
Ultra
Shadow draw distance:
Medium
Shadow Type
Cast
Receive
Internal Vehicle
External Vehicle
Simulation Objects
Vegetation
Buildings
Particles
Clouds
Terrain
No Shadow Flagged Content


Realism
Application
Information
Sound
Traffic
Realism
Add-ons
Scenery Library
Display
World
Lighting
Key Assignments
Axis Assignments
Control Calibration
Other Controls
Flight model
General 50 %
P-factor 50 %
Torque 50 %
Gyro 50 %
Crash tolerance 50 %
Easy
Realistic
Global Settings: Custom
Instruments and lights
Pilot controls aircraft lights
Enable gyro drift
Display true airspeed
Display indicated airspeed
Crashes and damage
Ignore crashes and damage
Detect crashes and damage
Allow collisions with other vehicles
Ignore avatar collision
Vehicle stress causes damage
Engines
Enable automixture
Unlimited fuel
Engine stress damages engine
Other Settings
Use Autorudder
Visualize G-effects
Visualize Momentum Effects
Ignore attachment weight
Ignore attachment forces


Information
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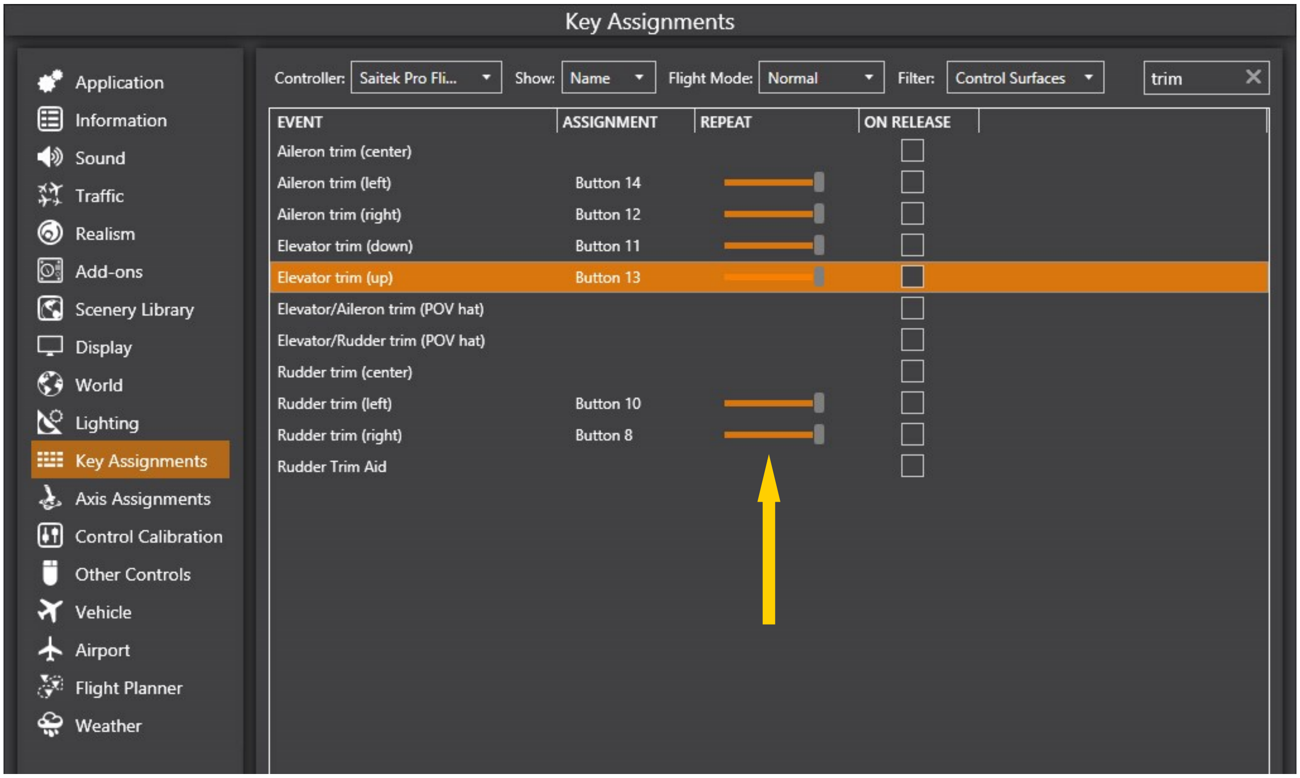
Scenery Library
Display
World
Lighting
Key Assignments
Axis Assignments
Control Calibration
Other Controls
Vehicle
Airport
Flight Planner
Weather
Vehicle Labels
User vehicle
Tail number
Manufacturer
Distance
Model
Altitude
Airspeed
Flight Plan
Heading
Airline
Container ID
Airline Flight Number
Label color: Red
Cycle rate: 1 second
Air Traffic Control
Show message log in ATC menu
Auto-open ATC window
Use a pilot voice
Pilot Voices: Pilot 3 (male)
Control Tower: Modern
Primary Info Text
Top Right Corner
Brakes
Parking Brakes
Pause
Slew
Stall
Overspeed
Weapon System
Countermeasures
Broadcast GPS
Other Text Settings
Text size: Small
Text Cycling:
Continuous
Single line
Scenario Compass/Pointer:
Compass and Pointer
Compass only
None
Miscellaneous Text:
Cockpit ToolTips
User tips
Use this to enable or disable the cockpit tooltips.
Scenario captions
Message Text



the aspect ratio to “**Wide-view Aspect Ratio**”.

8. Unless you own one of the latest generation high-end graphics cards, we always recommend **limiting your frame rate to 30 fps.**

9. To prevent dynamic head movement in the virtual cockpit during strong accelerations, you can uncheck the “**Visualize Momentum Effects**” option on the “Prepar3D > Top Menu Bar > Options > Realism > **Other Settings**” page.

10. Select “**Pilot controls aircraft lights**” and “**Enable automixture**”.

11. Unselect “**Enable gyro drift**”.

12. Adjust the **Traffic**, **World** and **Weather** options for optimal performance depending on your computer’s capabilities and limitations.

13. Make sure the “**Cockpit ToolTips**” option is selected on the “Prepar3D > Top Menu Bar > Options > General > Information > **Other Text Settings**” page.

14. Make sure that the unit of measure used by the simulator (“Prepar3D > Top Menu Bar > Options > General > Application > International > **Unit of Measure**”) is set to **U.S. System (feet, inches)**, or you may encounter issues with some flight instruments. Remember that the Gates Learjet 25/28 is an American airplane from the 1970s/80s.

15. **Highly recommended:** You may want to configure **trim buttons** for your joystick or yoke, as suggested above on the “Prepar3D > Top Menu Bar > Options > General > **Key Assignments**” page. Elevator (horizontal stabilizer), aileron and rudder trim tabs are animated features and fully operational on the GLJ Model 25/28 v4 addon. Proper trimming is an absolute necessity with this aircraft.

Note: *If you still experience performance issues after optimizing your simulation platform, you may need to upgrade your computer.*

AIRCRAFT DESCRIPTION AND SPECIFICATIONS

SECTION 3

AIRCRAFT DESCRIPTION

The Gates Learjet Model 25/28 is a twin turbojet-powered light civilian aircraft.

The Model 25 was first tested in the summer of 1966 and introduced in the fall of 1967. An estimated 368 aircraft were built over a period of almost 15 years.

Your GLJ Model 25 v4 addon is inspired by the Gates Learjet Model 25D, a longer-range, improved version of the Model 25 with greater fuel capacity, introduced in the mid-1970s. It has a short wing with tip tanks and a stretched fuselage compared to previous 20 Series models, allowing more passengers (7 seats +2) and loading options.

The Gates Learjet Model 28 was introduced in the summer of 1977. With a fuselage based on the acclaimed Model 25, it had a new wing dubbed the "Longhorn" that replaced the traditional tip tanks with upswept winglets, the first ever on a jet, which provided a dramatic reduction of induced drag, therefore stretching range and enhancing climb performance.

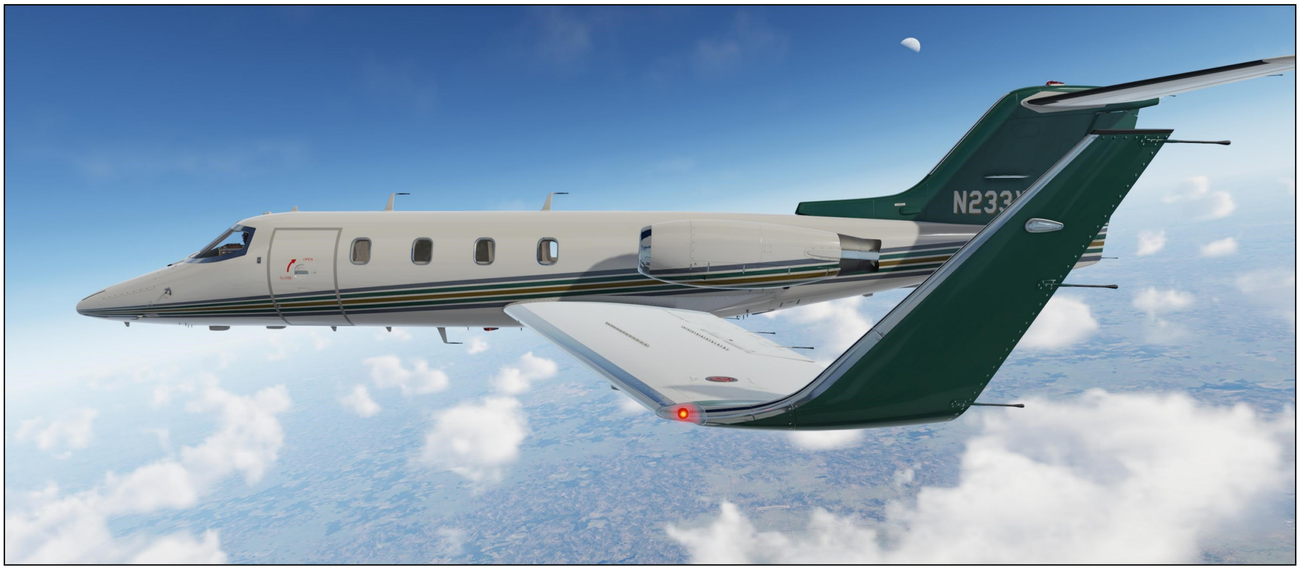
The Model 28's drawback without the wingtip tanks was a relative short range of slightly above 1,300 NM. Its sister ship, the Model 29, had a larger fuselage fuel tank at the expense of the last two seats to extend its range to 1,800 NM with a 1,200 lbs. payload.

Both the Model 25 and the Model 28 have a low wing with a very slight (15 degrees) sweep. Their T-tail is also swept.

The wing for both models is equipped with hydraulically powered, single-slotted Fowler flaps and hydraulically powered spoilers.

Roll control is achieved through cable-actuated ailerons. Both ailerons are equipped with a balance tab while the left aileron also has an electrically powered trim tab.

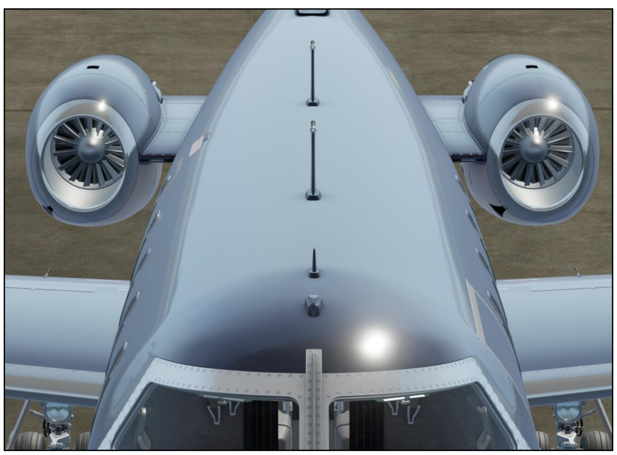
The electrically powered movable stabilizer is



the primary pitch trim. The cable-controlled elevator is the primary pitch control.

The rudder is also cable-actuated and has an electrically powered trim tab.

AIRCRAFT SPECIFICATIONS



Power Plant

The GLJ Model 25/28 v4 addon is equipped with the reliable General Electric CJ610-8A single-spool turbojet engine. Rated at 2,950 lbs. static thrust per side at sea level, the CJ610 provides the aircraft with fighter-like performance.

A single-spool turbojet engine will provide more thrust at altitude than a like-rated modern turbofan engine. This makes the 20 Series aircraft well-suited for high altitude flight. The

downside is that fuel consumption and noise are far greater.

The aircraft is also equipped with thrust reversers that may be used anytime the airplane is on the ground to produce shorter stopping distances. Each engine is equipped with a Dee Howard target thrust reverser system which consists of upper and lower clamshell doors, pivoted near the engine centerline. The reverser's doors are hydraulically actuated and electrically controlled.

Dimensions (Model 25D)

- **Length:** 47 ft. 7 in.
- **Wingspan:** 35 ft. 7 in.
- **Height (top of vertical fin to ground):** 12 ft. 3 in.

- **Wing area:** 231.8 sq. ft.
- **Wheelbase:** 19 ft. 2 in.
- **Tread:** 8 ft. 3 in.

Dimensions (Model 28)

- **Length:** 47 ft. 9 in.
- **Wingspan:** 43 ft. 8 in.
- **Height (top of vertical fin to ground):** 12 ft.1 in.
- **Wing area:** 264.5 sq. ft.
- **Wheelbase:** 19 ft. 2 in.
- **Tread:** 8 ft. 3 in.

Weight (Model 25D)

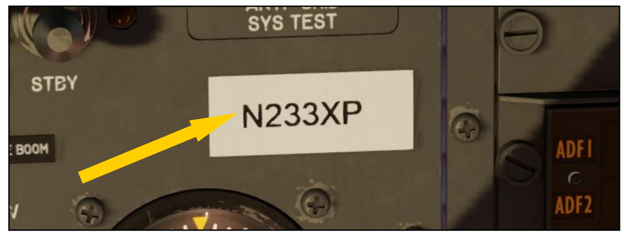
- **Gross weight (including fuel and internal load):** approx. 15,000 lbs.
- **Empty weight:** approx. 8,121 lbs.
- **Maximum ramp weight:** approx. 15,500 lbs.
- **Maximum landing weight:** 13,300 lbs.

Weight (Model 28)

- **Gross weight (including fuel and internal load):** approx. 15,000 lbs.
- **Empty weight:** approx. 8,568 lbs.
- **Maximum ramp weight:** approx. 15,500 lbs.
- **Maximum landing weight:** 14,300 lbs.

Limitations

- **Maximum Mach:** Mach 0.82 (at 24,000 ft.)
- **Maximum speed:** 359 KIAS (306 KIAS under 14,000 feet for protection against bird strikes)
- **Service ceiling:** 45,000 ft.
- **Absolute ceiling:** 51,000 ft.



TAIL NUMBERS

A tail number, also known as the aircraft registration number, is unique to a single aircraft and is required by international convention to be marked on the exterior of every aircraft.

The numbers painted on the 20 variations of the GLJ Model 25/28 v4 addon are fictitious. Any match with actual tail numbers is a pure coincidence.

The tail numbers are painted on the different textures that are mapped on the 3D model and cannot be changed. However, a paint kit is provided for users who wish to create new aircraft variations with their own liveries and tail numbers.

The tail number on the white label [6, fig. 5-15] located under the Anti-Skid Generator Lights on the captain's instrument panel can be changed in the "**aircraft.cfg**" (the aircraft configuration file), located in the add-on aircraft's main folder:

```
[fltsim.0]
atc_id=N864XP
```

Please make a copy of the original "aircraft.cfg" file before making any change.

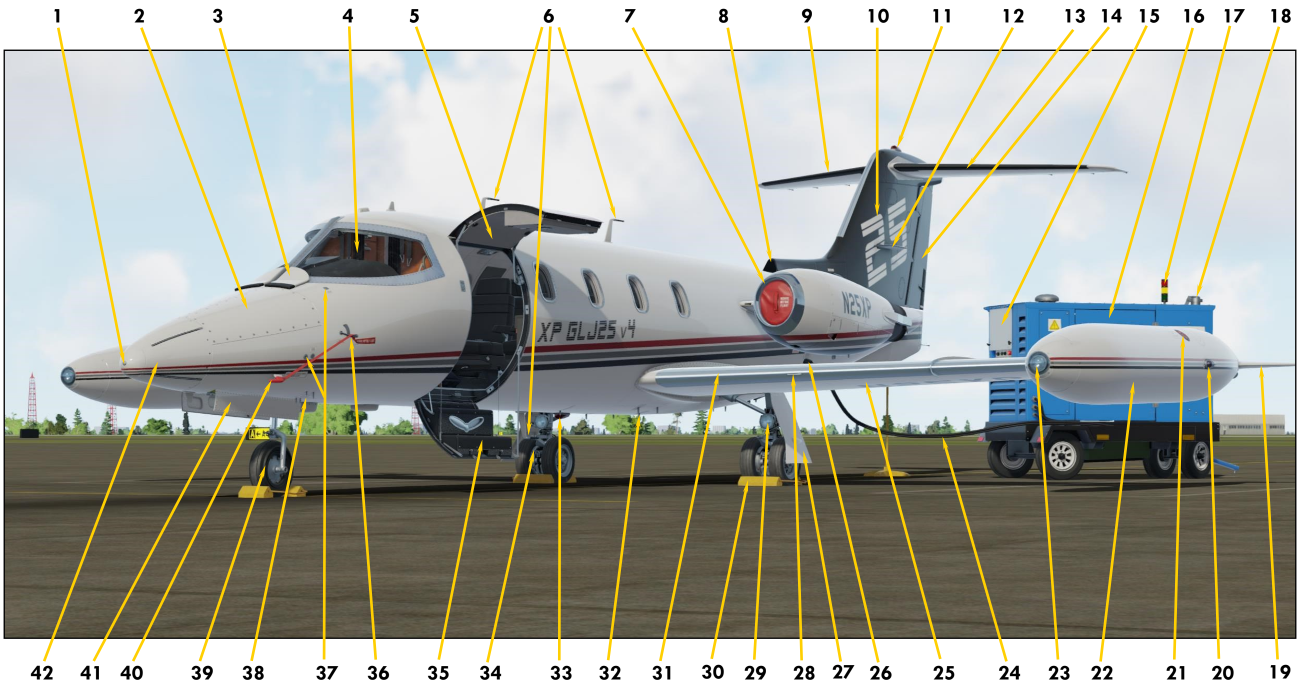


Figure 3-1

1. Radome Alcohol Outlet
2. Nose Compartment
3. Windshield De-Icing Nozzles and Defog Outlets
4. Windshield
5. Passenger and Crew Door Upper Section
6. Radio Antennas
7. Engine Nacelle De-Icing Lip
8. Cabin Air Intake
9. Movable Stabilizer
10. Vertical Fin
11. Rotating Beacon Light
12. VOR/Localizer Antenna
13. Stabilizer Heated Edge (Blanket)
14. Rudder
15. GPU Control Panel Cover
16. Ground Power Unit (GPU)
17. GPU Status Lights
18. GPU Exhaust Pipe and Rain Cap
19. Wingtip Tank Fin
20. Navigation and Strobe Lights
21. Fuel Filler Cap
22. Wingtip Tank
23. Recognition Light (optional on the left wingtip tank)
24. GPU Power Cable
25. Wing
26. External Power Receptacle
27. Main Gear Door
28. Stall Strip
29. Landing/Taxi Light (2 light intensities)
30. Wheel Chock
31. Wing Heated Leading Edge
32. Drains and Valves
33. Rotating Beacon Light
34. Main Landing Gear
35. Passenger and Crew Door Lower Section
36. Stall Warning Vane
37. Static Ports
38. Drains and Valves
39. Nose Gear
40. Pitot Head
41. Nose Gear Door
42. Radome with Static Dischargers

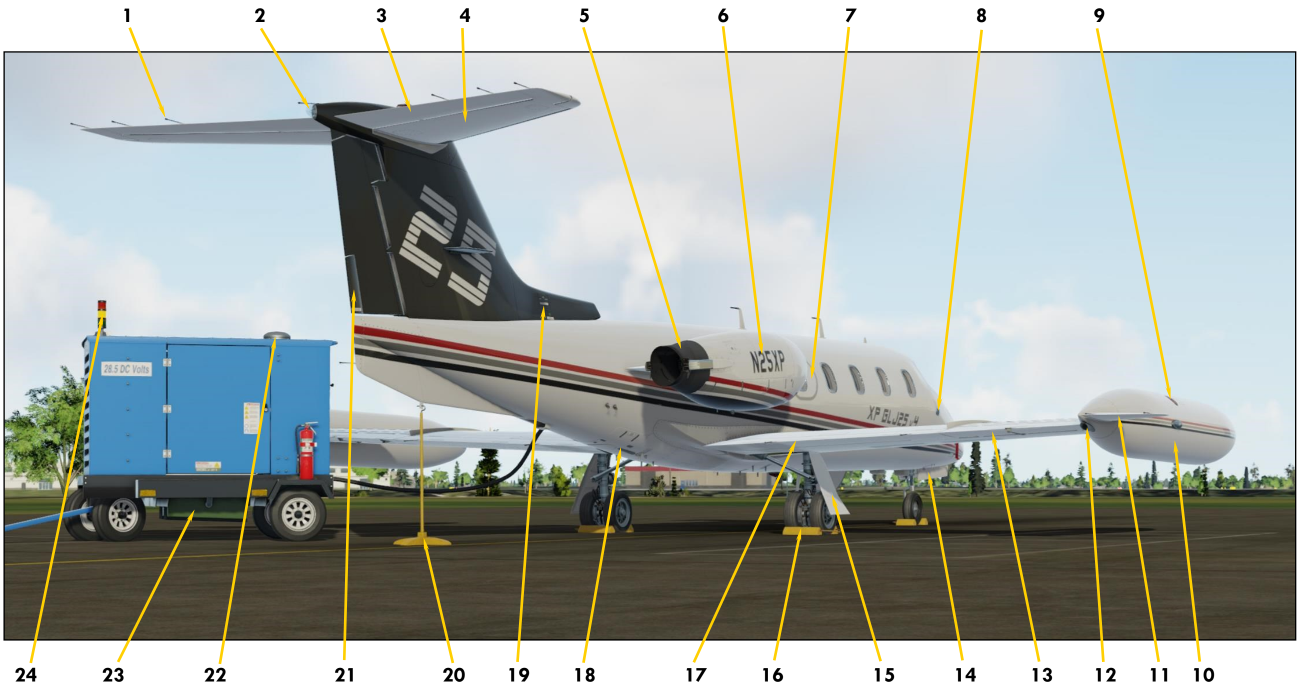
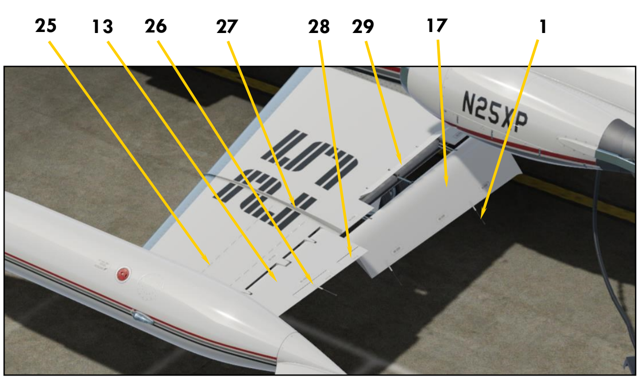
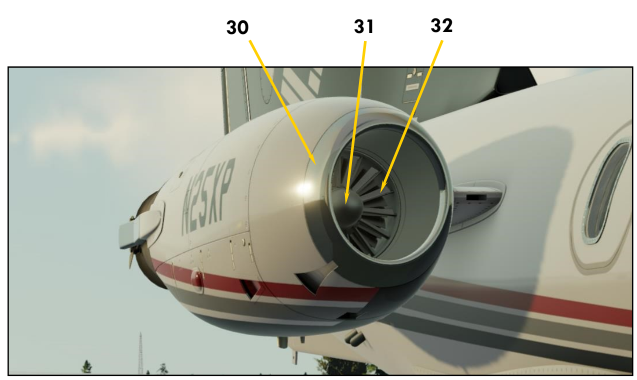


Figure 3-2

1. Static Discharger (Wick)
2. Navigation and Strobe Lights
3. Elevator
4. Movable Stabilizer
5. Thrust Reverser
6. Engine Nacelle
7. Emergency Exit Door
8. Right Wing Inspection Light
9. Fuel Filler Cap
10. Wingtip Tank
11. Wingtip Tank Fin
12. Wingtip Tank Fuel Jettison Tube
13. Aileron
14. Nose Gear Door
15. Main Gear Door
16. Wheel Chock
17. Flap
18. Tail Cone Access Door
19. Oxygen Tank Valve Access Door
20. Tail Stand
21. Rudder Trim Tab
22. GPU Air Cleaner Rain Cap
23. GPU Fuel Tank
24. GPU Status Lights
25. Boundary Layer Energizers
26. Aileron Balance Tab
27. Wing Fence
28. Aileron Trim Tab
29. Spoiler
30. Engine Nacelle De-Icing Lip
31. Engine Nose Cone
32. Engine Inlet Guide Vanes





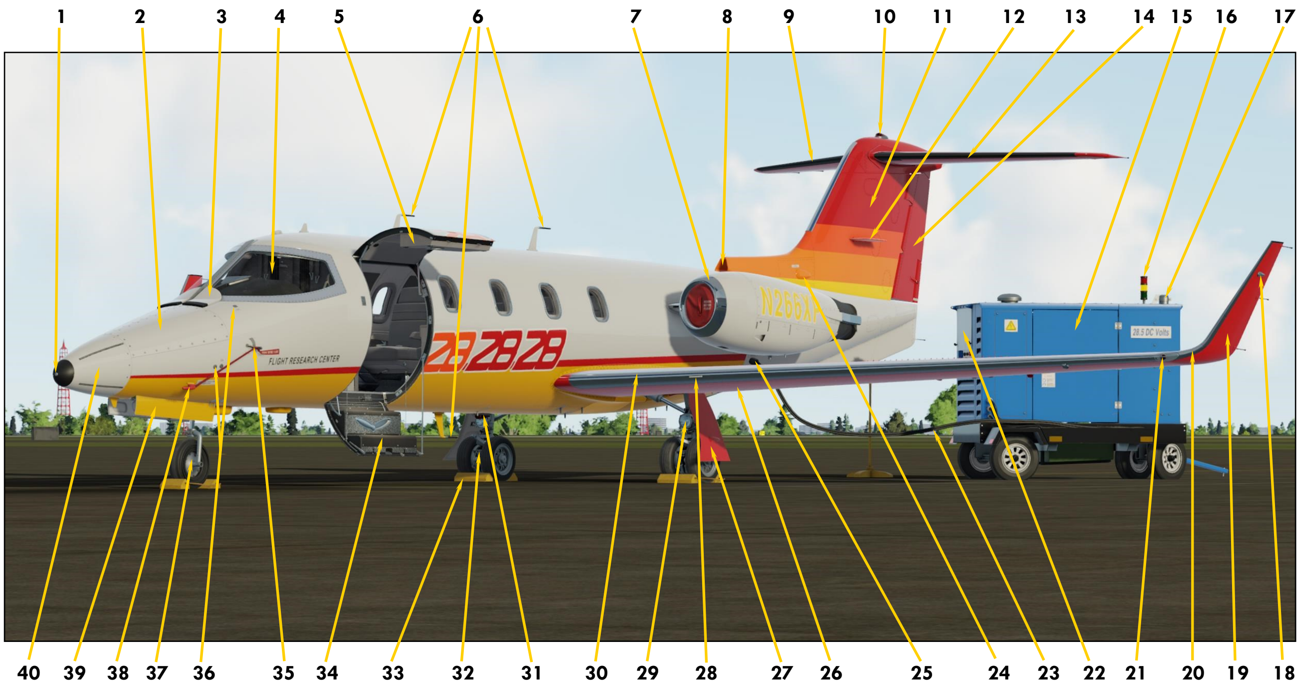


Figure 3-3

1. Radome Alcohol Outlet
2. Nose Compartment
3. Windshield De-Icing Nozzles and Defog Outlets
4. Windshield
5. Passenger and Crew Door Upper Section
6. Radio Antennas
7. Engine Nacelle De-Icing Lip
8. Cabin Air Intake
9. Movable Stabilizer
10. Rotating Beacon Light
11. Vertical Fin
12. VOR/Localizer Antenna
13. Stabilizer Heated Edge (Blanket)
14. Rudder
15. Ground Power Unit (GPU)
16. GPU Status Lights
17. GPU Exhaust Pipe and Rain Cap
18. Strobe Light
19. Winglet (“Longhorn”)
20. Winglet Leading Edge
21. Navigation Light
22. GPU Control Panel Cover
23. GPU Power Cable
24. Oxygen Bottle Compartment
25. External Power Receptacle
26. Wing
27. Main Gear Door
28. Stall Strip
29. Landing/Taxi Light (2 light intensities)
30. Wing Heated Leading Edge
31. Rotating Beacon Light
32. Main Landing Gear
33. Wheel Chock
34. Passenger and Crew Door Lower Section
35. Stall Warning Vane
36. Static Ports
37. Nose Gear
38. Pitot Head
39. Nose Gear Door
40. Radome with Static Dischargers

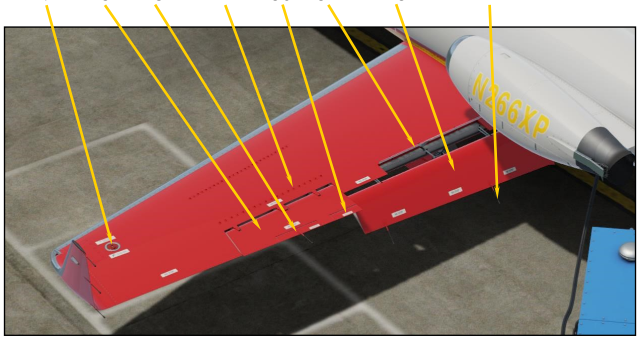
1 2 3 4 5 6 7 8 9 10

26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11

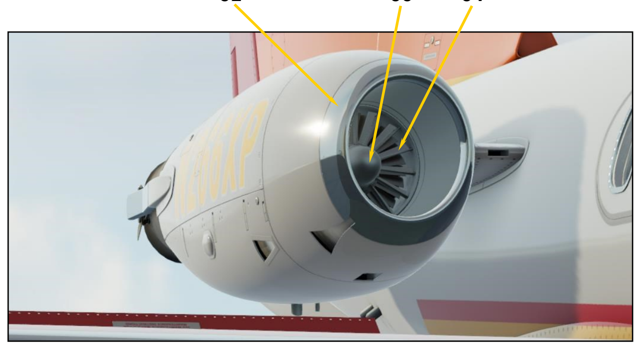
Figure 3-4

1. Static Discharger (Wick)
2. Navigation and Strobe Lights
3. Elevator
4. Movable Stabilizer
5. Oxygen Tank Valve Access Door
6. Thrust Reverser
7. Engine Nacelle
8. Emergency Exit Door
9. Right Wing Inspection Light
10. Strobe Light
11. Winglet ("Longhorn")
12. Wing
13. Aileron
14. Nose Gear Door
15. Nose Gear
16. Flap
17. Main Gear Door
18. Main Gear
19. Tail Cone Access Door
20. VOR/Localizer Antenna
21. GPU Power Cable
22. Rudder
23. Rudder Trim Tab
24. GPU Air Cleaner Rain Cap
25. GPU Fuel Tank
26. GPU Status Lights
27. Fuel Filler Cap
28. Aileron Balance Tab
29. Boundary Layer Energizers
30. Aileron Trim Tab
31. Spoiler
32. Engine Nacelle De-Icing Lip
33. Engine Nose Cone
34. Engine Inlet Guide Vanes

27 13 28 29 30 31 16 1



32 33 34



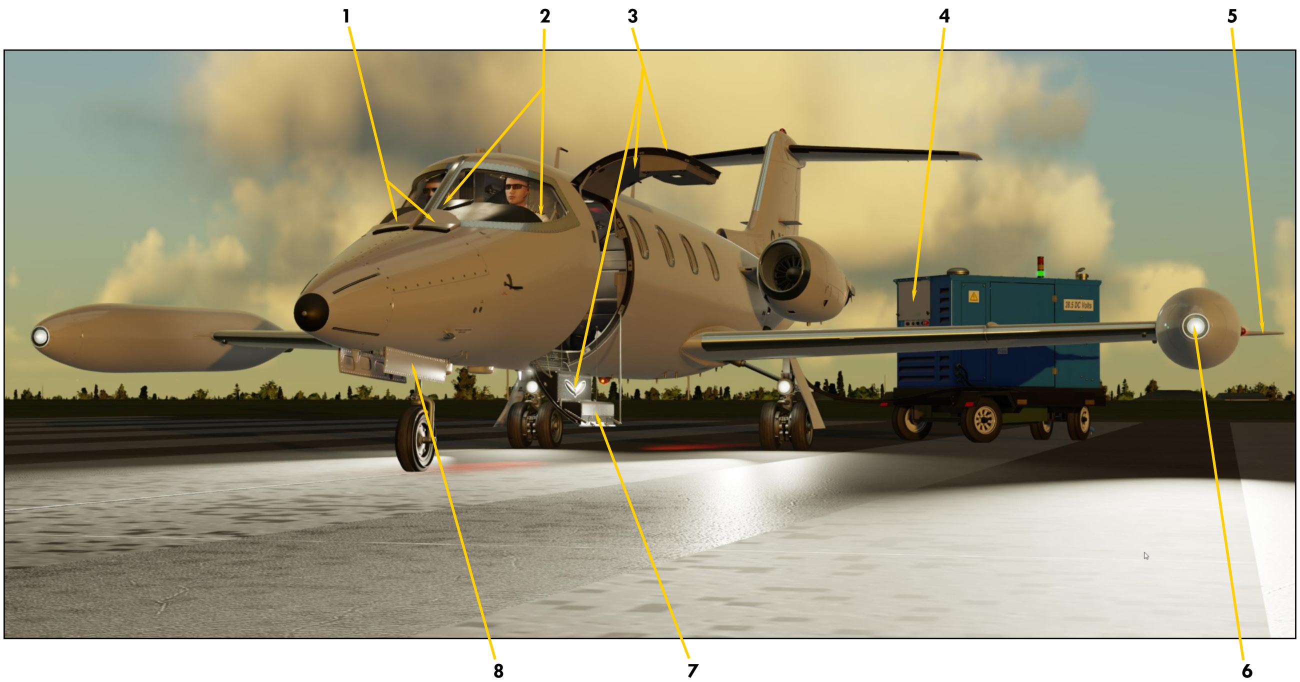


Figure 3-5

1. Pilot's Sunglasses
   Windshield Defog Outlets
2. Pilot Selection
   Either Pilot's Shirt
3. Open/Close Passenger and Crew Door
   Door Handles (Interior/Exterior)
4. GPU Start/Shutoff
   GPU Control Panel Cover
5. GPU Visible/Invisible
   Left Wingtip Tank Aileron (Model 25)
   Left Winglet Leading Edge (Model 28) [20, fig. 3-3]
6. Left Recognition Light Installed/Removed
   Left Wingtip Tank Nose Cone/Light (Model 25)
7. Crew Present/Absent
   Lower Section of the Passenger and Crew Door
8. "Remove Before Flight Items" Installed/ Removed
   Nose Gear Door (aircraft must be on the ground and parked)
9. Entry Lights On/Off
   Bottom Wall Switch [3, fig. 5-52]
10. Cabin Ceiling Lights Off/Low/High
   Top Wall Dimmer [4, fig. 5-52]

VIRTUAL COCKPITS

SECTION 4

Retrofitting the cockpit of our GLJ 20 Series addons with modern avionics was fun and made it more appealing to many desktop pilots considering how airplanes are flown in the 21st century. However, it must be remembered that the Gates Learjet Model 25/28 is a 1970s aircraft originally equipped with analog instrument panels and "steam gauges" from that period.

In our efforts to modernize the cockpit, we absolutely wanted to keep the look and feel of the original panels. We also wanted to give users the possibility to add their own navigation/communication systems, radars, and gauges acquired from third-party developers.

With the full-3D integration of the GNS 530, GTN 750, and radar, and the rearrangement of the retrofitted panels (which was quite a challenge considering the rather limited space for new devices) we believe that we have achieved our goals.

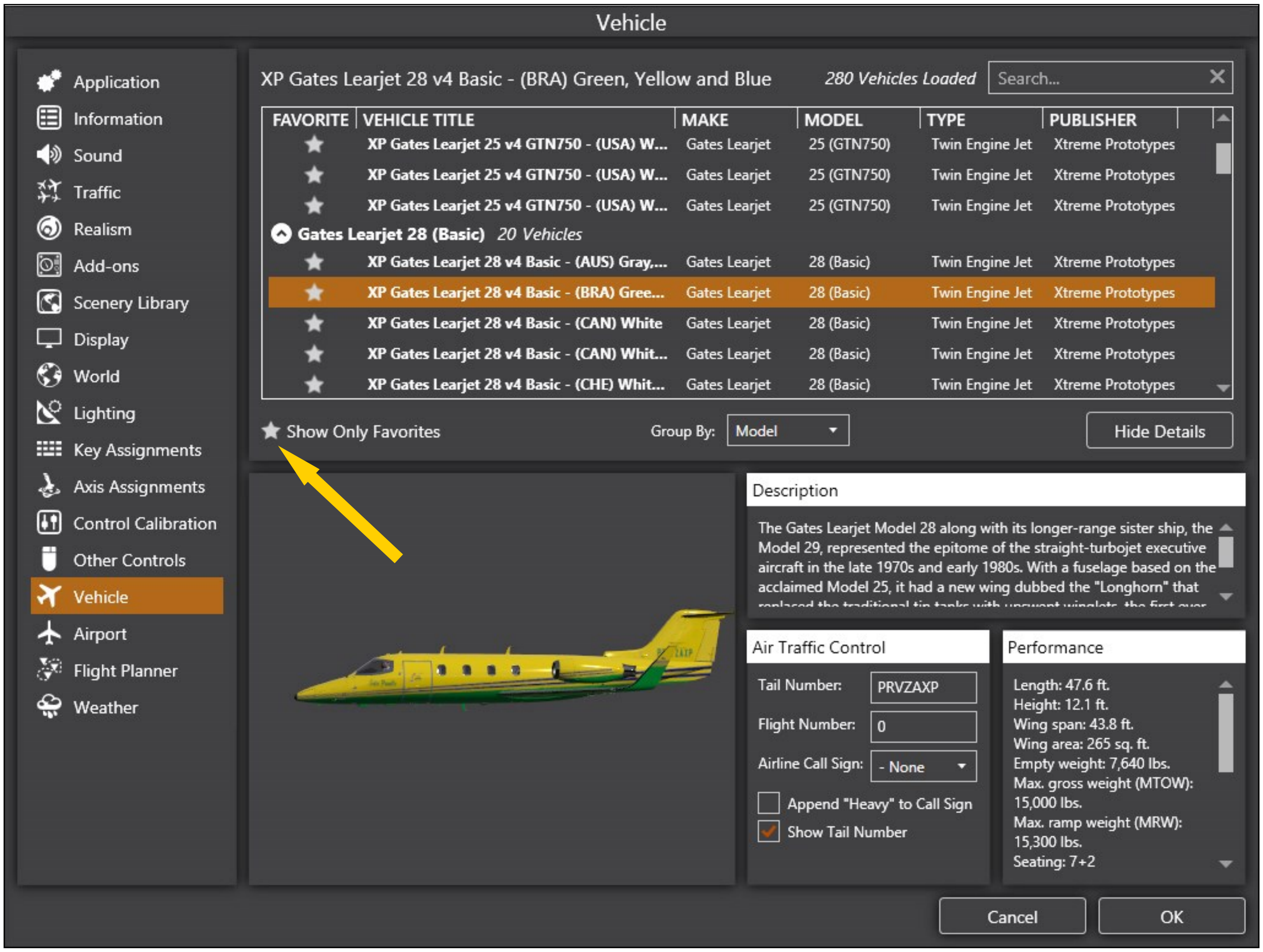
Because of the significant differences between the different panel configurations, aircraft systems and third-party addons, it was not possible to create a "one-size-fits-all" cockpit. Instruments and sub-panels had to be moved around or replaced to make room for modern avionics and new devices. Systems had to be reprogrammed, panels reconfigured.

To avoid confusion when installing third-party addons, to improve performance, and to allow for the best panel rearrangement, **two retrofitted virtual cockpits** with different panel configurations are provided. They represent the interior of a typical Gates Learjet Model 25/28 with the addition of modern avionics.

By using this approach, you can select the cockpit with the panel configuration that best suits your needs. As your learning experience progresses and your flying methods evolve, you may eventually select another configuration and add more complex systems.

You can choose which cockpit you prefer when selecting an aircraft from the "Prepar3D > Top Menu Bar > Vehicle > Select...> **Vehicle**" page.

Note: *The GLJ Model 25/28 v4 addon comes with two different virtual cockpits and 20 liv-*



eries (aircraft variations) for each cockpit. All aircraft variations should be visible on the "Prepar3D > ... > ***Vehicle****" page. However, the "****Show Only Favorites****" option may prevent some aircraft variations from being displayed. You may need to uncheck this option. You may also select only the aircraft variations that you want to fly as your favorites. This will speed up loading time when selecting a vehicle.*

The Basic Virtual Cockpit

The **Basic** virtual cockpit features a classic analog instrument panel from the early 1980s and strives to bring you the spirit and the actual feeling of flying a high-performance business jet at a time where large LCD screens did not exist. New radios with yellow VFD displays have replaced the original sets with analog displays from the 1960's. A generic GNS 530 navigation system, with built-in COM and NAV radios, and a generic weather radar are also installed.

Note: *Optional GNS 530, radar, and special transponder addons are not included and must be purchased separately from third-party vendors/developers. Prepar3D GPS 500, demo radar and transponder are included.*

The GTN750 Virtual Cockpit

The **GTN750** virtual cockpit features modern avionics including two generic GTN 750 multi-function navigation systems, a generic weather radar, an ADF radio, and a standby transponder with yellow VFD displays.

Note: *GTN 750 and radar addons are not included and must be purchased separately from third-party vendors/developers. Prepar3D demo radar and transponder are included.*

ADDING THIRD-PARTY ADDONS

The Xtreme Prototypes GLJ Model 25/28 v4 addon comes with preconfigured instrument panels for the following systems:

- The basic GPS 500 included with Prepar3D - or - the GNS 530/GTN 750 systems from Reality XP or Flight1 (not included);
- A dummy radar screen - or - the demo monochrome radar that comes with the Prepar3D SDK (included) - or - the Rex/ Milviz WX Advantage radar (not included).

Third-party add-on software must be installed and working properly on your system.

Note: *Some third-party addons may no longer be compatible with the latest versions of Prepar3D.* ***Please contact the developer for support. Xtreme Prototypes cannot provide technical assistance for third-party addons.***

Included Panel Configurations

By default, the instrument panel in the **Basic** virtual cockpit is preconfigured for the GPS 500 that comes with Prepar3D, and for a dummy radar screen. This is the standard option to choose **if you don't have third-party add-on software installed.** You can always change the configuration later and add other third-party navigation systems and radars, such as the included Prepar3D demo radar (see "Release Notes").

By default, the instrument panel in the **GTN750** virtual cockpit is preconfigured for the Reality XP GTN 750 (not included, sold separately), and for a dummy radar screen. We do not recommend flying with the GTN750 cockpit without a third-party GTN 750 addon installed (no navigation systems, no radios).

Alternate panel configurations are also provided for other systems and third-party add-on software.

Please refer to appendix 2 for complete instructions and for more information about adding third-party addons to the cockpit of the GLJ Model 25/28 v4 addon.

CONFIGURING THE VIRTUAL COCKPIT

Moving the Pilot's Viewpoint

While visibility is excellent looking forward in the GLJ Model 25/28 v4 cockpit, it may be helpful from time to time, and especially during takeoff and landing, to move the pilot's viewpoint in the virtual cockpit.

Use the keyboard to move the pilot's viewpoint in the virtual cockpit:

- "**CTRL+Backspace**" = Move Forward
- "**CTRL+Enter**" = Move Aft
- "**SHIFT+Enter**" = Move Up
- "**SHIFT+Backspace**" = Move Down
- "**SHIFT+(left)CTRL+Backspace**" = Move Left
- "**SHIFT+(left)CTRL+Enter**" = Move Right
- "+/-" = Zoom In and Zoom Out
- "**SHIFT++**" or "**SHIFT+-**" = Fine Zoom In or Zoom Out
- "**CTRL++**" or "**CTRL+-**" = Telephoto/Wide Angle Lens adjustment (field of view) - *this one works in exterior camera views only , but is good to know*
- "**Backspace**" = Reset Zoom

Important

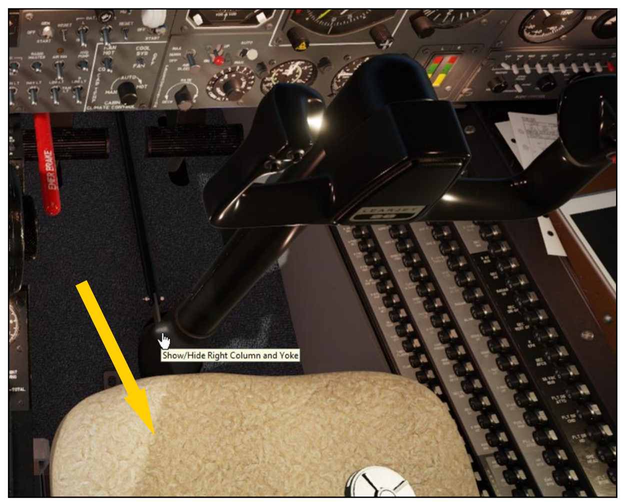
- Do not move the pilot's viewpoint too far aft because you may no longer be able to click some of the switches if the viewpoint is behind the seat or other obstacles. When this happens, move your viewpoint forward.

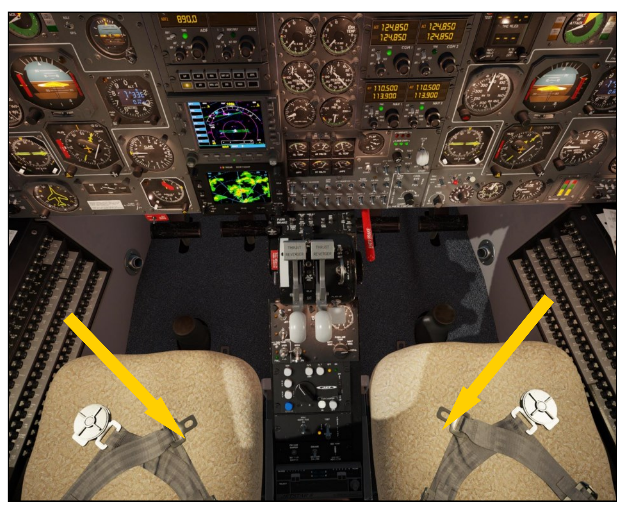
Tips

- We recommend using a wide screen aspect ratio in the virtual cockpit if you have a widescreen monitor. Refer to section 2 for more details on how to change the screen aspect ratio.

Hiding the Control Columns and Yokes

You can hide the control columns by clicking the **boot** at the base. This gives the pilot a better view of the main instrument panel, making the switches and controls more accessible and the instruments more readable. Click the boot again to show the column. Each column/yoke is independent.





Hiding the Throttles

You can hide the throttles, subthrottles and parking brake lever by clicking the **white strip** on the throttle quadrant [5, fig. 5-43]. This gives the pilot a better view of the switches on the electrical panel and center pedestal. Click the white strip again to show the throttles and parking brake lever.

Playing Music

As a tribute to the inventive genius of Bill Lear, the GLJ Model 25/28 v4 addon features a functional **“**Jetstar 8” **8-track tape player** [fig. 5-48] installed in the center pedestal (or under the copilot’s instrument panel in the GTN750 cockpit) that can play up to four different tracks of stereo music, like the original player.

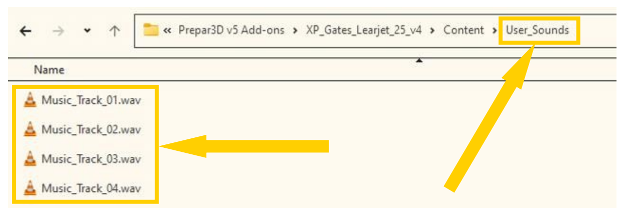
For demonstration purposes, we’ve added the legacy opening music that originally came with FSX, but the tracks can be changed to any musical piece of your choice.

To play your own music, simply convert four of your favorite music pieces to (16-bit stereo, 22,050Hz) **wave** files and renamed them:

Music_Track_01.wav
Music_Track_02.wav
Music_Track_03.wav
Music_Track_04.wav

Copy these files to the “**User_Sounds**” folder in the “**Content**” folder of the main add-on package folder, for example:

```
…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_25_v4\Content\User_Sounds
```



The “User_Sounds” folder contains the music for the 8-track tape player.

To insert an 8-track tape cartridge into the player, click the **player’s door** [1, fig. 5-48].

To remove the cartridge from the player, click the **cartridge** [5, fig. 5-48]. To push the cartridge in and play the music, use the mouse wheel (up). Requires DC power.

To pull the cartridge out and stop the music, use the mouse wheel (down).

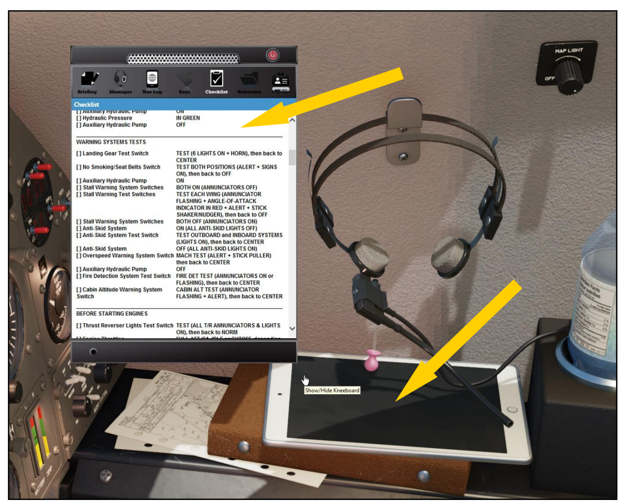
In the GTN750 cockpit, the 8-track tape player can be removed by clicking the breaker marked "**STEREO**" on the captain's breaker panel.

Note: *Bill Lear introduced the world's first Lear Jet Stereo 8-track player for automobiles back in the spring of 1965 through the Lear Jet Stereo division, an extension of Lear Jet Corporation. The format was largely adopted by the music industry and major electronics and car manufacturers from the mid-1960's to the late 1970's.*

Releasing the Armrests

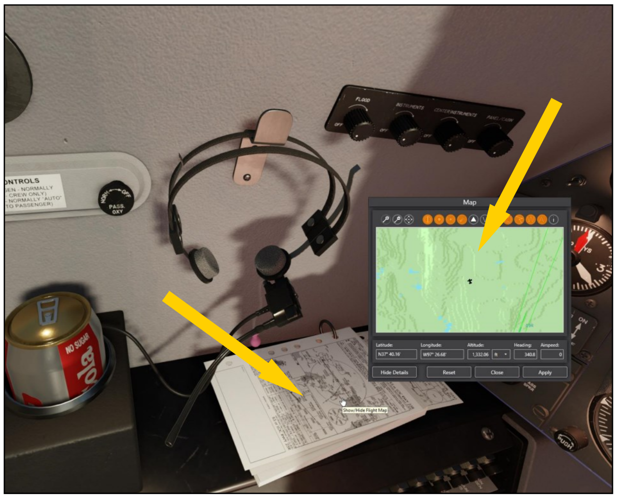
Click the armrests to release them. Click again to raise them. Use the mouse wheel to extend or retract the armrests.

To Show/Hide the Kneeboard



Click the tablet on the copilot's right console to show or hide the Prepar3D kneeboard.

To Show/Hide the Map



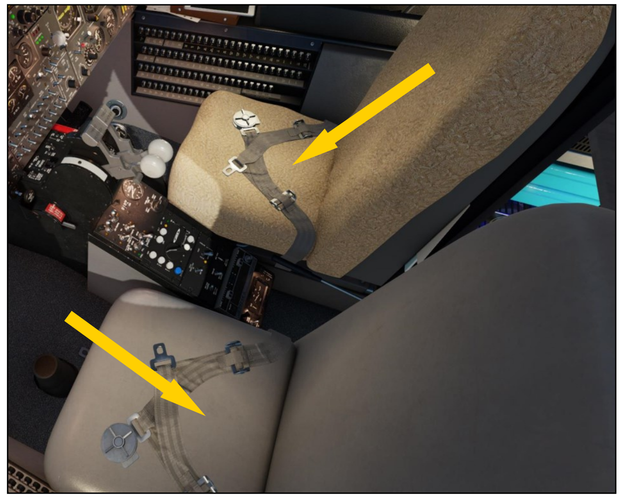
Click the brown binder on the copilot's right console or any charts on either the captain's or the copilot's side console to show or hide the Prepar3D map.

Using the Sun Visors

Click the green plastic flap to lower or to raise the sun visor. Click and drag the hinge to slide the sun visor along the track.

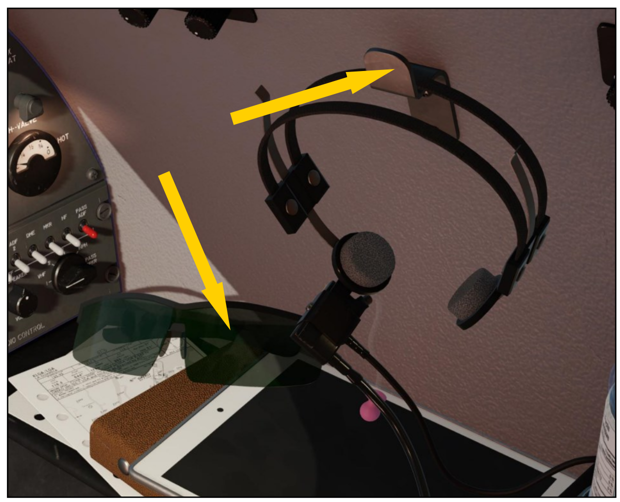
To Show/Hide the Sheepskin Seat Covers

Click either the pilot's or the copilot's seat cushion to switch from leather to sheepskin.



To Show/Hide the Pilots

Click either headphone hanger to show or hide the pilots (visible in the exterior view). When the headphones and seatbelts are visible, the crew is absent. When the headphones and seatbelts are not visible, the crew is present.



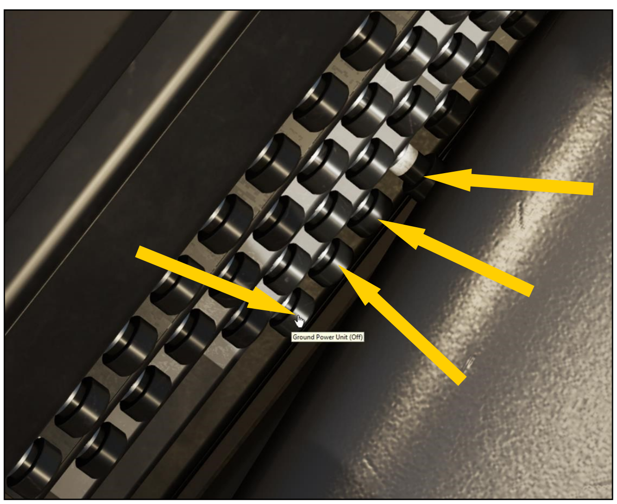
To Show/Hide the Pilots' Sunglasses

Click the pair of sunglasses on the copilot's right console (or the whisky compass housing or correction card) to show or hide the pilot's sunglasses. When the pair of sunglasses is visible on the copilot's right console, the pilots are not wearing sunglasses.

To Illuminate the Cockpit and the Instrument Panels

Use the mouse wheel on the left and right-side dimmers to adjust the brightness of the cockpit and panel lights (off/low/high or 0-100% brightness for the backlit panels). Refer to fig. 5-49 for more details. Requires DC power.

Other Cockpit Controls and Hot Spots



The **first four unused breakers** at the bottom of the captain's breaker panel have special hidden functions related to the simulation:

- **Breaker 1:** GPU on/off
- **Breaker 2:** Breaker panel back lights on/off
- **Breaker 3:** Windshield red ice detection lights on/off
- **Breaker 4:** Ice and frost effects on/off

Refer to section 5 for more details on other cockpit controls and hot spots.

CONFIGURING THE CABIN

To Open/Close the Curtains and the Toilet Door

Click the front cockpit curtain or the baggage compartment curtain at the back to open or close the curtains. Click the toilet door to open or close the door.

To Open/Close the Toilet Seat Cover

Click the toilet seat cover to open or close the toilet seat cover.

To Open/Close the Passenger Tables

Click the top section of the cabinet to open or close the table. Tables cannot be opened when their corresponding seat is folded.

To Fold/Unfold the Passenger Seats

Use the mouse wheel on the seat's backrest to fold or unfold the seat. Seats cannot be folded when their corresponding table is open.

To Open/Close the Cabinet Doors

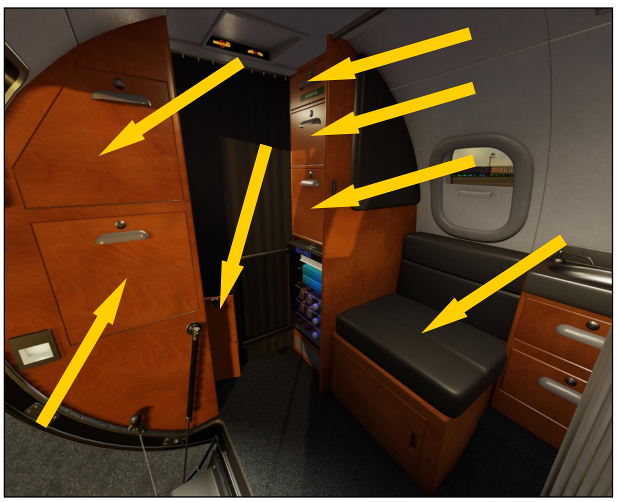
Click the cabinet doors to open or close the doors.

To Open/Close the Refrigerator Door

Click the refrigerator door (glass or frame) to open or close the door.

To Open/Close the Window Blinds

Use the mouse wheel to open or close the blind to any position.



To Turn the Cabin Ceiling Lights On/Off (+Dim)

Use the mouse wheel on the Cabin Lights Dimmer [4, fig. 5-52] to adjust the brightness of the cabin (and cockpit) ceiling lights (off/low/high).

To Turn the Entry Lights On/Off

Click the Entry Lights Switch [3, fig. 5-52] to turn the lights on/off.

To Turn the Passenger Reading Lights On/Off

Click the on/off button or the entire light fixture to turn the passenger reading light on/off. Requires DC power.

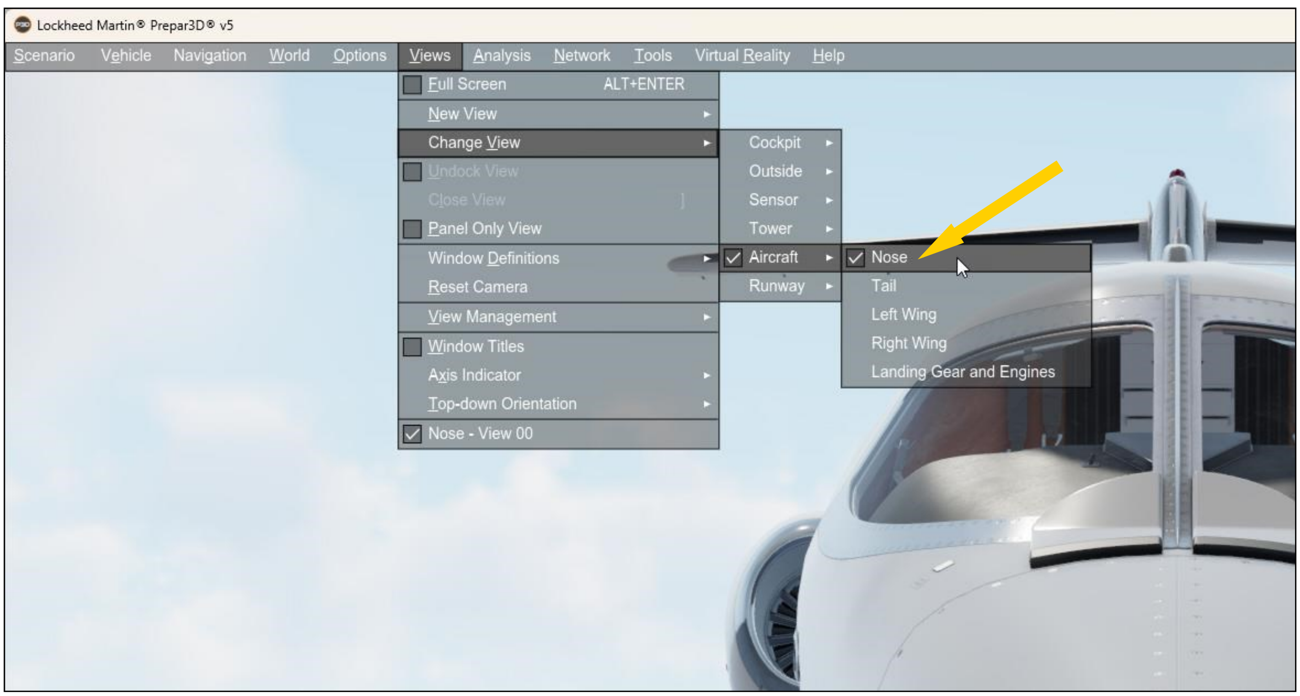
To Turn the Cabin TV On/Off

Click the logo at the bottom of the screen to turn the TV on/off. Requires DC/AC power.

Note: *The Cabin TV screen is a standard Prepar3D 2D gauge that displays a static image. It can be replaced by any third-party gauge that is compatible with Prepar3D. Refer to appendix 2 for more information.*

To Open/Close the Passenger and Crew Door

Click the red handle in the top section of the door or the chrome handle in the bottom section to open or close the clamshell door. The keyboard shortcut **SHIFT+E** can also be used for opening or closing the door.



How to Switch Views

To switch to one of the 15 cockpit camera views, press “**A**” or select a view from the “Prepar3D > Top Menu Bar > Views > Change Views > Cockpit > **Any cockpit view**”. Five (outside) aircraft camera views are also available, in addition to the default aircraft views.

INSTRUMENT PANELS

SECTION 5

The Xtreme Prototypes GLJ Model 25/28 v4 add-on aircraft for Prepar3D comes with two highly detailed VR-ready virtual cockpits with **interchangeable panel configurations** and full-3D animated gauges and other devices. Full-3D interior models allow for total immersion into the Gates Learjet Model 25/28 cockpit and cabin.

FULL 3D GAUGES

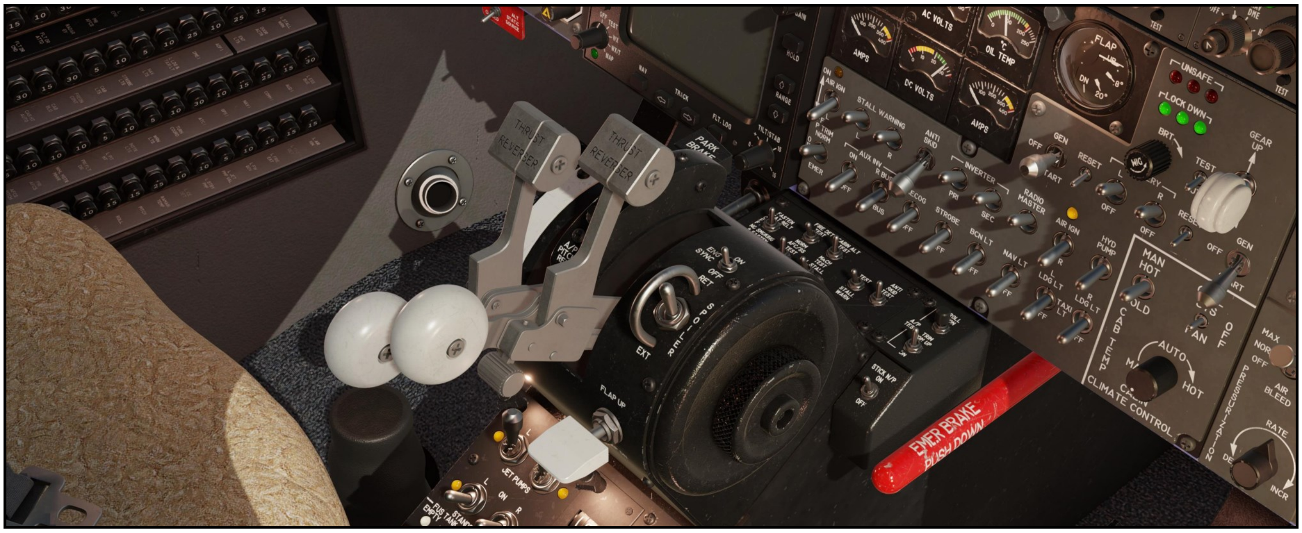
Some virtual cockpits found in other third-party addons or in the stock aircraft that come with Prepar3D use legacy (FSX-style) 2D gauges that are "projected" onto the various instrument panels. When viewed from an angle, these gauges appear flat even though they might contain needles, ribbons, buttons, knobs, and other movable parts that are not flat in the real world.

2D gauges are generally created with layers of animated drawings, while some may also include vector text and graphics. Most of these gauges use low-resolution graphics that are limited in size. The GPS 500 that comes with Prepar3D is a good example of a "flat" 2D gauge that contains both bitmaps and vector graphics. Viewed from the side, the knobs and buttons on the bezel look flat.

Xtreme Prototypes VR-ready virtual cockpits do not integrate 2D gauges, except for CRT/LCD screens and for some LED/VFD digital displays that are flat by nature, like in GPS/GNS/GTN, radar and radio displays. Our panels feature **fully modeled** instruments and gauges with real moving parts instead, like in the real world.

This, along with the highly detailed aircraft interior, makes the GLJ Model 25/28 v4 addon an ideal candidate for being used with some of the newest **virtual reality** devices and applications. When equipped with the proper software and VR headsets, desktop pilots feel they are inside the aircraft for real, not merely in front of flat 2D drawings.

The virtual cockpits that come with the GLJ Model 25/28 v4 addon contain hundreds of



animated objects that can be **interacted with**, such as gauges, switches, knobs, levers, light indicators, and other devices. These objects all have integrated "**tooltips**" that display useful information to the user when hovering over them with the mouse.

Nearly all levers, knobs and switches are clickable to perform useful functions, unless otherwise noted in the following pages.

Important

- All aircraft systems are programmed into the virtual cockpit. For this reason, it is suggested to select the virtual cockpit view after loading the aircraft in the simulator to make sure that all systems are initialized properly. For example, if you are in one of the exterior views after loading the aircraft and some exterior features are not displayed or working properly, simply switch to the virtual cockpit view and go back to the exterior view. While this should no longer be an issue in this software version, this simple step is still recommended.
- Multiple camera views are provided when in the virtual cockpit for entering the passenger cabin or to help the pilot with some switches and other cockpit items in areas that are difficult to reach. You can cycle through the different camera views when in the virtual cockpit view by pressing the "**A**" key on your keyboard.

DYNAMIC LIGHTING

Instrument panels in the virtual cockpits of the GLJ Model 25/28 v4 addon are illuminated with **real dynamic lights**, like in the real world. No static light maps (textures) are used for artificially illuminating the cockpit, like in legacy addons. **Each instrument, instrument eyelid, and panel lamp post has its own dynamic light effect built in.**

With static light maps, mobile objects in gauges and panels (like the attitude tape in the ADI, a switch, or a knob) move along with their shadows and bright spots. This is because the lighting effect comes from a fixed "emissive" texture applied to the objects. In the real world, shadows and bright spots on animated objects aren't supposed to move when the light source is fixed, like a panel

lamp post projecting its light beam on a gauge.

It is also impossible to simulate partly illuminated panels with static light maps. In the GLJ Model 25/28 v4 addon, instruments lights and panel post lights are separated into three sections: the **captain's panel**, the **center panel** (including the center pedestal), and the **copilot's panel**. Each section has its own independent dimmer located on each side of the cockpit.

The **yellow flood lights** above the main instrument panel are separated into two sections (one on the captain's side and the other on the copilot's side) and are controlled by separate dimmers on each side of the cockpit.

Additional **lights and annunciators** can be tested, and their brightness adjusted with a dimmer switch located under the glareshield. The **landing gear lights** on the center panel have their own independent dimmer.

Backlit instrument panels can be dimmed with their own dimmer located on the captain's side wall.

The captain's and copilot's **map lights** are also controlled individually by their own dimmer on each side of the cockpit, adjacent to the light fixture.

Note: *The GLJ Model 25/28 v4 addon uses real lights for illuminating the cabin, the cockpit, and the instrument panels. Because of limitations with the dynamic light effects in Prepar3D, cockpit and cabin lights are limited to two intensities (low or high), beside their off state. The brightness of the lights, annunciators, and backlit panels can be adjusted to any intensity from 0% to 100%.*

HOW TO ACTUATE SWITCHES, BUTTONS, AND KNOBS

- Most **2-position switches** can be turned ON or OFF with a simple left click with the mouse pointer positioned over the switch actuator. If a switch or button does not respond to clicks, it is probably a 3-position switch (see below). Try the mouse wheel instead.

  Note: *2-position switches will not respond to mouse wheel movements.*

- Most **3-position switches** can be turned to their UP position from their MIDDLE (or center) position by turning the mouse wheel up. Turning the mouse wheel down will move the switch actuator down one position at a time (UP, MID, DOWN). Turning the mouse wheel up will move the switch actuator up again one position at a time (DOWN, MID, UP).

Note: *Single-clicking with the left mouse button has no effect on most 3-position switches. Make sure you have a wheel mouse.*

- **Some 3-position switches** use a combination of mouse clicks and wheel turns (for example, the Gyro Drift Compensation Switch [8, fig. 5-5], the Manual Mode Cabin Temperature Control Switch [2, fig. 5-42] or the Manual Cabin Rate Cherry Picker Switch [3, fig. 5-41]). Turning the mouse wheel will move the switch to either direction while left clicking will return the switch to its middle (center) position. Other switches, such as the Flaps Switch [26, fig. 5-43] will respond to both the mouse wheel and mouse clicks.

- **2-position switch guards** can be opened or closed with a simple left click with the mouse pointer positioned over the guard, like 2-position switches (see above).

- **Push-button switches** (and **momentary switches**) can be actuated with a single left click on the center button/plunger/lever.

- Some **levers** and **handles** can be dragged with the mouse to the desired position. Simply click on the handle with the left mouse button, drag the handle to the desired position, and release the mouse button.

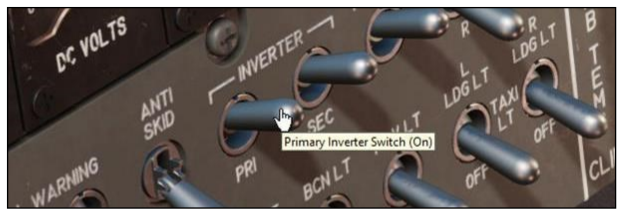
- **Control columns** and **yokes** cannot be dragged with the mouse because they are synchronized with the movements of your controller or with the keyboard arrow keys (pitch and roll).

- The **rudder pedals** are synchronized with the rotation movement of your joystick or your flight sim pedals. Note that the toe brakes are synchronized with the brake buttons on your joystick/yoke or with the toe brakes on your flight sim pedals.

Note: *The GLJ Model 25/28 v4 addon uses differential brakes!*

- **Knobs** can be rotated with the mouse wheel. Turning the mouse wheel up will turn the knob clockwise (or up), turning the mouse wheel down will turn the knob counterclockwise (or down). Continuous rotation is possible with some knobs by left or right clicking with the mouse and leaving the mouse button depressed until the knob is set to the desired position. Some knobs have dual functions. Turning the mouse wheel will trigger the first function while left and right clicking will trigger the second function. On some knobs, like the autopilot Turn Command Knob [2, fig. 5-46] or the autopilot Pitch Command Wheel [10, fig. 5-46], left clicking the knob will return it to its center position.

- Other **clickable objects** (and **hot spots**) such as cabinet doors, curtains, toilet cover and door, door handles, etc. can be interacted with using a single left mouse click. Other objects like window blinds and foldable seats can be activated by turning the mouse wheel, like 3-position switches.



- **Tooltips** are small rectangles with useful information that appear when hovering over objects with the mouse. They are integrated in every clickable part in the virtual cockpit. When the mouse pointer becomes a hand and the tooltip is displayed, the device can usually be actuated with the mouse. If the mouse pointer does not change but the tooltip appears, it means that the device cannot be clicked. However,

the tooltip may still contain useful information. The tooltip always displays the correct reading of the underlying instrument even if power is not supplied to the instrument and the pointer doesn't move. This is an indication of electrical power not being supplied to the instrument, or that the breaker affecting the instrument is pulled out, or that the instrument failed.

Note: *If you cannot see the tooltips in the virtual cockpit, make sure the "**Cockpit Tooltips**" option is selected in your simulator's settings ("Prepar3D > Top Menu Bar > Options > General > Information > Other Text Settings > **Cockpit Tooltips**").*

Known Issue: *During our early tests in Prepar3D v5, we have noticed that the Prepar3D Demo Radar, when installed in the virtual cockpit, might have interfered with some of the instrument tooltips, and with how the tooltips were displayed. We still don't know what might have caused the issue and we have informed Lockheed Martin about it. See Release Notes.*

Important

- A **wheel mouse** is required to actuate 3-position switches and knobs. Refer to "**Minimum System Requirements**" in section 2.
- It sometimes occurs that the pilot's viewpoint is adjusted too far back and lays inside the pilot seat's backrest or behind other objects, rendering the switches unclickable. When this happens, simply move your viewpoint forward.

  Note: *In Prepar3D, it is sometimes possible to click objects through other objects.*

ALT STATIC SOURCE
OFF
TEST
WX
WX/T
MAP
HOLD
THRUST REVERSER
THRUST REVERSER
AMPS
DC VOLTS
TEMP
AMPS
ON
AIR IGN
STALL WARNING
R
ANTI SKID
INVERTER
PRI
SEC
GEN
START
RADIO MASTER
STROBE
OFF
BCN LT
OFF
NAV LT
OFF
LDG LT
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A/P PITCH REL
IDLE
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RET
SPOILER
EXT
FLAP UP
EMER BRAKE

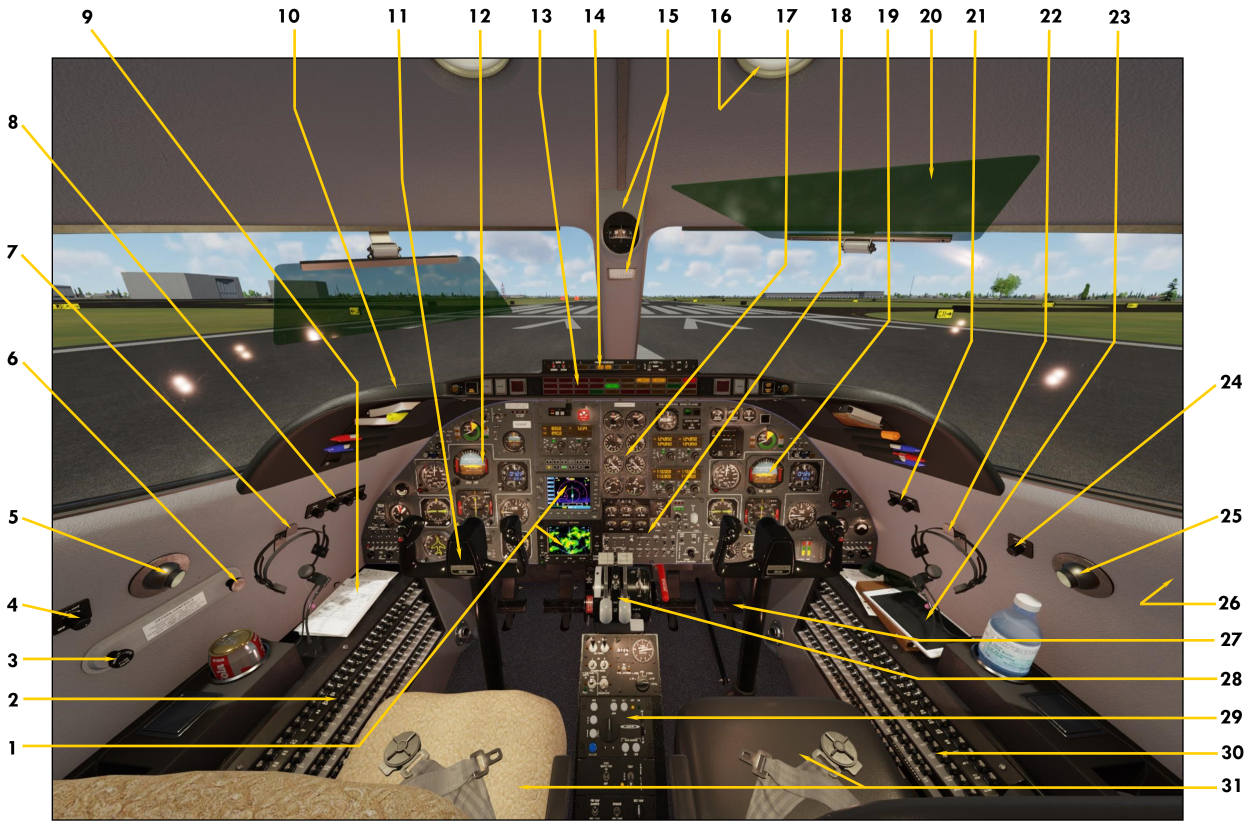


Figure 5-1

1. Third-Party Addons
   Refer to appendix 2 for details.
2. Captain's Breaker Panel (n/s)*
3. Passenger Mask Valve
4. Captain's Map Light Dimmer
5. Captain's Map Light
6. Passenger Oxygen Valve
7. Headphone Hanger
   Click to show/hide crew.
8. Cockpit Light Dimmers
9. Flight Maps
   Click to open the Prepar3D flight map.
10. Glareshield
11. Control Column and Yoke (hidable)
12. Captain's Instrument Panel
13. Fire and Main Annunciator Panels
14. Thrust Reversers Control Panel
15. Magnetic ("Whiskey") Compass
    Click the housing or the correction card to make your pilots wear sunglasses.
16. Cockpit Ceiling Light
17. Center Instrument Panel
18. Electrical Panel
19. Copilot's Instrument Panel
20. Sun Visor
21. Cockpit Light Dimmers
22. Headphone Hanger
    Click to show/hide crew.
23. Tablet
    Click to open the Prepar3D kneeboard.
24. Copilot's Map Light Dimmer
25. Copilot's Map Light
26. Cooling Fan Control (not shown)
27. Rudder and Brake Pedals
28. Throttle Quadrant (hidable)
29. Center Pedestal
30. Copilot's Breaker Panel (n/s)
31. Pilot Seat
    Click to switch seat cover.

***:** *(n/s) = Not Simulated. Device may be animated and may also have limited functionality and a tooltip. Some features may not be available in Prepar3D.*

Figure 5-2

1. Audio Panel
2. Ice Protection Switches
3. Analog Clock
4. Wing Temperature Gauge
5. Directional Gyro and Gyro Drift Compensation Knob
6. Radio Magnetic Indicator (RMI)
7. Airspeed/Mach Indicator (ASI)
8. Marker Beacon Lights
9. Gyro Switches (partially simulated)
10. Flight Director Annunciators
11. Left Angle-of-Attack Indicator
12. Attitude Director Indicator (ADI)
13. Horizontal Situation Indicator (HSI)
14. Emergency Batteries Switches
15. Optional Nose Boom
    Click to install/remove the nose boom.
16. Label
    Click to install/remove the "Remove Before Flight" items.
17. Anti-Skid Generator Lights
18. Tail Number Plaque
    Click to show/hide the Prepar3D ATC window.
19. Standby (Horizon) Gyro
20. Standby Gyro Caging/Adjustment Knob
21. Autopilot NAV1/GPS Switch
22. Altimeter/ADDU
23. Vertical Speed Indicator (VSI)
24. Trim Indicators
25. Radio Altimeter
26. Radio Altimeter Power Switch
27. Label
    Click to install/remove the left recognition light [23, fig. 3-1] (Model 25 only).
28. Alternate Static Source Switch (n/s)

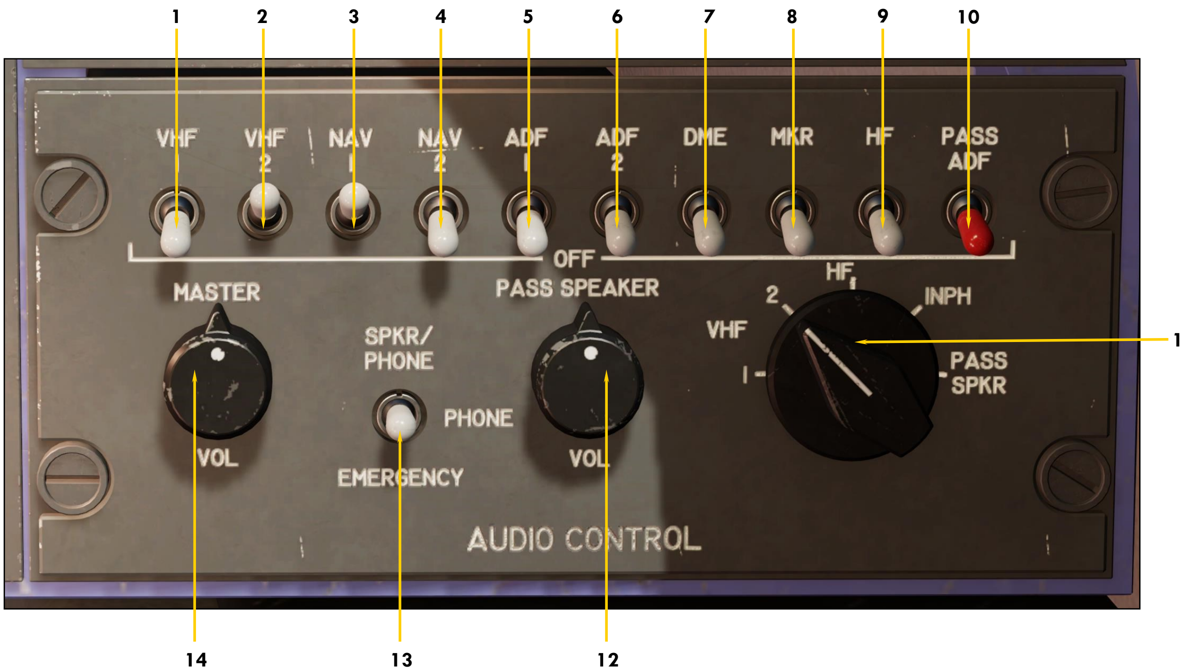


Figure 5-3

1. COM1 Monitor Switch
   *Set both COM1/COM2 Monitor Switches to **ON** [1-2] to receive on both radios.*
2. COM2 Monitor Switch
   *Set both COM1/COM2 Monitor Switches to **ON** [1-2] to receive on both radios.*
3. NAV1 Monitor Switch
   Allows the pilot to listen to navigation code identifiers.
4. NAV2 Monitor Switch
   Allows the pilot to listen to navigation code identifiers.
5. ADF1 Monitor Switch
   Allows the pilot to listen to navigation code identifiers.
6. ADF2 Monitor Switch
   Allows the pilot to listen to navigation code identifiers.
7. DME Monitor Switch
   Allows the pilot to listen to navigation code identifiers.
8. Marker Beacon Monitor Switch
   Allows the pilot to listen to navigation code identifiers.
9. HF Monitor Switch (n/s)
   This aircraft is not equipped with a short wave (HF) transceiver.
10. ADF (AM Radio) to Passengers Switch (n/s)
    Allows selected ADF (AM radio) stations to be broadcast in the cabin. Not simulated.
11. Audio Transmit Selector Knob
    *Select **COM1** or **COM2** for radio transmit. Will turn COM1/COM2 Monitor Switches [1-2] ON/OFF accordingly for radio reception on selected unit. HF radio, interphone and passenger speakers positions are not simulated.*
12. Passenger Speakers Volume Control Knob (n/s)
13. Audio Output Selector Switch (n/s)
14. Master Volume Control Knob (n/s)

***Note:** COM1and COM2 refer to the VHF voice communication transceivers [fig. 5-18]. NAV1 and NAV2 refer to the navigation receivers [fig. 5-19]. ADF1 and ADF2 refer to the low-frequency NDB (ADF) receivers [fig. 5-20]. DME refers to the distance measuring equipment installed in this aircraft (see "**DME Head**," fig. 5-38). Marker Beacon refers to the old VHF radio beacons used in conjunction with ILS (fig. 5-5). Navigation code identifiers are broadcast in Morse in Prepar3D. The GLJ Model 25/28 v4 addon is not equipped with a short wave (HF) transceiver because it is not supported in Prepar3D. P.A. system and intercom are not simulated.*

Figure 5-4

Note: The ice protection system installed in the GLJ Model 25/28 v4 addon is almost identical to the one in the real aircraft. Refer *to "**20 Series Anti-Ice System**" in section 6, page 12, for a complete discussion.*

1. Pitot Heat Switches
   These switches turn on heating elements in the pitot tubes and angle-of-attack vanes. Due to limitations in the simulator, these two switches are linked together.
2. Engine Nacelle Heat Switches
   These switches turn on heating elements and energize control valves that allow bleed air from the engine to circulate and prevent ice formation on the engine inlet components.
3. Wing and Stabilizer Heat Switch
   *This switch energizes the control valve that allows bleed air to circulate and prevent ice formation on the wing leading edges. It also turns on heating elements on the stabilizer leading edges if the aircraft is in flight. Requires the Bleed Air Switch [1, fig. 5-41] to be set to **NORM** or **MAX**.*
4. Windshield Heat Switches
   *These switches control the valve that allows bleed air from the engine to enter the footwarmer and defrost system and to heat the windshield if the Windshield Defog Knob [8, fig. 5-43] is **pulled out**. Requires the Bleed Air Switch [1, fig. 5-41] to be set to **NORM** or **MAX**.*
5. Anti-Ice Alcohol Switch
   *This switch activates the system that supplies methyl alcohol to the windshield or radome to prevent ice formation. When the switch is set to **RADOME**, the system supplies only the radome with alcohol for 120 minutes with a full reservoir. When the switch is set to **WSHLD & RADOME**, the system supplies both the radome and the captain's windshield with alcohol for 45 minutes with a full reservoir. Requires the Bleed Air Switch [1, fig. 5-41] to be set to **NORM** or **MAX**.*
6. Time Setting Knob
   Use the mouse wheel to set minutes. Use the mouse buttons to set hours.
7. Nose Gear Steer Lock Switch
   *Click this momentary switch to engage electrical nose gear steering. A green annunciator [14, fig. 5-32a] will illuminate on the main annunciator panel. Click the switch again to disengage electrical nose wheel steering (the annunciator will go off). This switch is spring loaded. Nose wheel steering is engaged automatically in Prepar3D at certain speeds. See also "**Wheel Master Button**" [2, fig. 5-51].*
8. Analog Clock
9. Wing Temperature Gauge
   Blue arc: temperature below 35˚F. Green arc: above 35˚F and below 215˚F. Red arc: above 215˚F. Make sure the needle is in the green.
10. Clock Red Hands (Bugs)
11. Clock Red Hands Setting Knobs
    Outer (large) for hours, inner (small) for minutes. Red hands are used as markers (bugs) on this clock model. Stopwatch functions are available with the Copilot's Digital Clock [fig. 5-40].

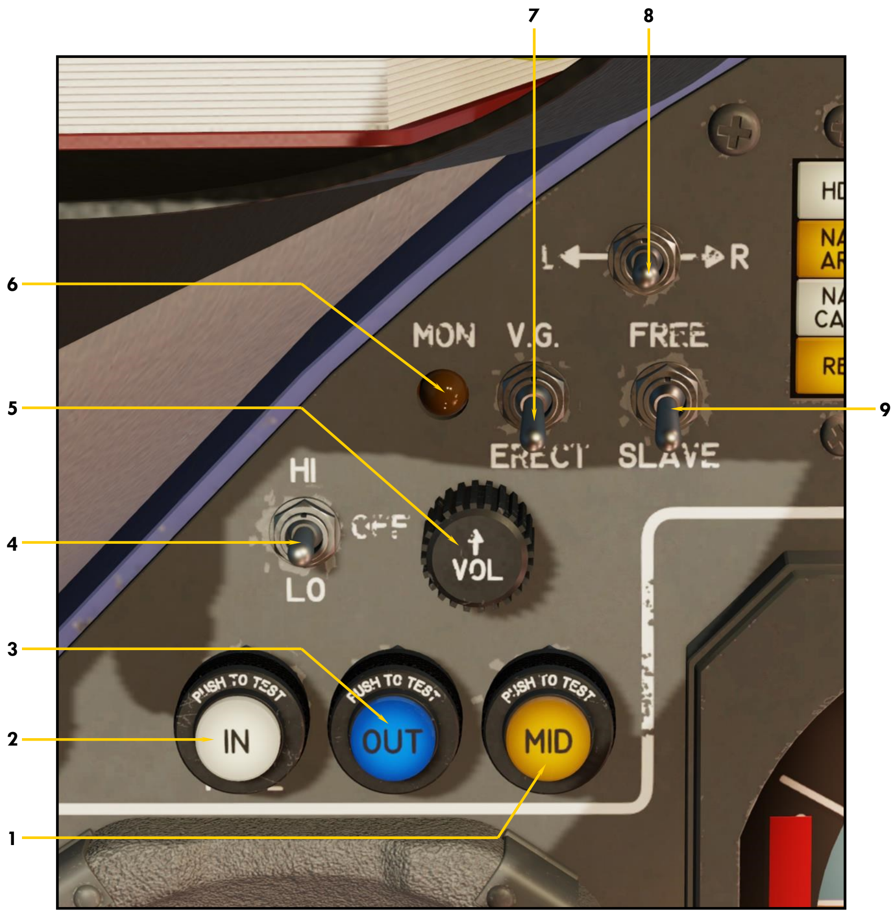


Figure 5-5

1. Middle Marker* Light (yellow)
   Push to test.
2. Inner Marker* Light (white)
   The old airway or fan/z marker light is replaced by the Inner Marker Light in the simulator. Push to test.
3. Outer Marker* Light (blue)
   Push to test.
4. Captain's Auxiliary Heat Switch (n/s)
5. Marker Beacon* Sound Volume Knob (n/s)
6. Marker Beacon* Monitor Light
   *Illuminates when the Marker Beacon Monitor Switch [8, fig. 5-3] on the audio panel is **ON**.*
7. Vertical Gyro Erect Switch
   This switch is used to re-erect the gyroscope if the ADI tumbles and becomes temporarily unusable after experiencing strong unusual attitudes. Use this switch to cage (lock in place) the gimbals in the ADI to prevent damage to the gyroscope. Actuating this switch will disengage the autopilot.
8. Gyro Drift Compensation Switch
   When the gyro type is preset to "2" in the "aircraft.cfg" and operates in free mode, use the mouse wheel to manually compensate gyro drift (refer to section 6, page 36, for more information). Moving this switch will disengage the autopilot. Click to reset the switch to its middle position. Refer to the Prepar3D documentation for a complete discussion about gyro drift. You can also use the Directional Gyro's Gyro Drift Compensation Knob [5, fig. 5-2] to compensate gyro drift.
9. Directional Gyro Free/Slave Switch (n/s)
   Unsupported in Prepar3D. Gyro type (free or slaved) is preset in the "aircraft.cfg" (refer to section 6, page 36, for more information). Moving this switch will disengage the autopilot. It has no other function.

