
# X-Plane
# Cirrus SR22T

# Pilot's Operating Manual

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# Contents

# The Cirrus SR22


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The Cirrus SR22 is a single-engined four / five-seater General Aviation aircraft built by Cirrus Design Corporation (Cirrus Aircraft) of Duluth, Minnesota. Preceded by the SR20 model, the SR22 has a larger wing, greater fuel capacity, and a more powerful engine.

The SR22 series of aircraft is currently the world's best-selling GA aircraft with over 6,000 units sold at the time of this publication..

Both the SR20 and SR22 are made primarily from composite material and are equipped with a ballistic parachute system. The Cirrus Airframe Parachute System (CAPS) is capable of lowering the entire aircraft (and occupants) safely to the ground in the event of an emergency.

**Certification:**

The SR22 was certified November 2000, and production began in 2001. The aircraft features a single Continental IO-550-N piston-engine, fixed tricycle landing gear and differential braking via the main wheels for steering. Steering is assisted by a castering nose wheel. Entry and exit for passengers are through doors on both sides of the aircraft.

A noteworthy feature of this aircraft is the use of side stick flight controls..

**Models:**

In 2004 the SR22 Generation-2 (G2) was introduced, followed by the Generation-3 (G3) in 2007. These featured modifications to the fuselage and wing, respectively. In 2010, the SR22T model debuted, utilizing a turbo-charged Continental TSIO-550K engine that produced more power, and could run on 94-octane unleaded fuel. The Generation-5 (G5) model was introduced in 2013, skipping the G4 designation for unknown reasons. This model was heavier and featured a standard five-seat cabin layout. Minor improvements were introduced in 2016 - in the areas of wireless connectivity, remove keyless entry and an improved lighting system. In 2017, the Generation-6 (G6) was introduced that featured upgraded avionics and navigation lighting. Both the G5 and G6 models were available with conventional and turbo-charged powerplants (the latter being designated 22T G5 and 22T G6). Cirrus rolled-out a training-oriented version (designated TRAC) in 2019. This model featured a revised interior, more durable seats, and additional features that aided in the use of the aircraft for flight instruction.

**Avionics:**

Early versions of the SR20 and SR22 featured analog instruments. This system was superseded in 2003 by the addition of the Avidyne Entegra primary flight display (PFD), made by the Avidyne corporation. This sparked an industry-wide adoption of 'glass cockpits' for contemporary General Aviation aircraft.

In 2008 Cirrus introduced a custom avionics suite named 'Cirrus Perspective'. This glass cockpit Primary Flight Display (PFD) and Multi-Function Display (MFD) combo was developed by Garmin Ltd. In 2009, infra-red and synthetic vision capability was added, termed the 'Enhanced Vision System' or EVS. Cirrus then went on to add Electronic Stability Protection (ESP) that could stabilize an aircraft automatically in the event the aircraft was in a dangerous attitude. In 2017, Cirrus introduced the 'Perspective-Plus' avionics system with improved computing power, animated real-time weather, a payload manager, 'glass' back-up instruments, and other new features.

## Cirrus SR22T Specifications

| | | |
|---|---|---|
| **Engines:** | | |
| Model | ---------- | 1 × Continental TSIO-550-K (Turbocharged) piston-engine |
| Power | ---------- | 315 hp (235 kW) |
| **Fuel:** | | |
| Capacity | ---------- | 92 U.S. gallons (348 Liters) |
| Type | ---------- | UL-94 (94 octane unleaded) |
| Burn (cruise)* | ---------- | 18 US gallons (68 liters) per hour |
| **Weights and Capacities:** | | |
| Max. Takeoff Weight | ---------- | 3,600 lbs. / 1,633 kg. |
| Basic Empty Weight | ---------- | 2,354 lbs. / 1,068 kg. |
| Useful Payload | ---------- | 1,260 lbs. / 572 kg. |
| Maximum Passengers | ---------- | 5 |
| **Performance:** | | |
| Max. Cruise Speed | ---------- | 213 KTAS (true) |
| Stall Speed | ---------- | 60 KIAS (full flap) |
| Never Exceed Speed | ---------- | 204 KIAS (indicated) |
| Service Ceiling | ---------- | 25,000 ft. / 7,620 m |
| Rate of Climb | ---------- | 1,200 ft. per min / 366 m per min |
| Range | ---------- | 1,207 nm |
| **Dimensions:** | | |
| Wingspan | ---------- | 38 ft. / 11.6 m |
| Length | ---------- | 26 ft. / 7.9 m |
| Height | ---------- | 9 ft. / 2.74 m |

- *Representative value depending on conditions*

# The X-Plane SR22T


Unlike other flight simulators, X-Plane employs a technique called “Blade Element Theory”. This utilizes the actual shape of the aircraft (as modeled in the simulator) and breaks down the forces on each part separately. The force of the “air” acting on each component of the model is individually calculated, and combined, to produce extremely realistic flight.

When you “fly” an airplane in X-Plane, there are no artificial rules in place to govern how the aircraft behaves. Your control inputs move the control surfaces of the aircraft, and these interact with the virtual flow of air around it. As such, you may consider that you are really flying the aircraft.

Due to the use of “Blade Element Theory” in X-Plane, an aircraft must be modeled with great accuracy, in order that it behaves like its real-life counterpart. This means the fuselage, wings and tail surfaces must be the right size and shape, the center of lift and center of gravity must be in the right places, and the engine(s) must develop the right amount of power. In fact, there are a great many properties that must be modeled correctly to achieve a high-fidelity flight model.

The aircraft featured in X-Plane is the (turbocharged) SR22T variant and has been modeled by our design team with a degree of accuracy that ensures its flight characteristics are like the real aircraft. However, despite this, some differences will be apparent, because even the smallest factor plays into the ultimate behavior of the aircraft in reality, and in X-Plane. The systems modeling of this aircraft involves some compromise too, because of the degree of complexity present in the real aircraft. However, in many cases, the actual SR22T procedures could be followed when operating the X-Plane version. Checklists are presented later in this document (with modifications to suit this specific simulation platform and model). It is recommended that X-Plane pilots follow those procedures when operating the aircraft.

# Views and Controls

The X-Plane SR22T features a detailed 3-D cockpit with many of the primary controls and systems modeled, including: Flight controls (side stick, rudder pedals, thrust lever, prop lever, condition lever), electrical systems, pneumatic systems, navigation aids, radios, autopilot, interior and exterior lighting, and fuel systems.

## Creating “Quick Look” views

Before discussing the controls, we suggest that the pilot establish a series of “Quick Look” views that will be helpful later when interacting with this particular aircraft. If you are not familiar with this technique, more information is available in the X-Plane Desktop Manual.

The following “Quick Look” views are recommended for the X-Plane SR22T, in a situation where the pilot is not using a Virtual Reality (VR) headset, or a head tracking device. To some degree, these correspond (on the keyboard Number Pad) with their physical locations in the cockpit - and are therefore logical and easy to recall later.


Standby Instruments and Parking Brake



Primary Switching Panel



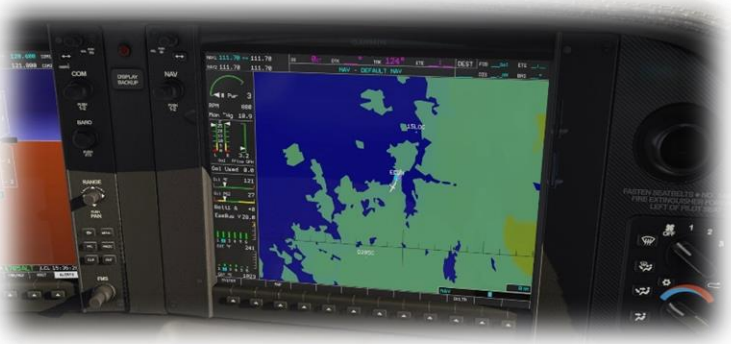
Throttle Quadrant


Center Console



Primary Flight Display (PFD)


Multi-Function Display (MFD)




Left Glance View


Forward View


Right Glance View

## Operating the controls

This section covers the basic techniques for the operation of the controls that you will encounter in the cockpit of an X-Plane aircraft. Control manipulators are consistent across all X-Plane aircraft. However, the specific illustrations in THIS chapter may differ from YOUR aircraft.