**: Marker beacons are legacy VHF radio beacons normally used in conjunction with ILS to provide indications of an aircraft's position along a route. They are becoming obsolete.*

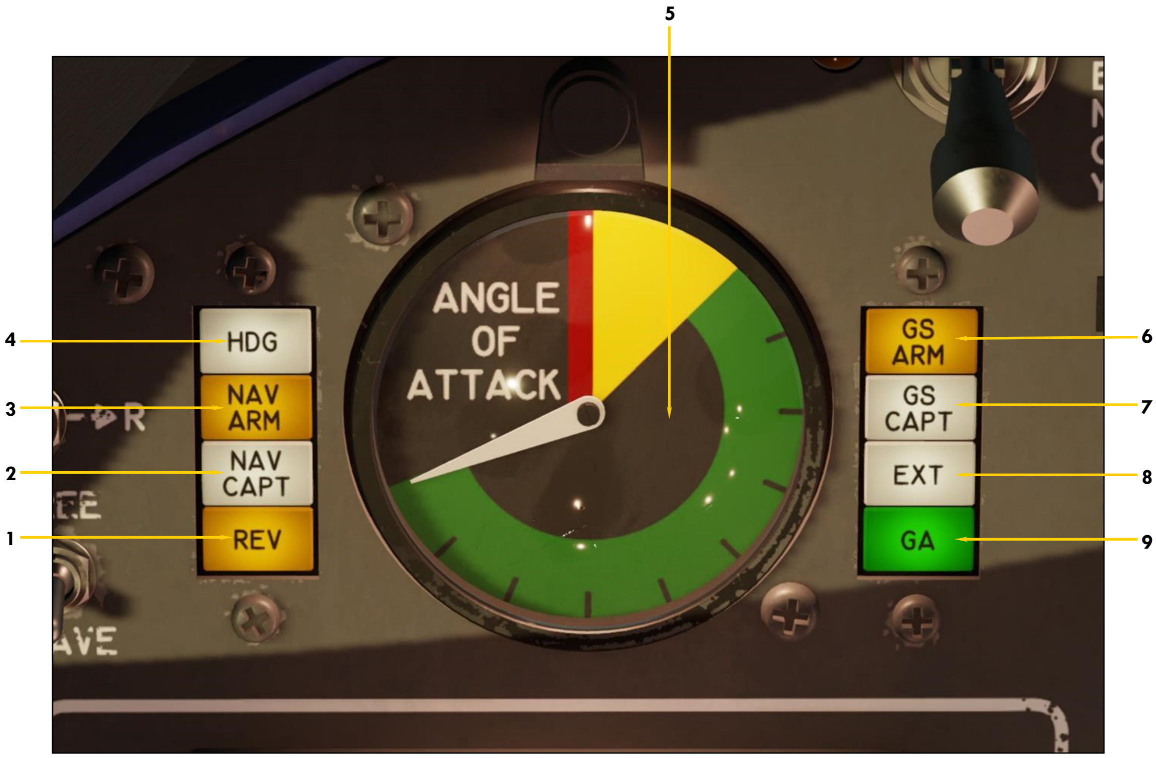


Figure 5-6

1. REV (Reverse Course Mode Engaged) Annunciator
2. NAV CAPT (Course Captured) Annunciator
3. NAV ARM (Navigation Hold Mode Engaged) Annunciator
4. HDG (Heading Hold Mode Engaged) Annunciator
5. Angle-of-Attack Indicator
   - *Alive above 80 KIAS (to prevent needle oscillation when the aircraft is on the ground and the wind causes the vane to move)*
   - ***Green arc:** Safe maneuvering range*
   - ***Yellow arc:** Caution range, impending stick shaker condition*
   - ***Red line:** Stall, stick nudger condition (or system being tested)*
6. GS ARM (Glideslope Approach Mode Engaged) Annunciator
7. GS CAPT (Glideslope Captured) Annunciator
8. EXT (Course and Glideslope Captured) Annunciator
9. GA (Takeoff/Go-Around Mode Engaged) Annunciator

***Note:** Refer to section 6, page 45, for a complete discussion about the Flight Director annunciators. The angle-of-attack needle will move into the red zone when testing the stall warning system (see 14-15, fig. 5-43). The Left Angle-of-Attack Indicator is independent from the Right Angle-of-Attack Indicator.*

Main Panel (both sides)

ATTITUDE DIRECTOR INDICATOR (ADI)

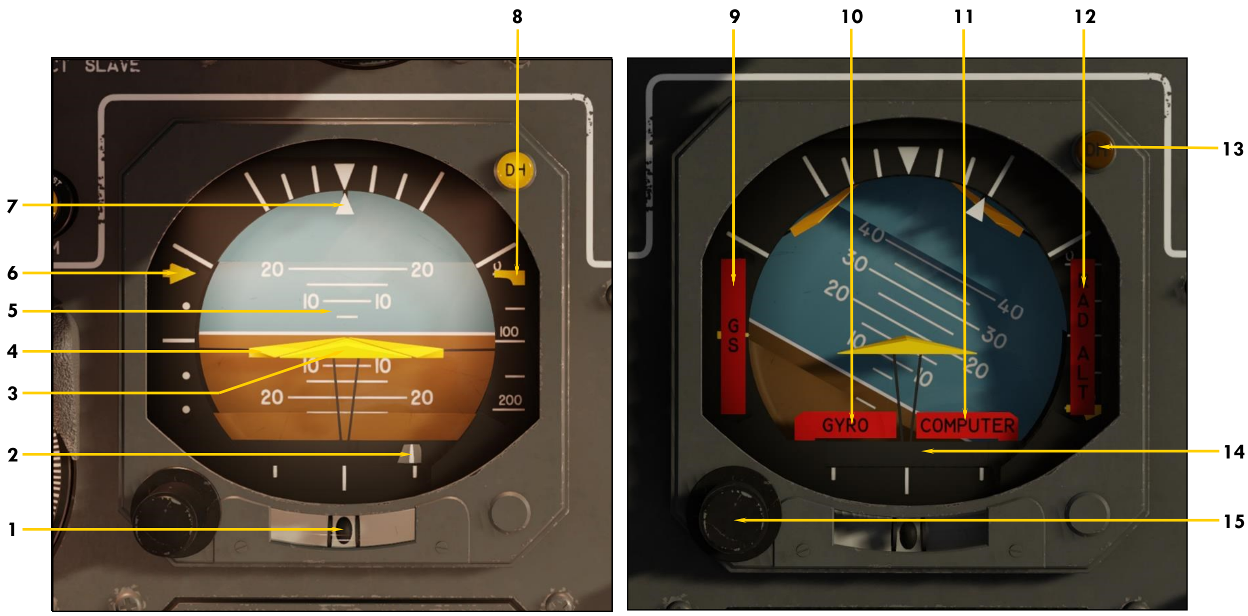


Figure 5-7

1. Inclinometer Ball Indicator
   Indicates slip/skid condition (if the turn is coordinated, the ball is centered).
2. Localizer Deviation Runway Symbol
   Repeats the HSI CDI indication [3, fig. 5-8] when a valid localizer signal is present. If the runway symbol is aligned with the middle reference bar, the aircraft is on course and aligned with the runway.
3. Fixed Airplane Symbol
   A stationary reference symbol that represents the aircraft.
4. Flight Director Command Bars
   *Maneuvering guidance - **Advisory**. Turn **ON** the Flight Director Switch [2, fig. 5-22a] to activate the command bars. The bars are parked and inactive when the Flight Director Switch is **OFF**. Refer to section 6, page 34, for a complete discussion about the flight director and the command bars.*
5. Attitude Tape
   Rotates for roll, moves up and down for pitch.
6. Glideslope Deviation Indicator
   Repeats the HSI glideslope deviation indication [6, fig. 5-8]. The arrow represents the glideslope. When the arrow is above the middle reference line, you are too low. When the arrow is below the middle reference line, you are too high. When the arrow is aligned with the middle reference line, you are on the glideslope.
7. Bank Indicator
   Indicates present bank angle.
8. Radio Altimeter Below 200 ft. Indicator
   *Indicates the last 200 feet above ground. See "**Radio Altimeter**", fig. 5-13.*
9. Glideslope Warning Flag
   Indicates unreliable or non-existent glideslope signal.
10. Gyro Warning Flag
    Indicates inoperative gyroscope (requires DC power).
11. Computer Warning Flag
    Indicates inoperative AFCS computer.
12. Radio Altimeter Warning Flag
    Indicates unreliable or non-existent radio altimeter signal.
13. Decision Height Annunciator
    *Indicates aircraft at or below selected decision height. See "**Radio Altimeter**", fig. 5-13.*
14. Runway Symbol Shutter
    Indicates unreliable or non-existent localizer signal.
15. Pitch Scale Adjustment Knob
    Use the mouse wheel to rotate this knob and adjust the pitch scale (attitude tape [5]) depending on your viewing angle.

Note: *All NAV indications coupled to NAV1 radio or GPS, depending on position of the NAV1/GPS Switch [4, fig. 5-16].*

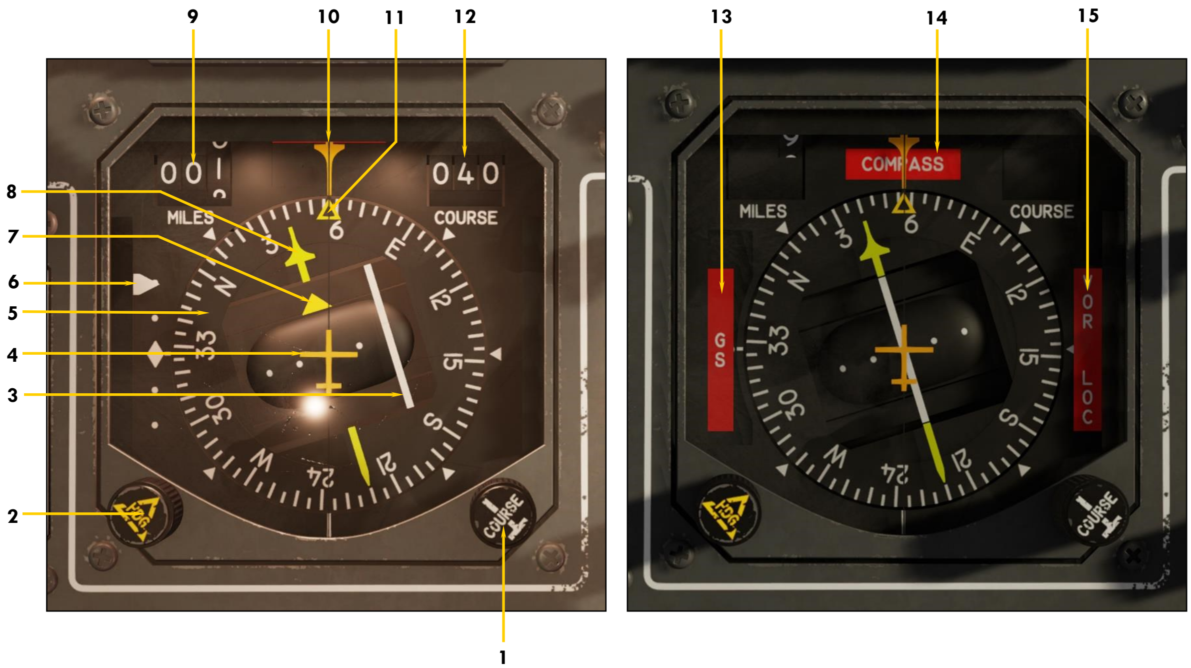


Figure 5-8

1. NAV1 Course Selector Knob
   Rotating this knob rotates the NAV1 Course Needle [8] to the desired course.
2. Heading Selector Knob
   Rotating this knob rotates the yellow Heading Bug [11] to the desired heading.
3. Course Deviation Indicator (CDI)
   This line indicates the lateral deviation from a captured VOR/LOC course. When the bar is aligned with the NAV1 Course Needle [8], the aircraft is on course. If the line deflects to the left (one or two dots), you are too far right and must steer left to bring the aircraft back on course. If the line deflects to the right (one or two dots), you are too far left and must steer right to bring the aircraft back on course.
4. Fixed Airplane Symbol
   A stationary reference symbol that represents the aircraft.
5. Heading (Compass) Card
   Aircraft heading is indicated on this rotating card, under the Lubber Line [10].
6. Glideslope Deviation Indicator
   When the arrow is above the middle reference line, you are too low. When the arrow is below the middle reference line, you are too high. When the arrow is aligned with the middle reference line, you are on the glideslope.
7. To/From (Yellow) Needle
   Indicates whether you are flying towards or away from the VOR.
8. NAV1 Course Needle
   This needle points to the VOR/LOC selected course. It is good practice to align the NAV1 Course Needle with the actual heading at the beginning of a flight and before engaging the autopilot. The NAV1 Course Needle should be aligned with the Course Deviation Indicator [3] when following a captured and valid VOR/LOC course. Used with all AP/FD NAV hold modes.
9. NAV1 DME Readout
   Displays the distance to/from the selected DME station in nautical miles. Shuttered when distance information is unreliable or non-existent.
10. Lubber Line
11. Heading Bug
    This yellow bug indicates the selected heading and can be rotated to any heading with the Heading Selector Knob [2]. It is good practice to align the bug with the actual aircraft heading at the beginning of a flight and before engaging the autopilot. Used with the AP/FD HDG hold mode.
12. Course Readout
    Displays the VOR/LOC selected course in degrees. Shuttered when the instrument is turned off.
13. Glideslope Warning Flag
    Indicates unreliable or non-existent glideslope signal.
14. Compass Warning Flag
    Indicates unreliable or non-existent magnetic heading signal.
15. VOR/LOC Warning Flag
    Indicates unreliable or non-existent NAV1signal.

Note: *All NAV indications coupled to NAV1 radio or GPS, depending on position of the NAV1/GPS Switch [4, fig. 5-16].*

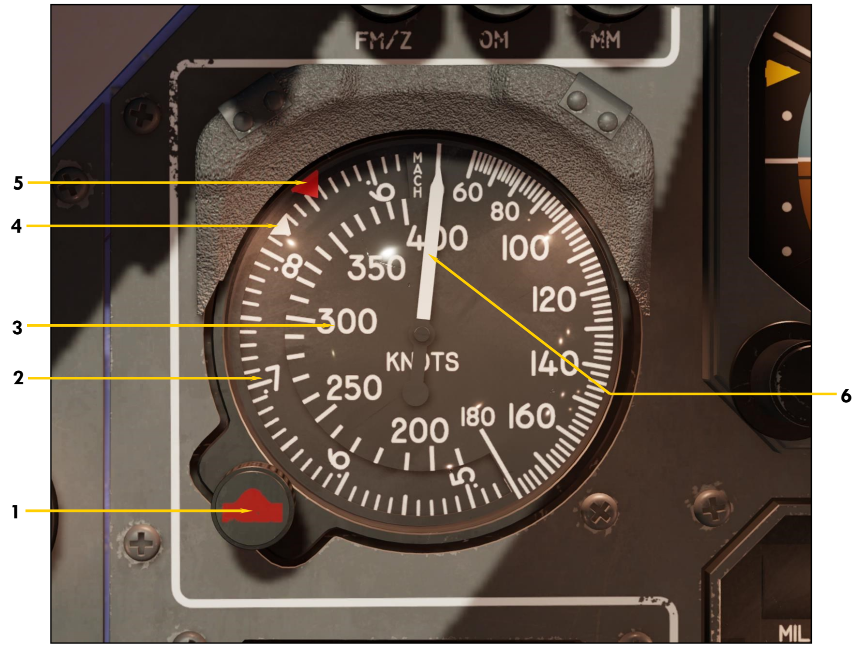


Figure 5-9

1. Reference Bug Knob
   Use the mouse wheel to rotate the red airspeed bug [5] (knots IAS). Use the left/right mouse buttons to rotate the white Mach bug [4].
2. Mach Scale
3. Airspeed Scale (knots IAS)
4. Mach Bug (white)
   This bug is linked to the Mach scale and can be rotated with the Reference Bug Knob [1]. The bug is preset to Mach 0.82.
5. Airspeed Bug (red)
   This bug can be rotated with the Reference Bug Knob [1]. The bug is preset to 350 knots (IAS).
6. Indicated Air Speed Needle
   Also indicates the Mach number on the Mach scale [2].

RADIO MAGNETIC INDICATOR (RMI)

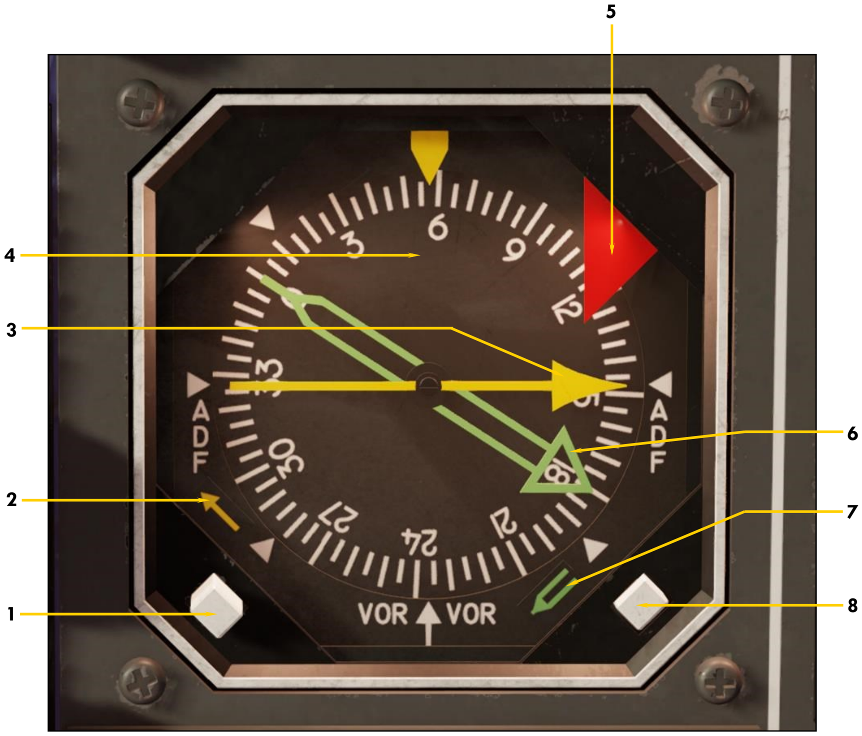
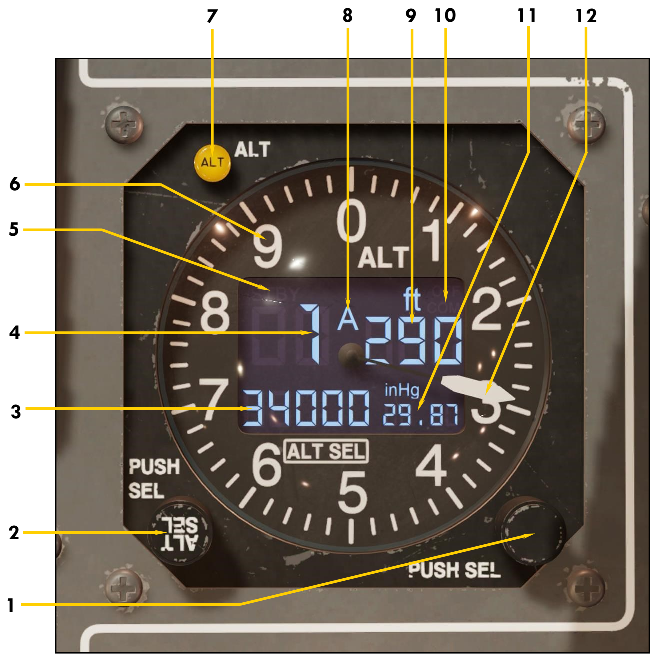


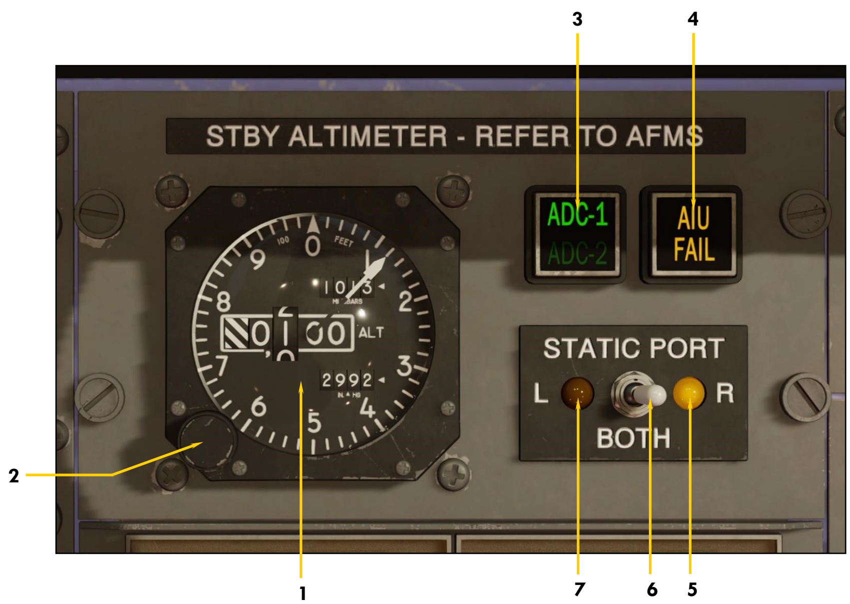
Figure 5-10

1. Yellow Needle Signal Selector Button
   This button is used to select the navigation signal that is sent to the yellow needle [3], either ADF1 or NAV1.
2. Yellow Needle Selection Flag
   Indicates which navigation signal is sent to the yellow needle [3], either ADF1 or NAV1/VOR1.
3. Yellow Needle (ADF1 or NAV1/VOR1)
   This single needle points to the selected VOR1 or ADF1 (NDB) station. The VOR1 station is tuned on the NAV1 radio [fig. 5-19] and the ADF1 station is tuned on the ADF1 radio [fig. 5-20]. The pointer on the needle indicates the magnetic heading to the station and the tail indicates the magnetic heading away from the station. If no signal is present, the needle will point to the east (90 degrees).
4. Compass Card
   Aircraft heading is indicated on this rotating card, below the yellow pointer.
5. Heading Warning Flag
   Indicates unreliable or non-existent magnetic heading signal.
6. Green Needle (ADF2 or NAV2/VOR2)
   This double needle points to the selected VOR2 or ADF2 (NDB) station. The VOR2 station is tuned on the NAV2 radio [fig. 5-19] and the ADF2 station is tuned on the ADF2 radio [fig. 5-20]. The pointer on the needle indicates the magnetic heading to the station and the tail indicates the magnetic heading away from the station. If no signal is present, the needle points to the east (90 degrees).
7. Green Needle Selection Flag
   Indicates which navigation signal is sent to the green needle [6], either ADF2 or NAV2.
8. Green Needle Signal Selector Button
   This button is used to select the navigation signal that is sent to the green needle [6], either ADF2 or NAV2.



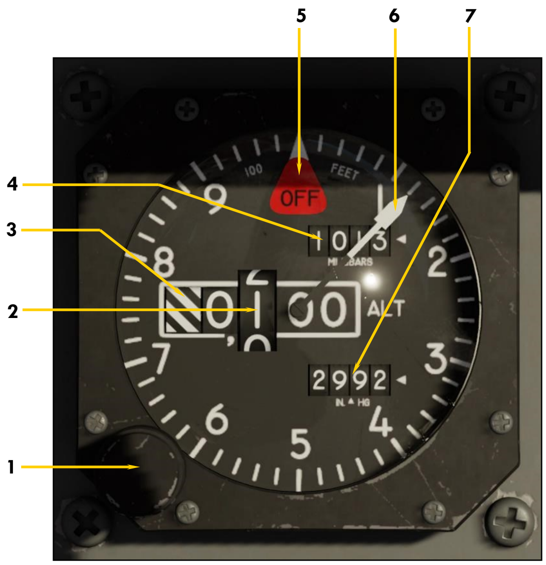
AIR DATA DISPLAY UNIT (ADDU)
Figure 5-11a

1. Barometric Setting Knob
   Click to toggle between inHg or Millibars.
2. Autopilot Altitude Preselector Knob
   Selects the desired altitude for the AFCS. Refer to section 6, page 39, for details.
3. Preselected Altitude Readout
4. Altitude Readout (Thousands Ft.)
5. Standby Annunciator (n/s)
6. Altitude Scale (Hundreds Ft.)
7. Altitude Alerter Annunciator
   Illuminated with aural warning if within 1000/300 feet of selected altitude.
8. Active Annunciator (n/s)
9. Altitude Readout (Hundreds Ft.)
10. Failure Indicators (n/s)
11. Barometric Setting Readout (inHg or MB)
12. Altitude Needle



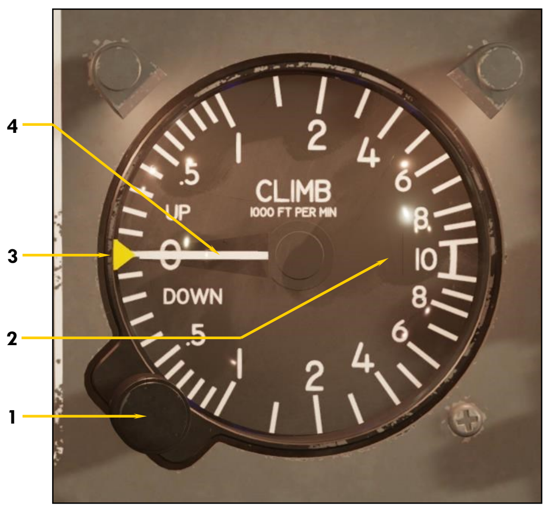
AIR DATA PANEL
Figure 5-11b

1. Standby Altimeter
   Refer to fig. 4-11a.
2. Barometric Setting Knob
3. Air Data Source Switch and Annunciator
   Selects (and displays in green) the air data source - ADDU 1 or 2 - for altitude preselect, altitude alerting, altitude reporting and the air data inputs to the AIU.
4. AIU Fail Annunciator
   Indicates that the Analog Interface Unit that converts digital data from the ADDUs to analog signals for the autopilot is not working properly.
5. Right Static Port Annunciator
   Indicates that the right static port is selected. OFF when both ports are cross coupled.
6. Static Port Selector Switch
   *Selects the active static port (left, right or both). Normally centered (**BOTH**).*
7. Left Static Port Annunciator
   Indicates that the left static port is selected. Off when both ports are cross coupled.



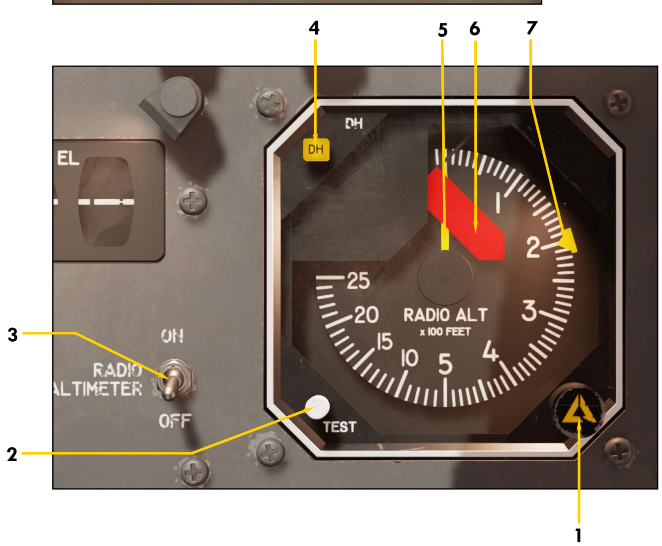
STANDBY ALTIMETER
Figure 5-11c

1. Barometric Setting Knob
2. Altitude Readout
3. Warning Strips
   Indicates altitude is below 10,000 feet.
4. Barometric Setting Readout (millibars)
5. Failure Warning Flag
6. Altitude Needle
7. Barometric Setting Readout (inHg)



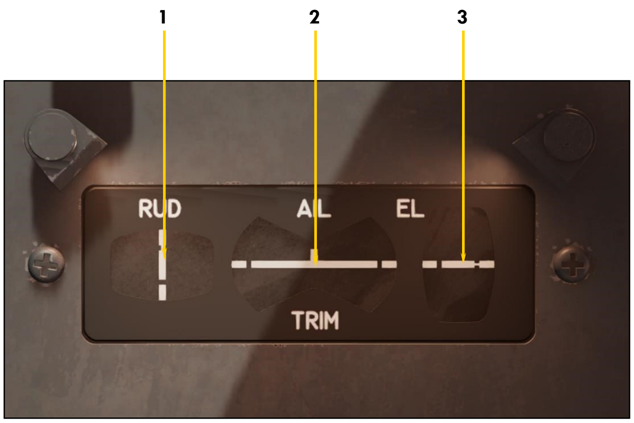
VERTICAL SPEED INDICATOR (VSI)
Figure 5-12

1. (Autopilot) Vertical Speed Selector Knob
   This is the vertical speed setting knob for the autopilot and the flight director. Refer to section 6, page 40, for more details.
2. Failure Warning Flag (not shown)
3. (Autopilot) Vertical Speed Bug
   This is the vertical speed command bug for the autopilot and the flight director. Refer to section 6, page 40, for more details.
4. Vertical Speed Needle



RADIO ALTIMETER
Figure 5-13

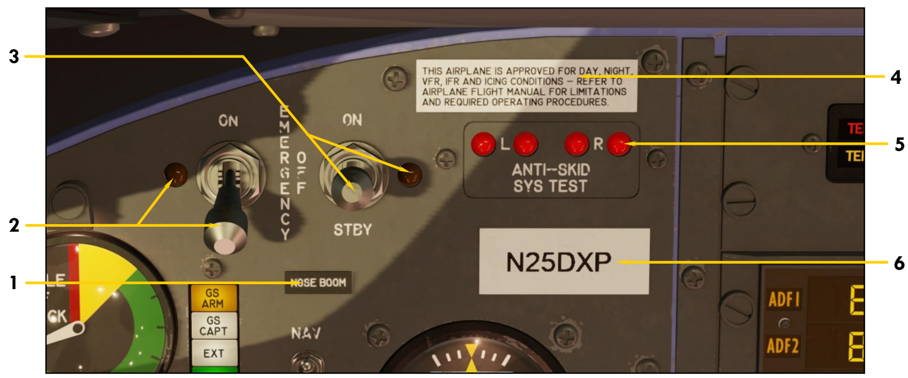
1. Radio Altimeter Decision Height Selector Knob
2. Radio Altimeter Test Button
3. Radio Altimeter Power Switch
4. Radio Altimeter Decision Height Annunciator
5. Radio Altimeter Needle
6. Failure Warning Flag
7. Radio Altimeter Decision Height Bug
   Indicates the height above ground that triggers the decision height annunciators [4; 13, fig. 5-7; 1, fig. 5-33; 8, fig. 5-35].



TRIM INDICATORS
Figure 5-14

1. Rudder Trim Indicator
2. Aileron Trim Indicator
3. Elevator Trim Indicator
   Takeoff trim is typically one needle thickness below neutral.

***Note:** Autopilot "effort indicators", like in the real aircraft, are not available in Prepar3D. In the simulator, this panel is essentially a repeater of the Trim Indicator Panel installed on the center pedestal [6, fig. 5-44a; 7, fig. 5-44b; 3-4, 11, fig. 5-47].*



EMERGENCY BATTERY SWITCHES AND ANTI-SKID LIGHTS
Figure 5-15

1. Optional Nose Boom
   Click this icon to show/hide the optional nose boom (with test probes and vanes). The nose boom is normally installed during test flights.
2. Emergency Battery Switch and Light
   *Emergency batteries are not available in the current simulation platforms. However, this switch, when set to **ON**, will start the available APU to simulate emergency battery backup in case of a power failure. Like in the real aircraft, the switch indicator light illuminates only when the emergency battery is powering the aircraft. A 3-second delay is normal before the relays are energized and the aircraft is powered again. In the real aircraft, this switch provides power to the standby gyro [fig. 5-16], to its associated avionics and to its indicator light. An emergency power pack, consisting of two batteries, an inverter and associated circuitry, provides DC and AC power. There is no APU in the real aircraft.*
3. Standby Emergency Battery Switch and Light
   *This switch, when set to **ON** or **STBY**, will start the simulator's APU to simulate emergency battery backup in case of a power failure. In the real aircraft, this switch provides power to its indicator light and to its associated circuits, normally the gear, flaps, and spoilers. The **STBY** position is used to conserve battery power by removing power to the gear, flaps, and spoilers.*
4. Label
   Click this label to install/remove the "Remove Before Flight" items on the exterior model.
5. Anti-Skid Generator Lights
   *These four red lights should go off when the Anti-Skid Power Switch [8, fig. 5-29] is set to **ON** and AC power is available. Illumination of these lights indicates anti-skid system malfunction or under test. The Anti-Skid Test Switch is located on the test switch panel [16, fig. 5-43]. Outboard lights represent outboard wheels and inboard lights represent inboard wheels (on the main landing gear). The Anti-Skid Test Switch is spring loaded to its middle position to allow for separate testing of outboard and inboard systems when moved forward or aft.*
6. Aircraft ATC Call (Tail) Number Plaque
   Click this plaque to show/hide the Prepar3D ATC window. The tail number can be changed in the "aircraft.cfg" file (see section 3, page 3).

STANDBY GYRO & NAV1/GPS SWITCH
Figure 5-16

1. Standby Gyro (Emergency Attitude Indicator)
   Powered by the emergency batteries in case of a general power failure. The Emergency Battery Switch [2, fig. 5-15] or the Standby Emergency Battery Switch [3, fig. 5-15] must be set to ***ON*** *or* ***STBY*** *in case of a power failure to provide AC power to the instrument. During normal operation, the Standby Gyro is powered by the main AC bus.*
2. Attitude Tape
   Rotates for roll, moves up and down for pitch.
3. Fixed Airplane Symbol
   A stationary reference symbol that represents the aircraft.
4. Autopilot NAV1/GPS Switch
   Selects autopilot mode of navigation (NAV1 or GPS). Refer to section 6, pages 37-38, for more details.
5. Bank Indicator
   Indicates present bank angle.
6. Failure Warning Flag
   Indicates instrument inoperative or gyro caged.
7. Standby Gyro Caging/Adjustment Knob
   Use the mouse wheel to rotate this knob and adjust the pitch scale (attitude tape [2]) depending on your viewing angle. If the indicator tumbles and becomes temporarily unusable after experiencing strong unusual attitudes, click this knob to cage (lock in place) the gimbals to prevent damage to the gyroscope. Click again to uncage.

Figure 5-17a

1. Radar
   Rotate the Mode Selector Knob [2, fig. 5-26] to light up the screen. The default dummy radar display can be replaced by your own functional third-party radar. See appendix 2. Requires DC and AC power.
2. GNS 530 (GPS/COM/NAV)
   Rotate the Power Knob [5, fig. 5-24] to light up the screen. The default GPS 500 can be replaced by your own third-party navigation system. See appendix 2. Requires avionics power.
3. Captain's Autopilot/Flight Director Mode Selector Panel
4. ADF1/ADF2 Radios
5. Transponder
6. Ground Proximity Warning System
7. Engine Sync Spinner Indicator
8. Electrical Gauge Cluster
9. Engine Gauge Cluster
10. Cockpit "Cold and Dark" Reset or "Auto Start" Icon
    Left click for "Cold and Dark", right click for "Auto Start".
11. RVSM Air Data Panel
12. COM1/COM2 Radios
13. NAV1/NAV2 Radios
14. Flaps Position Indicator
15. Gear Controls and Lights
16. Engine Starting Panel
17. Cabin Temperature Control Panel
18. Electrical Panel

Figure 5-17b

1. Radar
   Rotate the Mode Selector Knob [2, fig. 5-26] to light up the screen. The default dummy radar display can be replaced by your own functional third-party radar. See appendix 2. Requires DC and AC power.
2. Autopilot/Flight Director Mode Selector Panel
3. GTN 750 Unit 1 (GPS/COM/NAV/ATC)
   Compatible with your own third-party navigation system. See appendix 2. Requires avionics power.
4. Engine Sync Spinner Indicator
5. Electrical Gauge Cluster
6. Cockpit "Cold and Dark" Reset or "Auto Start" Icon
   Left click for "Cold and Dark", right click for "Auto Start".
7. Engine Gauge Cluster
8. RVSM Air Data Panel
9. Ground Proximity Warning System
10. GTN 750 Unit 2 (GPS/COM/NAV/ATC)
    Compatible with your own third-party navigation system. See appendix 2. Requires avionics power.
11. Flaps Position Indicator
12. Gear Controls and Lights
13. Engine Starting Panel
14. Cabin Temperature Control Panel
15. Electrical Panel

COM1/COM2 RADIOS
Figure 5-18

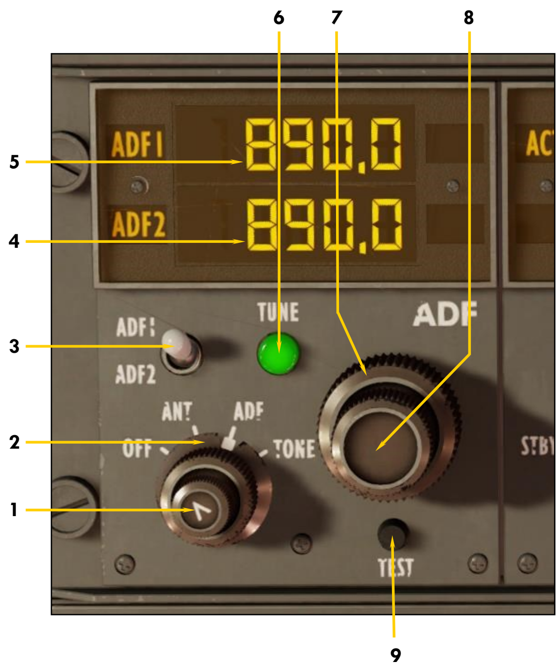
1. Volume Control Knob (n/s)
2. Function Selector Knob
   - ***OFF*** *- Turns off VFD readout only*
   - ***ON*** *- Normal operation*
   - ***TEST*** *- Squelch disabling test,* ***COM1*** *or* ***COM2*** *radio must be selected in the audio panel [1-2, fig. 5-3]*
3. Frequency Swap Switch
   Swaps the active frequency (ACT) with the standby frequency (PRE) and vice versa. Return the switch to ***PRE*** *before tuning in to the standby frequency. Active frequency cannot be tuned, only swapped with the standby frequency.*
4. Standby (PRE) Frequency Readout
   Mouseover the whole or fraction and use the mouse wheel to tune in to the desired standby frequency.
5. Active (ACT) Frequency Readout
   The active frequency cannot be changed directly. Return the Frequency Swap Switch to ***PRE*** *and tune in to the desired standby frequency. Move the switch to* ***ACT*** *to swap the active frequency with the selected standby frequency. Return the switch to* ***PRE*** *before selecting another standby frequency.*
6. Transmit Select Light
   Illuminated when the ***COM1*** *or* ***COM2*** *radio is selected for transmit on the audio panel [1-2, fig. 5-3].*
7. Standby Frequency Selector Knob (Whole)
   Use the mouse wheel to tune in to the desired frequency.
8. Standby Frequency Selector Knob (Fraction)
   Use the mouse wheel to tune in to the desired frequency.

Note: *COM1/COM2 radios require avionics power, usually: Battery Switches [8-9, fig. 5-30]* ***ON*** *or Engine Generator Switch [6, 11, fig 5-30]* ***GEN****, and Radio Master Switch [14, fig 5-29]* ***ON****.*

NAV1/NAV2 RADIOS
Figure 5-19

1. Volume Control Knob (n/s)
2. Function Selector Knob
   - ***OFF*** *- Turns off VFD readout only*
   - ***NAV*** *- Normal operation*
   - ***NAV DME*** *- n/s*
   - ***HOLD*** *- n/s*
   - ***FREQ*** *- Test tone. NAV1 or NAV2 radio must be selected in the audio panel [3-4, fig. 5-3]*
3. Frequency Swap Switch
   *Swaps the active frequency (ACT) with the standby frequency (PRE) and vice versa. Return the switch to **PRE** before tuning in to the standby frequency. Active frequency cannot be tuned, only swapped with the standby frequency.*
4. Standby (PRE) Frequency Readout
   Mouseover the whole or fraction and use the mouse wheel to tune in to the desired standby frequency.
5. Active (ACT) Frequency Readout
   *The active frequency cannot be changed directly. Return the Frequency Swap Switch to **PRE** and tune in to the desired standby frequency. Move the switch to **ACT** to swap the active frequency with the selected standby frequency. Return the switch to **PRE** before selecting another standby frequency.*
6. Tune Light
   Illuminated when a navigation signal is detected or captured.
7. Standby Frequency Selector Knob (Whole)
   Use the mouse wheel to tune in to the desired frequency.
8. Standby Frequency Selector Knob (Fraction)
   Use the mouse wheel to tune in to the desired frequency.
9. Test Button
   Push to test unit.

Note: *NAV1/NAV2 radios require avionics power, usually: Battery Switches [8-9, fig. 5-30] **ON** or Engine Generator Switch [6, 11, fig 5-30] **GEN**, and Radio Master Switch [14, fig 5-29] **ON**.*



ADF RADIOS
Figure 5-20

1. Volume Control Knob (n/s)
2. Function Selector Knob
   - ***OFF*** *- Turns off VFD readout only*
   - ***ANT*** *- Switches from the loop antenna to the sense antenna for monitoring station, RMI ADF needle will point to the east (90 degrees). Not supported in Prepar3D.*
   - ***ADF*** *- Normal operation.*
   - ***TONE*** *- Test tone.* ***ADF1*** *or* ***ADF2*** *radio must be selected in the audio panel [5-6, fig. 5-3]*
3. ADF Radio Selector Switch
   Selects the ADF radio to be tuned (ADF1 or ADF2).
4. ADF2 Frequency Readout
   With the ADF Radio Selector Switch [3] set to ***ADF2****, mouseover the whole or fraction and use the mouse wheel to tune in to the desired frequency for ADF2.*
5. ADF1 Frequency Readout
   With the ADF Radio Selector Switch [3] set to ***ADF1****, mouseover the whole or fraction and use the mouse wheel to tune in to the desired frequency for ADF1.*
6. Tune Light
   Illuminated when the ADF radios are active.
7. Standby Frequency Selector Knob (Whole)
   With the ADF Radio Selector Switch [3] set to ***ADF1****, use the mouse wheel to tune in to the desired frequency for ADF1. With the ADF Radio Selector Switch [3] set to* ***ADF2****, use the mouse wheel to tune in to the desired frequency for ADF2.*
8. Standby Frequency Selector Knob (Fraction)
   With the ADF Radio Selector Switch [3] set to ***ADF1****, use the mouse wheel to tune in to the desired frequency for ADF1. With the ADF Radio Selector Switch [3] set to* ***ADF2****, use the mouse wheel to tune in to the desired frequency for ADF2.*
9. Test Button
   Push to test unit. RMI ADF needle will point to the east (90 degrees).

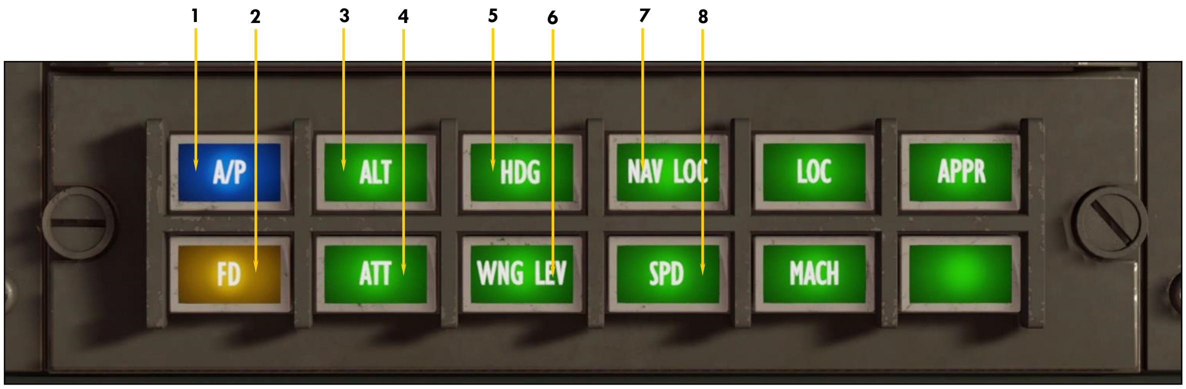
Note: *ADF radios require avionics power, usually: Battery Switches [8-9, fig. 5-30]* ***ON*** *or Engine Generator Switch [6, 11, fig 5-30]* ***GEN****, and Radio Master Switch [14, fig 5-29]* ***ON****.*

TRANSPONDER (ATC RADIO)
Figure 5-21

1. Volume Control Knob (n/s)
2. Function Selector Knob
   - ***STBY*** *- Turns off VFD readout only*
   - ***ON*** *- Normal operation*
   - ***ALT REP*** *- Altitude Reporting mode of operation (A+C Mode) - not available with the basic transponder that comes with Prepar3D. May be available with third-party transponders. Refer to appendix 2, page 15, for instructions about configuring the addon's transponder for your own third-party device.*
3. Transponder Radio Selector Switch (n/s)
4. Transponder Code Readout
   Mouseover each digit and use the mouse wheel to select the desired transponder code.
5. Transponder Activity Light
   Simulates transponder activity.
6. Transponder Selector Knob (First Digit)
   Use the mouse wheel to select the first digit of the desired transponder code.
7. Transponder Selector Knob (Last Three Digit)
   Use the mouse wheel to select the last three digits of the desired transponder code.
8. Test Button
   Push to test unit.

Note (1): *The transponder requires avionics power, usually: Battery Switches [8-9, fig. 5-30]* ***ON*** *or Engine Generator Switch [6, 11, fig 5-30]* ***GEN****, and Radio Master Switch [14, fig 5-29]* ***ON****.*

Note (2): *The generic transponder model installed in the virtual cockpits of the GLJ Model 25/28 v4 addon is preconfigured for the basic Prepar3D transponder that comes with your simulation platform. It can also be configured by the user for special third-party transponders supporting C mode of operation and other features (not included, available from third-party developers). Please refer to appendix 2, page 15, for more details.*



AUTOMATIC FLIGHT CONTROL SYSTEM / AUTOPILOT / FLIGHT DIRECTOR MODE SELECTOR PANEL
Figure 5-22a

1. A/P (Autopilot Engage) Switch and Light
   Engages the autopilot, captures, and maintains the aircraft's pitch attitude and levels the wing. The autopilot assumes aircraft control.
2. Flight Director Switch
   Toggles the flight director on/off. The flight director will be turned on automatically when some autopilot modes are engaged.
3. ALT (Altitude Hold Mode) Switch and Light
   Engages the Altitude Hold mode. If the selected altitude [2-3, fig. 4-11a] differs from the current altitude, the AFCS will calculate a path to the selected altitude at the selected vertical speed [1, 3, fig. 5-12]. The pilot is responsible for managing airspeed (unless the SPD/MACH Hold mode is engaged, see [8], right, and [10, fig. 5-22b]).
4. ATT (Attitude Hold Mode) Switch and Light
   This switch engages the Attitude Hold mode that keeps the aircraft's pitch at the state that existed when the switch was depressed. In the simulator, the Attitude Hold mode does not keep the aircraft's roll (bank) or heading.
5. HDG (Heading Hold Mode) Switch and Light
   Engages the Heading Hold mode. The autopilot will turn the airplane as necessary and fly a heading selected by the position of the Heading Bug on the HSI [2, 11, fig. 5-8].
6. WING LEV (Wing Leveler) Switch and Light
   This switch engages the Wing Leveler that keeps the aircraft's wing level. The WING LEV mode is engaged by default when the autopilot is engaged.
7. NAV/LOC (Navigation/Localizer Hold Mode) Switch and Light
   *Engages the Navigation Hold mode, the autopilot automatic tracking of a VOR course, GPS course, or localizer for navigation. The NAV1 radio signal will be tracked unless the NAV1/GPS Switch (see 12, fig. 5-22b) is set to **GPS**.*
8. SPD (Airspeed Hold Mode) Switch and Light
   This switch engages the autopilot Airspeed Hold mode. This mode maintains the aircraft at the indicated airspeed that existed when the switch was depressed. The SPD Hold Switch must be used at altitudes below 29,000 feet. Like in the real aircraft, above 29,000 feet, the autopilot will automatically switch to the MACH Hold mode. In the simulator, this is assumed by the autothrottle. Refer to section 6, page 44 for details.

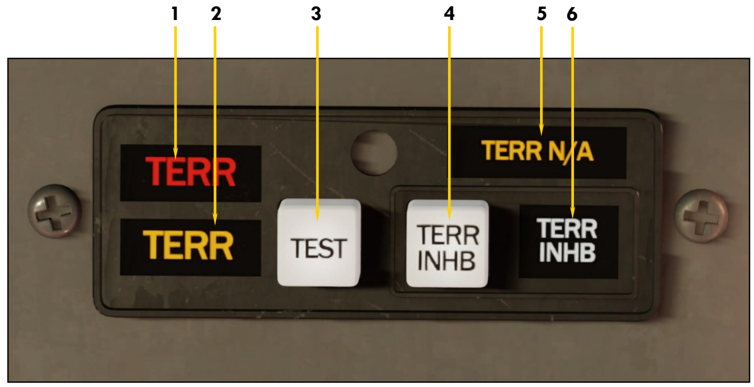
Continued on next page...

***Note:** The AFCS (autopilot and flight director) requires AC and avionics power, usually: Battery Switches [8-9, fig. 5-30] **ON** or Engine Generator Switch [6, 11, fig 5-30] **GEN**, Radio Master Switch [14, fig 5-29] **ON**, and either Inverter Switch [10, 12, fig 5-29] **ON**). Refer to section 6, page 32, for a complete discussion about the AFCS, the autopilot and the flight director. Interrelations between the different modes are summarized in section 6, pages 47-50.*

AUTOMATIC FLIGHT CONTROL SYSTEM / AUTOPILOT / FLIGHT DIRECTOR MODE SELECTOR PANEL
Figure 5-22b

9. LOC ("Localizer Only" Approach Mode) Switch and Light
   This switch engages the autopilot's "Localizer Only" approach mode, enabling automatic tracking of a localizer for instrument approaches. Localizer capture is identical with the NAV/LOC Hold mode or the APPR mode. In the simulator, the APPR light [11] will be illuminated when this mode is selected.
10. MACH (Mach Hold Mode) Switch and Light
    This switch engages the autopilot MACH Hold mode. This mode maintains the aircraft at the Mach number that existed when the switch was depressed. The MACH Hold Switch must be used at altitudes above 29,000 feet. Like in the real aircraft, below 29,000 feet, the autopilot will automatically switch to the SPD Hold mode. In the simulator, this is assumed by the autothrottle. Refer to section 6, page 44 for details.
11. APPR (Coupled Approach Mode) Switch and Light
    Engages the Coupled Approach mode (navigation plus glideslope) when a valid ILS signal is present on the NAV1 radio. It is recommended to engage the APPR mode only after initial localizer interception, with intercept angles shallower than 45 degrees. The coupled glideslope signal is best intercepted from below once the localizer course is established and the recommended approach speed is stabilized. In the simulator, the APPR light [11] will be illuminated when the LOC (only) approach mode is engaged.
12. Autopilot NAV1/GPS Switch
    *Toggles between NAV1and GPS driving NAV1 and Autopilot. Set to **GPS** for GPS navigation. See section 6, pages 37-38 for details.*

***Note:** The AFCS (autopilot and flight director) requires AC and avionics power, usually: Battery Switches [8-9, fig. 5-30] **ON** or Engine Generator Switch [6, 11, fig 5-30] **GEN**, Radio Master Switch [14, fig 5-29] **ON**, and either Inverter Switch [10, 12, fig 5-29] **ON**). Refer to section 6, page 32, for a complete discussion about the AFCS, the autopilot and the flight director. Interrelations between the different modes are summarized in section 6, pages 47-50.*



GROUND PROXIMITY WARNING SYSTEM (GPWS)
ENGINE SYNCHRONIZATION INDICATOR
Figure 5-23

1. TERR (Red) Annunciator
   Terrain is very near. *This annunciator will illuminate if the airplane is at or less than 200 feet from the ground.*
2. TERR (Amber) Annunciator
   Terrain is near. *This annunciator will illuminate if the airplane is at or less than 1,000 feet from the ground.*
3. GPWS Test Button
   Activates the GPWS computer self-test.
4. TERR INHB Button
   Push this button to place the GPWS in standby mode.
5. TERR NA (Amber) Annunciator
   Terrain information not available. *This annunciator will illuminate above 2,500 feet.*
6. TERR INHB (White) Annunciator
   GPWS is in standby mode. *This annunciator will illuminate if the GPWS is in standby - or off - mode.*
7. Engine Synchronization Indicator
   This rotating disc, often called a "spinner", indicates if the engines are synchronized (running together perfectly). The disc rotates clockwise when the right engine runs faster than the left engine and counterclockwise when the left engine runs faster than the right engine. The disc stops spinning when both engine RPMs are matched.

Note (1): *The GPWS requires AC and avionics power, usually: Battery Switches [8-9, fig. 5-30]* ***ON*** *or Engine Generator Switch [6, 11, fig 5-30]* ***GEN****, Radio Master Switch [14, fig 5-29]* ***ON****, and either Inverter Switch [10, 12, fig 5-29]* ***ON****).*

Note (2): *Prepar3D does not provide front detection that would allow for a complete TAWS or enhanced GPWS. Such systems may be available with third-party addons such as special gauges, GTN and radars. Only ground proximity is detected in this software version. The annunciator's illumination is based on the radio height.*

Note (3): *The GPWS parameters can be changed in the "aircraft.cfg" file (under `[GPWS])` located in the add-on aircraft's folder, and in the "system_misc_XXXX.xml" gauge (under `<Element id="GPWS">`) located in the "Gauges" subfolder in the "Content" folder of the main addon folder. We do not recommend editing these files unless you know what you are doing. Please make backup copies of the files before making any change.*

Figure 5-24

1. Left Inner Knob and Button
   No special function with the GPS 500.
2. Left Outer Knob
   No special function with the GPS 500.
3. VLOC Volume Knob and Button
   The volume function disabled with the GPS 500.
4. VLOC1 Flip-Flop (Swap) Button
   *Swaps the NAV1 active frequency with the standby frequency or vice versa, if the unit is **ON**. The swap function is disabled with the GPS 500.*
5. PWR/COM1 Volume Knob and Button
   Rotate the button clockwise to power up unit. The volume function is disabled with the GPS 500.
6. COM1 Flip-Flop (Swap) Button
   *Swaps the COM1 active frequency with the standby frequency and vice versa if the is **ON**. The swap function is disabled with the GPS 500.*
7. LCD Screen
8. Photocell
   Click to show the 2D gauge in a popup window.
9. Map Range Button (Zoom)
   Left click to zoom in, right click to zoom out, wheel up to zoom in, wheel down to zoom out.
10. Direct-To Button
11. Menu Button
12. Clear Button
13. Enter Button
14. Right Outer Knob (Group Select)
15. Right Inner Knob (Page Select) and Button
16. Procedure Button
17. Vertical Navigation (Terrain) Button
18. Terrain Data Card
    Special function with some third-party addons.
19. Flight Plan Button
20. Power LED (cards inserted)
21. Message Button
22. OBS (Omni Bearing Selector) Button
23. Navigation Data Card
    Click to show the 2D gauge in a popup window.
24. Course Deviation Indicator Button

***Note:** The GPS/GNS unit requires avionics power, usually: Battery Switches [8-9, fig. 5-30] **ON** or Engine Generator Switch [6, 11, fig 5-30] **GEN**, and Radio Master Switch [14, fig 5-29] **ON**. The unit is preconfigured for the Garmin GPS 500 that comes with Prepar3D. Refer to appendix 2 if you want to modify the default configuration and add your own third-party GPS/GNS addon.*

Figure 5-25

1. GTN 750 Unit
   Click here to show the 2D gauge in a popup window.
2. Navigation Data Card
   Special function with some third-party addons.
3. Volume Knob and Button
4. LCD Screen
5. Home Button
6. Photocell
   Click to show the 2D gauge in a popup window.
7. Direct-To Button
8. Large Outer Knob
9. Small Inner Knob and Button

Note:** GTN 750 units require avionics power, usually: Battery Switches [8-9, fig. 5-30]* ***ON *or Engine Generator Switch [6, 11, fig 5-30]* ***GEN****, and Radio Master Switch [14, fig 5-29]* ***ON****. The units are preconfigured for the Reality XP GTN 750 addon that accepts standard GPS commands from the simulator. Refer to your GTN 750 documentation for complete instructions. Refer to appendix 2 if you want to modify the default configuration and add your own third-party GTN 750 addon.*

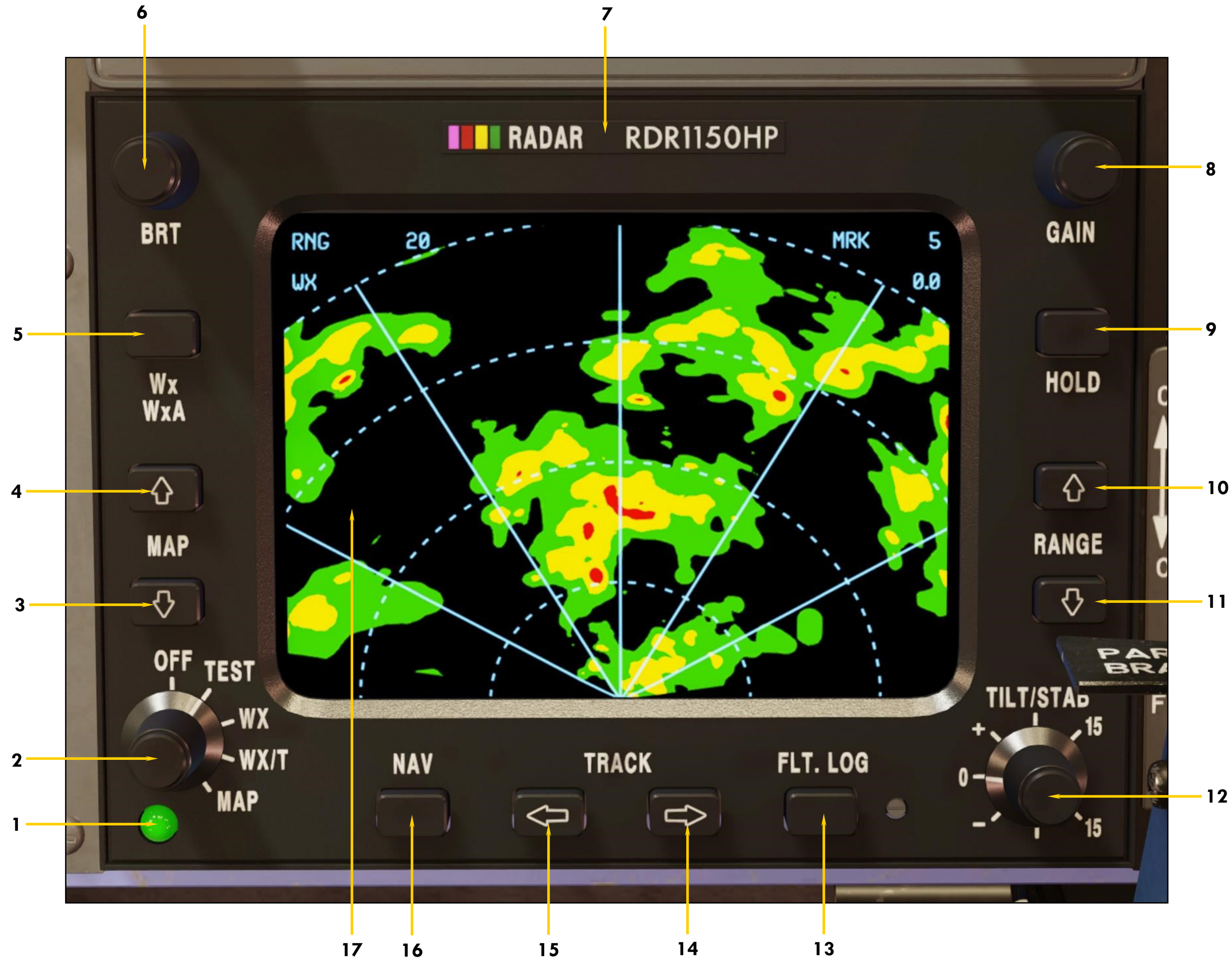


Figure 5-26

1. Power LED
2. Mode Selector Knob
   - ***OFF***
   - ***TEST***
   - ***WX*** *(precipitation)*
   - ***WX/T*** *(precipitation and turbulence*
   - ***MAP*** *(ground terrain detection)*
3. Map Down Button
4. Map Up Button
5. Wx/WxA Toggle Button
6. Brightness Control Knob
   Controls the brightness of the radar screen.
7. Radar Logo
   Click to show the 2D gauge in a popup window.
8. Gain Control Knob
   Controls the sensitivity of the radar receiver.
9. Hold Button
10. Range Up Button
    Adjusts the displayed distance (zoom out).
11. Range Down Button
    Adjusts the displayed distance (zoom in).
12. Tilt Control Knob
    Adjusts the angle of the radar beam.
13. Flight Log Button
14. Track Up Button
15. Track Down Button
16. Nav Button
17. Radar Screen

Note: *The radar requires requires AC and avionics power, usually: Battery Switches [8-9, fig. 5-30]* ***ON*** *or Engine Generator Switch [6, 11, fig 5-30]* ***GEN****, Radio Master Switch [14, fig 5-29]* ***ON****, and either Inverter Switch [10, 12, fig 5-29]* ***ON****). By default, the unit will show a dummy radar screen for users who don't have a third-party radar installed. The Prepar3D demo radar that comes with the Prepar3D SDK can also be installed (see "Release Notes"). Controls have no effect on the dummy radar screen. All buttons and knobs are programmable. Refer to your radar documentation for complete instructions. Refer to appendix 2 if you want to modify the default configurations and add your own third-party radar.*

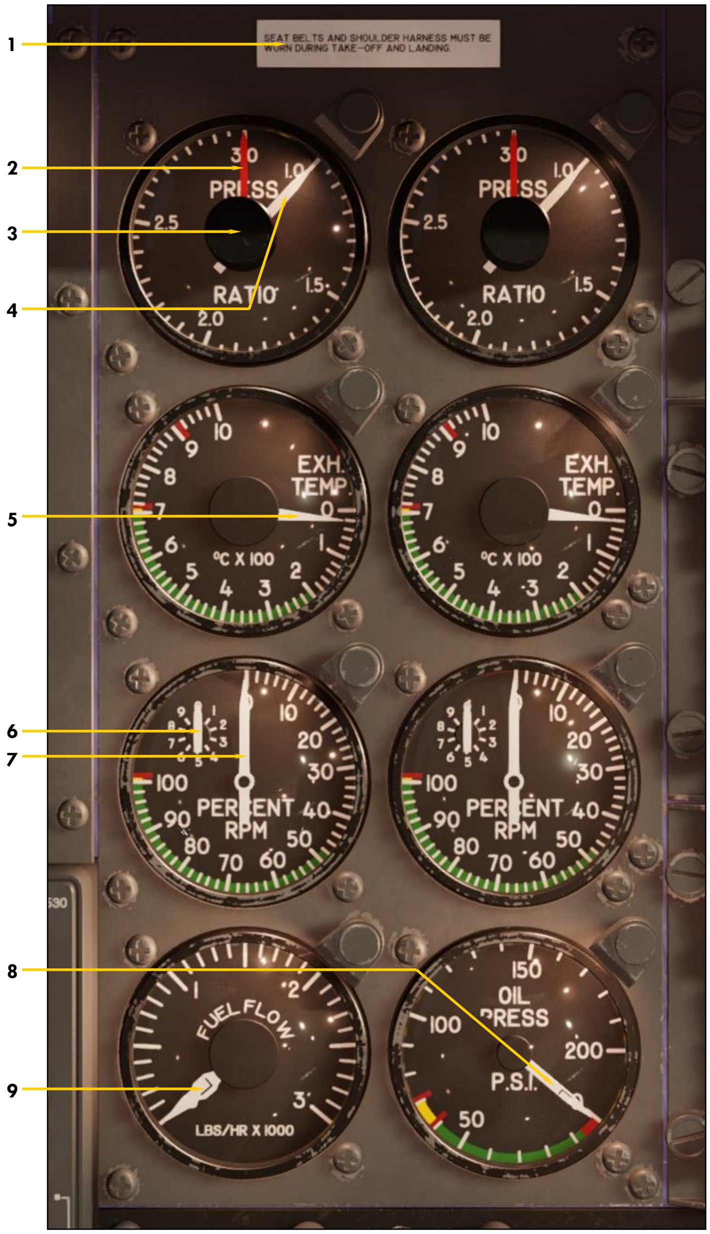


Figure 5-27

1. Cockpit “Cold and Dark” Reset or “Auto Start” Icon
   *Left click for “**Cold and Dark**”, right click for “**Auto Start**”. Refer to section 6, page 9, for details.*
2. Left Engine Target EPR Bug
   Same for the right engine.
3. Left Engine Target EPR Selector Knob
   Same for the right engine.
4. Left Engine Pressure Ratio (EPR) Needle
   Same for the right engine.
5. Left Engine Exhaust Gas Temperature (EGT) Needle
   Same for the right engine.
6. Engine Revolutions per Minute (RPM) Vernier Needle
   Used for fine power settings. Same for the right engine.
7. Engine Revolutions per Minute (RPM) Needle
   Used for coarse power settings. Same for the right engine.
8. Left & Right Engine Oil Pressure Needles
   Requires AC power from the inverters.
9. Left & Right Engine Fuel Flow Needles

Figure 5-28

1. Primary/Secondary AC Bus Selector Switch
   *This switch selects which AC bus voltage is sent to the AC voltmeter [3]. To read the voltage from the primary AC bus, set the switch to **AC PRI**. To read the voltage from the secondary AC bus, set the switch to **AC SEC**.*
2. Right Engine Oil Temperature Needle
3. AC Voltmeter Needle
   Indicates the available AC voltage from the primary, secondary, or auxiliary inverters.
4. Left Engine Oil Temperature Needle
5. Right DC Ammeter Needle
   Indicates the load on the right generator.
6. DC Voltmeter Needle
   Indicates the available voltage on the main DC bus.
7. Left DC Ammeter Needle
   Indicates the load on the left generator.

Note: *Refer to section 6, page 3, for more information about the electrical system.*

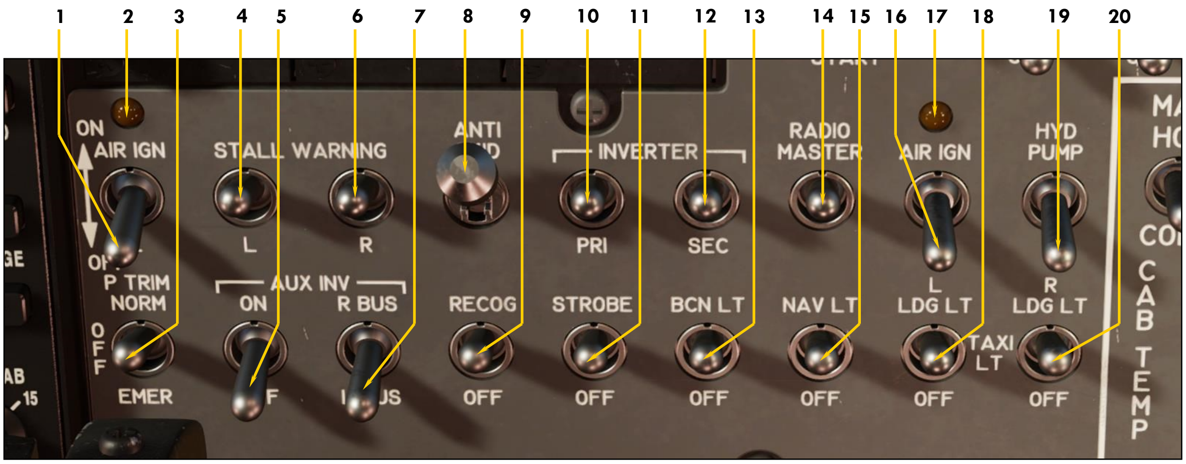


Figure 5-29

1. Left Engine Air Ignition Switch
   *This switch, when set to **AIR IGN**, provides for continuous operation of the ignition system for the left engine. The switch should be set to **OFF** unless ambient conditions require ignition to stay on.*
2. Left Engine Ignition Light
   This light illuminates when left air ignition is operating or the system is in a start cycle.
3. Emergency Pitch Trim Switch
   *This switch is normally set to **NORM**, unless emergency trim is required. The Emergency Trim Switch is on the center pedestal [2, fig. 5-47].*
4. Left Stall Warning Switch
   *This switch is normally set to **ON** and the red L STALL annunciator [3, fig. 5-32a] should go off. The switch energizes the left stall warning system and the stick shaker. In the real aircraft, this switch also energizes the stick nudger/puller. In the simulation, a separate switch is provided for the stick nudger/puller on the center pedestal [21, fig. 5-43].*
5. Auxiliary Inverter Switch
   The auxiliary inverter can be used in case of a failure of the main inverters. Inverters provide AC power to several aircraft systems. Inverters require battery or generator power (including emergency power in case of a general power failure).
6. Right Stall Warning Switch
   *This switch is normally set to **ON** and the red R STALL annunciator [6, fig. 5-32a] should go off. The switch energizes the right stall warning system.*
7. Auxiliary Inverter Bus Selector Switch
   This switch can be used to select which AC bus is powered by the auxiliary inverter in case of a malfunction of one of the main inverters.
8. Anti-Skid Power Switch
   *When AC power is available, set this switch to **ON** to energize the anti-skid system installed on the main landing gear. The four Anti-Skid Generator Lights [5, fig. 5-15] should go off when this switch is set to **ON** and AC power is available.*
9. Recognition Lights Switch
10. Primary Inverter Switch
    Inverters provide AC power to several aircraft systems. Inverters require battery or generator power (including emergency power in case of a general power failure). This switch energizes the primary inverter that provides power to the primary AC bus.
11. Strobe Lights Switch
12. Secondary Inverter Switch
    This switch energizes the secondary inverter that provides power to the secondary AC bus.
13. Rotating Beacon Lights Switch
14. Radio Master Switch (Avionics)
    The avionics bus provides DC power to the radios, the navigation systems, the AFCS and other instruments, systems, and devices.
15. Navigation Lights Switch
16. Right Engine Air Ignition Switch
    Same as 1 above, but for the right engine.
17. Right Engine Ignition Light
    Same as 2 above, but for the right engine.
18. Left Taxi/Landing Light Switch
    *This 3-position switch controls the intensity of the landing light installed on the left landing gear. Down position - **OFF**, Middle position - **Taxi Light**, Up position - **Landing Light (full intensity)**.*
19. Electric Auxiliary Hydraulic Pump Switch
    *This switch, when set to **HYD PUMP**, energizes the auxiliary hydraulic pump. This pump may be used in case of a main hydraulic system failure or for operating subsystems with no engine running.*
20. Right Taxi/Landing Light Switch
    Same as 18 above, but for the light installed on the right landing gear.

***Note:** Refer to section 6, page 3, for more information about the electrical system, and to page 41, for information about the stick nudger/puller.*

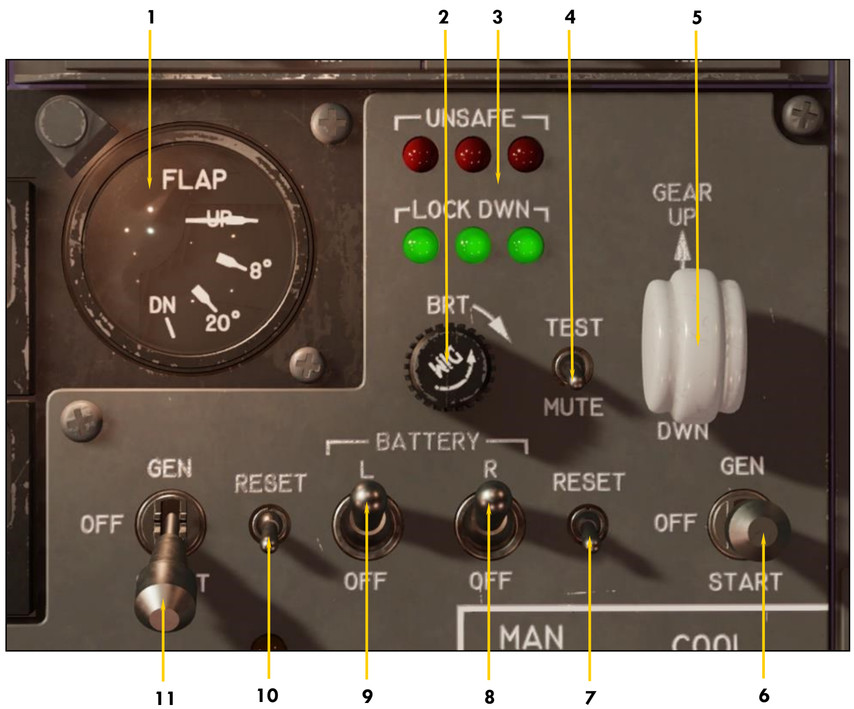


Figure 5-30

1. Flaps Position Indicator
*Indicates the position of the flaps: **Full up**, **8 degrees**, **20 degrees**, **40 degrees full down**. An audible alert will sound if the flaps are extended beyond 25 degrees and the landing gear is not down and locked. Requires DC power. Flaps require hydraulic power.*
2. Brightness Control Knob
Rotate to adjust the intensity of the Landing Gear Position Lights [3].
3. Landing Gear Position Lights (left, center, right)
Lights require DC power.
   - ***Red:** The indicated gear is unsafe or in transit, and/or the gear door is not closed, and/or either engine RPM is below 70%, and/or the flaps are extended beyond 25 degrees, and the gear is not down and locked.*
   - ***Green:** The indicated gear is down and locked*
   - ***No light:** The indicated gear is up and locked and the gear door is closed, or there is an electrical system failure.*
   - ***All lights on:** The system is being tested.*
4. Landing Gear Warning System Test Switch
*A warning horn will blow and the three red Position Lights [3] will illuminate if the flaps are extended beyond 25 degrees, and/or either engine RPM is below 70%, and the landing gear is not down and locked. Set this 3-position switch to **TEST** to test the gear warning system. The horn will blow, and the six red and green Position Lights [3] will illuminate. Reset the switch to **OFF** (middle position) when the test is finished. Setting the switch to **MUTE** will silence the warning horn in all conditions. Default position is **OFF**.*
5. Landing Gear Selector Switch
*Move this switch to the **GEAR UP** position to retract the landing gear. Move the switch to the **GEAR DWN** position to extend the landing gear. Requires DC power. Gear also requires hydraulic power.*
6. Right Engine Starter/Generator Switch
*Move this switch down to **START** for engine start. After the engine is started, move the switch up to **GEN** to engage the generator. Refer to section 8, page 19, for complete starting procedures.*
7. Right Engine Generator Reset Switch
This momentary switch will restart the right generator.
8. Right Battery Switch
Due to limitations in Prepar3D, both battery switches are linked together. Only one battery is provided in the simulator.
9. Left Battery Switch
Same as [8].
10. Left Engine Generator Reset Switch
This momentary switch will restart the left generator.
11. Left Engine Starter/Generator Switch
*Move this switch down to **START** for engine start. After the engine is started, move the switch up to **GEN** to engage the generator. Refer to section 8, page 19, for complete starting procedures.*

***Note:** Refer to section 6, page 3, for more information about the electrical system.*

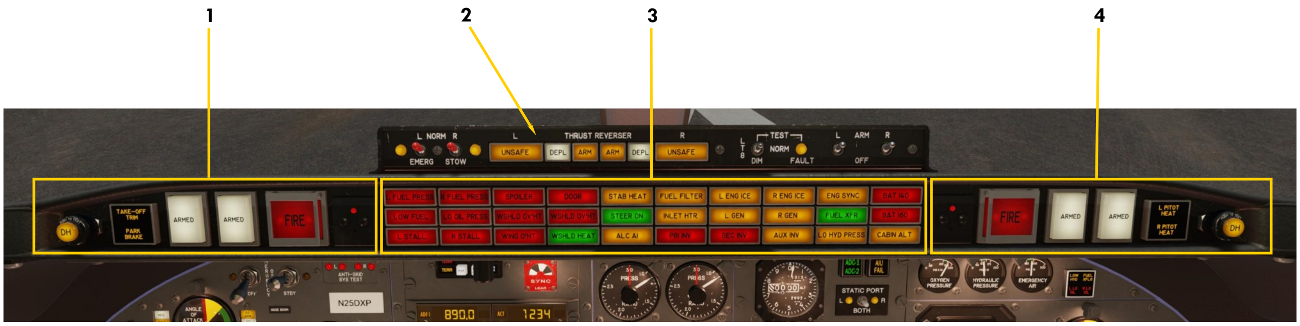


Figure 5-31

1. Captain's Fire Panel
2. Thrust Reversers Control Panel
3. Main Annunciator Panel
4. Copilot's Fire Panel

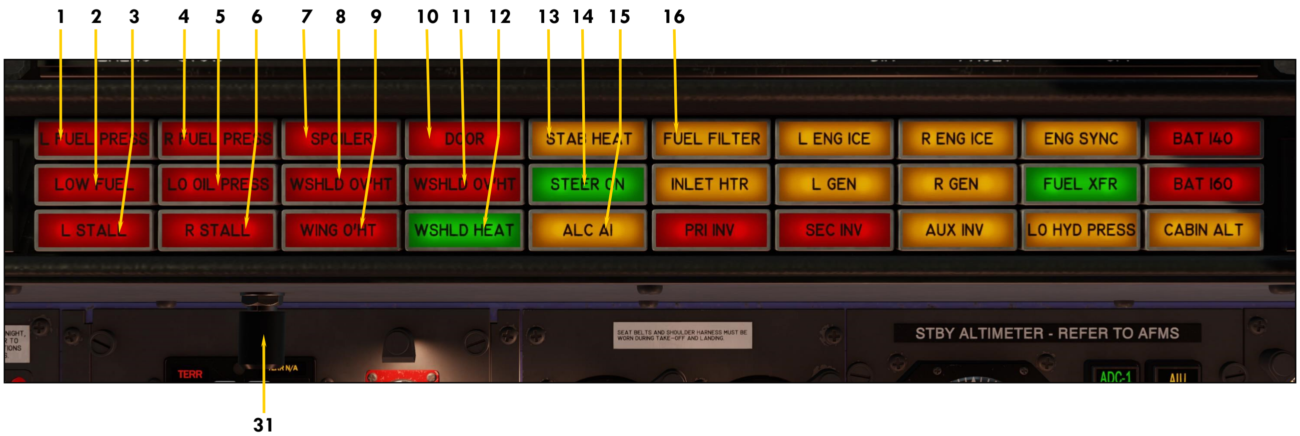


Figure 5-32a

1. Left Engine Low Fuel Pressure
   *Indicates left engine fuel pressure below 10 psi. The light should extinguish when the left jet pump and/or the left standby pump are operating (refer to "**20 Series Fuel System**", section 6, page 26).*
2. Low Fuel Remaining
   *This annunciator will illuminate when there is less than 50 gallons (approx. 335 pounds) of fuel in either wing tank or, if the Fuselage Tank Switch [6, fig. 5-45a; 5, fig. 5-45b] is set to **XFER**, in the center fuselage tank (refer to "**20 Series Fuel System**", section 6, pages 26-27).*
3. Left Stall
   *Flashing with audible alert and stick shaker: Indicates left wing stall or left system is being tested. Steady: System has failed or Left Stall Warning Switch [4, fig. 5-29] is **OFF**.*
4. Right Engine Low Fuel Pressure
   *Indicates right engine fuel pressure below 10 psi. The light should extinguish when the right jet pump and/or the right standby pump are operating (refer to "**20 Series Fuel System**", section 6, page 26).*
5. Low Oil Pressure
   Indicates oil pressure below 5 psi in one or both engines.
6. Right Stall
   *Flashing with audible alert and with or without stick shaker: Indicates right wing stall or right system is being tested. Steady: System has failed or Right Stall Warning Switch [6, fig. 5-29] is **OFF**.*
7. Spoilers Extended
   Indicates wing spoilers out of retracted position.
8. Left Windshield Overheat
   *Indicates left windshield overheat (above 215˚F). Mouseover to display the temperature. Usually occurs if the Windshield Heat Switch [4, fig. 5-4] is ON (manual or auto mode) when the aircraft is not moving, and warm conditions exist (refer to "**Windshield Heating System**", section 6, page 14).*
9. Wing Overheat
   *Indicates wing anti-ice overheat (above 215˚F). Mouseover to display the temperature. Usually occurs if the Wing and Stabilizer Heat Switch [3, fig. 5-4] is ON when the aircraft is not moving, and warm conditions exist (refer to "**Wing Heating System**", section 6, page 18).*
10. Passenger and Crew Door Unsecured
    Indicates door not closed and locked.
11. Right Windshield Overheat
    *Indicates right windshield overheat (above 215˚F). Mouseover to display the temperature. Usually occurs if the Windshield Heat Switch [4, fig. 5-4] is **ON** (manual or auto mode) when the aircraft is not moving, and warm conditions exist (refer to "**Windshield Heating System**", section 6, page 14).*
12. Windshield Heat Applied
    *Indicates windshield heat **ON** (see 4, fig. 5-4). Refer to "**Windshield Heating System**", section 6, page 14.*
13. Stabilizer Heat Power Failure (n/s)
    *Indicates a power failure in the leading-edge element of the stabilizer heating blanket. Won't occur in this software version. Refer to "**Horizontal Stabilizer Heating System**", section 6, page 19.*
14. Nose Wheel Steering Engaged
    When illuminated, indicates electrical nose wheel steering [7, fig. 5-4] is engaged (used for taxiing). When off, indicates nose wheel steering is disengaged. Nose wheel steering is initiated automatically in Prepar3D when taxiing at speeds lower than approx. 45 knots. Above 45 knots, the nose gear will lock (see 7, fig. 5-4 and 2, fig. 5-51, and appendix 7, pages 3-4).
15. Anti-Ice Alcohol Reservoir Empty
    Illuminates when the alcohol reservoir is empty. Mouseover to check remaining alcohol. Click to fill reservoir with 1.75 gallon of alcohol (see "Windshield and Radome Alcohol Anti-Ice System", section 6, page 17).
16. Fuel Filter Clogged (n/s)
    Indicates an abnormal pressure drop across either engine fuel filter.

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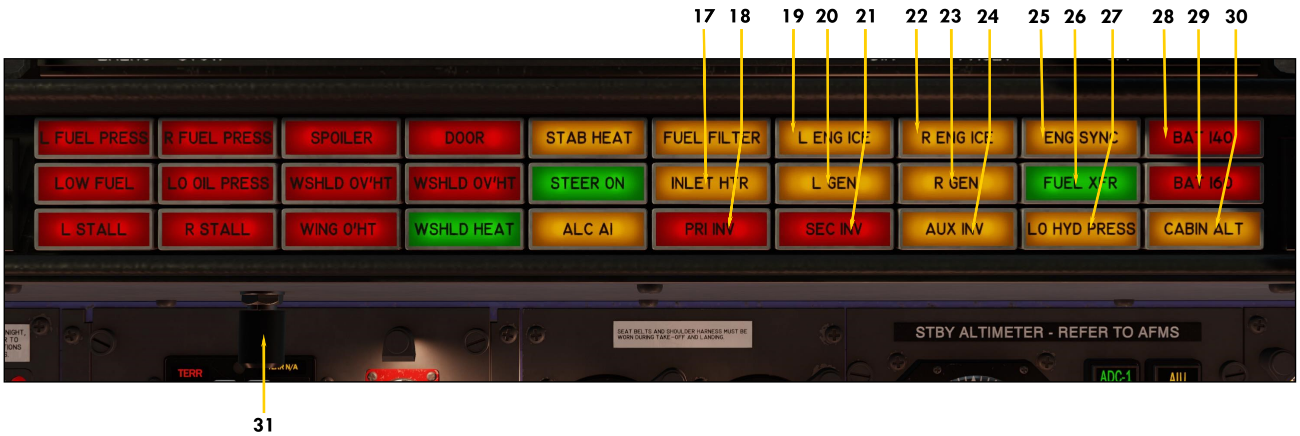


Figure 5-32b

17. Engine Inlet Heater Overheat
*Indicates an overheat condition in an engine inlet heater when the aircraft is on the ground. Mouseover to display the temperature. The annunciator illuminates when either nacelle temperature reaches 190 ˚F and extinguishes at 180 ˚F. When this happens, the Engine Nacelle Heat Switches [2, fig. 5-4] must be turned **OFF**. In flight, this annunciator is disabled by the right gear squat switch. Refer to "**Engine Anti-Ice System**", section 6, page 20.*

18. Primary Inverter Inoperative
Indicates low AC voltage from the primary inverter.

19. Left Engine Anti-Ice Warning
*Indicates insufficient bleed air pressure for adequate anti-ice protection. When the aircraft is on the ground, 70% RPM is required to extinguish the annunciator. Refer to "**Engine Anti-Ice System**", section 6, page 20.*

20. Left Generator Inoperative
Indicates low DC voltage from the left engine generator.

21. Secondary Inverter Inoperative
Indicates low AC voltage from the secondary inverter.

22. Right Engine Anti-Ice Warning
*Indicates insufficient bleed air pressure for adequate anti-ice protection. When the aircraft is on the ground, 70% RPM is required to extinguish the annunciator. Refer to "**Engine Anti-Ice System**", section 6, page 20.*

23. Right Generator Inoperative
Indicates low DC voltage from the right engine generator.

24. Auxiliary Inverter On
*Indicates that the auxiliary inverter has been switched **ON** (see 5, fig. 5-29). In the real aircraft, this annunciator indicates failure or low AC voltage from the auxiliary inverter if turned **ON**.*

25. Engine Sync On
*Indicates that the Engine Sync Switch [23, fig. 5-43] is **ON** (see 7, fig. 5-23).*

26. Fuel Transfer Pump On
*Indicates that the fuselage tank transfer pump is operating. In the simulator, this indicates that the Fuselage Tank Switch [6, fig. 5-45a; 5, fig. 5-45b] is set to **XFER** and that engines are fed from the center fuselage tank (refer to "**20 Series Fuel System**", section 6, page 28).*

27. Low Hydraulic Pressure
Indicates hydraulic pressure below 1,200 psi.

28. Battery Overheat (140)
Indicates overheating battery, over 140˚ C. Mouseover to display the temperature. Do not turn on the battery switches [8-9, fig. 5-30] when the batteries are fully charged, and the GPU (or the generators) are operating to prevent the NiCad batteries from overheating! The Battery Temperature Gauges [14, fig. 5-37] must be monitored constantly. This indicator is also illuminated when a "Cold and Dark" reset cycle or an "Auto Start" sequence is in progress.

29. Battery Overheat (160)
Indicates overheating battery, over 160˚ C. Mouseover to display the temperature. See note above [28].

30. Cabin Altitude Annunciator
Flashing: Indicates cabin altitude is above 9,000 feet. Flashing, with audible alert: Indicates cabin altitude is above 10,100 feet. Audible alert can be muted with the Horn Silence Switch [10, fig. 4-41] on the test switch panel.

31. Annunciator Test Button and Dimmer
Press to test the bulbs in all annunciators and lights. The autopilot and the flight director also have a separate test switch [11, fig. 5-43] on the test switch panel. Rotate the button (dimmer) to adjust the brightness of all lights and annunciators (0-100% brightness).

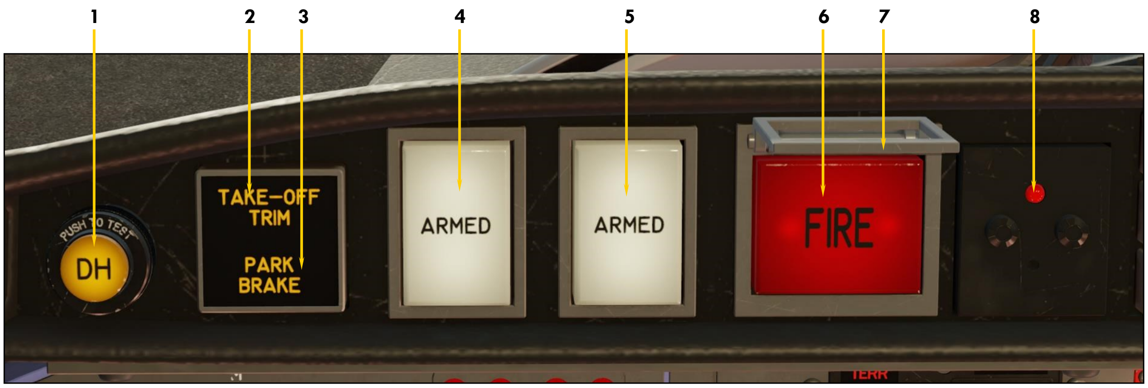


Figure 5-33

1. Decision Height Light
*Illuminates when the aircraft is at or below the selected decision height. Refer to "**Radio Altimeter**", fig. 5-13. Push to test.*
2. Takeoff Trim Alert Annunciator
*Illuminates when pitch trim is out of takeoff range. Takeoff trim is typically one needle thickness below neutral. The annunciator is disabled in flight. Refer to "**Trim Indicators**", fig. 5-14 or fig. 5-47.*
3. Parking Brake Annunciator
Indicates that the parking brake is set. Parking brake is set by pulling a lever located on the left side of the throttle quadrant [9, fig. 4-43].
4. First Fire Extinguisher Armed Annunciator and Discharge Button
Illuminates when the Left Engine Extinguisher Arming/Firewall Shutoff Button [6] has been pressed. Indicates that the first fire extinguisher bottle is ready for use. Press to discharge the first fire extinguisher bottle into the left engine nacelle.
5. Second Fire Extinguisher Armed Annunciator and Discharge Button
Illuminates when the Left Engine Extinguisher Arming/Firewall Shutoff Button [6] has been pressed. Indicates that the second fire extinguisher bottle is ready for use. Press to discharge the second fire extinguisher bottle into the left engine nacelle.
6. Left Engine Fire Alarm Annunciator and Extinguisher Arming/Firewall Shutoff Button
Indicates a fire in the left engine nacelle. Press to close the left engine nacelle firewall shutoff valves and arm both fire extinguisher bottles. Discharged bottles cannot be armed and the Fire Extinguisher Armed Annunciator [4-5] for the discharged bottle (s) will remain off.
7. Left Engine Extinguisher Arming/Firewall Shutoff Button Guard
Click to open guard.
8. Left Engine Firewall Shutoff Valve Pin Light
Indicates that the left engine nacelle firewall shutoff valves are closed if DC power is available.

***Note:** In Prepar3D, the two-bottle fire-extinguishing system is common to both engines. Either of two bottles of extinguishing agent can be discharged to either engine, or both bottles can be discharged to the same engine. Refer to section 9 for more details about emergency procedures in case of an engine fire.*

EXTERIOR EXTINGUISHER DISCHARGE INDICATORS
Figure 5-34

1. Thermal Discharge Indicator (Red Disc) (n/s)
Disc is ruptured (appears black) if one or both thermal relief valves have released extinguisher bottle pressure.
2. Extinguisher Bottle Discharge Indicator (Yellow Disc)
Disc is ruptured (appears black) if either extinguisher bottle is discharged.

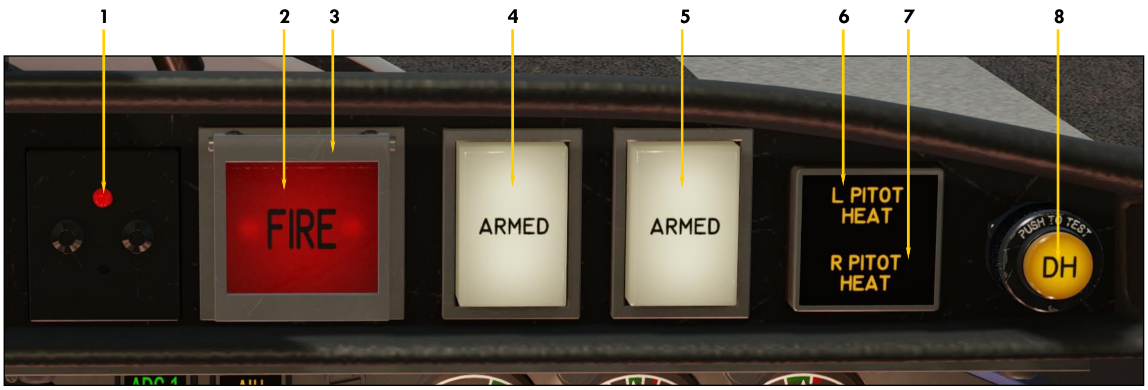


Figure 5-35

1. Right Engine Firewall Shutoff Valve Pin Light
   Indicates that the right engine nacelle firewall shutoff valves are closed if DC power is available.
2. Right Engine Fire Alarm Annunciator and Extinguisher Arming/Firewall Shutoff Button
   Indicates a fire in the right engine nacelle. Press to close the right engine nacelle firewall shutoff valves and arm both fire extinguisher bottles. Discharged bottles cannot be armed and the Fire Extinguisher Armed Annunciator [4-5] for the discharged bottle(s) will remain off.
3. Right Engine Extinguisher Arming/Firewall Shutoff Button Guard
   Click to open guard.
4. First Fire Extinguisher Armed Annunciator and Discharge Button
   Illuminates when the Right Engine Extinguisher Arming/Firewall Shutoff Button [2] has been pressed. Indicates that the first fire extinguisher bottle is ready for use. Press to discharge the first fire extinguisher bottle into the right engine nacelle.
5. Second Fire Extinguisher Armed Annunciator and Discharge Button
   Illuminates when the Right Engine Extinguisher Arming/Firewall Shutoff Button [2] has been pressed. Indicates that the second fire extinguisher bottle is ready for use. Press to discharge the second fire extinguisher bottle into the right engine nacelle.
6. Left Pitot Heat Inoperative Annunciator
   *Indicates pitot probe heaters are **OFF** [1, fig. 5-4].*
7. Right Pitot Heat Inoperative Annunciator
   *Indicates pitot probe heaters are **OFF** [1, fig. 5-4].*
8. Decision Height Light
   *Illuminates when the aircraft is at or below the selected decision height. Refer to “**Radio Altimeter**”, fig. 5-13. Push to test.*

Note: *In Prepar3D, the two-bottle fire-extinguishing system is common to both engines. Either of two bottles of extinguishing agent can be discharged to either engine, or both bottles can be discharged to the same engine. Refer to section 9 for more details about emergency procedures in case of an engine fire.*

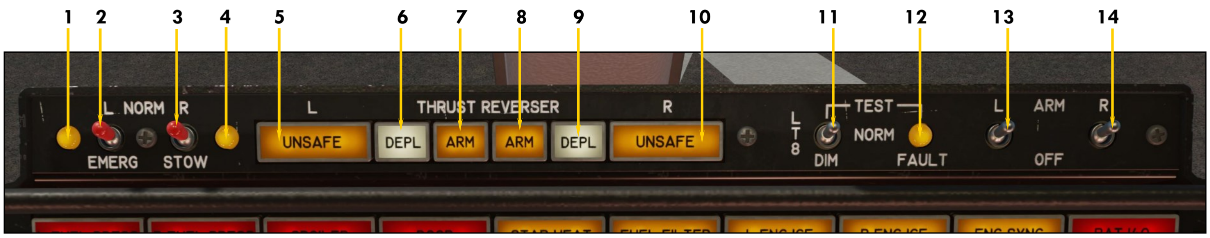


Figure 5-36

1. Left Thrust Reverser Emergency Stow Light
Illuminates during emergency stowing of the left thrust reverser, under certain conditions.
2. Left Thrust Reverser Emergency Stow Switch
*By default, this switch is set to the **NORMAL** position. In the real aircraft, setting the switch to **EMER STOW** will electrically stow the left thrust reverser if the aircraft is on the ground, if the left throttle is at **IDLE** and if the Left Thrust Reverser Arm Switch [13] is set to **OFF** (not possible in Prepar3D, see note below). This is used in case of a hydraulic system failure. Return the switch to **NORMAL** after the thrust reverser is stowed.*
3. Right Thrust Reverser Emergency Stow Switch
Same as [2], but for the right engine.
4. Right Thrust Reverser Emergency Stow Light
Illuminates during emergency stowing of the right thrust reverser, under certain conditions.
5. Left Thrust Reverser Unsafe Annunciator
Indicates that the left thrust reverser is in transit (not fully deployed or stowed, or in an incorrect position). Will flash for a few seconds at the first movement of the thrust reverser subthrottle.
6. Left Thrust Reverser Deployed Annunciator
Indicates that the left thrust reverser is deployed (not stowed).
7. Left Thrust Reverser Armed Annunciator
*Indicates that the left thrust reverser is armed. The left thrust reverser can be armed only if the aircraft is on the ground, if the left throttle is at **IDLE** and if the Left Thrust Reverser Emergency Stow Switch [2] is set to **NORMAL**.*
8. Right Thrust Reverser Armed Annunciator
Same as [7], but for the right engine.
9. Right Thrust Reverser Deployed Annunciator
Indicates that the right thrust reverser is deployed (not stowed).
10. Right Thrust Reverser Unsafe Annunciator
Indicates that the right thrust reverser is in transit (not fully deployed or stowed, or in an incorrect position). Will flash for a few seconds at the first movement of the thrust reverser subthrottle.
11. Thrust Reversers Control Panel Lights Test Switch
*Set this switch to **TEST** to test the bulbs in the thrust reversers control panel lights and annunciators.*
12. Annunciator System Fault Light (n/s)
Indicates a fault in the thrust reversers system.
13. Left Thrust Reverser Arm Switch
*This switch arms the left thrust reverser if the aircraft is on the ground, if the left throttle is at **IDLE** and if the Left Thrust Reverser Emergency Stow Switch [2] is set to **NORMAL**. In Prepar3D, thrust reversers are armed by default. Setting this switch to **OFF** has no effect in the simulator (see note below).*
14. Right Thrust Reverser Arm Switch
Same as [13], but for the right engine.

***Note:** Because of current limitations in Prepar3D, thrust reverser controls have limited functionalities in this software version. In the simulator, thrust reversers can be deployed by pressing the "**F2**" key when the throttles are set to **IDLE,** and the aircraft is on the ground. When deployed, thrust can be reduced by pressing the "**F3**" key. Pressing the "**F1**" key will return both throttles and thrust reverser subthrottles to **IDLE**, under certain conditions. In Prepar3D, thrust reversers are always armed when the aircraft is on the ground. In the GLJ Model 25/28 v4 addon, reverse thrust is limited to 85% RPM, like in the real aircraft.*

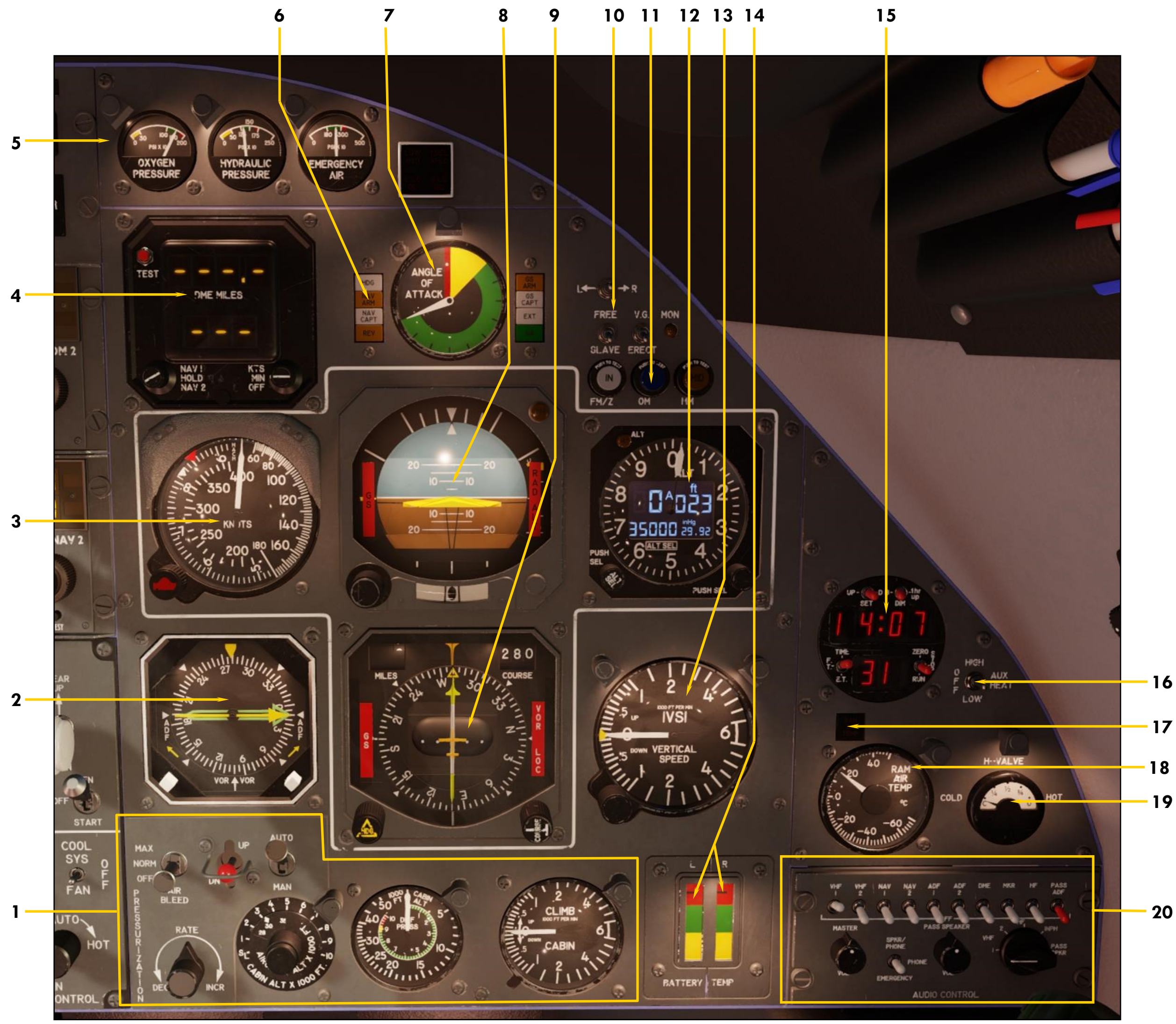
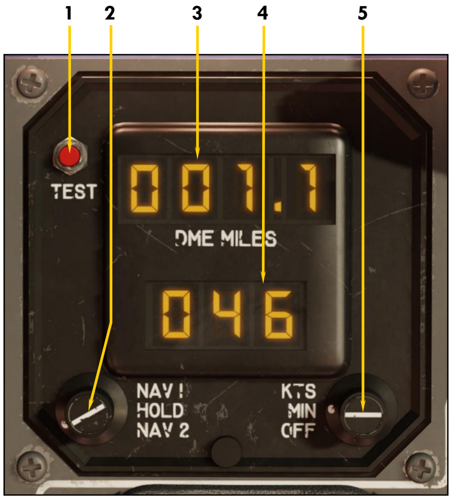


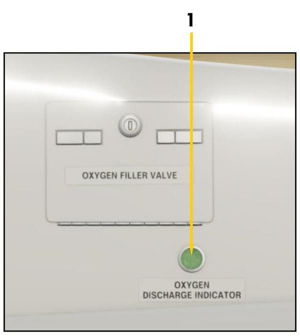
Figure 5-37

1. Pressurization Panel
2. Radio Magnetic Indicator (RMI)
3. Airspeed/Mach Indicator (ASI)
4. DME Head
5. Mini Gauge Cluster & Miscellaneous Annunciators
6. Flight Director Annunciators
7. Right Angle-of-Attack Indicator
8. Attitude Director Indicator (ADI)
9. Horizontal Situation Indicator (HSI)
10. Gyro Switches (partially simulated)
11. Marker Beacon Lights
    Push to test.
12. Altimeter/ADDU
13. Vertical Speed Indicator (VSI)
14. Battery Temperature Indicators
15. Digital Clock
16. Auxiliary Heat Switch (n/s)
17. Ram Air Temperature Warning Annunciator
    Illuminates if total air temperature is below -20° C or above 20° C.
18. Ram Air Temperature Gauge
19. H-Valve Position Indicator
20. Audio Panel



DME HEAD
Figure 5-38

1. DME Head Test Button
2. NAV1/NAV2 Selector Knob
   *Use this knob to select which DME signal to track (**NAV1** or **NAV2**). The **HOLD** position will keep the last readouts as reference only, even if other stations are tuned in on the navigation radios. This is a convenience feature only and it differs from the real instrument that has extra circuitry for holding the last frequency.*
3. Distance Readout
   Indicates the distance to/from the selected DME station in nautical miles. NAV1 readout is repeated on the HSI (see 9, fig. 5-8).
4. Ground Speed or Estimated Time to Arrival Readout
   Ground speed (in knots) is the closing speed to station, not the actual aircraft ground speed. ETA is valid only when flying to the station.
5. Ground Speed/Estimated Time to Arrival Selector Knob
   *Rotate this knob to **KTS** to select ground speed (in knots) or to **MIN** to select the estimated time of arrival (in minutes). The **OFF** position turns off the DME head.*



MINI GAUGE CLUSTER
Figure 5-39

1. Oxygen Cylinder Discharge Indicator (Green Disc)
   Disc is ruptured (appears gray) when the oxygen cylinder located in the dorsal fin is discharged.
2. Oxygen Pressure Gauge
   *Provides a direct reading of the pressure in the oxygen cylinder located in the dorsal fin. This green cylinder provides oxygen to the passengers and crew through a network of valves and regulators. Click the gauge to fill. See also "**Oxygen Valves**" [2,4, fig 5-49].*
3. Hydraulic Pressure Gauge
   *Provides a direct reading of the pressure in the hydraulic system. Refer to "**Hydraulic System**", section 6, page 4.*
4. Emergency Air Pressure Gauge
   *Provides a direct reading of the pressure in the emergency air bottle. The bottle is in the nose compartment and supplies compressed air to the emergency gear extension system. Click the gauge to fill. See also "**Emergency Gear Extension Lever**" [6, fig. 5-43 and section 9, page 5].*
5. Left Engine Low Oil Pressure Annunciator
   Indicates oil pressure below 5 psi in the left engine.
6. Low Hydraulic Pressure Annunciator
   Indicates hydraulic pressure below 1,200 psi.
7. Crossflow (Crossfeed) Valve Open Annunciator
   *In the simulator, this light indicates that the cross-feed valves are positioned for cross-feeding fuel from one wing tank to one or both engines (refer to "**Crossfeed**", section 6, pages 24-25).*
8. Right Engine Low Oil Pressure Annunciator
   Indicates oil pressure below 5 psi in the right engine.

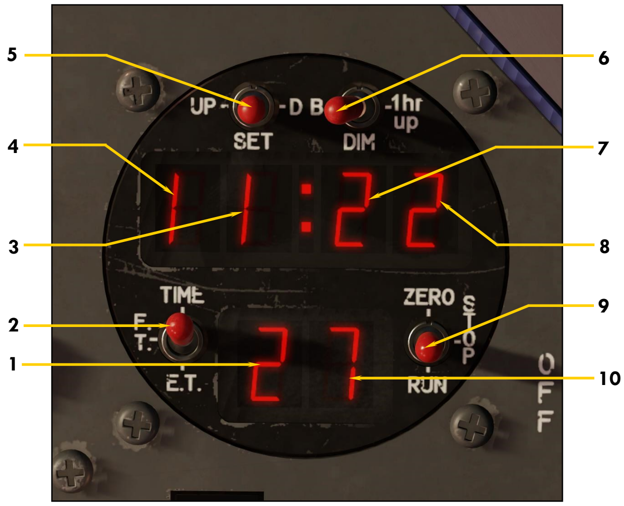
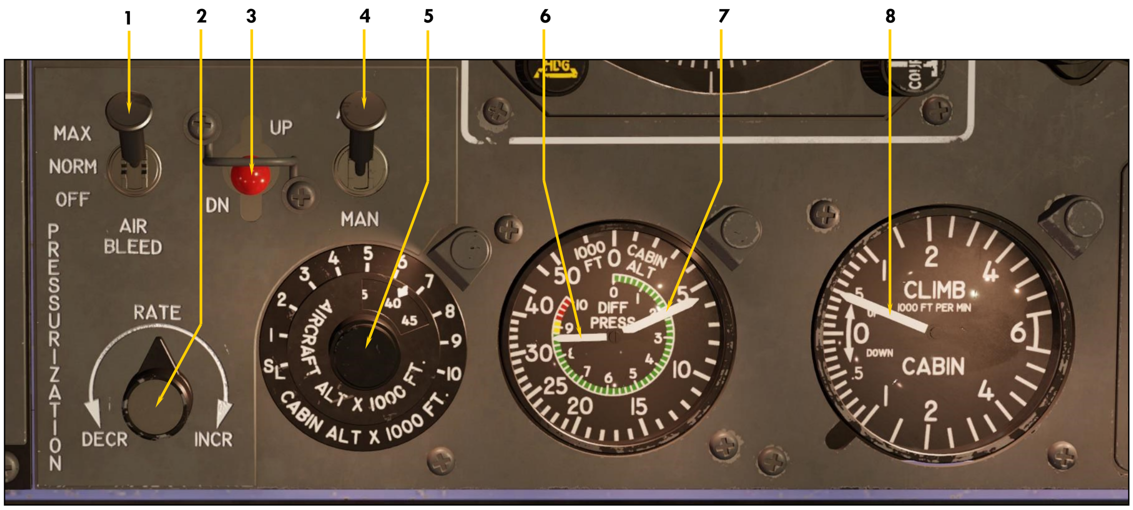


Figure 5-40

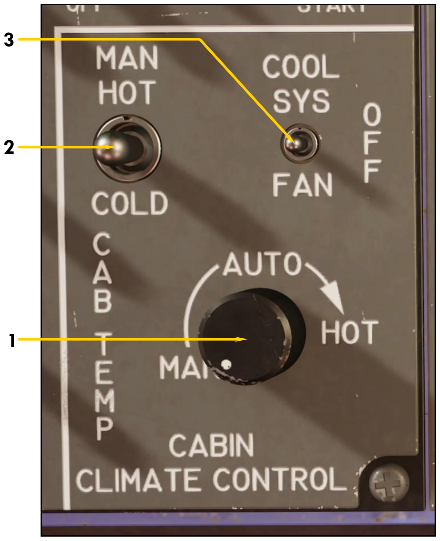
1. Tens of Seconds Readout
2. Time Switch
   - *Position 1* ***(TIME)*** *selects real time in hours, minutes, and seconds.*
   - *Position 2* ***(F.T.)*** *selects flight time, in hours, minutes and seconds of actual flight time. The flight time recorder will start as soon as the aircraft leaves the ground. It will stop when the aircraft lands and touches the ground. The flight time can be zeroed only by having aircraft power off and moving the stopwatch switch [9] to the* ***ZERO*** *position. The pilot can have total flight time on a trip with a number of stops if he avoids returning the fight time recorder to zero.*
   - *Position 3* ***(E.T.)*** *selects elapsed time in hours, minutes, and seconds. This is the stopwatch mode of operation. The recorder can be started, stopped, and reset to zero with the stopwatch switch [9]. It will continue to operate even if the aircraft power is off.*
3. Hours Readout
4. Tens of Hours Readout
5. Set Switch
   - *Position 1 (**UP**) is a momentary position to increment the clock one minute forward.*
   - *Position 2 (**SET**) is the normal position.*
   - *Position 3 (**D**) is a momentary position to reset seconds to zero.*
6. Dim Switch
   - *Position 1 (**B**) is the "bright" position of the display for daytime use.*
   - *Position 2 (**DIM**) is the "dim" position of the display for nighttime use.*
   - *Position 3 (**1hr up**) is a momentary position to increment the clock one hour ahead.*
7. Tens of Minutes Readout
8. Minutes Readout
9. Stopwatch Switch
   - *Position 1 (**ZERO**) is a momentary position to set the elapsed time recorder to zero. Use this position to reset the flight time recorder to zero when aircraft power is off.*
   - *Position 2 (**STOP**) will stop the elapsed time recorder.*
   - *Position 3 (**RUN**) will start the elapsed time recorder.*
10. Seconds Readout

Note: *No aircraft voltage is necessary for the clock to operate. The clock has its own internal battery. Aircraft power is required to illuminate the LED display only.*



PRESSURIZATION PANEL
Figure 5-41

1. Bleed Air Switch
   *Bleed air from the engine compressor section is necessary for cabin pressurization, wing/stabilizer heat, windshield heat, cabin temperature control and hydraulic reservoir pressurization. This switch should be set to **NORM** or **MAX** for the duration of the flight, but to **OFF** during ground operations (unless required).*
2. Auto Rate Control Knob
   Use this knob to control the rate at which the cabin climbs or descends when in auto mode. In auto mode, the cabin controller maintains the desired rate of climb or descent until the selected cabin altitude is attained. Use the mouse wheel to decrease or increase the rate. Click to reset the knob to its center position.
3. Manual Rate “Cherry Picker” Control Switch (partially simulated)
   Use this switch to control the rate at which the cabin climbs or descends when in manual mode. Manual mode can be used in case of a cabin controller malfunction. The switch can be used to increase or decrease the cabin altitude in either the automatic or manual mode. Please note that the manual mode is not available in Prepar3D. The cabin controller always maintains the desired rate of climb or descent until the selected cabin altitude is attained. Use the mouse wheel to decrease or increase the rate. Click to reset switch to its center position.
4. Pressurization Mode Switch
   (partially simulated)
   *Use this switch to select the auto or manual mode of pressurization. The switch is normally set to **AUTO** (manual mode is not available in Prepar3D). In auto mode, the cabin controller automatically regulates cabin pressure and maintains the desired rate of climb or descent until the selected cabin altitude is attained.*
5. Target Altitude Selector Knob (Cabin Altitude Controller)
   Rotating this knob aligns an index between two scales. The outer scale represents the cabin altitude, and the inner scale (seen through a window) represents the target aircraft altitude. Simply set the knob for flight plan altitudes on the inner scale before takeoff and during flight, and for the destination field elevation before descent. When in auto mode, the cabin controller regulates cabin pressure in relation to the altitude that is set on the altitude selector knob. Please note that the manual mode of operation is not available in Prepar3D. The cabin controller always maintains the desired rate of climb or descent until the selected cabin altitude is attained.
6. Cabin Differential Pressure Needle
   Indicates the cabin differential pressure (the difference of pressure between the cabin and the outside air) in PSI. Design cabin pressure: 10 psi. Max. differential pressure: 8.9 psi.
7. Cabin Altitude Needle
   Pressure inside the cabin is normally referred to as “cabin pressure altitude”.
8. Cabin Rate Needle (VSI)
   Indicates the cabin climb or descent rates, between 0 and 6,000 feet per minute.



CABIN TEMPERATURE CONTROL PANEL
Figure 5-42

1. Automatic Mode Cabin Temperature Control Knob
   Turning the knob fully counterclockwise will result in manual temperature control. Use this knob to adjust temperature when in auto mode. Make sure to keep the H-Valve position between 1/2 and 3/4. H-Valve movement is observed on the H-Valve Position Indicator [19, fig. 5-37].
2. Manual Mode Cabin Temperature Control Switch
   *Use the mouse wheel to increase or decrease the cabin temperature if the Automatic Mode Cabin Temperature Control Knob [1] is set to **MAN** (leftmost position). Click to reset switch to center position. Make sure to keep the H-Valve position between 1/2 and 3/4. H-Valve movement is observed on the H-Valve position indicator [19, fig. 5-37].*
3. Cooling System Selector Switch (n/s)
   In the real aircraft, this switch selects either the fan or the Freon-type air conditioner for the cooling system.

Note: *Cabin temperature selection will affect the H-Valve [19, fig. 5-37] position. In the real aircraft, cabin temperature control is assumed by conditioning the engine bleed air used for pressurization. The H-Valve controls the amount of engine bleed air that passes through the heat exchanger. The cabin heating system can be controlled manually or automatically.*

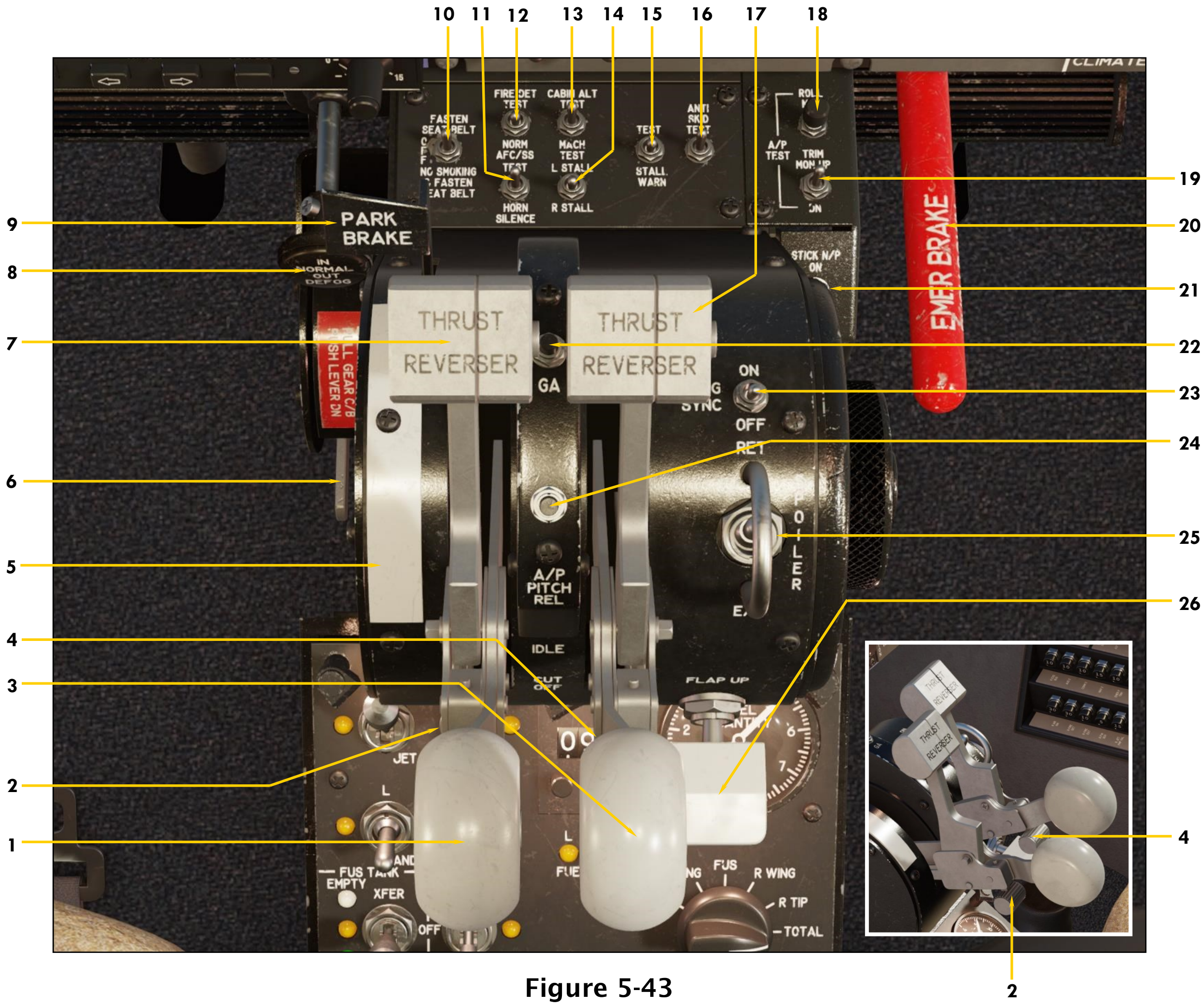


Figure 5-43

1. Left Throttle Lever
*Actuate this lever beyond the **IDLE** ("**F1**") mark to control thrust (left engine RPM). The Left Throttle Lever will not move if the Left Throttle Release Lever [2] is not raised, like in the real aircraft. Once released, the throttle can be dragged or moved with "**F2/F3**".*
2. Left Throttle Release Lever
*This lever must be raised to open the fuel valve and move the Left Throttle Lever from the **CUT OFF** position to the **IDLE** position or vice versa. During the engine starting sequence, this is normally done around 20% RPM in the simulator (10% in the real aircraft) for the selected engine. Clicking this lever when the engine is started will move the Left Throttle Lever back to **CUT OFF** and will shut off the engine (fuel valve closed).*
3. Right Throttle Lever
Same as [1], but for the right engine.
4. Right Throttle Release Lever
Same as [2], but for the right engine.
5. Show/Hide Throttles Icon
Click to show/hide the throttles and the parking brake lever.
6. Emergency Gear Extension Lever
*This lever is used to extend the landing gear in case of a hydraulic system failure. The Landing Gear Selector Switch [5, fig. 5-30] should be placed in the **DWN** position prior to using the lever. The emergency air tank [4, fig. 5-39] supplies compressed air to operate the emergency gear extension system.*
7. Left Thrust Reverser Subthrottle
*Use this lever to deploy or stow the thrust reversers and to control engine RPM in reverse. The aircraft must be on the ground, the thrust reversers armed [see 7-8, 13-14, fig. 5-36] and the throttle must be at **IDLE** ("**F1**") before the Thrust Reverser Subthrottle can be moved ("**F2/F3**").*
8. Windshield Defog Knob
*External windshield defogging is accomplished by **pulling out** the Windshield Defog Knob. This will allow hot bleed air from the engine to enter the ex-*

Continued on next page...

*ternal defog outlets and to heat the windshield if the Windshield Heat Switches [4, fig. 5-4] are properly set. When the knob is **pushed in**, hot bleed air will be directed to the crew footwarmers (normal position). Requires the Bleed Air Switch [1, fig. 5-41] to be set to **NORM** or **MAX**.*

9. Parking Brake Lever
   *Parking brake is set by **pulling** this lever that traps hydraulic pressure in the brake assemblies.*
10. No Smoking/Seatbelts Switch
11. AFCSS/Horn Silence Test Switch
    *In the simulator, setting this 3-position switch to **AFC/SS** will test all the bulbs in the autopilot and flight director lights and annunciators. In the real aircraft, this position is used to test the autopilot stability system. Setting this switch to **HORN SILENCE** will silence most audible alerts. Default position is **OFF** (middle position).*
12. Fire Detection Test Switch
    *Set this switch to **FIRE DET TEST** to test the continuity of the sensing elements and control units of the fire detection system. This will cause the fire panel lights to illuminate or to flash. Return the switch to **NORM** to end the test.*
13. Cabin Alt Warning/Mach Test Switch
    *When set to **CABIN ALT**, this 3-position switch is used to test the cabin altitude alert. When set to **MACH TEST**, this switch is used to test the overspeed warning system and alert, and the stick puller. The Stick Nudger/Puller Switch [21] must be set to **ON** prior to testing the stick puller. Default position is **OFF** (middle position).*
14. Stall Warning Test Vane Selector Switch
    This switch is used for selecting which stall warning system to test with the Stall Warning System Test Switch (15).
15. Stall Warning System Test Switch
    *This switch is used in conjunction with the Vane Selector Switch [14] to test the stall warning system, the stick shaker, and the stick nudger. The Stall Warning Switches [4, 6, fig. 5-29] must be set to **ON** and AC power must be available. The Stick Nudger/Puller Switch [21] must be set to **ON** prior to testing.*
16. Anti-Skid Test Switch
    *With the Anti-Skid Power Switch [8, fig. 5-29] set to **ON**, this 3-position switch is used to test the anti-skid system installed on each inboard or outboard wheel of the main landing gear, depending on the switch position. Under normal conditions, the four Anti-Skid Generator Lights [5, fig. 5-15] should be off. Testing the anti-skid systems will cause some of the lights to illuminate, each light representing one wheel. Reset the switch to its middle (**OFF**) position after performing the tests.*
17. Right Thrust Reverser Subthrottle
    Same as [7], but for the right engine.
18. Autopilot Roll Monitor Test Button
    *This button is used to test the autopilot disengage function when an improper signal is introduced to the roll function. The button has two positions: hold to **TEST** and a spring-loaded **OFF** position. Pushing this button to **TEST** will disengage the autopilot.*
19. Autopilot Pitch Trim Monitor Switch
    *This 3-position switch is used to test the autopilot disengage function when an improper signal is introduced to the pitch function. The switch is spring-loaded to the **OFF** position. Setting this switch to **UP** or **DN** will disengage the autopilot.*
20. Emergency Brake Lever (partially simulated)
    This lever will set the parking brake (no emergency brake is provided in Prepar3D).
21. Stick Nudger/Puller Switch
    *In the simulator, this switch is used to activate or deactivate the stick nudger/puller (see section 6, page 41). When the switch is set to **ON** and the autopilot is engaged, the stick nudger will be activated if a stall condition is detected, and the stick puller will be activated if an overspeed condition is detected. The switch is set to **ON** by default.*
22. Autopilot Go-Around Button
    Depressing this button disengages the autopilot pitch and roll hold modes (if the autopilot is engaged) and engages the Takeoff/Go-around mode. Throttles automatically advance to takeoff power, wings level, vertical speed is set to 4,500 fpm, and the flight director indicates takeoff pitch. The TO/GA mode can be used for takeoff, or for a go-around on landing. Releasing the button disengages the TO/GA mode and engages the ATT Hold mode if the autopilot is engaged.
23. Engine Sync Switch
    *This switch is used to synchronize the left engine RPM with the right engine RPM. The switch must be set to **OFF** for takeoff, landing, descent, single engine operation, and below 70% RPM. Engine synchronization for jet engines is not available in Prepar3D. However, we've programmed the throttles so that the right lever will stick to and follow the left lever if both throttle levers are close to one another when the switch is set to **ON**. This will synchronize both engine RPMs.*
24. Autopilot Pitch Release Button
    When depressed, this button disengages the autopilot pitch hold modes and the SPD/MACH Hold mode. Releasing the switch engages the ATT Hold mode, maintaining the airplane's pitch attitude.
25. Spoilers Switch
    *When this switch is set to **EXT**, the spoilers extend and the SPOILER annunciator [7, fig. 5-32a] illuminates on the main annunciator panel. The full extension is about 40º. Returning the switch to **RET** causes the spoilers to fully retract and the annunciator to go off. Like in the real aircraft, spoiler deployment is programmed to cause a nose down pitching moment which should be anticipated. Spoilers are electrically controlled and hydraulically actuated.*
26. Flap Selector Switch
    *Click or use the mouse wheel to extend or retract the flaps. In the simulator, four flap positions are provided: **Full Up**, **8° down**, **20° down** and **full down (40°)**. An audible alert will sound if the flaps are extended beyond 25º, and the landing gear is not down and locked. Flaps are electrically controlled and hydraulically actuated.*

Figure 5-44a

1. Fuel Control Panel (Model 25)
2. Flight Controller (AFCS/Autopilot)
3. Emergency Lights Panel
4. Yaw Damper System Panel
5. 8-Track Tape Player
6. Trim Indicators Panel

Note: *Except for the fuel panel, the center pedestal for the Basic cockpit configuration is identical in the Model 28.*

Figure 5-44b

1. Fuel Control Panel (Model 28)
2. Flight Controller (AFCS/Autopilot)
3. Yaw Damper System Panel
4. ADF1/ADF2 Radio
5. Transponder (Backup)
6. Emergency Lights Panel
7. Trim Indicators Panel

Note (1): *The 8-Track Tape Player is located under the copilot's main instrument panel in the GTN750 cockpit.*

Note (2): *Except for the fuel panel, the center pedestal for the GTN750 cockpit configuration is identical in the Model 25.*

FUEL CONTROL PANEL
Model 25

Figure 5-45a

1. Fuel Jettison Switch and Lights
This switch is used to jettison fuel from the wing tip tanks. The lights are illuminated when the fuel jettison valves are open.
2. Crossflow (Crossfeed) Valve Light
In the simulator, this light indicates that the cross-feed valves are in transit.
3. Crossflow (Crossfeed) Switch
In the simulator, this switch controls the crossfeed valves that allow fuel from one wing tank to feed the opposite or both engines by "isolating" the other wing tank. Used in conjunction with the Standby Pump Switches [8-9].
4. Fuselage Tank Full Light
*When the Fuselage Tank Switch [6] is set to **FILL**, this green light will come on if the fuselage tank is full.*
5. Fuselage Tank Valves Light
This light indicates that the fuselage tank valves are in transit.
6. Fuselage Tank Switch
*In the simulator, this switch, when set to **XFER**, is used to feed the engines from the fuselage tank when fuel in the main wing tanks is critically low. Normally set to **OFF**.*
7. Fuselage Tank Empty Light
*When the fuselage tank switch is set to **XFER**, this white light will come on if the fuselage tank is empty.*
8. Right Standby Pump Switch and Light
*Controls the right boost pump. Used for cross-feeding fuel or in case of a jet pump failure. Normally **OFF**.*
9. Left Standby Pump Switch and Light
*Controls the left boost pump. Used for cross-feeding fuel or in case of a jet pump failure. Normally **OFF**.*
10. Left Motive Flow Valve Light
If the position of the valve does not correspond to the position of the switch, the light will come on.
11. Left Jet Pump Switch (Fuel Pump)
*Should be **ON** for the duration of the flight. Allows motive flow to the wingtip/wing tank jet pumps.*
12. Right Jet Pump Switch (Fuel Pump)
*Should be **ON** for the duration of the flight. Allows motive flow to the wingtip/wing tank jet pumps.*
13. Right Motive Flow Valve Light
If the position of the valve does not correspond to the position of the switch, the light will come on.
14. Fuel Counter Reset Button
This button, when depressed, resets the Fuel Counter [15] to zero.
15. Fuel Counter
This counter indicates the total amount of fuel burned (in pounds) since the last engine start or reset. Often called a "fuel totalizer".
16. Fuel Tank Selector Knob
This selector knob enables the pilot to read the remaining fuel quantity in each of the five tanks as well as the total system quantity, on the Fuel Quantity Gauge [17].
17. Fuel Quantity Gauge
This gauge indicates the remaining fuel quantity (as weight) for the selected tank or for the total system.

Note: *Refer to "**20 Series Fuel System**" in section 6, page 22, for a complete discussion about the fuel system.*

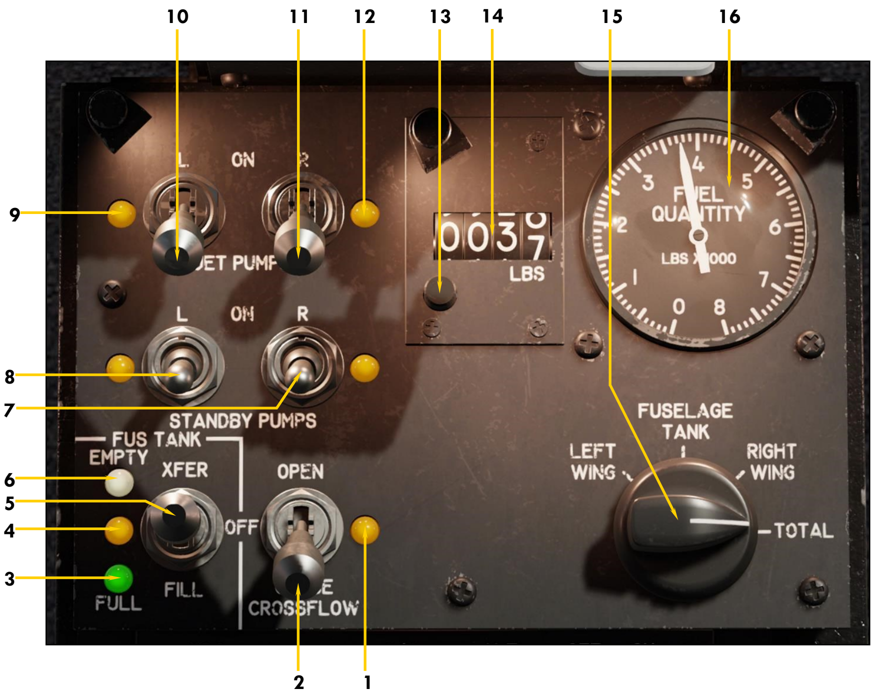


Figure 5-45b

1. Crossflow (Crossfeed) Valve Light
In the simulator, this light indicates that the crossfeed valves are in transit.
2. Crossflow (Crossfeed) Switch
In the simulator, this switch controls the crossfeed valves that allow fuel from one wing tank to feed the opposite or both engines by "isolating" the other wing tank. Used in conjunction with the Standby Pump Switches [7-8].
3. Fuselage Tank Full Light
When the Fuselage Tank Switch [5] is set to FILL, this green light will come on if the fuselage tank is full.
4. Fuselage Tank Valves Light
This light indicates that the fuselage tank valves are in transit.
5. Fuselage Tank Switch
*In the simulator, this switch, when set to **XFER**, is used to feed the engines from the fuselage tank when fuel in the main wing tanks is critically low. Normally set to **OFF**.*
6. Fuselage Tank Empty Light
*When the fuselage tank switch is set to **XFER**, this white light will come on if the fuselage tank is empty.*
7. Right Standby Pump Switch and Light
*Controls the right boost pump. Used for crossfeeding fuel or in case of a jet pump failure. Normally **OFF**.*
8. Left Standby Pump Switch and Light
*Controls the left boost pump. Used for crossfeeding fuel or in case of a jet pump failure. Normally **OFF**.*
9. Left Motive Flow Valve Light
If the position of the valve does not correspond to the position of the switch, the light will come on.
10. Left Jet Pump Switch (Fuel Pump)
*Should be **ON** for the duration of the flight. Allows motive flow to the wingtip/wing tank jet pumps.*
11. Right Jet Pump Switch (Fuel Pump)
*Should be **ON** for the duration of the flight. Allows motive flow to the wingtip/wing tank jet pumps.*
12. Right Motive Flow Valve Light
If the position of the valve does not correspond to the position of the switch, the light will come on.
13. Fuel Counter Reset Button
This button, when depressed, resets the Fuel Counter [14, below] to zero.
14. Fuel Counter
This counter indicates the total amount of fuel burned (in pounds) since the last engine start or reset. Often called a "fuel totalizer".
15. Fuel Tank Selector Knob
This selector knob enables the pilot to read the remaining fuel quantity in each of the three tanks as well as the total system quantity, on the Fuel Quantity Gauge [16].
16. Fuel Quantity Gauge
This gauge indicates the remaining fuel quantity (as weight) for the selected tank or for the total system.

***Note:** Refer to "**20 Series Fuel System**" in section 6, page 22, for a complete discussion about the fuel system.*

Figure 5-46

1. A/P (Autopilot Engage) Button and Light
Engages the autopilot, captures, and maintains the aircraft's pitch attitude and levels the wing. The autopilot assumes aircraft control.

2. Turn Command Knob
With the autopilot engaged, this knob will command bank angles, but will disengage any horizontal mode. Use the mouse wheel to control the bank. Click the knob to center both the knob and the ailerons, and to level the wing.

3. REV CRS (Reverse Course Approach Mode) Button and Light
The REV CRS button engages the autopilot's Back Course Approach mode, enabling automatic tracking of a localizer (or GPS) back course for instrument approaches. When engaged, the function is like the APPR mode, except the glideslope is disabled and the autopilot's response to a localizer signal is reversed.

4. NAV (Navigation Hold Mode) Button and Light
Engages the Navigation Hold mode, the autopilot automatic tracking of a VOR course, GPS course, or localizer for navigation.

5. HDG (Heading Hold Mode) Button and Light
Engages the Heading Hold mode. The autopilot will turn the airplane as necessary and fly a heading selected by the position of the Heading Bug on the HSI [2, 11, fig. 5-8].

6. G/S ARM (Glideslope Tracking Mode) Button and Light
When the G/S ARM button is depressed, the autopilot will capture and track the ILS glideslope signal.

7. ALT (Altitude Hold Mode) Button and Light
Engages the Altitude Hold mode. The aircraft climbs/descends to the altitude set on the Altitude Preselector [2-3, fig. 5-11a] at the rate set on the Vertical Speed Selector [1, 3, fig. 5-12].

8. Autopilot OFF Light
The amber Autopilot OFF Light is illuminated anytime the AFCS has power available, but the autopilot is not engaged.

9. Autopilot ON Light
The green Autopilot ON Light is illuminated when the autopilot is engaged with any pitch and/or roll mode engaged.

10. Pitch Command Wheel
With the autopilot engaged, rotating the Pitch Command Wheel will change the airplane's pitch attitude up or down. Click the knob to reset, maintain the pitch and level the wing.

11. Primary Yaw Damper OFF Button
*Depressing the **YAW DAMPER OFF** Button will disengage the primary yaw damper system.*

12. Primary Yaw Damper ON Button
*The **YAW DAMPER ON** Button engages the primary yaw damper system which helps eliminate unwanted aircraft yaw and keeps turns coordinated.*

Note: *Refer to section 6, page 32, for a complete discussion about the AFCS, the autopilot and the flight director.*

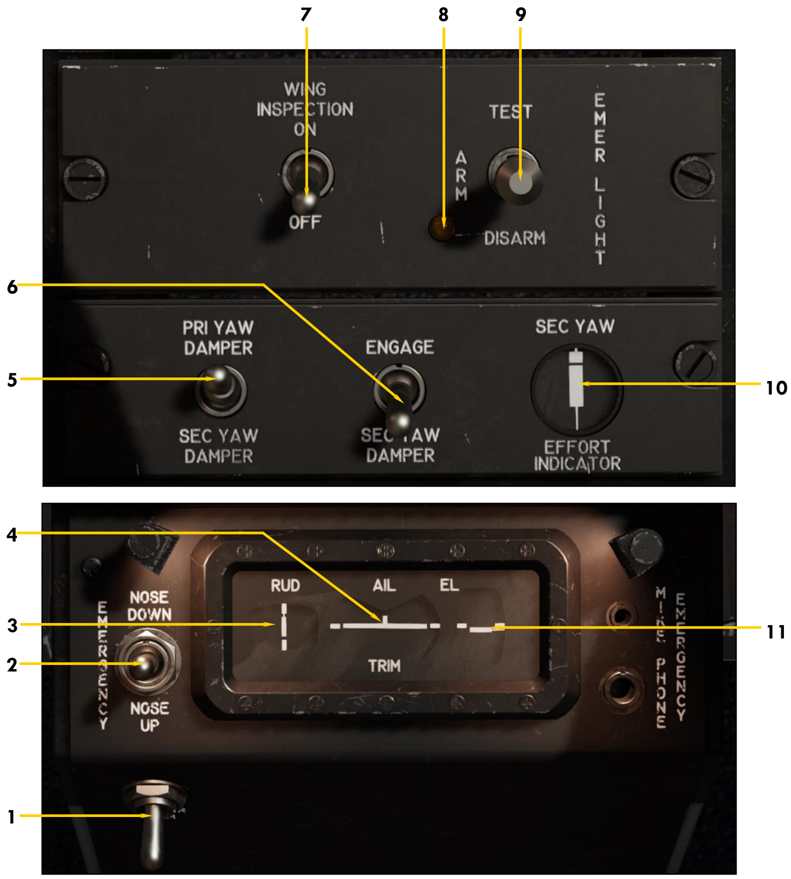
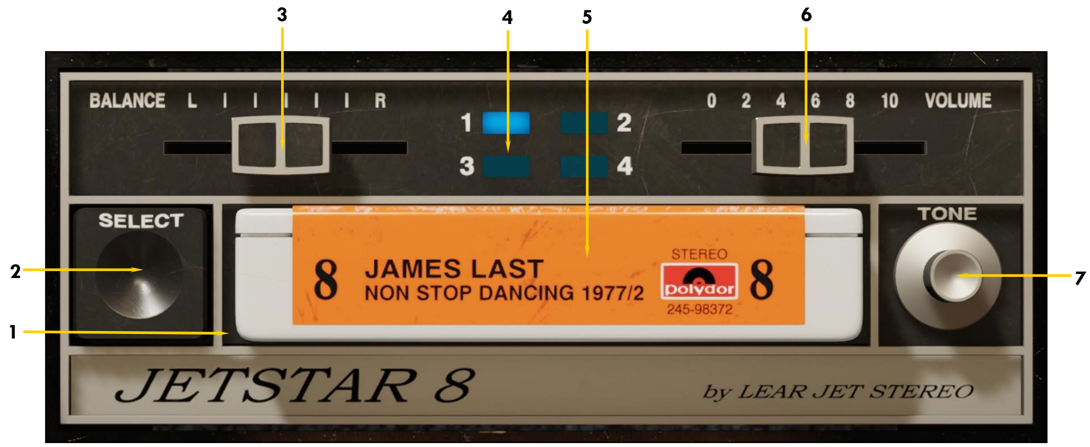


Figure 5-47

1. Rudder Trim Control Switch
   This switch is used for trimming the rudder. Use the mouse wheel to trim, click to center the switch.
2. Emergency Pitch Trim Control Switch
   *This switch is used in case of a failure of the primary trim system. The Emergency Pitch Trim Switch [3, fig. 5-29] should be set to **EMER** for the emergency pitch trim system to energize. Use the mouse wheel to trim, click to center the switch.*
3. Rudder Trim Indicator
4. Aileron Trim Indicator
5. Yaw Damper Selector Switch
   *This switch selects the primary yaw damper system when set to **PRI YAW DAMPER** and the secondary yaw damper system when set to **SEC YAW DAMPER**. The GLJ Model 25/28 v4 addon is equipped with a dual (primary and secondary) yaw damper system, like in the real aircraft. Each system is completely independent and only one yaw damper system can be engaged at a time.*
6. Secondary Yaw Damper Switch
   *This switch engages or disengages the secondary yaw damper system in case of an emergency. To engage the secondary yaw damper system, the Yaw Damper Selector Switch [5] must be set to **SEC YAW DAMPER**. Selecting the primary yaw damper system will disengage the secondary yaw damper system.*
7. Wing Inspection Light Switch
   The GLJ Model 25/28 v4 addon is equipped with a right-wing inspection light that is normally used for ice detection on the wing.
8. Emergency Lighting System OFF Warning Light
   *This amber light indicates that the emergency lighting system is not armed. The Emergency Lights Switch [9] should be set to **ARM** prior to takeoff.*
9. Emergency Lights Switch
   *This switch, when set to **ARM**, arms the self-powered emergency cabin lighting system that illuminates the cockpit and the cabin in case of a DC power failure. In the simulator, the system will turn on the cabin ceiling lights in case of a power failure. Set the switch to **TEST** to test the system.*
10. Rudder Activity Indicator
    In the simulator, this indicator shows rudder activity. A yaw damper effort indicator is not available in Prepar3D.
11. Elevator Trim Indicator
    Takeoff trim is typically one needle thickness below neutral.



LEAR JET STEREO
JETSTAR 8 STEREO 8-TRACK TAPE PLAYER
A tribute to the inventive genius of Bill Lear.

Figure 5-48

1. Cartridge Player Door
   Click the door to insert an 8-track tape cartridge into the player.
2. Track Selector Button
   Click to switch tracks. A Lear Jet Stereo 8-track cartridge (a format largely adopted by the music industry and major electronics and car manufacturers from the mid-1960's to the late 1970's) has four stereo tracks. On some real players, tracks can be played continuously - in a loop - or they can switch automatically to the next track when finished playing. When the last track is finished playing, the music can stop or the player can switch to and start playing the first track again, depending on the user's preferences. One of the main purposes of the 8-track player is to play music in a loop, continuously, without the need to rewind the tape or switch side. In the simulator, each track is played in a loop and the pilot needs to switch tracks manually by clicking this button.
3. Balance Control Cursor (n/s)
   Currently not available in Prepar3D.
4. Track LED Indicators
   Indicates which stereo track is playing (1-4).
5. Stereo 8-Track Tape Cartridge
   To push the cartridge in and play the music, use the mouse wheel (up). To pull the cartridge out and stop the music, use the mouse wheel (down). Click the 8-track tape cartridge to eject (remove) the cartridge from the player.
6. Volume Control Cursor (n/s)
   *Currently not available in Prepar3D. Use your sound system or computer audio controls instead. Cockpit sounds can also be adjusted in Prepar3D (Prepar3D > Top Menu Bar > Options > Sound > **Volume Levels** > **Cockpit**).*
7. Tone Control Knob (n/s)
   On a real player, this cursor will adjust the "tonal quality" (bass and treble combined) of the audio output. This is currently not available in Prepar3D.

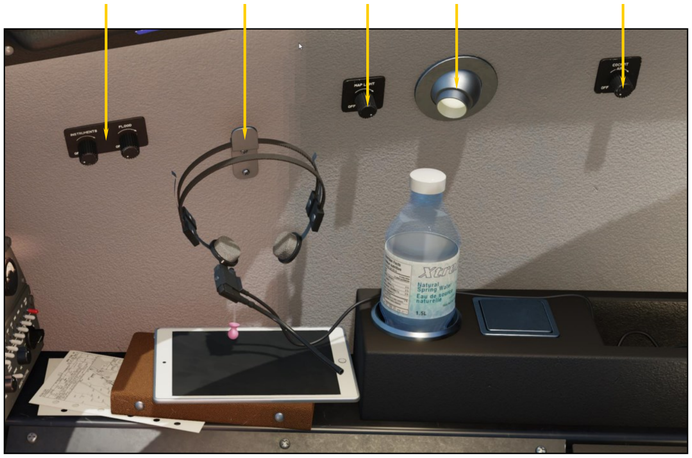
Note (1): *The 8-Track Tape Player is located under the copilot's main instrument panel in the GTN750 cockpit. In the GTN750 cockpit, the player can be removed by clicking the breaker marked "**STEREO**" in the captain's breaker panel.*

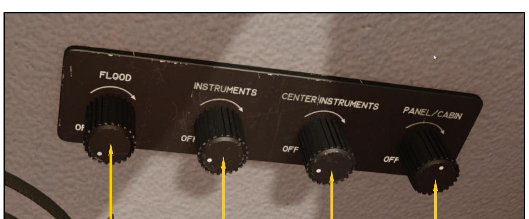
Note (2): *The 8-Track Tape Player requires DC power. Refer to section 4, page 5, for instructions on how to play your own music with the 8-Track Tape Player when flying your GLJ Model 25/28 v4 addon in the simulator.*

Figure 5-49

1 2 3 4 5 6

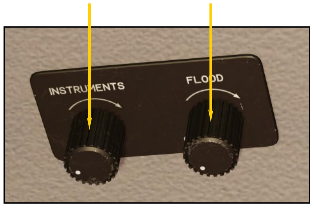
7 5 8 9 10





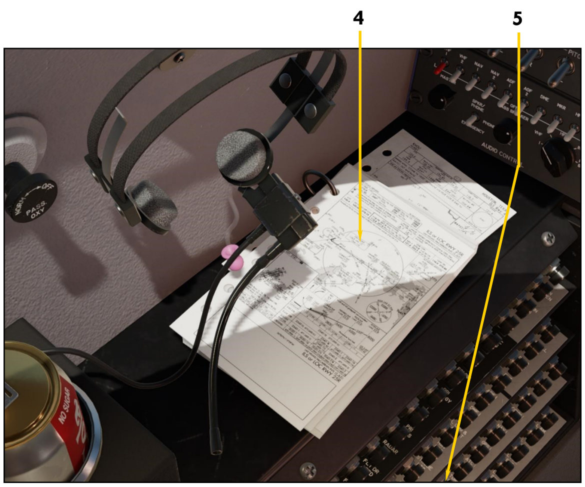
11 12 13 14

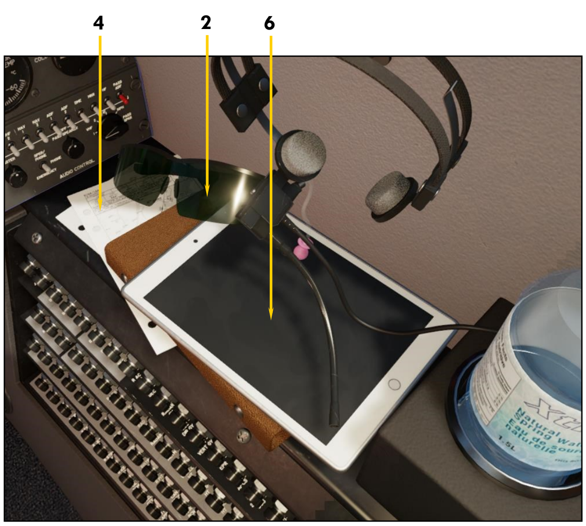
15 16



***Note:** Refer to "**Cockpit and Cabin Lighting System**" in section 6, page 7, for more details about cockpit lights and dimmers.*

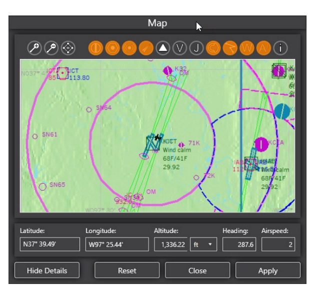
1. Captain's Map Light Dimmer
   Rotate to adjust the brightness of the captain's map light (off/low/high).
2. Passenger Oxygen Mask Valve
   *This valve is normally set to **AUTO**. Rotating this valve to **MAN** with the Passenger Oxygen Flow Valve [4] set to **NORM**, oxygen will be provided to the passenger masks.*
3. Captain's Map Light
4. Passenger Oxygen Flow Valve
   *This valve, when normally set to **NORM**, will automatically deliver oxygen to the passengers if the cabin altitude reaches 14,000 feet and DC power is available. In the real aircraft, the passenger masks will be deployed and the cabin lights will illuminate. If the valve is set to **OFF**, oxygen will not be available to the passengers. Oxygen is provided to the crew at all times. The crew distribution system consists of the pilot's and copilot's oxygen masks stowed on the pilot's and copilot's sidewalls. In the simulator, with only the crew being provided with oxygen, and the oxygen tank [2, fig. 5-39] filled to 1,500 psi, oxygen will last for about 120 minutes. With the crew and seven passengers being provided with oxygen, oxygen will last for about 30 minutes. Click the Oxygen Pressure Gauge [2, fig. 5-39] to fill the oxygen tank to 1,500 psi, if needed.*
5. Headphone Hanger
   Click to show/hide the flight crew. When the head-phones and seatbelts are visible, the pilots are absent from the cockpit.
6. Captain's Light Dimmers
7. Copilot's Light Dimmers
8. Copilot's Map Light Dimmer
   Rotate to adjust the brightness of the captain's map light (off/low/high).
9. Copilot's Map Light
10. Cockpit Fan Control Knob
11. Captain's Flood Lights Dimmer
    Rotate to adjust the brightness of the panel flood lights that are located under the glareshield, on the captain's side (off/low/high).
12. Captain's Instrument Lights Dimmer
    Rotate to adjust the brightness of the instrument lights, the panel post lights and the instrument eyebrows on the captain's side (off/low/high).
13. Center Instruments Lights Dimmer
    Rotate to adjust the brightness of the instrument lights, the panel post lights and the instrument eyebrows on the center panel and center pedestal (off/low/high).
14. Panel Lights Dimmer
    Rotate to adjust the brightness of the panel back lights (0-100% brightness). Left or right click to adjust the brightness of the cabin and cockpit ceiling lights (off/low/high).
15. Copilot's Instrument Lights Dimmer
    Rotate to adjust the brightness of the instrument lights, the panel post lights and the instrument eyebrows on the copilot's side (off/low/high).
16. Copilot's Panel Flood Lights Control
    Rotate to adjust the brightness of the panel flood lights that are located under the glareshield, on the copilot's side (off/low/high).



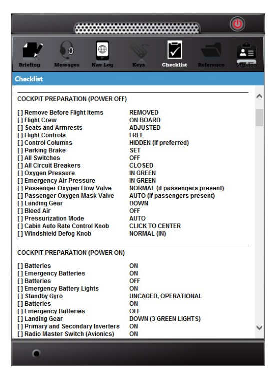


MISCELLANEOUS COCKPIT ITEMS
Figure 5-50

1. Sun Visor Hinge
   Click and drag the hinge to slide the sun visor along the track.
2. Pilot's Sunglasses
   Click the pair of sunglasses on the copilot's right console (or the whisky compass housing or correction card) to show or hide the pilot's sunglasses. When the sunglasses are visible on the copilot's right console, the pilots are not wearing sunglasses.
3. Sun Visor
   Click the green plastic flap to lower or to raise the sun visor.
4. Flight Map
   Click the charts to open the Prepar3D flight map.
5. Unused Breakers (not shown)
   The first four unused breakers at the bottom of the captain's breaker panel have special hidden functions related to the simulation. See section 4, page 8, for details.
6. Kneeboard
   Click the tablet on the copilot's right console to show or hide the Prepar3D kneeboard.



Map



Kneeboard

Figure 5-51

1. Control Yoke
   Click the Learjet 25/28 logo at the center of the yoke on the captain's side to select the captain that appears in the cockpit of the exterior model. Click the Learjet 25/28 logo on the copilot's side to select the copilot. You can choose between three different pilots. Crew must be aboard the aircraft.
2. Wheel Master Button
   Click this momentary push button to engage electrical nose gear steering (up to 10˚ in either direction below 45 knots). A green annunciator [14, fig. 5-32a] will illuminate on the main annunciator panel. Click the switch again to disengage electrical nose wheel steering (the green annunciator will go off). In the real aircraft, this switch, when held depressed, will engage the wheel master mode (steering of 40˚ to 50˚ in either direction, for taxi up to 10 knots). Nose wheel steering is initiated automatically in Prepar3D when taxiing at speeds lower than approx. 45 knots. Above 45 knots, the nose gear will lock (see 7, fig. 5-4 and appendix 7, pages 3-4).
3. Four-Way Trim Switch Arming Button
   When the center button on the four-way trim switch is momentarily depressed, the AP pitch and roll modes are disengaged. Releasing the button maintains the pitch and levels the wing.
4. Four-Way Trim Switch (n/s)
   In the real aircraft, when the autopilot is engaged and with the center arming button depressed, this four-position switch is used to trim the control surfaces in both pitch and roll. This can be configured on your controller (joystick or yoke).
5. Maneuver Control Button
   Depressing this button momentarily disconnects the AP pitch, roll and speed hold modes. Releasing the button maintains the pitch and levels the wing.
6. Pitch Sync Button
   When depressed, this button disengages the autopilot pitch and speed hold modes. Releasing the button maintains the pitch and levels the wing.
7. Stick Shaker Motor-Vibrator
   (not shown)
   Actuation of the stick shaker causes low-frequency, high-amplitude vibration in the control column. This is used in conjunction with the stall warning system and the stick nudger.

Figure 5-52

1. Side Entry Light
   Click the Entry Lights Switch [3] to turn the light on/off.
2. Liquors
   Click the door to open or close.
3. Entry Lights Switch
   Click the switch to turn the entry lights [1; 11, fig. 5-56] on/off.
4. Cabin Lights Dimmer
   Rotate dimmer to adjust the brightness of the cabin and cockpit ceiling lights [5, fig. 5-54] (off/low/high).
5. Snacks
   Click the door to open or close.
6. Cups and Coffee
   Click the door to open or close.
7. No Smoking/Seatbelts Sign
   *See "**No Smoking/Seatbelts Switch**" [10, fig. 5-43]*
8. Food
   Click the door to open or close.
9. First Aid
   Click the door to open or close.
10. Refrigerator
    Click the refrigerator door (glass or frame) to open or close.
11. Toilet Seat Cover
    Click the toilet seat cover to open or close.
12. Toilet Seat
13. Window Blind
    Use the mouse wheel to open or close the blind to any position.
14. Sink
15. Towels
    Click the door to open or close.
16. Trash
    Click the door to open or close.

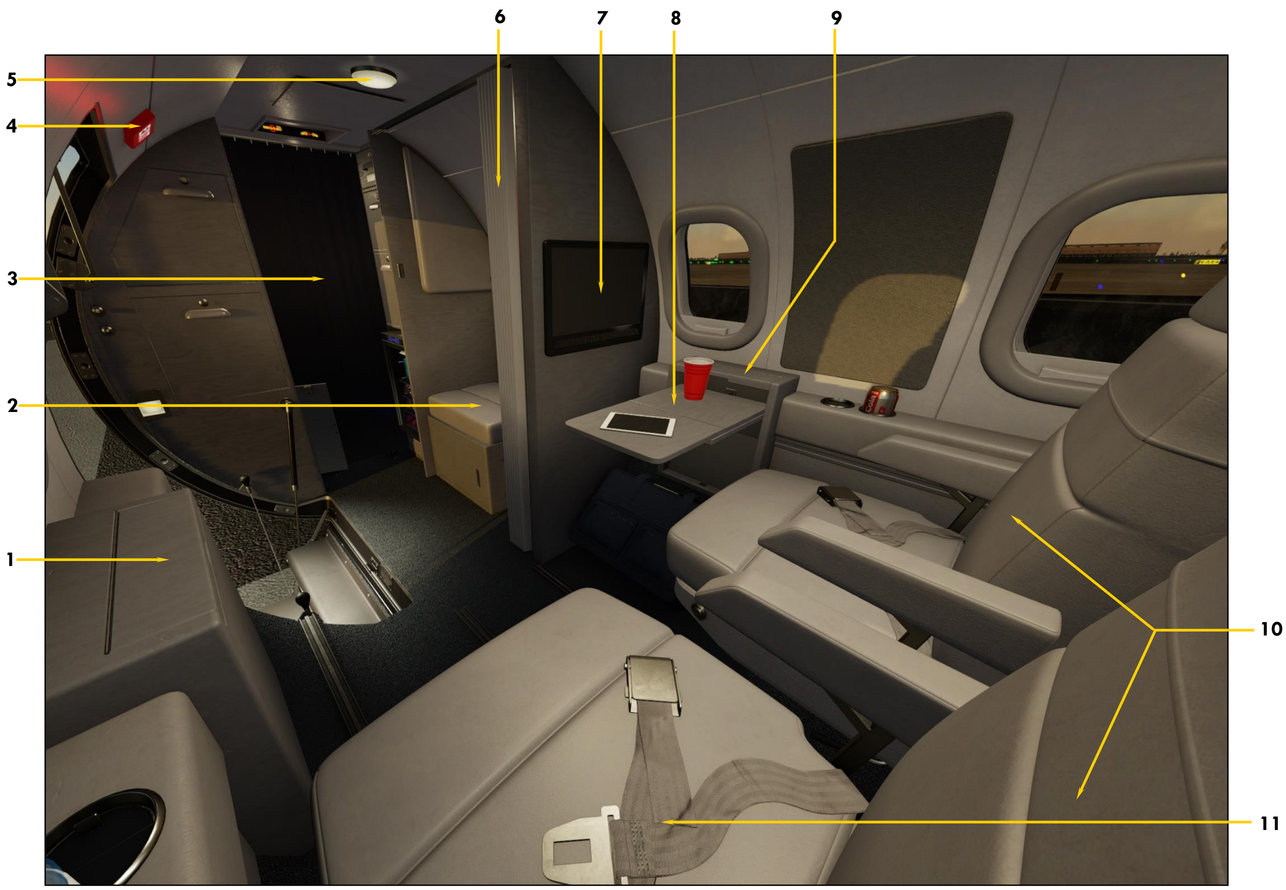


Figure 5-53

1. Table Cabinet (table is closed)
   Click the top section of the cabinet to open or close the table. Tables cannot be opened when their corresponding seat is folded.
2. Toilet Seat Cover
   Click the toilet seat cover to open or close.
3. Cockpit Curtain
   Click the curtain to open or close.
4. Exit Light
   Needs DC power.
5. Cabin Ceiling Light
   Rotate the Cabin Lights Dimmer [4, fig. 5-52] to adjust the brightness of the cabin and cockpit ceiling lights (off/low/high).
6. Toilet Door
   Click the toilet door to open or close.
7. Cabin TV
   Click the logo at the bottom of the screen to turn the TV on/off. The Cabin TV screen is a standard Prepar3D gauge that displays a static image. Users can create their own images to replace the default image. The default gauge can also be replaced by any custom or third-party gauge that is compatible with Prepar3D. Refer to appendix 2, page 27, for more information.
8. Passenger Table
9. Table Cabinet (table is open)
   Click the top section of the cabinet to open or close the table. Tables cannot be opened when their corresponding seat is folded.
10. Passenger Seat Backrest (normal)
    Use the mouse wheel on the backrest to fold or unfold the seat. Seats cannot be folded when their corresponding table is open.
11. Passenger Seatbelts

Figure 5-54

1. Window Blind
Use the mouse wheel to open or close the blind to any position.
2. Passenger Table
Click the top section of the cabinet to open or close the table. Tables cannot be opened when their corresponding seat is folded.
3. Passenger Seat Backrest (normal)
Use the mouse wheel on the backrest to fold or unfold the seat. Seats cannot be folded when their corresponding table is open.
4. Passenger Reading Lights
Click the on/off button or the entire light fixture to turn the reading light on/off.
5. Cabin Ceiling Lights
Rotate the Cabin Lights Dimmer [4, fig. 5-52] to adjust the brightness of the cabin and cockpit ceiling lights (off/low/high).
6. A/C Blower Duct (with diverters)
7. Passenger Rear Seat Backrest (folded)
Use the mouse wheel on the backrest to fold or unfold the seat. Seats cannot be folded when their corresponding table is open.
8. Passenger Rear Seat Backrest (normal)
Use the mouse wheel on the backrest to fold or unfold the seat. Seats cannot be folded when their corresponding table is open.
9. Passenger Seat Backrest (folded)
Use the mouse wheel on the backrest to fold or unfold the seat. Seats cannot be folded when their corresponding table is open.

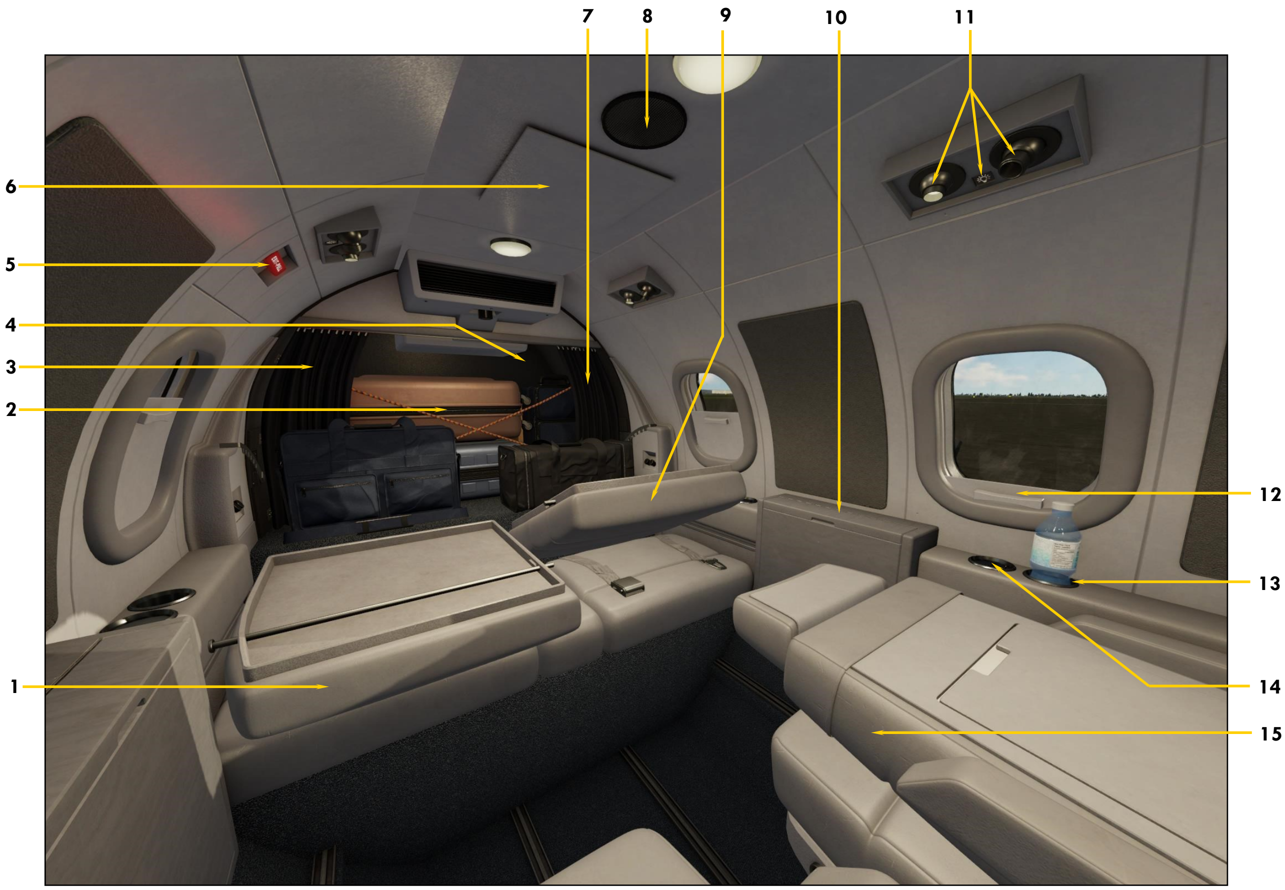


Figure 5-55

1. Passenger Seat Backrest (folded)
   Use the mouse wheel on the backrest to fold or unfold the seat. Seats cannot be folded when their corresponding table is open.
2. Baggage Compartment
3. Baggage Compartment Curtain
   Click the curtain to open or close.
4. Baggage Compartment Lights (both sides, not shown)
   Rotate the Cabin Lights Dimmer [4, fig. 5-52] to adjust the brightness of the cabin and cockpit ceiling lights, and of the baggage compartment lights (off/low/high).
5. Emergency Door Handle and Light
   Light needs DC power.
6. Oxygen Mask Compartment
7. Baggage Compartment Curtain
   Click the curtain to open or close.
8. Cabin Speaker
9. Passenger Rear Seat Backrest (folding)
   Use the mouse wheel on the backrest to fold or unfold the seat. Seats cannot be folded when their corresponding table is open.
10. Table Cabinet (table is closed)
    Click the top section of the cabinet to open or close the table. Tables cannot be opened when their corresponding seat is folded.
11. Passenger Reading Lights (and Air Vents)
    Click the on/off button or the entire light fixture to turn the reading light on/off.
12. Window Blind (fully open)
    Use the mouse wheel to open or close the blind to any position.
13. Cup Holder
14. Ashtray
15. Passenger Seat Backrest (folded)
    Use the mouse wheel on the backrest to fold or unfold the seat. Seats cannot be folded when their corresponding table is open.

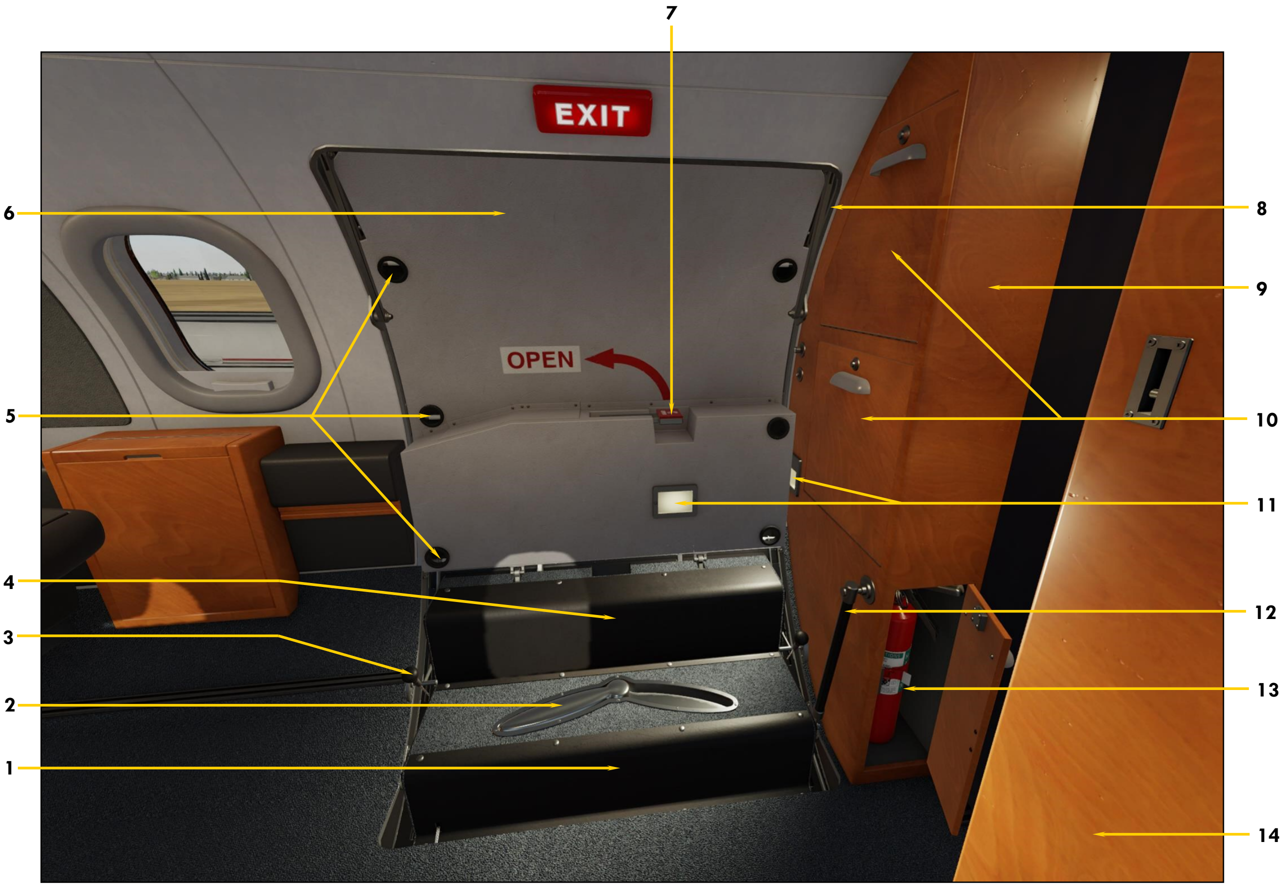


Figure 5-56

1. Lower Door
2. Lower Door Locking Handle
   *Click to open/close the passenger and crew door (or "**SHIFT+E**").*
3. Lower Door Support Cable Handle (both sides)
4. Lower Door Rubber Carpet
   Click to show/hide the flight crew.
5. Lock Pin Inspection Windows
6. Upper Door
7. Upper Door Handle
   *Click to open/close the passenger and crew door (or "**SHIFT+E**").*
8. Upper Door Torsion Bar
9. Utility Cabinet
10. Cabinet Door
    Click the door to open or close.
11. Entry Light (side and upper door)
    Click the Entry Lights Switch [3, fig. 5-52] to turn the lights on/off.
12. Lower Door Damper and Torsion Bar
13. Fire Extinguisher
    Click the door to open or close.
14. Toilet Compartment Wall

Figure 5-57

1. Lower Door (Step Half)
Click the rubber carpet to show/hide the flight crew.
2. Lower Door Locking Handle
*Click to open/close the passenger and crew door (or "**SHIFT+E**").*
3. Lower Door Support Cable and Handle (both sides)
4. Lower Door Damper and Torsion Bar
5. Entry Light (side)
Click the Entry Lights Switch [6; 3, fig. 5-52] to turn the light on/off.
6. Cabin Lights Dimmer (top) and Entry Lights Switch (bottom)
Click the Entry Lights Switch to turn the entry lights on/off. Rotate the Cabin Lights Dimmer to adjust the brightness of the cabin and cockpit ceiling lights (off/low/high).
7. Upper Door Torsion Bar
8. Upper Door
9. Entry Light (upper door)
Click the Entry Lights Switch [6; 3, fig. 5-52] to turn the light on/off.
10. Upper Door Handle
*Click to open/close the door (or "**SHIFT+E**").*
11. Locking Pin Inspection Windows
12. Lower Door Torsion Bar
13. Lower Door Retainer

SYSTEMS DESCRIPTIONS

SECTION 6

20 SERIES AIRCRAFT SYSTEMS

The following pages contain important information about the aircraft systems that are included with the Xtreme Prototypes GLJ Model 25/28 v4 SE addon for Prepar3D.

Although the virtual model is inspired by the classic Gates Learjet 20 Series aircraft family, there are some differences in systems when compared to the real aircraft. These differences are due mainly to software limitations in the simulation platforms.

Unless otherwise noted, the following systems are simulated to conform as closely as possible to the operation of the real aircraft, within the limitations and capabilities of the currently available simulation platforms:

- Flight controls
- Stall/overspeed warning systems with stick nudger/puller and stick shaker
- Electrical system
- Cockpit and cabin lighting systems with independent controls and dimmers, including emergency lighting
- Emergency batteries (not available in Prepar3D, APU used to simulate batteries instead)
- Ground power unit (Prepar3D GPU)
- Hydraulic system (including functional electric auxiliary hydraulic pump)
- Landing gear, anti-skid system, differential brakes
- Fuel system (including cross-feeding, and wingtip tanks fuel jettison system on the Model 25)
- CJ610-8A Power plant
- Fire detection and suppression system

- Pneumatic (high pressure), bleed air, pressurization, and environmental control systems
- Air conditioning and cabin temperature (H-valve) system
- Anti-ice system (fully simulated, with ice effects on the windshield, windows, and exterior aircraft surfaces)
- Automatic flight control system (AFCS) with autopilot, flight director, dual yaw damper and speed/Mach hold modes *(the Lear J.E.T. autopilot is retrofitted to be fully functional in GPS/GNS/GTN mode and compatible with the Prepar3D autopilot)*
- RVSM system, complete with digital altimeters/altitude preselectors (ADDUs) with blue VFD display, analog standby altimeter, and control panel
- Caution and warning system (annunciator panel)
- Avionics, radios, and classic navigation systems (COM1, COM2, NAV1, NAV2, ADF1, ADF2, transponder, DME, marker beacons)
- GPS (default Prepar3D)
- Programmable GNS 530, GTN 750, generic weather radar and transponder (3D models only, need third-party software to be fully operational)
- Ground proximity warning system (GPWS)
- Emergency gear extension system
- Crew and passenger oxygen system
- Passenger and crew door (fully animated)

Nearly all systems, gauges, switches, light indicators, and instruments are fully functional and behave like their original counterparts found in the real aircraft, unless otherwise noted.

Tooltips are provided for each interactive device in the virtual cockpit and can be used for cockpit familiarization (identifying the instruments, gauges and switches and memorizing their location on the different panels).

Below is a basic description of the most important systems, followed by complete discussions about the anti-ice system, the fuel system and the automatic flight control system installed in this software version.

Additional information about controls, switches, gauges, lights, and annunciators can be found in section 5.

Refer to section 8 for detailed operating procedures.

Flight Controls

The GLJ Model 25/28 v4 addon is equipped with manually powered primary flight control systems. These consist of the elevator, ailerons, and rudder. The secondary systems are either electric (stabilizer and other trims) or hydraulic (flaps and spoilers). The controls are balanced to provide reasonable effort and feel for the pilot.

The aircraft should be controlled with only constant and light movements of the joystick/

yoke. The controls should never be pushed hard and should be properly trimmed at all times.

Remember: *Trims are there to help you, but they are not primary flight controls. As a qualified pilot, you should hold the desired attitude with the controls and trim until the effort is gone. Do not let go of the controls and use trim to get the required attitude. This is sloppy flying and can lead to loss of control, especially with this aircraft.*

Refer to section 3, fig. 3-1 to fig. 3-4, for the location of the different flight control surfaces on the Gates Learjet Model 25/28.

Electrical System

The add-on aircraft's electrical system consists of a single 24-volt NiCad battery (instead of dual batteries like in the real aircraft – not supported in Prepar3D), a main battery bus, a battery charging bus, two 28-volt DC/400-amperes engine-driven starter-generators, two main DC buses, two essential DC buses, two 115-volt AC/1,000VA inverters, one auxiliary inverter, two AC buses and associated transformers, switches and gauges.

Note: *In Prepar3D, because of the limitation mentioned above, both Left and Right Battery Switches [8-9, fig. 5-30] are linked together.*

During normal operation, the generators supply DC power to the left and right DC buses where most components are connected and to the avionics bus, which powers most flight instruments, including the GPS and the communication and navigation radios. The generators also charge the battery.

Note: *Extra buses were added to the electrical system in this software version to better conform to the real aircraft and as a workaround to the rather basic electrical system that comes with Prepar3D.*

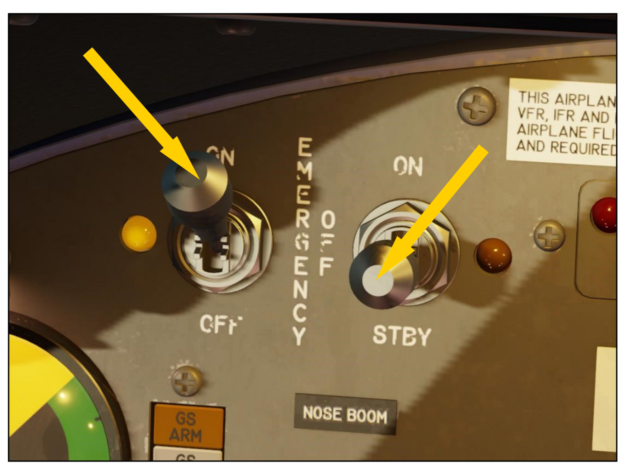
Two inverters (devices that convert DC current to AC current) provide 115 VAC (or 26 VAC through transformers) to different aircraft systems, including the radar. These are called the primary and secondary inverters. An auxiliary inverter is also installed for safety purposes since critical instruments depend on AC power to tell up from down.

Note: *The radar needs at least one Inverter Switch [5, 10, 12, fig. 5-29] to be turned* ***ON*** *to work (it needs both DC and AC power). The avionics (radios, transponder, navigation systems) only requires DC power and the Radio Master (avionics) Switch [14, fig. 5-29] to be turned* ***ON****, like in the real aircraft.*

Electrical control switches and meters are in the center section of the main instrument panels [fig. 5-28 to fig. 5-30].

The instrument panel is also equipped with a standby gyro horizon [fig. 5-16], powered by two emergency batteries when DC power is not available from the main DC buses. This means that in case of a loss of battery and generators, the pilot will have attitude indication for as long as the emergency batteries last (typically enough for a precautionary landing).

The dual emergency battery system is controlled with two power switches at the top of



the captain's instrument panel [2-3, fig. 5-15].

***Note:** Emergency batteries are not available in Prepar3D. As a workaround, we have replaced them with the auxiliary power supply that comes with Prepar3D. The APU (or in our case the emergency batteries) when engaged, will supply power to the critical aircraft systems.*

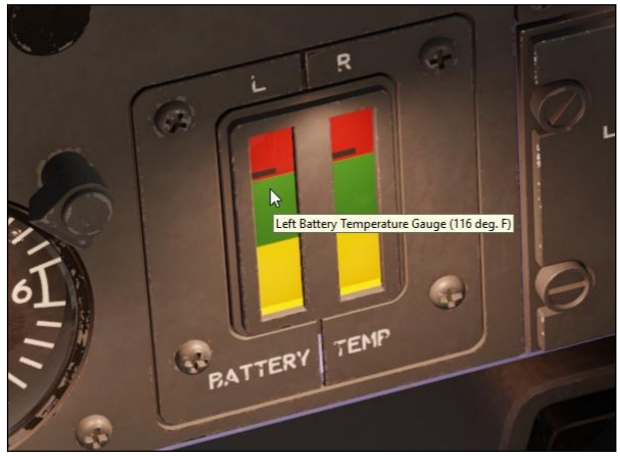
Ground Power Unit (GPU)

The GLJ Model 25/28 v4 addon comes with a ground power unit (GPU) that supplies 28 VDC to the aircraft during maintenance, training, and preflight procedures. The GPU is available when the aircraft is on the ground and not moving.

To preserve battery power during ground procedures up until the engines have started and the generators turned on, it is strongly suggested to use an external power source to power up the aircraft.

You can click the **aileron on the left wingtip tank** of the Model 25 [19, fig. 3-1] or the **leading edge of the left winglet** of the Model 28 [20, fig. 3-3] on the exterior model to call for a ground power unit. To start the GPU, click the **GPU control panel cover** [4, fig. 3-5]. To show/hide and start/shut off the GPU, you can also click the Ground Power Unit Breaker (see section 4, page 8) at the bottom of the captain's breaker panel in the virtual cockpit.

The GPU must be **SHUT OFF** and **DISCONNECTED (HIDDEN)** after the engines have started and the generators are turned on.



Very Important!

- Like in the real aircraft, **do not turn on the battery switches** [8-9, fig. 5-30] when the batteries are fully charged, and the GPU (or the generators) are operating to prevent the NiCad batteries from overheating. **This may cause a fire!**

Hydraulic System

The hydraulic system [3, fig. 5-39] consists of two engine-driven hydraulic pumps and a backup fluid reservoir. The hydraulic system powers the landing gear and brakes, the flaps, and the spoilers. Like the real aircraft, the addon is also equipped with an electric auxiliary hydraulic pump [19, fig. 5-29] for operations on the ground or in case of emergency.

Landing Gear

The landing gear is of the tricycle, retractable type, and is electrically controlled and hydraulically operated. The main gear has dual wheels while the nose gear has a single, steerable wheel. An emergency air system is provided to extend the landing gear in case of hydraulic or electrical failure [6, fig. 5-43; 4, fig. 5-39].

The main gear is equipped with multi-disc hydraulic brakes controlled by an anti-skid computer, sensors, and modulator valves. The anti-skid system [8, fig. 5-29] provides maximum braking performance.

The nose gear incorporates an electrical steering system that can be engaged by the pilot [7, fig. 5-4]. The rudder is inoperative when electric nose gear steering is engaged, and the aircraft is on the ground, like in the real aircraft.

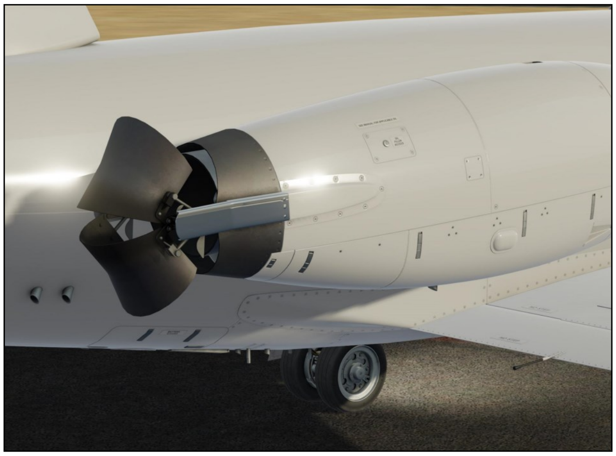
Note: *In Prepar3D, nose wheel steering when taxiing is initiated automatically, and at slower speeds only, whether it is engaged by the pilot manually or not. Nose wheel steering will not work above a certain speed. Because this is controlled by the simulator, there is very little we can do about it until more options to control nose wheel steering at any speed become available. When taxiing, you will need to reduce speed to initiate nose wheel steering (under about 45 knots). Above that speed, the nose gear will lock.*

Power Plant

Like the real aircraft, the GLJ Model 25/28 v4 addon is equipped with the reliable General Electric CJ610-8A single-spool turbojet engine. Rated at 2,950 lbs. static thrust per side at sea level, the CJ610 provides the aircraft with fighter-like performance (especially at low weights). It was said that a lightly loaded 20 Series aircraft could outperform the legendary Lockheed T-33!

The single-spool turbojet engine will produce higher thrust at altitude than a modern turbofan engine with similar ratings. This makes the 20 Series aircraft well-suited for high altitude flight. The downside is that fuel consumption and noise are far greater. The GLJ Model 25/28 v4 addon is no exception, so plan adequate fuel for your trip (see "**Flight Planning**", in section 7)!

Thrust Reversers



The GLJ Model 25/28 v4 addon is equipped with fully modeled Dee Howard target thrust reversers consisting of upper and lower clamshell doors, pivoted near the engine centerline. The reverser's doors are hydraulically actuated and electrically controlled.

The thrust reversers are an additional deceleration system which may be used anytime the airplane is on the ground to produce shorter stopping distances.

***Note:** Because of current limitations in Prepar3D, thrust reverser controls have limited functionalities in this software version. In the simulator, thrust reversers can be deployed by pressing the "**F2**" key when the throttles are set to **IDLE**, and the aircraft is on the ground. When deployed, thrust can be reduced by pressing the "**F3**" key. Pressing the "**F1**" key will return both throttles and thrust reverser subthrottles to **IDLE**, under certain conditions. In the simulator, thrust reversers are always armed when the aircraft is on the ground. In the GLJ Model 25/28 v4 addon, reverse thrust is limited to 85% RPM, like in the real aircraft.*

Fire Detection and Suppression System

Each engine nacelle is equipped with a fire detection system. Two fire extinguisher bottles in the fuselage may discharge to either engine as needed. Each engine has its own fire control panel installed in the glareshield [fig. 5-33 to fig. 5-35].

Refer to "**Abnormal/Emergency Procedures**", in section 9, for more details.

***Note:** In the current simulation platforms, the two-bottle fire-extinguishing system is common to both engines. Either of two bottles of extinguishing agent can be discharged to either engine, or both bottles can be discharged to the same engine.*

Environmental Control System

The Gates Learjet Model 25/28 is meant to operate at high altitudes, where the air is thin and very cold. The addon is therefore equipped with a high-performance pressurization system, like the real aircraft.

The pressurization system bleeds high-pressure air from the engine compressors and the dorsal RAM air inlet [8, fig. 3-1; 8, fig. 3-3] and directs it into the cabin to maintain pressurization. The pressure is regulated through an outflow valve slaved to the pressurization controller [5, fig. 5-41].

Before takeoff and during flight, the pilot sets the target altitude of the flight, and the pressurization controller will take care of the

rest. Manual adjustment of the automatic cabin climb/descent rate is available via a control knob [2, fig. 5-41] on the pressurization panel. The “cherry picker” switch [3, fig. 5-41] controls the cabin rate when in “manual” mode.

Note: *The manual mode of operation is not available in Prepar3D. The cabin controller always maintains the desired rate of climb or descent until the selected cabin altitude is attained.*

Bleed air is quite hot as it leaves the engine. This heat is used to control cabin temperature as well. By mixing hot bleed air with bleed air cooled in a heat exchanger, a comfortable cabin temperature can be obtained.

The mixing of these two airflows takes place in the so-called “H-valve” [19, fig. 5-37]. As the cabin temperature is set on the temperature control panel [fig. 5-42], make sure to monitor the H-valve position indicator accordingly.