Toggle and Rocker switches are operated with a single click of the mouse. Place the mouse pointer slightly above, or below, the center point of the switch, depending on the direction you intend to move it. A small white arrow is displayed to confirm the intended direction. Click the mouse button to complete the operation.

Levers are operated by assigning a peripheral device to the necessary axes in X-Plane (throttle, prop, mixture etc.). More information is available in the X-Plane Desktop Manual.

Levers may also be operated by clicking and dragging the mouse pointer.


Some rotary dials are operated by positioning the mouse pointer on top of the control, and then a click and drag to the right, or to the left. The same can be accomplished using the mouse wheel - if one is present on your device.

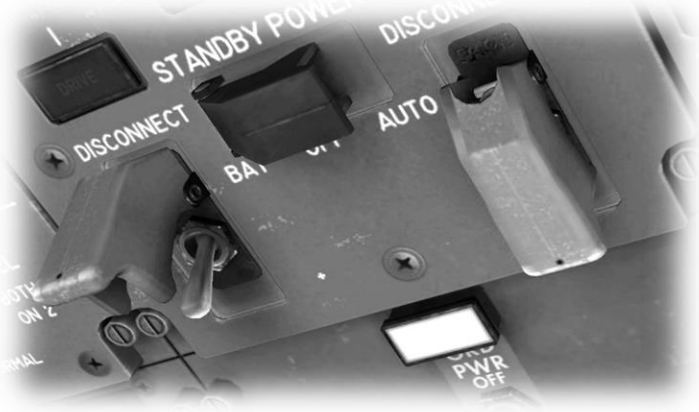
Other rotary controls require finer precision. When the mouse pointer is positioned slightly to the left of such a control, a counter-clockwise arrow appears. This indicates that you are ready to rotate the control counter-clockwise. Correspondingly, a clockwise arrow indicates that you are ready to rotate the control clockwise. After positioning the mouse pointer, changing the frequency in the desired direction is accomplished in two ways:

i) By rolling the mouse wheel forwards, or backwards

ii) By clicking (dragging is not supported here)

Radio and Navigation frequency rotary dials are grouped together as “twin concentric knobs”. Here, the larger rotary is used to tune the integer portion of the frequency, and the smaller rotary is used to tune the decimal portion. Each works independently, using the same technique, as described above.

Push buttons are operated by pointing and clicking with the mouse.




Guarded switches are used in situations where accidental activation of the switch must be prevented. To operate a guarded switch, the guard must first be opened. Do this by positioning the mouse pointer over the switch until the two vertical white arrows are displayed. Click once. If the switch is currently closed, it will open, and vice-versa. After the guard has been opened, the switch may be operated like a toggle and rocker switch (see earlier in this section).

- Illustration not taken from this aircraft

The Side Stick is operated by assigning a peripheral device to the “roll” and “pitch” axes in X-Plane. This is discussed in greater detail later in the guide.

The Rudder Pedals are operated by assigning a peripheral device to the “yaw” axis in X-Plane. If your rudders also support toe braking, create additional assignments to the “left toe brake” and “right toe brake” axes in X-Plane. This is discussed in greater detail later in the guide.

Note that you may also assign keys on your keyboard, or buttons on your external peripheral to move the rudder to the left or right, or to center the rudder.

- Illustration not taken from this aircraft

## Assigning peripheral devices

This section of the manual deals with an “ideal” scenario, in terms of the assignment of external computer peripherals to operate the X-Plane SR22T with the highest degree of realism. If you are missing some of these external peripherals, you may elect to choose a different configuration that better suits your hardware.

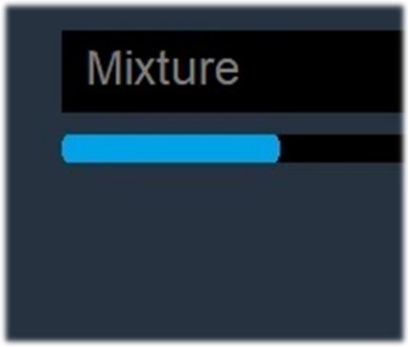
More information is available in the X-Plane Desktop Manual.


This aircraft is equipped with side sticks, for roll and pitch control.

Assign the lateral axis of your joystick (or yoke) to the “Roll” command in X-Plane, and the vertical axis to the “Pitch” command.


This aircraft is equipped with a single throttle – which controls the torque (power) output by the engine.

Assign the throttle lever on your quadrant to the “Throttle” property in X-Plane.




This aircraft is equipped with a single mixture lever which controls the fuel flow to the engine.

Assign the throttle lever on your quadrant to the “Mixture” property in X-Plane.


This aircraft is equipped with a Flap lever, which controls the deployment of the flaps.

Assign a peripheral lever to the “Flaps” property in X-Plane.

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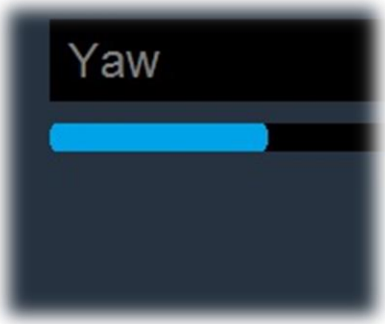
- Illustration not from this aircraft




This aircraft has conventional rudder controls, actuated by the rudder pedals.

Assign the yaw axis of your pedals peripheral device (or a joystick axis) to the “yaw” property in X-Plane.

- Illustration not from this aircraft


This aircraft has rudder toe-braking, actuated by the tip of the rudder pedals.

Assign the brake “toe-tipping” motion of each individual pedal (or a joystick axis) to the “left toe brake” and “right toe brake” property in X-Plane.

# A Tour of the Cockpit

In this section of the manual, the cockpit will be broken down into distinct functional areas, and the controls that are featured in those areas will be identified and described. This will assist in locating the necessary instruments and controls later, when working through the aircraft check lists, and flying the aircraft.

### Overhead Panel


| | | |
|---|---|---|
| **CAPS DEPLOY** | Click the highlighted area to deploy the 'CAPS' emergency parachute system. | The Cirrus Airframe Parachute System (CAPS) is capable of lowering the entire aircraft (and occupants) safely to the ground in the event of an emergency.<br><br>**Use this only in an emergency, and with the throttle set to idle.** |

## Side Sticks and Pitch Trim Indicators


| | | |
|---|---|---|
| **SIDE STICK** | Controls pitch and roll. | Side sticks are frequently favored over traditional yokes in modern General Aviation aircraft and some airliners. |
| **PITCH TRIM INDICATOR** | Indicates the level of pitch trim selected by the pilot. | Pitch trim alleviates the need for the pilot to maintain a forward, or rearward pressure on the side stick. In this aircraft, this is accomplished by an electric motor combined with a mechanical spring-loaded system. These combine to change the 'default' location of the side stick. This system replaces elevator trim tabs. |