Cockpit and Cabin Lighting System

The cockpit and cabin lighting system in the GLJ Model 25/28 v4 addon is very similar to lighting system in the real aircraft and consists of:

- Two cabin entry lights
- Cabin and cockpit ceiling lights, and luggage compartment lights
- Passenger reading lights
- Captain’s and copilot’s map lights
- Main instrument panel left and right (yellow) flood lights

- Captain’s instrument lights and post lights
- Center instrument lights and post lights
- Copilot’s instrument lights and post lights
- An emergency lighting system with its own battery
- Instrument panel lights and annunciators
- Backlit instrument panels

All lights except the cabin entry lights and ceiling lights are connected to the main DC bus, like in the real aircraft. They require the battery switches [8-9, fig. 5-30] to be turned on (or the generators/GPU/emergency batteries to be operational).

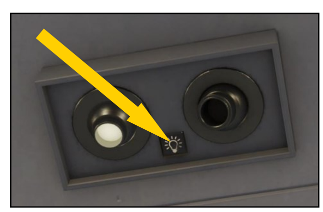
The cabin entry lights [11, fig. 5-56] and ceiling lights (including the luggage compartment lights) [5, fig. 5-54] are connected to the hot battery bus. They don’t require the battery switches to be turned on, or the generators/GPU/emergency batteries to be operational. Therefore, it is possible to turn on the entry lights and the ceiling lights before the aircraft is powered. This is very convenient for the pilots at night to avoid entering a completely dark cockpit.

The cabin entry lights are controlled by the Entry Light Switch [3, fig. 5-52] located on the large wood cabinet near the passenger and crew door. The Cabin Light Dimmer [4, fig 5-52] controls the intensity of the cabin and cockpit ceiling lights, including the rear luggage compartment lights (off/low/high).

Tip

- The cabin and cockpit lights can also be controlled from the cockpit by right/left clicking the Panel Light Dimmer located on the captain’s side wall [14, fig. 5-49].

Passenger’s reading lights [4, fig. 5-54] have their own illuminated switch and can be turned on or off individually.



The captain's and copilot's map lights [3, 9, fig. 5-49] are controlled individually (off/low/high) by their own dimmer on each side of the cockpit, adjacent to the light fixture [1, 8, fig. 5-49].

The yellow flood lights above the main instrument panel are separated into two sections (one on the captain's side and the other on the copilot's side) and are controlled (off/low/high) by separate dimmers on each side of the cockpit [11, 16, fig. 5-49].

Instruments lights and post lights on the main instrument panel and center console are separated into three sections: the captain's side, the center section, and the copilot's side. Each section has its own independent dimmer (off/low/high) located on each side of the cockpit [12-13, 15, fig. 5-49].

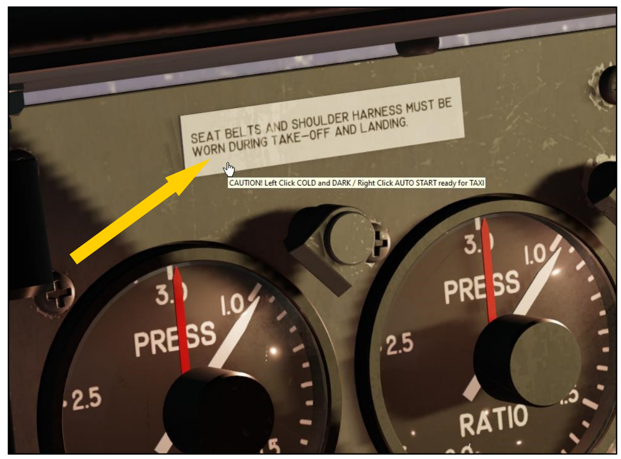
The aircraft is also equipped with an emergency lighting system connected to its own battery located under the captain's seat. The system will turn on the cockpit and cabin ceiling lights in case of emergency. Controls for the emergency lighting system are located on the center console [8-9, fig. 5-47].

Additional lights and annunciators on the different instrument panels in the cockpit can be tested and dimmed (0-100% brightness) with their dedicated dimmer switch located under the glareshield [31, fig. 5-32a/b]. The landing gear lights have their own independent dimmer [2, fig. 5-30].

Backlit instrument panels can be dimmed (0-100% brightness) with the Panel Light Dimmer [14, fig. 5-49] located on the captain's side wall .

Note: *The GLJ Model 25/28 v4 addon uses real light effects for illuminating the cabin, the cockpit, and the instrument panels. Because of limitations with the dynamic light effects in Prepar3D, cockpit and cabin lights are limited to two intensities (low or high), in addition to their off state. Lights, annunciators and backlit panels on the different instrument panels can be dimmed to any intensity, from 0% to 100%.*

"Cold and Dark" Reset and "Auto Start" Sequence (addon-related)



The white seatbelt label located in the upper center section of the main instrument panel [10, fig. 5-17a; 6, fig. 5-17b] is a hot spot for initiating a "**Cold and Dark**" reset cycle or an "**Auto Start**" sequence.

Cold and Dark Reset

- **Left clicking** the label will shut down the engines and turn off all lights and aircraft systems, including all custom Learjet systems unique to this addon, in less than 10 seconds. The cockpit will be reset to its "Cold and Dark" state and the airplane will be parked.

Auto Start Sequence

- **Right clicking** the label will launch the "Auto Start" sequence. The automatic sequencer will start the engines and set up all aircraft systems ready for taxi. The pilot has nothing to do, but to wait and watch the sequencer perform the required preflight procedures automatically. Buttons, switches, and lights will be animated with sound during the entire sequence. It takes about 80 seconds for the sequencer to perform the necessary pre-flight procedures. The "Auto Start" sequencer goes beyond the simulator's standard CTRL+E command by setting up all Learjet custom systems unique to this addon that are needed for taxi. **We strongly recommend using this feature instead of CTRL+E!**

The two battery indicators (BAT140 and BAT160) in the upper right corner of the annunciator panel [28-29, fig. 5-32b] warn the pilot that the "Cold and Dark" reset cycle or the "Auto Start" sequence is **in progress**. An audio alert will be triggered at the beginning and at the end of both cycles.

It is not possible to initiate both cycles simultaneously for obvious reasons, and although the cycles cannot be stopped when initiated, they can be paused.

DO NOT INITIATE a "Cold and Dark" reset cycle or an "Auto Start" sequence while the aircraft is airborne!

Note: *For version 4, we have separated the scripts for the **Cold and Dark Reset** and **Auto Start Sequence** into distinct XML gauges that can be edited by the user. If you are familiar with RPN scripting and with how XML gauges are created for Prepar3D, **you can add or remove procedures** that are performed automatically when the scripts are executed. We recommend editing these "reset" gauges only if you know what you are doing. Please make backup copies of the gauges before modifying their content. The gauges are in the "Gauges" folder inside the add-on package's main "Content" folder. Depending on the addon you have purchased, the gauges are:*

- *resets_GLJ25_basic.xml*
- *resets_GLJ25_GTN750_x2.xml*
- *resets_GLJ28_basic.xml*
- *resets_GLJ28_GTN750_x2.xml*

Below are the procedures that are performed automatically (by default) during a "Cold and Dark" reset cycle and an "Auto Start" sequence:

Cold and Dark Reset:

- (0 second) Beginning of cycle
- (1 sec.) Flaps **UP**, Spoilers **RETRACTED**
- (2 sec.) Throttles **IDLE**, Simulator's "Engine Auto Shutdown" **INITIATED**
- (3 sec.) Fuel Valves **CLOSED**, throttles **LOCKED**, mixture **LEAN**
- (4 sec.) Starter Generator Switches **OFF**, Air Ignition Switches **OFF**
- (5 sec.) All Lights and Aircraft Systems **OFF**
- (7 sec.) Electrical Systems **OFF**
- (8 sec.) Parking Brake **SET**, Crew **ABSENT**, Passenger and Crew Door **CLOSED**, "Remove Before Flight" Items **INSTALLED**, GPU **DISCONNECTED** and **REMOVED**
- (10 sec.) End of cycle

Auto Start Sequence:

Note: *Although the "Auto Start" sequence can be launched at any time, we recommend initiating a "Cold and Dark" reset cycle before starting the "Auto Start" sequence.*

- (0 second) Beginning of sequence
- (1 sec.) GPU **DISCONECTED** and **REMOVED**, "Remove Before Flight" Items **REMOVED**, Crew **ON BOARD**, Passenger and Crew Door **CLOSED**
- (2 sec.) Parking Brake **SET**
- (3 sec.) Throttles **IDLE**
- (4 sec.) Left Fuel Valve **CLOSED**, Left Throttle **LOCKED**
- (5 sec.) Right Fuel Valve **CLOSED**, Right Throttle **LOCKED**
- (6 sec.) Main Batteries **ON**

- (7 sec.) Rotating Beacon Lights **ON**
- (8 sec.) Left Mixture **RICH**, Left Starter Generator Switch **START**, Simulator's "Engine Auto Start" **INITIATED**
- (33 sec.) Left Starter Generator Switch **GEN**, Right Mixture **RICH**, Right Starter Generator Switch **START**
- (58 sec.) Right Starter Generator Switch **GEN**
- (59 sec.) Fuel Tank Selector Knob **TOTAL**, Left Jet Pump Switch **ON**
- (60 sec.) Right Jet Pump Switch **ON**
- (61 sec.) Primary Inverter **ON**
- (62 sec.) Secondary Inverter **ON**
- (63 sec.) Navigation Lights **ON**
- (64 sec.) Strobe Lights **ON**
- (65 sec.) Left Taxi Light **ON**
- (66 sec.) Right Taxi Light **ON**
- (67 sec.) Anti-Skid Power Switch **ON**
- (68 sec.) Bleed Air Switch **NORM**
- (69 sec.) Pressurization Mode Switch **AUTO**
- (70 sec.) Cabin Altitude Controller **SET FOR APROX. 32,000 FT A/C ALT**
- (71 sec.) Left Stall Warning Switch **ON**
- (72 sec.) Right Stall Warning Switch **ON**
- (73 sec.) Left Thrust Reverser Arm Switch **ARM**
- (74 sec.) Right Thrust Reverser Arm Switch **ARM**
- (75 sec.) Autopilot **OFF**
- (76 sec.) Elevator Trim **SET FOR TAKEOFF**
- (77 sec.) Spoilers **RETRACTED**
- (78 sec.) Flaps **4 DEGREES DOWN FOR TAKEOFF**
- (79 sec.) Nose Wheel Steer Lock Switch **ELECTRIC STEERING ENGAGED**
- (80 sec.) Throttles **IDLE**
- (81 sec.) Parking Brake **RELEASED**
- (83 sec.) End of sequence

Note: *"Cold and Dark" reset and "Auto Start" features are not available in the real aircraft.*

"Remove Before Flight" Items (addon-related)

The "Remove Before Flight" items (ribbons and Pitot covers, wheel chocks, engine inlet covers, tail stand) need to be installed manually after the aircraft is parked. Click the white label above the Anti-Skid Lights in the virtual cockpit [4, fig. 5-15] to install/remove the "Remove Before Flight" items. The items can also be removed by clicking the nose gear doors of the exterior model [41, fig. 3-1; 39, fig. 3-3] when the aircraft is parked.

The "Remove Before Flight" items cannot be installed if the aircraft is not parked, not on the ground or if the starters/engines are running. Please note that the tail stand is installed only when the aircraft is full of fuel (85% or more, CoG near aft limit).

Crew (addon-related)

The captain and the copilot appear by default in the cockpit of the exterior model when the aircraft model is loaded in the simulator.

You can click the lower section of the passenger and crew door [1, fig. 5-57] to bring the crew on board or to make it leave the cockpit after the aircraft is parked. This can be performed from inside the cockpit as well by clicking either headphone hanger [5, fig. 5-49] on the cockpit side walls. When the headphones and the pilot's seatbelts are visible inside the cockpit, the crew is absent. When the headphones and the pilot's seatbelts are not visible, the crew is present.

You can select between three pilots. Switching pilots is done by clicking the Learjet logo at the center of each yoke in the virtual cockpit [1, fig. 5-51] or by clicking each pilot's shirt on the exterior model [2, fig. 3-5]. You can also make your pilots wear sunglasses by clicking the windshield defog outlets on the exterior model [1, fig. 3-5] or the pair of sunglasses located on the copilot's side console in the cockpit [2, fig. 5-50].

For more details about these and other systems, please refer to section 5.

20 SERIES ANTI-ICE SYSTEM

The Xtreme Prototypes GLJ Model 25/28 v4 addon is equipped with a new anti-ice system comparable to the one installed in the real aircraft. Ice buildup on the windshields, the cabin windows, and exterior surfaces is visi-

ble when icing conditions exist during flight (precipitations or visible moisture present, and ram-air temperature below 10 degrees Celsius) or on the ground (precipitations or visible moisture present, and very low exterior temperature).

Note: *Visual ice effects on the windshield and other surfaces can be disabled by the user, if desired. Removing the ice effects does not prevent the aircraft from being physically affected by ice buildup on the wing and other critical surfaces when icing conditions exist, which is controlled by the simulator.*

Tip

- Visual ice effects on the model are enabled by default. To disable the effects, simply click (pull) the Ice Effect Breaker at the bottom of the captain's breaker panel (see section 4, page 8).

All anti-icing equipment must be turned on before icing conditions are encountered to avoid a serious hazard of safety during flight. The Ram Air Temperature Warning Indicator and the Ram Air Temperature Gauge [17-18, fig. 5-37] should be monitored frequently when flying in areas where icing may occur.

Like in the real aircraft, the anti-ice system in the GLJ Model 25/28 v4 addon will prevent ice buildup on:

- The windshield
- The radome
- Pitot probes, angle-of-attack vanes, and static ports
- The leading edges of the wing
- The leading edges of the horizontal stabilizer
- The engines (nacelle inlet front lips, inlet guide vanes and nose cone)

The windshield, the wing leading edges and the engine front frames use engine hot bleed air for de-icing. An alcohol defrosting system is installed in the nose of the aircraft and takes care of the radome and the pilot's windshield if needed. Other components are de-iced through electrically heated systems.

Ice Detection

During daylight operation, ice buildup on the windshields and other surfaces can be visually detected.

At night, red spots from special ice-detection lights located on top of the glareshield be-

come visible on the inside of both the captain's and copilot's windshields. These lights continuously shine on the windshield's interior and are generally unnoticeable during the day or at night when no ice is accumulating. The lights are always turned on when the aircraft is powered.

The red light on the captain's side is located inside the anti-ice airstream coming from the exterior defog nozzles. The red light on the copilot's side is located outside the anti-ice airstream coming from the exterior defog nozzles. For this reason, it is important to monitor the red light on the copilot's side for ice buildup when the windshield defog system is on (heat or alcohol).

Tip

- To turn off the red ice-detection lights, click (pull) the Ice Detection Light Breaker at the bottom of the captain's breaker panel (see section 4, page 8).

The Wing Inspection Light located on the right side of the aircraft [8, fig. 3-2; 9, fig. 3-4] can be turned on to inspect the right wing's leading edge at night. The Wing Inspection Light Switch is located on the center pedestal [7, fig. 5-47]. Recognition lights, installed in the nose of the Model 25's wingtip fuel tanks [23, fig. 3-1] can also be used for detecting ice accumulation on the tanks and wing. The Recognition Lights Switch [9,

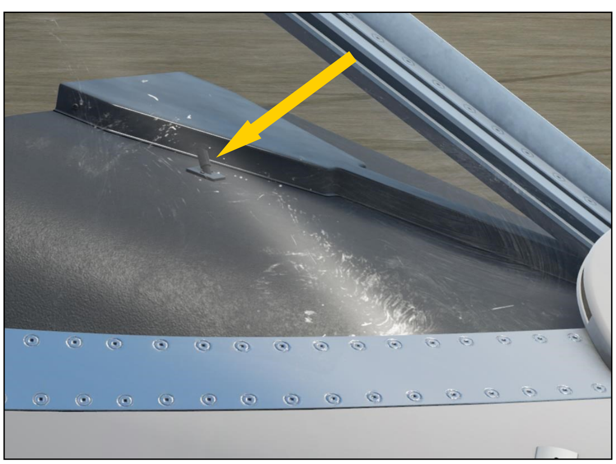


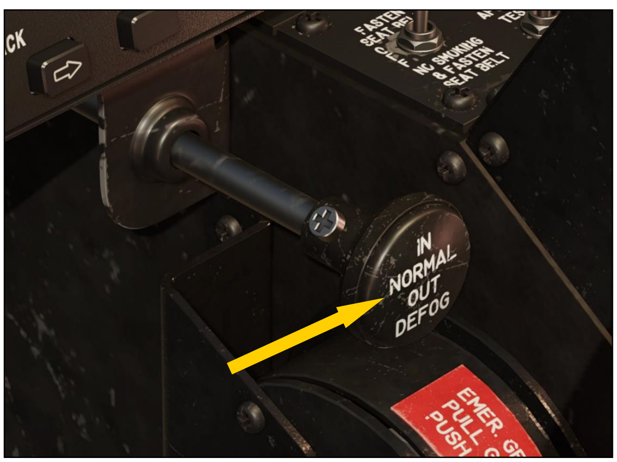
fig. 5-29] is on the electrical panel, in the center section of the main instrument panel.

Windshield Heating System

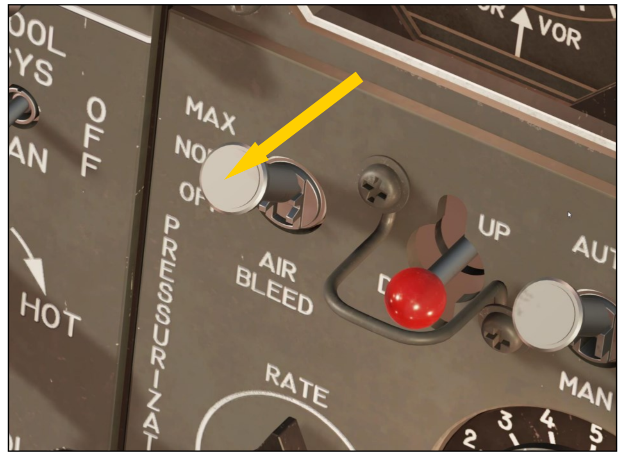
The windshield heating system uses hot bleed air from the engines redirected to exterior defog nozzles located at the base of the windshield [3, fig. 3-1; 3, fig. 3-3]. An alcohol anti-ice system (see page 6-17) can also be used to de-ice/defog the captain's windshield should it becomes necessary.

Note: *In the real aircraft, the windshield heating system can also be used to supplement cockpit heating and to provide an alternate source of air for emergency pressurization.*

The windshield heating system can be controlled either manually or automatically. Switches are provided on the ice protection panel, to the left of the captain's main instrument panel [see fig. 5-4]. Annunciators are also installed on the main annunciator panel [see fig. 5-32a/b].



The Windshield Defog Knob [8, fig. 5-43], located under the captain's main instrument panel, near the throttle quadrant, is used to divert the hot bleed air to the windshield defog nozzles or to footwarmers inside the cockpit. When the knob is pushed in, to its **NORMAL** position, the bleed air is diverted to the cockpit. When the knob is pulled out, to its **DEFOG** position, the hot air is diverted to the windshield. The knob is normally kept pushed in but must be pulled out for heating the windshield.



Hot bleed air from the engine compressor sections is necessary for heating the windshield. The Bleed Air Switch [1, fig. 5-41] on the environmental control panel (located at the bottom of the copilot's main instrument panel) should be set to **NORM** or **MAX** for the system to work. This switch opens or closes the flow control valves that allows bleed air from the engines to enter the cabin and the anti-ice system.

Note: *The Bleed Air Switch should always be set to **NORM** or **MAX** for the duration of the flight, but to **OFF** during ground operations (unless required).*

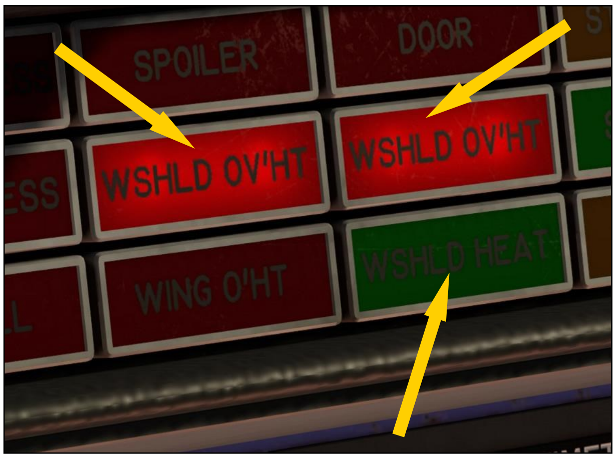
Two important valves are at the base of the windshield heating system: the pressure-regulator valve and the shutoff valve.

The pressure-regulator valve is energized open when the aircraft is powered. It regulates the hot bleed air from the engines to 16 psi.

Two Windshield Heat Switches, marked WSHLD HEAT ON/OFF and WSHLD HEAT AUTO/MAN [4, fig. 5-4], are used concurrently with the Bleed Air Switch and the Windshield Defog Knob to heat the windshield. These switches control the shutoff valve that allows hot bleed air from the engines to enter the windshield heating system.

Automatic Mode of Operation

When the WSHLD HEAT AUTO/MAN switch [4 right, fig. 5-4] is set to **AUTO**, the flow of hot bleed air to the windshield is controlled automatically by two low/high limit thermoswitch-



es installed in each of the exterior defog nozzles. The pilot has nothing to do, except making sure the system is working properly.

When the aircraft is on the ground, if a low limit thermoswitch senses 215˚F, the left or right red Windshield Overheat Annunciator (marked WSHLD OVHT) on the main annunciator panel [8, 11, fig. 5-32a] illuminates, the shutoff valve closes, and the green Windshield Heat Applied annunciator (marked WSHLD HEAT) [12, fig. 5-32a] goes out.

When the aircraft is in flight, the windshield heat cycles off the low limit thermoswitch. When the temperature reaches 215˚F, the left or right red Windshield Overheat Annunciator (marked WSHLD OVHT) on the main annunciator panel illuminates, the shutoff valve closes, and the green Windshield Heat Applied annunciator (marked WSHLD HEAT) goes out. When the thermoswitch cools, the left or right Windshield Overheat Annunciator goes off, the shutoff valve opens, and the green Windshield Heat Applied annunciator (marked WSHLD HEAT) illuminates, and the cycle repeats.

In the real aircraft: *If the low limit thermoswitch fails, the temperature may rise above 250˚F to trigger the high limit thermoswitch and close the pressure-regulator valve. This won't happen with the GLJ Model 25/28 v4 addon.*

To heat the windshield in AUTO mode (engines must be running and the aircraft powered):

1. Bleed Air Switch [1, fig. 5-41] - **NORM** or **MAX**.
2. Windshield Defog Knob [8, fig. 5-43] - Pulled out, to its **DEFOG** position.
3. WSHLD HEAT AUTO/MAN Switch [4 right, fig. 5-4] - **AUTO**.

To stop windshield heating in AUTO mode:

1. WSHLD HEAT ON/OFF Switch [4 left, fig. 5-4] – **OFF.**
2. WSHLD HEAT AUTO/MAN Switch [4 right, fig. 5-4] - **MAN**. The green Windshield Heat Applied annunciator (marked WSHLD HEAT) [12, fig. 5-32a] on the main annunciator panel should go out.

   Or

   Windshield Defog Knob [8, fig. 5-43] - Pulled in, to its **NORMAL** position.

Manual Mode of Operation

When the WSHLD HEAT AUTO/MAN switch [4 right, fig. 5-4] is set to **MAN**, the shutoff valve can be opened or closed manually with the WSHLD HEAT ON/OFF 3-position switch [4 left, fig. 5-4] .

With the WSHLD HEAT ON/OFF switch set to **ON**, the shutoff valve opens. When the switch is set to **OFF**, the shutoff valve closes. Nothing happens when the switch is held to **NEUTRAL** (its middle position). **For this reason, it is necessary to reset the switch to OFF to close the shutoff valve if it was previously set to ON (and vice-versa).**

Note: *In the real aircraft, this switch is* *spring loaded to **NEUTRAL** and must be held to the ON or OFF position to open or close the shutoff valve.*

When the valve is open or not fully closed, the green Windshield Heat Applied annunciator [12, fig. 5-32a] on the main annunciator panel illuminates. This indicates that heat is applied to the windshield.

To heat the windshield in MANUAL mode (engines must be running and the aircraft powered):

1. Bleed Air Switch [1, fig. 5-41] - **NORM** or **MAX**.
2. Windshield Defog Knob [8, fig. 5-43] - Pulled out, to its **DEFOG** position.
3. WSHLD HEAT AUTO/MAN Switch [4 right, fig. 5-4] - **MAN**.
4. WSHLD HEAT ON/OFF Switch [4 left, fig. 5-4] – **ON.** The green Windshield Heat Applied annunciator (marked WSHLD HEAT) [12, fig. 5-32a] on the main annunciator panel should illuminate.

To stop windshield heating in MANUAL mode:

1. WSHLD HEAT ON/OFF Switch [4 left, fig. 4-4] – **OFF.** The green Windshield Heat Applied annunciator (marked WSHLD HEAT) [12, fig. 5-32a] on the main annunciator panel should go out.

   Or

   Windshield Defog Knob [8, fig. 5-43] - Pulled in, to its **NORMAL** position.

When the aircraft is on the ground, if a low limit thermoswitch senses 215˚F, the left or red Windshield Overheat Annunciator (marked WSHLD OVHT) [8, 11, fig. 5-32a] on the main annunciator panel illuminates, but the shutoff valve and the pressure-regulator valve do not close, and the green Windshield Heat Applied annunciator (marked WSHLD HEAT) [12, fig. 5-32a] remains illuminated.

If the temperature rises above 250 ˚F, the high limit thermoswitch closes the pressure-regulator valve but the shutoff valve remains open.

When the aircraft is in flight, the low limit thermoswitch is disabled. Overheat protection is provided by the high limit thermoswitch which closes the pressure-regulator valve if the temperature rises above 250 ˚F.

Important

- In manual mode, the pilot decides when heat must be applied to the windshield and should monitor the red Windshield Overheat (WSHLD OVHT) [8, 11, fig. 5-32a] and Windshield Heat Applied (WSHLD HEAT) [12, fig. 5-32a] annunciators constantly.

Tip

- Mouse overing the red Windshield Overheat (WSHLD OVHT) [8, 11, fig. 5-32a] annunciators will display a tooltip with the temperature of the thermoswitches in the exterior defog nozzles.

Windshield and Radome Alcohol Anti-Ice System

1.75 gallon of methyl alcohol stored in a reservoir located in the left side of the nose compartment is used to prevent ice formation on the radome. The system may also be used for defogging the captain's windshield, as a backup for the windshield heating system.

When the Anti-Ice Alcohol Switch [5, fig. 5-4] is set to **RADOME**, the system supplies only the radome with alcohol for 120 minutes with a full reservoir. When the switch is set to **WSHLD & RADOME**, the system supplies

both the radome and the captain's windshield with alcohol for 45 minutes with a full reservoir.

The amber ALC AI annunciator on the main annunciator panel [15, fig. 5-32a] illuminates when the alcohol reservoir is empty.

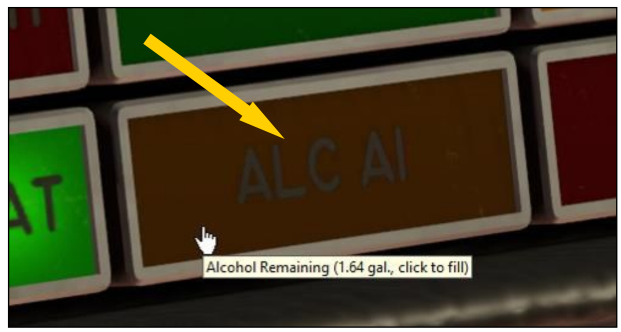
Tip

- Mouse overing the amber ALC AI [15, fig. 5-32a] annunciator will display a tooltip with the remaining quantity of alcohol in the reservoir. You can click the annunciator to service the reservoir with 1.75 gallon of alcohol.

DC power and bleed air from the engines is required for the system to work. Moving the switch from the **OFF** position to either the **RADOME** or **WSHLD & RADOME** also opens both a shutoff valve and a pressure regulator in the engine's bleed air supply line to pressurize the reservoir with 2.3 psi of bleed air. The alcohol is then forced through a filter and a 3-way shutoff valve that is positioned to the selected switch position.

To de-ice the radome only (engines must be running and the aircraft powered):

1. Bleed Air Switch [1, fig. 5-41] - **NORM** or **MAX**.



2. Anti-Ice Alcohol Switch [5, fig. 5-4] - **RADOME**.

To de-ice the radome and the captain's windshield (engines must be running and the aircraft powered):

1. Bleed Air Switch [1, fig. 5-41] - **NORM** or **MAX**.
2. Anti-Ice Alcohol Switch [5, fig. 5-4] – **WSHLD & RADOME**.

To stop the flow of alcohol:

1. Anti-Ice Alcohol Switch [5, fig. 5-4] – **OFF**.

Wing and Horizontal Stabilizer Anti-Ice System

Hot bleed air from the engines is used to prevent ice buildup on the wing leading edges. Two heated electrical blankets are used to protect the horizontal stabilizer leading edges from ice formation.

Wing Heating System

When the Wing and Stabilizer Heat Switch [3, fig. 5-4] is turned **ON**, a shutoff valve opens to allow hot bleed air from the engines to flow through a 16-psi pressure regulator and is routed on to tubes in the wing leading edges. The air is then vented outboard through scuppers located under the wing.

The red WING O'HT annunciator on the main annunciator panel [9, fig. 5-32a] illuminates when the right-wing leading edge's temperature reaches 215˚F. The system should not be used when the annunciator is illuminated.

Tip

- Mouse overing the red WING O'HT annunciator [9, fig. 5-32a] will display a tooltip with the wing temperature.

DC power and bleed air from the engines is required for the system to work.

To heat the wing leading edges (engines must be running and the aircraft powered):

1. Bleed Air Switch [1, fig. 5-41] - NORM or MAX.
2. Wing and Stabilizer Heat Switch [3, fig. 5-4] - ON.

To stop heating the wing leading edges:

1. Wing and Stabilizer Heat Switch [3, fig. 5-4] - OFF.

The Wing Temperature Gauge [9, fig. 5-4] provides a visual representation of the changes in wing temperature:

- **Blue arc:** temperature below 35˚F
- **Green arc:** above 35˚F and below 215˚F
- **Red arc:** above 215˚F

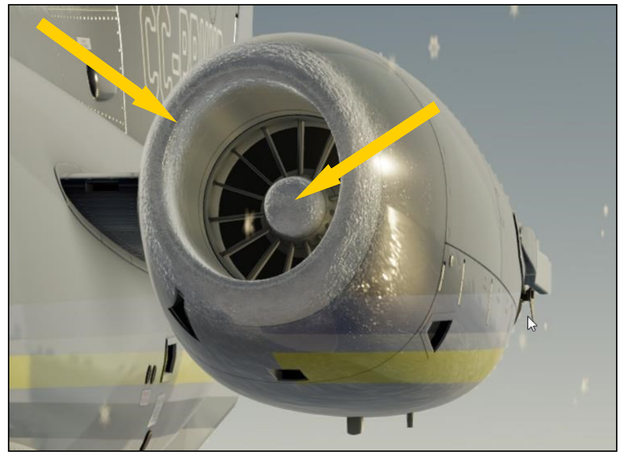
Make sure the needle is in the green. Monitor pressurization and reduce RPM when the needle is in the red (or turn **OFF** the Wing and Stabilizer Heat Switch [3, fig. 5-4]).

Horizontal Stabilizer Heating System

When the aircraft is in flight and the Wing and Stabilizer Heat Switch [3, fig. 5-4] is turned **ON**, electrical current is supplied to two heating blankets on the horizontal stabilizer leading edges to protect the stabilizer against ice accumulation. **On the ground, the stabilizer heating system is disabled by the right gear squat switch.**

Intermittent DC electrical power is applied to elements inside the heating blankets, from front to rear, in sequences of 15 seconds for each element. Power is also applied continuously to the front leading-edge element.

The amber STAB HEAT annunciator on the



main annunciator panel [13, fig. 5-32a], when illuminated, indicates a power failure in the leading-edge element of the stabilizer heating blanket.

***Note:** Power failure of the leading-edge element of the stabilizer heating blanket is not simulated in this software version. The amber STAB HEAT annunciator should remain off.*

When power is applied to the blankets, the left and right ammeters on the electrical gauge cluster panel [5, 7, fig. 5-28] reflect a current drain of about 60 amperes (total) in 15-second cycles. This is the only indication that the system is working.

DC power is required for the system to work, and **the aircraft must be in flight**.

To heat the horizontal stabilizer leading edges when the aircraft is in flight:

1. Wing and Stabilizer Heat Switch [3, fig. 5-4] - **ON**.

To stop heating the horizontal stabilizer leading edges when the aircraft is in flight:

1. Wing and Stabilizer Heat Switch [3, fig. 5-4] - **OFF**.

Heating will stop as soon as the aircraft touches the ground.

Engine Anti-Ice System

The engine anti-ice system protects the engine nacelle inlet front lips, nose cone and inlet guide vanes. The nose cone and inlet guide vanes are heated pneumatically (with hot bleed air), and the nacelle inlet front lips are heated electrically.

When either Engine Nacelle Heat Switch [2, fig. 5-4] is turned **ON**, electric power is supplied to heat the selected engine nacelle inlet front lips. Heating elements in each nacelle require about 50 to 60 amperes.

At the same time, hot bleed air from the engine is allowed to recirculate through the engine nose cone and inlet guide vanes. Bleed air reentering the engine causes a decrease in the engine pressure ratio (EPR) [4, fig 5-27].

When illuminated, the amber L ENG ICE and R ENG ICE annunciators [19, 22, fig. 5-32b] on the main annunciator panel indicate **insufficient bleed air pressure** for adequate anti-ice protection. When the aircraft is on the ground, **70% RPM is required** to extinguish the annunciators.

When the aircraft is on the ground, the amber INLET HTR annunciator [17, fig. 5-32b], when illuminated, indicates an overheat condition in an inlet heater. The annunciator illuminates when either nacelle temperature reaches 190 ˚F and extinguishes at 180 ˚F. When this happens, the Engine Nacelle Heat Switch [2, fig. 5-4] must be turned **OFF**. In flight, this annunciator is disabled by the right gear squat switch.

Tip

- Mouse overing the amber INLET HTR annunciator will display a tooltip with the left and right engine inlet temperatures.

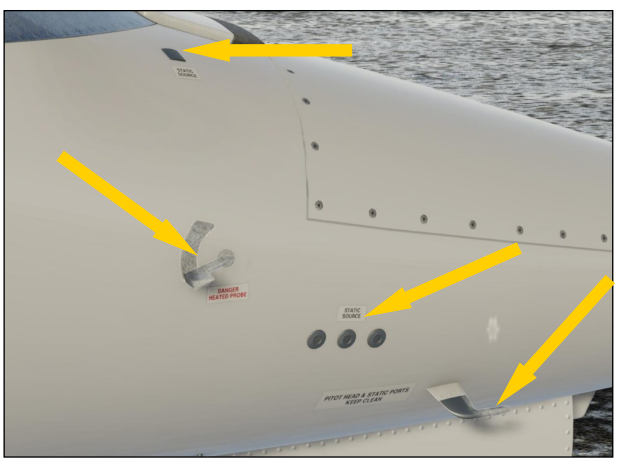
To heat an engine nacelle:

1. (Left or Right) Engine Nacelle Heat Switch [2, fig. 5-4] - **ON**.

To stop heating an engine nacelle:

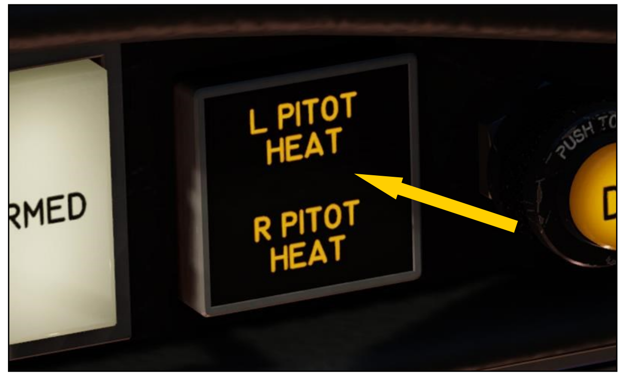
1. (Left or Right) Engine Nacelle Heat Switch [2, fig. 5-4] - **OFF**.

Pitot, AofA Vane, and Static Port Anti-Ice System



The left and right pitot tubes, angle-of-attack vanes, and static ports (located on the aircraft's nose) contain heating elements to prevent ice accumulation that may lead to failures of critical aircraft systems and hazardous situations.

Heat is applied to the pitot tubes and angle-of-attack vanes by setting the left and right



Pitot Heat Switches [1, fig. 5-4] to **ON**.

Note: *Prepar3D supports only one pitot system. Therefore, in the GLJ Model 25/28 v4 addon, both pitot heat switches are linked together.*

Two amber annunciators located on the copilot's fire panel [6-7, fig. 5-35] illuminate when the pitot tube heaters are turned off.

To heat the pitot tubes and the angle-of-attack vanes:

1. (Left or Right) Pitot Heat Switches [1, fig. 5-4] - ON.

To stop heating the pitot tubes and the angle-of-attack vanes:

1. (Left or Right) Pitot Heat Switches [1, fig. 5-4] - OFF.

The static port heaters are connected to the pitot heat circuit, but not to the Pitot Heat Switches. Therefore, static ports are heated as soon as the aircraft is powered.

20 SERIES FUEL SYSTEM

Because of software limitations in Prepar3D, the fuel system in the GLJ Model 25/28 addon is very similar but not totally identical to the rather peculiar fuel system installed in the real aircraft. However, all the switches, gauges and annunciators are provided to emulate the real system as closely as possible and to simulate every procedure you would normally perform with the real aircraft. The differences between the addon and the real aircraft are fully explained in the following pages.

Note: *Significantly modifying the simulator's native fuel system goes beyond the scope of this project. As the simulation platforms evolve, so will the systems in future versions of this addon.*

Like in the real Gates Learjet 25/28 aircraft, the addon's fuel system is divided into left and right tankage, each feeding the corresponding engine. For the model 25, it consists of two wingtip tanks, two wing tanks and a center fuselage tank. For the Model 28, it consists of two main wing tanks and a center fuselage tank (no wingtip tanks).

Fuel Mixture (addon-related)

Releasing the throttles with the Throttle Release Levers [2, 4, fig. 5-43] opens the fuel valves, like in the real aircraft. During the engine startup cycle (see section 8, page 19), when the fuel valves open and the fuel gets in contact with the igniters, the engines should start.

In Prepar3D however, if the **fuel mixture** is not rich enough, the engines won't start. In the real world, jet engines don't require fuel mixture adjustments like piston engines. Unfortunately, the simulator seems to make no distinction and mixture control is available even for jet engines. Make sure the fuel mixture is set to "**rich**" before starting the engines (**CTRL+SHIFT+F4** on your keyboard). You can also use the mixture lever on your physical throttle quadrant or controller.

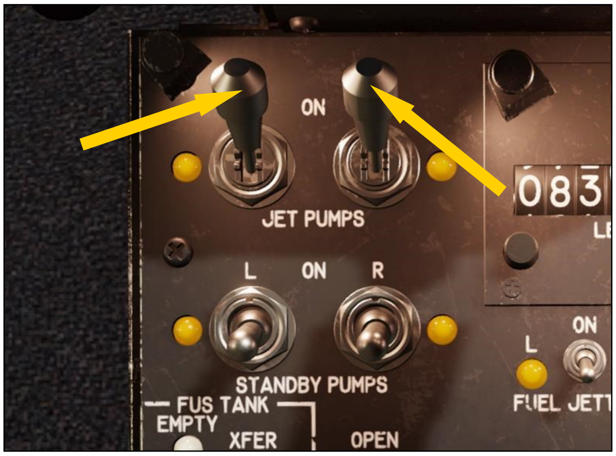
Note (1): *The "Auto Start" sequence, if initiated, will set the fuel mixture to "rich". The "Cold and Dark" reset cycle will set the mixture to "lean".*

Note (2): *In this software version, we've also programmed the Throttle Release Levers to set the mixture to rich before they open the fuel valves when actuated.*

Fuel Pumps

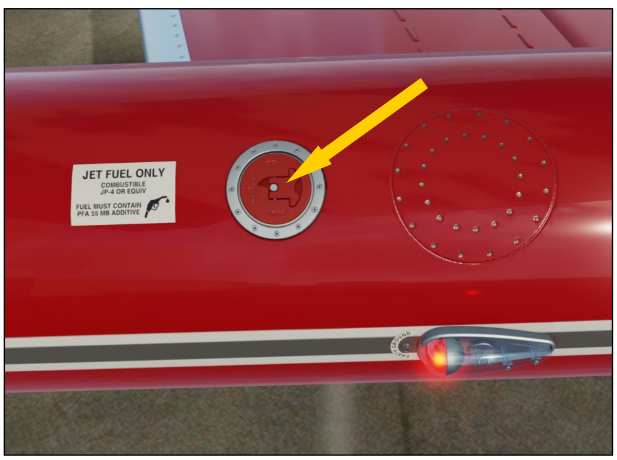
While the real aircraft uses pumps to assist in emptying the wingtip tanks (Model 25) and the center tank into the main wing tanks, the addon uses mainly gravity. However, the addon is equipped with two fuel pumps to assist transferring fuel from the tanks to the power plants. Two switches [11-12, fig. 5-45a; 10-11, fig. 5-45b] are provided on the addon's fuel panel to energize the fuel pumps, one for each engine.

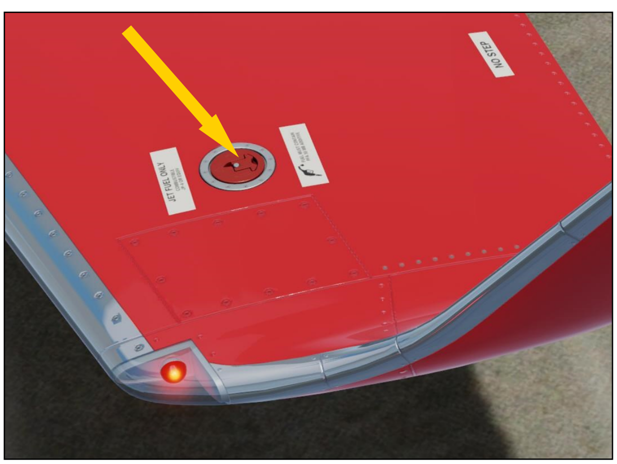
In the real Model 25 aircraft: *The top half-part of each wingtip tank will gravity flow into the wing tank automatically. An ejector-type jet pump in each wingtip tank is used to*



transfer the remaining wingtip tank fuel into the respective wing tank.

In the real Model 25/28 aircraft: *A venturi-type jet pump and an electrically operated centrifugal-type multi-function low pressure standby (boost) pump are installed at the most inboard and lower portion of each wing tank. This ensures that the pumps are submerged in fuel until the tanks are almost empty.*



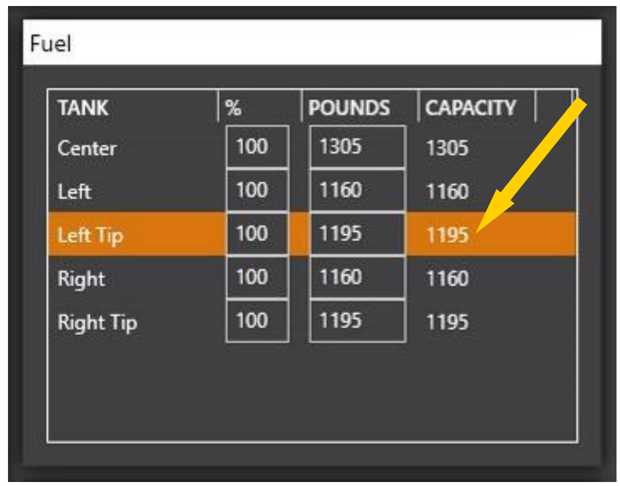


Refueling

In both the addon and the real aircraft, refueling is performed through a filler cap on top of each wingtip tank (Model 25), or on top of each wing (Model 28). In the simulator, refueling is achieved through the "**Fuel and Payload**" panel or by requesting a fuel truck ("**SHIFT+F**") in certain parking areas. Refer to your simulation platform's documentation for more details.

See also "**Flight Planning**", in section 7.

Wingtip Tanks (Model 25)



Fuel

TANK	%	POUNDS	CAPACITY
Center	100	1305	1305
Left	100	1160	1160
Left Tip	100	1195	1195
Right	100	1160	1160
Right Tip	100	1195	1195

Like the real aircraft, the addon is equipped with two wingtip tanks. Both tanks have a fuel jettison system at the rear. The right wingtip tank has a recognition light installed in the nose and a capacity of **1,195 pounds** of fuel. The left wingtip tank may or may not have a recognition light installed in the nose (user-selectable) and has a capacity of **1,195** or **1,235 pounds** of fuel.

Tip

- The left wingtip tank capacity is preset to **1,195 pounds** of fuel by default. You may increase the quantity of fuel in the left wingtip tank (in the "**aircraft.cfg**") if you decide to remove the recognition light in the nose [6, fig. 3-5]. Please back up the file before making any change.

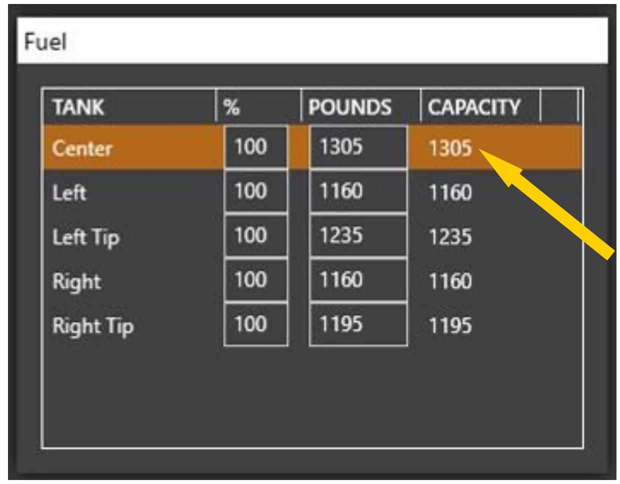
Fuel is automatically transferred from each wingtip tank into its respective wing tank.

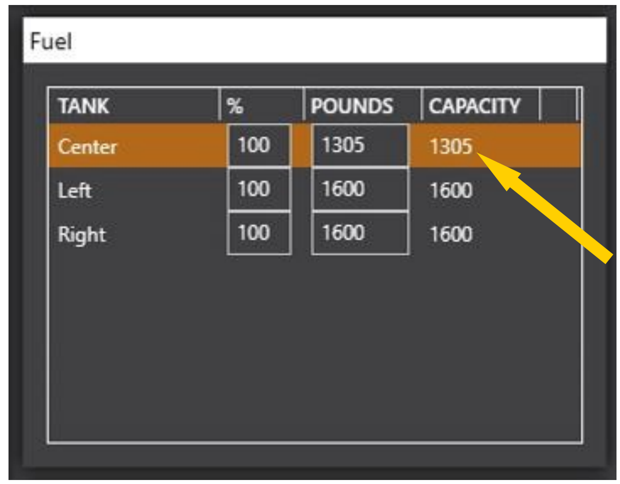
The totality of the fuel in the wingtip tank can be jettisoned through a valve in the tank's tail cone (see page 6-25).

Wing Tanks

The wing is divided by a center bulkhead into two separate compartments which serve as sealed, full span, integral fuel tanks. Fuel is not stored in the landing gear wheel well and in the wing leading edge area. By default, the left engine uses fuel from the left-wing tank and the right engine uses fuel from the right-wing tank.

Each wing tank has a capacity of **1,160 pounds** of fuel for the Model 25 and **1,600 pounds** of fuel for the Model 28.





Center Fuselage (Storage) Tank

The center fuselage tank is used as a storage tank in both the addon and the real aircraft. The fuselage tank has a capacity of **1,305 pounds** of fuel.

A Fuselage Tank Switch [6, fig. 5-45a; 5, fig. 5-45b] is provided on the addon's fuel panel to feed both engines with fuel contained in the fuselage tank when fuel in the wing tanks is critically low.

Due to limitations in Prepar3D, the addon's Fuselage Tank Switch cannot be used to pump fuel from the center fuselage tank into the wing tanks, like in the real aircraft. The Fuselage Tank Switch is used to directly connect both engines to the center fuselage tank instead. Like a real Learjet pilot, the desktop pilot must constantly monitor fuel in the wing tanks to prevent engine starvation.

The Fuselage Tank Switch must be set to **XFER** when the fuel in the main wing tanks is critically low. Switching from the main wing tanks to the center fuselage tank is not done automatically and must be performed manually, which is like the fuel transfer procedure in the real aircraft. The "Low Fuel Remaining" annunciator [2, fig. 5-32a] will illuminate when there is less than 50 gallons (approx. 335 pounds) of fuel in either wing tank - or in the center fuselage tank if the Fuselage Tank Switch is set to **XFER**.

In the real aircraft: *The fuselage tank consists of four bladder-type cells. Like in the addon, the fuselage tank is only a storage tank and fuel must be pumped into the wing tanks for use by the engines. This is done by setting the Fuselage Tank Switch to XFER.*

Tip

- In the Model 29, the sister ship of the Model 28, the center fuselage tank had an extra capacity of **100 gallons of fuel** (670 pounds) at the expense of two passenger seats. To emulate a Model 29, you may add 100 gallons of fuel to the center fuselage tank in the "**aircraft.cfg**". Please back up the file before making any change.

Crossfeed

A Crossfeed Valve Switch (labeled "Crossflow") [3, fig. 5-45a; 2, fig. 5-45b] and

two Standby Pump Switches [8-9, fig. 5-45a; 7-8, fig. 5-45b] are provided on the addon's fuel panel for cross-feeding fuel from one wing tank to the opposite engine or to both engines. In this case, the unused tank is "isolated" from its power plant. This may be used to balance fuel between the two wing tanks or during single engine operation.

The Crossfeed Valve Switch cannot be used to transfer fuel from one wing tank into the other, like in the real aircraft.

Note: *Crossflow between tanks is not available due to limitations in Prepar3D.*

In the real aircraft: *A crossflow valve is provided to balance fuel between the two wing tanks, especially in case of single engine operation. The crossflow valve is used in conjunction with the two standby (boost) pumps. During cross-flowing, the Crossflow Switch is set to OPEN while the Standby Pump Switch for the heavy wing is turned ON and the standby pump switch for the light wing is turned OFF.*

Fuel Jettison (Model 25)

The GLJ Model 25 v4 addon is equipped with a fuel jettison system [1, fig. 5-45a]. The fuel jettison system will jettison fuel from the wingtip tanks only, like in the real aircraft. It takes a few minutes to empty both wingtip tanks, depending on the remaining fuel. Fuel jettisoning can be interrupted at any time and will stop automatically when both wingtip tanks are empty. Fuel cannot be jettisoned from the wing tanks or from the center fuselage tank.

Note: *Due to some limitations in Prepar3D, fuel will first be jettisoned from the left wingtip tank, then from the right wingtip tank. The pilot will need to compensate for the fuel imbalance until both tanks are emptied.*

In the real aircraft: *The fuel jettison system is applicable to the wingtip tanks only. Both wingtip tanks are emptied simultaneously. It takes about five minutes to empty both wingtip tanks. Very few Learjet 25D are equipped with a fuel jettison system because fuel is burned so quickly on this type of aircraft that fuel jettisoning is almost never required.*

Fuel System Limitations

- **Maximum ramp weight:** 15,500 lbs.
- **Maximum takeoff weight:** 15,000 lbs.
- **Maximum landing weight:** 13,300 lbs. (Model 25); 14,300 lbs. (Model 28)
- **Zero fuel weight:** 11,400 lbs. including everything except fuel.
- **Maximum altitude with no jet or standby pumps:** 25,000 ft.
- **If fuel temperature is -30° or below:** Do

not take off!

- **Maximum wingtip tank landing weight (Model 25):** 800 lbs. for each tank
- Do not cross-feed with Jet Pumps inoperative!
- With Low Fuel Remaining Annunciator [2, fig. 4-30] ON, limit nose up attitude to a maximum of 25 degrees.

Fuel System Controls, Lights and Annunciators

Left and Right Jet Pump Switches (Electric Fuel Pump Switches in Prepar3D)
[11-12, fig. 5-45a; 10-11, fig. 5-45b]

The two Jet Pump Switches control the motive flow valves and allow motive flow to their respective wingtip tank (Model 25) and wing tank (all aircraft) jet pumps. They should always be in the **ON** position. These two switches control the electric fuel pumps in the simulator. There is one fuel pump for each engine. The fuel pressure annunciators [1, 4, fig. 5-32a] should go out when the fuel pumps are operating.

Left and Right Jet Pump Flow Valve Lights
[10, 13, fig. 5-45a; 9, 12, fig. 5-45b]

These two amber lights next to the Jet Pump Switches monitor the position of their respective motive flow valve. If the position of the valve does not correspond to the position of the switch, the light will come on. It is normal for the light to come on for about one second when the Jet Pump Switch is set, indicating that the motion flow valve is in transit.

Left and Right Standby (Boost) Pump Switches
[8-9, fig. 5-45a; 7-8, fig. 5-45b]

The two Standby Pump Switches control the boost pumps. They are normally set to **OFF** except during cross-feeding or in the case of a jet pump failure. Regardless of the position of the switches, the boost pumps will be automatically energized when the fuselage tank switch is set to **FILL** or when the starter engaged (the boost pumps supply fuel during engine starts) and de-energized when the fuselage tank switch is set to **XFER**.

To feed both engines with fuel from the left-wing tank only, set the Crossflow Switch [3, fig. 5-45a; 2, fig. 5-45b] to **OPEN** (see below). Then set the Left Standby Pump Switch to **ON** and the Right Standby Pump Switch to **OFF**. This will isolate the right-wing tank and both engines will be fed by the left-wing tank.

To feed both engines with fuel from the right -wing tank only, set the Crossflow Switch to **OPEN** (see below). Then set the Left Standby Pump Switch to **OFF** and the Right Standby Pump switch to **ON**. This will isolate the left-wing tank and both engines will be fed by the right-wing tank.

Left and Right Standby (Boost) Pump Flow Valve Lights

These two amber lights next to the Standby Pump Switches [8-9, fig. 5-45a; 7-8, fig. 5-45b] monitor the position of their respective motive flow valve. If the position of the valve does not correspond to the position of the switch, the light will come on. It is normal for the light to come on for about one second when the Standby Pump Switch is set, indicating that the motion flow valve is in transit.

Low Fuel Pressure Annunciators
[1, 4, fig. 5-32a]

These two red annunciators, marked L FUEL PRESS and R FUEL PRESS, indicate low engine fuel pressure below 10 psi. (one for each engine). They should go OFF when the jet pumps or the standby (boost) pumps are operating, or after the engines have started.

Low Fuel Remaining Annunciator
[2, fig. 5-32a]

This red annunciator, marked LOW FUEL, will illuminate when there is less than 50 gallons (approx. 335 pounds) of fuel in either wing tank - or in the center fuselage tank, if the Fuselage Tank Switch [6, fig. 5-45a; 5, fig. 5-45b] is set to **XFER**. When there is less than 300 pounds of fuel in either wing tank and the annunciator is illuminated, it is time to switch to the center fuselage tank by turning the Fuselage Tank Switch to **XFER**.

Crossflow Switch (Crossfeed Switch in the simulator)
[3, fig. 5-45a; 2, fig. 5-45b]

In the real aircraft, this switch, marked CROSSFLOW, controls the crossflow valve allowing fuel to flow between the wing tanks. In the addon, this switch controls the crossfeed valves which allow fuel from one wing tank to feed the opposite engine or both engines by "isolating" the other wing tank.

Note: *Due to limitations in Prepar3D, the Crossflow (crossfeed) Switch cannot be used to transfer fuel from one wing tank into the other like in the real aircraft.*

The Crossflow Switch must be used in conjunction with the two Standby Pump Switches [8-9, fig. 5-45a; 7-8, fig. 5-45b] (see above).

To crossfeed fuel from the left-wing tank to both engines, the Crossflow Switch must be set to **OPEN,** and the Left Standby Pump Switch must be set to **ON** while the Right Standby Pump Switch is set to **OFF** (this will isolate the right tank and feed both engines from the left-wing tank).

To crossfeed fuel from the right-wing tank to both engines, the Crossflow Switch must be set to **OPEN,** and the Left Standby Pump Switch must be set to **OFF** while the Right Standby Pump Switch is set to **ON** (this will isolate the left tank and feed both engines from the right-wing tank).

This technique can be used to balance fuel between the two wingtip/wing tanks by feeding both engines from the heavy side until balance is achieved. It can also be used for single-engine operation (cross-feeding fuel to one engine only, if only one engine is running).

To stop cross-feeding fuel, the Crossflow Switch and the two Standby Pump Switches must be returned to **OFF**.

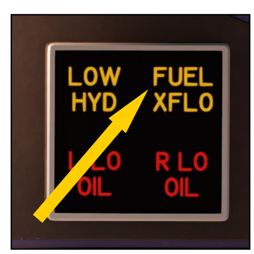
Crossfeed will not occur if both Standby Pump Switches are set to **ON** to prevent isolating both wing tanks which would cause engine starvation. Do not crossfeed fuel if the Jet Pumps are inoperative as engine starvation may also occur.

Crossfeed will not occur either if the Fuselage Tank Switch [6, fig. 5-45a; 5, fig. 5-45b] is not in the **OFF** (middle) position.

Crossflow Valve Light (Crossfeed Valves Light in the simulator)
[2, fig. 5-45a; 2, fig. 5-45b]

In the simulator, this amber light indicates that the crossfeed valves are in transit. It is normal for this light to come on for about one second when the Crossflow (crossfeed) Switch is moved.

Crossflow Valve OPEN Annunciator (Crossfeed Annunciator in the simulator)
[7, fig. 5-39]



In the simulator, this annunciator, located on the copilot's instrument panel and marked FUEL XFLO, indicates that the crossfeed valves are positioned for cross-feeding fuel from one wing tank to one or to both engines.

Fuselage Tank Switch
[6, fig. 5-45a; 5, fig. 5-45b]

In both the addon and the real aircraft, the fuselage tank is used as a storage tank only. In the real aircraft, fuel from the center fuselage tank must be pumped into the wing tanks to be used by the engines. In the simulator, due to software limitations, fuel must be *transferred* from the fuselage tank to the engines directly, without passing through the wing tanks.

By default, the left engine uses fuel from the left-wing tank and the right engine uses fuel from the right-wing tank (in the Model 25, fuel is automatically transferred from each wingtip tank into its respective wing tank). In the addon, the Fuselage Tank Switch is used to feed the engines from the center fuselage tank when fuel in the main wing tanks is critically low.

When the Fuselage Tank Switch is set to **XFER**, both engines are fed from the center fuselage tank. The addon's Fuselage Tank Switch cannot be used to transfer fuel from the center fuselage tank into the wing tanks, like in the real aircraft. The Fuselage Tank Switch is used to connect the engines to the center fuselage tank directly.

In the real aircraft, the switch is also used during filling of the center fuselage tank. The standby (boost) pumps automatically fill the fuselage tank when the Fuselage Tank Switch is set to FILL. This is normally done on the ground with both engines shut off during servicing and rarely in flight for CG considerations. When the tank is full, the pumps stop automatically, and fuel is no longer transferred. In the addon, setting this switch to **FILL** has no special function except for monitoring if the center fuselage tank is full. Both engines will still be connected to their respective wing tank when the Fuselage Tank Switch is set to **FILL**.

***Note:** In both the addon and the real aircraft, refueling is accomplished through a filler cap on top of each wingtip tank (Model 25), or on top of each wing (Model 28). In the simulator, refueling is achieved through the "**Fuel and Payload**" panel or by requesting a fuel truck ("**SHIFT+F**") in certain parking areas. Refer to your simulation platform's documentation for more details.*

In the addon, engines are fed from their respective wing tank when the Fuselage Tank Switch is set to **OFF**: The left engine is fed from the left-wing tank, and the right engine is fed from the right-wing tank. The Fuselage Tank Switch is set to **OFF** by default at the beginning of each flight and should remain in the **OFF** position until the fuel level in the wing tanks is critically low (below 300 pounds typically). When this happens, the Fuselage Tank Switch must be positioned to **XFER** for the engines to be fed from the center fuselage tank. Switching from the wing tanks to the fuselage tank is not done automatically and must be performed manually by the desktop pilot, a procedure similar to transferring fuel from the fuselage tank into the wing tanks in the real aircraft.

***Known Issue:** The addon's fuel panel uses its own custom variables which to this date are still not kept by the simulator when a flight is saved. For example, if the engines were both fed by the fuselage tank when the flight was saved (Fuselage Tank Switch set to **XFER**), settings will return to their default state when the flight is reloaded. In this case, the Fuselage Tank Switch will return to its **OFF** position and the engines will be fed by their respective wing tank until the switch is returned to **XFER** again. Therefore, it is important **to leave some fuel in the wing tanks** before switching to the center fuselage* *tank to avoid engine starvation. This should be done as a standard procedure.*

Note: *By default, the Fuselage Tank Switch is set to **OFF** at the beginning of each flight, allowing both wing tanks to be selected and to feed their respective engine. This solves the old simulator issue where settings from a previous flight with another aircraft with a different tankage or engine configuration are kept at the beginning of a new flight and prevent the engines from starting or to be fed properly during a flight.*

Fuselage Tank Full Light
[4, fig. 5-45a; 3, fig. 5-45b]

When the Fuselage Tank Switch is set to **FILL**, this green light will come on if the center fuselage tank is full. This light is off when the Fuselage Tank Switch is set to **OFF** or to **XFER**.

Fuselage Tank Empty Light
[7, fig. 5-45a; 6, fig. 5-45b]

When the Fuselage Tank Switch is set to **XFER**, this white light will come on if the center fuselage tank is empty. This light is off when the Fuselage Tank Switch is set to **OFF** or to **FILL**.

Fuselage Tank Valves (unmarked) Light
[5, fig. 5-45a; 4, fig. 5-45b]

This amber light indicates that the fuselage tank valves are in transit. It is normal for this light to come on for about one second when the Fuselage Tank Switch is moved.

Fuselage Tank Transfer Pump ON Annunciator
[26, fig. 5-32b]

This annunciator, located in the main annunciator panel and marked FUEL XFR, indicates that the fuselage tank transfer pump is operating. In the simulator, this indicates that the engines are fed from the center fuselage tank.

Fuel Counter and Reset Button
[14-15, fig. 5-45a; 13-14, fig. 5-45b]

This counter, often called a “fuel totalizer”, indicates the total amount of fuel burned (in pounds) since the last engine start or reset. The reset button, when depressed, resets the counter to zero. The counter should be reset to zero before starting the first engine. The counter is powered by the main DC bus.

Fuel Tank Selector Knob
[16, fig. 5-45a; 15, fig. 5-45b]

This selector knob enables the pilot to read the remaining fuel quantity in each tank as well as the total system quantity, on the Fuel Quantity Gauge [17, fig. 5-45a; 16, fig. 5-45b].

Note: *This knob is not a fuel tank selector switch to assign fuel tanks to engines. It is used in conjunction with the Fuel Quantity Gauge only to select the tank for which the remaining fuel quantity can be read on the gauge.*

Fuel Quantity Gauge
[17, fig. 5-45a; 16, fig. 5-45b]

This gauge indicates the remaining fuel quantity (as weight) for the selected tank or for the total system in increments of 100 pounds and should be constantly monitored. Tank selection is made by rotating the Fuel Tank Selector Knob [16, fig. 5-45a; 15, fig. 5-45b]. The gauge is powered by the main DC bus.

Fuel Jettison Switch (Model 25 only)
[1, fig. 5-45a]

When set to **ON**, this switch is used to jettison fuel from the wingtip tanks only. It takes a few minutes to empty both wingtip tanks, depending on the remaining fuel. Fuel jettisoning can be interrupted at any time and will stop automatically when both wingtip tanks are empty. Fuel cannot be jettisoned from the wing tanks or from the center fuselage tank.

Note: *Due to some limitations in Prepar3D, fuel will first be jettisoned from the left wingtip tank, then from the right wingtip tank. The pilot will need to compensate for the fuel imbalance until both tanks are emptied.*

Fuel Jettison Lights (both sides of the Fuel Jettison Switch, Model 25 only)

These amber lights, adjacent to the Fuel Jettison Switch, indicate that the fuel jettison valves are energized.

FUEL SYSTEM PROCEDURES

Refueling

1. Battery switches [8-9, fig. 5-30] (or external power source) - **ON**.

2. All circuit breakers - Check **DEPRESSED**.

3. Fuselage Tank Switch [6, fig. 5-45a; 5, fig. 5-45b] - **FILL**.

Note: *In both the addon and the real aircraft, refueling is accomplished through a filler cap on top of each wingtip tank (Model 25), or on top of each wing (Model 28). In the simulator, refueling is achieved through the "**Fuel and Payload**" panel or by requesting a fuel truck ("SHIFT+F") in certain parking areas. Refer to your simulation platform's documentation for more details.*

1. After the fuselage tank is full as desired (the green Fuselage Tank Full Light [4, fig. 5-45a; 3, fig. 5-45b] will come on when the fuselage tank is full), set the Fuselage Tank Switch to **OFF**. The green Fuselage Tank Full Light will come off.

In the real aircraft: *During fuselage fill, the crossflow valve will open, both standby (boost) pumps will turn on and the fuselage transfer valve will open. When the fuselage tank is full, the crossflow valve will close, both standby pumps will turn off and the fuselage transfer valve will be closed automatically. The green Fuselage Tank Full Light will come on until the Fuselage Tank Switch is set to OFF.*

Preflight

1. Left Jet Pump Switch [11, fig. 5-45a; 10, fig. 5-45b] - **ON** and watch for the amber Motive Flow Valve Light [10, fig. 5-45a; 9, fig. 5-45b] beside the Left Jet Pump Switch to come on and then off while the motive flow control valve is in transit. Check that the left Low Fuel Pressure Annunciator [1, fig. 5-32a] goes out.

2. Left Jet Pump Switch - **OFF** and watch for the amber Motive Flow Valve Light beside the Left Jet Pump Switch to come on and then off while the motive flow control valve is in transit.

3. Right Jet Pump Switch [12, fig. 5-45a; 11, fig. 5-45b] - **ON** and watch for the amber Motive Flow Valve Light [13, fig. 5-45a; 12, fig. 5-45b] beside the right Jet Pump Switch to come on and then off while the motive flow control valve is in transit. Check that the Right Low Fuel Pressure Annunciator [2, fig. 5-32a] goes out.

4. Right Jet Pump Switch - **OFF** and watch for the amber Motive Flow Valve Light beside the Right Jet Pump Switch to come on and then off while the motive

flow control valve is in transit.

5. Left Standby Pump Switch [9, fig. 5-45a; 8, fig. 5-45b] - **ON**, check that the Left Low Fuel Pressure Annunciator [1, fig. 5-32a] goes out.

6. Left Standby Pump Switch - **OFF**.

7. Right Standby Pump Switch [8, fig. 5-45a; 7, fig. 5-45b] - **ON**, check that the Right Low Fuel Pressure Annunciator [2, fig. 5-32a] goes out.

8. Right Standby Pump Switch - **OFF**.

9. Left Jet Pump Switch [11, fig. 5-45a; 10, fig. 5-45b] - **ON**.

10. Right Jet Pump Switch [12, fig. 5-45a; 11, fig. 5-45b] - **ON**.

11. Crossflow (Crossfeed) Valve Switch [3, fig. 5-45a; 2, fig. 5-45b] - **OPEN** and check for the amber in-transit light beside the Crossflow Valve Switch [2, fig. 5-45a; 1, fig. 5-45b] to come on and then off while the crossflow valve is in transit.

12. Crossflow (Crossfeed) Valve Switch - **CLOSE**.

13. If the fuselage tank is full, set the Fuselage Tank Switch [6, fig. 5-45a; 5, fig. 5-45b] to **FILL** and check for the green Fuselage Full Light [4, fig. 5-45a; 3, fig. 5-45b] to come on. Then turn the switch to **OFF** and the green light will come off.

Engine Start (same for both engines)

1. When the Starter Generator Switch [6, 11, fig. 5-30] is set to **START**, the motive flow control valve closes, the standby pump is energized, and ignition is armed. When the throttle [1, 3, fig. 5-43] is **released** and set to **IDLE**, ignition comes on and fuel flow is obtained. When the Starter Generator Switch is set to **GEN**, the motive flow control valve opens, the standby pump is de-energized, ignition goes off, the generator comes on and the Low Fuel Pressure Annunciator [1,2, fig. 5-32a] remains out.

Takeoff

1. Both Jet Pump Switches [11-12, fig. 5-45a; 10-11, fig. 5-45b] - Check **ON**.

2. Both Standby Pump Switches [8-9, fig. 5-45a; 7-8, fig. 5-45b] - Check **OFF**.

3. Crossflow (Crossfeed) Valve Switch [3, fig. 5-45a; 2, fig. 5-45b] - Check **CLOSE**.

4. Fuselage Tank Switch [6, fig. 5-45a; 5, fig. 5-45b] - Check **OFF**.

5. Both Air Ignition Switches [1, 16, fig. 5-29] - **OFF**, except if required (see "**Normal Procedures and Check Lists**" in section 8).

Cruise

To switch from the wing tanks to the center fuselage tank when the remaining fuel quantity in either wing tank is below 300 pounds and the red Low Fuel Remaining Annunciator [2, fig. 5-32a] is illuminated, proceed as follows:

1. Fuselage Tank Switch [6, fig. 5-45a; 5, fig. 5-45b] - **XFER**. If there is more than 50 gallons of fuel (about 335 pounds) remaining in the center fuselage tank, the red Low Fuel Remaining Annunciator will go out. The green Fuselage Tank Transfer Pump ON Annunciator [26, fig. 5-32b] will illuminate, indicating that the fuselage tank transfer pump is operating and that both engines are fed from the center fuselage tank.

Note: *This procedure is like transferring fuel from the fuselage tank into the wing tanks.*

Crossfeed

To balance fuel between wing tanks, proceed as follows:

1. Fuselage Switch [6, fig. 5-45a; 5, fig. 5-45b] - **OFF**.

2. Crossflow Valve Switch [3, fig. 5-45a; 2, fig. 5-45b] - **OPEN**.

To crossfeed fuel from the left-wing tank

(heavy side) to both engines:

1. Left Standby Pump Switch [9, fig. 5-45a; 8, fig. 5-45b] - **ON**.
2. Right Standby Pump Switch [8, fig. 5-45a; 7, fig. 5-45b] - **OFF**.

To crossfeed fuel from the right-wing tank (heavy side) to both engines:

1. Left Standby Pump Switch [9, fig. 5-45a; 8, fig. 5-45b] - **OFF**.
2. Right Standby Pump Switch [8, fig. 5-45a; 7, fig. 5-45b] - **ON**.
3. Monitor fuel balance as it takes little time for fuel to balance unless out of balance by large amounts.
4. When wing tanks are balanced, set both Standby Pump Switches to **OFF**.
5. Crossflow Valve Switch - **CLOSE**.

Note: *In Prepar3D, the Crossflow (Crossfeed) Switch cannot be used to transfer fuel from one wing tank into the other, like in the real aircraft.*

Single Engine Operation

To crossfeed fuel to operating engine, proceed as follows:

1. Fuselage Tank Pump Switch [6, fig. 5-45a; 5, fig. 5-45b] - **OFF**.
2. Crossflow Valve Switch [3, fig. 5-45a; 2, fig. 5-45b] - **OPEN**.
3. Standby Pump Switch [8 or 9, fig. 5-45a; 7 or 8, fig. 5-45b] of operative engine - **OFF**.
4. Standby Pump Switch [8 or 9, fig. 5-45a; 7 or 8, fig. 5-45b] of inoperative engine - **ON**.

AUTOMATIC FLIGHT CONTROL SYSTEM (AFCS)

The GLJ Model 25/28 v4 addon is equipped with a modified J.E.T. FC-110 autopilot and a modified Collins FD-108 Integrated Flight System (flight director). Both units have been modified from the ones installed in the real aircraft because of software limitations in Prepar3D, but also for the desktop pilot to benefit from additional AP/FD modes that are available in the simulator but not available in the real aircraft (refer to the comparison table on page 6-47 at the end of this section, for more details).

Note: *Significantly modifying the simulator's autopilot goes beyond the scope of this project. As Prepar3D evolves, so will the systems in future versions of this addon.*

Autopilot

The autopilot (AP) reduces the pilot's workload by flying the airplane to and maintaining desired altitudes, attitudes, and headings. It can also capture and track VOR/ILS radio signals, among other functions.

The modified J.E.T. FC-110 autopilot installed in the GLJ Model 25/28 v4 addon can:

- Level the wing so that the airplane does not turn
- Maintain a selected altitude

- Maintain a selected rate of climb or descent
- Maintain the aircraft's current pitch attitude
- Maintain a selected heading
- Follow a VOR radial
- Track a localizer or localizer back course
- Track the localizer and glide slope of an instrument landing system (ILS)
- Track a GPS course (and waypoints)
- Assist the pilot during takeoff and go-around
- Maintain a selected airspeed or Mach number
- Remove unwanted yaw (yaw damping)
- React in case of an overspeed or stall condition by automatically pulling or pushing the stick

The flight controller (FC-110 control panel) [fig. 5-46] is mounted in the center pedestal, below the fuel panel. The system requires AC, DC, and avionics power: Battery [8-9, fig. 5-30] and/or Generator Switches [6, 11, fig. 5-30] **ON**, Inverter Switches [10, 12, fig. 5-29] **ON**, and Master Radio (avionics) Switch [14, fig. 5-29] **ON**.

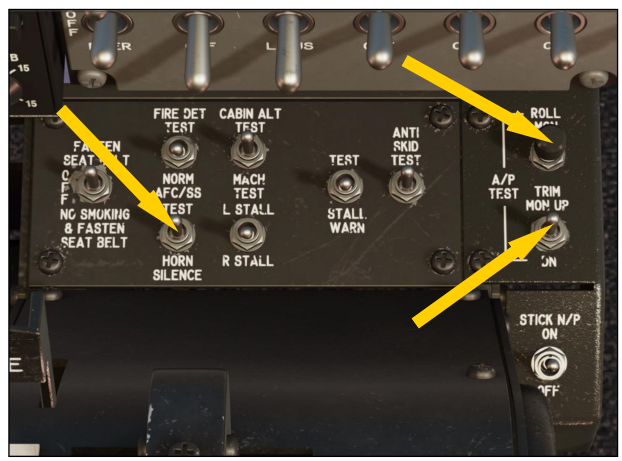
The flight controller contains several mode buttons, the Autopilot Engage Button, the ON/OFF lights, the Turn Command Knob, and the Pitch Command Wheel. Yaw damper ON/OFF buttons are also included. The dual yaw damper system is independent from the autopilot and additional controls are available in the yaw damper panel in the center pedestal, below the flight controller [fig. 5-47].

Autopilot effort indicators, normally installed on the main instrument panel in front of the pilot, are not available in Prepar3D and have been replaced by surface trim indicators [3-4, 11, fig. 5-47].

In the real aircraft, the autopilot controls are separate from the flight director controls. In the GLJ Model 25/28 v4 addon, the autopilot modes are interrelated with the flight director modes to comply with the way the autopilot and the flight director work together in the simulator. Additional AP/FD modes are available by depressing Korry switches located on the main instrument panel [fig. 5-22a/b].

A NAV1/GPS Switch [12, fig. 5-22b] is provided on the main instrument panel for selecting which navigation signal - either from the NAV1 radio or from the installed navigation system (GPS/GNS/GTN) - is sent to the AFCS.

Autopilot Test Switches



Switches are provided on the center pedestal, between the main instrument panel and the throttle quadrant, to test the autopilot. These switches are functional and can be used to simulate standard procedures.

AFC/SS (Autopilot/Stability System) Test Switch
[11, fig. 5-43]

In the simulator, this 3-position switch, when set to the AFC/SS position, is used to test the bulbs in all the AFCS and flight director lights and annunciators. In the real aircraft, it also tests the AFCS stability system.

Autopilot Roll Monitor Test Button
[18, fig. 5-43]

This button, marked ROLL MON, is used to test the autopilot disengage function when an improper electrical signal is introduced to the roll function. The button has two positions: hold to TEST and a spring-loaded OFF position. In the simulator, pushing this button to **TEST** will disengage the autopilot.

Autopilot Pitch Trim Monitor Switch
[19, fig. 5-43]

This 3-position switch, marked TRIM MON UP/DN, is used to test the autopilot disengage function when an improper electrical signal is introduced to the pitch function. The switch is spring-loaded to the middle **OFF** position. In the simulator, setting this switch to **UP** or **DN** will disengage the autopilot.

Flight Director

The flight director (FD) helps the pilot do manually what the autopilot would do if it were engaged. It provides visual commands to the pilot to manually maintain a desired attitude, capture and maintain a desired heading, capture and maintain a desired VOR course, and capture and maintain an ILS course and glide path.

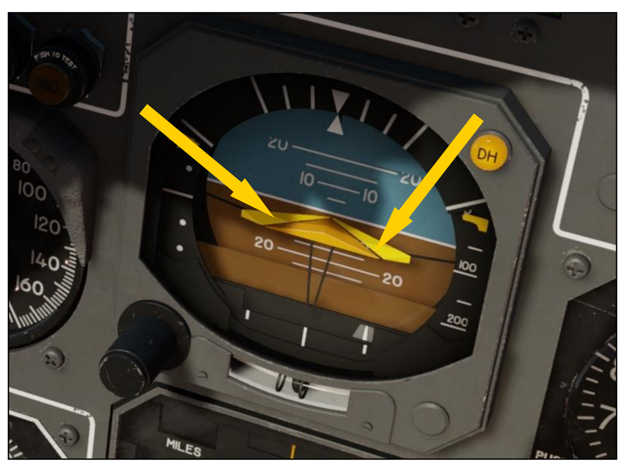
The flight director requires the pilot to select an operating mode. With the flight director turned **ON** and autopilot modes selected - but the autopilot not engaged - the flight director shows what the autopilot would do if it were engaged. When both the flight director and the autopilot are **engaged**, the flight director shows what the autopilot is doing.

The modified Collins FD-108 Integrated Flight System (flight director) installed in the GLJ Model 25/28 v4 addon includes:

- A flight director power switch [2, fig. 5-22a]
- An attitude director indicator (ADI) [fig. 5-7]
- A horizontal situation indicator (HSI) [fig. 5-8]
- Course [1, fig. 5-8] and heading [2, fig. 5-8] selector knobs located on the HSI
- A mode selector panel with Korry switches [fig. 5-22a/b]
- Two annunciator panels [fig. 5-6]
- A pitch sync and other buttons located on the control yokes [fig. 5-51]

The flight director provides indication of airplane heading on the HSI and roll and pitch attitude and sideslip on the ADI.

Two yellow flight director command bars on the ADI [4, fig. 5-7] - sometimes called chevron or V-bars - indicate deviation from the suggested heading and pitch attitude. The idea is to move the yoke to keep the orange chevron [3, fig. 5-7] (that represents the aircraft) nestled just under the yellow command bars. In other words, to follow the command bars or to keep them centered.

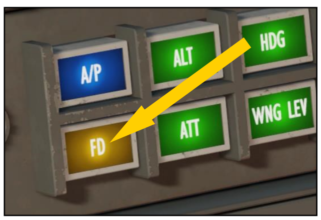


The aircraft should be maneuvered to satisfy the flight director command bars on the ADI. However, the flight director may sometimes command a momentary large correction to an important deviation from the calculated attitude. The pilot should not follow these large variations implicitly but rather interpret them as advisory.

Remember: *You are still hand-flying the aircraft, so common sense still applies, and exaggerated attitudes should be avoided.*

The command bars are biased out of view when the flight director is not engaged. The basic attitude reference mode is energized when AC and DC power is applied to the airplane but with no modes selected on the mode selector panels and on the flight controller.

The Flight Director Power Switch, marked FD, [2, fig. 5-22a] toggles the flight director ON and OFF.



Known issue: *On some occasions, it might be necessary to reset the flight director if the V-bars are not responding properly. If you suspect that the flight director is not giving you correct indications, simply turn the Flight Director Power Switch to* ***OFF****, then back to* ***ON*** *again. This seems to be a simulator issue.*

Attitude Direction Indicator (ADI)

The attitude director indicator (ADI) [fig. 5-7] provides a presentation of the airplane attitude, localizer and glideslope deviation, bank angle, and airplane slip or skid.

When the flight director is engaged, command bars on the ADI appear in view to provide the computed roll and pitch commands. These bars move up or down to command pitch, and clockwise or counterclockwise to command bank. The pilot must maneuver the airplane so that the fixed airplane symbol (the orange chevron) is “flown into” the command bars and the two are aligned to satisfy the commands.

Horizontal Situation Indicator (HSI)

The horizontal situation indicator (HSI) [fig. 5-8] displays airplane position and heading with respect to magnetic north, selected heading, slant range DME distance from a selected station, lateral deviation from a selected VOR or localizer course, and vertical deviation from the center of a glideslope beam.

Two controls are located on the HSI:

Heading Selector Knob
[2, fig. 5-8]

Rotating the HDG selector knob sets the yellow heading marker (bug) to the desired heading as read on the azimuth card.

NAV1 Course Knob
[1, fig. 5-8]

The COURSE selector knob rotates the course arrow to a magnetic heading and/or selects a VOR or localizer course tuned on the NAV1 radio.

Important Changes to the Gyro Drift Compensation Switch, the Directional Gyro Compensation Knob, and the Directional Gyro Free/Slave Switch

By default, the direction indicators (HSI, RMI, directional gyro, etc.) in the cockpit of the GLJ Model 25/28 v4 are configured to be slaved to an electro-magnetic slaved compass. This mode of operation normally requires no gyro drift correction on the part of the pilot and is used in areas where magnetic references are reliable. When this mode of operation is selected in Prepar3D, it is not possible to make manual corrections by using the Gyro Drift Compensation Switch or the Directional Gyro Compensation Knob, even when the Directional Gyro Free/Slave Switch is set to **FREE**.

In the real aircraft: *The directional gyroscope in the real aircraft can operate in two modes: the SLAVE mode and the FREE mode. When the Directional Gyro Free/Slave Switch is set to SLAVE, the directional gyro is slaved to the magnetic flux valve for correcting the apparent gyro drift. When the switch is set to FREE, the pilot is free to make manual corrections with the Gyro Drift Compensation Switch (or the Directional Gyro Compensation Knob). The SLAVE position is the normal mode of operation in areas where magnetic references are reliable.*

Unfortunately, Prepar3D does not provide means for switching from the **SLAVE** mode to the **FREE** mode or vice versa after the aircraft model is loaded in the simulator. Add-on aircraft developers and users must decide in advance if they want the direction indicators in the cockpit to be slaved to an electric gyroscope (FREE mode) or to an electro-magnetic slaved compass (SLAVE mode). This is set in the `[direction_indicators]` section of the "**aircraft.cfg**" (the aircraft configuration file located in the add-on aircraft's main folder):

```
[direction_indicators]
direction_indicator.0 = 3
```

The first number ("0") is the reference for the direction indicator, the second number ("**3**") is the type of device to which the direction indicator is slaved. In Prepar3D, the types are:

0. None
1. Vacuum gyro
2. Electric gyro
3. **Electro-mag slaved compass**
4. Slaved to another indicator

By default, the direction indicators in the GLJ Model 25/28 v4 addon are set to operate in **mode "3" (electro-mag slaved compass)** and **do not require manual adjustments**. This is how the direction indicators in most of the stock aircraft included with Prepar3D are configured.

If you prefer to have full control over the instrument, for example if you fly in areas where magnetic references are not reliable, you can switch to **mode "2" (electric gyro)** by changing the value in the "aircraft.cfg".

Also, consider that in mode "2", you will need to make manual gyro drift corrections periodically. If you don't want to make manual gyro drift corrections, you can disable gyro drift on the "Prepar3D > Top Menu Bar > Options > General > **Realism**" page:

1. Enable gyro drift - **UNSELECTED.**

Please note that in the current software version, the Directional Gyro Free/Slave Switch [9, fig. 5-5] does not work like in the real aircraft for the reasons mentioned above and has no special function except to disengage the autopilot when clicked.

Autopilot/Flight Director Buttons, Switches, Knobs, and Lights

While all the mode buttons in the real aircraft are solenoid engaged and stay depressed until canceled by other operations, the buttons in the GLJ Model 25/28 v4 addon are of the **momentary type**. When the ENGAGE button or any mode button on the flight controller is depressed, a light inside the button will illuminate and extinguish when the mode is disengaged, like in the real aircraft.

A/P (Autopilot Engage) Button and Light
[1, fig. 5-46]

When depressed, this (blue) button engages the autopilot, captures and maintains the aircraft's pitch attitude and levels the wing, like in the real aircraft.

This is a very convenient feature, especially after takeoff. With a nose up pitch of about 15 to 20 degrees and speed stabilized, you can engage the autopilot and it will capture and keep the aircraft's attitude and level the wing. You can also engage the ATT Hold mode, if desired.

You can use the Autopilot Pitch Command Wheel [10, fig. 5-46] to control the pitch. You can also initiate a turn with the Autopilot Turn Command Knob [2, fig. 5-46] (this will disengage the wing leveler). Click either knob to reset, capture and maintain the aircraft's pitch attitude and level the wing.

Please remember that when the autopilot is engaged, the pilot cannot control the aircraft. Either the autopilot is controlling the aircraft, or the pilot is. When the autopilot is engaged, it controls both pitch and roll, and the flight director displays both pitch and roll commands.

Important

- With this type of aircraft, the autopilot should never be used for takeoff or landing. If the autopilot was tested or engaged prior to takeoff, always remember to turn it off and check the elevator trim indicator [3, fig. 5-14] for the correct takeoff position (about one needle thickness below center). When engaged while the aircraft was on the ground, the autopilot might have tried to compensate by running the trim all the way nose up or nose down. If unnoticed, you may lose control of the aircraft during takeoff. For the same reason, do not attempt to control the aircraft manually with the joystick while the autopilot is engaged. The autopilot will compensate by running the trim and could even disengage itself after hitting the trim limits. This may lead to very unpleasant situations.

Note: *It is good practice to verify that the heading bug, altitude select, and course select are properly set before engaging the autopilot.*

Known issue: *Repositioning the addon at altitude with the Prepar3D map while the autopilot is engaged may lead to unpredictable aircraft behavior. To avoid this issue, disengage the autopilot before repositioning the addon with the map. This seems to be a simulator issue.*

NAV1/GPS Switch
[12, fig. 5-22b]

This switch, located on the main instrument panel, is used for selecting which navigation signal - either from the NAV1 radio or from the installed navigation system (GPS/GNS/GTN) - is sent to the AFCS.

If the NAV1/GPS Switch is set to **NAV**, the autopilot intercepts, captures and tracks the VOR course or localizer tuned on the NAV1 radio [fig. 5-19] and set on the course needle on the HSI [8, fig. 5-8].

If the NAV1/GPS Switch is set to **GPS**, the autopilot will follow the programmed GPS course (from the installed navigation system) to each lateral waypoint in sequence. However, the GPS does not provide vertical guidance to the autopilot.

Note: *Like in the real aircraft, the autopilot/flight director cannot track signals coming from the NAV2 radio.*

Turn Command Knob
[2, fig. 5-46]

With the autopilot engaged, this knob will command bank angles, but it will disengage any horizontal mode that was engaged before (HDG, NAV, REV CRS, LOC, APPR). It will also disengage the Wing Leveler. Use the mouse wheel to control the bank. Click the knob to center both the knob and the ailerons, to capture and maintain the aircraft's pitch and to level the wing.

REV CRS (Reverse Course Approach Mode) Button and Light
[3, fig. 5-46]

The REV CRS Button engages the autopilot Reverse Course Approach mode, enabling automatic tracking of a localizer (or GPS) back course for instrument approaches. The navigation radio [fig. 5-19] must be tuned to a localizer frequency and when engaged, the function is like the APPR mode, except the glide slope is disabled and the autopilot's response to a localizer signal is **reversed**.

Depressing the REV CRS button will disengage the NAV and G/S modes, will turn on the flight director and will engage the WING LEV if the autopilot is disengaged.

Note: *In Prepar3D, the APPR Switch [11, fig. 5-22b] will be illuminated when the REV CRS mode is engaged. This is because the simulator recognizes the REV CRS mode as an approach mode.*

NAV (Navigation Hold Mode) Button and Light
[4, fig. 5-46]

The NAV Button is pressed to engage the autopilot Navigation Hold mode, the autopilot automatic tracking of a VOR course, GPS course, or localizer for navigation. If the NAV1/GPS Switch [12, fig. 5-22b] is set to **NAV**, the autopilot intercepts, captures and tracks the VOR course or localizer tuned on the NAV1 radio [fig. 5-19] and set on the course needle on the HSI [8, fig. 5-8]. If the NAV1/GPS Switch is set to **GPS**, the aircraft captures and tracks the course to the next GPS waypoint.

Engaging the NAV Hold mode will disengage the LOC, APPR and REV CRS modes. It will also turn on the flight director and engage the WING LEV if the autopilot is disengaged.

HDG (Heading Hold Mode) Button and Light
[5, fig. 5-46]

The HDG Button is pressed to activate the Heading Hold mode of the autopilot. This mode commands the autopilot to turn the airplane as necessary and fly a heading selected by the position of the yellow heading bug on the HSI [11, fig. 5-8].

Note: *In Prepar3D, this mode has priority over other horizontal modes including the NAV mode. It will also disengage the WING LEV, ATT, and REV CRS modes, and will engage the flight director if the autopilot is disengaged.*

G/S ARM (Glideslope Tracking Mode) Button and Light
[6, fig. 5-46]

When the G/S ARM Button is pressed, the autopilot will capture and track the ILS glideslope signal. For the G/S mode to function, the NAV1 radio [fig. 5-19] must be tuned to a localizer frequency and an active glideslope signal must be present. For the autopilot to capture a glideslope, you must intercept it from below. Although it is possible to capture a glideslope from above, standard operating procedure is to intercept and capture glideslopes from below.

When the G/S mode is engaged, the NAV,

REV CRS, and LOC modes are disengaged. The APPR mode will also be disengaged if the coupled approach mode is disengaged (G/S mode only). The flight director will be turned on and the WING LEV will engage if the autopilot is disengaged.

ALT (Altitude Hold Mode) Button
[7, fig. 5-46]

The ALT Button engages the autopilot Altitude Hold mode. When engaged, the aircraft climbs/descends to the altitude set on the Altitude Preselector on the ADDU [2, fig. 5-11a] at the rate set with the Vertical Speed Selector Knob [1, fig. 5-12]. By varying the selected vertical speed, pitch control is obtained. Because the Learjet 25/28 has an amazing climb performance, power management during climb is very important. When the ALT Hold mode is engaged, the ATT mode is disengaged. The flight director will be turned on and the WING LEV will engage if the autopilot is disengaged.

Autopilot OFF Light
[8 fig. 5-46]

The amber Autopilot OFF Light is illuminated anytime the AFCS is powered up with the autopilot not engaged.

Autopilot ON Light
[9, fig. 5-46]

The green Autopilot ON Light is illuminated when the autopilot is engaged with any pitch and/or roll mode engaged.

Pitch Command Wheel
[10, fig. 5-46]

When the autopilot is engaged and the Pitch Command Wheel is rotated, the autopilot will change the aircraft's pitch attitude in response to the pitch command rotation and will follow the flight director's pitch angle. The ALT mode will disengage. Click the knob to reset, capture and maintain the pitch attitude, and level the wing.

Primary Yaw Damper Buttons
[11-12, fig. 5-46]

The YAW DAMPER **ON** Button engages the primary yaw damper system which helps eliminate unwanted aircraft yaw and keeps turns coordinated. Depressing the YAW DAMPER **OFF** Button will disengage the primary yaw damper system.

The GLJ Model 25/28 v4 addon is equipped with a dual (primary and secondary) yaw damper system, like in the real aircraft. Each system is completely independent and only one yaw damper system can be engaged at a time. To engage the primary yaw damper system, the Yaw Damper Selector Switch on the yaw damper panel [5, fig. 5-47] must be set to **PRI YAW DAMPER**. Selecting the second-

ary yaw damper system will disengage the primary yaw damper system.