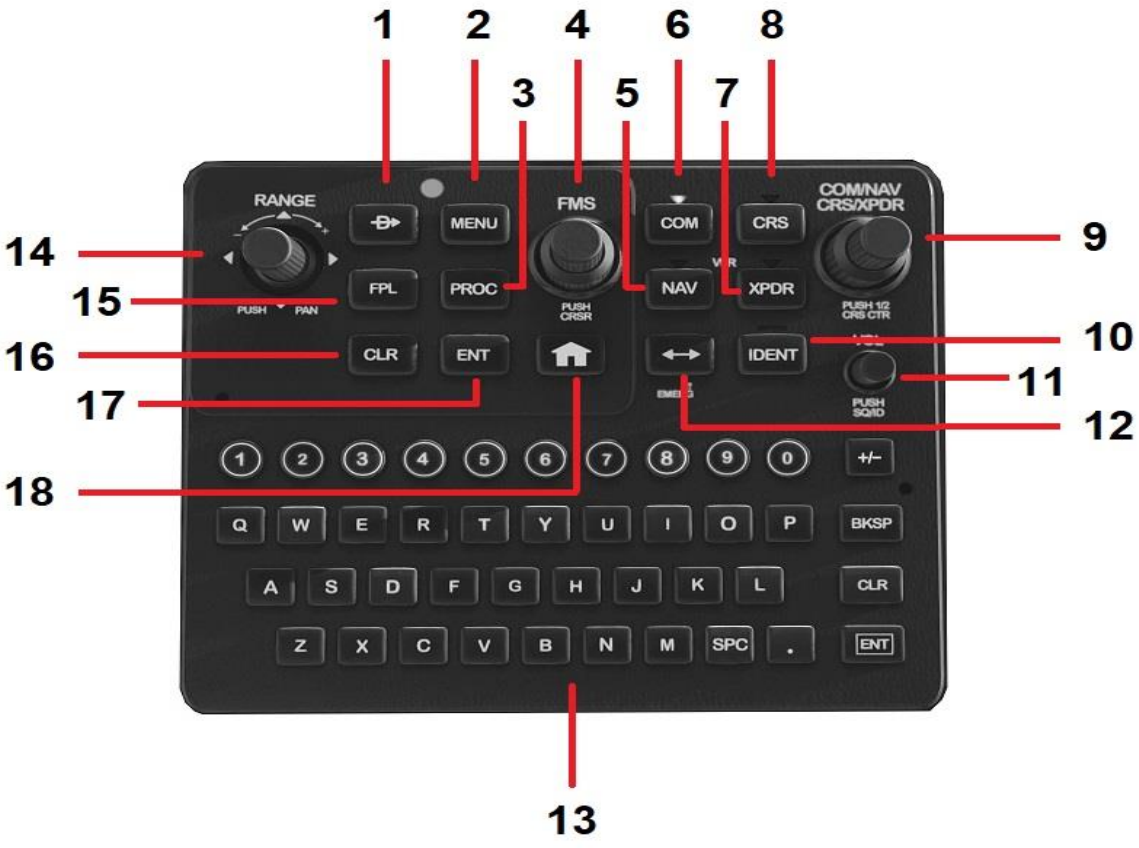
## Battery and Electrical Panel


| | | |
|---|---|---|
| **STARTER KEY** | Use the starter key to select Left, Right or Both Magnetos, and to engage the starter-motor. This control operates as a Rotary Control. | Magnetos generate electrical sparks for the engine. This aircraft is equipped with twin magnetos for redundancy, and the aircraft is capable of operating on just a single magneto. |
| **BAT 1** | Powers the aircraft's electrical systems that are connected to battery bus 1. | Essential buses are powered from battery 1 and battery 2 Non-essential buses, and the starter-motor are powered from battery 1 only. |
| **BAT 2** | Powers the aircraft's electrical systems that are connected to battery bus 2. | Essential buses are powered from battery 1 and battery 2 Non-essential buses, and the starter-motor are powered from battery 1 only. |
| **ALT 1** | Charges battery 1 | Alternator provides charge to battery when engine is running and RPMs and sufficiently high. |
| **ALT 2** | Charges battery 2. | Alternator provides charge to battery when engine is running and RPMs and sufficiently high. |
| **NAV** | Activates the navigation lights. | Red, green, and white lights to provide visibility and directional information to other pilots. |

| | | |
|---|---|---|
| **STROBE** | Activates the strobe lights. | The wingtip-mounted strobe lights provide additional visibility to other aircraft once airborne. These can be distracting when used on the ground. |
| **ICE** | Illuminates the leading edges of the wings. | When it is dark, this provides the pilot with visibility of ice buildup on the leading edges of the wings. |
| **PITOT HEAT** | Activates the pitot tube heating element. | The pitot tube is used to provide airspeed information to the pilot. Ice formation in the tube can lead to erroneous airspeed readings. |
| **ICE PROTECT** | Set to ON to inject de-icing fluid along the wing, horizontal stabilizer, and propeller blades. | Use NORM when icing conditions are encountered and prior to icing occurring.<br><br>Use MAX when ice buildup has occurred. MAX switch does not toggle – it must be held in position for the duration of the process. |
| **PUMP BKUP** | Activates backup de-icing fluid pump. | |
| **WIND SHLD** | Injects de-icing fluid onto the external windshield. | |
| **INSTRUMENT LIGHTING** | These rotary controls vary the intensity of the instrument panel front-lighting, and back-lighting. | |