Yaw Damper Selector Switch
[5, fig. 5-47]

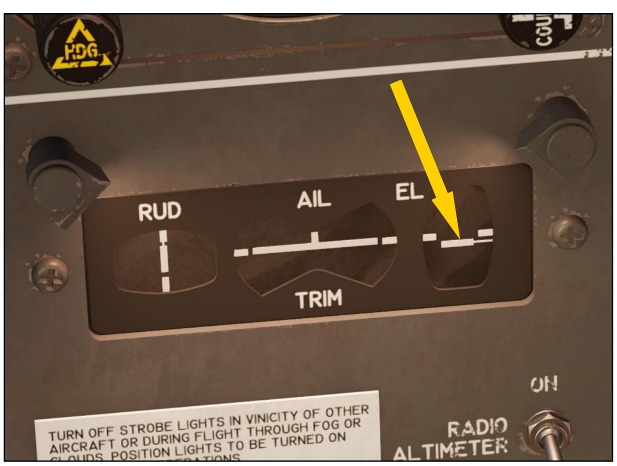
The Yaw Damper Selector Switch on the yaw damper panel selects the primary yaw damper system when set to **PRI YAW DAMPER** and the secondary yaw damper system when set to **SEC YAW DAMPER**. Only one yaw damper system can be engaged at a time.

Secondary (Emergency) Yaw Damper Switch
[6, fig. 5-47]

The Secondary Yaw Damper Switch on the yaw damper panel engages or disengages the secondary yaw damper system in case of emergency. To engage the secondary yaw damper, the Yaw Damper Selector Switch [5, fig. 5-47] must be set to **SEC YAW DAMPER**. Selecting the primary yaw damper will disengage the secondary yaw damper.

Autopilot Effort Indicators (Surface Trim Indicators in the simulator)
[1-3, fig. 4-14]

In the real aircraft, an autopilot effort monitor senses the autopilot output signals (forces being applied to the autopilot servo actuators). Autopilot effort indicators, normally installed on the main instrument panel in front of the captain, are not available in Prepar3D and have been replaced by surface trim indicators. We believe that installing surface trim indicators in front of the captain's seat is much more convenient than at the bottom of the center pedestal, like in the real aircraft.



Note: *This panel is essentially a repeater of the Trim Indicator Panel installed in the center pedestal [3-4, 11, fig 5-47].*

Important

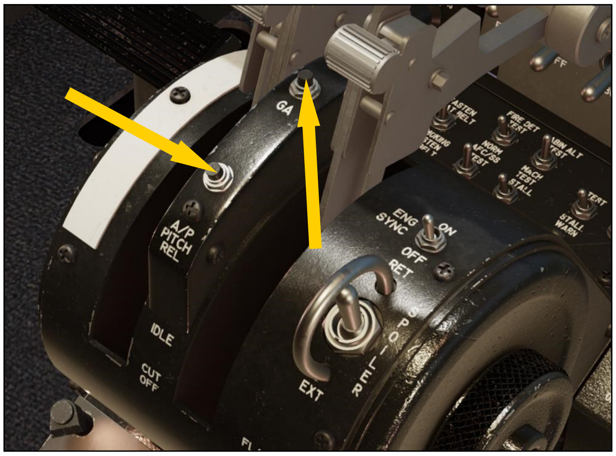
- If the autopilot is tested or engaged before flight, the autopilot will move the horizontal stabilizer (elevator trim) out of range for takeoff. Prior to takeoff, disengage the autopilot and set the elevator trim correctly for takeoff - normally about one needle thickness below center. The autopilot should never be used for takeoff.

Autopilot Vertical Speed Selector Knob
[1, fig. 5-12]

The Autopilot Vertical Speed Selector Knob (and bug) on the Vertical Speed Indicator (VSI) enables the selection of a climb/descent rate for the autopilot to use when climbing or descending to the altitude set on the Altitude Preselector [2, fig. 5-11a] when the ALT Hold mode is engaged (by default, 1,000 ft./min.). By varying the selected vertical speed with the Autopilot Vertical Speed Selector Knob, pitch control is obtained. Because the Learjet 25/28 has an amazing climb performance, power management during climb is very important.

GA (Takeoff/Go-Around) Button
[22, fig. 5-43]

Depressing the GA Button, located on top of the throttle quadrant, disengages all autopi-



lot pitch, roll and speed modes, turns on the flight director and engages the autothrottle Takeoff/Go-Around (TOGA) mode. Throttles automatically advance to takeoff power, the WING LEV is engaged, vertical speed is set to 4,500 fpm, and the flight director indicates takeoff pitch. The pilot still has manual control of the pitch until the autopilot is engaged. The autopilot can be engaged after the aircraft has taken off and will follow the flight director's takeoff pitch.

Releasing the button disengages the TO/GA mode, engages the autopilot (if not already engaged), levels the wing, and captures and maintains the aircraft's pitch attitude. The TO/GA mode can be used for takeoff, or for a go-around on landing.

Note: *The autothrottle is not available in the real aircraft.*

Important

- The autopilot should never be engaged before depressing the GA button for takeoff. The elevator trim should always be checked and set correctly before takeoff.

A/P PITCH REL (Autopilot Pitch Release) Button
[24, fig. 5-43]

When depressed, this button, located on top of the throttle quadrant, disengages the autopilot pitch and speed modes (ATT, ALT, C/APPR, G/S, SPD/MACH). Releasing the button engages the autopilot (if not already engaged), captures and maintains the aircraft's pitch attitude and engages the WING LEV.

Stick Nudger/Puller

Autopilot Stick Nudger/Puller Switch
[21, fig. 5-43]

This switch, marked STICK N/P, is used to toggle on/off the autopilot stick nudger (pusher)/puller. If this switch is set to **ON**, the autopilot will automatically push the stick in case of a stall condition or pull the stick in case of an overspeed condition. When the aircraft recovers from an overspeed or stall condition, the stick nudger/puller releases and the autopilot maintains the pitch attitude and levels the wing. The pilot may compensate with the Autopilot Pitch Command Wheel [10, fig. 5-46], if needed. By default, this switch is set to **ON**.

Control Yoke Buttons

While it may not be easy to click buttons on a moving yoke [fig. 5-51] during a simulated flight, you may program the switches and buttons on your controller (joystick/yoke) to trigger some of the actions described below, such as temporarily disconnecting the autopilot or some individual modes. Refer to the documentation included with your simulation platform and controller for instructions on how to assign simulator commands to buttons and switches on your controller.

Four-Way Trim Switch
[4, fig. 5-51]

In the real aircraft, with the autopilot engaged and the center arming button [3, fig. 5-51] depressed, this four-position switch (like

a directional pad on a video game controller) is used to change the attitude of the aircraft - in pitch and roll - when the autopilot's pitch, roll and speed modes are temporarily disengaged. This switch is disabled in the simulator. However, buttons may be programmed on your controller for pitch and roll trim.

Trim Switch Arming Button
[3, fig. 5-51]

When this button at the center of the four-way trim switch is momentarily depressed, the autopilot and all pitch, roll and speed modes are disengaged. Releasing the button reengages the autopilot, levels the wing and maintains the aircraft's pitch attitude.

Maneuver Control Button
[5, fig. 5-51]

Depressing this button momentarily disconnects the autopilot pitch, roll and speed modes. Releasing the button reengages the autopilot (if not already engaged), levels the wing and maintains the aircraft's pitch attitude.

Pitch Sync Button
[6, fig. 5-51]

When depressed, this button disengages the autopilot pitch and speed modes. Releasing the button reengages the autopilot (if not already engaged), levels the wing and maintains the aircraft's pitch attitude.

AP/FD Mode Selector Panels (Korry Switches)

Additional autopilot/flight director modes are available by depressing Korry switches in the mode selector panel located on the main instrument panel [fig. 5-22a/b].

The light indicates that the mode is engaged.

A/P (Autopilot Engage) Switch and Light
[1, fig. 5-22a]

Same as the A/P ENGAGE Button [1, fig. 5-46] on the flight controller (see page 37, in this section).

ALT (Altitude Hold Mode) Switch and Light
[3, fig. 5-22a]

Same as the ALT Hold Mode Button [7, fig. 5-46] on the flight controller (see page 39, in this section).

HDG (Heading Hold Mode) Switch and Light
[5, fig. 5-22a]

Same as the HDG Hold Mode Button [5, fig. 5-46] on the flight controller (see page 38, in this section).

NAV LOC (Navigation/Localizer Hold Mode) Switch and Light
[7, fig. 5-22a]

Same as the NAV Hold Mode Button [4, fig. 5-46] on the flight controller (see page 38, in this section).

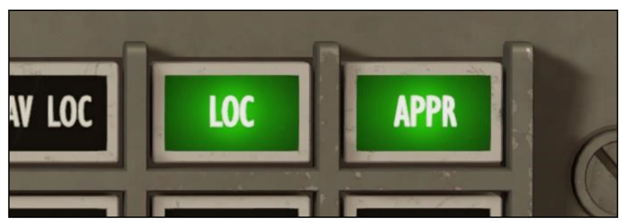
LOC ("Localizer Only" Approach Mode) Switch and Light
[9, fig. 5-22b]

The LOC Switch disengages the autopilot NAV and G/S modes and engages the "Localizer Only" approach mode, enabling automatic tracking of a VOR course, GPS course or localizer for instrument approaches. Localizer capture is identical with the NAV Hold mode.

If the NAV1/GPS Switch on the main instrument panel [12, fig. 5-22b] is set to **NAV**, the autopilot intercepts, captures and tracks the VOR course, localizer and glideslope tuned on the NAV1 radio [fig. 5-19] and set on the course needle on the HSI [8, fig. 5-8]. If the NAV1/GPS Switch is set to **GPS**, the autopilot will follow the programmed GPS course to each lateral waypoint in sequence.

When the LOC mode is engaged, the flight director is turned on and the WING LEV is engaged if the autopilot is disengaged.

In the current simulation platforms, the APPR Switch [11, fig. 5-22b] is illuminated when the LOC mode is engaged. This is because the simulator recognizes the LOC mode as an approach mode.



APPR (Coupled Approach Mode) Switch and Light
[11, fig. 5-22b]

The APPR Switch disengages the NAV mode and engages the autopilot Coupled (navigation plus glideslope) Approach mode or C/APPR, enabling automatic tracking of a VOR course, GPS course, localizer, and glideslope for instrument approaches. Localizer capture in the C/APPR mode is identical with the NAV or LOC modes. In addition, the C/APPR mode provides for glideslope arm and capture.

If the NAV1/GPS Switch on the main instrument panel [12, fig. 5-22b] is set to **NAV**, the autopilot intercepts, captures and tracks the

VOR course, localizer and glideslope tuned on the NAV1 radio [fig. 5-19] and set on the course needle on the HSI [8, fig. 5-8]. If the NAV1/GPS Switch is set to **GPS**, the autopilot will follow the programmed GPS course to each lateral waypoint in sequence. However, the GPS does not provide vertical (G/S) guidance to the autopilot.

Engaging the C/APPR mode in the simulator will disengage the NAV mode and will turn on the flight director and engage the wing leveler if the autopilot is disengaged.

For G/S ARM mode to function, the NAV1 radio must be tuned to a localizer frequency and an active glideslope signal must be present. When a valid ILS signal is present on the NAV1 receiver, the system will intercept and capture the localizer path and the glideslope.

It is sometimes recommended that the interception be initiated on HDG Hold mode until a shallow interception angle is established.

For the autopilot to capture a glideslope, you must intercept it from below. Although it is possible to capture a glideslope from above, standard operating procedure is to intercept and capture glideslopes from below.

In Prepar3D, the APPR Switch is illuminated when the LOC mode is engaged but not when the G/S (only) mode is engaged. This is because the simulator recognizes the LOC mode as an approach mode. Following the same logic, the simulator does not recognize the G/S mode as a true approach mode.

When the LOC "Localizer Only" approach mode is engaged, the G/S mode is disengaged and the G/S Arm Button [6, fig. 5-46] is off. Both the LOC and APPR switches are still illuminated.

When the APPR Switch is depressed, both the LOC approach mode and the G/S mode are engaged in a **coupled approach** mode (C/APPR). Both the LOC and APPR switches are still illuminated.

This may be a bit confusing at first, but the logic makes sense.

When the APPR mode is engaged, the flight director is turned on and the WING LEV is engaged if the autopilot is disengaged. When the APPR mode is disengaged, both the LOC and G/S modes are disengaged.

The flight director NAV ARM (or NAV CAPT) and GS ARM (or GS CAPT) annunciators [fig. 5-6] are both illuminated when the C/APPR (Coupled Approach) mode is engaged. If the LOC mode is engaged, only the NAV ARM (or NAV CAPT) annunciators are illuminated.

SPD (Airspeed Hold Mode) Switch and Light
[8, fig. 5-22a]

This switch, when depressed, will engage the autopilot Airspeed Hold mode. The SPD Hold mode maintains the aircraft at the indicated airspeed that existed when the switch was depressed. The SPD Switch must be used at altitudes below 29,000 feet. Like in the real aircraft, above 29,000 feet, the autopilot will automatically switch to the Mach Hold mode.

In Prepar3D, the SPD Hold function is always assumed by the autothrottle.

Note (1): *The real Gates Learjet 20 Series aircraft were not equipped with an autothrottle for SPD/MACH Hold, even though we are giving our users the option to use the autothrottle that is readily available in Prepar3D. We know purists may find this feature unrealistic in the case of the Learjet 25/28 (in some of the real aircraft, the autopilot maintained speed by varying the aircraft's pitch) but the vast majority of our users still appreciate the convenience of an autothrottle, especially when learning to fly the aircraft when there is so much to do.*

Note (2): *The beta "SPD P" autopilot speed control mode from the previous addon version was removed from the AFCS because of unsolvable stability issues and software limitations in Prepar3D. "Speed Hold by Pitch" and "Flight Level Change" speed control modes are not natively supported in Prepar3D and were not available in most Learjet 20 Series aircraft.*

MACH (Mach Hold Mode) Switch and Light
[10, fig. 5-22b]

This switch, when depressed, will engage the autopilot MACH Hold mode. The MACH Hold mode maintains the aircraft at the Mach number that existed when the switch was depressed. The MACH Hold Switch must be used at altitudes above 29,000 feet. Like in the real aircraft, below 29,000 feet, the autopilot will automatically switch to the SPD Hold mode.

In Prepar3D, Mach hold is always assumed by the autothrottle.

*See **notes (1) and (2)** on previous page.*

WING LEV (Wing Leveler) Switch and Light
[6, fig. 5-22a]

The WING LEV Switch disengages the HDG, and REV CRS modes and engages the Wing Leveler which keeps the aircraft's wing level. The Wing Leveler is engaged automatically when the autopilot and/or some AP/FD modes are engaged. The flight director is turned on when the WING LEV is engaged and the autopilot is disengaged.

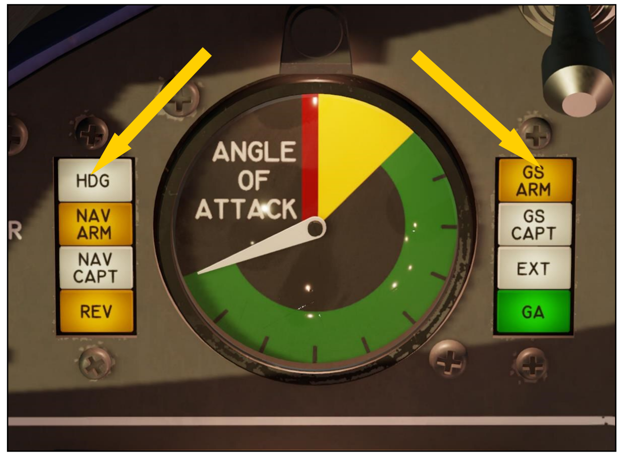
Note: *The WING LEV mode is no longer engaged automatically when the ATT Hold mode is engaged.*

ATT (Attitude Hold Mode) Switch and Light
[4, fig. 5-22a]

In Prepar3D, the ATT Hold Switch disengages the HDG and REV CRS modes and engages the Attitude Hold mode which keeps the aircraft's pitch at the state that existed when the switch was depressed. By turning the Pitch Command Wheel [10, fig. 5-46] you can control the pitch when the ATT Hold mode is engaged. Depressing the ATT Switch will also turn on the flight director if the autopilot is disengaged.

Note (1): *The WING LEV mode is no longer engaged automatically when the ATT Hold mode is engaged.*

Note (2): *In Prepar3D, the ATT Hold mode only captures and maintains the pitch, not the pitch and the roll.*



Flight Director Annunciators

The flight director annunciators are located on each side of the angle-of-attack indicators [fig. 5-6] (on both the captain's and copilot's instrument panels).

HDG (Heading Hold Mode) Annunciator
[4, fig. 5-6]

This white annunciator, when illuminated, indicates that the HDG Hold mode is engaged.

NAV ARM (Navigation Arm) Annunciator
[3, fig. 5-6]

In the simulator, this amber annunciator, when illuminated, indicates that one of the NAV/LOC/APPR/REV CRS modes is engaged, but that a course signal has not yet been captured. When course capture is achieved, the NAV ARM Annunciator will go off and the NAV CAPT Annunciator (below) will illuminate.

NAV CAPT (Course Capture) Annunciator
[2, fig. 5-6]

This white annunciator, when illuminated, indicates that course capture is achieved.

REV (Reverse Course Mode) Annunciator
[1, fig. 5-6]

This amber annunciator, when illuminated, indicates that the REV CRS mode is engaged.

GS ARM (Glideslope Arm) Annunciator
[6, fig. 5-6]

In the simulator, this amber annunciator, when illuminated, indicates that either the (coupled) APPR mode or the G/S mode is engaged, but that a glideslope has not yet been captured. When the glideslope is captured, the GS ARM Annunciator will go off and the GS CAPT Annunciator (below) will illuminate. Glideslope capture is independent of localizer capture. Glideslope capture is possible when the aircraft is approaching the glideslope from below or from above the actual glideslope.

GS CAPT (Glideslope Capture) Annunciator
[7, fig. 5-6]

This white annunciator, when illuminated, indicates that glideslope capture is achieved.

EXT (Course and Glideslope Capture) Annunciator
[8, fig. 5-6]

This white annunciator, when illuminated, indicates that both navigation course and glideslope are captured.

GA (Takeoff/Go-Around Mode) Annunciator
[9, fig. 5-6]

This green annunciator, when illuminated, indicates that the Takeoff/Go-Around mode is engaged.

AP/FD OPERATION COMPARED TO THE REAL AIRCRAFT

The GLJ Model 25/28 v4 addon uses the native autopilot and flight director that come with Prepar3D. While we have modified some of the logic that governs the interrelations between the different AP/FD modes of operation to make these systems comparable to the ones installed in the real aircraft, there are still some differences that persist. This is for the most part due to how the autopilot works in the simulator. Because of software limitations in Prepar3D, the new logic only applies to the AP/FD switches, buttons, and knobs in the virtual cockpit. The new logic won't apply to the simulator's keyboard shortcuts that have their own built-in logic.

If you prefer a mode of operation that is closer to the one with the real aircraft, please use the controls in the virtual cockpit and not the keyboard shortcuts. If you prefer the default AP/FD logic from the simulator, you can use the keyboard shortcuts.

Below is a detailed comparison between the autopilot and the flight director in the Xtreme Prototypes GLJ Model 25/28 v4 addon and their counterparts installed in the real aircraft.

Autopilot/Flight Director Comparison

AP/FD Mode or Function	**Real Gates Learjet 25/28 Aircraft J.E.T FC-110 Autopilot/Collins FD 108 Flight Director**		**GLJ Model 25/28 v4 Addon Modified Prepar3D Autopilot/Flight Director**	
	Engaged, ON, Depressed or Moved	**Disengaged, OFF, Released or Reset**	**Engaged, ON, Depressed or Moved**	**Disengaged, OFF, Released or Reset**
ENGAGE AP	▪ Illuminated when the AP is engaged ▪ Engages the AP ▪ FD already on ▪ Engages pitch and roll axes, maintains heading and levels wing	▪ Off when the AP is disengaged ▪ Disengages the AP ▪ Disengages pitch and roll axes	▪ Illuminated when the AP is engaged ▪ Engages the AP ▪ Captures and maintains the aircraft's pitch attitude ▪ Engages the WING LEV if the flight director is off ▪ Disengages ALT (can be reengaged later)	▪ Off when the AP is disengaged ▪ Disengages the AP ▪ Disengages all modes (except speed modes) if the FD is off
FD	▪ The FD becomes active when the AFCS is powered up ▪ Basic attitude reference provided when energized	▪ The FD is off when the AFCS is off	▪ Illuminated when the FD is on ▪ Turns on the FD ▪ Engages the WING LEV if the autopilot is disengaged	▪ Off when the FD is off ▪ Turns off the FD and all modes (except speed modes) if the AP is disengaged
REV CRS	▪ Illuminated when REV CRS is engaged ▪ Engages REV CRS ▪ Disengages HDG	▪ Off when REV CRS is disengaged ▪ Disengages RV CRS	▪ Illuminated when REV CRS is engaged ▪ Engages REV CRS ▪ Turns on the FD and engages the WING LEV if the AP is disengaged ▪ Engages LOC, APPR ▪ Disengages NAV, G/S	▪ Off when REV CRS is disengaged ▪ Disengages REV CRS
NAV or NAV LOC	▪ Illuminated when NAV LOC is engaged ▪ Engages NAV LOC ▪ Disengages HDG ▪ NAV and LOC modes are combined	▪ OFF when NAV LOC is disengaged ▪ Disengages NAV LOC	▪ Illuminated when NAV is engaged ▪ Engages NAV ▪ Turns on the FD and engages the WING LEV if the AP is disengaged ▪ Disengages LOC, C/APPR, REV CRS	▪ Off when NAV is disengaged ▪ Disengages NAV

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AP or FD Mode or Function	Real Gates Learjet 25 Aircraft J.E.T FC-110 Autopilot/Collins FD 108 Flight Director		GLJ Model 25/28 v4 Addon Modified Prepar3D Autopilot/Flight Director	
	Engaged, ON, Depressed or Moved	**Disengaged, OFF, Released or Reset**	**Engaged, ON, Depressed or Moved**	**Disengaged, OFF, Released or Reset**
LOC-only Approach	▪ Not available ▪ NAV LOC mode used instead	▪ Not available	▪ Illuminated when LOC is engaged ▪ Engages LOC (localizer only) approach mode ▪ Turns on the FD and engages the WING LEV if the AP is disengaged ▪ Engages APPR ▪ Disengages G/S, NAV	▪ Off when LOC is disengaged ▪ Disengages LOC, APPR, REV CRS
APPR Or C/APPR	▪ Illuminated when C/APPR is engaged ▪ Engages C/APPR (NAV+G/S) ▪ Disengages SPD P	▪ Off when C/APPR is disengaged ▪ Disengages C/APPR (NAV+G/S)	▪ Illuminated when APPR or C/APPR (coupled approach) are engaged ▪ Engages C/APPR (LOC+G/S) ▪ Turns on the FD and engages the WING LEV if the AP is disengaged ▪ Disengages NAV, SPD P (when in C/APPR mode)	▪ Off when APPR or C/APPR (coupled approach) are disengaged ▪ Disengages APPR, C/APPR ▪ Disengages LOC, G/S, REV CRS
HDG	▪ Illuminated when HDG is engaged ▪ Engages HDG ▪ Disengages NAV, REV CRS	▪ Off when HDG is disengaged ▪ Disengages HDG	▪ Illuminated when HDG is engaged ▪ Engages HDG (with priority) ▪ Turns on the FD if the AP is disengaged ▪ Disengages REV CRS (can be reengaged later), ATT, WING LEV	▪ Off when HDG is disengaged ▪ Disengages HDG
G/S ARM	▪ Illuminated when G/S is engaged ▪ Engages G/S capture and tracking	▪ Off when G/S is disengaged ▪ Disengages G/S capture and tracking	▪ Illuminated when G/S is engaged ▪ Engages G/S capture and tracking ▪ Turns on the FD and engages the WING LEV if the AP is disengaged ▪ Disengages SPD P, REV CRS, NAV (can be reengaged later), LOC, APPR (but G/S is engaged when C/APPR is engaged)	▪ Off when G/S is disengaged ▪ Disengages G/S, NAV ▪ Disengages C/APPR
ALT	▪ Illuminated when ALT is engaged ▪ Engages ALT ▪ Disengages SPD P	▪ Off when ALT is disengaged ▪ Disengages ALT	▪ Illuminated when ALT is engaged ▪ Engages ALT ▪ Turns on the FD and engages the WING LEV if the AP is disengaged ▪ Disengages ATT	▪ Off when ALT is disengaged ▪ Disengages ALT
ATT	▪ Not available ▪ Pitch axis engaged when the AP is engaged, maintaining pitch attitude	▪ Not available ▪ Pitch axis disengaged when the AP is disengaged	▪ Illuminated when ATT is engaged ▪ Captures and maintains the airplane's pitch attitude ▪ Engages ATT ▪ Turns on the FD if the AP is disengaged ▪ Disengages ALT, HDG, REV CRS (can be reengaged later)	▪ Off when ATT is disengaged ▪ Disengages ATT

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AP or FD Mode or Function	Real Gates Learjet 25 Aircraft J.E.T FC-110 Autopilot/Collins FD 108 Flight Director		GLJ Model 25/28 v4 Addon Modified Prepar3D Autopilot/Flight Director	
	Engaged, ON, Depressed or Moved	**Disengaged, OFF, Released or Reset**	**Engaged, ON, Depressed or Moved**	**Disengaged, OFF, Released or Reset**
WING LEV	▪ Not available ▪ Roll axis engaged when the AP is engaged, levelling the wing	▪ Not available ▪ Roll axis disengaged when the AP is disengaged	▪ Illuminated when the WING LEV is engaged ▪ Engages the WING LEV ▪ Turns on the FD if the AP is disengaged ▪ Levels the wing ▪ Disengages HDG, REV CRS (can be reengaged later)	▪ Off when the WING LEV is disengaged ▪ Disengages the WING LEV
OFF Light	▪ Illuminated when the AP has DC/AC power but is not engaged	▪ Off when the AP is not powered up or is engaged	▪ Illuminated when the AP has DC/AC power but is not engaged	▪ Off when the AP is not powered up or is engaged
ON Light	▪ Illuminated when the AP has DC/AC power with any autopilot pitch and/or roll axis engaged	▪ Off when the AP is not powered up or none of the pitch and/or roll axes are engaged	▪ Illuminated when the AP is engaged with any autopilot pitch and/or roll mode engaged	▪ Off when the AP is not engaged or none of the pitch and/or roll modes are engaged
Turn Command Knob	▪ Commands bank angles up to 30 degrees ▪ Disengages all horizontal modes if the AP is engaged	▪ Knob must be in detent mode (centered) for the AP to engage horizontal modes	▪ Commands bank angles, AP must be engaged ▪ Disengages all horizontal modes if AP is engaged: HDG, NAV, REV CRS, WING LEV, LOC, APPR	▪ Centers the knob and reset the ailerons **when clicked** ▪ Engages the AP ▪ Captures and maintains the aircraft's pitch attitude ▪ Engages the WING LEV
Pitch Command Wheel	▪ Changes the aircraft's pitch attitude when the AP is engaged ▪ Disengages SPD P, ALT, C/APPR, G/S		▪ Changes the aircraft's pitch attitude if the AP and/or FD are engaged/on ▪ Changes the FD pitch angle (up or down) ▪ Disengages ALT	▪ Centers the wheel **when clicked** ▪ Engages the AP (if not engaged) ▪ Captures and maintains the aircraft's pitch attitude ▪ Engages the WING LEV
SPD/MACH	▪ Autothrottle not available	▪ Autothrottle not available	▪ Illuminated when SPD/ MACH is engaged ▪ Engages SPD/MACH (autothrottle) ▪ Maintains airspeed or Mach ▪ Independent from AP/FD	▪ Off when SDP/MACH is disengaged ▪ Disengages SPD/MACH
SPD P	▪ Engages SPD P ▪ Maintains speed (or Mach above 29,000 ft.) during climb or descent by varying the aircraft's pitch	▪ Off when SPD P is disengaged ▪ Disengages SPD P	▪ SPD P not simulated, using SPD/MACH autothrottle instead (see above) ***Note:*** *The beta "SPD P" autopilot speed control mode from the previous addon version was removed from the AFCS because of unsolvable stability issues and software limitations in Prepar3D. "Speed Hold by Pitch" and "Flight Level Change" speed control modes are not natively supported in Prepar3D and were not available in most Learjet 20 Series aircraft.*	▪ SPD P not simulated, using SPD/MACH autothrottle instead (see above)
Throttle Quadrant Pitch Release Button	▪ Disengages all pitch and speed modes ▪ Allows the aircraft's pitch attitude to be changed manually	▪ Maintains the pitch attitude and levels the wing	▪ Disengages all pitch and speed modes: ALT, ATT, C/APPR, G/S, SPD/MACH ▪ Allows the aircraft's pitch attitude to be changed manually	▪ Engages the AP (if not engaged) ▪ Captures and maintains the aircraft's pitch attitude ▪ Engages the WING LEV

Continued on next page...

AP or FD Mode or Function	Real Gates Learjet 25 Aircraft J.E.T FC-110 Autopilot/Collins FD 108 Flight Director		GLJ Model 25/28 v4 Addon Modified Prepar3D Autopilot/Flight Director	
	Engaged, ON, Depressed or Moved	**Disengaged, OFF, Released or Reset**	**Engaged, ON, Depressed or Moved**	**Disengaged, OFF, Released or Reset**
Throttle Quadrant TA/GA Button	▪ Disengages all pitch, roll and speed modes ▪ Engages the pitch axis ▪ The AP follows the FD takeoff pitch ▪ Pilot controls power (no autothrottle) and speed	▪ Maintains the pitch attitude and levels the wing	▪ Disengages all pitch, roll and speed modes: ALT, ATT, WING LEV, LOC, APPR, G/S, NAV, HDG, REV CRS, SPD/MACH ▪ Engages the TA/GA mode ▪ Throttles advance to takeoff power (autothrottle mode) ▪ Vertical speed is set to 4,500 fpm ▪ Engages the WING LEV ▪ The AP follows the FD takeoff pitch when engaged (after takeoff)	▪ Disengages TA/GA ▪ Engages the AP (if not engaged) ▪ Captures and maintains the aircraft's pitch attitude ▪ Engages the WING LEV
Yoke Maneuver Control Button	▪ Disengages all pitch, roll and speed modes ▪ Allows the aircraft to be flown manually	▪ Maintains the pitch attitude and levels the wing	▪ Disengages all pitch, roll and speed modes: ALT, ATT, WING LEV, LOC, APPR, G/S, NAV, HDG, REV CRS, SPD/MACH ▪ Allows the aircraft to be flown manually	▪ Engages the AP (if not engaged) ▪ Captures and maintains the aircraft's pitch attitude ▪ Engages the WING LEV
Yoke Pitch Sync Button	▪ Disengages all pitch and speed modes: ALT, C/APPR, G/S, SPD P ▪ Allows the aircraft's pitch attitude to be changed manually	▪ Maintains the pitch attitude and levels the wing	▪ Disengages all pitch and speed modes: ATT, ALT, C/APPR, G/S, SPD/MACH ▪ Allows the aircraft's pitch attitude to be changed manually	▪ Engages the AP (if not engaged) ▪ Captures and maintains the aircraft's pitch attitude ▪ Engages the WING LEV
Yoke Trim Switch Arming Button	▪ Disengages the AP and all pitch, roll and speed modes ▪ Allows for the Four-Way Trim Switch to be actuated to change the attitude of the aircraft manually (pitch and roll)	▪ Reengages the AP, maintains the pitch attitude and levels the wing	▪ Disengages the AP and all pitch, roll and speed modes: ALT, ATT, WING LEV, LOC, APPR, G/S, NAV, HDG, REV CRS, SPD/MACH ▪ Allows for the Four-Way Trim Switch (not simulated) to be actuated to change the attitude of the aircraft manually (pitch and roll)	▪ Engages the AP ▪ Captures and maintains the aircraft's pitch attitude ▪ Engages the WING LEV
Yoke Four-Way Trim Switch	▪ When armed, used to change the attitude of the aircraft manually (pitch and roll)		▪ Not simulated	▪ Not simulated
Test Switch Panel AP Pitch Trim Monitor Switch	▪ Disengages the AP ▪ Used for testing the AP pitch trim monitor system	▪ Sets system to normal mode of operation	▪ Disengages the AP	▪ Sets system to normal mode of operation
Test Switch Panel AP Roll Monitor Test Button	▪ Disengages the AP ▪ Used for testing the AP roll monitor system	▪ Sets system to normal mode of operation	▪ Disengages the AP	▪ Sets system to normal mode of operation
Stick Nudger/ Puller	▪ Disengages all pitch and speed modes: ALT, C/APPR, G/S, SPD P ▪ Pushes the stick in case of a stall condition ▪ Pulls the stick in case of an overspeed condition	▪ Maintains the pitch attitude and levels the wing	▪ Disengages all pitch and speed modes: ALT, C/APPR, G/S, SPD/MACH ▪ Pushes the stick in case of a stall condition ▪ Pull the stick in case of an overspeed condition	▪ Engages the AP (if not engaged) ▪ Captures and maintains the aircraft's pitch attitude (engages ATT mode) ▪ Engages the WING LEV

FLIGHT PLANNING

SECTION 7

This section presents a set of simplified criteria for planning your GLJ Model 25/28 flights in Prepar3D. In the real world, you would normally use many complicated charts and tables to determine the exact performance criteria required for a flight. We have purposely omitted this complexity from the following procedures because we feel that desktop pilots should be flying and having fun, instead of worrying about numbers.

Nonetheless, there are a few steps that are definitely required:

1. **Determine the Fuel Required and the Gross Weight** - The gross weight is the total weight of the aircraft including fuel and payload. This number is crucial to the aircraft's performance.

2. **Determine Takeoff Data** - Takeoff data includes V_1 decision speed, Vr rotation speed, and V_2 takeoff safety speed. Runway length requirements are also important, especially in hot-and-high conditions with a heavy aircraft.

3. **Plan Climb and Cruise** - Calculate fuel requirements based on time, distance, altitude, and temperature.

4. **Determine Approach and Landing Data** - Approach and landing data includes Vref landing reference speed and runway length requirements, again quite important in hot-and-high conditions with a heavy aircraft.

Determine the Fuel Required and the Gross Weight

- Assume a cruise at FL450, at Mach 0.78.
- On a standard day, your true air speed (TAS) will be around 460 knots.
- Assume 100 nautical miles for climb.

- Assume 100 nautical miles for descent.
- Estimate around 1,000 lbs. of fuel for take-off and climb (100% RPM for takeoff; 90% RPM for climb).
- Estimate around 1,300 lbs. of fuel for the first hour of cruise.
- Estimate around 1,200 lbs. of fuel for the second hour of cruise.
- Estimate around 1,100 lbs. of fuel for the third hour of cruise.
- Add 1,000 lbs. of fuel for reserve.

See **Table 6-1**. For example:

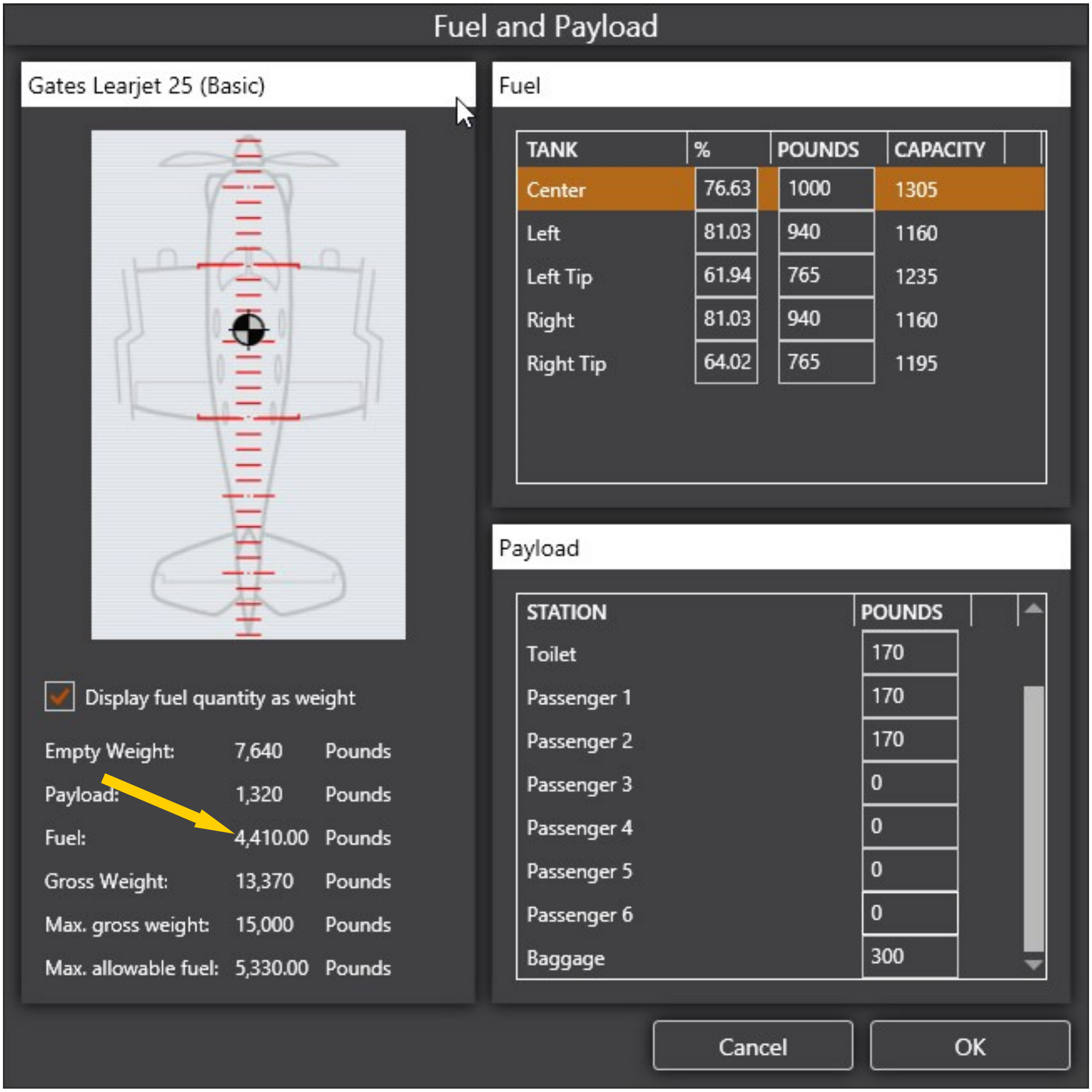
Flight plan distance = 950 nautical miles

- *Allow 100 nautical miles for climb. Fuel burn = 1,000 lbs.*
- *Allow 100 nautical miles for descent. Fuel burn = 350 lbs.*
- *Remaining distance = 950-100-100 = 750 nautical miles*

Table 6-1
ESTIMATED FUEL REQUIREMENTS
(see above assumptions)

	APPROX FUEL BURN (LBS.)
Takeoff + climb	1,000
First hour cruise	1,300
Second hour cruise	1,200
Third hour cruise	1,100
Descent + landing	350

- *At 460 KTAS, 750 NM = 98 minutes = 1 hour + 38 minutes*
- *First hour fuel burn: 1,300 lbs.*
- *Remaining 38 minutes: 38 / 60 x 1200 = 760 lbs.*
- *Reserves: 1,000 lbs.*
- *Total fuel required: 1,000 + 1,300 + 760 + 350 + 1,000 =* ***4,410 lbs.***



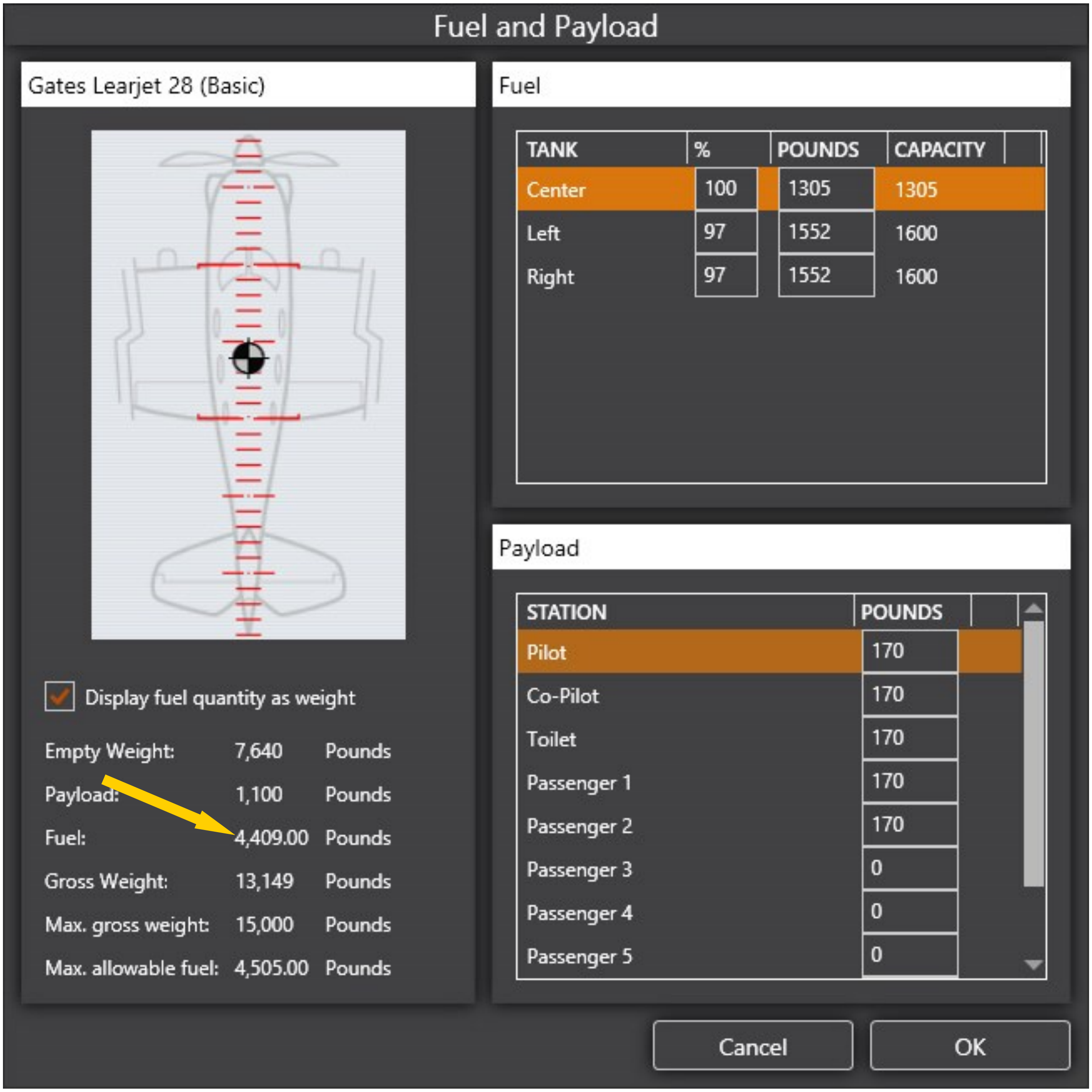
In the “**Fuel and Payload**” panel (Prepar3D > Top Menu Bar > Vehicle > **Fuel and Payload**...), add the necessary fuel for your flight and load the required passengers. Read the total gross weight and use it to determine the takeoff data.

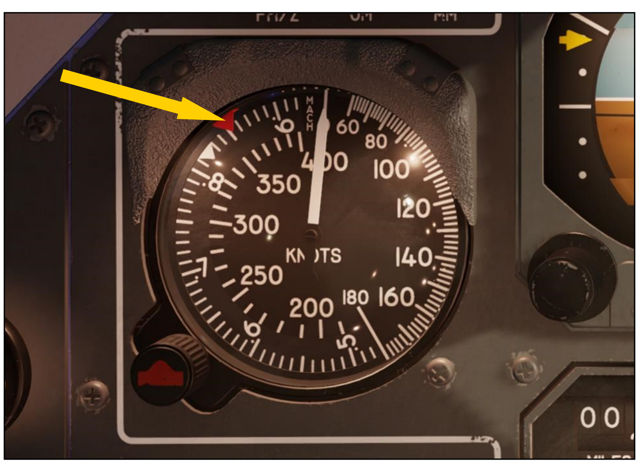
Determine Takeoff Data

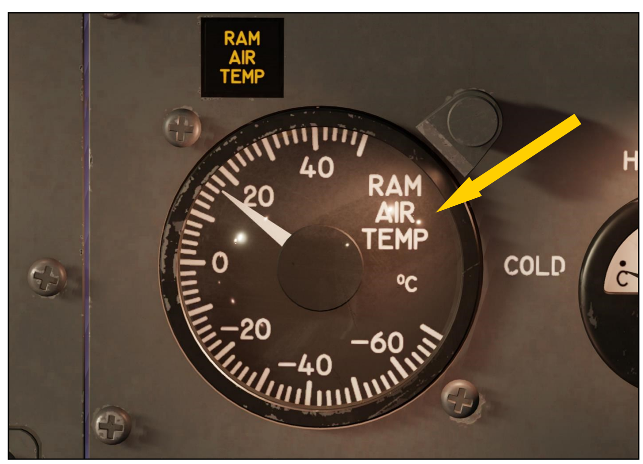
Takeoff data in this case refers to three critical speeds (V_1, Vr and V_2) that you will need during takeoff. Refer to appendix 1 and to sections 8 for more details.

The Airspeed Indicators in the GLJ Model 25/28 v4 addon are equipped with independent **speed bugs** [5, fig. 5-9]. It is suggested to set the captain’s bug on V_1 and the copilot’s bug on Vr (or the reverse if the copilot is performing the takeoff). The pilot flying decides to abort at V_1 or to continue, and the pilot not flying calls for rotation.

To determine the takeoff data, you will also need the outside air temperature (OAT), which you can get either from ATC or better still, from the Ram Air Temperature Gauge [18, fig. 5-37] on the copilot’s panel.


Fuel and Payload
Gates Learjet 28 (Basic)
Fuel
TANK | % | POUNDS | CAPACITY
Center 100 1305 1305
Left 97 1552 1600
Right 97 1552 1600
Payload
STATION | POUNDS
Pilot 170
Co-Pilot 170
Toilet 170
Passenger 1 170
Passenger 2 170
Passenger 3 0
Passenger 4 0
Passenger 5 0
Display fuel quantity as weight
Empty Weight: 7,640 Pounds
Payload: 1,100 Pounds
Fuel: 4,409.00 Pounds
Gross Weight: 13,149 Pounds
Max. gross weight: 15,000 Pounds
Max. allowable fuel: 4,505.00 Pounds
Cancel
OK


KNOTS


RAM AIR TEMP
RAM AIR TEMP
°C
COLD

It is assumed that 100 % RPM will be used for takeoff power and the flaps will be extended 8 degrees [1, fig. 4-30]. First, from **Table 6-2**, determine your V_1 takeoff decision speed. This speed will be used to decide if you abort or continue the takeoff, should an engine failure occur. Refer to "**Abnormal/Emergency Procedures**" in section 9 for more details.

Next, from **Table 6-4**, determine the rotation speed (V_r) and the takeoff safety speed (V_2). During the takeoff roll, the pilot should raise the nose at Vr. Once airborne, accelerating to V_2 will ensure single-engine climb performance.

Finally, you need to determine if you have enough runway to perform the takeoff. To do this, you first need to know the density altitude of the departure field. This depends on the outside air temperature (OAT) and the field elevation that can be extrapolated from **Table 6-3**.

Once you know the density altitude of the field, you can determine the runway distance necessary for takeoff from **Table 6-5**.

Table 6-2

V_1 TAKEOFF DECISION SPEED (KIAS)

Flaps 8°

	OUTSIDE AIR TEMPERATURE °C					
GROSS WT	**20**	**24**	**28**	**32**	**36**	**38**
16,000	135	135	136	136	138	140
15,000	130	130	132	134	134	136
14,000	127	127	129	129	130	132
13,000	122	124	126	126	128	128
12,000	118	118	119	120	120	121
11,000	112	113	114	114	115	116
10,000	106	106	106	110	110	112
9,000	105	105	106	108	109	110

Table 6-3

DENSITY ALTITUDE (FEET)

	DEPARTURE FIELD ELEVATION (FEET)				
OAT °C	**S.L.**	**2,500**	**5,000**	**7,500**	**10,000**
-30	-5,000	-2,000	1,200	4,500	7,500
-20	-4,000	-500	2,500	5,500	8,500
-10	-3,000	2,000	3,500	6,500	9,500
0	-2,000	2,000	5,000	7,500	11,000
10	-500	3,500	6,000	9,000	12,500
20	500	4,000	7,000	10,000	13,000
30	1,500	5,000	8,000	11,000	14,000
40	3,500	6,500	9,500	13,500	15,500

Table 6-4

V_r ROTATION SPEED / V_2 TAKEOFF SAFETY SPEED (KIAS)

Flaps 8°

	GROSS WEIGHT (LBS.)							
	9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**	**16,000**
V_r	120	124	124	128	132	134	136	140
V_2	124	128	130	132	136	138	140	144

Table 6-5 **TAKEOFF DISTANCE REQUIREMENTS (FEET)**								
	GROSS WEIGHT (LBS.)							
DENSITY ALTITUDE	**9,000**	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**	**16,000**
-5,000	2,000	2,200	2,400	2,600	2,900	3,200	3,500	4,000
-2,500	2,500	2,700	2,900	3,100	3,400	3,700	4,000	4,500
0	2,500	2,700	2,900	3,300	3,700	4,100	4,500	5,500
2,500	3,000	3,300	3,600	4,000	4,500	5,000	5,500	6,500
5,000	3,500	3,800	4,200	4,700	5,200	5,800	6,500	7,000
7,500	4,000	4,400	4,800	5,400	6,000	6,500	7,000	9,500
10,000	4,500	5,000	6,600	7,200	8,000	8,800	9,500	11,000
12,500	5,000	6,000	7,000	8,000	9,000	10,000	11,000	12,500
15,000	5,500	6,500	7,700	8,800	9,900	11,000	12,500	14,000

Plan Climb and Cruise

This section contains simplified tables for planning your climb and cruise. The numbers are for reference only as many factors can affect fuel consumption in the simulator which sometimes differs from the real world.

You should monitor the fuel counter [15, fig. 5-45a; 14, fig. 5-45b] and the fuel quantity gauge [17, fig. 5-45a; 16, fig. 5-45b] at all times during flight and follow the standard procedures for switching from the wing tanks to the fuselage tank when fuel in the wing tanks reaches critical level. See section 6, pages 24 and 28, for details.

After a few flights, you will be able to plot your own charts and tables, based on your own flying habits. Advanced users may find more complete charts and tables about climb/cruise planning on the Internet.

Table 6-6 **CLIMB TIME (MIN) / FUEL (LBS) / DISTANCE (NM)**							
ALT X 1,000 FT		INITIAL CLIMB WEIGHT X 1,000 LBS					
		15	**14**	**13**	**12**	**11**	**10**
45	TIME	-	-	32.9	22.0	17.3	14.2
	FUEL	-	-	1,136	845	700	596
	DIST	-	-	218	145	114	94
41	TIME	24.5	19.7	16.5	14.2	12.3	10.6
	FUEL	1,050	881	761	665	58.3	512
	DIST	162	130	104	93	80	70
35	TIME	13.8	12.3	10.9	9.8	8.7	7.7
	FUEL	742	666	598	536	479	425
	DIST	90	80	71	63	56	50
25	TIME	7.7	7.0	6.4	5.8	5.2	4.7
	FUEL	498	454	414	375	338	303
	DIST	49	44	40	36	33	29
11	TIME	2.4	2.2	2.1	1.9	1.7	1.5
	FUEL	191	175	161	147	133	120
	DIST	14	12	11	10	9	9
300 KIAS up to 25,000 ft. Inlet Mach 0.70 up to 45,000 ft.							

Table 6-7 **FUEL REQUIREMENTS - CRUISE FL250**								
OAT ˚C	MACH 0.77	GROSS WEIGHT (LBS.)						
		9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**
-10	**LBS./HR**	1,985	2,032	2,072	2,123	2,166	2,211	2,264
	KTAS	438	438	438	438	438	438	438
0	**LBS./HR**	2,069	2,118	2,159	2,213	2,258	2,304	2,359
	KTAS	447	447	447	447	447	447	447
10	**LBS./HR**	2,160	2,211	2,255	2,310	2,357	2,405	2,462
	KTAS	457	457	457	457	457	457	457
20	**LBS./HR**	2,247	2,300	2,344	2,402	2,451	2,501	2,560
	KTAS	466	466	466	466	466	466	466

Table 6-8 **FUEL REQUIREMENTS - CRUISE FL350**								
OAT ˚C	MACH 0.77	GROSS WEIGHT (LBS.)						
		9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**
-10	**LBS./HR**	1,351	1,387	1,442	1,499	1,558	1,629	1,703
	KTAS	425	425	425	4425	425	425	425
0	**LBS./HR**	1,415	1,452	1,510	1,570	1,632	1,706	1,783
	KTAS	435	435	435	435	435	435	435
10	**LBS./HR**	1,481	1,520	1,580	1,643	1,708	1,785	1,866
	KTAS	445	445	445	445	445	445	445
20	**LBS./HR**	1,547	1,588	1,651	1,716	1,784	1,855	1,949
	KTAS	455	455	455	455	455	455	455

Table 6-9 **FUEL REQUIREMENTS - CRUISE FL410**								
OAT ˚C	MACH 0.77	GROSS WEIGHT (LBS.)						
		9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**
-10	**LBS./HR**	1,145	1,210	1,275	1,358	1,444	1,541	1,653
	KTAS	428	428	428	428	428	428	428
0	**LBS./HR**	1,197	1,265	1,332	1,419	1,509	1,610	1,727
	KTAS	437	437	437	437	437	437	437
10	**LBS./HR**	1,256	1,327	1,397	1,488	1,583	-	-
	KTAS	448	448	448	448	448	-	-
20	**LBS./HR**	1,309	1,383	-	-	-	-	-
	KTAS	457	457	-	-	-	-	-

Table 6-10 **FUEL REQUIREMENTS - CRUISE FL450**								
OAT ˚C	MACH 0.77	GROSS WEIGHT (LBS.)						
		9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**
-10	**LBS./HR**	1,077	1,151	1,246	1,345	1,468	-	-
	KTAS	431	431	431	431	431	-	-
0	**LBS./HR**	1,128	1,205	1,305	1,409	-	-	-
	KTAS	441	441	441	441	-	-	-
10	**LBS./HR**	1,180	1,261	-	-	-	-	-
	KTAS	451	451	-	-	-	-	-
20	**LBS./HR**	1,233	-	-	-	-	-	-
	KTAS	461	-	-	-	-	-	-

My Own Table **FUEL REQUIREMENTS - CRUISE FL________**								
OAT ˚C	MACH 0.77	GROSS WEIGHT (LBS.)						
		9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**
-10	**LBS./HR**							
	KTAS							
0	**LBS./HR**							
	KTAS							
10	**LBS./HR**							
	KTAS							
20	**LBS./HR**							
	KTAS							

My Own Table **FUEL REQUIREMENTS - CRUISE FL________**								
OAT ˚C	MACH 0.77	GROSS WEIGHT (LBS.)						
		9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**
-10	**LBS./HR**							
	KTAS							
0	**LBS./HR**							
	KTAS							
10	**LBS./HR**							
	KTAS							
20	**LBS./HR**							
	KTAS							

My Own Table **FUEL REQUIREMENTS - CRUISE FL_______**								
OAT °C	MACH 0.77	GROSS WEIGHT (LBS.)						
		9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**
-10	**LBS./HR**							
	KTAS							
0	**LBS./HR**							
	KTAS							
10	**LBS./HR**							
	KTAS							
20	**LBS./HR**							
	KTAS							

My Own Table **FUEL REQUIREMENTS - CRUISE FL_______**								
OAT °C	MACH 0.77	GROSS WEIGHT (LBS.)						
		9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**
-10	**LBS./HR**							
	KTAS							
0	**LBS./HR**							
	KTAS							
10	**LBS./HR**							
	KTAS							
20	**LBS./HR**							
	KTAS							

My Own Table **FUEL REQUIREMENTS - CRUISE FL_______**								
OAT °C	MACH 0.77	GROSS WEIGHT (LBS.)						
		9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**
-10	**LBS./HR**							
	KTAS							
0	**LBS./HR**							
	KTAS							
10	**LBS./HR**							
	KTAS							
20	**LBS./HR**							
	KTAS							

Determine Approach and Landing Data

The same way you determined takeoff data, you will need to determine the landing reference speed (Vref) at which you will cross the runway threshold (see appendix 1). For this, you need to know the landing weight of the aircraft which differs from the takeoff weight by the amount of fuel used for the flight.

You may compute this weight and cross-check it during approach using the Fuel Counter (totalizer) [15, fig. 5-45a; 15, fig. 5-45b]. During the pre-landing checks, the airspeed bugs [5, fig. 5-9] may be set to Vref.

It is assumed that flaps will be fully extended at 40 degrees for landing. However, other speeds are available from table 6-11 for partial flaps. No-flaps landing should only be attempted in an emergency.

You may now determine the landing distance required. Again, you will require the density altitude from **Table 6-13**, but this time of the destination field.

You need an approximation of the outside air temperature (OAT) on the ground which means you cannot use the addon's Ram Air Temperature Gauge while in flight.

Determine the landing distance required from **Table 6-12**.

The data assumes a full-flaps landing, spoilers extended, thrust reversers deployed on touchdown, and normal braking effort with anti-skid engaged.

Table 6-11
Vref LANDING REFERENCE SPEED (KIAS)

GROSS WT (LBS.)	FLAPS POSITION			
	40°	**20°**	**8°**	**UP**
16,000	136	142	161	166
15,000	134	140	157	164
14,000	130	139	152	160
13,000	126	137	148	156
12,000	122	135	144	152
11,000	118	132	140	148
10,000	114	128	136	144
9,000	112	124	134	142
8,000	110	120	130	140

Table 6-12
DENSITY ALTITUDE (FEET)

OAT °C	DESTINATION FIELD ELEVATION (FEET)				
	S.L.	**2,500**	**5,000**	**7,500**	**10,000**
-30	-5,000	-2,000	1,200	4,500	7,500
-20	-4,000	-500	2,500	5,500	8,500
-10	-3,000	2,000	3,500	6,500	9,500
0	-2,000	2,000	5,000	7,500	11,000
10	-500	3,500	6,000	9,000	12,500
20	500	4,000	7,000	10,000	13,000
30	1,500	5,000	8,000	11,000	14,000
40	3,500	6,500	9,500	13,500	15,500

Check that the chosen airfield has enough runway for the conditions of your flight. If not, you may need to either unload the aircraft, choose another airfield, or wait for colder weather.

Jot down your reference speeds so you have them available during the flight. You should now be ready for a successful flight in your new GLJ Model 25/28 business jet addon!

Table 6-13
LANDING DISTANCE REQUIREMENTS (FEET)

DENSITY ALTITUDE (FEET)	LANDING WEIGHT (LBS.)						
	9,000	**10,000**	**11,000**	**12,000**	**13,000**	**14,000**	**15,000**
-5,000	4,500	4,600	4,700	4,800	4,900	5,000	5,200
-2,500	4,500	4,600	4,800	4,900	5,000	5,100	5,200
0	4,500	4,600	4,700	4,900	5,000	5,300	5,500
2,500	5,000	5,100	5,200	5,300	5,400	5,500	5,500
5,000	5,000	5,100	5,300	5,500	5,700	5,900	6,000
7,500	5,500	5,600	5,700	5,800	5,800	5,900	6,000
10,000	5,500	5,700	5,800	5,900	6,000	6,300	6,500
12,500	6,000	6,100	6,200	6,300	6,400	6,500	6,500
15,000	6,000	6,200	6,400	6,700	6,900	7,200	7,500

NORMAL PROCEDURES AND CHECK LISTS

This section contains the detailed "**Normal Procedures and Check Lists**" for the operation of the Xtreme Prototypes GLJ Model 25/28 v4 add-on aircraft for Prepar3D.

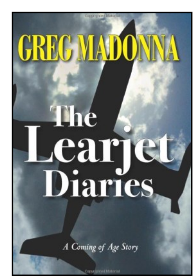
The operation of the GLJ Model 25/28 v4 addon is very similar to the operation of the real aircraft. In the following pages, we will teach you how to operate your new business jet addon, both on the ground and in the air. We encourage you to follow each step presented in this section very carefully.

A condensed version of these procedures is provided in section 10. You may refer to the "**Quick Start Procedures**" when you are more familiar with both your simulation platform and your new GLJ Model 25/28 v4 addon.

Refer to section 9 for "**Abnormal and Emergency Procedures**" and to section 7, for "**Flight Planning**". Key "**Reference Information**" about the aircraft is presented in appendix 1.

Note: *The following procedures are inspired from the original Gates Learjet 20 Series flight manuals and from other sources.*

Tip



- As a complement to this section, may we suggest the captivating book by Greg Madonna, "**The Learjet Diaries**", a work of semi-fiction inspired from the author's own experience as a young Learjet pilot back in the 1970s. Never flown a Learjet? The book describes in detail what it was like to fly one of the top high-performance business jets at times where training was virtually nonexistent, and jet flying was new to general aviation pilots more accustomed to flying slower and more forgiving prop driven airplanes. A required reading for every classic Learjet fan!

GETTING STARTED

The Xtreme Prototypes GLJ Model 25/28 v4 is an **add-on software package** that requires Lockheed Martin Prepar3D (your flight simulation platform) to be installed on your computer. Refer to “**Minimum System Requirements**” in section 2 for more information.

Launching the Simulator

1. Please make sure that Prepar3D and the GLJ Model 25/28 v4 addon are **properly installed** on your computer before proceeding.

2. Make sure your controller (joystick/yoke) and pedals are **properly connected** to your computer and have been previously tested with your simulation platform. A joystick/yoke is essential to fly the GLJ Model 25/28 v4 addon. Rudder pedals are optional but recommended.

3. Make sure your mouse has a center (scroll) wheel. A wheel mouse is essential to actuate some controls in the virtual cockpit, such as 3-position switches and knobs.

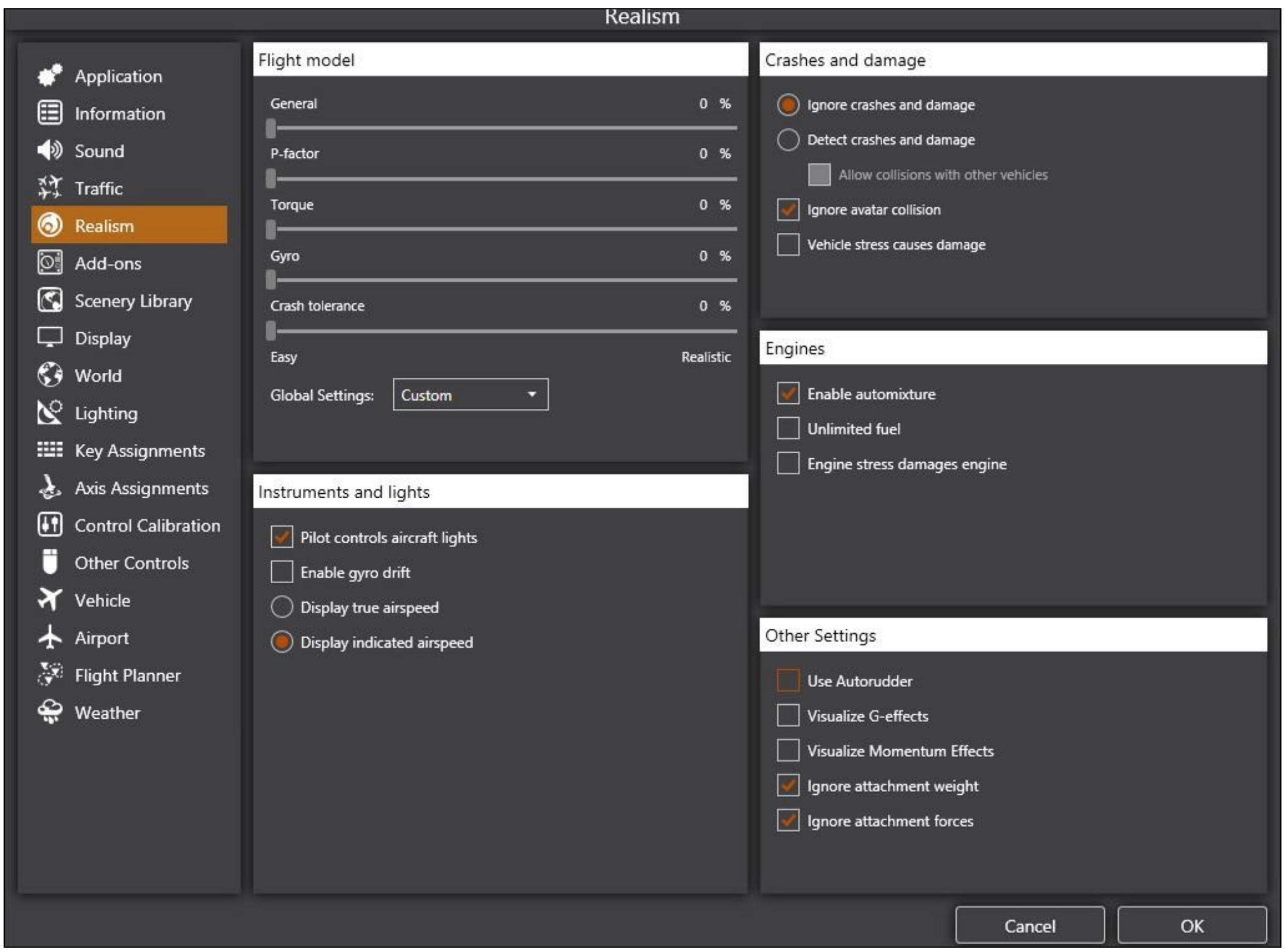
4. **Launch Prepar3D**.

***Note:** The user interface may vary between different versions of Prepar3D. However, the commands and settings are essentially the same.*

Recommended Settings for Beginners

These **optional Prepar3D settings** will make your first flights in the GLJ Model 25/28 v4 addon more enjoyable. You can reset them to their default state when you have more experience as a desktop pilot:

1. On the “Prepar3D > Opening Menu > Options > General > **Realism**” page, set the



followings:

a. All flight model settings - **EASY** (all cursors to the left).

b. Pilot controls aircraft lights - **SELECTED.**

c. Enable gyro drift - **UNSELECTED.**

d. Display indicated airspeed - **SELECTED.**

e. Ignore crashes and damage - **SELECTED.**

f. Ignore avatar collision - **SELECTED.**

g. Vehicle stress causes damage - **UNSELECTED.**

h. Enable automixture - **SELECTED.**

i. Unlimited fuel - **UNSELECTED.**

j. Engine stress damages engine - **UNSELECTED.**

k. Use Autorudder - **UNSELECTED.**

l. Visualize G-effects - **UNSELECTED.**

m. Visualize Momentum Effects - **UNSELECTED**

n. Ignore attachment weight - **SELECTED.**

o. Ignore attachment forces - **SELECTED**

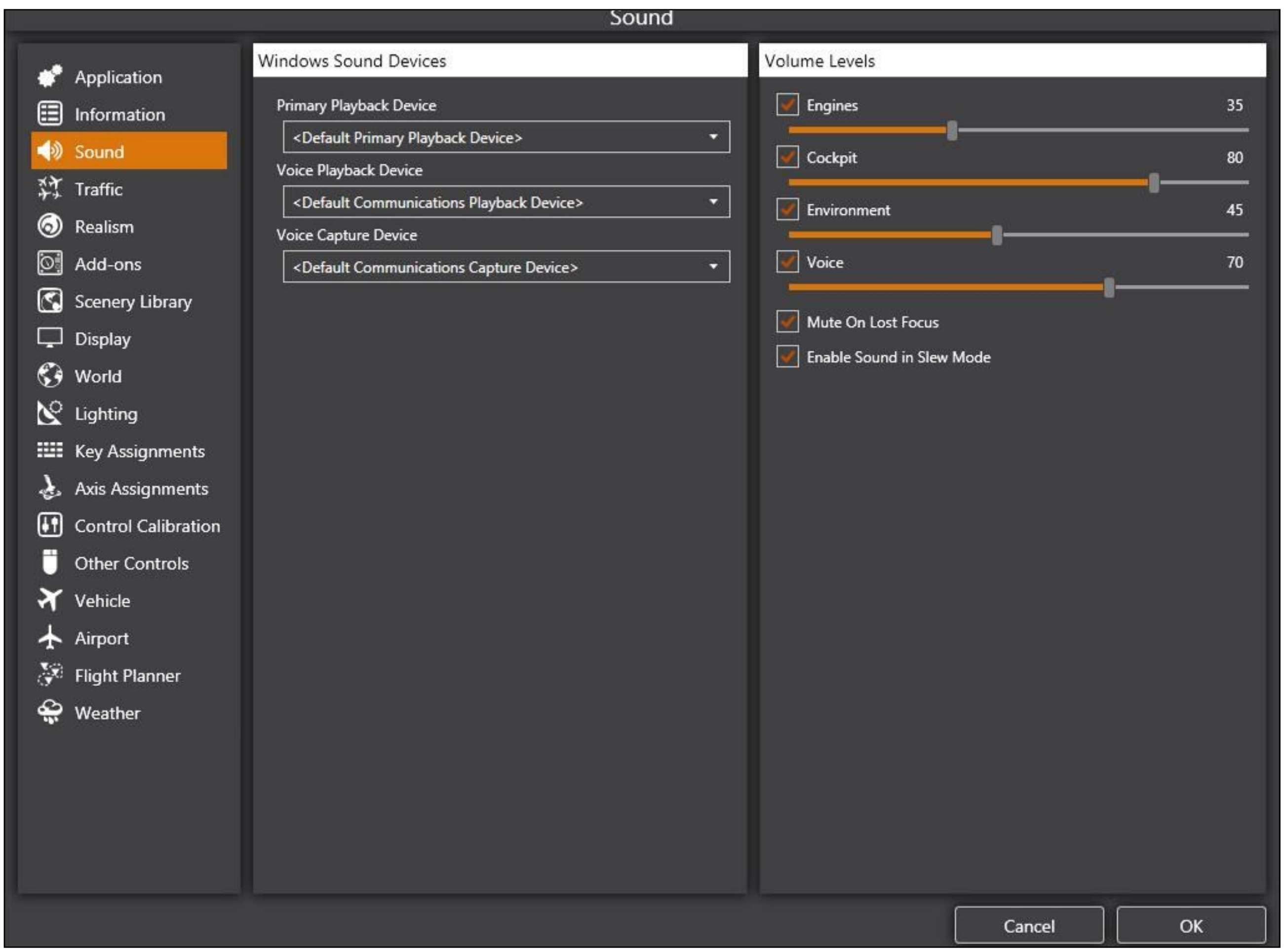
2. Click OK to close the “Prepar3D > … > **Realism**” page.

For more setting options, refer to section 2.

Adjusting the Sound Volume

Depending on your sound system and settings, you may want to adjust the volume levels in the “Prepar3D > Top Menu Bar > Options > General > **Sound**” page:

1. On the “Prepar3D > … > **Sound**” page, under “**Volume Levels**”, adjust the **volume**



levels for the engine and other sounds. Make sure all sounds are selected.

2. Click **OK** to close the "Prepar3D > … > **Sound**" page.

To reduce the volume of the engines, try a setting of between 30% to 50%. If you like more rumble, noise, and vibrations, try anything from 50% to 70%. A setting of about 40% seems acceptable for most computer sound systems and will produce the level of noise, whine, and rumble one would expect from the noisy CJ610 engine.

A little experimentation may be necessary to find the optimal settings, depending on your own sound system configuration and personal preferences.

Please note that the addon's CJ610 engines will produce a high level of noise, recorded from the real aircraft, especially when in an outside view.

Known Issue

- In addition to the basic aircraft sounds, the GLJ Model 25/28 v4 addon features over 90 extra sound effects (mainly cockpit sounds). Due to software limitations in Prepar3D, some interior sound effects can still be heard from an external view or when the simulator is on pause.

Tip

- You can adjust the volume of the cockpit and cabin sound effects by moving the "**Cockpit**" cursor on the "Prepar3D > Top Menu Bar > Options > General > **Sound**" page, under "**Volume Levels**".

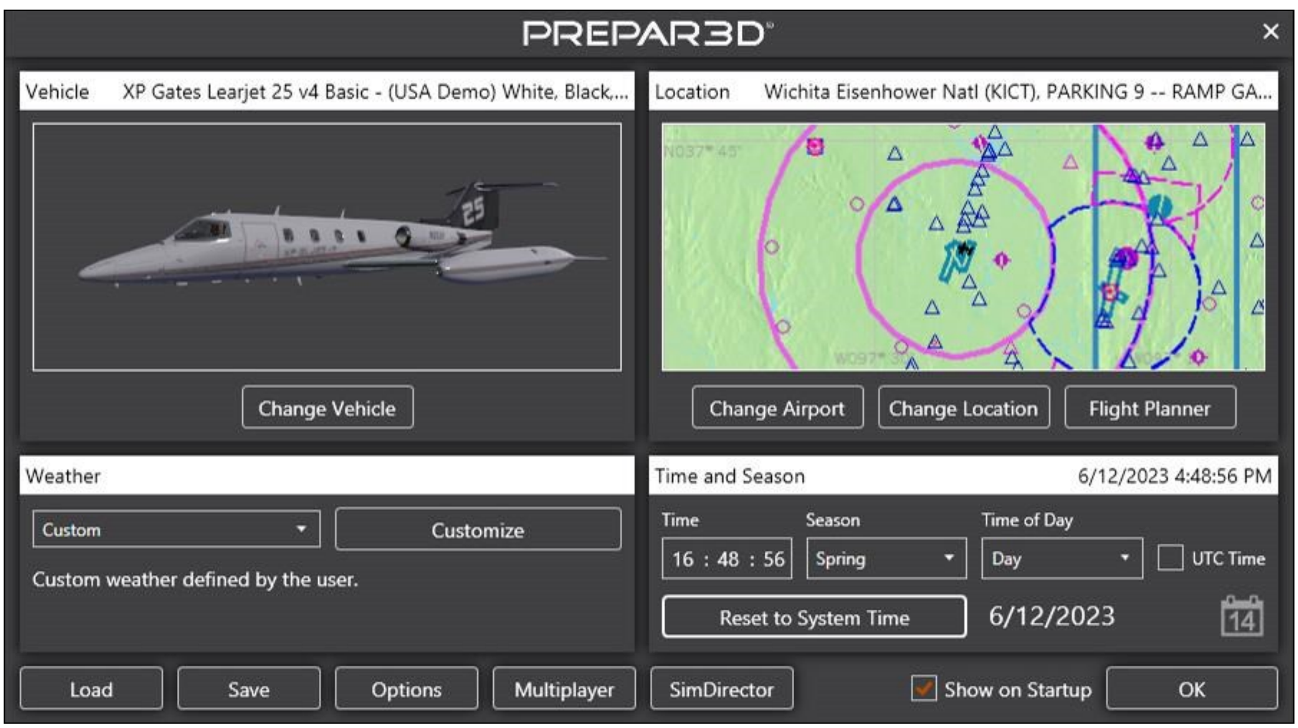
Unit of Measure

1. Please make sure that the unit of measure used by the simulator ("Prepar3D > Top Menu Bar > Options > General > Application > International > **Unit of Measure**") is set to **U.S. System (feet, inches)**, or you may encounter issues with some flight instruments.

Remember that the Gates Learjet 25/28 is an American airplane from the 1970s/80s.

Starting a New Flight

Refer to the documentation included with your simulation platform for complete instructions on how to create and save a new flight (scenario). Make sure to select one of the Xtreme Prototypes GLJ Model 25/28 v4 aircraft variations included with your add-on package and **start a new flight**.



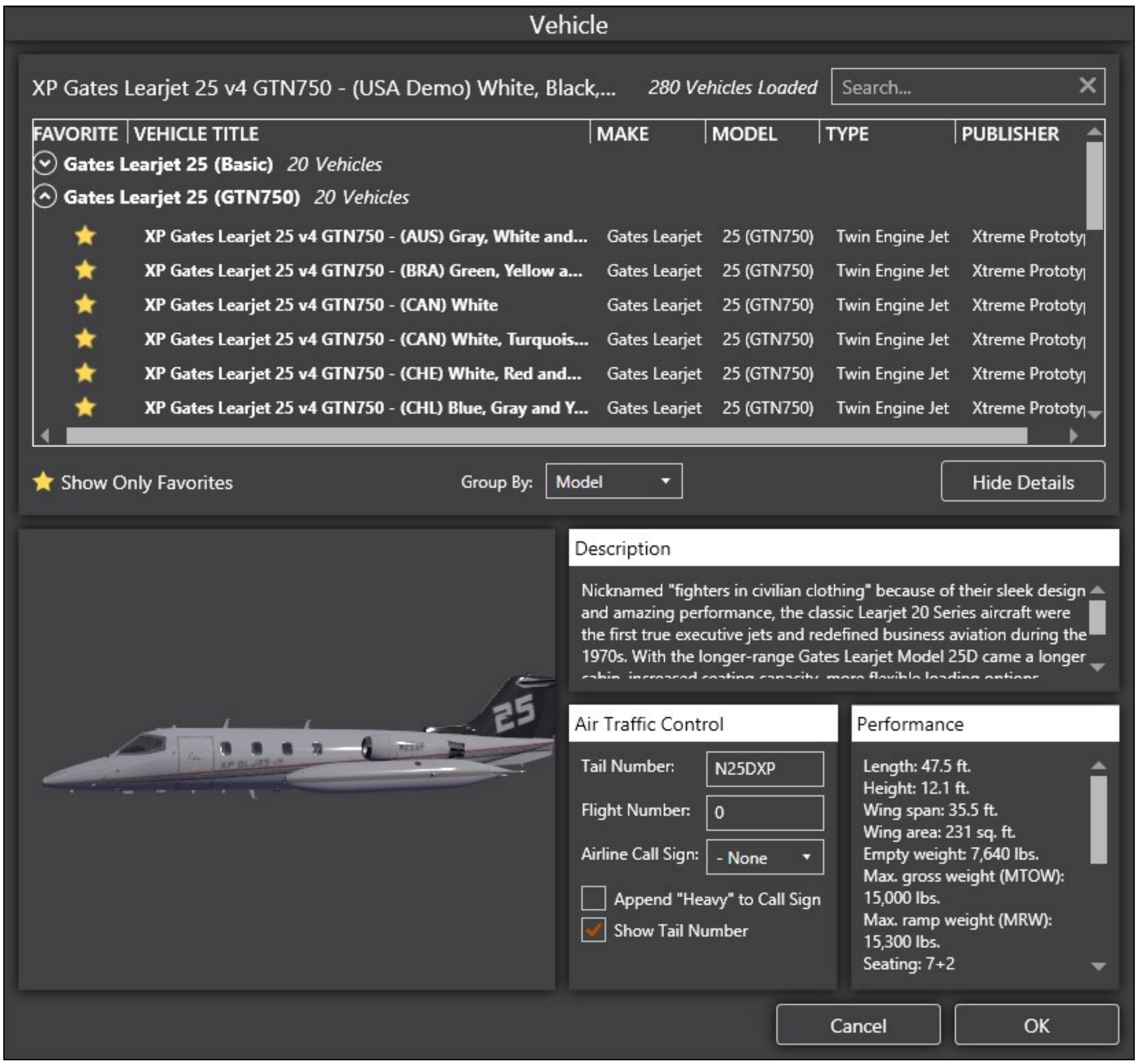
The GLJ Model 25/28 v4 addon comes with **two different virtual cockpits** and **20 aircraft variations** (liveries) for each cockpit. All aircraft variations should be visible on the "Prepar3D > Top Menu Bar > Vehicle > Select… > **Vehicle**" page (see below).

Note: *The "**Show Only Favorites**" option on the "Prepar3D > … >**Vehicle**" page may prevent some aircraft variations from being displayed. You may need to uncheck this option. You may also select only the aircraft variations that you want to fly as your favorites. This will speed up loading time when selecting a vehicle.*

Remember

- Xtreme Prototypes next generation addons no longer include 2D panels found in legacy products. You must be in the virtual cockpit view to fly this addon.

- If your GLJ Model 25/28 add-on aircraft appears to have no virtual cockpit, make sure you have selected the **Virtual Cockpit** view ("Prepar3D > Top Menu Bar > Views > Change View > Cockpit > **Virtual Cockpit**"). You can also switch to the virtual cockpit by pressing the "**F9**" key. You can cycle forward or backward the different views with the "**S**" key. You can also select the virtual



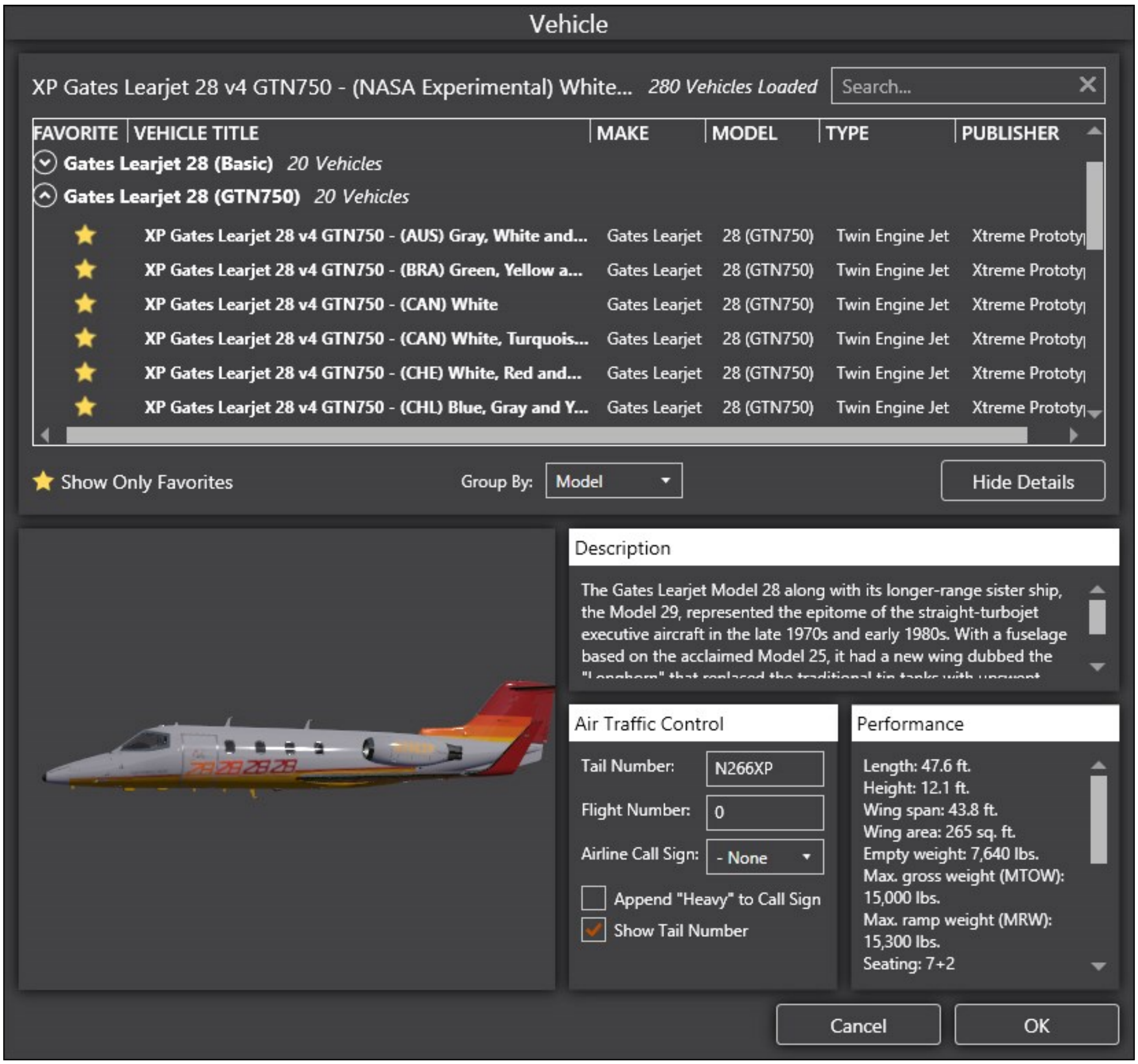
cockpit as the default cockpit view when configuring your simulation platform.

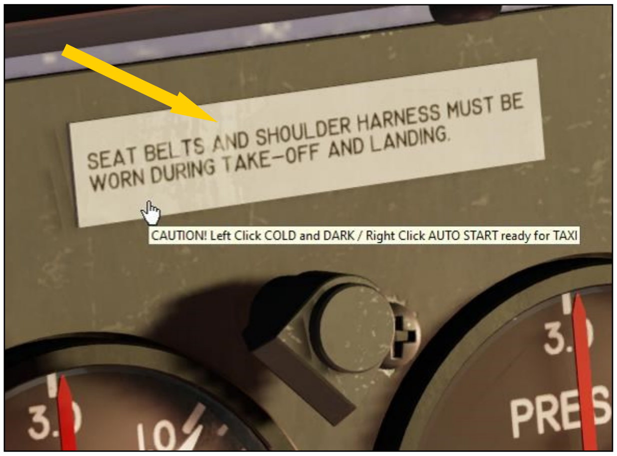
- All aircraft systems are programmed into the virtual cockpit. For this reason, it is suggested to select the **Virtual Cockpit** view after loading the aircraft in the simulator to make sure that all systems are initialized properly. For example, if you are in one of the exterior views after loading the aircraft and some exterior features are not displayed or working properly, simply switch to the virtual cockpit view and go back to the exterior view. While this should no longer be an issue in this software version, this simple step is still recommended.

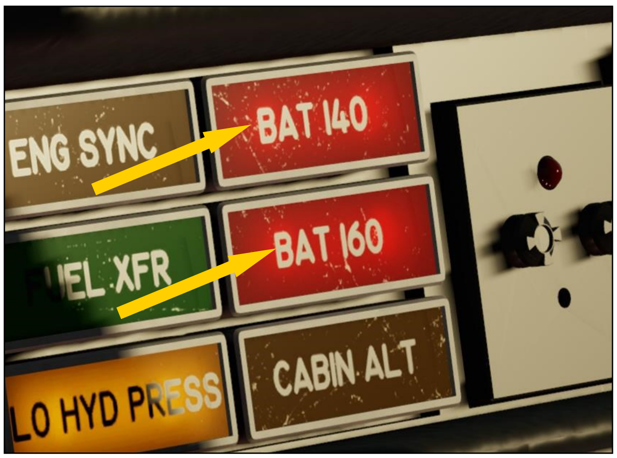
- Multiple camera views are provided when in the virtual cockpit for entering the passenger cabin and to help the pilot with some switches and other cockpit items in areas that are difficult to reach. You can cycle through the different camera views when in the virtual cockpit by pressing the "**A**" key.

"Cold and Dark" Reset and "Auto Start" Sequence

The white seatbelt label located in the upper center section of the main instrument panel [10, fig. 5-17a; 6, fig. 5-17b] is a hot spot for initiating a "**Cold and Dark**" reset cycle or an







“**Auto Start**” sequence.

Cold and Dark Reset

- **Left clicking** the label will shut down the engines and turn off all lights and aircraft systems, including all custom Learjet systems unique to this addon, in less than 10 seconds. The cockpit will be reset to its “Cold and Dark” state and the airplane will be parked.

Auto Start Sequence

- **Right clicking** the label will launch the “Auto Start” sequence. The automatic sequencer will start the engines and set up all aircraft systems ready for taxi. The pilot has nothing to do, but to wait and watch the sequencer perform the required pre-flight procedures automatically. Buttons, switches, and lights will be animated with sound during the entire sequence. It takes about 80 seconds for the sequencer to perform the necessary pre-flight procedures. The “Auto Start” sequencer goes beyond the simulator’s standard CTRL+E command by setting up all Learjet custom systems unique to this addon that are needed for taxi. **We strongly recommend using this feature instead of CTRL+E!**

The two battery indicators (BAT140 and BAT160) in the upper right corner of the annunciator panel [28-29, fig. 5-32b] warn the pilot that the “Cold and Dark” reset cycle or the “Auto Start” sequence is **in progress**. An audio alert will be triggered at the beginning and at the end of both cycles.

It is not possible to initiate both cycles simultaneously for obvious reasons, and although the cycles cannot be stopped when initiated, they can be paused.

DO NOT INITIATE a “Cold and Dark” reset cycle or an “Auto Start” sequence while the aircraft is airborne!

Immediate Takeoff or “Cold and Dark” Startup

At this time, it is assumed that the GLJ Model 25/28 v4 add-on aircraft has been serviced by the simulator when first loaded and that the engines are running. You can take off immediately, but we suggest that you move the aircraft to a parking at one of your favorite airports, shut off the engines, and follow the procedures below to initiate a “**cold and dark**” startup (all engines, lights, and systems off):

After the aircraft is **parked**, proceed as follows:

1. Make sure you are in the virtual cockpit view by pressing “**F9**”.
2. Simultaneously press the “**CTRL+SHIFT+F1**” keys on your keyboard (this will shut off the engines, if running).
3. Simultaneously press the “**SHIFT+M**” keys on your keyboard (this will turn off electrical power, if already on).
4. To make sure all systems are off, **left click the white seatbelt label** located in the upper center section of the main instrument panel [10, fig. 5-17a; 6, fig. 5-

17b] for initiating a "**Cold and Dark**" reset cycle.

Tip

- With the engines and all switches and lights turned off, and the aircraft parked, you can **save your current flight** and use it as a template for subsequent flights, from a "cold and dark" cockpit.

Exterior Inspection

An **exterior description** of the GLJ Model 25/28 v4 addon is available in section 3 of the manual [fig. 3-1 to fig. 3-5]. It is recommended to familiarize yourself with the general external arrangement of the aircraft before your first flight.

1. Select the **Locked Spot** view ("Prepar3D > Top Menu Bar > New View > Outside > **Locked Spot**"). This will allow you to inspect the exterior of the aircraft. You can use the "top hat" button on your controller (or the arrow keys on your numeric keypad) to walk around the aircraft. Use the "+/=" or "_/-" keys on your keyboard to zoom in and out.

2. To open (or close) the passenger and crew door, press the "**SHIFT+E**" keys simultaneously. You can also click the **door handle** to open/close the door.

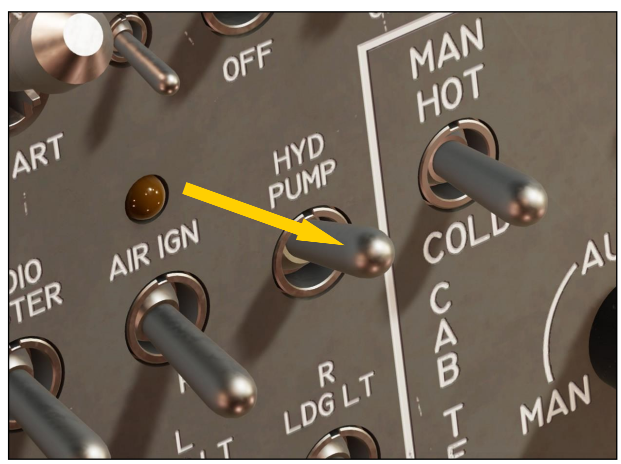
3. Use your controller (joystick/yoke) and/or pedals to control and observe movements of the rudder, elevator, and ailerons. These surfaces are **cable actuated** and always controlled manually. While moving the ailerons, you can also observe the movement of their balance tabs. Observing the movements of the horizontal stabilizer, flaps, spoilers, and trim tabs should not be possible at this time because they require electrical and/or hydraulic power (a Prepar3D issue that still needs to be fixed).

4. You can click the **aileron on the left wingtip tank** of the Model 25 [5, fig. 3-5] or the **leading edge of the left winglet** of the Model 28 [20, fig. 3-3] to call for a ground power unit. The GPU supplies 28 VDC to the aircraft during ground procedures or maintenance. Click the **GPU control panel cover** [4, fig. 3-5] to start the GPU.

5. With the GPU still turned on and providing DC voltage to the aircraft, you may now observe the movements of the horizontal stabilizer (pitch trim) and of the trim tabs on the left aileron and rudder. The trim tabs are **electrically actuated and controlled**.

6. Return to the **Virtual Cockpit ("F9").**

7. On the electrical panel, located in the lower section of the center instrument panel, turn **ON** the Electric Auxiliary Hydraulic Pump Switch [19, fig. 5-29]. The auxiliary hydraulic pump provides hydraulic power to the aircraft when the engines are not running. This is very useful for ground maintenance or in case of emergency.



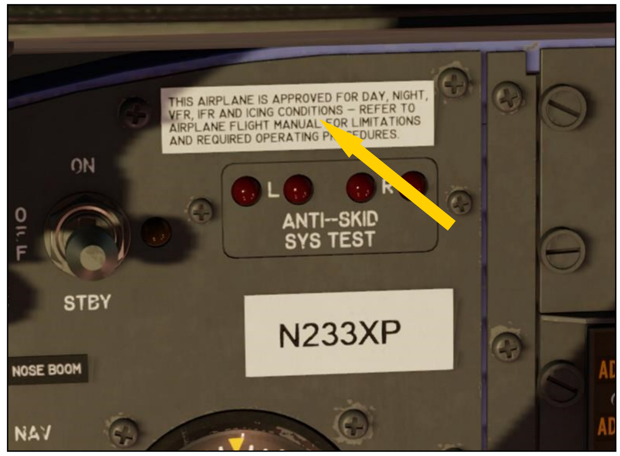
8. Return to the **Locked Spot view ("S").**

9. You may observe the movements of the

flaps and spoilers. To extend or retract the flaps, press the "**F6/F7**" keys on your keyboard or the corresponding button on your controller. To extend or retract the spoilers, press the "/" key on your keyboard or the corresponding button on your controller. Flaps and spoilers are **electrically actuated and hydraulically controlled**.