## G1000 Control Panel

This panel features shortcut controls for the Primary Flight Display (PFD) and Multi-Function Display (MFD). See also: PFD Controls & Features and MFD Controls and Features



| | | |
|---|---|---|
| **1** | Direct To (a waypoint) | Used together with the FMS rotary combo to select a waypoint and compute a direct course. |
| **2** | MENU Key | Displays menu of options for the current mode the MFD is operating in (context-driven). |
| **3** | PROC Key | Selects approaches, departures and arrivals associated with a waypoint in the flight plan. |
| **4** | **FMS Rotary** | Click the center of this control to activate the flight plan cursor (when the Flight Plan Page is displayed). When viewing the flight plan, use the outer rotary to SELECT the next or previous waypoint.<br><br>Use the inner rotary to commence input of a new waypoint, and to change each character in the waypoint identifier. Use the outer rotary to move to the next or previous character within the waypoint identifier. |
| **5** | **NAV Button** | Used together with the COM / NAV / CRS / XPDR rotary combo (to the right).<br><br>Click to change the (highlighted) standby nav radio frequency on the MFD.<br><br>Hint: You may also use the keypad below to input the desired frequency. |
| **6** | **COM Button** | Used together with the COM / NAV / CRS / XPDR rotary combo (to the right).<br><br>Click to change the (highlighted) standby com radio frequency on the PFD.<br><br>Hint: You may also use the keypad below to input the desired frequency. |
| **7** | **XPDR Button** | Used together with the COM / NAV / CRS / XPDR rotary combo (to the right).<br><br>Click to change the transponder code on the PFD.<br><br>Hint: You may also use the keypad below to input the desired code. |

| | | |
|---|---|---|
| **8** | **CRS Button** | Used together with the COM / NAV / CRS / XPDR rotary combo (to the right).<br><br>Click to change the VOR course (radial) on the PFD.<br><br>Hint: You may also use the keypad below to input the desired code. |
| **9** | **COM/NAV/CRS/XPDR Rotary Combo** | Used together with the COM / NAV / CRS / XPDR buttons.<br><br>In COM mode this rotary combo changes the highlighted standby com radio frequency on the PFD.<br><br>In NAV mode this rotary combo changes the highlighted standby nav radio frequency on the MFD.<br><br>In CRS mode this rotary combo changes the VOR course radial.<br><br>In XPDR mode this rotary combo can be used to select the transponder code. |
| **10** | **IDENT Button** | Places the transponder in 'IDENT' mode, which highlights this aircrafts location to ATC. |
| **11** | Not Modeled | |
| **12** | **Frequency Toggle Button** | When in COM mode this button toggles the highlighted standby and active com radio frequencies on the PFD.<br><br>When in NAV mode this button toggles the highlighted standby and active nav radio frequencies on the MFD. |
| **13** | **Keypad** | Provides a shortcut method of inputting text and numeri's for waypoints, frequencies and transponder code. |
| **14** | **Range Rotary** | Changes the zoom level of the map on the MFD. |
| **15** | FPL Button | Invokes the Flight Plan Page on the MFD - to create or edit the active flight plan. |

| | | |
|---|---|---|
| **16** | CLR Button | Click and hold this button to clear the current mode on the MFD and return to the default state. |
| **17** | **ENT Button** | Use the ENTER button to commit commands on the MFD. |
| **18** | **Home Button** | Click this button to clear the current mode on the MFD and return to the default state. |

## Autopilot Controls


This panel features the controls that operate the autopilot, which is described further in the Autopilot Operation chapter.

## Audio Panel


This panel manages the active audio sources.

| | | |
|---|---|---|
| **COM1 / COM2** | Enables or disables audio from the COM1 / COM2 radios, respectively. | Used for speech transmission and reception. |
| **MIC1 / MIC2** | Enables or disables the microphone associated with the COM1 / COM2 radios, respectively. | Used for speech transmission. |
| **NAV1 / NAV2** | Enables or disables the audio Morse code identifier for the navigation aid station currently tuned to the NAV1 / NAV 2 radios, respectively. | |
| **MKR MUTE** | Toggles the audio for the inner and outer (approach) marker beacons. | |
| **PLAY / AUX / PILOT / COPLT / MUS1 / MUS2 / PASS / MAN SQ / SPKR** | Not modeled | |

## Flap Panel


| | | |
|---|---|---|
| **FLAP LEVER** | Deploys and retracts the wing-flaps for takeoff and landing. | This aircraft features two fixed flap positions – 50% (max speed 150 KIAS) and 100% (max speed 110 KIAS). |
| **SUPPLIMENTAL OXYGEN** | Set to ON to enable supplemental oxygen. | Supplemental oxygen can be provided to the occupants via a hose and cannula system. The oxygen level remaining in the cylinder is shown to the left of the switch. The LEDs at the right illuminate when the cabin altitude requires the use of supplemental oxygen (12,000 ft) or when a fault is detected that renders the system unreliable. |