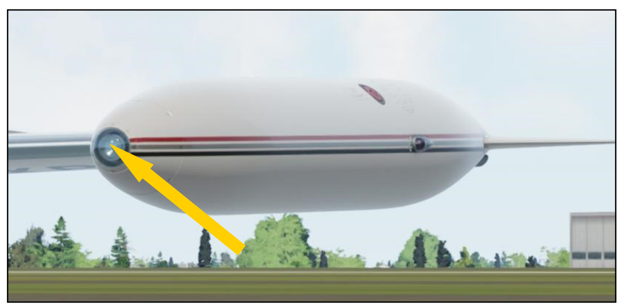
10. Click the **lower section of the main entry door** [7, fig 3-5] to show/hide the flight crew. This can be performed from inside the cockpit as well by clicking either headphone hanger [5, fig. 5-49] on the cockpit side walls. When the headphones and the pilot's seatbelts are visible inside the cockpit, the crew is absent. When the headphones and the pilot's seatbelts are not visible, the crew is present. Click one of the **pilot's shirts** to switch crew.

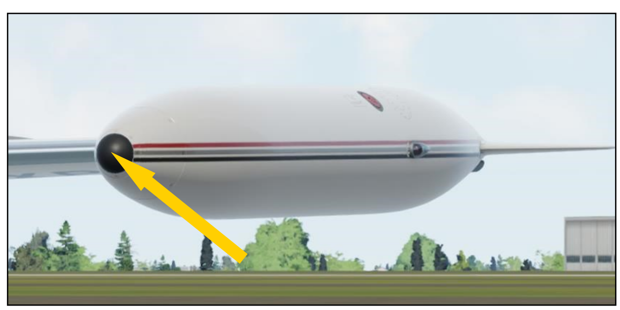
11. You can click the **nose gear door** [8, fig. 3-5] to install/remove the "Remove Before Flight" items (ribbons and Pitot covers,



wheel chocks, engine inlet covers, tail stand). This can also be performed from the virtual cockpit by clicking the **white label** above the Anti-Skid Generator Lights in the upper section of the captain's instrument panel [4, fig. 5-15]. The "Remove Before Flight" items cannot be installed if the aircraft is not parked, not on the ground, or if the starters/engines are running. Please note that the tail stand is installed only when the aircraft is full of fuel (85% or more, CoG near aft limit).

12. On the Learjet 25, you can click the **nose of the left wingtip tank** [6, fig. 3-5] to install/remove the recognition light at the front. This can also be performed from the virtual cockpit by clicking the white label [27, fig. 5-2] under the Trim Indicator Panel in the lower section of the cap-





tain's instrument panel. Having one or two recognition lights installed is a matter of personal choice. Recognition lights are not installed on the Model 28. See section 6, page 23.

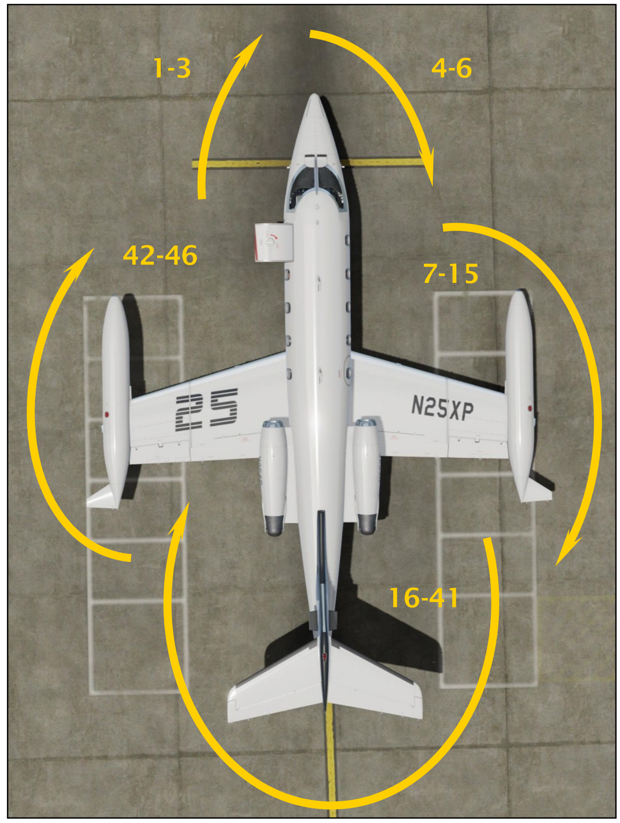
13. Click the **aileron on the left wingtip tank** of the Model 25 [5, fig. 3-5] or the **leading edge of the left winglet** of the Model 28 [20, fig. 3-3] to shut off and remove the GPU.

14. Return to the **Virtual Cockpit ("F9").**

15. Set the Electric Auxiliary Hydraulic Pump Switch [19, fig. 5-29] to **OFF**.

16. To make sure all systems are off, click the **white seatbelt label** located in the upper center section of the main instrument panel [10, fig. 5-17a; 6, fig. 5-17b] for initiating a "**Cold and Dark**" reset cycle.

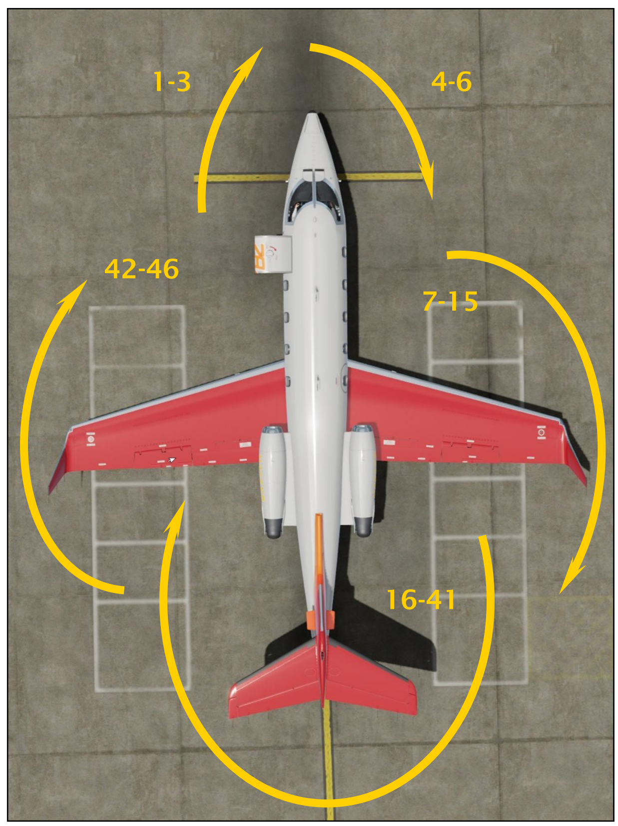
Note: *Other clickable "hot spots" are available on the exterior model. Please refer to fig. 3-5 for details.*



Complete Walkaround

In the real world, the crew (usually the copilot) will perform a complete exterior power off inspection of the aircraft before every flight, even though it has been checked and rechecked by expert mechanics on the ground. The "walkaround" is performed clockwise and starts at the left front section of the aircraft. The purpose of the inspection is to make sure everything is secure, in perfect condition, that there are no obstructions or leaks, that movable parts can move freely, etc. In addition, Learjet pilots take great care of their bird. Everything must be spotless, polished, and shiny, inside out, for the next executive ride. **There is no such thing as a dirty Learjet!**

Note: *A detailed exterior description of the GLJ Model 25/28 v4 addon is available in section 3 [fig. 3-1 to fig. 3-5].*



1. Make sure you are in the **Virtual Cockpit ("F9").**

2. Make sure all systems are **OFF**. *In doubt, click the* ***white seatbelt label*** *located in the upper center section of the main instrument panel* [10, fig. 5-17a; 6, fig. 5-17b] *for initiating a "****Cold and Dark****" reset cycle.*

3. Select the **Locked Spot** view ("Prepar3D > Top Menu Bar > Views > New View > Outside > **Locked Spot**").

Here is a **summary of what needs to be checked** (see charts on previous page):

1. Left pitot tube, static ports, shoulder static port, static port drains and stall warning vane
2. Captain's windshield, windshield defog outlet and nozzle
3. Nose gear, nose gear well, wheel and tire
4. Radome, radome static dischargers, radome alcohol discharge port
5. Right pitot tube, static ports, shoulder static port, static port drains and stall warning vane
6. Copilot's windshield, windshield defog outlet and nozzle
7. Wing inspection light
8. Lower rotating beacon light and antennas
9. Upper antennas
10. Cabin windows
11. Emergency exit door
12. Right wing leading edge, stall strip, fence, boundary layer or vortex generator, heat scuppers, access panels, fuel vents
13. Right winglet, strobe light and navigation light, static discharge wicks (Model 28)
14. Right wing fuel cap (Model 28)
15. Right wingtip tank, right recognition light, tank fuel cap, right navigation light and strobe, tank fin and static discharge wicks, fuel jettison tube (Model 25)
16. Right aileron and aileron balance tab
17. Right spoiler, flap, and static discharge wicks
18. Right landing gear, gear doors, well, brakes, brake hoses, wheels, and tires
19. Right landing/taxi light
20. Right engine inlet
21. Right engine access doors, oil filler cap and door, drains
22. Right engine thrust reverser
23. Right engine turbine exhaust area
24. Rear lower fuselage valves, vents, and drains (both sides)
25. Tail cone interior and access door
26. Oxygen servicing door, filler valve and discharge disk
27. Tail VOR/LOC antennas
28. Upper rotating beacon light
29. Horizontal stabilizer, stabilizer leading edge blankets, rudder, rudder trim tab, elevator, static discharge wicks, navigation lights and strobe, tail access doors
30. External power port
31. Fire extinguisher disks
32. Left engine turbine exhaust area
33. Left engine thrust reverser
34. Left engine access doors, oil filler cap and door, drains
35. Left engine inlet
36. Left landing gear, landing gear doors, well, brakes, brake hoses, wheels, and tires
37. Left landing/taxi light
38. Left spoiler, flap and static discharge wicks
39. Left aileron, aileron balance tab and trim tab
40. Left wingtip tank, left recognition light (if installed), tank fuel cap, left navigation light and strobe, tank fin and static discharge wicks, fuel jettison tube (Model 25)
41. Left winglet, strobe light and navigation

light, static discharge wicks (Model 28)

42. Left wing fuel cap (Model 28)

43. Left wing leading edge, stall strip, fence, boundary layer or vortex generator, heat scuppers, access panels, fuel vents

44. Cabin windows

45. Passenger and crew door, door handles, lock, upper and lower sections, snubber, restraint cables and pole (retainer)

46. Cabin entry lights

CHECKLIST

1. Return to the **Virtual Cockpit** (“**F9**”).

2. Make sure all systems are **OFF**. *In doubt, click the **white seatbelt label** located in the upper center section of the main instrument panel [10, fig. 5-17a; 6, fig. 5-17b] for initiating a “**Cold and Dark**” reset cycle.*

Cockpit Preparation (Power OFF)

1. “Remove Before Flight” Items - **REMOVED.** *Click the **white label** above the Anti-Skid Generator Lights [4, fig. 5-15] to remove the items. Switch to the exterior view (“**S**”) to check that the items have been removed. Then return to the virtual cockpit (“**F9**”).*

2. Flight Crew - **ON BOARD.** *To show/hide the flight crew, click either **headphone hanger** [5, fig. 5-49] on the cockpit side walls. When the headphones and the pilot’s seatbelts are visible inside the cockpit, the crew is absent. When the headphones and the pilot’s seatbelts are not visible, the crew is present. You can also click either the **lower section of the passenger and crew door** on the exterior model [1, fig. 5-57] or inside the cabin [4, fig. 5-56]. To switch to one of the cabin views when in the virtual cockpit, press “**A**” several times. To return to the virtual cockpit, press “**F9**”. Switch to the exterior view (“**S**”) to check if the captain and the copilot are present in the cockpit. To return to the virtual cockpit, press “**F9**”.*

3. Captain - **SELECT PILOT.** *Click the **Learjet logo** [1, fig. 5-51] at the center of the captain’s yoke to select the pilot of your choice. You can also click on the **captain’s shirt** [2, fig. 3-5] on the exterior model.*

4. Copilot - **SELECT PILOT.** *Click the **Learjet logo** at the center of the copilot’s yoke to*

select the pilot of your choice. You can also click on the ***copilot's shirt*** *on the exterior model.*

5. Sunglasses - **OPTIONAL.** *If you want your pilots to wear sunglasses, click the* ***pair of sunglasses*** *on the copilot's right console [2, fig. 5-50] or the* ***whiskey compass housing*** *or* ***correction card*** *to show/hide the sunglasses. You can also click the* ***windshield defog outlets*** *[1, fig. 3-5] on the exterior model.*

6. Pilots - **CHECK**. *Switch to the exterior view ("****S****") to check the pilots in the cockpit. To go back to the virtual cockpit, press "****F9****".*

7. Seats - **ADJUST ARMRESTS** *(see "****Configuring the Virtual Cockpit****", section 4, page 6).*

8. Flight controls - **FREE**. *Hide the control columns and yokes if desired. You can show/hide the control columns and yokes by clicking their* ***respective boot*** *(see "****Hiding the Control Columns and Yokes****", section 4, page 4).*

9. Parking brake [9, fig. 5-43] - **SET**.

10. All switches - **OFF**.

11. All circuit breakers - Check **IN (CLOSED)**.

12. Oxygen Pressure Gauge [2, fig. 5-39] - **IN GREEN**. *Click to fill if necessary.*

13. Emergency Air Pressure Gauge [4, fig. 5-39] - **IN GREEN**. *Click to fill if necessary.*

14. Passenger Oxygen Flow Valve [4, fig. 5-49] - **NORM**, if passengers are present.

15. Passenger Oxygen Mask Valve [2, fig. 5-49] - **AUTO**, if passengers are present.

16. Landing Gear Selector Switch [5, fig. 5-30] - Check **DOWN**.

17. Bleed Air Switch [1, fig. 5-41] - Check **OFF**.

18. Pressurization Mode Switch [4, fig. 5-41] - **AUTO**.

19. Auto Rate Control Knob [2, fig. 5-41] - Check **CENTERED**.

20. Windshield Defog Knob [8, fig. 5-43] - **IN (NORMAL)**.

21. "ALC AI" annunciator [15, fig. 5-32a] - **CHECK** alcohol level (1.75 gallon). *Click* ***to fill*** *the reservoir if necessary.*

Testing the Emergency Batteries

1. Emergency Battery Switch [2, fig. 5-15] - **ON**.

2. Check amber light next to the Emergency Battery Switch **ON**, after a brief delay.

3. Standby Gyro [fig. 5-16] - Check **OPERATIONAL.** Uncage and adjust pitch scale [7, fig. 5-16] if necessary.

4. Emergency Battery Switch - **OFF**.

5. Standby Emergency Battery Switch [3, fig. 5-15] - **ON**.

6. Check the amber light next to the Standby Emergency Battery Switch **ON**, after a brief delay.

7. Standby Emergency Battery Switch - **OFF**, then **STBY**.

8. Check the amber light next to the Standby Emergency Battery Switch **ON**, after a brief delay.

9. Standby Gyro [fig. 5-16] - Check **OPERATIONAL.**

10. Standby Emergency Battery Switch - **OFF**.

External Power Source (Optional)

To preserve battery power during ground procedures up until the engines have started and the generators turned on, it is strongly suggested to use an external power source to power up the aircraft:

1. Switch to the **Locked Spot** view (“**S**”).

2. Click the **aileron on the left wingtip tank** of the Model 25 [5, fig. 3-5] or the **leading edge of the left winglet** of the Model 28 [20, fig. 3-3] to call for a ground power unit. *The GPU supplies 28 VDC to the aircraft during ground procedures or maintenance.* Click the **GPU control panel cover** [4, fig. 3-5] to start the GPU.

Tip

- To show/hide and start/shut off the GPU, you can also click the **Ground Power Unit Breaker** at the bottom of the captain’s breaker panel. See section 4, page 8.

3. Return to the **Virtual Cockpit** (“**F9**”).

Note: *Don’t forget to* ***SHUT OFF*** *and* ***DISCONNECT (HIDE)*** *the GPU after the engines have started and the generators are turned on.*

Cockpit Preparation (Power ON)

1. Make sure the GPU is **shut OFF**, if batteries are used.

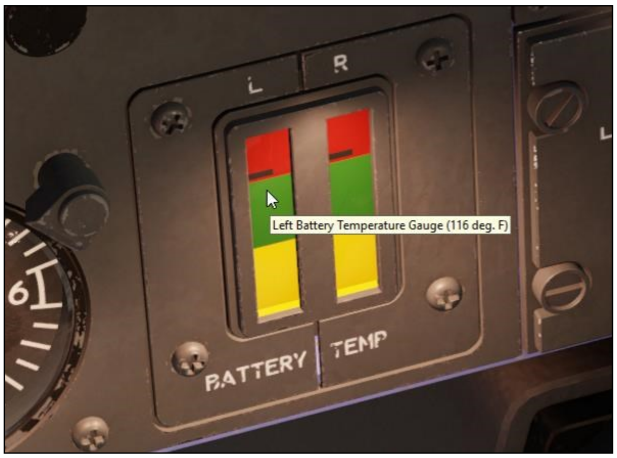
2. Battery Switches [8-9, fig. 5-30] - **ON**, if the GPU is not operational.

Very Important!

- Like in the real aircraft, **do not turn on the battery switches** when the batteries are fully charged, and the GPU (or the generators) are operating to prevent the NiCad batteries from overheating. **This may cause a fire!**

Tip

- Mouse overing either Battery Temperature Gauge [14, fig. 5-37] will display a tooltip with the temperature of the left or right NiCad battery.



3. Cockpit lights - **ADJUSTED** to your preferences. *See "**Cockpit and Cabin Lighting System**" in section 6, page 7.*

4. Landing Gear Selector Switch and Lights [5, 3, fig. 5-30] - Check **DOWN + 3 GREEN**.

5. Both Primary and Secondary Inverter Switches [10,12, fig. 5-29] - **ON**.

6. Radio Master Switch (Avionics) [14, fig. 5-29] - **ON**.

7. Instrument Warning Flags - **OUT OF VIEW**.

8. Annunciators:

   a. Annunciator Panel Test Button and Dimmer [31, fig. 5-32a/b] - **DEPRESSED** (**ON**). You can **set the intensity** (0-100 %) of the panel lights and annunciators with the mouse wheel.

   b. All annunciators and most panel and center console lights - **ON**.

   c. Decision height lights on the ADIs [fig. 5-7] and radio-altimeter [fig. 5-13] - **ON**.

   d. Altitude alert lights on the ADDUs [fig. 5-11a] - **ON**.

   e. Annunciator Panel Test Button - **RELEASED** (**OFF**).

9. Decision height lights on the captain's and copilot's fire panels [1, fig. 5-33; 8, fig. 5-35] - **PUSH TO TEST (ON/OFF)**.

10. Marker Beacon Lights on the captain's and copilot's fire panels [1-3, fig. 5-5] - **PUSH TO TEST (ON/OFF)**.

11. Electric Auxiliary Hydraulic Pump Switch [19, fig. 5-29] - **ON**.

12. Hydraulic Pressure Gauge [3, fig. 5-39] - **RISING, then IN GREEN**.

13. Electric Auxiliary Hydraulic Pump Switch - **OFF**.

Warning Systems Tests

1. Landing Gear Warning System Test Switch [4, fig. 5-30] - **TEST**. Check all six Landing Gear Position Lights [3, fig. 5-30] **ON** with aural warning.

2. Landing Gear Warning System Test Switch - **CENTER (OFF)**.

3. No Smoking/Seat Belt Switch [10, fig. 5-

43] - **TEST (BOTH POSITIONS).** Return switch to **OFF** after test.

4. Electric Auxiliary Hydraulic Pump Switch [19, fig. 5-29] - **ON.**

5. Stall warning system test:

   a. Both Stall Warning Switches [4, 6, fig. 5-29] - **ON.** Check annunciators [3, 6, fig. 5-32a] **OFF.**

   b. Stall Warning Test Vane Selector Switch [14, fig. 5-43] - **RIGHT.**

   c. Stall Warning System Test Switch [15, fig. 5-43] - **ON.**

   d. Right Angle-of-Attack Indicator [7, fig. 5-37] - **IN RED.** Check for aural alert, stick shaker, stick nudger (pusher) and Right Stall Warning Annunciator [6, fig. 5-32a] **FLASHING.**

   e. Stall Warning Test Vane Selector Switch [14, fig. 5-43] - **LEFT.**

   f. Left Angle-of-Attack Indicator [11, fig. 5-2] - **IN RED.** Check for aural alert, stick shaker, stick nudger (pusher) and Left Stall Warning Annunciator [3, fig. 5-32a] **FLASHING.**

   g. Stall Warning System Test Switch - **OFF.**

   h. Both Stall Warning Switches - **OFF.** Check annunciators [3, 6, fig. 5-32a] **ON.**

6. Anti-skid system test:

   a. Anti-Skid Power Switch [8, fig. 5-29] - **ON.** Check Anti-Skid Generator Lights [5, fig. 5-15] **OFF.**

   b. Anti-Skid System Test Switch [16, fig. 5-43] - **FORWARD (OUTBOARD).** Check Anti-Skid Generator Lights **OUTBOARD ON.**

   c. Anti-Skid System Test Switch - **AFT (INBOARD).** Check Anti-Skid Generator Lights **INBOARD ON.**

   d. Anti-Skid System Test Switch - **CENTER (OFF).**

   e. Anti-Skid Power Switch - **OFF.** Check Anti-Skid Generator Lights **ON.**

7. Overspeed warning test:

   a. Cabin Altitude Warning/Mach Test Switch [13, fig. 5-43] - **AFT (MACH TEST).** Check for aural alert and stick puller.

   b. Cabin Altitude Warning/Mach Test Switch - **CENTER (OFF).**

8. Electric Auxiliary Hydraulic Pump Switch [19, fig. 5-29] - **OFF.**

9. Fire detection system test:

   a. Fire Detection System Test Switch [12, fig. 5-43] - **ON.** Check both captain and copilot fire annunciators [fig. 5-33; fig. 5-35] **ON** or **FLASHING.**

b. Fire Detection System Test Switch - **OFF**. Check both captain and copilot fire annunciators **OFF**.

10. Cabin altitude warning test:

a. Cabin Altitude Warning/Mach Test Switch [13, fig. 5-43] - **FORWARD (CABIN ALT TEST)**. Check Cabin Altitude Annunciator [30, fig. 5-32b] **FLASHING** (with aural alert).

b. Cabin Altitude Warning/Mach Test Switch - **CENTER (OFF)**. Check Cabin Altitude Annunciator **OFF**.

Before Starting the Engines

1. Thrust reversers:

a. Thrust Reverser Lights Test Switch [11, fig. 5-36] - **TEST**. Check all thrust reverser annunciators and lights **ON**.

b. Thrust Reverser Lights Test Switch - **NORM**. Check all thrust reverser annunciators and lights **OFF**.

c. Engine Throttles [1, 3, fig. 5-43] - **IDLE** (“**F1**” or **FULL AFT** on your controller) if released, or **CUTOFF** if locked. *Throttles cannot be moved if locked*.

d. Thrust Reverser Subthrottles [7, 17, fig. 5-43] - **PUSHED FORWARD** or **IDLE 0%** (“**F1**”).

e. Thrust Reverser Arm Switches [13-14, fig. 5-36] - **ARM**. Check Thrust Reverser Armed Annunciators [7, 8, fig. 5-36] **ON**.

f. Thrust Reverser Arm Switches - **OFF**. Check Thrust Reverser Armed Annunciators **OFF**.

g. Thrust Reverser Emergency Stow Switches [2-3, fig. 5-36] - **NORM (UP)**. Check Thrust Reverser Emergency Stow Lights [1, 4, fig. 5-36] **OFF**.

h. Thrust Reverser Unsafe Annunciators [5, 10, fig. 5-36] - **OFF**.

i. Thrust Reverser Deployed Annunciators [6, 9, fig. 5-36] - **OFF**.

2. Autopilot check:

a. AFC/SS Test Switch [11, fig. 5-43] - **FORWARD (AFCS TEST)**. Check all AFCS (autopilot/flight director) mode annunciators and lights **ON**.

b. AFC/SS Test Switch - **CENTER (OFF)**.

c. Autopilot Engage Button [1, fig. 5-46] - **PRESS ON** to engage, then **PRESS OFF** to disengage. Check for aural alert when autopilot is disengaged.

d. Autopilot Engage Button - **PRESS ON**.

e. Autopilot Roll Monitor Test Button [18, fig. 5-43] - **DEPRESS TO TEST**. Autopilot will disengage. Release to **OFF**.

f. Autopilot Engage Button - **PRESS ON**.

g. Autopilot Pitch Trim Monitor Switch [19, fig. 5-43] - **TEST UP AND DOWN**. Autopilot will disengage. Reset to **CENTER (OFF)**.

h. Autopilot Engage Button - **PRESS ON**.

i. Turn Command Knob [2, fig. 5-46] - **TEST (ROTATE) LEFT/RIGHT**, then reset to **CENTER**. *Click to center.*

j. Pitch Command Wheel [10, fig. 5-46] - **TEST (ROTATE) UP/DOWN**, then reset to **CENTER**. *Click to center.*

k. Autopilot Engage Button - **PRESS OFF**.

l. Yaw Damper Selector Switch [5, fig. 5-47] - **PRI YAW DAM**PER.

m. Primary Yaw Damper ON Button [12, fig. 5-46] - **PRESS ON** to engage.

n. Primary Yaw Damper OFF Button [11, fig. 5-46] - **PRESS OFF** to disengage. Check for aural alert when primary yaw damper is disengaged.

o. Yaw Damper Selector Switch - **SEC YAW DAMPER**.

p. Secondary Yaw Damper Switch [6, fig. 5-47] - **ENGAGE**.

q. Secondary Yaw Damper Switch - **OFF**. Check for aural alert when secondary yaw damper is disengaged.

r. Yaw Damper Selector Switch - Back to **PRI YAW DAMPER**.

3. Emergency Pitch Trim Selector Switch [3, fig. 5-29] - **NORM**.

4. Trim:

   a. Elevator trim (on your controller) - Check that Pitch Trim Indicator [3, fig. 5-14] is about **one needle thickness below center**. Listen for trim in motion clicker (autopilot must be disengaged).

   b. Takeoff Trim Alert Annunciator [2, fig. 5-33] - **OFF**.

   c. Aileron trim (on your controller) - **CHECKED (0 deg.)**.

   d. Rudder trim [1, fig. 5-47] - **CHECKED (0 deg.)**.

5. Fuel quantity [17, fig. 5-45a; 16, fig. 5-45b]:

   a. Check **sufficient quantity** for flight.

   *Refer to "**Flight Planning**", in section 7 for details.*

   b. Check for **imbalance** between L/R tanks. *See "**Crossflow (Crossfeed) Switch**", section 6, page 27, for more information about cross-feeding fuel.*

6. Fuel counter [15, fig. 5-45a; 14, fig. 5-45b] - Click button to **RESET TO ZERO.** *Fuel counter indicates fuel consumed since the last engine start (after reset). Must be reset manually.*

7. Crossflow (Crossfeed) Switch [3, fig. 5-45a; 2, fig. 5-45b] - **CLOSE**. *See "**Crossflow (Crossfeed) Switch**", section 6, page 27, for more information about cross-feeding fuel.*

8. Fuselage Tank Switch [6, fig. 5-45a; 5, fig. 5-45b] - **OFF (CENTER).**

9. Fuel Jettison Switch (Model 25) [1, fig. 5-45a] - **OFF.** *Refer to "**Fuel Jettison**", section 6, page 25, for more information about the fuel jettison system.*

10. Jet pumps:

   a. Jet Pumps Switches [11-12, fig. 5-45a; 10-11, fig. 5-45b] - Both **ON**.

   b. Motive Flow Valve Lights [10, 13, fig. 5-45a; 9, 12, fig. 5-45b] - Both **ON** for one second (valve in transit), then **OFF**.

   c. Engine Low Fuel Pressure Annunciators [1,4, fig. 5-32a] - **OFF**.

11. Standby Pumps Switches [8-9, fig. 5-45a; 7-8, fig. 5-45b] - **OFF**.

12. Passenger and Crew Door [fig. 5-56 and 5-57] - **CLOSED AND SECURE (SHIFT+E).**

13. Door Unsecured Annunciator [10, fig. 5-32a] - **OFF.**

Right Engine Start
(same procedures for the left engine)

Note: *If the engine won't start, make sure the fuel mixture is set to "**rich**" (**CTRL+SHIFT+F4**) before proceeding. Refer to "**Fuel Mixture**", in section 6, page 22, for more information (Known Issue).*

1. Right Engine Throttle [3, fig. 5-43] - **IDLE** ("**F1**" or **FULL AFT** on your controller) if released, or **CUTOFF** if locked. *Throttle cannot be moved if locked.*

2. Right Thrust Reverser Subthrottle [17, fig. 5-43] - Check **FULL FORWARD** (**IDLE** or "**F1**").

3. Right Throttle Release Lever [4, fig. 5-43] - Click to **LOCK** or "**CTRL+SHIFT+F1**" (release lever down and locked, throttle set to cutoff, fuel valve closed).

4. Right Engine Throttle - Check **CUTOFF** (locked, full down position).

5. Rotating Beacon Lights [13, fig. 5-29] - **ON.**

6. Right Starter/Generator Switch [6, fig. 5-30] - **START.** Check for Right Ignition Light [17, fig. 5-29] **ON.**

7. Right engine RPM [7 right, fig. 5-27] - Check about **10 to 25%.**

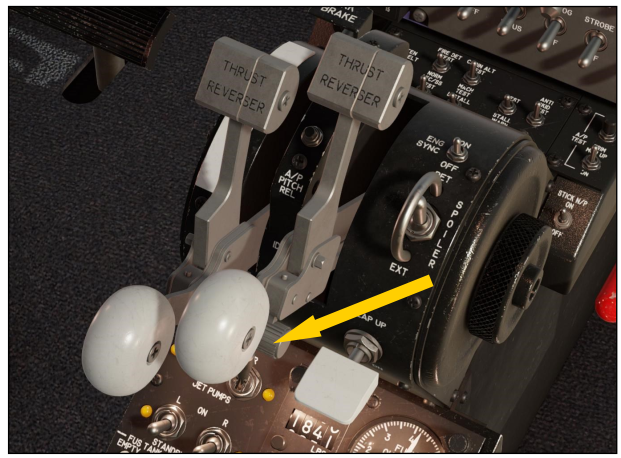
8. Right Throttle Release Lever - Click to **RELEASE** (release lever up, throttle set to idle, fuel valve open).

9. Right Engine Throttle - Check **IDLE** ("**F1**" or **FULL AFT** on your controller).

10. Right engine EGT [5 right, fig. 5-27] - Monitor and make sure **WITHIN GREEN ARC.**

11. Right engine RPM - Check about **50%.**

12. Right Starter/Generator Switch - Set to **OFF**, then to **GEN** when engine is stable at **IDLE.**



13. Right Engine Ignition Light - **OFF.**

14. Right Generator Inoperative Annunciator [23, fig. 5-32a] - **OFF.**

15. Right DC Ammeter [5, fig. 5-28] - Check **MOVING (about 170 amps.).**

16. Right Engine Low Fuel Pressure Annunciator [4, fig. 5-32a] - Check **OFF**.

17. Right engine oil pressure and temperature [8, fig. 5-27; 5 right, fig. 5-27] - Check **BOTH IN GREEN**.

18. Fuel flow [9, fig. 5-27] - **NORMAL.**

19. Hydraulic pressure [3, fig. 5-39] - **IN GREEN**.

20. Engine Sync Indicator [7, fig. 5-23] - **SPINNING**.

21. GPU - **SHUT OFF** and **DISCONNECTED**, if it was used for pre-flight procedures. *Click the **Ground Power Unit Breaker** at the bottom of the captain's breaker panel in the virtual cockpit to shut off/hide the GPU (see section 4, page 8). You can also click the **aileron on the left wingtip tank** of the Model 25 [5, fig. 3-5] or the **leading edge of the left winglet** of the Model 28 [20, fig. 3-3] (exterior model).*

22. Battery Switches [8-9, fig. 5-30] - Make sure the batteries are fully charged, then **OFF**. ***Do not turn on the battery switches** when the batteries are fully charged, and the generators are operating to prevent the NiCad batteries from overheating. **This may cause a fire!***

Left Engine Start (optional at this time)

Repeat the above procedures for the **left engine** if desired (can be performed later just before takeoff).

1. Engine Sync Indicator [7, fig. 4-24c] - **STABILIZING**, when both engines are running.

***Note:** To save fuel, some Learjet pilots prefer to taxi with only one engine running, depending on their flight plan. It's up to you to decide if you want to taxi with one or two engines running.*

Before Taxi

1. Primary & Secondary Inverter Switches [10, 12, fig. 5-29] - Check **ON**.
2. Auxiliary Inverter Switch [5, fig. 5-29] - Check **OFF**.
3. Radio Master Switch (avionics) [14, fig. 5-29] - Check **ON**.
4. Engine instruments [fig. 5-27] - **CHECKED**.
5. Navigation Lights [15, fig. 5-29] - **ON**.
6. Strobe Lights [11, fig. 5-29] - **ON**.
7. Recognition Lights (Model 25) [9, fig. 5-29] - **ON (if required).**
8. Taxi Lights [18, 20, fig. 5-29] - **ON (TAXI LT)**.
9. Emergency Lights Switch [9, fig. 5-47] - **ARM**. Check Emergency Lighting System OFF Warning Light [8, fig. 5-47] **OFF**.
10. Spoilers:
    a. Spoilers Switch [25, fig. 5-43] - Check **RET**.
    b. Spoilers Extended Annunciator [7, fig. 5-32a] - Check **OFF**.
11. Bleed Air Switch [1, fig. 5-41] - **NORMAL** or **MAX**.
12. Anti-ice:
    a. Windshield Heat Switches [4, fig. 5-4] - **AS REQUIRED**.
    b. Windshield Defog Knob [8, fig. 5-43] - **AS REQUIRED**.
    c. Wing and Stabilizer Heat Switch [3, fig. 5-4] - **AS REQUIRED**.
    d. Engine Nacelle Heat Switches [2, fig. 5-4] - **AS REQUIRED**.
    e. Pitot Heat Switches [1, fig. 5-4] - **AS REQUIRED**.
    f. Anti-Ice Alcohol Switch [5, fig. 5-4] - **RADOME, AS REQUIRED**.

Note: *All anti-icing equipment must be turned on* ***before icing conditions are encountered*** *to avoid a serious hazard of safety during flight. The Ram Air Temperature Warning Indicator and the Ram Air Temperature Gauge [17, 18, fig. 5-37] should be monitored frequently when flying in areas where icing may occur. Refer to "****20 Series Anti-Ice System****", in section 6, page 12, for more information about icing conditions, ice detection, and system operation.*

13. Parking brake [9, fig. 5-43] - **RELEASED**.
14. Anti-Skid Power Switch [8, fig. 5-29] - **ON**.
15. Anti-Skid Generator Lights [5, fig. 5-15] - **ALL OFF**.

Taxi

1. Radios [fig. 5-18 to fig. 5-21] - Check **ON** and **SET**.
2. ATC clearance - **OBTAINED** from appropriate authority. **SET** radios accordingly.

3. GPS/GNS/GTN [fig. 5-24 and fig. 5-25] - **ON** and **SET** according to flight plan and ATC clearance (if available/needed).

4. Flight controls - **CHECKED**.

5. Thrust reversers controls [fig. 5-36] - **CHECKED.**

6. Nose wheel steering:

   a. Nose Gear Steer Lock Switch [7, fig. 5-4] - **DEPRESS MOMENTARILY** to **ENGAGE** electric nose wheel steering.

   b. Nose Wheel Steering Engaged Annunciator [14, fig. 5-32a] - **ON**.

7. Engine Throttle(s) [1, 3, fig. 5-43] - **AS NEEDED** for taxi. *Taxiing with only one engine running requires some practice.*

8. Aircraft rolling above 5 knots:

   a. Toe brakes - **APPLIED**. Listen for “birds in the cockpit” sounds.

   b. Verify aircraft deceleration.

   c. Toe brakes - **RELEASED**.

Before Takeoff

1. Cabin pressurization:

   a. Bleed Air Switch [1, fig. 5-41] - Check **NORMAL** or **MAX.**

   b. Cabin Altitude Controller Knob [5, fig. 5-41] - **SET** to **initial planned cruise altitude**.

2. Cabin temperature:

   a. Cabin Temperature Control Knob/Switch [1 or 2, fig. 5-42] - **SET** to **desired temperature.**

   b. H-Valve Position Indicator [19, fig. 5-37] - Check, **about 1/2.**

   c. Lower cabin temperature **if necessary**.

3. Anti-ice:

   a. Bleed Air Switch [1, fig. 5-41] - Check **NORMAL** or **MAX.**

   b. Windshield Heat Switches [4, fig. 5-4] - **AS REQUIRED.**

   c. Windshield Defog Knob [8, fig. 5-43] - **AS REQUIRED.**

d. Wing and Stabilizer Heat Switch [3, fig. 5-4] - **AS REQUIRED**.

e. Engine Nacelle Heat Switches [2, fig. 5-4] - **AS REQUIRED**.

f. Pitot Heat Switches [1, fig. 5-4] - **AS REQUIRED**.

g. Anti-Ice Alcohol Switch [5, fig. 5-4] - **RADOME, AS REQUIRED**.

4. All external lights, except landing lights [fig. 5-29] - **ON**.

5. Avionics:

a. ADI Gyro and Computer Warning Flags [10-11, fig. 5-7] - **OUT OF VIEW**.

b. HSI Compass Warning Flag [14, fig. 5-8] - **OUT OF VIEW**.

c. Radios and transponder [fig. 5-18 to fig. 5-21] - Check **ON** and **SET** according to flight plan and ATC clearance.

d. GPS/GNS/GTN [fig. 5-24 and fig. 5-25] - **ON** and **SET** according to flight plan and ATC clearance (if available/ needed).

e. Radar [fig. 5-26] - **ON** and **SET** (if available/needed).

6. Gyro:

a. Directional Gyro Free/Slave Switch [9, fig. 5-5] - Check **SLAVE**.

b. Gyro Drift Compensation Switch [8, fig. 5-5] - If Directional Gyro Free/Slave Switch is set to **FREE** (magnetic references unreliable), **use as needed** to synchronize directional gyros with ground indications (the Directional Gyro Drift Knob [5, fig. 5-2] can also be used). *Requires a type "2" gyro in the addon's "aircraft.cfg". See section 6, page 36.*

7. Flight instruments:

a. Barometric pressure on altimeters [1, fig. 5-11a] - **SET**, according to nearest weather station.

b. Airspeed bugs [1, 5, fig. 5-9] - **SET** to V_1 and V_R **as needed**. *Refer to "**Flight Planning**", in section 7.*

c. Initial course on HSI [1, 8, fig. 5-8] - **SET**.

d. Initial heading on HSI [2, 11, fig. 5-8] - **SET**.

e. RMI [fig. 5-10] - **SET, as needed**.

f. DME head [fig. 5-38] - **SET, as needed**.

g. All directional indicators as aircraft turns while taxiing - **CHECKED**.

8. Autopilot Altitude Preselector [2-3, fig. 5-11a] - **SET** to **initial ATC clearance altitude.**

9. Flight Director Switch [2, fig. 5-22a] - **OFF, then ON (reset)**. Check Flight Director Command Bars [4, fig. 5-7] **IN RANGE** on ADI.

10. Radio altimeter check:

a. Radio Altimeter Power Switch [3, fig. 5-13] - **ON** (to test).

b. Radio altimeter flags [12, fig. 5-7; 6, fig. 5-13] - Check **OUT OF VIEW**.

c. Radio Altimeter Power Switch [3, fig. 5-13] - **OFF**. *Radio altimeter needed for landing only.*

11. Spoilers:

a. Spoilers Switch [25, fig. 5-43] - Check **RET**.

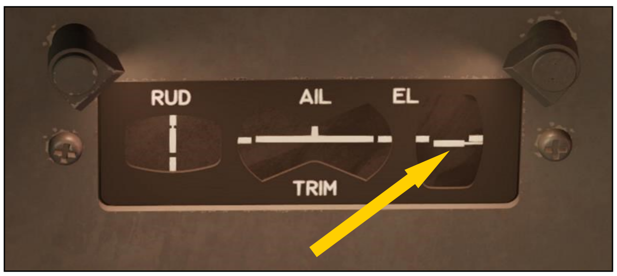
b. Spoilers Extended Annunciator [7, fig. 5-32a] - Check **OFF**.

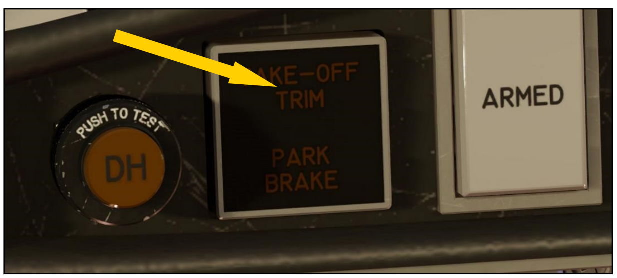
12. Flaps:

a. Flaps Switch [26, fig. 5-43] - **PUSH DOWN AS NEEDED**.

b. Flaps Position Indicator [1, fig. 5-30] - Check for correct **TAKEOFF POSITION (8°** or **AS NEEDED)**. *Refer to "**Flight Planning**", in section 7.*

13. Emergency Pitch Trim Switch [3, fig. 5-29] - Check **NORM**.





14. Trim:

    a. Elevator trim (on your controller) - **SET FOR TAKEOFF**. Check that Pitch Trim Indicator [3, fig. 5-14] is about **one needle thickness below center**. *Forward center of gravity requires more trim. No clicker sound with flaps extended more than 3 degrees.*

    b. Takeoff Trim Alert Annunciator [2, fig. 5-33] - Check **OFF**.

    c. Aileron trim (on your controller) - **CHECKED**.

    d. Rudder trim [1, fig. 5-14] - **CHECKED**. *Use your controller or the Rudder Trim Control Switch [1, fig. 5-47] to adjust, if needed.*

Left Engine Start

1. Repeat the above "**Right Engine Start**" procedures (this section, page 19) and apply them to the left engine for **STARTING** the left engine if only the right engine was used for taxi.

2. Engine Sync Indicator [7, fig. 5-23] - **STABILIZING**, when both engines are running.

Takeoff

1. Fuel quantity [17, fig. 5-45a; 16, fig. 5-45b] - With both engines running, check for **imbalance** between the L/R wing tanks. *You may have to perform a crossfeed operation now or later to balance the L/R wing tanks. See "**Crossflow (Crossfeed) Switch**", section 6, page 27, for more information.*

2. **Prepare passengers** for takeoff.

3. No Smoking/Seat Belt Switch [10, fig. 5-43; 7, fig. 5-52] - **NO SMOKING AND SEAT BELTS (ON)**.

4. Flight controls:

    a. Check - **FREE.**

    b. **HIDE** control columns and yokes if desired**.** *Control columns can be hidden by clicking their respective boot (see "**Hiding the Control Columns and Yokes**", section 4, page 4).*

5. Nose wheel steering:

    a. Nose Gear Steer Lock Switch [7, fig. 5-4] - **DEPRESS MOMENTARILY** to **DISENGAGE** electric nose wheel steering.

    b. Nose Wheel Steering Engaged Annunciator [14, fig. 5-32a] - **OFF.**

6. Anti-Skid Power Switch [8, fig. 5-29] - Check **ON.**

7. Anti-Skid Generator Lights [5, fig. 5-15] - Check **OFF.**

8. Engine Air Ignition Switches [1, 16, fig. 5-29] - Normally **OFF** (can be turned **ON** if wet or turbulent conditions).

9. Stall Warning Switches [4, 6, fig. 5-29] - Both **ON**. Check annunciators [3,6, fig. 5-32a] **OFF.**

10. Pitot Heat Switches [1, fig. 5-4] - Check, both **ON.**

11. Thrust Reverser Arm Switches [13-14, fig. 5-36] - **ARM.**

12. Thrust Reverser Armed Annunciators [7, 8, fig. 5-36] - **ON.**

13. Annunciator panel - **CHECKED**, no warnings or abnormal indications. *It is normal for the amber L ENG ICE and R ENGINE ICE annunciators [19, 22, fig. 5-32a] to be illuminated on the ground when their respective engine RPM is under 70%. See "**Engine Anti-Ice System**", section 6, page 20.*

14. ATC clearance - **OBTAINED** from the appropriate authority.

15. Landing Lights [18, 20, fig. 5-29] and all external lights - **ON (LDG LT).**

16. Toe Brakes:

    a. Brakes - **APPLIED.**

Takeoff Sequence

Important

- In case of an engine failure, refer to "**Abnormal/Emergency Procedures**" in section 9.
- The Gates Learjet Model 25/28 is a **very high-performance jet aircraft**. The takeoff sequence happens **quite fast** and requires an efficient drill to observe and maintain altitude and speed clearances.

1. Throttles [1,3, fig. 5-43]:

    a. **ADVANCE** slowly to **takeoff power** (**100% RPM**).

2. Toe Brakes:

    a. Brakes - **RELEASED**.

3. **ACCELERATE** to **V_1**:

    a. If engine fails before V_1, **ABORT** take-off. *Refer to "**Abnormal/Emergency Procedures**" in section 9*.

    b. If engine fails after V_1, **CONTINUE** take-off. *Refer to "**Abnormal/Emergency Procedures**" in section 9*.

4. V_r attained:

    a. **ROTATE** to **15 degrees (nose up)**.

    b. Airspeed (red) bugs [1, 5, fig. 5-9] - **SET** to **V_2 as needed**. *Refer to "**Flight Planning**", in section 7*.

5. Angle-of-Attack:

    a. Angle-of-Attack Indicator [5, fig. 5-6] - **MAINTAIN IN GREEN**.

6. Positive rate of climb:

    a. Landing Gear Selector Switch [5, fig. 5-30] - **UP**.

    b. Landing Gear Position Lights [3, fig. 5-30] - Check **RED ON** in transit, then all **OFF**.

    c. **ACCELERATE** to **V_2 + 15**.

7. Flaps [26, fig. 5-43]:

    a. **RETRACT** on schedule. *Refer to "**Maximum Flap Placard Speeds**" in appendix 1*.

8. Landing and Taxi Lights [18, 20, fig. 5-29] - **OFF**. *Landing and taxi lights will turn off automatically when the landing gear is retracted.*

9. Engine Air Ignition Switches [1, 16, fig. 5-29] - **OFF** (can be turned **ON** if wet or turbulent conditions during flight).

10. Anti-Skid Power Switch [8, fig. 5-29] - **OFF**.

11. Anti-Skid Generator Lights [5, fig. 5-15] - Check **ON**.

12. Thrust Reverser Arm Switches [13-14, fig. 5-36] - **OFF**.

13. Thrust Reverser Armed Annunciators [7, 8, fig. 5-36] - **OFF**.

14. **ACCELERATE** to **climb speed** - (**MAX 250 KIAS** if ATC-restricted, **MAX 306 KIAS** under FL140). *An aural alert will sound if airspeed is above 306 KIAS under 14,000 feet (bird strike protection).*

15. Cabin pressure [6-7, fig. 5-41] - **CHECKED.**

16. No Smoking/Seat Belt Switch [10, fig. 5-43; 7, fig. 5-52] - **OFF**.

Climb

1. Throttles [1, 3, fig. 5-43]:

    a. **SET** to climb power (90% RPM).

2. Autopilot Engage Button [1, fig. 5-46 or 1, fig. 5-22a] - **PRESS ON** (if desired) to engage the autopilot. *The autopilot will capture and maintain the pitch and level the wing (ATT Hold mode and Wing Leveler engaged).*

3. Anti-ice:

    a. Bleed Air Switch [1, fig. 5-41] - Check **NORMAL** or **MAX.**

    b. Windshield Heat Switches [4, fig. 5-4] - **AS REQUIRED.**

    c. Windshield Defog Knob [8, fig. 5-43] - **AS REQUIRED.**

    d. Wing and Stabilizer Heat Switch [3, fig. 5-4] - **AS REQUIRED.**

    e. Engine Nacelle Heat Switches [2, fig. 5-4] - **AS REQUIRED.**

    f. Pitot Heat Switches [1, fig. 5-4] - **AS REQUIRED.**

    g. Anti-Ice Alcohol Switch [5, fig. 5-4] - **RADOME, AS REQUIRED.**

4. Cabin pressure [6-7, fig. 5-41] - **MONITORED.**

5. Transition level (18,000 feet maximum):

    a. Barometric pressure on altimeters [1, 11, fig. 5-11] - **SET** to **29.92.**

6. Airspeed:

    a. **ACCELERATE** to **0.7 Mach**.

Cruise

1. Engine instruments [fig. 5-27] - Check **WITHIN LIMITS.**

2. Cabin pressure [6-7, fig. 5-41] - **MONITORED.**

3. Engine Sync Switch [23, fig. 5-43] - **ON, if needed**. *Check Engine Sync Indicator [7, fig. 5-23]. Throttles need to be close to one another.*

4. Engine Sync ON Annunciator [25, fig. 5-32b] - Check **ON** *(if the Engine Sync*

Switch is set to ON).

5. Yaw Damper Selector Switch [5, fig. 5-47] - Check **PRI YAW DAMPER**.

6. Primary Yaw Damper ON Button [12, fig. 5-46] - **PRESS ON** *(Primary Yaw Damper engaged).*

7. Fuel status:

   a. **MONITOR** fuel **at all times** [17, fig. 5-45a; 16, fig. 5-45b].

   b. **ENSURE** fuel burn [15, fig. 5-45a; 14, fig. 5-45b] is **consistent with flight plan**. *Refer to "**Flight Planning**", in section 7.*

   c. **SWITCH TO THE FUSELAGE TANK** if fuel level in the wing tanks **becomes critically low** [6, fig. 5-45a; 5, fig. 5-45b]. *Refer to "**Fuselage Tank Switch**", section 6, page 28, for details and full procedures.*

8. Autopilot Engage Button [1, fig. 5-46 or 1, fig. 5-22a] - **PRESS ON** (if desired), to engage the autopilot. *The autopilot will capture and maintain the pitch and level the wing (ATT Hold mode and Wing Leveler engaged).*

9. Autopilot Speed/Mach Hold Mode Switch [8, fig. 5-22a] - **PRESS ON** to engage (if desired).

10. Other autopilot modes [fig. 5-22a/b; fig. 5-46] - **PRESS ON** to engage (if desired).

Descent

1. ATC clearance - **OBTAINED.** Set the radios accordingly.

2. Pressurization:

   a. Set **destination field elevation** [5, fig. 5-41]. *Refer to "**Flight Planning**" in section 7.*

3. Anti-ice:

   a. Bleed Air Switch [1, fig. 5-41] - Check **NORMAL** or **MAX.**

   b. Windshield Heat Switches [4, fig. 5-4] - **AS REQUIRED.**

   c. Windshield Defog Knob [8, fig. 5-43] - **AS REQUIRED.**

   d. Wing and Stabilizer Heat Switch [3, fig. 5-4] - **AS REQUIRED.**

   e. Engine Nacelle Heat Switches [2, fig. 5-4] - **AS REQUIRED.**

   f. Pitot Heat Switches [1, fig. 5-4] - **AS**

REQUIRED.

g. Anti-Ice Alcohol Switch [5, fig. 5-4] - **RADOME, AS REQUIRED.**

4. Throttles:

   a. During descent, **MAINTAIN 75% RPM** minimum until 12,000 ft. *The CJ610 axial-flow turbojet engine does not provide enough bleed air to maintain pressurization and de-icing at low RPMs, due to its rather primitive 8-stage compressor design.*

5. Fuel quantity [17, fig. 5-45a; 16, fig. 5-45b] - **MONITORED.**

6. Hydraulic Pressure Gauge [3, fig. 5-39] - **IN GREEN.**

7. Spoilers [25, fig. 5-43] - **AS REQUIRED.**

8. Transition level (18,000 feet maximum):

   a. Barometric pressure on altimeters [1, 11, fig. 5-11a] - **SET** to **local setting.**

Approach

1. ATC clearance - **OBTAINED.** Set the radios accordingly.

2. Fuel balance between L/R wing tanks [17, fig. 5-45a; 16, fig. 5-45b] - **CHECKED.**

3. Thrust Reverser Arm Switches [13-14, fig. 5-36] - **ON.** Thrust Reverser Armed Annunciators [7, 8, fig. 5-36] will remain **OFF** until the aircraft touches down. *Thrust reversers cannot be armed with the engine throttles above idle.*

4. Hydraulic Pressure [3, fig. 5-39] - **IN GREEN.**

5. Emergency Air Pressure [4, fig. 5-39] - **IN GREEN.**

6. **Prepare passengers** for landing.

7. No smoking/seat belts sign:

   a. No Smoking Switch [10, fig. 5-43; 7, fig. 5-52] - **NO SMOKING and SEAT-BELTS ON.**

8. Cabin Pressure [6-7, fig. 5-41] - **CHECKED.**

9. Engine Sync Switch [23, fig. 5-43] - **OFF.**

10. Engine Sync ON Annunciator [25, fig. 5-32b] - Check **OFF.**

11. Spoilers:

    a. Spoilers Switch [25, fig. 5-43] - Check **RET.**

    b. Spoilers Extended Annunciator [7, fig. 5-32a] - Check **OFF.**

12. Radio altimeter:

    a. Radio altimeter power switch [3, fig. 5-13] - **ON.**

Before Landing

1. Landing gear:

    a. Landing Gear Selector Switch [5, fig. 5-30] - **DOWN**.

    b. Check Landing Gear Position Lights [3, fig. 5-30] - **RED ON** in transit, then all **GREEN**.

2. Landing Lights [18, 20, fig. 5-29] - Both **ON (LDG LT)**.

3. Parking brake [9, fig. 5-43] - Check **RELEASED**.

4. Anti-Skid Power Switch [8, fig. 5-29] - **ON**.

5. Anti-Skid Generator Lights [5, fig. 5-15] - Check **OFF**.

6. Flaps:

    a. **DOWN AS REQUIRED** [26, fig. 5-43; 1, fig. 5-30]. *Refer to "**Flight Planning**" in section 7.*

7. Engine Air Ignition Switches [1, 16, fig. 5-29] - Normally **OFF**, or **ON** if wet or turbulent conditions.

8. Primary Yaw Damper OFF Button [11, fig. 5-46] - **PRESS OFF (primary yaw damper disengaged).**

9. Secondary Yaw Damper Switch [6, fig. 5-47] - **OFF (secondary yaw damper disengaged).**

Landing (after Touchdown)

1. Spoilers:

    a. Spoilers Switch [25, fig. 5-43] - **EXT. (spoilers extended as needed).**

b. Spoilers Extended Annunciator [7, fig. 5-32a] - **ON.**

2. Thrust reversers (if needed):

   a. Thrust Reverser Subthrottles [7, 17, fig. 5-43] - **PULLED AFT ("F2" AS NEEDED) to deploy thrust reversers.** *Up to 85% RPM in reverse.*

   b. Thrust Reverser Deployed Annunciators [6, 9, fig. 5-36] - **ON.**

3. Thrust reversers (if needed, after deceleration):

   a. Thrust Reverser Subthrottles - **PUSHED FORWARD ("F1" to IDLE).**

   b. Thrust Reverser Deployed Annunciators - **OFF.**

4. Thrust Reverser Arm Switches [13-14, fig. 5-36] - **OFF.**

5. Thrust Reverser Armed Annunciators [7, 8, fig. 5-36] - **OFF.**

6. Spoilers (after deceleration):

   a. Spoilers Switch - **RET (spoilers retracted).**

   b. Spoilers Extended Annunciator - **OFF.**

Before Clearing the Runway

1. Anti-Skid Power Switch [8, fig. 5-29] - **OFF.**

2. Anti-Skid Generator Lights [5, fig. 5-15] - Check **ON.**

3. Flaps:

   a. Flaps Switch [26, fig. 5-43] - **UP (AS NECESSARY).**

   b. Confirm flaps position [1, fig. 5-30] - **FULL UP.**

2. Nose wheel steering:

   a. Nose Gear Steer Lock Switch [7, fig. 5-4] - **DEPRESS MOMENTARILY** to **ENGAGE** electric nose wheel steering.

   b. Nose Wheel Steering Engaged Annunciator [14, fig. 5-32a] - **ON.**

After Clearing the Runway

1. Engine Air Ignition Switches [1, 16, fig. 5-29] - **OFF.** Check Engine Air Ignition Lights [2, 17, fig. 5-29] **OFF.**

2. Taxi Lights [18, 20, fig. 5-29] - Check **ON (TAXI LT).** *Landing lights will come off.*

3. Strobe Lights [11, fig. 5-29] - **OFF.**

4. Recognition Lights (Model 25) [9, fig. 5-29] - **OFF**.

5. Both Stall Warning Switches [4, 6, fig. 5-29] - **OFF**.

6. Anti-ice:

   a. Bleed Air Switch [1, fig. 5-41] - **NORMAL** if needed or **OFF**.

   b. Windshield Heat Switches [4, fig. 5-4] - **AS REQUIRED**.

   c. Windshield Defog Knob [8, fig. 5-43] - **AS REQUIRED**.

   d. Wing and Stabilizer Heat Switch [3, fig. 5-4] - **OFF**.

   e. Engine Nacelle Heat Switches [2, fig. 5-4] - **OFF**.

   f. Pitot Heat Switches [1, fig. 5-4] - **OFF**.

   g. Anti-Ice Alcohol Switch [5, fig. 5-4] - **OFF.**

8. Bleed Air Switch [1, fig. 5-41] - **OFF**, if not needed for anti-ice or cabin temperature control.

9. Unnecessary avionics - **OFF**.

10. Emergency Lights Switch [9, fig. 5-47] - **DISARM**.

Shutdown

Once the aircraft is parked:

1. Parking brake:

   a. Parking Brake Lever [9, fig. 5-43] - **SET**.

2. Anti-ice:

   a. Bleed Air Switch [1, fig. 5-41] - **OFF**.

   b. Windshield Heat Switches [4, fig. 5-4] - **OFF**.

   c. Windshield Defog Knob [8, fig. 5-43] - **OFF**.

   d. Wing and Stabilizer Heat Switch [3, fig. 5-4] - **OFF**.

   e. Engine Nacelle Heat Switches [2, fig. 5 -4] - **OFF**.

   f. Pitot Heat Switches [1, fig. 5-4] - **OFF**.

   g. Anti-Ice Alcohol Switch [5, fig. 5-4] - **OFF.**

3. Battery Switches [8-9, fig. 5-30] - **ON**.

4. Engine Starter/Generator Switches [6, 11, fig. 5-30] - **OFF**.

5. Engine shutoff:

   a. Thrust Reverser Subthrottles [7, 17, fig. 5-43] - **FULL FORWARD TO IDLE (“F1”).**

   b. Throttles [1, 3, fig. 5-43] - **FULL AFT TO IDLE** (“**F1”** or **FULL AFT** on your controller).

   c. Jet Pump Switches [11-12, fig. 5-45a; 10-11, fig. 5-45b] - **OFF**.

   d. Standby Pump Switches [8-9, fig. 5-

45a; 7-8, fig. 5-45b] - Check **OFF**.

e. Throttle Release Levers [2, 4, fig. 5-43] - Click to **LOCK** or **"CTRL+SHIFT+F1"** (release levers down, throttles set to cutoff, fuel valves closed). *Engines will shut off.*

6. Rotating Beacon Lights [13, fig. 5-29] - **OFF**.

7. All remaining exterior lights [fig. 5-29] - **OFF**.

8. Emergency Battery Switches [2-3, fig. 5-15] - Check **OFF**.

9. Standby Gyro [fig. 5-16] - **CAGED**.

10. Radio Master Switch (Avionics) [14, fig. 5-29] - **OFF**.

11. Primary, Secondary and Auxiliary Inverter Switches [10,12, 5, fig. 5-29] - **OFF**.

12. All remaining panel switches - **OFF**.

13. Battery Switches [8-9, fig. 5-30] - **OFF**.

14. Controls - **LOCKED**.

15. Passenger and Crew Door - **OPEN ("SHIFT+E")**. *You can also click the handle on the upper section of the door [7, fig. 5-56].*

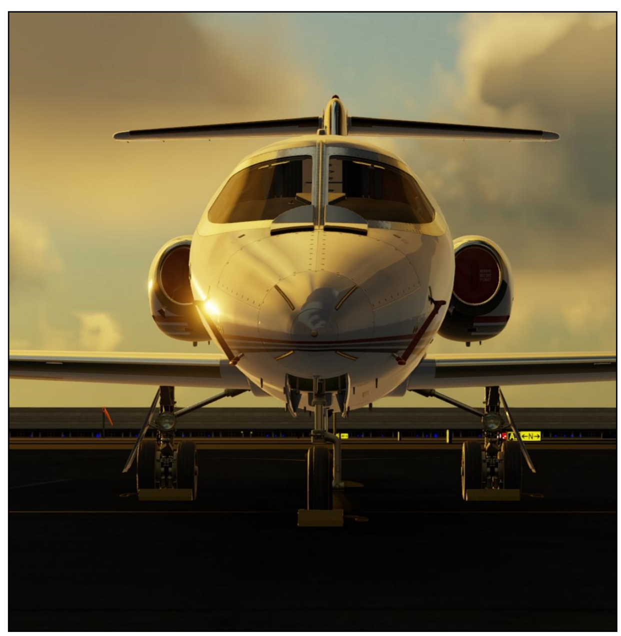
16. Switch to the **LOCKED SPOT** view (Prepar3D > Top Menu Bar > New View > Outside > **Locked Spot**).

17. Flight Crew - **LEAVING**. *Click the rubber carpet on the lower step of the lower section of the door [7, fig. 3-5].*

18. "Remove Before Flight" Items - **INSTALLED**. *Click the **nose gear doors** on the exterior model [8, fig. 3-5] to install the "Remove Before Flight" items.*

19. Passenger and Crew Door - **CLOSED AND LOCKED ("SHIFT+E")**. *You can also close the door by clicking the **door handles** [3, fig. 3-5].*

Welcome to your destination!



ABNORMAL / EMERGENCY PROCEDURES

SECTION 9

This section contains the procedures in case of abnormal operation or emergency.

ENGINE FAILURE

Engine Failure on Takeoff

If below V_1, ABORT takeoff - may require spoilers/thrust reversers and maximum braking energy.

If above V_1:

1. **MAINTAIN** directional control.
2. **PERFORM** single engine takeoff.
3. **ACCELERATE** to **V_2 + 10**.
4. **TRIM** rudder as needed.
5. **INFORM** ATC and request amended clearance if possible.
6. **RETURN** for landing if cleared by ATC.

Engine Failure in Cruise

1. **MAINTAIN** directional control.
2. **TRIM** rudder as needed.
3. **ATTEMPT** in-flight engine restart.

If engine won't restart:

1. Affected engine - **SECURED**:

   a. Throttle and Subthrottle [1 or 3, 7 or 17, fig. 5-43] - to **IDLE ("F1").**

   b. Throttle Release Lever [2 or 4, fig. 5-43] - **LOCKED (fuel valve closed).** *This will set the throttle to **CUTOFF**. Engine will shut off.*

   c. Manual and air ignition [6 or 11, fig. 5-30; 1 or 16, fig. 5-29] - **OFF**.

2. **INFORM** ATC.

3. **EVALUATE** fuel status [17, fig. 5-45a; 16, fig. 5-45b].

4. Fuel Crossfeed Switch [3, fig. 5-45a; 2, fig. 5-45b] and Standby Pump Switches [8-9, fig. 5-45a; 7-8, fig. 5-45b] - **AS REQUIRED.** *See "**Crossflow (Crossfeed) Switch**", section 6, page 27, for more information.*

5. **COMPLETE** flight at lower altitude if possible and/or **PERFORM** a precautionary landing if needed.

Engine Failure on Approach

1. Same as above. Engine restart and cross-feeding optional.

2. **MAINTAIN** directional control and **TRIM** rudder as needed.

3. **INFORM** ATC.

4. **PERFORM** a normal approach at slightly higher speed if field length allows (may preclude full flaps).

ENGINE FIRE

1. Fire Alarm Annunciator [6, fig. 5-33 or 2, fig. 5-35] - **ON.** Identify engine on fire.

2. **THROTTLE BACK** engine and **MONITOR** Fire Alarm Annunciator.

3. If fire persists after 10 seconds, **PRESS** Firewall Shutoff Button [6, fig. 5-33 or 2, fig. 5-35]. ***OPEN** button guard first. This will arm the fire extinguisher.*

4. Confirm firewall shutoff:

   a. Pin light [8, fig. 5-33 or 1, fig. 5-35] - **ON** with engine shutoff.

5. Affected engine - **SECURED**:

   a. Throttle and Subthrottle [1 or 3, 7 or 17, fig. 5-43] - to **IDLE ("F1").**

b. Throttle Release Lever [2 or 4, fig. 5-43] - **LOCKED (fuel valve closed).** *This will set throttle to **CUTOFF**. Engine will shut off.*

c. Manual and air ignition [6 or 11, fig. 5-30; 1 or 16, fig. 5-29] - **OFF**.

6. Confirm extinguishers **ARMED** [4-5, fig. 5-33 or 4-5, fig. 5-35] - **ON**.

7. If fire persists after 10 seconds, **PUSH** First Fire Extinguisher Discharge Button [4, fig. 5-33 or 4, fig. 5-35].

8. If fire persists after 10 more seconds, **PUSH** Second Fire Extinguisher Discharge Button [5, fig. 5-33 or 5, fig. 5-35].

9. If fire persists after 10 more seconds, **DECLARE EMERGENCY** to ATC and **LAND** as soon as possible.

ELECTRICAL AND/OR HYDRAULIC SYSTEMS FAILURE

Simplified Procedures in Case of a Total Engine/ Generator Failure

1. Main Battery Switches [8-9, fig. 5-30] - **ON** (if generators failed).

2. Engine Starter/Generator Switches [6, 11, fig. 5-30] - **OFF** (if generators failed**).**

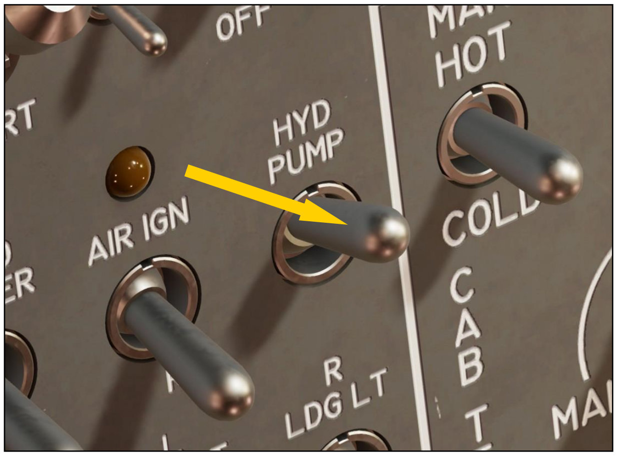
3. Auxiliary Inverter Switch [5, fig. 5-29] - **ON** (if main inverters failed).

4. Primary and Secondary Inverter Switches [10, 12, fig. 5-29] - **OFF** (if failed).

5. **REDUCE** electrical load by turning **OFF** all unnecessary equipment.

6. Electric Auxiliary Hydraulic Pump Switch [19, fig. 5-29] - **ON** to test, then **OFF** and **ON** again only when hydraulic power is needed (flaps, spoilers, landing gear, brakes).

7. Hydraulic Pressure Gauge [3, fig. 5-39] -



IN GREEN when electric auxiliary hydraulic pump is **ON.**

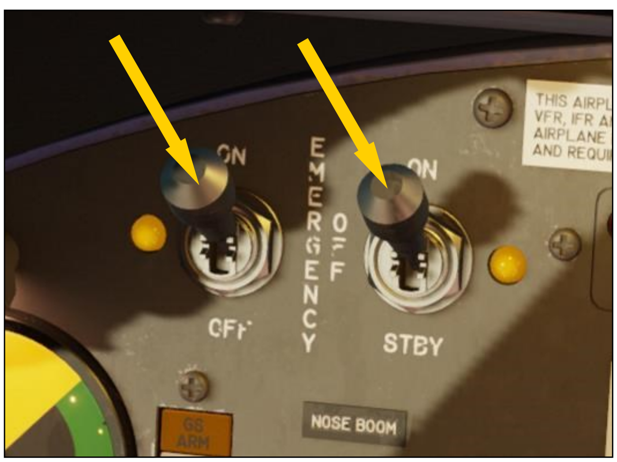
8. Frequently **CHECK** airspeed/Mach, altitude, attitude, and angle-of attack.

9. **DECLARE EMERGENCY** to ATC and **LAND** as soon as practical.

After main batteries are depleted:

1. Emergency Battery Switch [2, fig. 5-15] - **ON.** The amber light next to the switch will come **ON** after about 1 to 3 seconds, indicating that power is supplied to the aircraft by the emergency batteries.

2. Standby Emergency Battery Switch [3, fig. 5-15] - **ON.** The amber light next to the switch will come **ON.**



3. Standby Gyro [fig. 5-16] - **UNCAGED** and **CHECKED.**

4. Battery Switches [8-9, fig. 5-29] - **OFF**.

Note: *Emergency batteries are not available in Prepar3D. However, setting either Emergency Battery Switch [2 or 3, fig. 5-15] to* ***ON****, will start the available APU to simulate emergency battery backup in case of a power failure. There is no APU in the real aircraft. Refer to fig. 5-15 for more details.*

On approach:

1. Electric Auxiliary Hydraulic Pump Switch [19, fig. 5-29] - **ON**.

2. Hydraulic Pressure Gauge [3, fig. 5-39] - **IN GREEN.**

3. Spoilers:

   a. Spoilers Switch [25, fig. 5-43] - Check **RET**.

   b. Spoilers Extended Annunciator [7, fig. 5-32a] - Check **OFF.**

4. Flaps:

   a. **DOWN AS REQUIRED** [26, fig. 5-43; 1, fig. 5-30]. *Refer to "**Flight Planning**" in section 7.*

   b. Confirm flaps position [1, fig. 5-30] - **DOWN.**

5. Landing gear:

   a. Landing Gear Selector Switch [5, fig. 5-30] - **DOWN**.

   b. Check Landing Gear Position Lights [3, fig. 5-30] - **RED ON** in transit, then all **GREEN**.

If electric auxiliary hydraulic pump fails, on approach:

1. Check Emergency Air Pressure Gauge [4, fig. 5-39] - **IN GREEN**.

2. Spoilers:

   a. Spoilers Switch [25, fig. 5-43] - Check **RET**.

   b. Spoilers Extended Annunciator [7, fig. 5-32a] - Check **OFF**.

3. Flaps:

   a. **DOWN AS REQUIRED** [26, fig. 5-43; 1, fig. 5-30]. *Refer to "**Flight Planning**" in section 7.*

   b. Confirm flaps position [1, fig. 5-30] - **DOWN.**

4. Landing gear:

   a. Landing Gear Selector Switch [5, fig. 5-30] - **DOWN**.

   b. Check Landing Gear Position Lights [3, fig. 5-30] - **RED ON** in transit, then all **GREEN**.

If landing gear won't extend:

1. Check Emergency Air Pressure Gauge [4, fig. 5-39] - **IN GREEN**.

2. Landing Gear Selector Switch [5, fig. 5-30] - **DOWN.**

3. Emergency Gear Extension Lever [6, fig. 5-43] - **DOWN**. *Click several times until landing gear is fully extended.*

4. Check Landing Gear Position Lights [3, fig. 5-30] - **RED ON** in transit, then all **GREEN**.

5. Frequently **CHECK** airspeed/Mach, altitude, attitude, and angle-of attack.

6. **LAND** as soon as possible.

7. Use the **Emergency Brake** [20, fig. 5-43] in case of a total brake failure after touchdown.

WINDSHIELD ANTI-ICE SYSTEM FAILURE

In case of a failure of the windshield heating system, the **Windshield and Radome Alcohol Anti-Ice System** can be used to de-ice/defog the captain's windshield.

Note: *The alcohol system will not de-ice/defog the co-pilot's windshield. Refer to "**Windshield and Radome Alcohol Anti-Ice System**" in sec-*

tion 6, page 17, for more information.

To de-ice the radome and the captain's windshield (engines must be running and the aircraft powered):

1. Bleed Air Switch [1, fig. 5-41] - **NORM** or **MAX.**

2. Anti-Ice Alcohol Switch [5, fig. 5-4] – **WSHLD & RADOME.**

To stop the flow of alcohol:

1. Anti-Ice Alcohol Switch [5, fig. 5-4] – **OFF** or **RADOME** only (if required).

When the switch is set to **WSHLD & RADOME**, the system supplies both the radome and the captain's windshield with alcohol for about 45 minutes with a full reservoir.

The amber ALC AI annunciator on the main annunciator panel [15, fig. 5-32a] illuminates when the alcohol reservoir is empty.

You may follow these **simplified procedures** to operate the Xtreme Prototypes GLJ Model 25/28 v4 addon in Prepar3D without going through the detailed procedures presented in the previous section. We recommend using the "**Quick Start Procedures**" only if you are familiar with both your simulation platform and the GLJ Model 25/28 v4 systems described in sections 4, 5 and 6.

We assume that you have already started your simulation platform, created a flight (scenario) and configured the simulator with the optimal settings for your system. We also assume that the engines are shut off, that power is off, and that you are in the virtual cockpit view.

***Note:** An even more condensed version of these procedures is included in the Prepar3D kneeboard ("**Checklist**" tab).*

Tip

- The white seatbelt label located in the upper center section of the main instrument panel [10, fig. 5-17a; 6, fig. 5-17b] is a hot spot for initiating a "**Cold and Dark**" reset cycle. Left clicking the label will shut down the engines and turn off all lights and aircraft systems, including all custom Learjet systems unique to this addon, in less than 10 seconds. The cockpit will be reset to its "Cold and Dark" state and the airplane will be parked.

CHECKLIST

1. Make sure all systems are **OFF**.

Cockpit Preparation (Power OFF)

1. "Remove Before Flight" Items - **REMOVED.**
2. Flight Crew - **ON BOARD.**
3. Captain - **SELECT PILOT.**
4. Copilot - **SELECT PILOT.**
5. Sunglasses - **OPTIONAL.**

6. Pilots - **CHECK**.
7. Seats - **ADJUST ARMRESTS**.
8. Flight controls - **FREE**.
9. Parking brake - **SET**.
10. All switches - **OFF**.
11. All circuit breakers - Check **IN (CLOSED)**.
12. Oxygen Pressure Gauge - **IN GREEN**.
13. Emergency Air Pressure Gauge - **IN GREEN**.
14. Passenger Oxygen Flow Valve - **NORM**, if passengers are present.
15. Passenger Oxygen Mask Valve - **AUTO**, if passengers are present.
16. Landing Gear Selector Switch - Check **DOWN**.
17. Bleed Air Switch - Check **OFF**.
18. Pressurization Mode Switch - **AUTO**.
19. Auto Rate Control Knob - Check **CENTERED**.
20. Windshield Defog Knob - **IN (NORMAL)**.
21. "ALC AI" annunciator - **CHECK** alcohol level (1.75 gallon).

Testing the Emergency Batteries

1. Emergency Battery Switch - **ON**.
2. Check amber light next to the Emergency Battery Switch **ON**, after a brief delay.
3. Standby Gyro - Check **OPERATIONAL.** Uncage and adjust pitch scale if necessary.
4. Emergency Battery Switch - **OFF**.
5. Standby Emergency Battery Switch - **ON**.
6. Check the amber light next to the Standby Emergency Battery Switch **ON**, after a brief delay.
7. Standby Emergency Battery Switch - **OFF**, then **STBY**.
8. Check the amber light next to the Standby Emergency Battery Switch **ON**, after a brief delay.
9. Standby Gyro - Check **OPERATIONAL.**
10. Standby Emergency Battery Switch - **OFF**.

External Power Source (Optional)

To preserve battery power during ground procedures up until the engines have started and the generators turned on, it is strongly suggested to use an external power source to power up the aircraft:

1. Click the **aileron on the left wingtip tank** of the Model 25 or the **leading edge of the left winglet** of the Model 28 to call for a ground power unit.
2. Click the **GPU control panel cover** to start the GPU.

Note: *Don't forget to* ***SHUT OFF*** *and* ***DISCONNECT (HIDE)*** *the GPU after the engines have started and the generators are turned on.*

Cockpit Preparation (Power ON)

1. Make sure the GPU is **shut OFF,** if using the batteries.
2. Battery Switches - **ON**, if the GPU is not operational.

Caution

- **Do not turn on the battery switches** when the batteries are fully charged, and the GPU (or the generators) are operating to prevent the NiCad batteries from overheating. **This may cause a fire!** The Battery Temperature Gauges must be monitored constantly.

3. Cockpit lights - **ADJUSTED** to your preferences.
4. Landing Gear Selector Switch and Lights - Check **DOWN + 3 GREEN**.

5. Both Primary and Secondary Inverter Switches - **ON**.

6. Radio Master Switch (Avionics) - **ON**.

7. Instrument Warning Flags - **OUT OF VIEW**.

8. Annunciators:

   a. Annunciator Panel Test Button and Dimmer - **DEPRESSED** (**ON**). You can **set the intensity** of the panel lights and annunciators with the mouse wheel.

   b. All annunciators and most panel and center console lights - **ON**.

   c. Decision height lights on the ADIs and radio-altimeter - **ON**.

   d. Altitude alert lights on the ADDUs - **ON**.

   e. Annunciator Panel Test Button - **RELEASED** (**OFF**).

9. Decision height lights on the captain's and copilot's fire panels - **PUSH TO TEST (ON/OFF)**.

10. Marker Beacon Lights on the captain's and copilot's fire panels - **PUSH TO TEST (ON/OFF)**.

11. Electric Auxiliary Hydraulic Pump Switch - **ON**.

12. Hydraulic Pressure Gauge - **RISING, then IN GREEN**.

13. Electric Auxiliary Hydraulic Pump Switch - **OFF**.

Warning Systems Tests

1. Landing Gear Warning System Test Switch - **TEST**. Check all six Landing Gear Position Lights **ON** with aural warning.

2. Landing Gear Warning System Test Switch - **CENTER (OFF)**.

3. No Smoking/Seat Belt Switch - **TEST (BOTH POSITIONS)**. Return switch to **OFF** after test.

4. Electric Auxiliary Hydraulic Pump Switch - **ON**.

5. Stall warning system test:

   a. Both Stall Warning Switches - **ON**. Check annunciators [3, 6, fig. 4-30] **OFF**.

   b. Stall Warning Test Vane Selector Switch - **RIGHT**.

   c. Stall Warning System Test Switch - **ON**.

   d. Right Angle-of-Attack Indicator - **IN RED**. Check for aural alert, stick shaker, stick nudger (pusher) and Right Stall Warning Annunciator **FLASHING**.

   e. Stall Warning Test Vane Selector Switch - **LEFT**.

   f. Left Angle-of-Attack Indicator - **IN RED**. Check for aural alert, stick shaker, stick nudger (pusher) and Left Stall Warning Annunciator **FLASHING**.

   g. Stall Warning System Test Switch - **OFF**.

   h. Both Stall Warning Switches - **OFF**. Check annunciators **ON**.

6. Anti-skid system test:

   a. Anti-Skid Power Switch - **ON**. Check Anti-Skid Generator Lights **OFF**.

   b. Anti-Skid System Test Switch - **FORWARD (OUTBOARD)**. Check Anti-Skid Generator Lights **OUTBOARD ON**.

   c. Anti-Skid System Test Switch - **AFT (INBOARD)**. Check Anti-Skid Generator Lights **INBOARD ON**.

   d. Anti-Skid System Test Switch - **CENTER (OFF)**.

   e. Anti-Skid Power Switch. Check Anti-Skid Generator Lights **ON**.

7. Overspeed warning test:

   a. Cabin Altitude Warning/Mach Test Switch - **AFT (MACH TEST)**. Check for aural alert and stick puller.

   b. Cabin Altitude Warning/Mach Test Switch - **CENTER (OFF)**.

8. Electric Auxiliary Hydraulic Pump Switch - **OFF**.

9. Fire detection system test:

   a. Fire Detection System Test Switch - **ON**. Check both captain and copilot fire annunciators **ON** or **FLASHING**.

   b. Fire Detection System Test Switch - **OFF**. Check both captain and copilot fire annunciators **OFF**.

10. Cabin altitude warning test:

    a. Cabin Altitude Warning/Mach Test Switch - **FORWARD (CABIN ALT TEST)**. Check Cabin Altitude Annunciator **FLASHING** (with aural alert).

    b. Cabin Altitude Warning/Mach Test Switch - **CENTER (OFF)**. Check Cabin Altitude Annunciator **OFF**.

Before Starting the Engines

1. Thrust reversers:

   a. Thrust Reverser Lights Test Switch - **TEST**. Check all thrust reverser annunciators and lights **ON**.

   b. Thrust Reverser Lights Test Switch - **NORM**. Check all thrust reverser annunciators and lights **OFF**.

   c. Engine Throttles - **IDLE** ("**F1**" or **FULL AFT** on your controller) if released, or **CUTOFF** if locked. *Throttles cannot be moved if locked.*

   d. Thrust Reverser Subthrottles - **PUSHED FORWARD** or **IDLE 0%** ("**F1**").

   e. Thrust Reverser Arm Switches - **ARM**. Check Thrust Reverser Armed Annunciators **ON**.

   f. Thrust Reverser Arm Switches - **OFF**. Check Thrust Reverser Armed Annunciators **OFF**.

   g. Thrust Reverser Emergency Stow Switches - **NORM (UP)**. Check Thrust Reverser Emergency Stow Lights **OFF**.

   h. Thrust Reverser Unsafe Annunciators - **OFF**.

   i. Thrust Reverser Deployed Annunciators - **OFF**.

2. Autopilot check:

   a. AFC/SS Test Switch - **FORWARD (AFCS TEST)**. Check all AFCS (autopilot/flight director) mode annunciators and lights **ON**.

   b. AFC/SS Test Switch - **CENTER (OFF)**.

   c. Autopilot Engage Button - **PRESS ON** to engage, then **PRESS OFF** to disengage. Check for aural alert when autopilot is disengaged.

   d. Autopilot Engage Button - **PRESS ON**.

   e. Autopilot Roll Monitor Test Button - **DEPRESS TO TEST**. Autopilot will disengage. Release to **OFF**.

   f. Autopilot Engage Button - **PRESS ON**.

   g. Autopilot Pitch Trim Monitor Switch - **TEST UP AND DOWN**. Autopilot will disengage. Reset to **CENTER (OFF)**.

   h. Autopilot Engage Button - **PRESS ON**.

   i. Turn Command Knob - **TEST (ROTATE) LEFT/RIGHT**, then reset to **CENTER**. *Click to center.*

   j. Pitch Command Wheel - **TEST (ROTATE) UP/DOWN**, then reset to **CENTER**. *Click to center.*

   k. Autopilot Engage Button - **PRESS OFF**.

   l. Yaw Damper Selector Switch - **PRI YAW DAMPER**.

   m. Primary Yaw Damper ON Button - **PRESS ON** to engage.

   n. Primary Yaw Damper OFF Button - **PRESS OFF** to disengage. Check for aural alert when primary yaw damper is disengaged.

   o. Yaw Damper Selector Switch - **SEC YAW DAMPER**.

   p. Secondary Yaw Damper Switch - **EN-**

GAGE.

q. Secondary Yaw Damper Switch - **OFF**. Check for aural alert when secondary yaw damper is disengaged.

r. Yaw Damper Selector Switch - Back to **PRI YAW DAMPER**.

3. Emergency Pitch Trim Selector Switch - **NORM**.

4. Trim:

   a. Elevator trim (on your controller) - Check that Pitch Trim Indicator is about **one needle thickness below center**. Listen for trim in motion clicker (autopilot must be disengaged).

   b. Takeoff Trim Alert Annunciator - **OFF**.

   c. Aileron trim (on your controller) - **CHECKED (0 deg.)**.

   d. Rudder trim - **CHECKED (0 deg.)**.

5. Fuel quantity:

   a. Check **sufficient quantity** for flight.

   b. Check for **imbalance** between L/R tanks.

6. Fuel counter - **RESET TO ZERO.**

7. Crossflow (Crossfeed) Switch - **CLOSE**.

8. Fuselage Tank Switch - **OFF (CENTER)**.

9. Fuel Jettison Switch (Model 25) - **OFF.**

10. Jet pumps:

    a. Jet Pumps Switches - Both **ON**.

    b. Motive Flow Valve Lights - Both **ON** for one second (valve in transit), then **OFF**.

    c. Engine Low Fuel Pressure Annunciators - **OFF**.

11. Standby Pumps Switches - **OFF**.

12. Main Cabin Door - **CLOSED AND SECURE (SHIFT+E).**

13. Door Unsecured Annunciator - **OFF**.

Right Engine Start
(same procedures for the left engine)

Note: *If the engine won't start, make sure the fuel mixture is set to "**rich**" (**CTRL+SHIFT+F4**) before proceeding.*

1. Right Engine Throttle - **IDLE** ("**F1**" or **FULL AFT** on your controller) if released, or **CUTOFF** if locked. *Throttle cannot be moved if locked.*

2. Right Thrust Reverser Subthrottle - Check **FULL FORWARD** (**IDLE** or "**F1**").

3. Right Throttle Release Lever - Click to **LOCK** or "**CTRL+SHIFT+F1**" (release lever down and locked, throttle set to cutoff, fuel valve closed).

4. Right Engine Throttle - Check **CUTOFF** (locked, full down position).

5. Rotating Beacon Lights - **ON**.

6. Right Engine Starter/Generator Switch - **START.** Check for Right Ignition Light **ON**.

7. Right RPM - Check about **10 to 25%.**

8. Right Throttle Release Lever - Click to **RE-LEASE** (release lever up, throttle set to idle, fuel valve open).

9. Right Engine Throttle - Check **IDLE** ("**F1**" or **FULL AFT** on your controller).

10. Right EGT - Monitor and make sure **WITH-IN GREEN ARC**.

11. Right RPM - Check about **50%.**

12. Right Starter/Generator Switch - Set to **OFF**, then to **GEN** when engine is stable at **IDLE**.

13. Right Engine Ignition Light - **OFF**.

14. Right Generator Inoperative Annunciator - **OFF**.

15. Right DC Ammeter - Check **MOVING (about 170 amps.).**

16. Right Engine Low Fuel Pressure Annuncia-tor - Check **OFF**.

17. Right engine oil pressure and temperature

- Check **BOTH IN GREEN.**

18. Fuel flow - **NORMAL.**

19. Hydraulic pressure - **IN GREEN.**

20. Engine Sync Indicator - **SPINNING.**

21. GPU - **SHUT OFF** and **DISCONNECTED**, if it was used for pre-flight procedures.

22. Battery Switches - Make sure the batteries are fully charged, then **OFF**. ***Do not turn on the battery switches*** *when the batteries are fully charged, and the generators are operating to prevent the NiCad batteries from overheating.* ***This may cause a fire!***

Left Engine Start (optional at this time)

Repeat the above procedures for the **left engine** if desired (can be performed later before takeoff).

1. Engine Sync Indicator - **STABILIZING**, when both engines are running.

Note: *To save fuel, some Learjet pilots prefer to taxi with only one engine running, depending on their flight plan. It's up to you to decide if you want to taxi with one or two engines running.*

Before Taxi

1. Primary & Secondary Inverter Switches - Check **ON**.

2. Auxiliary Inverter Switch - Check **OFF**.

3. Radio Master Switch (avionics) - Check **ON**.

4. Engine instruments - **CHECKED.**

5. Navigation Lights - **ON**.

6. Strobe Lights - **ON**.

7. Recognition Lights (Model 25) - **ON (if required).**

8. Taxi Lights - **ON (TAXI LT).**

9. Emergency Lights Switch - **ARM**. Check Emergency Lighting System OFF Warning Light **OFF.**

10. Spoilers:

    a. Spoilers Switch - Check **RET.**

    b. Spoilers Extended Annunciator - Check **OFF.**

11. Bleed Air Switch - **NORMAL** or **MAX.**

12. Anti-ice:

    a. Windshield Heat Switches - **AS REQUIRED.**

    b. Windshield Defog Knob - **AS REQUIRED.**

    c. Wing and Stabilizer Heat Switch - **AS REQUIRED.**

    d. Engine Nacelle Heat Switches - **AS REQUIRED.**

    e. Pitot Heat Switches - **AS REQUIRED.**

    f. Anti-Ice Alcohol Switch - **RADOME, AS REQUIRED.**

Note: *All anti-icing equipment must be turned on* ***before icing conditions are encountered*** *to avoid a serious hazard of safety during flight. The Ram Air Temperature Warning Indicator and the Ram Air Temperature Gauge should be monitored frequently when flying in areas where icing may occur.*

13. Parking brake - **RELEASED.**

14. Anti-Skid Power Switch - **ON.**

15. Anti-Skid Generator Lights - **ALL OFF.**

Taxi

1. Radios - Check **ON** and **SET**.

2. ATC clearance - **OBTAINED** from appropriate authority. **SET** radios accordingly.

3. GPS/GNS/GTN - **ON** and **SET** according to flight plan and ATC clearance (if available/needed).

4. Flight controls - **CHECKED.**

5. Thrust reversers controls - **CHECKED.**

6. Nose wheel steering:

    a. Nose Gear Steer Lock Switch - **DEPRESS MOMENTARILY** to **ENGAGE** electric nose wheel steering.

    b. Nose Wheel Steering Engaged Annunciator - **ON.**

7. Engine Throttle(s) - **AS NEEDED** for taxi. *Taxiing with only one engine running requires some practice.*

8. Aircraft rolling above 5 knots:

    a. Toe brakes - **APPLIED.** Listen for "birds in the cockpit" sounds.

    b. Verify aircraft deceleration.

    c. Toe brakes - **RELEASED.**

Before Takeoff

1. Cabin pressurization:

    a. Bleed Air Switch - Check **NORMAL** or **MAX.**

    b. Cabin Altitude Controller Knob - **SET** to **initial planned cruise altitude.**

2. Cabin temperature:

    a. Cabin Temperature Control Knob/Switch - **SET** to **desired temperature.**

    b. H-Valve Position Indicator - Check, **about 1/2.**

    c. Lower cabin temperature **if necessary.**

3. Anti-ice:

    a. Bleed Air Switch - Check **NORMAL** or **MAX.**

    b. Windshield Heat Switches - **AS REQUIRED.**

    c. Windshield Defog Knob - **AS REQUIRED.**

    d. Wing and Stabilizer Heat Switch - **AS REQUIRED.**

    e. Engine Nacelle Heat Switches - **AS REQUIRED.**

    f. Pitot Heat Switches - **AS REQUIRED.**

    g. Anti-Ice Alcohol Switch - **RADOME, AS REQUIRED.**

4. All external lights, except landing lights - **ON.**

5. Avionics:

    a. ADI Gyro and Computer Warning Flags - **OUT OF VIEW.**

    b. HSI Compass Warning Flag - **OUT OF VIEW.**

    c. Radios and transponder - Check **ON** and **SET** according to flight plan and ATC clearance.

    d. GPS/GNS/GTN - **ON** and **SET** according to flight plan and ATC clearance (if available/needed).

    e. Radar - **ON** and **SET** (if available/needed).

6. Gyro:

    a. Directional Gyro Free/Slave Switch - Check **SLAVE.**

    b. Gyro Drift Compensation Switch - If Directional Gyro Free/Slave Switch is set to **FREE** (magnetic references unreliable), **use as needed** to synchronize directional gyros with ground indications (the Directional Gyro Drift Knob can also be used). *Requires a type "2" gyro in the addon's "aircraft.cfg".*

7. Flight instruments:

    a. Barometric pressure on altimeters - **SET**, according to nearest weather station.

    b. Airspeed bugs - **SET** to V_1 and V_R **as needed.**

    c. Initial course on HSI - **SET.**

    d. Initial heading on HSI - **SET.**

    e. RMI - **SET, as needed.**

f. DME head - **SET, as needed**.

g. All directional indicators as aircraft turns while taxiing - **CHECKED.**

8. Autopilot Altitude Preselector - **SET** to **initial ATC clearance altitude.**

9. Flight Director Switch - **OFF, then ON (reset).** Check Flight Director Command Bars **IN RANGE** on ADI.

10. Radio altimeter check:

    a. Radio Altimeter Power Switch - **ON** (to test).

    b. Radio altimeter flags - Check **OUT OF VIEW.**

    c. Radio Altimeter Power Switch - **OFF.**

11. Spoilers:

    a. Spoilers Switch - Check **RET.**

    b. Spoilers Extended Annunciator - Check **OFF.**

12. Flaps:

    a. Flaps Switch - **PUSH DOWN AS NEEDED.**

    b. Flaps Position Indicator - Check for correct **TAKEOFF POSITION (8°** or **AS NEEDED).**

13. Emergency Pitch Trim Switch - Check **NORM.**

14. Trim:

    a. Elevator trim (on your controller) - **SET FOR TAKEOFF.** Check that Pitch Trim Indicator is about **one needle thickness below center.** *Forward center of gravity requires more trim. No clicker sound with flaps extended more than 3 degrees.*

    b. Takeoff Trim Alert Annunciator - Check **OFF.**

    c. Aileron trim (on your controller) - **CHECKED.**

    d. Rudder trim - **CHECKED.**

Left Engine Start

1. Repeat the above "**Right Engine Start**" procedures (page 6, in this section) and apply them to the left engine for **STARTING** the left engine if only the right engine was used for taxi.

2. Engine Sync Indicator - **STABILIZING**, when both engines are running.

Takeoff

1. Fuel quantity - With both engines running, check for **imbalance** between L/R wing tanks. *You may have to perform a cross-feed operation now or later in the flight to balance L/R wing tanks.*

2. **Prepare passengers** for takeoff.

3. No Smoking/Seat Belt Switch - **NO SMOKING AND SEAT BELTS (ON).**

4. Flight controls:

    a. Check - **FREE.**

    b. **HIDE** control columns and yokes if desired.

5. Nose wheel steering:

    a. Nose Gear Steer Lock Switch - **DEPRESS MOMENTARILY** to **DISENGAGE** electric nose wheel steering.

    b. Nose Wheel Steering Engaged Annunciator - **OFF.**

6. Anti-Skid Power Switch - Check **ON.**

7. Anti-Skid Generator Lights - Check **OFF.**

8. Engine Air Ignition Switches - Normally **OFF** (can be turned **ON** if wet or turbulent conditions).

9. Stall Warning Switches - Both **ON.** Check annunciators **OFF.**

10. Pitot Heat Switches - Check, both **ON.**

11. Thrust Reverser Arm Switches - **ARM.**

12. Thrust Reverser Armed Annunciators - **ON.**

13. Annunciator panel - **CHECKED**, no warnings or abnormal indications. *It is normal for the amber L ENG ICE and R ENGINE ICE annunciators to be illuminated on the ground when their respective engine RPM is under 70%.*

14. ATC clearance - **OBTAINED** from the appropriate authority.

15. Landing Lights and all external lights - **ON**.

16. Toe Brakes:

    a. Brakes - **APPLIED.**

Takeoff Sequence

Important

- In case of an engine failure, refer to "**Abnormal/Emergency Procedures**".
- The Gates Learjet Model 25/28 is a **very high-performance jet aircraft**. The takeoff sequence happens **quite fast** and requires an efficient drill to observe and maintain altitude and speed clearances.

1. Throttles:

    a. **ADVANCE** slowly to **takeoff power** (**100% RPM**).

2. Toe Brakes:

    a. Brakes - **RELEASED.**

3. **ACCELERATE** to **V_1**:

    a. If engine fails before V_1, **ABORT** takeoff. *Refer to "**Abnormal/Emergency Procedures**" in section 9*.

    b. If engine fails after V_1, **CONTINUE** takeoff. *Refer to "**Abnormal/ Emergency Procedures**" in section 9*.

4. V_r attained:

    a. **ROTATE** to **15 degrees (nose up).**

    b. Airspeed bugs - **SET** to **V_2 as needed.**

5. Angle-of-Attack:

    a. Angle-of-Attack Indicator - **MAINTAIN IN GREEN.**

6. Positive rate of climb:

    a. Landing Gear Selector Switch - **UP.**

    b. Landing Gear Position Lights - Check **RED ON** in transit, then all **OFF**.

    c. **ACCELERATE** to **V_2 + 15.**

7. Flaps:

    a. **RETRACT** on schedule.

8. Landing and Taxi Lights - **OFF**. *Landing and taxi lights will turn off automatically when the landing gear is retracted.*

9. Engine Air Ignition Switches - **OFF** (can be turned **ON** if wet or turbulent conditions during flight).

10. Anti-Skid Power Switch - **OFF.**

11. Anti-Skid Generator Lights - Check **ON.**

12. Thrust Reverser Arm Switches - **OFF.**

13. Thrust Reverser Armed Annunciators - **OFF.**

14. **ACCELERATE** to **climb speed** - (**MAX 250 KIAS** if ATC-restricted, **MAX 306 KIAS** under FL140). *An aural alert will sound if airspeed is above 306 KIAS under 14,000 feet (bird strike protection).*

15. Cabin pressure - **CHECKED.**

16. No Smoking/Seat Belt Switch - **OFF.**

Climb

1. Throttles:

    a. SET to climb power (90% RPM).

2. Autopilot Engage Button - **PRESS ON** (if desired) to engage the autopilot. *The autopilot will capture and maintain the pitch and level the wing (ATT Hold mode and Wing Leveler engaged).*

3. Anti-ice:

    a. Bleed Air Switch - Check **NORMAL** or **MAX.**

b. Windshield Heat Switches - **AS REQUIRED.**

c. Windshield Defog Knob - **AS REQUIRED.**

d. Wing and Stabilizer Heat Switch - **AS REQUIRED.**

e. Engine Nacelle Heat Switches - **AS REQUIRED.**

f. Pitot Heat Switches - **AS REQUIRED.**

g. Anti-Ice Alcohol Switch - **RADOME, AS REQUIRED.**

4. Cabin pressure - **MONITORED.**

5. Transition level (18,000 feet maximum):

   a. Barometric pressure on altimeters - **SET** to **29.92**.

6. Airspeed:

   a. **ACCELERATE** to **0.7 Mach**.

Cruise

1. Engine instruments - Check **WITHIN LIMITS.**

2. Cabin pressure - **MONITORED.**

3. Engine Sync Switch - **ON, if needed**. *Check Engine Sync Indicator. Throttles need to be close to one another.*

4. Engine Sync ON Annunciator - Check **ON** *(if the Engine Sync Switch is set to ON).*

5. Yaw Damper Selector Switch - Check **PRI YAW DAMPER.**

6. Primary Yaw Damper ON Button - **PRESS ON** *(Primary Yaw Damper engaged).*

7. Fuel status:

   a. **MONITOR** fuel **at all times**.

   b. **ENSURE** fuel burn is **consistent with flight plan.**

   c. **SWITCH TO THE FUSELAGE TANK** if fuel level in the wing tanks **becomes critically low.**

   d. Autopilot Engage Button - **PRESS ON** (if desired), to engage the autopilot. *The autopilot will capture and maintain the pitch and level the wing (ATT Hold mode and Wing Leveler engaged).*

e. Autopilot Speed/Mach Hold Mode Switch - **PRESS ON** to engage (if desired).

f. Other autopilot modes - **PRESS ON** to engage (if desired).

Descent

1. ATC clearance - **OBTAINED.** Set the radios accordingly.

2. Pressurization:

   a. Set **destination field elevation.**

3. Anti-ice:

   a. Bleed Air Switch - Check **NORMAL** or **MAX.**

   b. Windshield Heat Switches - **AS REQUIRED.**

   c. Windshield Defog Knob - **AS REQUIRED.**

   d. Wing and Stabilizer Heat Switch - **AS REQUIRED.**

   e. Engine Nacelle Heat Switches - **AS REQUIRED.**

   f. Pitot Heat Switches - **AS REQUIRED.**

   g. Anti-Ice Alcohol Switch - **RADOME, AS REQUIRED.**

4. Throttles:

   a. During descent, **MAINTAIN 75% RPM** minimum until 12,000 ft. *The CJ610 axial-flow turbojet engine does not provide enough bleed air to maintain pressurization and de-icing at low RPMs, due to its rather primitive 8-stage compressor design.*

5. Fuel quantity - **MONITORED.**

6. Hydraulic Pressure Gauge - **IN GREEN.**

7. Spoilers - **AS REQUIRED.**

8. Transition level (18,000 feet maximum):

   a. Barometric pressure on altimeters - **SET** to **local setting**.

Approach

1. ATC clearance - **OBTAINED.** Set the radios accordingly.

2. Fuel balance between L/R wing tanks - **CHECKED.**

3. Thrust Reverser Arm Switches - **ON.** Thrust Reverser Armed Annunciators will remain **OFF** until the aircraft touches down. *Thrust reversers cannot be armed with the engine throttles in forward thrust above idle.*

4. Hydraulic Pressure - **IN GREEN.**

5. Emergency Air Pressure - **IN GREEN.**

6. **Prepare passengers** for landing.

7. No smoking/seat belts sign:

   a. No Smoking Switch - **NO SMOKING and SEATBELTS ON.**

8. Cabin Pressure - **CHECKED.**

9. Engine Sync Switch - **OFF.**

10. Engine Sync ON Annunciator - Check **OFF.**

11. Spoilers:

    a. Spoilers Switch - Check **RET.**

    b. Spoilers Extended Annunciator - Check **OFF.**

12. Radio altimeter:

    a. Radio altimeter power switch - **ON.**

Before Landing

1. Landing gear:

   a. Landing Gear Selector Switch - **DOWN.**

   b. Check Landing Gear Position Lights - **RED ON** in transit, then all **GREEN.**

2. Landing Lights - Both **ON (LDG LT).**

3. Parking brake - Check **RELEASED.**

4. Anti-Skid Power Switch - **ON.**

5. Anti-Skid Generator Lights - Check **OFF.**

6. Flaps:

   a. **DOWN AS REQUIRED.**

7. Engine Air Ignition Switches - Normally **OFF**, or **ON** if wet or turbulent conditions.

8. Primary Yaw Damper OFF Button - **PRESS OFF (primary yaw damper disengaged).**

9. Secondary Yaw Damper Switch - **OFF (secondary yaw damper disengaged).**

Landing (after Touchdown)

1. Spoilers:

   a. Spoilers Switch - **EXT. (spoilers extended as needed).**

   b. Spoilers Extended Annunciator - **ON.**

2. Thrust reversers (if needed):

   a. Thrust Reverser Subthrottles - **PULLED AFT ("F2" AS NEEDED) to deploy thrust reversers.** *Up to 85% RPM in reverse.*

   b. Thrust Reverser Deployed Annunciators - **ON.**

3. Thrust reversers (if needed, after deceleration):

   a. Thrust Reverser Subthrottles - **PUSHED FORWARD ("F1" to IDLE).**

   b. Thrust Reverser Deployed Annunciators - **OFF.**

4. Thrust Reverser Arm Switches - **OFF.**

5. Thrust Reverser Armed Annunciators - **OFF.**

6. Spoilers (after deceleration):

   a. Spoilers Switch - **RET. (spoilers retracted).**

   b. Spoilers Extended Annunciator - **OFF.**

Before Clearing the Runway

1. Anti-Skid Power Switch - **OFF.**
2. Anti-Skid Generator Lights - Check **ON**.
3. Flaps:
   a. Flaps Switch - **UP (AS NECESSARY).**
   b. Confirm flaps position - **FULL UP**.
2. Nose wheel steering:
   a. Nose Gear Steer Lock Switch - **DEPRESS MOMENTARILY** to **ENGAGE** electric nose wheel steering.
   b. Nose Wheel Steering Engaged Annunciator - **ON**.

After Clearing the Runway

1. Engine Air Ignition Switches - **OFF**. Check Engine Air Ignition Lights **OFF**.
2. Landing Lights - **OFF (TAXI LT).**
3. Taxi Lights - Check **ON (TAXI LT).**
4. Strobe Lights - **OFF**.
5. Recognition Lights (Model 25) - **OFF**.
6. Both Stall Warning Switches - **OFF**.
7. Anti-ice:
   a. Bleed Air Switch - **NORMAL** if needed or **OFF**.
   b. Windshield Heat Switches - **AS REQUIRED**.
   c. Windshield Defog Knob - **AS REQUIRED**.
   d. Wing and Stabilizer Heat Switch - **OFF**.
   e. Engine Nacelle Heat Switches - **OFF**.
   f. Pitot Heat Switches - **OFF**.
   g. Anti-Ice Alcohol Switch - **OFF.**
8. Bleed Air Switch - **OFF**, if not needed for anti-ice or cabin temperature control.
9. Unnecessary avionics - **OFF**.
10. Emergency Lights Switch - **DISARM**.

Shutdown

Once the aircraft is parked:

1. Parking brake:
   a. Parking Brake Lever - **SET.**
2. Anti-ice:
   a. Bleed Air Switch - **OFF.**
   b. Windshield Heat Switches - **OFF.**
   c. Windshield Defog Knob - **OFF.**
   d. Wing and Stabilizer Heat Switch - **OFF.**
   e. Engine Nacelle Heat Switches - **OFF.**
   f. Pitot Heat Switches - **OFF.**
   g. Anti-Ice Alcohol Switch - **OFF.**
3. Battery Switches - **ON**.
4. Engine Starter/Generator Switches - **OFF**.
5. Engine shutoff:
   a. Thrust Reverser Subthrottles - **FULL FORWARD TO IDLE ("F1").**
   b. Throttles - **FULL AFT TO IDLE** ("**F1"** or **FULL AFT** on your controller).
   c. Jet Pump Switches - **OFF**.
   d. Standby Pump Switches - Check **OFF**.
   e. Throttle Release Levers - Click to **LOCK** or **"CTRL+SHIFT+F1"** (release levers down, throttles set to cutoff, fuel valves closed). *Engines will shut off.*
6. Rotating Beacon Lights - **OFF**.
7. All remaining exterior lights - **OFF**.
8. Emergency Battery Switches - Check **OFF**.
9. Standby Gyro - **CAGED**.
10. Radio Master Switch (Avionics) - **OFF**.

11. Primary, Secondary and Auxiliary Inverter Switches - **OFF**.

12. All remaining panel switches - **OFF**.

13. Battery Switches - **OFF**.

14. Controls - **LOCKED**.

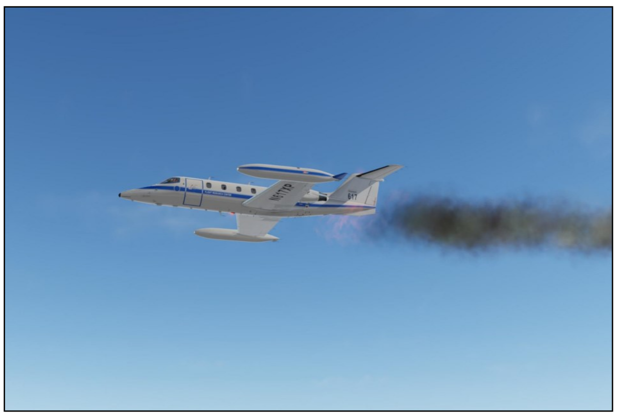
15. Passenger and Crew Door - **OPEN ("SHIFT+E")**.

16. Flight Crew - **LEAVING**.

17. "Remove Before Flight" Items - **INSTALLED**.

18. Passenger and Crew Door - **CLOSED AND LOCKED ("SHIFT+E")**.

Welcome to your destination!



ABNORMAL / EMERGENCY PROCEDURES

You may follow these **simplified procedures** in case of abnormal operation or emergency.

ENGINE FAILURE

Engine Failure upon Takeoff

If below V_1, **ABORT** takeoff - may require spoilers/thrust reversers and maximum braking energy.

If above V_1:

1. **MAINTAIN** directional control.
2. **PERFORM** single engine takeoff.
3. **ACCELERATE** to **V_2 + 10**.
4. **TRIM** rudder as needed.
5. **INFORM** ATC and request amended clearance if possible.
6. **RETURN** for landing if cleared by ATC.

Engine Failure in Cruise

1. **MAINTAIN** directional control.
2. **TRIM** rudder as needed.
3. **ATTEMPT** in-flight engine restart.

If engine won't restart:

1. Affected engine - **SECURED**:

   a. Throttle and Subthrottle - to **IDLE ("F1")**.

   b. Throttle Release Lever - **LOCKED (fuel valve closed).** *This will set throttle to **CUTOFF**. Engine will shut off.*

   c. Manual and air ignition - **OFF**.

2. **INFORM** ATC.
3. **EVALUATE** fuel status.
4. Fuel Crossfeed Switch and Standby Pump Switches - **AS REQUIRED.**
5. **COMPLETE** flight at lower altitude if possible or **PERFORM** precautionary landing if needed.

Engine Failure on Approach

1. Same as above. Engine restart and cross-feeding optional.
2. **MAINTAIN** directional control and **TRIM** rudder as needed.
3. **INFORM** ATC.
4. **PERFORM** normal approach at slightly higher speed if field length allows (may preclude full flaps).

ENGINE FIRE

1. Fire Alarm Annunciator - **ON.** Identify engine on fire.

2. **THROTTLE BACK** engine and **MONITOR** Fire Alarm Annunciator.

3. If fire persists after 10 seconds, **PRESS** Firewall Shutoff Button. ***OPEN*** *button guard first. This will arm the fire extinguisher.*

4. Confirm firewall shutoff:

   a. Pin light - **ON** with engine shutoff.

5. Affected engine - **SECURED**:

   a. Throttle and Subthrottle - to **IDLE (“F1”).**

   b. Throttle Release Lever - **LOCKED (fuel valve closed).** *This will set throttle to* ***CUTOFF****. Engine will shut off.*

   c. Manual and air ignition - **OFF**.

6. Confirm extinguishers **ARMED** - **ON**.

7. If fire persists after 10 seconds, **PUSH** First Fire Extinguisher Discharge Button.

8. If fire persists after 10 more seconds, **PUSH** Second Fire Extinguisher Discharge Button.

9. If fire persists after 10 more seconds, **DECLARE EMERGENCY** to ATC and **LAND** as soon as possible.

ELECTRICAL AND/OR HYDRAULIC SYSTEMS FAILURE

Simplified Procedures in Case of a Total Engine/ Generator Failure

1. Main Battery Switches - **ON** (if generators failed).

2. Engine Starter/Generator Switches - **OFF** (if generators failed)**.**

3. Auxiliary Inverter Switch - **ON** (if main inverters failed).

4. Primary and Secondary Inverter Switches - **OFF** (if failed).

5. **REDUCE** electrical load by turning **OFF** all unnecessary equipment.

6. Electric Auxiliary Hydraulic Pump Switch - **ON** to test, then **OFF** and **ON** again only when hydraulic power is needed (flaps, spoilers, landing gear, brakes).

7. Hydraulic Pressure Gauge - **IN GREEN** when electric auxiliary hydraulic pump is **ON.**

8. Frequently **CHECK** airspeed/Mach, altitude, attitude, and angle-of attack.

9. **DECLARE EMERGENCY** to ATC and **LAND** as soon as practical.

After main batteries are depleted:

1. Emergency Battery Switch - **ON.** The amber light next to the switch will come **ON** after about 1 to 3 seconds, indicating that power is supplied to the aircraft by the emergency batteries.

2. Standby Emergency Battery Switch - **ON.** The amber light next to the switch will come **ON.**

3. Standby Gyro - **UNCAGED** and **CHECKED.**

4. Battery Switches - **OFF**.

On approach:

1. Electric Auxiliary Hydraulic Pump Switch - **ON**.

2. Hydraulic Pressure Gauge - **IN GREEN.**

3. Spoilers:

   a. Spoilers Switch - Check **RET**.

   b. Spoilers Extended Annunciator - Check **OFF**.

4. Flaps:

   a. **DOWN AS REQUIRED**.

   b. Confirm flaps position - **DOWN.**

5. Landing gear:

a. Landing Gear Selector Switch - **DOWN**.

b. Check Landing Gear Position Lights - **RED ON** in transit, then all **GREEN**.

If electric auxiliary hydraulic pump fails, on approach:

1. Check Emergency Air Pressure Gauge - **IN GREEN**.

2. Spoilers:

   a. Spoilers Switch - Check **RET**.

   b. Spoilers Extended Annunciator - Check **OFF**.

3. Flaps:

   a. **DOWN AS REQUIRED**.

   b. Confirm flaps position - **DOWN.**

4. Landing gear:

   a. Landing Gear Selector Switch - **DOWN**.

   b. Check Landing Gear Position Lights - **RED ON** in transit, then all **GREEN**.

If landing gear won't extend:

1. Check Emergency Air Pressure Gauge - **IN GREEN**.

2. Landing Gear Selector Switch - **DOWN.**

3. Emergency Gear Extension Lever - **DOWN**. *Click several times until landing gear is fully extended.*

4. Check Landing Gear Position Lights - **RED ON** in transit, then all **GREEN**.

5. Frequently **CHECK** airspeed/Mach, altitude, attitude, and angle-of attack.

6. **LAND** as soon as possible.

7. Use **Emergency Brake** in case of a total brake failure after touchdown.

WINDSHIELD ANTI-ICE SYSTEM FAILURE

In case of a failure of the windshield heating system, the **Windshield and Radome Alcohol Anti-Ice System** can be used to de-ice/defog the captain's windshield.

Note: *The alcohol system will not de-ice/defog the co-pilot's windshield.*

To de-ice the radome and the captain's windshield (engines must be running and the aircraft powered):

1. Bleed Air Switch - **NORM** or **MAX.**

2. Anti-Ice Alcohol Switch – **WSHLD & RADOME.**

To stop the flow of alcohol:

1. Anti-Ice Alcohol Switch – **OFF** or **RADOME** only (if needed).

When the switch is set to **WSHLD & RADOME**, the system supplies both the radome and the captain's windshield with alcohol for 45 minutes with a full reservoir.

The amber ALC AI annunciator on the main annunciator panel illuminates when the alcohol reservoir is empty.

APPENDICES

XTREME PROTOTYPES GATES LEARJET MODEL 25/28 v4 FOR PREPAR3D
AIRCRAFT REFERENCE INFORMATION

Note: *This chart also appears as the **Reference Tab** of the pilot's **Kneeboard** in Prepar3D.*

Maximum Gross Weight – Gates Learjet Model 25/28	**15,000 lbs.**

Note: *To adjust fuel and payload, please refer to "Flight Planning" in section 7 of the Flight Manual.*

V_{MO} - Maximum Operating Speed	**359 KIAS**
M_{MO} - Maximum Operating Mach (at 24,000 ft.)	**0.82 Mach**
V_A - Maneuvering Speed 10,000 lbs. (sea level)	**160 KIAS**
V_A - Maneuvering Speed 10,000 lbs. (20,000 ft.)	**165 KIAS**
V_A - Maneuvering Speed 10,000 lbs. (45,000 ft.)	**170 KIAS**
V_A - Maneuvering Speed 15,000 lbs. (sea level)	**200 KIAS**
V_A - Maneuvering Speed 15,000 lbs. (20,000 ft.)	**205 KIAS**
V_A - Maneuvering Speed 15,000 lbs. (45,000 ft.)	**220 KIAS**
V_{LO} - Maximum Gear Operating Speed	**200 KIAS**
V_{LE} - Maximum Landing Gear Extension Speed	**265 KIAS**

Maximum Flap Placard Speeds

Flaps degrees	KIAS
8	**202**
20	**200**
40	**153**

Note: *For complete V-speed tables covering various loading and atmospheric conditions, please refer to "Flight Planning" in section 7 of the Flight Manual. For explanations of the V-speeds used in this tab, see "V-speeds" in the Prepar3D "Glossary" (Learning Center).*

V_1 - Takeoff Decision Speed
(dry runway, standard temperature, flaps 8°)

9,000 lbs.	**105 KIAS**
15,000 lbs.	**135 KIAS**

V_R - Rotation Speed
(dry runway, standard temperature, flaps 8°)

9,000 lbs.	**120 KIAS**
15,000 lbs.	**138 KIAS**

V_2 - Minimum Climb Speed
(standard temperature)

9,000 lbs.	**124 KIAS**
15,000 lbs.	**140 KIAS**

V_{REF} - Landing Reference Speed
(flaps 40°, standard temperature, sea level pressure altitude)

8,000 lbs.	**110 KIAS**
15,000 lbs.	**134 KIAS**

ADDING THIRD-PARTY ADDONS, SYSTEMS AND GAUGES

APPENDIX 2

Note: *The following pages were written for users with no programming experience and limited knowledge about what lies behind their simulation platform. If you are an experienced programmer and are familiar with the Prepar3D SDK, with configuring instrument panels and programming XML gauges, you can skip parts of the discussion, jump to the sections that interest you the most and use the following topics as a reference guide.*

ABOUT THIRD-PARTY ADDONS

The virtual cockpits of the GLJ Model 25/28 v4 addon contains fully animated 3D representations of the **GNS 530** and **GTN 750** navigation systems, and of a generic **weather radar** and **transponder**. Except for the basic devices that are shipped with Prepar3D such as the classic GPS 500 or the demo radar that comes with the SDK (see “Release Notes”), the add-on software required to make these 3D models fully operational is not included with the GLJ Model 25/28 v4 addon and must be purchased separately from third-party developers.

All screens, buttons, and knobs in the 3D models can be configured by users to integrate almost any Prepar3D-compatible third-party addon, system or gauge.

While it is impossible to offer full support and/or custom configuration panels for the installation and integration of every third-party addon available nowadays, we did our best to provide our users with as much information as possible, should they decide to install their own third-party navigation systems, radars, or transponders.

In this section, we presume that your third-party addons are **fully compatible** with your version of Prepar3D, have been **installed properly**, and are **working well** with other aircraft installed on your system. We do not recommend using third-party setup utilities or configuration panels to add your third-party navigation systems or radars to the virtual cockpits of the GLJ Model 25/28 v4 addon. This will be explained later.

Preconfigured Virtual Cockpits and Panels

The Xtreme Prototypes GLJ Model 25/28 v4 addon comes with two different virtual cockpits; the **Basic** virtual cockpit and the **GTN750** virtual cockpit.

- By default, the instrument panel in the Basic virtual cockpit is preconfigured for the GPS 500 that comes with Prepar3D, and for a dummy radar screen. **This is the standard option to choose if you don't have third-party add-on software installed on your system.** You can always change the configuration later and add other third-party navigation systems and radars.
- By default, the instrument panel in the GTN750 virtual cockpit is preconfigured for the Reality XP GTN 750 (not included, sold separately), and for a dummy radar screen. We do not recommend flying with the GTN750 cockpit without a third-party GTN 750 addon installed (no navigation system, no radios).

Alternate panel configurations are also provided for other systems and third-party add-on software.

Alternate Panel Configurations

Preconfigured instrument panels are included for the following systems:

- The basic **GPS 500** included with Prepar3D
- The **Reality XP GNS 530/GTN 750** navigation systems (not included, sold separately)
- The **Flight1 GNS 530/GTN 750** navigation systems (not included, sold separately)
- A **dummy radar** screen
- The **demo monochrome radar** that comes with the **Prepar3D SDK** (see "Release Notes")
- The **Rex/Milviz WX Advantage radar** (not included, sold separately)

Important

- Please note that some existing third-party addons may no longer be compatible with the latest versions of Prepar3D or might have new features that were not available at the time of this writing. In doubt, **please contact the developer for support**.
- Xtreme Prototypes is not responsible for changes in third-party software that would prevent the GLJ Model 25/28 v4 add-on aircraft or the third-party software from performing or being used, including the discontinuation of such third-party software.
- **Xtreme Prototypes cannot provide technical assistance for third-party add-on software. Please contact the developer for support**.

Preconfigured Panel Configurations

You will find the "**panel.cfg**" files (panel configuration files) for the Basic and GTN750 virtual cockpits in separate folders, located in the main add-on package folder:

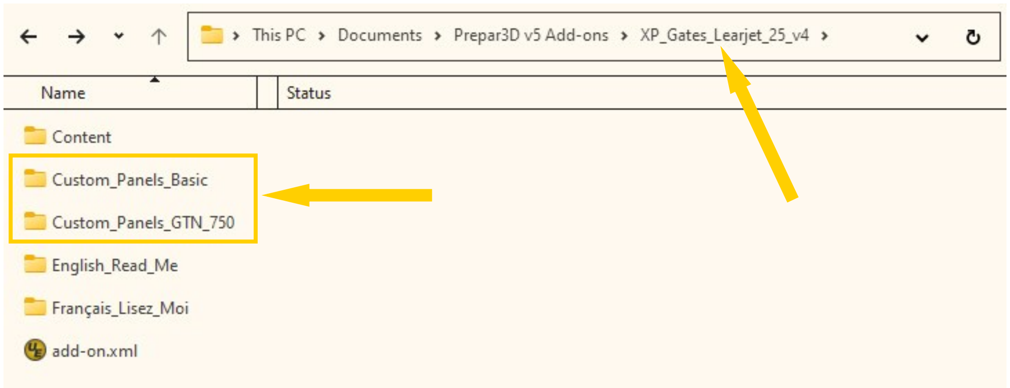
…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_25_v4**Custom_Panels_Basic**

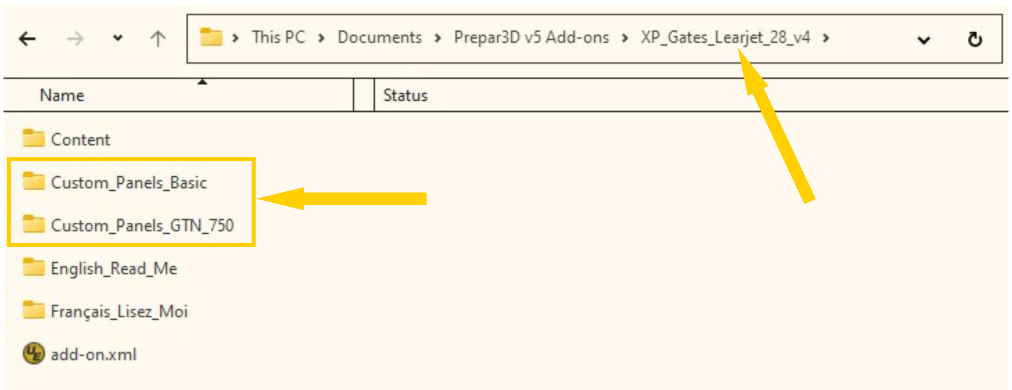
…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_25_v4**Custom_Panels_GTN_750**

or

…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_28_v4**Custom_Panels_Basic**

…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_28_v4**Custom_Panels_GTN_750**





Preconfigured Panels for the Basic Virtual Cockpit

For the **Basic** virtual cockpit, you will find the available "**panel.cfg**" configuration files in the following folders:

…\Custom_Panels_Basic**Flight1_GNS_530_and_Dummy_Radar****panel.cfg**

…\Custom_Panels_Basic**Flight1_GNS_530_and_P3D_Radar****panel.cfg**

…\Custom_Panels_Basic**Flight1_GNS_530_and_Rex_Radar****panel.cfg**

…\Custom_Panels_Basic**P3D_GPS_500_and_Dummy_Radar****panel.cfg**

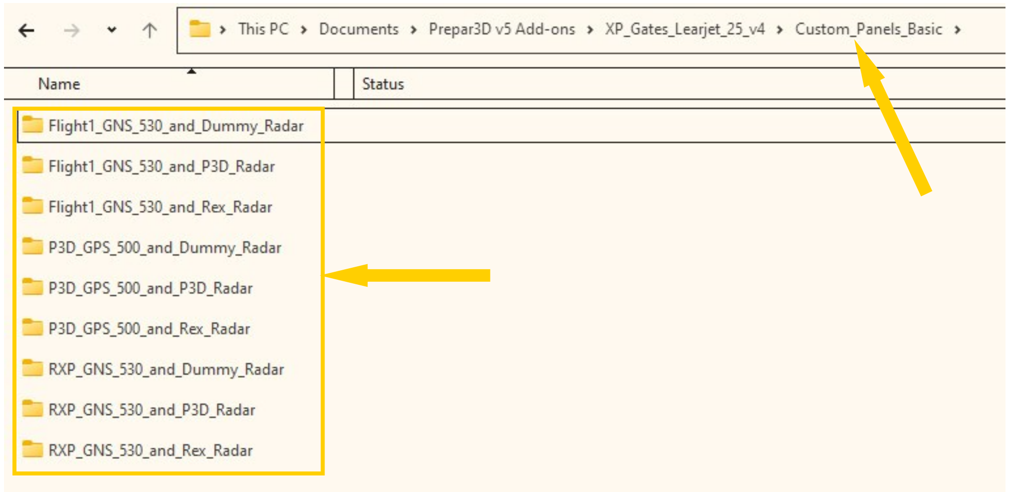
…\Custom_Panels_Basic**P3D_GPS_500_and_P3D_Radar****panel.cfg**

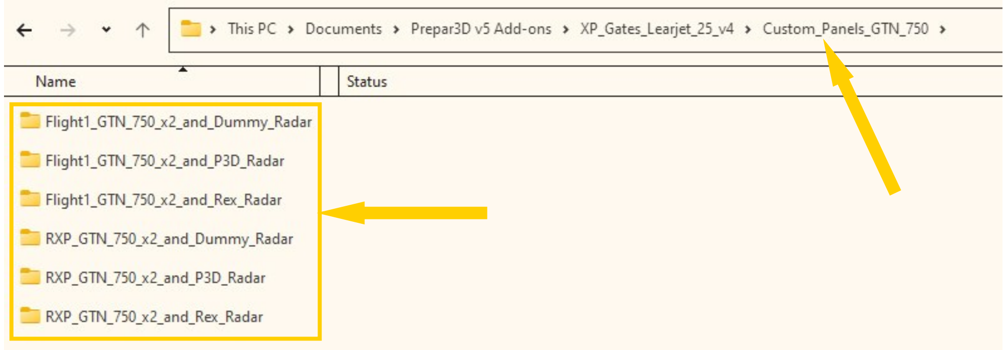
…\Custom_Panels_Basic**P3D_GPS_500_and_Rex_Radar****panel.cfg**

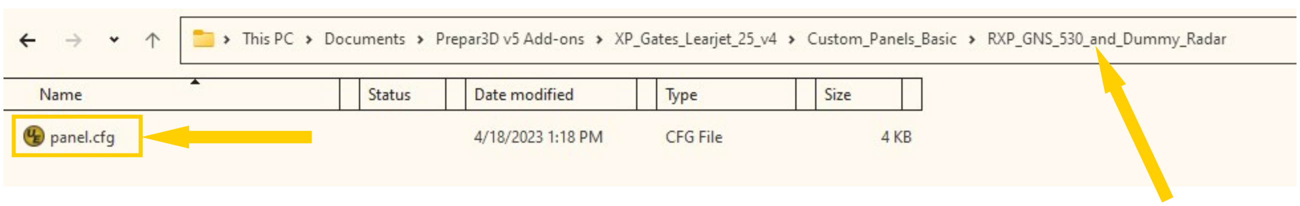
…\Custom_Panels_Basic**RXP_GNS_530_and_Dummy_Radar****panel.cfg**

…\Custom_Panels_Basic**RXP_GNS_530_and_P3D_Radar****panel.cfg**

…\Custom_Panels_Basic**RXP_GNS_530_and_Rex_Radar****panel.cfg**







Preconfigured Panels for the GTN750 Virtual Cockpit

For the **GTN750** virtual cockpit, you will find the available “**panel.cfg**” configuration files in the following folders:

…\Custom_Panels_GTN_750**Flight1_GTN_750_x2_and_Dummy_Radar****panel.cfg**

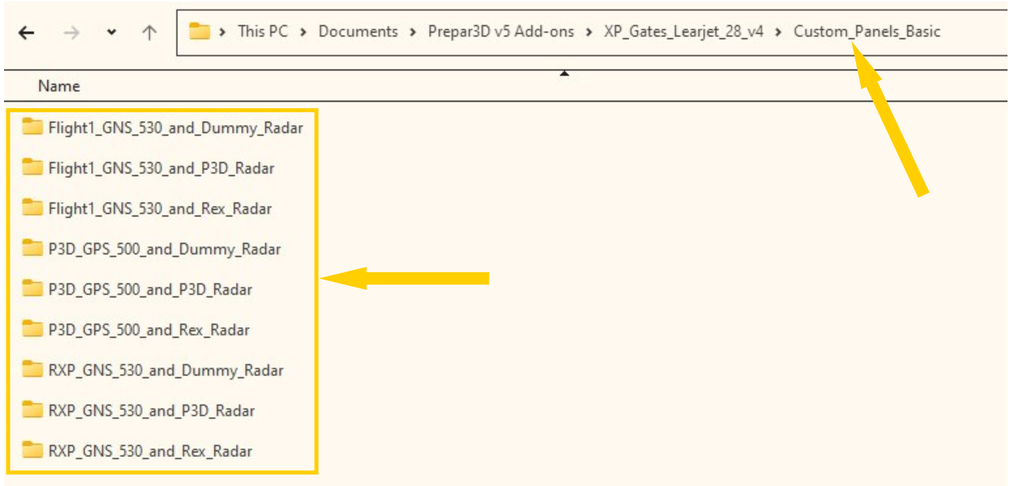
…\Custom_Panels_GTN_750**Flight1_GTN_750_x2_and_P3D_Radar****panel.cfg**

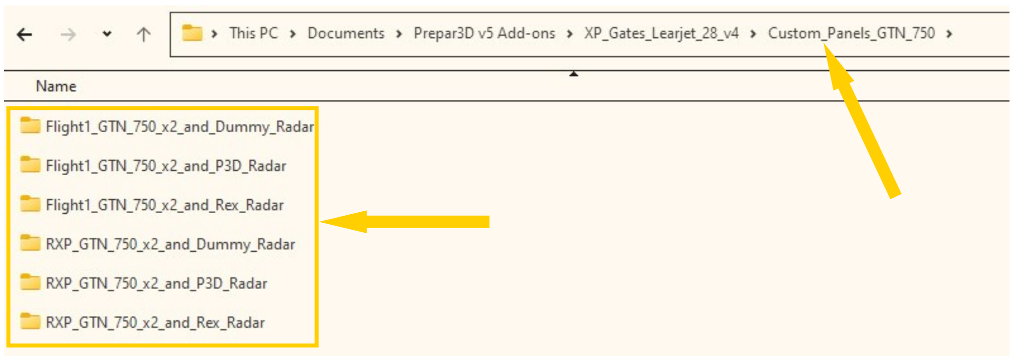
…\Custom_Panels_GTN_750**Flight1_GTN_750_x2_and_Rex_Radar****panel.cfg**

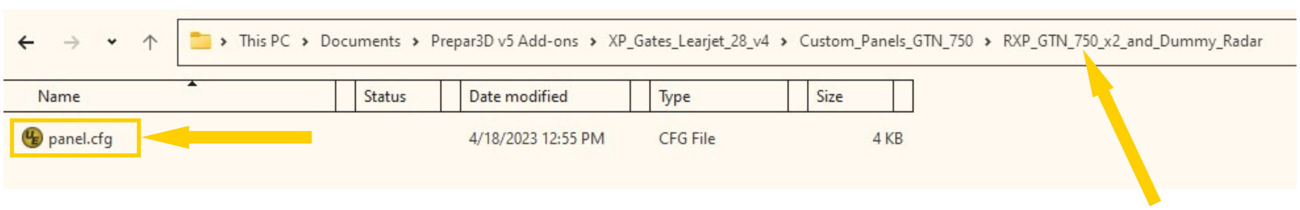
…\Custom_Panels_GTN_750**RXP_GTN_750_x2_and_Dummy_Radar****panel.cfg**

…\Custom_Panels_GTN_750**RXP_GTN_750_x2_and_P3D_Radar****panel.cfg**

…\Custom_Panels_GTN_750**RXP_GTN_750_x2_and_Rex_Radar****panel.cfg**







Switching Panels

Switching to a different panel configuration is as simple as **copying** the desired "**panel.cfg**" configuration file to the GLJ Model 25/28 v4 "**panel**" folder, for example:

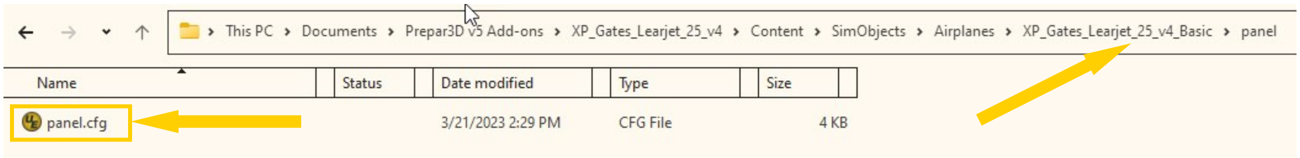
…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_25_v4
\Content\SimObjects\Airplanes\XP_Gates_Learjet_25_v4_Basic**panel****panel.cfg**

…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_28_v4
\Content\SimObjects\Airplanes\XP_Gates_Learjet_28_v4_Basic**panel****panel.cfg**

Note: *You no longer have to copy the "**control gauges**" (the interfaces between the 3D models and the third-party addons), like in version 3. They are already included in the add-on package's "**Gauges**" folder. More on this later.*

Remember to **exit from Prepar3D** before copying a new panel configuration file to the GLJ Model 25/28 v4 "panel" folder. After the file is copied, you can restart the simulator.

Selecting and copying the right panel for your gear is usually done only once after installing your new addon.



You don’t have to switch panels if you don’t have third-party add-on software installed. Use the default panel configurations.

ADDING OTHER THIRD-PARTY ADDONS

Adding other third-party addons to the virtual cockpits of the GLJ Model 25/28 v4 add-on aircraft, other than those mentioned above, is also possible by **modifying a few lines** in the aircraft’s “**panel.cfg**” (the panel configuration file) or creating a new “panel.cfg”.

Third-party addons can also be installed as “**popup windows**” that are available from the simulator’s top menu bar. This also requires modifying a few lines in the “panel.cfg”.

Programming the buttons and knobs on the 3D models so they can communicate with your third-party addons is achieved by changing a few lines in specially provided “**control gauges**” that are the **interfaces** between the 3D models and the third-party addons. More on this later.

Buttons and knobs are preprogrammed by default in the control gauges to be compatible with the most popular GPS/GNS/GTN and radar third-party addons. Should you want to install devices from other developers, including freeware stuff, this would require modifying the control gauges or creating new ones. This method gives you maximum flexibility and control when adding third-party addons, systems or gauges.

The control gauges are located in the “**XP_GLJ25v4_gauges**” or “**XP_GLJ28v4_gauges**” folder, in the add-on package’s “**Gauges**” folder:

Refer to “**Programming Buttons and Knobs**” on page 19, in this section, for more information and complete instructions on how to program the buttons and knobs in the virtual cockpit for your own third-party addons.

Refer to the documentation included with your third-party addons for special instructions on how to operate and configure the devices for your version of Prepar3D and contact the developer for further assistance. Refer to the Prepar3D Software Development Kit (SDK) for more information about the panel configuration file.

What’s Next?

The following pages contain important information and instructions for adding typical third-party addons, systems or gauges to the virtual cockpits of the GLJ Model 25/28 v4 add-on aircraft, and for programming the buttons and knobs of the 3D models for your own devices.

Don’t be discouraged if your third-party addons or gauges don’t work as expected the first time you install them. Configuration errors are frequent and may prevent your third-party addons or the GLJ Model 25/28 v4 addon from functioning properly. If necessary, reopen the “panel.cfg”, and check the changes you have made.

Customizing the virtual cockpit of your GLJ Model 25/28 v4 for third-party addons, systems and gauges may require some research and experimentation on your part.

Backing Up your Panel Configuration Files

Most third-party addons are installed like standard Prepar3D gauges by modifying a few lines in the aircraft’s “panel.cfg” (the panel configuration file) with a text editor. Other addons may have their own installers and configuration panels that will make some of the changes for you.

Unfortunately, too many third-party setup utilities have the bad habit of **altering** the content of your configuration files, including the “panel.cfg”. In some instances, custom sections and comments are removed entirely and you may lose important information that we have added to the “panel.cfg” to guide you when installing or configuring your own third-party addons. Worse, they can also prevent the GLJ Model 25/28 v4 add-on aircraft from working properly.

For this and other reasons, we recommend **that you don’t use** setup utilities and configuration panels to add your third-party addons to the cockpits of the GLJ Model 25/28 v4, and to follow the instructions in the following pages instead. We believe that this simple “manual” approach gives you maximum flexibility while remaining in full control of the changes that are being made.

As always, it is good practice to **backup** your “panel.cfg” files before attempting to install, set up or configure any third-party addon, system or gauge for your GLJ Model 25/28 v4 add-on aircraft.

Should anything go wrong when installing your third-party addons, simply revert to your backups or to the original configuration files and start over.

INSTALLING A GPS 500 OR A GNS 530

Follow the procedures below when installing a third-party **GPS 500** or **GNS 530** navigation system in the **Basic virtual cockpit** of the GLJ Model 25/28 v4 add-on aircraft. This is achieved by modifying a few lines in the aircraft's "panel.cfg" and in the "control gauge" for the GNS 530 3D model in the virtual cockpit. The new device will also be installed as a "popup window" available from the simulator's top menu bar.

Installing the Gauge

1. Make sure that your third-party addon is **fully compatible** with your version of Prepar3D, has been **installed properly** and is **working well** with other aircraft installed on your system.

2. Make a **backup copy** of the aircraft's "panel.cfg" file you want to modify before proceeding.

3. Using a text editor like Notepad, **open** the aircraft's "panel.cfg" file.

4. Based on the example below, **replace the text in RED** in the "panel.cfg" file with the custom entries for your third-party addon. Refer to the documentation included with your third-party addon for the correct modifications that need to be made. Be careful and do not change anything else in the file. If this is not done correctly, your third-party addon and/or your GLJ Model 25/28 v4 add-on aircraft may not work properly.

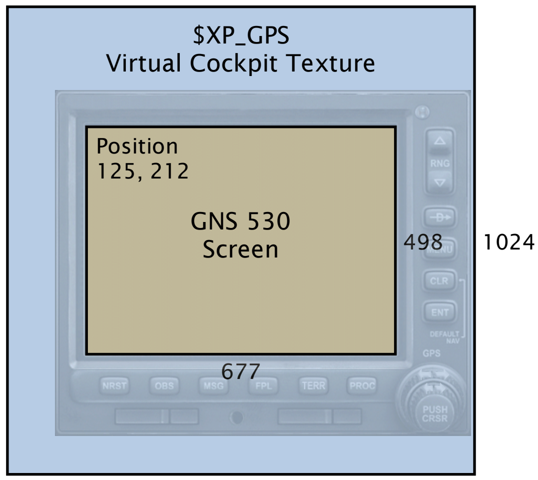
Note: *Only the relevant sections of the "panel.cfg" are shown in the example below.*

```
// 2D COCKPIT SECTION STARTS HERE //////////////////////////


[Window Titles]
Window00=2D Cockpit
Window01= My GNS Addon


// My GNS Addon 2D panel ---------------------

[Window01]
background_color=0,0,0
size_mm=490,357
position=0
visible=0
always_visible=0
ident=15531
window_size=0.360,0.400
sizeable=1
gauge00=My_GNS_Addon_Folder!My_GNS_Addon_Gauge,0,0,490,357


// VIRTUAL COCKPIT SECTION STARTS HERE /////////////////////


// My GNS Addon display ----------------------

[Vcockpit00]
```

```
background_color=36,36,36
size_mm=1024
visible=1
pixel_size=1024,1024
texture=$XP_GPS
gauge00=My_GNS_Addon_Folder!My_GNS_Addon_Gauge, 125,212,677,498,NO_BEZEL
gauge01=XP_GLJ25v4_gauges!controls_GNS530_RXP,1,1,1,1
```

1. **Save** the “panel.cfg” in the aircraft’s “panel” folder.

Experimentation may be required to fit the gauge into the LCD screen of the generic 3D model. The coordinates and gauge size above are for the Reality XP GNS 530. You may need to adjust these parameters for your own third-party addon.



Please note that the GPS/GNS screen (size 677 x 498) is mapped **at the center** of a 1024 x 1024 VC texture (**$XP_GPS**) at position 125, 212 (upper left corner). The reason for this is to mask the bezel of the basic Prepar3D GPS 500 gauge (some addons give you the option of removing the bezel, some don’t). This gives you enough room to move around and center the screen of your third-party gauge inside the bezel of the 3D model in the virtual cockpit.

Please note that the lines above are provided as an example only and that experimentation will be required.

Programming Buttons and Knobs

The buttons and knobs of the GNS 530 3D model inside the virtual cockpit can be programmed to work with other third-party navigation/communication systems. Programming the buttons and knobs so they can communicate with your third-party addon is achieved by modifying a few lines in the “**control gauge**” (we suggest creating a new one for your third-party addon).

The line “**gauge01= XP_GLJ25v4_gauges!controls_GNS530_RXP,1,1,1,1**” in the above example contains the name of the control gauge (**in green**) and **should not be removed** or the 3D buttons and knobs in the virtual cockpit will not be able to communicate with your third-party addon. The control gauge “**controls_GNS530_RXP.xml**” needs to be edited and renamed for your third-party addon and referenced in the “panel.cfg”. For example: “**gauge01= XP_GLJ25v4_gauges! controls_My_GNS_Addon,1,1,1,1**”.

Please refer to “**Programming Buttons and Knobs**” on page 19 for complete instructions.

INSTALLING A PAIR OF GTN 750s

Follow the procedures below when installing a pair of third-party **GTN 750** navigation systems in the **GTN750 virtual cockpit** of the GLJ Model 25/28 v4 add-on aircraft. This is achieved by modifying a few lines in the aircraft's "panel.cfg" and in the "control gauge" for the GTN 750 3D models in the virtual cockpit. The new devices will also be installed as "popup windows" available from the simulator's top menu bar.

Installing the Gauge

1. Make sure that your third-party addon is **fully compatible** with your version of Prepar3D, has been **installed properly** and is **working well** with other aircraft installed on your system.

2. Make a **backup copy** of the aircraft's "panel.cfg" file you want to modify before proceeding.

3. Using a text editor like Notepad, **open** the aircraft's "panel.cfg" file.

4. Based on the example below, **replace the text in RED** in the "panel.cfg" file with the custom entries for your third-party addon. Refer to the documentation included with your third-party addon for the correct modifications that need to be made. Be careful and do not change anything else in the file. If this is not done correctly, your third-party addon and/or your GLJ Model 25/28 v4 add-on aircraft may not work properly.

***Note:** Only the relevant sections of the "panel.cfg" are shown in the example below.*

```
// 2D COCKPIT SECTION STARTS HERE //////////////////////////


[Window Titles]
Window00=2D Cockpit
Window01=My GTN 750 Addon Unit 1
Window02=My GTN 750 Addon Unit 2


// My GTN 750 Addon 2D panel 1 ---------------------------

[Window01]
background_color=0,0,0
size_mm=100,100
position=0
visible=0
always_visible=0
zorder=99
ident=15751
window_pos=0.000000,0.000000
window_size=0.439153,0.715580
sizeable=1
gauge00=My_GTN750_Addon_Folder!My_GTN750_Addon_Gauge_1,0,0,100,100


// My GTN 750 Addon 2D panel 2 --------------------------

[Window02]
```

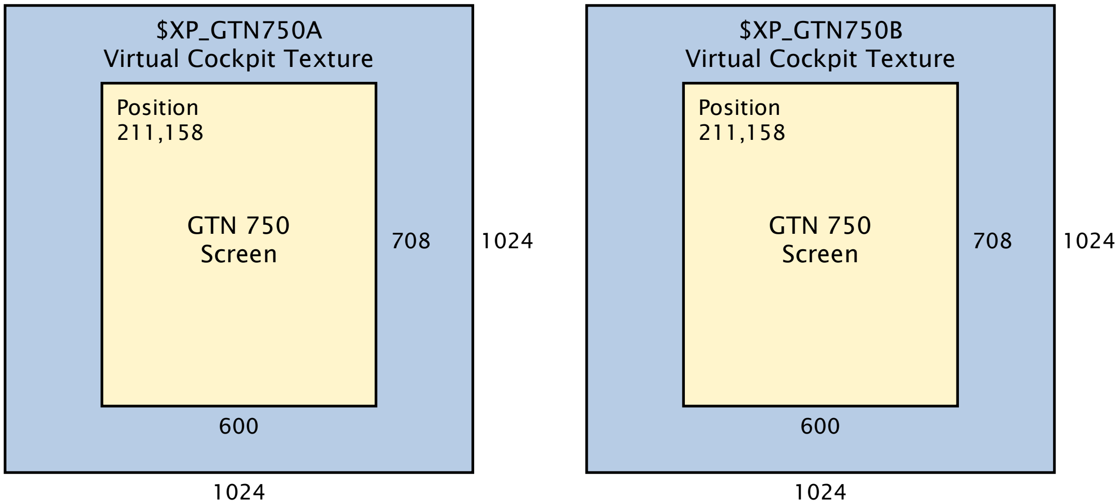
```
background_color=0,0,0
size_mm=100,100
position=1
visible=0
always_visible=0
zorder=99
ident=15652
window_pos=0.439153,0.000000
window_size=0.439153,0.715580
sizeable=1

gauge00=My_GTN750_Addon_Folder!My_GTN750_Addon_Gauge_2,0,0,100,100


// VIRTUAL COCKPIT SECTION STARTS HERE /////////////////////


// My GTN 750 Addon Unit 1 - Captain Side ------------------

[Vcockpit00]
background_color=36,36,36
size_mm=1024, 1024
visible=1
pixel_size=1024,1024
texture=$XP_GTN750A
gauge00=My_GTN750_Addon_Folder!My_GTN750_Addon_Gauge_1,211,158,600,708,NO_BEZEL
gauge01=XP_GLJ25v4_gauges!controls_My__x2_RXP,1,1,1,1


// My GTN 750 Addon Unit 2 - Copilot Side ------------------

[Vcockpit01]
background_color=36,36,36
size_mm=1024, 1024
visible=1
pixel_size=1024,1024
texture=$XP_GTN750B
gauge00=My_GTN750_Addon_Folder!My_GTN750_Addon_Gauge_2,211,158,600,708,NO_BEZEL
```

1. **Save** the “panel.cfg” in the aircraft’s panel folder.

Experimentation may be required to fit the gauges into the LCD screen of the generic 3D models. The coordinates and gauge size above are for the Reality XP GTN 750 addon. You may need to adjust these parameters for your own third-party addon.

Please note that the GTN 750 screens (size 600 x 708) are mapped on 1024 x 1024 VC textures (**$XP_GTN750A** and **$XP_GTN750B**) at position 211,158 (upper left corner). The reason for this is to mask the bezel of the third-party gauges (some addons give you the option of removing the bezel, some don’t). This gives you enough room to move around and center the screen of your third-party gauges inside the bezel of the 3D models in the virtual cockpit.

Please note that the lines above are provided as an example only and that experimentation will be required.



Programming Buttons and Knobs

The buttons and knobs of the GTN 750 3D models inside the virtual cockpit can be programmed to work with other third-party navigation/communication systems. Programming the buttons and knobs so they can communicate with your third-party addon is achieved by modifying a few lines in the "**control gauge**" (we suggest creating a new one for your third-party addon).

The line "`gauge01=XP_GLJ25v4_gauges!controls_GTN750_x2_RXP,1,1,1,1`" contains the name of the **control gauge** (**in green**) and should not be removed or the 3D buttons and knobs in the virtual cockpit will not be able to communicate with your third-party addon. The control gauge "**controls_GTN750_x2_RXP.xml**" needs to be edited and renamed for your third-party addon and referenced in the "panel.cfg". For example: "`gauge01= XP_GLJ25v4_gauges! controls_My_GTN750_Addon_x2,1,1,1,1`".

Please refer to "**Programming Buttons and Knobs**" on page 19 for complete instructions.

INSTALLING A WEATHER RADAR

Follow the procedures below when installing a third-party **weather radar** in the **Basic** or **GTN750 virtual cockpits** of the GLJ Model 25/28 v4 add-on aircraft. This is achieved by modifying a few lines in the aircraft's "panel.cfg" and in the "control gauge" for the generic weather radar 3D model in the virtual cockpit. The new device will also be installed as a "popup window" available from the simulator's top menu bar.

Note: *For instructions on how to install the Prepar3D monochrome demo radar that comes with the Prepar3D SDK, please refer to the "Release Notes" at the beginning of this manual.*

Installing the Gauge

1. Make sure that your third-party addon is **fully compatible** with your version of Prepar3D, has been **installed properly** and is **working well** with other aircraft installed on your system.

2. Make a **backup copy** of the aircraft's "panel.cfg" file you want to modify before proceeding.

3. Using a text editor like Notepad, **open** the aircraft's "panel.cfg" file.

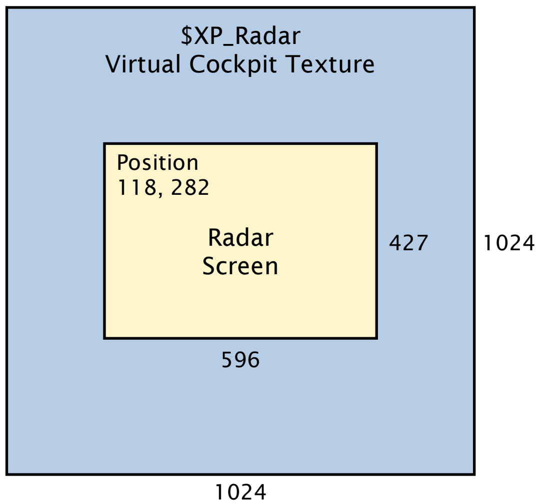
4. Based on the example below, **replace the text in RED** in the "panel.cfg" file with the custom entries for your third-party addon. Please refer to the documentation included with your third-party addon for the correct modifications that need to be made. Be careful and do not change anything else in the file. If this is not done correctly, your third-party addon and/or your GLJ Model 25/28 v4 add-on aircraft may not work properly.

Note: *Only the relevant sections of the "panel.cfg" are shown in the example below.*

```
// 2D COCKPIT SECTION STARTS HERE //////////////////////////


[Window Titles]
Window00=2D Cockpit
Window01=Flight1 Garmin GNS530 U1 - DO NOT MODIFY
Window02=Flight1 GNS Stack - DO NOT MODIFY
Window03=My Radar Addon


// My Radar Addon 2D panel ------------------

[Window03]
background_color=0,0,0
size_mm=419,381
position=2
visible=0
always_visible=0
ident=71
window_size=0.218,0.335
sizeable=1
gauge00=My_Radar_Addon_Folder!My_Radar_Addon_Gauge,64,121,291,205,1
```

```
// VIRTUAL COCKPIT SECTION STARTS HERE //////////////////////


// My Radar Addon display -------------------

[Vcockpit01]
background_color=36,36,36
size_mm=1024
visible=1
pixel_size=1024,1024
texture=$XP_Radar
gauge00=My_Radar_Addon_Folder!My_Radar_Addon_Gauge,218,282,596,427
gauge01=XP_GLJ28v4_gauges!controls_radar_Rex,1,1,1,1
```

1. **Save** the “panel.cfg” in the aircraft’s panel folder.



Experimentation may be required to fit the gauge into the screen of the generic 3D model. The coordinates and gauge size above are for the Rex/Milviz WX Advantage weather radar. You may need to adjust these parameters for your own third-party addon. Note that the radar screen (size 596 x 427) is mapped on a 1024 x 1024 VC texture (`$XP_Radar`) at position 218, 282 (upper left corner). The reason for this is to mask the bezel of the third-party radar gauge (some addons give you the option of removing the bezel, some don’t). This gives you enough room to move around and center the screen of your third-party radar gauge inside the bezel of the 3D model in the virtual cockpit. The above example is provided as an example only.

Programming Buttons and Knobs

The buttons and knobs of the generic weather radar 3D model inside the virtual cockpit can be programmed to work with other third-party radars. Programming the buttons and knobs so they can communicate with your third-party addon is achieved by modifying a few lines in the “**control gauge**” (we suggest creating a new one for your third-party addon).

The line “`gauge01=XP_GLJ28v4_gauges!controls_radar_Rex,1,1,1,1`” contains the name of the control gauge (**in green**) and should not be removed or the 3D buttons and knobs in the virtual cockpit will not be able to communicate with your third-party addon. The control gauge “**controls_radar_Rex.xml**” needs to be edited and renamed for your third-party addon and referenced in the “panel.cfg”. For example: “`gauge01= XP_GLJ25v4_gauges!controls_My_Radar_Addon,1,1,1,1`”.

Please refer to “**Programming Buttons and Knobs**” on page 19 for complete instructions.

INSTALLING A SPECIAL TRANSPONDER

The generic transponder model in the virtual cockpits of the GLJ Model 25/29 v4 add-on aircraft can be configured to work with third-party **transponder** addons supporting various modes of operation and other features. Follow the procedures below when installing a third-party transponder.

You have two options: Fitting your transponder gauge into the VFD display of the 3D model or sending data from your transponder to the VFD display of the 3D model.

Option 1: Fitting your Transponder Gauge into the VFD Display

Your first option is to install your third-party transponder in such a way that the full gauge (or just the screen if you prefer) appears in the VFD display of the generic 3D model in the virtual cockpit of the GLJ Model 25/28. This is achieved by modifying a few lines in the aircraft's "panel.cfg" and in the "control gauge" for the generic transponder 3D model in the virtual cockpit. You may also want your transponder gauge to be displayed in a "popup window" available from the simulator's top menu bar.

1. Make sure that your third-party addon is **fully compatible** with your version of Prepar3D, has been **installed properly** and is **working well** with other aircraft installed on your system.
2. Make a **backup copy** of the aircraft's "panel.cfg" file you want to modify before proceeding.
3. Using a text editor like Notepad, **open** the aircraft's "panel.cfg" file.
4. Based on the example below, **replace the text in RED** in the "panel.cfg" file with the custom entries for your third-party addon. Refer to the documentation included with your third-party addon for the correct modifications that need to be made. Be careful and do not change anything else in the file. If this is not done correctly, your third-party addon and/or your GLJ Model 25/28 v4 add-on aircraft may not work properly.

Note: *Only the relevant sections of the "panel.cfg" are shown in the example below.*

```
// 2D COCKPIT SECTION STARTS HERE //////////////////////////


[Window Titles]
Window00=2D Cockpit
Window01=GPS
Window02=My Transponder Addon


// My Transponder Addon 2D panel ------------------

[Window02]
background_color=0,0,0
size_mm=419,381
position=2
visible=0
always_visible=0
ident=71
window_size=0.218,0.335
sizeable=1
gauge00=My_Transponder_Addon_Folder!My_Transponder_Addon_Gauge,0,0,600,395
```

```
// VIRTUAL COCKPIT SECTION STARTS HERE ////////////////////


// Digital radios and altimeters (do not edit) -------------

[Vcockpit03]
background_color=0,0,0
size_mm=2048
visible=1
pixel_size=2048,2048
texture=$XP_Radios_Alt
gauge00=XP_GLJ25v4_gauges!display_digital_altimeter,22,856,638,440

(…)

gauge08=My_Transponder_Addon_Folder!My_Transponder_Addon_Gauge,650,19,600,395
gauge09=XP_GLJ25v4_gauges!controls_transponder_P3D,1,1,1,1
```

1. Save the "panel.cfg" in the aircraft's panel folder.

The previous steps will install your third-party transponder in the virtual cockpit, but some adjustments will be necessary to fit the gauge into the VFD display of the generic transponder 3D model. The coordinates and gauge size are for the XP transponder gauge that comes with your GLJ Model 25/28 v4 addon. You will need to tweak these parameters for your own third-party transponder. Please note that all VFD radio gauges and ADDU displays in your GLJ Model 25/28 v4 addon are mapped on a 2048 x 2048 VC texture (`$XP_Radios_Alt`). The transponder VFD display is mapped at location 650, 19 (upper left corner). Size: 600 x 395.

Please note that the lines above are provided as an example only and that experimentation will be required.

Programming Buttons and Knobs

The buttons and knobs of the transponder 3D model inside the virtual cockpit can be programmed to work with other third-party transponders. Programming the buttons and knobs so they can communicate with your third-party addon is achieved by modifying a few lines in the "**control gauge**" (we suggest creating a new one for your third-party addon).

The line "`gauge08=XP_GLJ25v4_gauges!controls_transponder_P3D,1,1,1,1`" contains the name of the control gauge (**in green**) and should not be removed or the 3D buttons and knobs in the virtual cockpit will not be able to communicate with your third-party addon. The control gauge "**controls_transponder_P3D.xml**" needs to be edited and renamed for your third-party addon and referenced in the "panel.cfg". For example: "`gauge08= XP_GLJ25v4_gauges!controls_My_Transponder_Addon,1,1,1,1`".

Please refer to "**Programming Buttons and Knobs**" on page 19 for complete instructions.

Option 2: Sending Data from your Transponder to the VFD Display

Another option is to keep the XP transponder gauge/display like in the default configuration, and to add your third-party transponder as an **additional gauge** to the aircraft's "panel.cfg". By using this option, you can configure the panel so that your transponder gauge won't show in the virtual cockpit, but its **data** will be sent to the VFD display of the 3D model.

If you are using this option, you will also need to modify a few lines in the transponder **control gauge** for your third-party transponder to send data to the VFD display of the transponder 3D model in the virtual cockpit (see below).

1. Make sure that your third-party addon is **fully compatible** with your version of Prepar3D, has been **installed properly** and is **working well** with other aircraft installed on your system.

2. Make a **backup copy** of the aircraft's "panel.cfg" file you want to modify before proceeding.

3. Using a text editor like Notepad, **open** the aircraft's "panel.cfg" file.

4. Based on the example below, **replace the text in RED** in the "panel.cfg" file with the custom entries for your third-party addon. Refer to the documentation included with your third-party addon for the correct modifications that need to be made. Be careful and do not change anything else in the file. If this is not done correctly, your third-party addon and/or your GLJ Model 25/28 v4 add-on aircraft may not work properly.

Note: *Only the relevant sections of the "panel.cfg" are shown in the example below.*

```
// 2D COCKPIT SECTION STARTS HERE //////////////////////////

[Window Titles]
Window00=2D Cockpit
Window01=GPS
Window02=My Transponder Addon


// My Transponder Addon 2D panel ------------------

[Window02]
background_color=0,0,0
size_mm=419,381
position=2
visible=0
always_visible=0
ident=71
window_size=0.218,0.335
sizeable=1
gauge00=My_Transponder_Addon_Folder!My_Transponder_Addon_Gauge,0,0,600,395


// VIRTUAL COCKPIT SECTION STARTS HERE /////////////////////


// Digital radios and altimeters (do not edit) -------------

[Vcockpit03]
background_color=0,0,0
size_mm=2048
visible=1
pixel_size=2048,2048
texture=$XP_Radios_Alt
gauge00=XP_GLJ25v4_gauges!display_digital_altimeter,22,856,638,440

(…)

gauge09=XP_GLJ25v4_gauges!controls_transponder_P3D,1,1,1,1
gauge10=My_Transponder_Addon_Folder!My_Transponder_Addon_Gauge,2,2,1,1
```

1. **Save** the "panel.cfg" in the aircraft's panel folder.

Please note that the lines above are provided as an example only and that experimentation will be required.

Programming Buttons and Knobs

The buttons and knobs of the transponder 3D model inside the virtual cockpit can be programmed to work with other third-party transponders. Programming the buttons and knobs so they can communicate with your third-party addon is achieved by modifying a few lines in the "**control gauge**" (we suggest creating a new one for your third-party addon).

The line "`gauge08=XP_GLJ25v4_gauges!controls_transponder_P3D,1,1,1,1`" contains the name of the control gauge (**in green**) and should not be removed or the 3D buttons and knobs in the virtual cockpit will not be able to communicate with your third-party addon. The control gauge "**controls_transponder_P3D.xml**" needs to be edited and renamed for your third-party addon and referenced in the "panel.cfg". For example: "`gauge08= XP_GLJ25v4_gauges! controls_My_Transponder_Addon,1,1,1,1`".

Please refer to "**Programming Buttons and Knobs**" (next page) for complete instructions.

PROGRAMMING BUTTONS AND KNOBS

As we saw in the previous pages, adding your own third-party addons, systems and gauges to the virtual cockpits of the GLJ Model 25/28 v4 add-on aircraft was made relatively easy by modifying a few lines in the aircraft's "panel.cfg".

Making the hard-coded buttons and knobs of the GNS/GTN, radar and transponder 3D models compatible with almost any available third-party addon was a bit more challenging. We wanted to provide our users with a method that is open, flexible, and universal. We also wanted to provide enough information to make the process of customizing the virtual cockpits to their own needs as simple and straightforward as possible, even for nonprogrammers.

With these objectives in mind, we have developed special "**control gauges**" which act as universal interfaces between the hard-coded buttons and knobs inside the virtual cockpits and your third-party addons.

The control gauges are standard **XML gauges** that are referenced like any other Prepar3D gauge in the aircraft's "panel.cfg".

Control gauges should not be removed or the buttons and knobs of the GNS/GTN, radar and transponder in the virtual cockpits will no longer work!

For example:

```
// Reality XP GNS 530 display ------------------------------

[Vcockpit00]
background_color=36,36,36
size_mm=1024
visible=1
pixel_size=1024,1024
texture=$XP_GPS
gauge00=rxpGNS2!GNS_530_1,125,212,677,498,NO_BEZEL
gauge01=XP_GLJ28v4_gauges!controls_GNS530_RXP,1,1,1,1
```

The last line ("**gauge01=XP_GLJ28v4_gauges!controls_GNS530_RXP,1,1,1,1**") refers to the "**controls_GNS530_RXP.xml**" gauge located in the "**XP_GLJ28v4_gauges**" folder, inside the add-don's main "**Gauges**" folder. This is a custom XML system gauge that plays the role of an **interface** between the hard-coded buttons and knobs of the GNS 530 3D model in the virtual cockpit and the Reality XP GNS 530 third-party addon.

The control gauges that come with your GLJ Model 25/28 v4 addon are pre-programmed for the most popular third-party addons. By modifying **editable fields** in those control gauges, you can enter **custom commands** for your own third-party addons that are triggered when the hard-coded buttons and knobs are actuated in the virtual cockpit. Customizing the control gauges for your third-party addons requires a text editor like Notepad that comes with Windows.

Detailed instructions are provided in the following pages and inside each control gauge file to guide you during the customization process.

Customizing the virtual cockpit of your GLJ Model 25/28 v4 add-on aircraft for third-party addons, systems and gauges may require a little bit of research and experimentation on your part.

Custom Commands

Most third-party add-on software such as navigation systems and radars come in the form of unique Prepar3D-compatible **gauges** that are added to your aircraft's instrument panels through the "panel.cfg" (the panel configuration file). The basic GPS 500 that comes with Prepar3D is a good example of this type of gauge.

These gauges, when displayed on 2D instrument panels or in popup windows, become functional 2D models of the real devices they are supposed to represent. Normally they are responsive to user clicks.

Some of these gauges need to respond to commands (from users) to trigger specific tasks. Users usually control these gauges by clicking screens, buttons and knobs that are part of the gauges. For example, if a user rotates a knob on a radio gauge to select a specific frequency, the knob will send a special command to the radio gauge and/or to the simulator for selecting the frequency.

2D gauges can also be installed in the virtual cockpit. However, in full-3D virtual cockpits such as the ones included with your GLJ Model 25/28 v4 addon, only the "flat" portion of a 2D gauge (usually an LCD screen or a digital display) is kept and appears inside the bezel of a 3D model of the instrument. The flat 2D switches, buttons and knobs of the gauge are masked and replaced by their animated 3D counterparts in the model.

Each third-party addon, system or gauge uses **its own set of commands and variables**. The 3D switches, buttons and knobs in the virtual cockpit need to be programmed in such a way that they can send the custom commands to your third-party addons for them to become responsive.

Although preprogramming the buttons and knobs in the 3D models for the most popular third-party addons would have been possible, we concluded that it would also be too limiting. It is simply not possible to program a universal set of commands in the 3D models that would work for every imaginable third-party addons. Additionally, third-party addons may evolve with time and use different sets of commands and variables, rendering the hard-coded models obsolete.

Because 3D models are hard coded and cannot be modified, sending commands to your third-party addons is accomplished through special "**control gauges**" which are the **interface** between the hard-coded buttons and knobs in the 3D models and your third-party addons.

By following the instructions provided in the next pages, you can **customize** the 3D switches, buttons, and knobs in the virtual cockpit by adding your own commands and make them **compatible** with almost any third-party addon, system or gauge you may want to install. This approach gives you maximum flexibility and control.

Commands can be standard Prepar3D "Event IDs" (simulator commands) contained in very short scripts or more elaborate XML code that uses both Event IDs and variables (simulator variables or custom local variables from your third-party addons).

For example, this is the command you would enter to actuate the Flight1 GTN 750 "Home" button (a custom instruction through a local variable):

```
0x0001FA02 (>L:F1GTNMOUSE, bool)
```

And this is the command to actuate the Reality XP GNS 530 "Menu" button (a simulator Event ID):

```
0 (>K:GPS_MENU_BUTTON)
```

Before customizing buttons and knobs for your own needs, please check the documentation that comes with your third-party addons for their own lists of custom commands and variables. Event IDs to send commands directly to the simulator are listed in the Prepar3D Software Development Kit (SDK).

Custom Variables

Some third-party gauges provide virtual cockpit developers with **custom variables** that can be used to store the state of their buttons and knobs, among other functions. These variables are a must when programming animations in hard-coded virtual cockpits. **They allow third-party gauges to send valuable data to the virtual cockpit, and not just the other way around.**

For example, if you change the position of a knob on your third-party radar's 2D popup window, the change should also be reflected on the corresponding 3D knob in the virtual cockpit. By opposition, if you change the position of a 3D knob in the virtual cockpit, it should be reflected on the knob on the 2D gauge. This is possible because the virtual cockpit 3D model can send commands to the 2D gauge and is also capable of receiving similar commands from the 2D gauge.

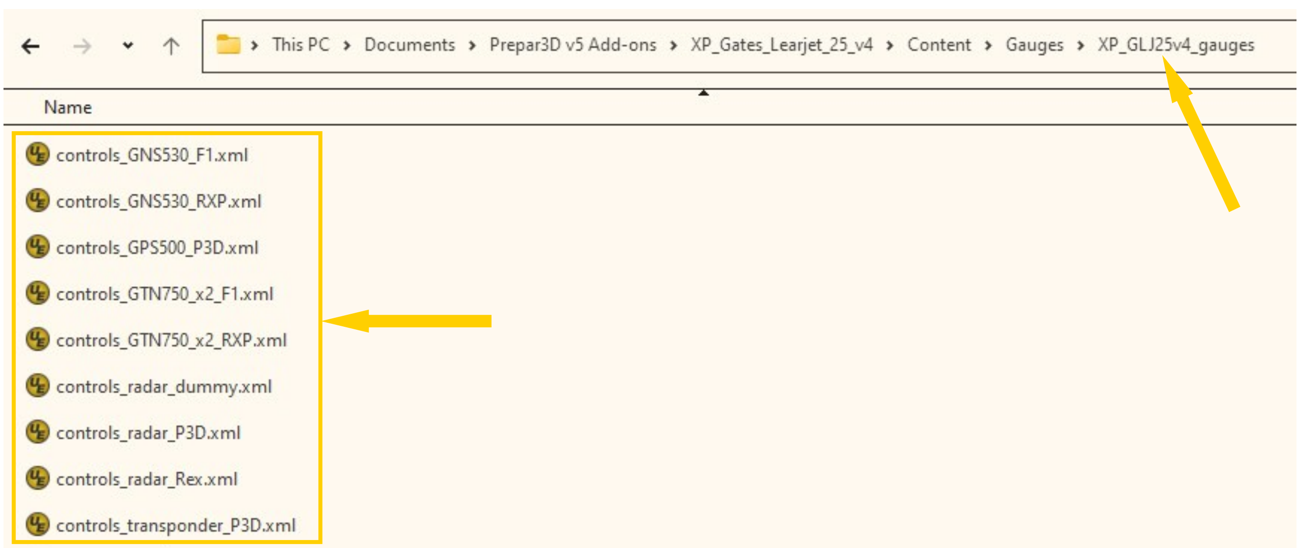
The special XML control gauges included with your GLJ Model 25/28 v4 addon have provisions for these custom variables for some hard-coded knobs.

THE CONTROL GAUGES

The **control gauges** for the GLJ Model 25/28 v4 add-on aircraft are in the "**XP_GLJ25v4_gauges**" folder, in the add-on package's "**Gauges**" folder, for example:

`…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_25_v4`
`\Content\`**`Gauges\XP_GLJ25v4_gauges`**`\`**`controls_GNS530_F1.xml`**

`…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_28_v4`
`\Content\`**`Gauges\XP_GLJ28v4_gauges`**`\`**`controls_GNS530_F1.xm`**



The included control gauges are:

- For the Flight1 GNS 530: **controls_GNS530_F1.xml**
- For the Reality XP GNS 530: **controls_GNS530_RXP.xml**
- For the Prepar3D GPS 500: **controls_GPS500_P3D.xml**
- For the Flight1 GTN 750: **controls_GTN750_x2_F1.xml**

- For the Reality XP GTN 750: **controls_GTN750_x2_RXP.xml**
- For the Xtreme Prototypes dummy radar screen: **controls_radar_dummy.xml**
- For the Prepar3D monochrome demo radar: **controls_radar_P3D.xml**
- For the Rex/Milviz WX Advantage weather: **controls_radar_Rex.xml**
- For the Xtreme Prototypes/Prepar3D transponder: **controls_transponder_P3D.xml**

These are the control gauges included with your GLJ Model 25/28 v4 addon that permit the hard-coded buttons and knobs in the virtual cockpits to communicate with your third-party addons. You may edit these gauges or create new ones to make them compatible with your own third-party addons that are not included in the list.

Note: *The control gauge for the Prepar3D monochrome demo radar ("**controls_radar_P3D.xml**") cannot be edited.*

Programming the Control Gauges to Suit your Needs

Before customizing buttons and knobs for your own needs, please check the documentation that comes with your third-party addons for their own lists of **custom commands and variables.** Event IDs to send commands directly to the simulator are listed in the Prepar3D Software Development Kit (SDK).

Commands must be **expressions or scripts** that can be sent to/from XML gauges, for example:

```
0x14007 (>L:WXEVENT, enum)
```

Modifying the control gauges requires a text editor like Notepad that comes with Windows.

Make sure to back up the original control gauges you wish to modify for your own third-party addons before making any change! We also recommend creating new control gauges with **different names** for your own third-party addons.

Please follow the instructions very carefully and modify the **user-editable sections** of the gauge only. If the changes are not made correctly, your third-party addon and/or your GLJ Model 25/28 v4 add-on aircraft may not work properly. Should anything go wrong, simply revert to the original files, and start over.

Unless you know what you are doing and are familiar with XML scripting and with your simulator's SDK, we do not recommend modifying any section of the control gauge other than those that are indicated in the gauge.

When opening the control gauge with your text editor, you will notice the followings:

- A commented top section named "`INSTRUCTIONS_FOR_END_USERS`". This section contains **instructions** for modifying the gauge. Please read it carefully.
- At the end of the top section, you will find the comment "`USER-CONFIGURABLE SECTION BEGINS HERE`". This is the start of the **user-editable section** that contains a series of small blocks of XML scripts called "**macros**" (for "macroinstructions").
- A typical **macro** (or macro element) looks like this:

```
<Macro Name="RIGHT_INNER_KNOB_CLOCKWISE">
<MacroValue>0 (>K:GPS_PAGE_KNOB_INC)</MacroValue>
</Macro>
```

- Each macro contains a self-explanatory and user-friendly **macro** Name that is associated with a hard-coded knob or button in the 3D model. It may contain the name and or the function of the knob or button. In the example above, the macro Name for the action of turning the right inner knob of the GNS 530 model clockwise is: "RIGHT_INNER_KNOB_CLOCKWISE". **The macro Name is precoded and should not be changed!**

- Each macro also contains a <MacroValue> sub-element **that can be customized.** The <MacroValue> sub-element contains the command (or script) that needs to be sent to your third-party addon so it can trigger the action mentioned in the macro Name. For example, the command associated by default with the macro Name "RIGHT_INNER_KNOB_CLOCKWISE" is "0 (>K:GPS_PAGE_KNOB_INC)" (in this case, a simulator Event ID).

- The command or script must be typed inside the opening and closing tags of the <MacroValue> sub-element, for example:

  ```
  <MacroValue>0 (>K:GPS_PAGE_KNOB_INC)</MacroValue>
  ```

- The <MacroValue> sub-element can remain blank if no action is required from the selected knob or button, for example:

  ```
  <MacroValue> </MacroValue>
  ```

- Comments (*comment*) are permitted in the <MacroValue> sub-element, for example:

  ```
  <MacroValue>(*No command here*)</MacroValue>
  ```

- Users are allowed to change the "content" of the <MacroValue> sub-element with custom commands or XML scripts if you are familiar with XML programming and the simulator's SDK and know what you are doing. If you are not familiar with XML programming, please limit yourself to entering the custom commands provided by the third-party addon developer with the required formatting, for example:

  ```
  <MacroValue>0 (>K:GPS_DIRECTTO_BUTTON)</MacroValue>
  ```

- At the end of the section that contains the customizable macros, you will find the comment "USER-CONFIGURABLE SECTION ENDS HERE - DO NOT EDIT BELOW THIS LINE". **Please do not make any changes below this line!**

After you have entered your custom commands, variables, or scripts in the selected macros, **save the file** in the "**XP_GLJ25v4_gauges**" folder, in the addon's main "**Gauges**" folder:

…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_25_v4
\Content**Gauges\XP_GLJ25v4_gauges****controls_GNS530_F1.xml**

…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_28_v4
\Content**Gauges\XP_GLJ28v4_gauges****controls_GNS530_F1.xml**

We recommend using a different name for your own third-party addon's control gauge (for example: **controls_My_GNS_Addon.xml**). **Make sure that the new name is referenced in the addon's "panel.cfg" or your custom control gauge won't be recognized by the simulator.**

Launch the simulator and **test your third-party addon** in the cockpit of the GLJ Model 25/28 v4 add-on aircraft. Check if all the buttons and knobs are working.

Don't be discouraged if your addon or gauge does not work as expected the first time. Configuration and scripting errors are frequent and may prevent some knobs or buttons from functioning properly. If necessary, reopen the control gauge XML file and check the changes you have made.

Also, make sure that your third-party addon **is configured properly to receive standard commands from the simulator (or XML gauges).** For example, if you write standard Prepar3D commands (Event IDs) in the control gauge to be sent to your third-party GNS addon, make sure that the latter is configured to accept standard GPS commands from the simulator. If not, the buttons and knobs will not work. For example, some Reality XP addons can receive standard GPS commands from the simulator but need to be configured to do so.

Customizing the virtual cockpit of your GLJ Model 25/28 v4 add-on aircraft for third-party addons, systems and gauges may require some research and experimentation on your part.

Notes

- For more information about how to make changes to XML gauges and for the list of Event IDs (simulator commands), please refer to the Prepar3D Software Development Kit (SDK).
- For the list of commands and variables that you can use to control your third-party addons through the buttons and knobs in the virtual cockpits, please refer to the documentation included with your third-party addons, systems or gauges. The commands and variables can usually be found in the user manual.
- Please note that some existing third-party addons may no longer be compatible with the latest versions of Prepar3D or might have new features that were not available at the time of this writing. **In doubt, please contact the developer for support**.
- Xtreme Prototypes is not responsible for changes in third-party software that would prevent the GLJ Model 25/28 v4 add-on aircraft or the third-party software from performing or being used, including the discontinuation of such third-party software.
- **Xtreme Prototypes cannot provide support for third-party addons other than the information included in this manual. Please contact the developer for further assistance.**

SOME EXAMPLES

- Here are the instructions you will find when opening the "**controls_GNS530_RXP.xml**" gauge, a custom XML control gauge that allows the buttons and knobs of the GNS 530 3D model in the virtual cockpit to communicate with the Reality XP GNS 530 addon:

```
<!--

==========================
INSTRUCTIONS FOR END USERS
==========================

The following section contains user-configurable macros for customizing the knobs
and buttons of the GNS 530 3D model that is installed in the virtual cockpit of
your Xtreme Prototypes Gates Learjet 20 Series add-on aircraft for Prepar3D.

Depending on which GNS (or GPS) third-party software is installed on your system,
you can program the knobs and buttons to suit your individual needs.

The knobs and buttons of the GNS 530 3D model installed in the virtual cockpit are
preconfigured below for the Reality XP GNS 530, but they can be configured for oth-
er third-party GNS/GPS addons as well.

In the following lines, the "Macro Name" is a user-friendly name for a specific
knob, button or function of the GNS 530 3D model installed in the virtual cockpit.

DO NOT EDIT the "Macro Name"!

The "MacroValue" is the custom script or command for the specific knob, button or
function.

YOU CAN CHANGE the content of the "MacroValue" to customize the knobs and buttons
for your third-party GNS/GPS.

Please refer to the manual that comes with your Xtreme Prototypes Gates Learjet 20
Series add-on aircraft for more information about how to customize knobs and but-
tons in the virtual cockpit, and how to add third-party addons, systems or gauges.
Refer to your third-party software documentation for installation instructions and
for the list of commands or scripts you can use to replace the commands or scripts
that appear in the "MacroValue" fields below.

DO NOT EDIT other portions of this gauge and make a backup copy before making any
change!

Note: The GNS/GPS is turned off when the top volume knob is turned fully counter-
clockwise or if there is no avionics power (required for the built-in radios). A
blank screen will appear on top of the GNS/GPS gauge when it is off. With avionics
power on, the GNS/GPS is turned on when the top volume knob is turned clockwise and
the blank screen is removed from the GNS/GPS gauge. This is hardcoded in the 3D
model and cannot be changed.

-->
```

- Here are a few customizable macros from the "**controls_GNS530_F1.xml**" gauge, a custom XML control gauge that allows the buttons and knobs of the GNS 530 3D model in the virtual cockpit to communicate with the Flight1 GNS 530 addon:

```
<Macro Name="POWER_SWITCH">
    <MacroValue>

     (*This script is used to flag that the GNS unit is turned on or off - an optional green LED is illuminated when the unit is on*)

     (A:AVIONICS MASTER SWITCH, bool) 1 == (A:ELECTRICAL MAIN BUS VOLTAGE, volts)
     17 &lt; ! &amp;&amp; (L:v3GNS530TopVolumeKnobPosition, number) 0 != &amp;&amp;
     if{

     1 (&gt;L:v3GNS530 Power, bool) 1 (&gt;L:v3GNS530 Power Light, bool)


     (*This script is unique to the Flight1 GNS 530 power switch*)

     (L:F1GNSPowerSwitchOneShot, bool) 0 == if{

     0x0001FB01 (>L:F1GNSMOUSE, bool) 0x0001FB02 (>L:F1GNSMOUSE, bool)
     L:F1GNS530U1_PWRKNOB, bool) ! (&gt;L:F1GNS530U1_PWRKNOB, bool)

     1 (&gt;L:F1GNSPowerSwitchOneShot, bool)

      }

      }

      els{

      0 (&gt;L:v3GNS530 Power, bool) 0 (&gt;L:v3GNS530 Power Light, bool)

      L:F1GNSPowerSwitchOneShot, bool) 1 == if{

      0x0001FB01 (>L:F1GNSMOUSE, bool) 0x0001FB02 (>L:F1GNSMOUSE, bool)
      (L:F1GNS530U1_PWRKNOB, bool) ! (&gt;L:F1GNS530U1_PWRKNOB, bool)

      0 (&gt;L:F1GNSPowerSwitchOneShot, bool)

      }

      }

     </MacroValue>
</Macro>

<Macro Name="TOP_VOLUME_KNOB_CLOCKWISE">
    <MacroValue>(*no command here*)</MacroValue>
</Macro>

<Macro Name="TOP_VOLUME_KNOB_COUNTERCLOCKWISE">
    <MacroValue>(*no command here*)</MacroValue>
</Macro>

<Macro Name="LEFT_OUTER_KNOB_CLOCKWISE">
    <MacroValue>0x0001FB24 (>L:F1GNSMOUSE, bool)</MacroValue>
</Macro>

<Macro Name="LEFT_OUTER_KNOB_COUNTERCLOCKWISE">
    <MacroValue>0x0001FB23 (>L:F1GNSMOUSE, bool)</MacroValue>
</Macro>
```

```
<Macro Name="DIRECT_TO_BUTTON_DN">
    <MacroValue>0x0001FB0F (>L:F1GNSMOUSE, bool)</MacroValue>
</Macro>

<Macro Name="DIRECT_TO_BUTTON_UP">
    <MacroValue>0x0001FB10 (>L:F1GNSMOUSE, bool)</MacroValue>
</Macro>
```

- The transponder control gauge (“**controls_transponder_P3D.xml”)** has a special macro that allows your third-party transponder to send its data to the VFD display of the generic transponder 3D model in the virtual cockpit. By default, the macro value contains the simulator variable `(A:TRANSPONDER1 CODE, BCO16)` from the basic transponder that comes with Prepar3D. This variable can be replaced by a local variable from your third-party transponder, for example: `(L:MY TRANSPONDER CODE, BCO16)`

```
<Macro Name="TOOLTIP_VALUE”>
     <MacroValue>

     (*The ATC code value you want the VFD display and the tooltip to show - must
     be in the BCO16 format.*)

     (A:TRANSPONDER1 CODE, BCO16)

     </MacroValue>
</Macro>
```

CHANGING THE CABIN TV IMAGE

You can change the **image** that appears on the **TV screen** in the cabin of the GLJ Model 25/28 v4 addon by modifying a few lines in the aircraft's "**panel.cfg**" and creating your own image or 2D gauge for the TV screen.

Changing the Image

Changing only the image requires a paint program like Adobe Photoshop and a basic text editor like Notepad that comes with Windows.

1. Open your paint program and **create a new image** for the TV screen. The dimensions for the new image must be: **996 pixels by 572 pixels**.

2. **Save the image** as a "**image_TV.bmp**" (RGB, 8 bits/channel, Windows bitmap format).

3. **Copy** the new "image_TV.bmp" to the "**XP_GLJ25v4_gauges**" or "**XP_GLJ28v4_gauges**" folder, in the add-on package's "Gauges" folder (we suggest to backup the existing TV image before replacing it):

   `…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_25_v4`
   `\Content\`**`Gauges\XP_GLJ25v4_gauges`**`\`**`image_TV.bmp`**

   `…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_28_v4`
   `\Content\`**`Gauges\XP_GLJ28v4_gauges`**`\`**`image_TV.bmp`**

4. **Launch** the simulator, load the aircraft, and **test your image** on the TV screen in the cabin of the GLJ Model 25/28 v4 addon.

Note: *The TV can be turned on/off by clicking the* ***TV logo*** *at the bottom of the screen. The TV requires DC and AC power (at least one Inverter Switch [10, 12, fig. 5-29]* ***ON****).*

Creating your Own TV Gauge

Creating your own TV gauge is more complex than just changing the image on the screen. It requires a good text editor like UltraEdit (for XML and Lua gauges) or a programming environment like Visual Studio (for C++ gauges and DLL), a paint program like Photoshop for creating the image(s) and/or animations, and some knowledge about creating gauges for Prepar3D (from the Prepar3D SDK).

Teaching you how to create a new TV gauge for the cabin of the GLJ Model 25/28 v4 addon goes beyond the scope of this manual. However, if you are familiar with how to create gauges for Prepar3D, you may design your own TV gauge to display different images, animations, even to play sounds. Your imagination sets the limits.

There is no control gauge for the cabin TV. The TV can be turned on/off by clicking the **TV logo** at the bottom of the screen.

You can add the **local variable** for turning the TV on/off to your TV gauge if desired:

```
(L:TV Power Switch, bool)
```

0 = TV screen **off**

1= TV screen **on**

Note: *The TV requires DC and AC power (at least one Inverter Switch [10, 12, fig. 5-29]* ***ON****).*

Information about creating gauges for Prepar3D can be found in the Prepar3D Software Development Kit's (SDK). While we recommend developing XML gauges, other types of gauges may also be created depending on the required features.

After the new TV gauge is created and packaged in its own folder or cabinet file with all its components, it needs to be copied to the add-on package's "**Gauges**" folder and be referenced in the "**panel.cfg**" located in the aircraft's "**panel**" folder.

Sound files (optional, if required by your project) need to be copied to the add-on package's "**User_Sounds**" folder. **Scripts**, if needed, need to be copied to the "**Scripts**" folder.

1. **Create** a new Prepar3D-compatible "TV gauge" to be displayed on the screen of the TV 3D model in the cabin of the GLJ Model 25/28 v4 add-on aircraft. Choose an original name for your custom gauge. For example: **My_TV_Gauge.xml.**

2. **Copy** all the gauge's components (XML file, DLL, images, etc.) to a custom gauge folder or cabinet (.cab) file. Give that folder or cabinet file **the same name as your TV gauge** (optional but recommended).

3. **Copy** the sound files (if required) to the "**User_Sounds**" folder. **Copy** the scripts (if required) to the "**Scripts**" folder.