## Throttle Quadrant


| | | |
|---|---|---|
| **THROTTLE** | Combined throttle and propeller RPM control. | This lever controls both the power output by the engine (torque) and propeller RPMs.<br><br>When power is set to high, the propeller governor will automatically maintain 2,700 RPM.<br><br>When power is set between low and high, the propeller governor will automatically maintain 2,500 RPM.<br><br>When power is set to low, the propeller RPMs are not governed automatically. |
| **MIXTURE** | Controls the ratio of fuel to air that enters the engine. Also used to cutoff fuel flow for engine shutdown. | As air pressure reduces with altitude, a 'leaner' mixture helps maintain the ideal fuel to air ratio. |
| **FUEL (TANK) SELECTOR** | Selects either the left, or right fuel tank from which to draw fuel during flight. | |

## Backup Instrumentation


This aircraft features a backup attitude indicator and airspeed/altimeter in the event the G1000 PFD or MFD fail. For redundancy purposes, these backup instruments are powered by battery bus 1. The G1000 PFD (when operating in fail mode) is powered by battery bus 2.

## Parking Brake and Alternate Air selector


| | | |
|---|---|---|
| **PARKING BRAKE** | The parking brake is activated by pulling the lever towards the pilot and released by pushing it away from the pilot. | This may be accomplished by a toggle-click operation. |
| **ALTERNATE AIR SOURCE** | Pull for ON. Push for OFF. | This aircraft is equipped with an Alternate Air Source for engine operations. In icing conditions, the engine air intake can become compromised by ice build-up. Pulling this lever activates the 'Alternate Air Source', which bypasses the air filter and allows warm unfiltered air to enter the engine. |

## G1000 Avionics Panels

### Primary Flight Display (PFD)

This aircraft features the Garmin G1000 avionics system, represented here by the X-Plane ‘X1000’ version.

The X1000 avionics system is comprised of a Primary Flight Display (PFD) on the left, and a Multi-Function Display (MFD) on the right.

The Primary Flight Display incorporates airspeed, altitude, and attitude information, and replaces the traditional ‘six-pack’ gauges found on older aircraft.

The PFD also incorporates capability for flight planning, route display, and radio operations.

A detailed manual for the operation of the X1000 avionics system is available here:

https://x-plane.com/manuals/G1000_Manual.pdf

**Multi-Function Display (MFD)**

This aircraft features the Garmin G1000 avionics system, represented here by the X-Plane ‘X1000’ version.

The X1000 avionics system is comprised of a Primary Flight Display (PFD) on the left, and a Multi-Function Display (MFD) on the right.

The Multi-Function Display incorporates flight-plan input, coupled with GPS, VOR and ILS navigation capability and map display.

The MFD also incorporates an Engine Indication System (EIS) that displays thrust and diagnostic information that is customized to the engine configuration of the host aircraft.