4. **Open** the aircraft's "**panel.cfg**" file.

5. Based on the example on the next page, **replace the text in RED** in the aircraft's "**panel.cfg**" file with the custom entries for your new TV gauge. Be careful and do not change anything else in the file. If this is not done correctly, your TV gauge and/or your GLJ Model 25/28 v4 add-on aircraft may not work properly.

```
// VIRTUAL COCKPIT SECTION STARTS HERE /////////////////////

// Cabin TV (do not edit) ----------------------------

[Vcockpit04]
background_color=0,0,0
size_mm=1024,1024
visible=0
pixel_size=1024,1024
texture=$XP_Cabin_TV
gauge00=My_TV_Gauge_Folder!My_TV_Gauge,14,226,996,572
```

6. **Save** the "**panel.cfg**" in the aircraft's "**panel**" folder.

7. **Launch** the simulator, **load** the aircraft, and **test your TV gauge** on the TV screen in the cabin of the GLJ Model 25/28 v4 addon.

Note: *The TV can be turned on/off by clicking the* ***TV logo*** *at the bottom of the screen. The TV requires DC and AC power (at least one Inverter Switch [10, 12, fig. 5-29]* ***ON****).*

Please note that the lines above are provided as an example only.

Customizing the virtual cockpit of your GLJ Model 25/28 v4 add-on aircraft for third-party addons, systems and gauges may require some research and experimentation on your part.

CREATING YOUR OWN PBR AIRCRAFT LIVERIES

APPENDIX 3

The Xtreme Prototypes GLJ Model 25/28 v4 addon features all new **PBR materials** and **textures**. **Physically Based Rendering** (or **PBR**) is a method of shading and rendering that provides a more accurate representation of how light interacts with surfaces. The result is a 3D model that looks almost real under different lighting conditions.

Where Are the Aircraft Liveries Located?

Liveries (aircraft exterior paint schemes and markings) for your GLJ Model 25/28 v4 addon are contained in different "**texture.xxx**..." folders inside the aircraft's main folder. For example:

`…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_25_v4`
`\Content\SimObjects\Airplanes\XP_Gates_Learjet_25_v4_Basic\`**`texture.blue`**

"**texture.blue**" is the folder that contains the livery for the Learjet 25 "(USA) White, Blue and Gold" aircraft variation.

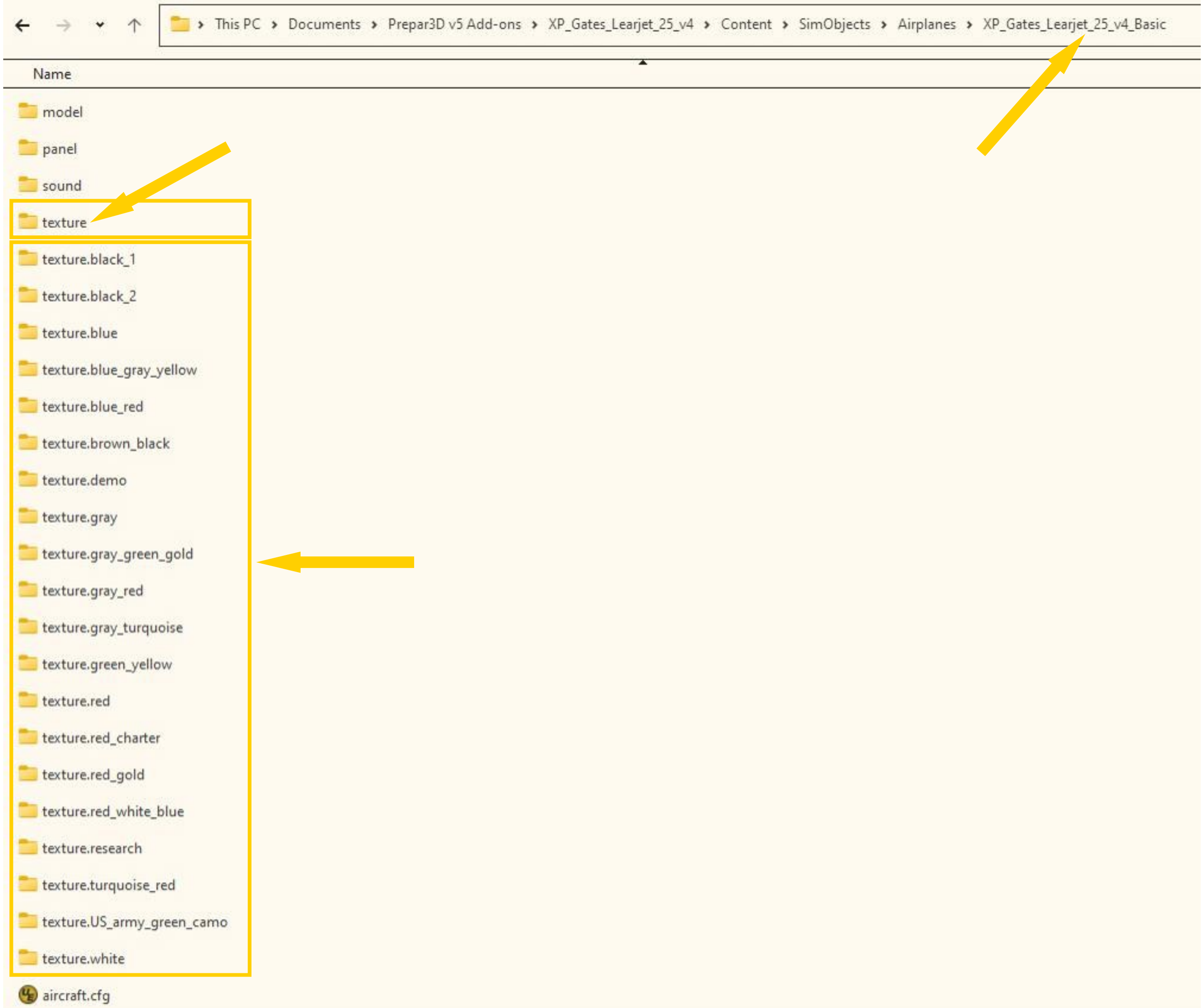
`…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_28_v4`
`\Content\SimObjects\Airplanes\XP_Gates_Learjet_28_v4_GTN750\`**`texture.red_charter`**

"**texture.red_charter**" is the folder that contains the livery for the Learjet 28 "(USA Charter) Red, White and Blue" aircraft variation.

By default, there are 20 different folders for the 20 aircraft variations that are included with the GLJ Model 25/28 v4 addon.

Each folder corresponds to one aircraft variation and contains several **textures** (DDS files).

The textures contained in the "**texture**" folder with **no extension** after the word "texture" are common to all aircraft variations and **cannot be modified or replaced at this time**.

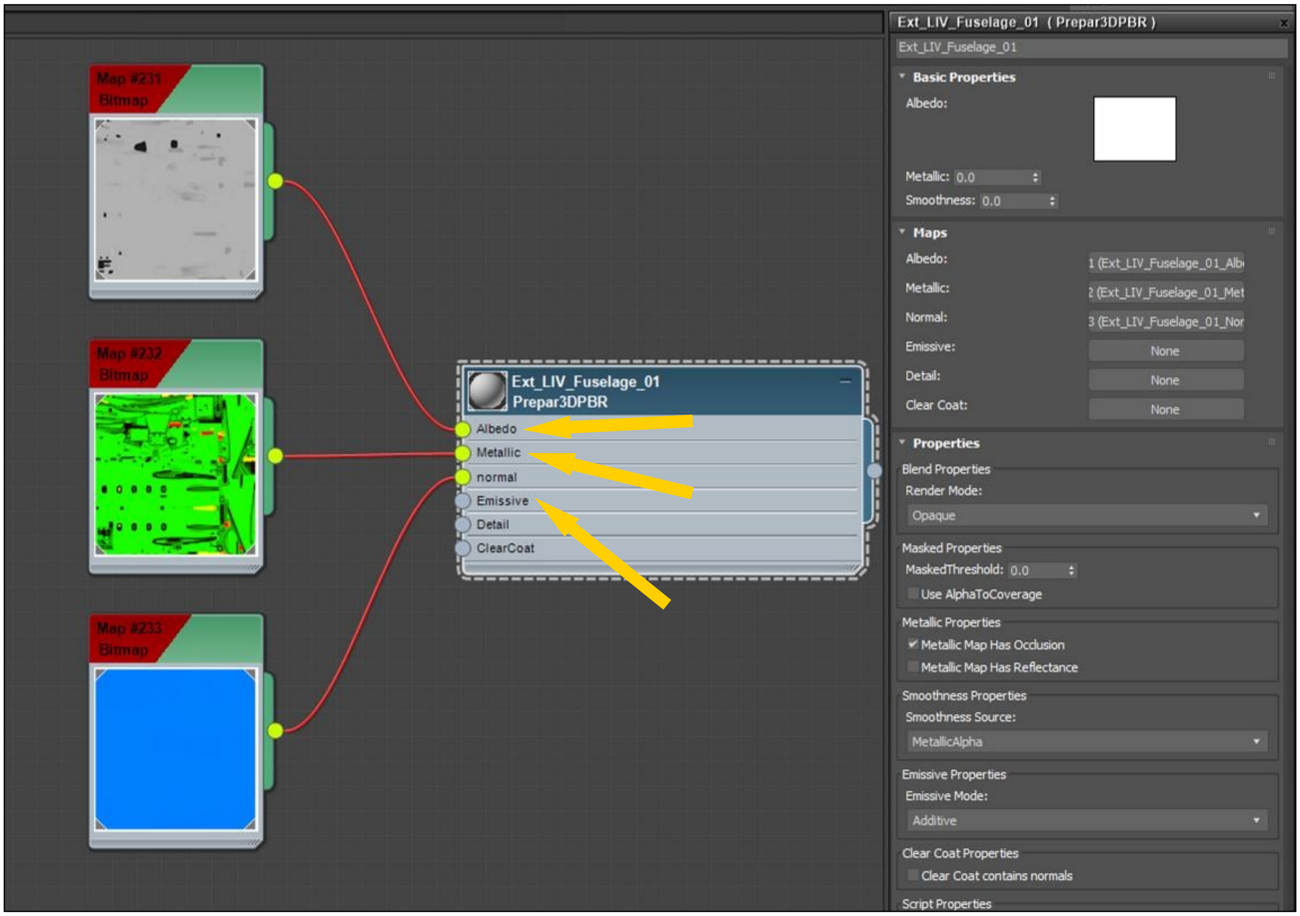


Some Background

During production, several Prepar3D PBR materials were applied to objects in the 3D mesh of our aircraft models. Each material has its own set of PBR textures called "**maps**". These are the default **textures** that come with your GLJ Model 25/28 v4 addon and that are contained in the **texture folders** mentioned above.

Producing PBR textures for Prepar3D is different from producing conventional textures for FSX or early versions of Prepar3D and requires a different method or "workflow". The "**Metal/Roughness**" workflow must be followed for producing PBR textures for Prepar3D.

With this method, at least three different maps are created for each PBR material in the 3D model: the **Albedo** map, the **Metallic** map, and a **Normal** map. The Normal map is not always required, depending on the model and on what the artist wants to accomplish. Illuminated objects have an



additional **Emissive** map. These maps are special **multi-channel textures** created and exported from a **paint program that can produce PBR textures**.

Note: *Textures that were created following the legacy "Specular/Glossiness" workflow (with Diffuse, Specular, Reflection maps, etc.) will not work with the Prepar3D PBR material and cannot be used for the GLJ Model 25/28 v4 add-don.*

In our aircraft models, textures with the prefix "**Ext_LIV**" are **livery textures** for a specific aircraft variation's **exterior model**, for example:

Ext_LIV_Fuselage_01_Albedo.dds

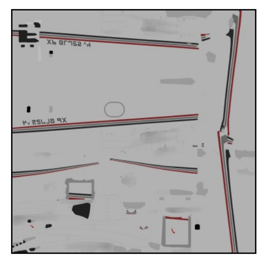
Ext_LIV_Fuselage_01_Metallic.dds

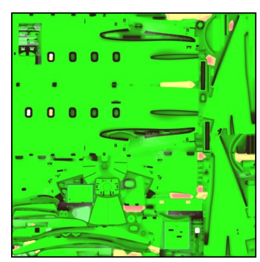
Ext_LIV_Fuselage_01_Normal.dds

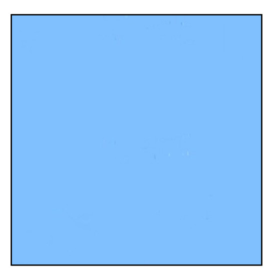
In this example, the Albedo, Metallic and Normal textures are forming a set of three maps for a single PBR material ("**Ext_LIV_Fuselage_01**") applied to the aircraft's main fuselage.

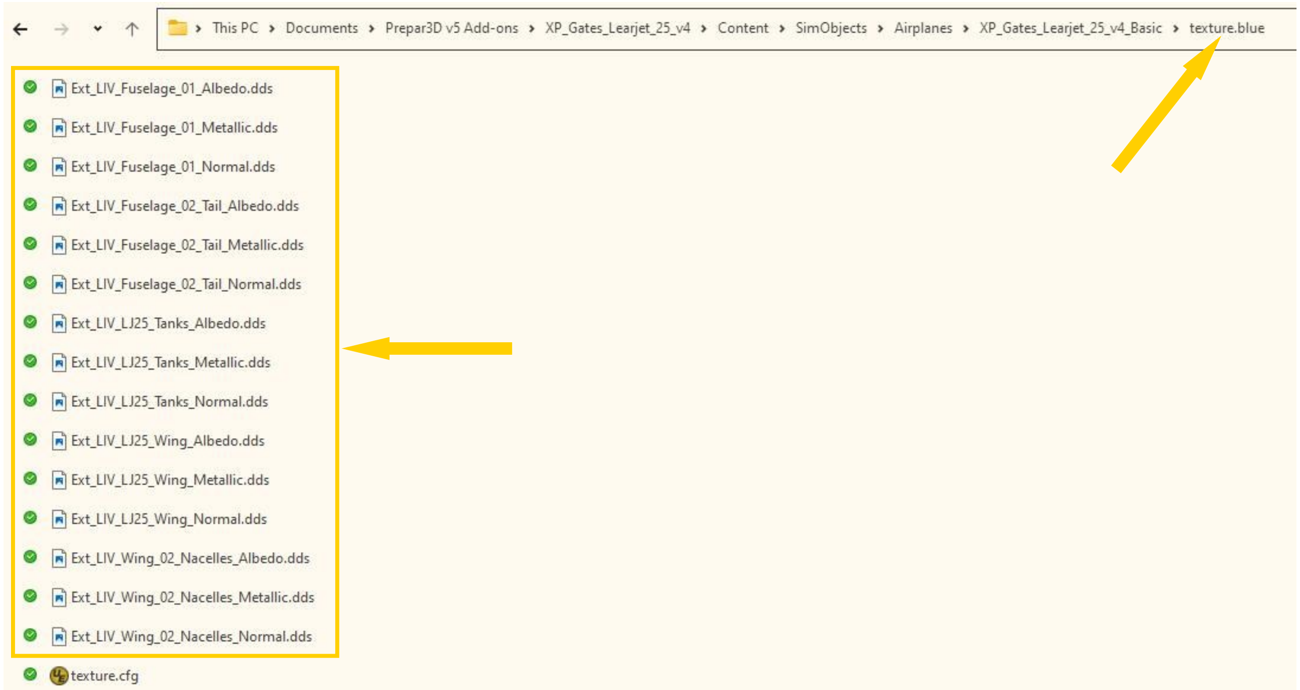
This is how the textures are organized.

Some "texture.xxx..." folders may also include other texture sets in addition to the liveries. **These extra textures don't have the "Ext_LIV" prefix and should not be modified.**









How to Proceed

To create your own liveries for the GLJ Model 25/28 v4 addon, special paint tools **that can export PBR textures** are required.

Original textures for the GLJ Model 25/28 v4 addon were 3D-painted in Adobe Substance 3D Painter. Some details were imported from Adobe Photoshop. This method of painting directly on 3D objects requires the use of a 3D mesh of the aircraft model that is not available to users. Consequently, to produce your own PBR liveries, you will require a **2D painting program that can export PBR textures**, such as Photoshop.

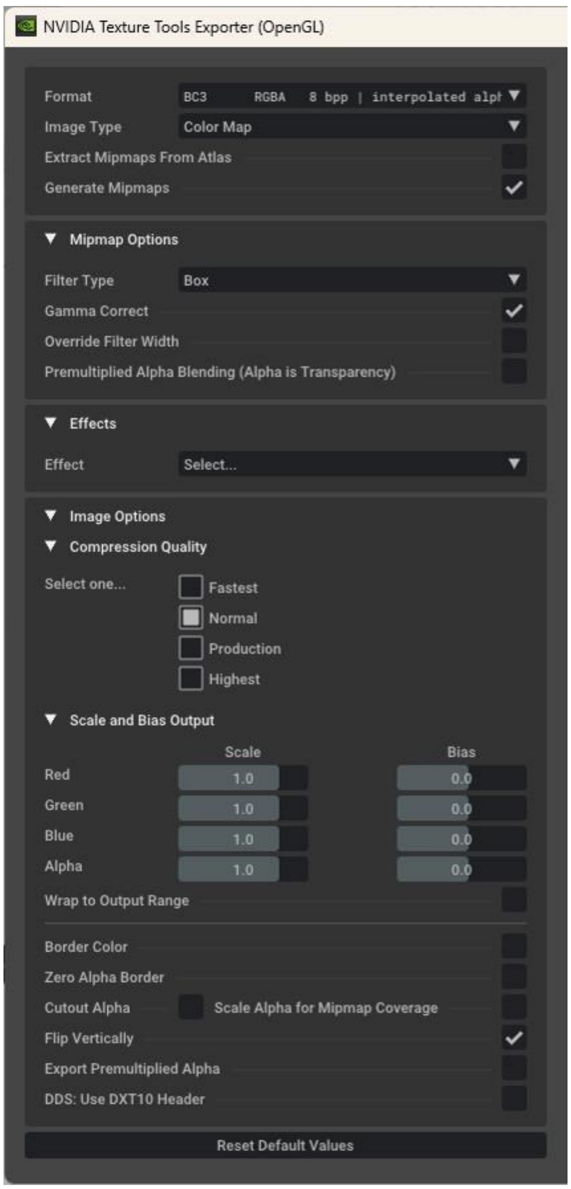
Included with the paint kit are basic Photoshop **templates** for creating your own PBR textures. The **UV map** (contours of the objects to paint) of each texture set is also included.

Our original textures were created with hundreds of layers. We did our best to simplify and document the layers we have included in the paint kit as much as we could to make them easier for you to use when creating your own liveries.

When finished, your Photoshop images will need to be converted to the **DXT5 format with interpolated alpha and MIP maps** and saved as **DDS** files using a special **NVIDIA plugin** for Photoshop:

https://developer.nvidia.com/nvidia-texture-tools-exporter

Below are the settings we used:



Adding your Textures

Each aircraft variation has its own livery that requires **4 to 5 sets of three textures** (12 to 15 textures in total). For example, the textures for a single variation of the GLJ Model 25 v4 addon are:

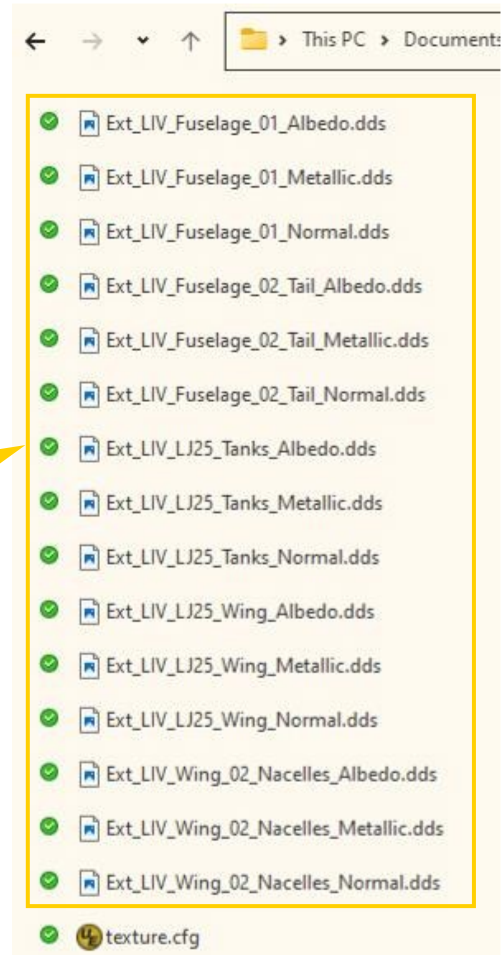
- Ext_LIV_Fuselage_01_Albedo.dds
- Ext_LIV_Fuselage_01_Metallic.dds
- Ext_LIV_Fuselage_01_Normal.dds

- Ext_LIV_Fuselage_02_Tail_Albedo
- Ext_LIV_Fuselage_02_Tail_ Metallic
- Ext_LIV_Fuselage_02_Tail_ Normal

- Ext_LIV_LJ25_Tanks_Albedo.dds
- Ext_LIV_LJ25_Tanks_ Metallic.dds
- Ext_LIV_LJ25_Tanks_ Normal.dds

- Ext_LIV_LJ25_Wing_Albedo.dds
- Ext_LIV_LJ25_Wing_ Metallic.dds
- Ext_LIV_LJ25_Wing_ Normal.dds

- Ext_LIV_Wing_02_Nacelles_Albedo.dds
- Ext_LIV_Wing_02_Nacelles_ Metallic.dds
- Ext_LIV_Wing_02_Nacelles_ Normal.dds



Your own textures will need to have the **same names** inside each texture set (aircraft variation).

We recommend adding **new aircraft variations** and **new texture sets** instead of modifying the textures that are included with the GLJ Model 25/28 v4 addon. Each new texture set must be contained in **its own folder**. Each texture folder must have the **"texture" prefix** followed by a **name of your own.** For example:

`…\Documents\Prepar3D v5 Add-ons\XP_Gates_Learjet_28_v4`
`\Content\SimObjects\Airplanes\XP_Gates_Learjet_28_v4_GTN750\`**`texture.my_first_livery`**

"**texture.my_first_livery**" is the folder that contains your new personalized livery for the Learjet 28 "(My Country) My First Livery" aircraft variation (see next page).

Adding New Aircraft Variations

Adding **new aircraft variations** to the GLJ Model 25/28 v4 addon also requires referencing your new texture sets (liveries) to the “**aircraft.cfg**” (the aircraft configuration file) inside the main aircraft folder. We suggest adding your extra variations **at the end of the existing list**, like in the following example (Learjet 28):

```
(…)
[fltsim.17]
(…)
[fltsim.18]
(…)
[fltsim.19]
(…)
[fltsim.20]
title=XP Gates Learjet 28 v4 Basic - (My Country) My First Livery
sim=XP_Gates_Learjet_28_v4_Basic
model=
panel=
sound=
texture=my_first_livery
script=
kb_checklists=XP_GLJ25-28_v4_check
kb_reference=XP_GLJ25-28_v4_ref
atc_id=N1234
atc_airline=
atc_flight_number=
atc_model=Learjet
ui_manufacturer=Gates Learjet
ui_type=28 (Basic)
ui_variation=My First Livery
ui_typerole=Twin Engine Jet
ui_createdby=Xtreme Prototypes
description=The Gates Learjet Model 28 along with…
```

As always, remember to make a **backup copy** of the “aircraft.cfg” file before making changes.

Refer to the Prepar3D Software Development Kit (SDK) for more information about **aircraft configuration files** and **Prepar3D PBR materials and textures**.

For More Information about PBR Textures

For a complete discussion about **Physically Based Rendering**, we recommend "**The PBR Guide**" by Wes McDermott, available free from Adobe:

https://substance3d.adobe.com/tutorials/courses/the-pbr-guide-part-1

https://substance3d.adobe.com/tutorials/courses/the-pbr-guide-part-2

We hope you will enjoy creating new liveries for your GLJ Model 25/28 v4 addon. Feel free to experiment and share your own creations.

Good luck!

EULA

By downloading and using the paint kit, you agree to the followings:

Modification of Aircraft Textures (Repaints) - You may create new textures and/or edit and/or modify (repaint) the aircraft textures included in the paint kit and/or with the Xtreme Prototypes GLJ Model 25/28 v4 addon with a paint program for your own non-profit private experimentation and use. Making your textures available to other registered users is allowed if it is not for commercial purposes. You may not sell or otherwise distribute or transfer the modified textures or make them part of another product for commercial purposes. You may post your own repaints, images and videos of the aircraft with the modified textures over the Internet or elsewhere, provided that the original software product name and the nature and author of the modifications are mentioned.

Read the full EULA in section 1, page 18.

SELECTED BIBLIOGRAPHY

These books, manuals and films provided us with invaluable information during the development of our Gates Learjet 20 Series addons for Prepar3D and we highly recommend them to all Learjet fans. Some are out of print but still available online or at public libraries.

Books

Stormy Genius:
The Rags to Riches Life of Bill Lear
Richard Rashke
Publisher: KR Books (1985, 2017 reprint)
Paperback: 351 pages
ISBN-13: 978-1499217858

Learjets: The World's Executive Aircraft
Donald J. Porter
Publisher: Tab Books (1990)
Paperback: 120 pages
ISBN: 0-8306-2440-6

The Learjet Diaries (semi-fiction)
Greg Madonna
Publisher: Middle River Press (2020)
Paperback: 388 pages
ISBN: 978-1-946886-15-6

Learjets
Geza Szurovy
Publisher: Motorbooks International (1996)
Paperback: 96 pages
ISBN: 0-7603-0049-6

Flying the Classic Learjet (Models 35/36)
Peter D. Condon
Publisher: Peter D. Condon (2007)
Paperback: 210 pages.
ISBN: 978-0-646-48135-7

Manuals

Gates Learjet 25B/C/D/F Manuals
Publisher: Gates Learjet Corporation (1969 and 1977)
Paperback: 1,500 pages (approx.)

Gates Learjet 28/29 Manuals
Publisher: Gates Learjet Corporation (1977)
Paperback: 1,500 pages (approx.)

Learjet 20 Series Pilot Training Manual
Volume 1 - Maneuvers and Procedures
Publisher: Flight Safety (1998)
Paperback: 65 pages

Learjet 20 Series Pilot Training Manual
Volume 2 - Aircraft Systems
Publisher: Flight Safety (2005)
Paperback: 373 pages

Learjet 24/25
Cockpit Reference Handbook
Publisher: CAE SimuFlite (2010)
Paperback: 592 pages

Learjet 25
Operating Handbook
Publisher: CAE SimuFlite (2005)
Paperback: 132 pages

DVDs (Video)

Ameristar Learjet 24/Falcon 20 DVD
Studio: World Air Routes
DVD Release Year: 2005
Run Time: 185 minutes

HELP AND SUPPORT

APPENDIX 5

Answers to most technical questions can be found in the present manual.

We've added a "**Frequently Asked Questions**" section in appendix 6 to help you find answers to the most common questions you may have about your new GLJ Model 25/28 v4 addon for Prepar3D.

Known issues are discussed in the "**Known Issues**" section in appendix 7.

If you don't find what you are looking for in the present manual and need further assistance, please contact us. We'll try our best to answer you the same day or within two business days.

We offer free, personalized technical support in English or French via email to **registered users only**.

How to Contact Us

The best way to reach us is by using the contact forms on our website.

For sales support and general inquiries - If you need support related to your online purchase or simply want to send us a message, please use our general contact form:

https://xtremeprototypes.com/shopcustcontact.asp

For technical support - If you need technical support for your addon beyond what is available in the present manual, please fill out our technical support request form:

https://xtremeprototypes.com/shopcustcontactsupport.asp

Make sure all the required fields in the form are filled out correctly and provide us with as much information as possible about your technical issue(s).

Please note that we do not answer support requests and inquiries via Facebook.

Software Patches

When available, patches for your Xtreme Prototypes addons are listed at the bottom of each product page on our website. To download these files, please login to you user account and review your previous orders.

Manuals

Manuals are updated regularly. Please make sure you have the latest version:

http://xtremeprototypes.com/shopcontent.asp?type=manuals

We Need Your Feedback

Our products are designed to evolve with time, according to the feedback we receive from our users. Please let us know your comments, ideas and suggestions and feel free **to report any bug or other issue** you may encounter while installing or operating your new addon. Thank you for helping us creating better products!

If you are a real-world Learjet pilot or were involved in the development of the real Lear Jet/Gates Learjet 20 Series aircraft during the 1960s/70s/80s, it will be an honor to hear from you.

FREQUENTLY ASKED QUESTIONS

APPENDIX 6

Answers to most questions can be found in the present manual. Answers to other questions may be found in this section.

GENERAL

Is the Xtreme Prototypes GLJ Model 25/28 v4 addon an upgrade to previous versions of the XP GLJ Model 25 SE addon and to the legacy XP 20 Series Business Jet v1 addon?

No. The GLJ Model 25/28 v4 addon is a **redesigned product** with many new features and improvements over previous versions, including revised exterior/interior 3D models with more details and additional animations, full PBR materials and textures, 20 new liveries, new aircraft interiors, instrument panel dynamic light effects, dimmable cockpit and cabin lights, over 40 visual effects, more than 120 sound effects including 90 new cockpit and cabin sounds, a new sound system, new Learjet custom aircraft systems including a fully simulated anti-ice system with visual effects, and two different cockpit configurations with support for third-party GPS/GNS/GTN systems and radars. It is our definitive and most advanced, study-level Gates Learjet 20 Series business jet simulator for Lockheed Martin Prepar3D.

Are the XP GLJ Model 25 v4 addon and the XP GLJ Model 28 v4 sold separately?

Yes. However, a **bundle** is also available at a special discount price. Please visit our website for details.

Is the GLJ Model 25/28 v4 addon available for Microsoft Flight Simulator X?

No. The GLJ Model 25/28 v4 addon is available for Prepar3D v5.4 (or later*) only. Xtreme Prototypes no longer produces addons for FSX. A new version for Microsoft Flight Simulator 2020 (MSFS) is currently in production. Please visit our website for future product announcements.

**: New addon versions may become available for future versions of Prepar3D when released by Lockheed Martin (see "Release Notes").*

Is the manual available in PDF?

Yes. A 300-page printable PDF manual (the present document) is available for this addon. Adobe Reader is required to view the manual.

Where is the manual?

You can download the complete manual for this addon from our "**Manuals**" section on our website. Our manuals are free and available online. Registered users can print copies of the manual for their own use.

Le manuel est-il disponible en français ? (Is the manual available in French?)

Oui. Un guide complet des procédures normales et d'urgence en français (sections 8, 9 et 10 du présent manuel) est disponible et peut être téléchargé à partir de notre site Internet. Visitez la section « **Manuels** ». Bien que le manuel complet de ce nouveau produit ne soit pour l'instant disponible qu'en anglais, nous offrons à nos utilisateurs francophones enregistrés une assistance technique en ligne personnalisée en français pour l'ensemble de nos produits. Xtreme Prototypes est l'un des rares développeurs à offrir de la documentation et de l'assistance technique en français. Nous travaillons très fort à rendre nos manuels disponibles en français selon la demande.

Are all the Gates Learjet 25/28 systems simulated?

The GLJ Model 25/28 v4 addon is a study-level Gates Learjet 20 Series business jet simulator. Nearly all systems that can be reproduced in Prepar3D are simulated, except where otherwise noted in the documentation.

Due to limitations in the currently available simulation platforms, some systems may operate differently from those in the real aircraft. In the case of systems that are not fully simulated, we have strived to provide you with working switches and knobs to allow you to fully follow the procedures outlined in the manual for a more realistic experience. The virtual cockpit allows for complete IFR flight, and contains all the instruments, radios, annunciators, switches and knobs necessary to do so. Significantly modifying the simulator's native systems goes beyond the scope of this project. As the simulation platforms evolve, so will the systems in future versions of this addon.

How realistic is the GLJ Model 25/28 v4 addon?

The Xtreme Prototypes GLJ Model 25/28 v4 addon is inspired by a series of real-world aircraft known in the 1970s as the Lear Jet/ Learjet 20 Series (models 23 to 29). The package strives to recreate the general look and feel of the original aircraft for the desktop pilot's enjoyment.

The operation of the addon is very similar to the operation of the real aircraft. Nearly all systems, gauges, switches, light indicators and instruments are functional and behave like their original counterparts.

While we regard this addon as a **mini aircraft simulator** rather than just a game, we do not pretend that it is one hundred percent historically or technically accurate, or that it faithfully reproduces all the systems and flight characteristics of the real aircraft which would be impossible in Prepar3D. Nevertheless, we've always paid attention to details, and we did our best to make sure we provide our users with the best flight simulation experience they can get within the limitations of the currently available simulation platforms.

This addon strives to bring you not only the actual feeling of flying a high-performance aircraft now equipped with modern avionics, but also the spirit of maneuvering such a vehicle at times where large LCD screens and powerful computers didn't exist, and where pilots needed to know how to fly and navigate with minimal resources and rely on their own experience, abilities, and judgment. We believe out GLJ Model 25/28 v4 addon for Prepar3D is the most advanced, detailed, and faithful classic Learjet simulation you can find.

Note: *Xtreme Prototypes addons and manuals for the general public are considered edutainment software and shall not be used for real-*

world training.

I am a Learjet fan but a beginner desktop pilot. Is the GLJ Model 25/28 v4 addon too complex for me?

While this addon allows for comprehensive procedural IFR flight, we at Xtreme Prototypes recognize that not everyone has the time, patience, or inclination to read a 300-page manual, which is why our addons remain relatively simple to operate. Anyone who masters the simulator's default jet aircraft can fly the GLJ Model 25/28 v4 addon in Prepar3D. It's up to you, the desktop pilot, to decide which level of complexity you want to achieve.

If you are a true Learjet fan and already have some knowledge about the aircraft and a desire to learn more, this addon is for you. This is your chance to go beyond books and films and hop into the cockpit of this extraordinary aircraft in a compelling simulation environment.

All the necessary information to fly the GLJ Model 25/28 v4 addon is in the present manual. There are two sets of instructions: a detailed set (section 8), which contains all the "**Normal Operating Procedures**" with images and additional information, and a condensed set called "**Quick Start Procedures**" (section 9), for those who want shorter check lists.

Like a real Learjet pilot, the desktop pilot needs some time to become familiar with the cockpit and the operation of the aircraft. If you're feeling overwhelmed by the cockpit of the GLJ Model 25/28 v4 addon, we suggest giving the manual a chance as it was written with non-experienced pilots in mind. The addon is quite rewarding once mastered, but as with most things in life, practice makes perfect!

Why are the tail numbers on your liveries not accurate?

The tail numbers on the 20 aircraft variations included with the GLJ Model 25/28 v4 addon are fictitious. Any match with actual tail numbers is a pure coincidence. Some liveries are inspired by actual airplane liveries, and some are our original creations. You can use the available paint kit to create new liveries with your own tail numbers.

Is a paint kit available so I can repaint the aircraft?

Yes. A paint kit is available for registered users. Please visit your account page on our website.

What are PBR textures?

The Xtreme Prototypes GLJ Model 25/28 v4 addon features all new PBR materials and textures. Physically based rendering (or PBR) is a method of shading and rendering that provides a more accurate representation of how light interacts with surfaces. The result is a 3D model that looks almost real under different lighting conditions.

Can I create my own PBR liveries?

Yes. However, creating PBR liveries is different from creating liveries for FSX or previous versions of Prepar3D. Some learning and experimentation will be required. Please refer to appendix 3 for information about how to create your own PBR aircraft liveries for your GLJ Model 25/28 v4 addon. Additional information is included with the paint kit.

What is a VR-ready virtual cockpit with full-3D gauges?

Some virtual cockpits found in other third-party addons or in the stock aircraft that come with Prepar3D use legacy (FSX-style) 2D gauges that are "projected" onto the various instrument panels. When viewed from an angle, these gauges appear flat even though they might contain needles, ribbons, buttons, knobs, and other movable parts that are not flat in the real world.

2D gauges are generally created with layers of animated drawings, while some may also include vector text and graphics. Most of these gauges use low-resolution graphics that are limited in size. The GPS 500 that comes with Prepar3D is a good example of a "flat" 2D gauge that contains both bitmaps and vector graphics. Viewed from the side, the knobs and buttons on the bezel look flat.

Xtreme Prototypes **VR-ready** virtual cockpits do not integrate 2D gauges, except for CRT/LCD screens and for some LED/VFD digital displays that are flat by nature, like in GPS/GNS/GTN, radar and radio displays. Our panels feature **fully modeled** instruments and gauges with real moving parts instead, like in the real world.

This, along with the highly detailed aircraft interior, makes the GLJ Model 25/28 v4 addon an ideal candidate for being used with some of the newest **virtual reality** devices and applications. When equipped with the proper software and VR headsets, desktop pilots feel they are inside the aircraft for real, not merely in front of flat 2D drawings.

The virtual cockpits that come with the GLJ Model 25/28 v4 addon contain hundreds of animated objects that can be **interacted with**, such as gauges, switches, knobs, levers, light indicators, and other devices. These objects all have integrated "**tooltips**" that display useful information to the user when hovering over them with the mouse.

Nearly all levers, knobs and switches are clickable to perform useful functions, unless otherwise noted.

Does my GLJ Model 25/28 v4 addon come with 2D panels?

No. Xtreme Prototypes next generation addons no longer include 2D panels found in legacy products. They are replaced by fully functional, VR-ready, 3D virtual cockpits. You must be in the virtual cockpit to operate this addon.

What is the maximum speed of my GLJ Model 25/28 v4 addon?

Your GLJ Model 25/28 v4 addon can cruise at Mach 0.82 at altitude. Maximum airspeed is 359 KIAS (306 KIAS under FL140). See section 3.

What is the maximum altitude that can be reached with my GLJ Model 25/28 v4 addon?

Your GLJ Model 25/28 v4 addon can reach FL510 at lighter weights. 51,000 feet is the absolute ceiling. 45,000 feet is the service ceiling. See section 3.

Is the GNS/GTN and weather radar software included?

No. The GNS/GTN, radar and special transponder add-on software is not included and must be purchased separately from third-party developers. However, the two included virtual cockpits contain fully animated, 3D models of these devices that can be configured by users to integrate almost any Prepar3D-compatible third-party addon, system or gauge.

For users who don't plan to install third-party addons, the GNS 530 in the Basic cockpit is preconfigured for the GPS 500 that comes with Prepar3D. The radar comes with a dummy radar screen but is also compatible with the demo monochrome radar that comes with the Prepar3D SDK (see "Release Notes"). The transponder model uses the transponder that comes with Prepar3D.

Please note that some existing third-party addons may no longer be compatible with the latest versions of Prepar3D or might have new features that were not available at the time of this writing. In doubt, please contact the developer for support.

Xtreme Prototypes is not responsible for changes in third-party software that would prevent the GLJ Model 25/28 v4 add-on aircraft or the third-party software from performing or being used, including the discontinuation of such third-party software.

Xtreme Prototypes cannot provide technical assistance for third-party add-on software. Please contact the developer for support.

Installing and configuring third-party addons for the GLJ Model 25/28 v4 add-on aircraft may require some research and experimentation on the part of the user.

Is the weather radar unit in the main panel functional?

Not by default. You will need to add your own third-party radar software (not included, available from third-party developers) to make it fully functional. The buttons and knobs on the radar model in the virtual cockpits are animated and can be configured by users to send commands to third-party radars. By default, the radar comes with a dummy radar. It is also compatible with the demo monochrome radar gauge that comes with the Prepar3D SDK (see "Release Notes").

Please note that some existing third-party addons may no longer be compatible with the *latest versions of Prepar3D or might have new features that were not available at the time of this writing. In doubt, please contact the developer for support.*

Xtreme Prototypes is not responsible for changes in third-party software that would prevent the GLJ Model 25/28 v4 add-on aircraft or the third-party software from performing or being used, including the discontinuation of such third-party software.

Xtreme Prototypes cannot provide technical assistance for third-party add-on software. Please contact the developer for support.

Installing and configuring third-party addons for the GLJ Model 25/28 v4 add-on aircraft may require some research and experimentation on the part of the user.

Can I add my own third-party navigation systems, radars, and transponders to the virtual cockpit?

Yes. The Xtreme Prototypes GLJ Model 25/28 v4 addon comes with preconfigured instrument panels for the following systems:

- The basic GPS 500 included with Prepar3D - or - the GNS 530/GTN 750 systems from Reality XP and Flight1 (not included, sold separately);
- A dummy radar screen - or - the demo monochrome radar that comes with the Prepar3D SDK - or - the Rex/Milviz WX Advantage radar from Rex Simulations (not included, sold separately).

Adding other third-party addons, systems or gauges is also possible by modifying a few lines in the aircraft's "panel.cfg" and in the special control gauges that are provided with the GLJ Model 25/28 v4 addon. This only requires a text editor like Notepad that comes with Windows.

Third-party add-on software must be installed first and working properly.

Appendix 2 contains important information and detailed instructions for adding third-party addons, systems or gauges to the virtual cockpits of the GLJ Model 25/28 v4 addon and how to program the 3D buttons and knobs for your own devices.

Please note that some existing third-party addons may no longer be compatible with the latest versions of Prepar3D or might have new features that were not available at the time of this writing. In doubt, please contact the developer for support.

Xtreme Prototypes is not responsible for changes in third-party software that would prevent the GLJ Model 25/28 v4 add-on aircraft or the third-party software from performing or being used, including the discontinuation of such third-party software.

Please note that Xtreme Prototypes cannot provide support for adding third-party addons other than the one provided in this manual. Please contact the developer for support.

Installing and configuring third-party addons for the GLJ Model 25/28 v4 add-on aircraft may require some research and experimentation on the part of the user.

Is a glass cockpit available for this addon?

Not for now. However, a fully retrofitted glass cockpit is currently under development and will be sold separately. Please visit our website for future product announcements.

Where's the parabrake?

Although a parabrake was installed on some 20 Series aircraft, your GLJ Model 25/28 v4 addon doesn't have one. You may use the thrust reversers and the spoilers instead of the parabrake for deceleration.

SOFTWARE INSTALLATION AND SETUP

What are the minimum system requirements for installing the GLJ Model 25/28 v4 addon?

The GLJ Model 25/28 v4 is an add-on software package that requires **Lockheed Martin Prepar3D v5.4 (or later*)** to be installed on your computer. The software is not a standalone product and cannot be used without the underlying simulation platform. Make sure that your simulation platform has been properly installed according to the instructions provided by the developer.

Xtreme Prototypes next generation addons are designed to take advantage of the new and more powerful gaming computers that are available today. They require better graphics cards and more processing power and RAM than other more conventional addons. **Increased performance will be noticed on more powerful systems.**

Refer to "**Minimum System Requirements**" in section 2, page 1, for more details.

**: New addon versions may become available for future versions of Prepar3D when released by Lockheed Martin (see "Release Notes").*

I have trouble downloading my addon. The file transfer keeps getting interrupted. What can I do?

The GLJ Model 25/28 v4 Add-on Package is contained in a single 3GB compressed **zip file**. Normally, it should not take more than about 5 to 10 minutes to download the zip file over a reliable high-speed Internet connection. If you don't have a high-speed Internet connection or experience intermittent connection issues, you may be timed out or disconnected while downloading your addon.

If you are not able to download your addon after several attempts, we recommend using another and better Internet connection. If you don't have access to another connection, and still cannot download your addon, please contact us.

We recommend using your Internet browser to download your addon. Do not use a third-party download manager or you may experience problems that were reported by some users.

Some antivirus programs may also prevent you from downloading your addon. Make sure your antivirus does not interfere with your downloads. Some antiviruses won't allow you to download zip files. You can disable your antivirus program temporarily while downloading your addon to solve this issue. Don't forget to reactivate your antivirus after the file is downloaded.

Can I re-download my addon if I lose the original zip file?

Yes. You can download your addon again at any time by logging in to your account on our website. You may download your addon a limited number of times. After that, you will need to contact us for assistance.

Please note that the replacement of lost downloaded files is not guaranteed. Please make backup copies and save your activation key in a safe place. Refer to the "**End-User Software License Agreement**", in section 1, page 18, for more details.

How do I install the GLJ Model 25/28 v4 addon on my computer?

For version 4, we wanted to keep things as simple as possible. The GLJ Model 25/28 v4 add-on aircraft is distributed as a single and unique "**add-on package**" to be copied to your your "Prepar3D v5 (or later) Add-ons" folder, normally located in your Windows "Documents" folder. This is the method of installation recommended by Lockheed Martin. The package provides a centralized list of all the add-on components necessary to load the add-on aircraft in the simulator.

Please refer to section 2 for complete installation instructions.

How do I remove the GLJ Model 25/28 v4 addon from my computer?

To remove the addon from your computer, simply remove (or delete) the add-on package folder from your "Prepar3D v5 (or later) Add-on" folder.

You can also leave the add-on package in your "Prepar3D v5 (or later) Add-on" folder and manage your addons on the "Prepar3D > Top Menu Bar > Options > General > **Add-ons**" page (recommended).

Where do I find my product activation key?

An **activation key** is required to install and activate the GLJ Model 25/28 v4 addon. Your activation key was issued when you purchased your addon online and was sent to you by email. Please contact us if you did not receive your activation key after your order was processed.

I've lost my personal activation key. May I contact you to obtain another one?

Yes. You will be reissued the same activation key that was linked to your original purchase. Please use our general contact form:

https://xtremeprototypes.com/shopcustcontact.asp

Make sure you are using the same email address as the one that appears on your account page on our website. You will also need your original order number (the one you received by email that also appears in your purchase history on your account page on our website).

Will version 4 replace the previous versions of the XP GLJ Model 25 SE addon on my computer?

No. Version 4 will not replace versions 3, 2.1 and 2 of the XP GLJ Model 25 SE addon, if installed on your computer. However, we always recommend removing previous versions from your computer before installing a new version. This is to avoid confusion between aircraft bearing similar names. Previous versions of our GLJ Model 25 SE addon can be removed from the **Windows Control Panel** ("Control Panel > Program > **Uninstall a Program**"), like any other Windows program.

Will version 4 replace the legacy 20 Series Business Jet addon version 1.x on my computer?

No. Version 4 will not replace version 1.x of our legacy 20 Series Business Jet addon, if installed on your computer. However, we always recommend removing previous versions from your computer before installing a new version. This is to avoid confusion between aircraft bearing similar names. Please note that our original 20 Series Business Jet addon (2009) is now a legacy product designed for FSX for which we can no longer offer support.

Is the GLJ Model 25/28 v4 addon compatible with previous versions of Lockheed Martin Prepar3D?

No. The GLJ Model 25/28 v4 addon is compatible with Prepar3D v5.4 (or later*) only.

**: New addon versions may become available for future versions of Prepar3D when released by Lockheed Martin (see "Release Notes").*

Is the GLJ Model 25/28 v4 addon compatible with Lockheed Martin Prepar3D v6?

Not at the time of this writing. Our GLJ Model 25/28 v4 addon for Prepar3D v5.4 is not compatible with Prepar3D v6. We are working hard to make the addon fully compatible and a patch will be released soon (free for registered users). Software updates are listed at the bottom of each product page on our website. *See the "Release Notes" at the beginning of this manual.*

Is the GLJ Model 25/28 v4 addon compatible with Microsoft Flight Simulator X?

No. Xtreme Prototypes no longer produces addons for FSX. A new version for Microsoft Flight Simulator 2020 (MSFS) is currently in production. Please visit our website for new product announcements.

Is the GLJ Model 25/28 v4 addon compatible with Microsoft Flight Simulator 2020 (MSFS)?

Not yet. A new version for Microsoft Flight Simulator 2020 (MSFS) is currently in production. Please visit our website for future product announcements.

Is the GLJ Model 25/28 v4 addon compatible with Microsoft Flight Simulator 2004?

No. Refer to section 2 for more information.

Is the GLJ Model 25/28 addon compatible with Laminar Research X-Plane?

Not at this time.

Is this addon compatible with the latest version of Windows?

Yes. Windows 11/10 or later is required to install and fly this addon in Prepar3D. Please refer to the Prepar3D documentation and to section 2 for more information about minimum system requirements.

Is this addon compatible with the latest version of DirectX?

Yes. Refer to your simulation platform's documentation for more information about the recommended version of DirectX. Prepar3D v5.4 requires DirectX 12.

My GLJ Model 25/28 v4 addon has no cockpit. How is this possible?

Make sure you are in the **virtual cockpit view** ("**F9**"). The GLJ Model 25/28 v4 addon has no 2D cockpit. Refer to sections 4 and 5 for details.

Some aircraft variations are missing in Prepar3D. How can I fix this?

The "**Show Only Favorites**" option on the Prepar3D "**Vehicle**" page may prevent some aircraft variations from being displayed. You may need to uncheck this option. You may also select only the aircraft variations that you want to fly as your favorites. This will speed up loading time when selecting a vehicle. Refer to section 2 for more information.

I hear no cockpit sounds. How can I solve this issue?

Make sure that your speakers are turned on and that the sound volume is properly adjusted on your computer sound system. The GLJ Model 25/28 v4 addon uses its own sound module and this should no longer be a problem in this software version. Refer to section 8, page 3, for more information.

AIRCRAFT OPERATION AND PROCEDURES

How do I fly my GLJ Model 25/28 v4 add-on aircraft?

Complete instructions on how to fly the GLJ Model 25/28 v4 addon are in the present manual. Refer to "**Normal Procedures and Check Lists**" in section 8.

What's the easiest way to start the engines without going through the entire check lists and procedures?

Going through the procedures makes for a much more enjoyable and realistic experience. That being said, you can also use the "**Auto Start**" feature.

The white seatbelt label located in the upper center section of the main instrument panel [10, fig. 5-17a; 6, fig. 5-17b] is a **hot spot** for initiating a "Cold and Dark" reset cycle or an "Auto Start" sequence.

Right clicking the label will launch the "Auto Start" sequence. The automatic sequencer will start the engines and set up all aircraft systems ready for taxi. The pilot has nothing to do, but to wait and watch the sequencer perform the required preflight procedures automatically. Buttons, switches, and lights will be animated with sound during the entire sequence. It takes about 80 seconds for the sequencer to perform the necessary pre-flight procedures. The "Auto Start" sequencer goes beyond the simulator's standard CTRL+E command by setting up all Learjet custom systems unique to this addon that are needed for taxi. **We strongly recommend using this feature instead of CTRL+E!**

Please refer to section 6, pages 9-11, for more information.

Can I use "CTRL+E" to start the engine?

Yes, but not recommended. Use the "**Auto Start**" feature instead (see above). "CTRL+E" will start the engines, but you will need to turn on a few custom systems that are unique to this addon manually. Most important, the Inverter Switches [10, 12, fig. 5-29] must be turned **ON** for some systems to function. Make sure the Radio Master Switch (avionics) [14, fig. 5-29] is also turned **ON**, or the radios will not work.

Why can't I reach the maximum altitude?

Like in the real world, maximum cruise altitude can only be reached with lighter weights. As your aircraft burns fuel during cruise, you may step-climb from FL410 up to FL510 at a low vertical speed (sometimes not greater than 500 feet per minute).

It must be remembered that FL510 is never reached during normal operation. To reach this level, you would need perfect conditions, an empty plane and about 2,000 pounds of fuel.

With the real aircraft, there is no way you can reach this high level directly after taking off with 5,000 pounds of fuel and 7 passengers plus crew. It is normal to climb at 500 fpm above FL400. If your climb rate is more than 500 fpm above FL450, be careful!

Note: *On February 21, 1979, former NASA astronaut Neil Armstrong and Learjet test pilot Pete Reynolds set five world records for business jets when their Gates Learjet Model 28 climbed from the ground to above 50,000 feet in about 12 minutes.*

I noticed that you need to put a lot of power in for the plane to begin rolling. Is this normal?

It depends how much fuel and payload are on board. With the maximum ramp weight, to break the inertia you sometimes have to apply more than 85% RPM with the real aircraft, according to our real-world Learjet pilot. In the simulator, it is around **70% RPM**, and this is perfectly normal.

After loading a saved flight, several switches were not in the state they were when the flight was saved. Consequently, I had to change the status of those switches manually. Are you aware of this and is there a plan to fix it?

Unfortunately, this is normal and is due to some limitations in Prepar3D. It is not an addon issue.

Our addons are complex aircraft simulators with many custom systems and controls that are not currently supported in the simulator and that you won't find in the stock aircraft (for example: the Inverter Switches [10, 12, fig. 5-29] or the 3-position Starter/Generator Switches [6, 11, fig. 5-30] in the virtual cockpit of the GLJ Model 25/28 v4 addon). These custom systems use their own sets of proprietary variables and commands. **Currently, these custom local variables are not kept by the simulator when a flight is saved.** This explains why some of the switches need to be reset manually after loading a saved flight or changing vehicles.

A solution would be to limit ourselves to the basic aircraft systems that are natively supported by the simulator and to stop implementing custom systems in our Learjet addons at the price of realism. We believe our fans would prefer to keep the Learjet custom systems intact even if it means resetting a few switches manually after loading a saved flight.

We sincerely hope that local custom variables will be kept when saving a flight in future versions of Prepar3D.

Is a GPU available so we may proceed with the preflight procedures without depleting the batteries?

Yes. The GLJ Model 25/28 v4 addon comes with a **ground power unit (GPU)** that supplies 28 VDC to the aircraft during maintenance, training, and preflight procedures. The GPU is available when the aircraft is on the ground and not moving.

To preserve battery power during ground procedures up until the engines have started and the generators turned on, it is strongly suggested to use an external power source to power up the aircraft.

You can click the **aileron on the left wingtip tank** of the Model 25 [5, fig. 3-5] or the **leading edge of the left winglet** of the Model 28 [20, fig. 3-3] on the exterior model to call for a ground power unit. To start the GPU, click the **GPU control panel cover** [4, fig. 3-5]. To show/hide and start/shut off the GPU, you can also click the **Ground Power Unit Breaker** (see section 4, page 8) at the bottom of the captain's breaker panel in the virtual cockpit.

The GPU must be **SHUT OFF** and **DISCONNECTED (HIDDEN)** after the engines have started and the generators are turned on.

Like in the real aircraft, do not turn on the battery switches [8-9, fig. 5-30] when the batteries are fully charged, and the GPU (or the generators) are operating to prevent the NiCad batteries from overheating. **This may cause a fire!**

In the real world, GPUs are rarely used with this aircraft because the ground procedures can be performed in a relatively short period of time.

How come there is no pilot in the cockpit?

The captain and the copilot **appear by default** in the cockpit of the exterior model only, when the aircraft model is loaded in the simulator.

You can click the **lower section of the passenger and crew door** [7, fig. 3-5] to bring the crew on board or to make it leave the cockpit after the aircraft is parked. This can be performed from inside the cockpit as well by clicking either **headphone hanger** [5, fig. 5-49] on the cockpit side walls. When the headphones and the pilot's seatbelts are visible inside the cockpit, the crew is absent. When the headphones and the pilot's seatbelts are not visible, the crew is present.

You can select between three pilots. Switching pilots is done by clicking the **Learjet logo** at the center of each yoke in the virtual cockpit [1, fig. 5-51] or by clicking each **pilot's shirt** on the exterior model [2, fig. 3-5]. You can also make your pilots wear sunglasses by clicking the **windshield defog outlets** on the exterior model [1, fig. 3-5] or the **pair of sunglasses** located on the copilot's side console in the cockpit [2, fig. 5-50].

How do I install the "Remove Before Flight" items after the aircraft is parked?

The "Remove Before Flight" items (ribbons and Pitot covers, wheel chocks, engine inlet covers, tail stand) need to be installed manually after the aircraft is parked. Click the **white label** above the Anti-Skid Lights in the virtual cockpit [4, fig. 5-15] to install/remove the "Remove Before Flight" items. The items can also be removed by clicking the **nose gear doors** [8, fig. 3-5] of the exterior model when the aircraft is parked. The "Remove Before Flight" items cannot be installed if the aircraft is not parked, not on the ground or if the starters/engines are running. Please note that the tail stand is installed only when the aircraft is full of fuel (85% or more, CoG near aft limit).

I've just installed my GLJ Model 25/28 v4 addon and started my first flight, but I cannot see the cockpit. What's the problem?

If you cannot see the virtual cockpit, make sure you are in the **virtual cockpit view** ("**F9**"). This addon has no 2D cockpit. Try cycling the different views by pressing the "**S**" and "**A**" keys on your keyboard until you get in the virtual cockpit view.

The landing gear won't retract. What do I do?

We suspect your landing gear was damaged during takeoff because of the strong acceleration (Gates Learjet 20 Series aircraft are equipped with powerful engines and have an astonishing climb performance). The landing gear must be retracted as soon as the aircraft is airborne to avoid it being damaged by excessive speed. Resetting the flight should correct the problem or simply select the "**Ignore crashes and damage**" option on the "Prepar3D > Top Menu Bar > Options > General > **Realism**" page. Refer to "**Recommended Settings**" in section 2 (and section 8).

The yoke pushes the aircraft in a steep dive or a steep climb after a stall or an overspeed condition, even when the autopilot is engaged. Is this normal?

The GLJ Model 25/28 v4 addon is equipped with a **stick nudger/puller** like in the real aircraft. It is normal for the yoke to react to stall and overspeed conditions when the autopilot stick nudger/puller is active. While stall and overspeed should always be avoided under normal conditions, you can disable the stick nudger/puller with the **Autopilot Stick Nudger/Puller Switch** [19, fig. 5-43]. By default, the stick N/P system is always active. Please refer to section 6, page 41, for more details.

For some reason I can only climb after takeoff, basically vertically until stalling. Thought it might be a trim issue. Can you help?

The autopilot should never be used for takeoff (or landing). If the autopilot was tested or engaged prior to takeoff, always remember to **turn it off** and check the elevator trim indicator [3, fig. 5-14] for the correct takeoff position (about one needle thickness below center). When engaged while the aircraft was on the ground, the autopilot might have tried to compensate by running the trim all the way nose up or nose down. If unnoticed, you may lose control of the aircraft during takeoff or initial climb. For the same reason, do not attempt to control the aircraft with the joystick while the autopilot is engaged. The autopilot will compensate by running the trim and could even disengage itself after hitting the trim limits. This may lead to very unpleasant situations.

Before takeoff, make sure the Takeoff Trim Alert Annunciator [2, fig. 5-33] is extinguished. If you cannot turn off the Takeoff Trim Alert Annunciator before takeoff by using the trim controls on your joystick, it means that the latter may not be calibrated properly. Elevator trim is indicated on the main panel, in front of the captain's yoke [3, fig. 5-14]. The needle should move when adjusting your trim with the buttons on your joystick. **A calibrated joystick is a must.**

After takeoff, adjust your trim to maintain the proper rate and angle of climb (around 15 degrees nose up). When speed is stabilized, you have the option to engage the autopilot [1, fig. 5-22a]. It will capture and maintain the pitch (attitude) and level the wing. Always check your speed during all phases of the flight and engage the autopilot SPD Hold Mode [8, fig. 5-22a] if necessary. You may need to use the spoilers and the throttle to reduce velocity.

Your addon should be controlled with only constant and light movements of the joystick/yoke. The controls should never be pushed hard and should always be properly trimmed. Trims are there to help you, but they are not primary flight controls. As a qualified pilot, you should hold the desired attitude with the controls and trim until the effort is gone. Do not let go of the controls and use trim to get the required attitude. This is sloppy flying and can lead to loss of control.

We recognize that the takeoff sequence happens quite fast and requires an efficient drill in order to observe and maintain altitude, speed and climb rate. The Learjet 20 Series is a very performant aircraft and the climb rate right after takeoff could easily get out of control.

Please refer to section 8 for complete takeoff and climb procedures.

***Note:** The GLJ Model 25/28 v4 addon has its own flight dynamics that have been tweaked, tested and retested by our aeronautical engineer, our real-world Learjet pilot and a number of beta testers in order to emulate as closely as possible the behavior of the real Gates Learjet 20 Series aircraft within the limitations of the current simulation platforms. If you don't like the flight model and would like to tweak it to your own preferences, you have the option to tweak some of the values in the* `[flight_tuning]` *and* `[airplane_geometry]` *sections of the "aircraft.cfg" (please backup the original file before making any change). We recommend modifying the "aircraft.cfg" only if you know what you are doing. This would require some experimentation on the part of the user.*

When using the autothrottle TO/GA mode, the aircraft always stalls and crashes upon takeoff. Am I doing something wrong?

This happens usually because the autopilot was engaged before the TO/GA Button [22, fig. 5-43] was depressed. The autopilot should never be used for takeoff (see previous Q/A).

If the autopilot was tested or engaged prior to takeoff, always remember to **turn it off** and check the elevator trim indicator [3, fig. 5-14] for the correct takeoff position (about one needle thickness below center). When engaged while the aircraft was on the ground, the autopilot might have tried to compensate by running the trim all the way nose up or nose down. If unnoticed, you may lose control of the aircraft during takeoff.

The elevator trim should always be checked and set correctly before takeoff.

In the simulator, depressing the TO/GA Button disengages all autopilot pitch, roll and speed modes, turns on the flight director and engages the autothrottle* Takeoff/Go-Around mode. Throttles automatically advance to takeoff power, the WING LEV is engaged, vertical speed is set to 4,500 fpm, and the flight director indicates takeoff pitch.

Remember that you, the pilot, still have manual control of the aircraft's pitch until the autopilot is engaged. The autopilot can be engaged after the aircraft has taken off and it will follow the flight director takeoff pitch.

Releasing the TO/GA Button disengages the TO/GA mode, engages the autopilot (if not already engaged), levels the wing, and captures and maintains the aircraft's pitch attitude.

**: The autothrottle is not available in the real aircraft.*

The spoilers caused the aircraft to climb when extended. Isn't it supposed to be the opposite?

This is how the real airplane behaves when the spoilers are deployed, and this is how we have programmed our addon to reproduce the effect. Learjet pilots are aware of this unusual behavior, and they anticipate it. It is part of their training. With the Learjet 25/28 (the real one and the addon), extending the spoilers causes a climb because of the location of the spoilers with respect to the center-of-gravity. Each aircraft has its own challenges.

Is there a button to set the cockpit to "cold and dark" or to prepare the aircraft for taxi and takeoff?

Yes. The white seatbelt label located in the upper center section of the main instrument panel [10, fig. 5-17a; 6, fig. 5-17b] is a hot spot for initiating a "**Cold and Dark**" reset cycle or an "**Auto Start**" sequence.

Left clicking the label will shut down the engines and turn off all lights and aircraft systems, including all custom Learjet systems unique to this addon, in less than 10 seconds. The cockpit will be reset to its "Cold and Dark" state and the airplane will be parked.

Right clicking the label will launch the "Auto Start" sequence. The automatic sequencer will start the engines and set up all aircraft systems ready for taxi. The pilot has nothing to do, but to wait and watch the sequencer perform the required preflight procedures automatically. Buttons, switches, and lights will be animated with sound during the entire sequence. It takes about 80 seconds for the sequencer to perform the necessary pre-flight procedures. The "Auto Start" sequencer goes beyond the simulator's standard CTRL+E command by setting up all Learjet custom systems unique to this addon that are needed for taxi. **We strongly recommend using this feature instead of CTRL+E!**

The two battery indicators (BAT140 and BAT160) in the upper right corner of the annunciator panel [28-29, fig. 5-32b] warn the pilot that the "Cold and Dark" reset cycle or the "Auto Start" sequence is in progress. An audio alert will be triggered at the beginning and at the end of both cycles.

It is not possible to initiate both cycles simultaneously for obvious reasons, and although the cycles cannot be stopped when initiated, they can be paused.

DO NOT INITIATE a "Cold and Dark" reset cycle or an "Auto Start" sequence while the aircraft is airborne!

Please refer to section 6, pages 9-11, for more details.

I'm using third-party navigation systems and radar and I cannot power up the units in the virtual cockpit. Am I forgetting something?

The GNS/GTN navigation systems both need DC and avionics power. Please make sure the Battery Switches [8-9, fig. 5-30] (or the Generator Switches [6, 11, fig. 5-30]) are **ON**, and the Radio Master Switch (avionics) [14, fig. 5-29] is **ON**. The radar needs **AC power** (Inverter Switches [10, 12, fig. 5-29] **ON**) in addition to DC power. Navigation systems and radars may also have a power or selector switch/knob that must be turned **ON**. Most third-party addons also have different power up options. Please refer to the documentation included with your navigation system or radar.

The autopilot cannot track the GNS/GTN GPS. Can you help?

Normally, the autopilot will track the GPS when the Autopilot NAV1/GPS Switch [12, fig. 5-22b] is set to **GPS**. However, some third-party navigation systems have different options that need to be set in their control panel for the simulator's autopilot to track the GPS. Please refer to the documentation included with your third-party addon or contact the developer for further assistance.

I am trying to engage the autopilot, but nothing works, and the lights remain off. What's wrong?

The autopilot in requires **avionics power** in addition to **DC** and **AC power**. Please make sure the Battery Switches [8-9, fig. 5-30] (or the Generator Switches [6, 11, fig. 5-30]) are **ON**, the Inverter Switches [10, 12, fig. 5-29] are **ON** and the Radio Master Switch (avionics) [14, fig. 5-29] is **ON**. The autopilot needs to be engaged (blue button on the flight controller [1, fig. 5-46] or the first Korry switch [1, fig. 5-22a] on the captain's panel).

Some switches in the virtual cockpit don't work when clicked on. Is this an issue?

No. It sometimes occurs that the pilot's viewpoint is adjusted too far back and lays inside the pilot seat's backrest, rendering some switches unclickable. When this happens, simply move your viewpoint forward a little.

Note: *In Prepar3D, it is sometimes possible to click objects through other objects.*

3-position switches and knobs require a wheel mouse. Refer to "**How to Actuate Switches, Buttons, and Knobs**" in section 5, page 3, for more information.

The radios, the autopilot and the GPS don't work, the AP altitude preselector cannot be changed, ADF is not working and not tunable. Please help!

Please make sure that the **avionics are powered up**. You need to have the Radio Master Switch [14, fig. 5-29] **ON** with the Battery Switches [8-9, fig. 5-30] **ON** (or the engines running and the Generator Switches [6, 11, fig. 5-30] **ON**). The autopilot and the radar, among other systems, also need **AC power** (both Inverter Switches [10, 12, fig. 5-29] **ON**). Please review sections 4, 5 and 6 for details.

I can't see the tooltips in the virtual cockpit. What's wrong?

We noticed that for some unknown reasons the tooltips may not always appear when the mouse pointer hovers above objects in the virtual cockpit. We believe this to be an intermittent simulator or display issue and not an addon issue. Please make sure that your simulation platform, operating system, and graphics drivers are all up to date. You may also restart your simulation platform or reboot your computer if necessary.

Also, make sure the "**Cockpit ToolTips**" option is selected on the "Prepar3D > Top Menu Bar > Options > General > Information > **Other Text Settings**" page.

Known Issue: *During our early tests in Prepar3D v5, we have noticed that the Prepar3D Demo Radar, when installed in the virtual cockpit, might have interfered with some of the instrument tooltips, and with how the tooltips were displayed. We still don't know what might have caused the issue and we have informed Lockheed Martin about it. See "Release Notes".*

The engine throttles cannot be moved. How come?

The Engine Throttles and Subthrottles [1, 3, 7, 17, fig. 5-43] cannot be moved when they are locked (**CUTOFF** position), like in the real aircraft. Click the **Throttle Release Levers** (under each throttle) [2, 4, fig. 5-43] to release the throttles and set the throttles to **IDLE**.

No "pitch trim in motion" clicker sound. Why?

Like in the real aircraft, there is no clicker sound when the autopilot is engaged and/or the flaps are extended more than 3 degrees.

The fuel tanks are empty or half full at the beginning of a new flight. How is this possible?

We always take for granted that all tanks are full before starting a new flight. However, the simulator might have kept the fuel levels from a previous or saved flight. Please make sure to check your fuel status at the beginning of a new flight and service the aircraft if necessary. Refer to "**20 Series Fuel System**" in section 6, page 22, and to "**Flight Planning**" in section 7 for more details.

There was no autothrottle in the real aircraft. Why is an autothrottle provided with the GLJ Model 25/28 v4 addon?

The real Gates Learjet 20 Series aircraft were not equipped with an autothrottle for SPD/MACH Hold, even though we are giving our users the option to use the autothrottle that is available in Prepar3D. We know purists may find this feature unrealistic in the case of the Learjet 25/28 (see note below), but the vast majority of our users still appreciate the convenience of an autothrottle, especially when learning how to fly the aircraft.

Note: *In some of the real aircraft, the autopilot maintained speed by varying the aircraft's pitch. The beta "Speed Hold by Pitch" (SPD P) autopilot speed control mode from the previous addon version was removed from the AFCS because of unsolvable stability issues and software limitations in Prepar3D. "Speed Hold by Pitch" and "Flight Level Change" speed control modes are not natively supported in Prepar3D and were not available in most Learjet 20 Series aircraft.*

All lights and annunciators are extinguished. How do I fix this?

If the aircraft is powered, make sure all light dimmers are not turned fully counterclockwise or off. This includes the Annunciator Test Button and Dimmer located under the glareshield [31, fig. 5-32a/b].

I experienced low frame rate while flying the GLJ Model 25/28 v4 addon. Is this normal?

Yes and no. Frame rate may vary depending on your hardware and several factors such as your graphics options, the complexity of the scene (especially with add-on sceneries), installed third-party addons, etc. For example, it is normal for the frame rate to drop over high-density sceneries such as big cities or airports (with any aircraft). Also, it is normal for the exterior model to cause a slightly lower frame rate because it contains not only the exterior parts but some of the interior parts as well that are visible from the outside view such as the seats, cabin lights, instrument panels, etc.

The GLJ Model 25/28 v4 addon is a **complex aircraft simulator** (not a toy) with high-resolution models and full PBR textures, hundreds of animations, visual effects, sounds, and complex aircraft systems that are fully simulated. It requires a powerful computer to run. It cannot be compared to the stock aircraft that come with your simulation platform nor to third-party addons with limited functionalities and systems, low resolution textures and 3D models, flat 2D gauges or a single glass cockpit.

It's always a dilemma for developers and users to manage quality and details vs performance. We've decided to invest in quality, systems, and features as we expect computer systems to evolve and to become more powerful in the future. More recent gaming computers equipped with the latest graphics cards and a powerful CPU will allow for higher frame rates.

You may need to tweak your simulator's settings to improve performance. You can try moving all the cursors to their middle (medium or standard) position to see if it makes a difference. Combining aggressive settings with a next generation addon such as the GLJ Model 25/28 v4 may affect performance on your PC.

Unless you own one of the latest generation high-end graphics cards, we always recommend limiting your frame rate to 30 fps. This will free other computer resources for other tasks. 30 fps (standard NTSC video frame rate) is enough for flight simulation and should improve performance on slower systems. Note that the graphics card is usually the weakest component in a given system, especially in laptop computers.

Regarding what computer to buy for flight simulation, we would recommend a reliable desktop computer equipped with a high-end graphics card. There are computer systems made specifically for 3D gaming. SSD drives are recommended because they are faster and more reliable than mechanical drives. Don't hesitate to invest in the best graphics card you can afford. It makes all the difference. Most modern computer systems have the necessary processing power, motherboard and RAM to run the latest simulation platforms.

Refer to section 2 for additional information about how to optimize your system for this addon.

I've installed my new GLJ Model 25/28 v4 addon and nothing works! The switches don't work, the radios don't work, I cannot start the engines by all means and I cannot move the throttles. Please help!

May we strongly recommend that you revisit sections 4, 5 and 6 of the manual, and follow the procedures in section 8?

Under normal circumstances, this situation will never occur unless the simulator freezes (which is very rare)! If this happens, relaunching the simulator and starting a new flight is the only solution.

It sometimes occurs that the pilot's viewpoint is adjusted too far back and lays inside the pilot seat's backrest, rendering the switches unclickable. When this happens, simply move your viewpoint forward a little.

Some switches and knobs can only be actuated with the mouse wheel, some with left or right clicks or a combination of both. With this addon, you absolutely need a wheel mouse to operate in the virtual cockpit.

Please make sure the Battery Switches [8-9, fig. 5-30] (or the Generator Switches [6, 11, fig. 5-30]) are **ON**, the Inverter Switches [10, 12, fig. 5-29] are **ON** and the Radio Master Switch (avionics) [14, fig. 5-29] is **ON**. Radios need avionics power and some systems, like the radar and the autopilot, need AC power.

The Engine Throttles and Subthrottles [1, 3, 7, 17, fig. 5-43] cannot be moved when they are locked (**CUTOFF** position), like in the real aircraft. Click the **Throttle Release Levers** (under each throttle) [2, 4, fig. 5-43] to release the throttles and set the throttles to **IDLE**.

TROUBLESHOOTING

I have several installation, display and performance issues with my new GLJ Model 25/28 v4 addon. Could you help me troubleshooting my problems?

If you are experiencing issues with your new GLJ Model 25/28 v4 addon, please review the answers provided in the previous pages and the information contained in section 2. If you still cannot solve your issue(s) after reading the manual and the present FAQ section, please consider the followings:

1. **Is the GLJ Model 25/28 v4 addon compatible with your simulation platform?** The GLJ Model 25/28 v4 addon for Prepar3D is compatible with Prepar3D v5.4 (or later*) only. It will not work with previous versions of Prepar3D. It will not work with FSX or MSFS 2020.

2. **Did you install the correct version of the GLJ Model 25/28 v4 addon for your version of Prepar3D?** When downloading your addon from our website, make sure you have installed the correct addon version for your version of Prepar3D*.

   ***:** *New addon versions may become available for future versions of Prepar3D when released by Lockheed Martin.*

3. **Is Prepar3D running smoothly on your system?** If not, this might be a simulator issue (or a computer issue, see below). Please review your installation instructions carefully and reinstall the simulator if necessary. Refer to the Lockheed Martin Prepar3D website for more information.

4. **Is your simulator up to date?** Make sure the latest service packs, hotfixes and updates, if any, are installed.

5. **Is the GLJ Model 25/28 v4 addon the only add-on aircraft installed on your computer that is causing the issue(s)?** If not, the addon is not causing the issue(s).

6. **Do you have the latest iteration of the GLJ Model 25/28 v4 addon?** Please visit our website to check for patches and updates for your addon.

7. **Is your version of DirectX compatible with your simulation platform and graphics card?** Prepar3D v5.4 requires DirectX 12 and a DirectX 12-compatible graphics card. Refer to the Prepar3D website for minimum system requirements.

8. **Can you see at least one GLJ Model 25/28 v4 aircraft on the "Vehicle" page in Prepar3D?** If not, the addon is not installed properly or there is a display or compatibility issue. Make sure that your

simulation platform is configured properly (see section 2). Also, the "**Show Only Favorites**" option on the Prepar3D "**Vehicle**" page may prevent some aircraft variations from being displayed. You may need to uncheck this option. You may also select only the aircraft variations that you want to fly as your favorites. If the addon is not properly installed, you may have to reinstall it. Refer to section 2 and follow the instructions to reinstall your addon if necessary.

9. **Do you see the GLJ Model 25/28 v4 aircraft in the spot plane view?** If the addon is properly installed and loaded and you don't see the aircraft in the spot plane view, there is a display or compatibility issue. If the addon is not properly installed, you may have to reinstall it. Refer to section 2 and make sure that your simulation platform is configured properly. Follow the instructions to reinstall your addon if necessary.

10. **Do you see the GLJ Model 25/28 v4 virtual cockpit?** If the addon is properly installed and loaded and you don't see the aircraft in the spot plane view and there is no virtual cockpit, there is a display or compatibility issue. Refer to section 2. Make sure that your simulation platform is configured properly. If you see the aircraft in the spot plane view and there is no virtual cockpit, make sure you are in the virtual cockpit view ("**F9**").

11. **Do you see the throttles in the virtual cockpit? Can you power up the aircraft? Can you start the engines?** If not, the addon is not installed properly. You will need to reinstall your addon with the proper credentials and a valid activation key. Make sure you are using the same email address that appears on your original receipt. Refer to section 2 and follow the instructions carefully to reinstall your addon.

12. **Did you try resetting the flight or reloading the GLJ Model 25/28 v4 aircraft?** Sometimes, it works.

13. **Did you install the latest updates for your Windows operating system?** Make sure your Windows operating system is up to date.

14. **Did you install the latest driver for your graphics card?** Many times, it solves display issues.

15. **Did you try tweaking the different parameters and options that are available in Prepar3D?** If you experience low frame rate, try different display parameters. Moderate traffic, weather and scenery settings may also improve your system performance. Refer to section 2.

16. **Do you suspect the GLJ Model 25/28 v4 addon package you downloaded from our website of being corrupted?** In doubt, please login to your user account on our website, download the latest version of the software, and reinstall the addon.

17. **Do you have the minimum system requirements to run the software?** You may need a new computer or graphics card. Refer to "**Minimum System Requirements**" in section 2, page 1.

If you are still unable to solve your issue(s), please contact us for technical support:

https://xtremeprototypes.com/shopcustcontactsupport.asp

Make sure all the required fields in the form are filled out correctly and provide us with as much information as possible about your technical issue(s).

Please note that we do not answer support requests and inquiries via Facebook.

TECHNICAL SUPPORT AND CONTACT INFORMATION

I have another question about my GLJ Model 25/28 v4 addon. Can I contact you?

Yes. We'll try our best to answer you the same day or within two business days.

For sales support or general inquiries:

If you need support related to your online purchase or simply want to send us a message, please use our general contact form:

https://xtremeprototypes.com/shopcustcontact.asp

For technical support:

If you need technical support for your addon beyond what is available in the present manual, please fill out our technical support request form:

https://xtremeprototypes.com/shopcustcontactsupport.asp

Make sure all the required fields in the form are filled out correctly and provide us with as much information as possible about your technical issue(s).

Please note that we do not answer support requests and inquiries via Facebook.

How do I get product patches?

When available, patches for your Xtreme Prototypes addons are listed at the bottom of each product page on our website. To download these files, please login to you user account and review your previous orders.

I'm a real-world Learjet pilot and I have some ideas about improving the GLJ Model 25/28 v4 addon. Can I contact you?

Yes. We'll be most happy to hear from you. Please use our general contact form:

https://xtremeprototypes.com/shopcustcontact.asp

I was involved in the development of the real Lear Jet/Gates Learjet 20 Series aircraft during the 1960s/70s/80s, and I would be interested in helping you with your future projects. Can I contact you?

Yes. It will be an honor to hear from you. Please use our general contact form:

https://xtremeprototypes.com/shopcustcontact.asp

KNOWN ISSUES

APPENDIX 7

As is always the case with computer software, and especially with addons to existing third-party platforms over which as independent developers we have limited control, there are still a few **known issues** remaining with the current version of the GLJ Model 25/28 v4 addon for Prepar3D.

Some of these issues are **related to the simulator**, in which case there is little that can be done from our side, except proposing a workaround and expecting a fix from Lockheed Martin. Other issues are **related to the addon** itself, in which case we are working hard to get them resolved.

We always appreciate **constructive feedback** from our users. Please don't hesitate to report any bug or other issue you may encounter while installing or flying the GLJ Model 25/28 v4 addon.

To report bugs and/or issues, please fill out our technical support request form:

https://xtremeprototypes.com/shopcustcontactsupport.asp

Make sure all the required fields in the form are filled out correctly and provide us with as much information as possible about your technical issue(s).

Please note that we do not answer support requests via Facebook.

Because there are as many computer systems as they are users, **you may or may not** experience the following issues depending on:

- Your computer and graphics hardware (and settings)
- Your operating system (and settings)
- Your version of DirectX
- Your version of Prepar3D (and settings)
- Your GLJ Model 25/28 addon version (including patches, if any)
- Your third-party addons, systems, gauges, sceneries, airports (if installed)

Some cockpit sounds can be heard from the outside views or when the simulation is paused

In addition to the basic aircraft sounds, the GLJ Model 25/28 v4 addon features over 90 extra sound effects (mainly cockpit sounds). Due to software limitations in Prepar3D, some interior sound effects can still be heard from an outside view or when the simulator is on pause. You can adjust the volume of the cockpit and cabin sound effects by moving the "**Cockpit**" cursor on the "Prepar3D > Top Menu Bar > Options > General > **Sound**" page, under "**Volume Levels**". See section 8, page 3.

Fire extinguishing can be performed only once during a flight

This is how the fire extinguishers in Prepar3D work. The flight needs to be reset or a new flight initiated for the simulator's extinguishers (bottles) to recharge.

Electrically actuated/controlled trim tabs (including the horizontal stabilizer) are moving without the aircraft being powered

Due to some limitations in Prepar3D, electrically powered trim tabs (including the horizontal stabilizer) can be actuated with your controller buttons even when the aircraft is not powered. This is a known simulator issue. As a workaround, we have disabled the animation of those surfaces when the aircraft is not powered.

After loading a saved flight, several switches are not in the same state they were when the flight was saved

This is a known issue in Prepar3D. It is not an addon issue.

Our addons are complex aircraft simulators with many custom systems and controls that are not currently supported in the simulator and that you won't find in the stock aircraft (for example: the Inverter Switches [10, 12, fig. 5-29] or the 3-position Starter/Generator Switches [6, 11, fig. 5-30] in the virtual cockpit of the GLJ Model 25/28 v4 addon). These custom systems use their own sets of proprietary variables and commands. **Currently, these custom local variables are not kept by the simulator when a flight is saved.** This explains why some of the switches need to be reset manually after loading a saved flight or changing vehicles.

A solution would be to limit ourselves to the basic aircraft systems that are natively supported by the simulator and to stop implementing custom systems in our Learjet addons at the price of realism. We believe our fans would prefer to keep the Learjet custom systems intact even if it means resetting a few switches manually after loading a saved flight.

We sincerely hope that local custom variables will be kept when saving a flight in future versions of Prepar3D.

The flight director behaves erratically

On some occasions, it might be necessary to reset the flight director if the V-bars are not responding properly (sometimes after the autopilot has been turned on and off). If you suspect that the flight director is not giving you correct indications, simply reset the flight director by turning the Flight Director Power Switch [2, fig. 5-22a] to **OFF**, then back to **ON** again. This is a simulator issue.

The aircraft behaves erratically (lost of control) after being repositioned at altitude with the map, with the autopilot engaged

Repositioning the addon at altitude with the map while the autopilot is engaged may lead to unpredictable aircraft behavior. To avoid this issue, **turn off** the autopilot before repositioning the addon with the map. This is a simulator issue.

The autopilot changes the elevator (pitch) trim setting if energized before a flight, even after the elevator was trimmed correctly for takeoff

If the autopilot is engaged before takeoff, the autopilot will move the horizontal stabilizer (elevator pitch trim) out of range for takeoff to follow the flight director. Prior to takeoff, **disengage** the autopilot and set the elevator trim correctly for takeoff - normally about one needle thickness below center [3, fig. 5-14].

The "**Auto Start**" sequencer [right click, 10, fig. 5-17a; 6 fig. 5-17b] will automatically set the elevator trim correctly for takeoff, if initiated. **Do not engage the autopilot before takeoff**.

The fuel tanks are empty or half full at the beginning of a new flight

We always take for granted that all tanks are full before starting a new flight. However, the simulator might have kept the fuel levels from a previous or saved flight.

Please make sure to check your fuel status at the beginning of a new flight and service the aircraft if necessary. Refer to "**20 Series Fuel System**" in section 6, page 22, and to "**Flight Planning**" in section 7 for more details.

The aircraft textures appear blurred and in a much lower resolution than what is shown in the product screenshots

The GLJ Model 25/28 v4 addon uses ultra crisp, 4096 x 4096, high-resolution PBR textures.

For optimal graphics quality in Prepar3D, make sure the texture resolution is set to "**Ultra - 4096x4096**" on the "Prepar3D > Top Menu Bar > Options > General... > **Display** > **Image and Texture Quality**" page.

If not set properly, the simulator may downsize the high-resolution 4096 x 4096 textures to a lower resolution (2048 x 2048, for example) and sometimes it does it badly. It is normal for uncompressed native 2048 x 2048 textures to look better than downsized 4096 x 4096 textures. Your textures should look crisp and detailed with no reduction/compression artefacts, like the ones in our screenshots.

Also, the textures on the exterior model use mipmaps (optimized sequences of images with progressively lower resolution to increase rendering speed and reduce artifacts when the model is viewed at a distance). In Prepar3D v5.4, we recommend the **Anisotropic 16x Texture Filtering** option (under ".../**Image and Texture Quality**"). Refer to section 2 for more details.

Textures are a bit slow to load

The GLJ Model 25/28 v4 addon uses a large number of high-resolution PBR textures. It is normal for the textures to take more time to load than when loading one of the stock aircraft that come with Prepar3D, depending on your computer and graphics card. Wait until all the textures are applied to the model in the preview window of the Prepar3D "**Vehicle**" page before launching a new flight.

The simulator shows a black screen and shuts down after switching vehicles

The only time we experienced this issue, it was caused by third-party software (the radar, in our case). Please contact the third-party developer for assistance and make sure you have the latest software version for your simulation platform.

Tooltips won't show

Make sure the "**Cockpit ToolTips**" option is selected on the "Prepar3D >Top Menu Bar > Options > General > Information > **Other Text Settings**" page.

We sometimes noticed that for unknown reasons the tooltips may not always appear when the mouse pointer hovers above objects in the virtual cockpit. We believe this to be an intermittent simulator or display issue and not an addon issue. Please make sure that your simulation platform, operating system, and graphics drivers are all up to date. You may also have to restart your simulation platform and/or reboot your computer.

Note: *During our early tests in Prepar3D v5, we have noticed that the Prepar3D Demo Radar, when installed in the virtual cockpit, might have interfered with some of the instrument tooltips, and with how the tooltips were displayed. We still don't know what might have caused the issue and we have informed Lockheed Martin about it. See "Release Notes".*

Nose wheel steering seems not to work all the time when taxiing

In Prepar3D, nose wheel steering when taxiing is initiated automatically, and at slower speeds only, whether it is engaged by the pilot manually or not. Nose wheel steering will not work above a certain speed. Because this is controlled by the simulator, there is very little we can do about it until more options to control nose wheel steering at any speed become available.

When taxiing, you will need to reduce speed to activate nose wheel steering (under about 45 knots). Above that speed, the nose gear will lock.

To add a touch of realism, we have disabled the rudder animation when nose wheel steering is engaged by the pilot.

The Gyro Drift Compensation Switch and the Directional Gyro Compensation Knob are disabled by default

By default, the direction indicators (HSI, RMI, directional gyro) in the cockpit of the GLJ Model 25/28 v4 are configured to be slaved to an electro-magnetic slaved compass. This mode of operation normally requires no gyro drift correction on the part of the pilot and is used in areas where magnetic references are reliable. When this mode of operation is selected in Prepar3D, it is not possible to make manual corrections by using the Gyro Drift Compensation Switch or the Directional Gyro Compensation Knob, even when the Directional Gyro Free/Slave Switch is set to **FREE**.

In the real aircraft: *The directional gyroscope in the real aircraft can operate in two modes: the SLAVE mode and the FREE mode. When the Directional Gyro Free/Slave Switch is set to SLAVE, the directional gyro is slaved to the magnetic flux valve for correcting the apparent gyro drift. When the switch is set to FREE, the pilot is free to make manual corrections with the Gyro Drift Compensation Switch (or the Directional Gyro Compensation Knob). The SLAVE position is the normal mode of operation in areas where magnetic references are reliable.*

Unfortunately, Prepar3D does not provide means for switching from the **SLAVE** mode to the **FREE** mode or vice versa after the aircraft model is loaded in the simulator. Add-on aircraft developers and users must decide in advance if they want the direction indicators in the cockpit to be slaved to an electric gyroscope (FREE mode) or to an electro-magnetic slaved compass (SLAVE mode). This is set in the `[direction_indicators]` section of the "**aircraft.cfg**" (the aircraft configuration file located in the add-on aircraft's main folder):

```
[direction_indicators]
direction_indicator.0 = 3
```

The first number ("0") is the reference for the direction indicator, the second number ("**3**") is the type of device to which the direction indicator is slaved. In Prepar3D, the types are:

0. None
1. Vacuum gyro
2. Electric gyro
3. **Electro-mag slaved compass**
4. Slaved to another indicator

By default, the direction indicators in the GLJ Model 25/28 v4 addon are set to operate in **mode "3" (electro-mag slaved compass)** and **do not require manual adjustments.** This is how the direction indicators in most of the stock aircraft included with Prepar3D are configured.

If you prefer to have full control over the instrument, for example if you fly in areas where magnetic references are not reliable, you can switch to **mode "2" (electric gyro)** by changing the value in the "aircraft.cfg".

Also, consider that in mode "2", you will need to make manual gyro drift corrections periodically. If you don't want to make manual gyro drift corrections, you can disable gyro drift on the "Prepar3D > Top Menu Bar > Options > General > **Realism**" page:

1. Enable gyro drift - **UNSELECTED.**

Please note that in the current software version, the Directional Gyro Free/Slave Switch [9, fig. 5-5] does not work like in the real aircraft for the reasons mentioned above and has no special function except to disengage the autopilot when clicked.

Third-party GNS/GTN/GPS/radar screens too bright at night

The GLJ Model 25/28 v4 addon uses the "AdditiveUserControlled" method for blending third-party 2D gauges in the 3D virtual cockpits. This prevents the gauges from being too dim during the day or at dawn/dusk. Most third-party addons (like GTN or radars) now have a brightness control to adjust the screen luminosity under different lighting conditions. Please refer to your third-party addon's documentation for more information or contact the developer for further assistance.

Engines won't start when the fuel valves open and the throttles are released

Releasing the throttles with the Throttle Release Levers [2, 4, fig. 5-43] **opens the fuel valves**, like in the real aircraft. During the engine startup cycle (see section 8, page 19), when the fuel valves open and the fuel gets in contact with the igniters, the engines should start.

In Prepar3D however, if the fuel mixture is not rich enough, the engines won't start. In the real world, jet engines don't require fuel mixture adjustments like piston engines. Unfortunately, the simulator seems to make no distinction and mixture control is available even for jet engines.

Make sure the fuel mixture is set to "**rich**" before starting the engines (**CTRL+SHIFT+F4** on your keyboard). You can also use the mixture lever on your physical throttle quadrant or game controller.

Note (1): *The "**Auto Start**" sequence, if initiated, will set the fuel mixture to "rich". The "**Cold and Dark**" reset cycle will set the mixture to "lean". See [10, fig. 5-17a; 6, fig. 5-17b].*

Note (2): *In this software version, we've also programmed the Throttle Release Levers [2, 4, fig. 5-43] to set the mixture to rich before they open the fuel valves when actuated.*

Third-party addons won't show in the virtual cockpit (no display)

Make sure that your navigation systems and radar are powered up. GPS/GNS/GTN systems need **avionics power** and the radar needs **AC power** (inverters **ON**).

Make sure the Main Battery Switches [8-9, fig. 5-30] (or the Generator Switches [6, 11, fig. 5-30]) are **ON**, the Inverter Switches [10, 12, fig. 5-29] are **ON** and the Radio Master Switch (avionics) [14, fig. 5-29] is **ON**.

Refer to appendix 2 for more information about adding third-party addons to the cockpit of the GLJ Model 25/28 v4 add-on aircraft.

AIRCRAFT VARIATIONS *(1 of 5)*

(AUS) Gray, White and Black


(BRA) Green, Yellow and Blue

(CAN) White


(CAN) White, Turquoise and Red


(CHE) White, Red and Gold


(CHL) Blue, Gray and Yellow

(FRA) White, Blue and Red

(DEU) White, Gray and Turquoise

AIRCRAFT VARIATIONS (2 of 5)

(MEX) White, Brown and Black

(USA Demo) White, Black, Gray and Red

(NASA Research) White and Blue

(GBR) White, Blue and Red


(USA Charter) Red, White and Blue

(USA) Black Orange and White

(USA) Gray, Green and Gold


(USA) Red, White, Blue and Gold

(USA) White, Black and Gold

(USA) White, Blue and Gold


(USA) White, Gray and Red


(US Army) Green Camo

(AUS) Gray, White and Black


(BRA) Green, Yellow and Blue

(CAN) White

(CAN) White, Turquoise and Red

AIRCRAFT VARIATIONS *(4 of 5)*

(CHE) White, Red and Gold


(CHL) Blue, Gray and Yellow

(FRA) White, Blue and Red

(DEU) White, Gray and Turquoise

(MEX) White, Brown and Black


(NASA Exp) White, Red, Orange and Yellow

(NASA Research) White and Blue

(GBR) White, Blue and Red

AIRCRAFT VARIATIONS *(5 of 5)*


(USA Charter) Red, White and Blue


(USA) Black Orange and White


(USA) Gray, Green and Gold


(AUS) Gray, White and Black


(AUS) Gray, White and Black


(USA) Red, White, Blue and Gold


(USA) White, Gray and Red


(US Army) Green Camo

USER NOTES

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Xtreme Prototypes

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