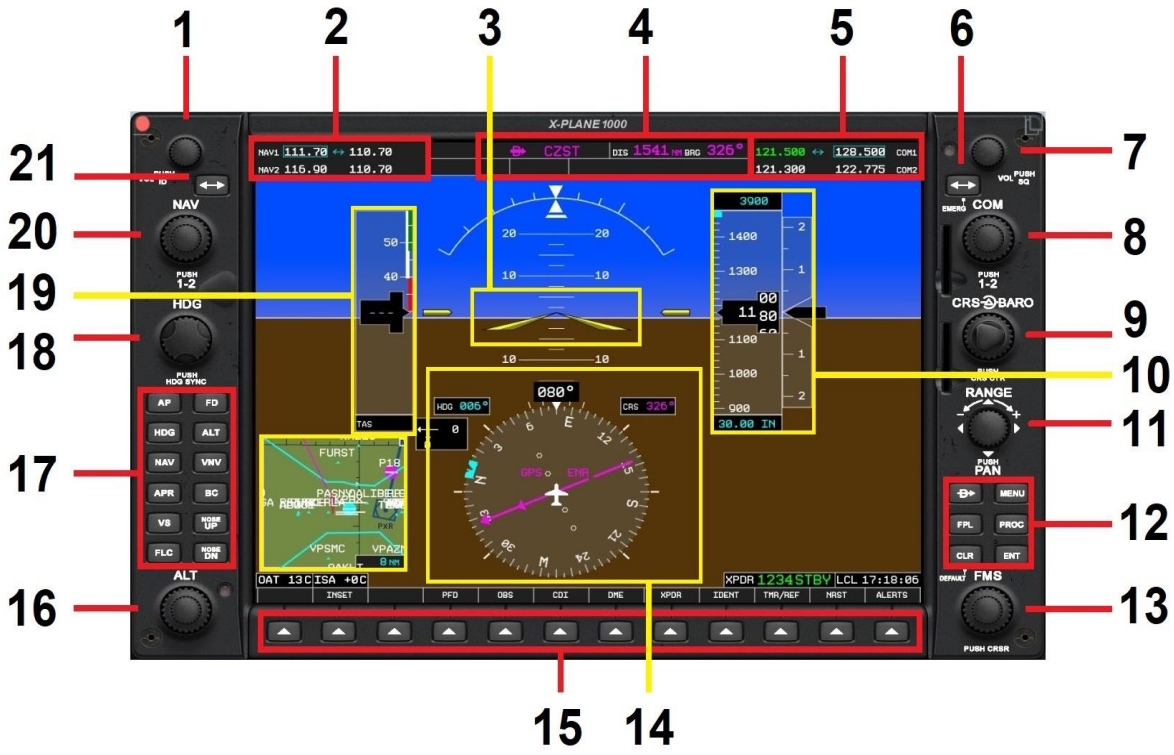
A detailed manual for the operation of the X1000 avionics system is available here:

https://x-plane.com/manuals/G1000_Manual.pdf

## PFD Controls & Features

This section identifies the controls and features of the (pop-up) X1000 PFD (Primary Flight Display). A detailed manual for the operation of the X1000 avionics system is available here: https://x-plane.com/manuals/G1000_Manual.pdf

*Note: The button groups described below are also located in the (upper) 3D center console of this aircraft.*




| | | |
|---|---|---|
| **1** | **NAV Audio Squelch** | Toggles the Morse code audio identifier (of the selected NAV radio frequency) ON and OFF. Note that when toggling to 'Off', the Morse will finish its cycle before the audio is cut. |
| **2** | **Not applicable to this aircraft** | |
| **3** | **Attitude Indicator** | Displays the aircraft's attitude, relative to the horizon.<br><br>In Flight Director mode, displays an inverted-V style Flight Director |

| | | |
|---|---|---|
| **4** | **Next Waypoint** | This area of the display panel features the next waypoint in your flight plan, together with the distance and bearing to that waypoint from the current location. |
| **5** | **Active & Stand-by COM1 and COM Frequencies** | This area of the display panel features the active and stand-by frequencies for the COM1 and COM2 radios. The active frequency is on the left, and the stand-by frequency is on the right. |
| **6** | **COM Frequency Toggle** | Toggles between the active and stand-by COM1 or COM2 radio frequency. |
| **7** | **COM Audio Squelch** | Toggles the audio of the selected COM radio frequency ON and OFF. Note that when toggling to 'Off', the message will finish before the audio is cut. |
| **8** | **COM Rotary** | Click the center of this control to switch between COM1 and COM2 in the 'Active & Standby COM Frequencies' area.<br><br>Use the outer and inner rotary controls to adjust the numeric and decimal portion of the stand-by COM frequency respectively. |
| **9** | **CRS/BARO Rotary** | Use the outer rotary control to set the altimeter barometric pressure.<br><br>Use the inner rotary control to adjust the CDI (Course Deviation Indicator) when the HSI is in VOR/LOC or GPS-OBS mode.<br><br>Pressing the inner rotary will reset the selected course to the bearing or the localizer front course, depending on selected navigation source. |

| | | |
|---|---|---|
| **10** | **Altimeter** | Displays current altitude, Baro Minimum Reference Altitude, Autopilot Selected Altitude, Vertical Speed, and Barometric Altimeter Setting. |
| **11** | **Joystick** | This rotary control adjusts the map range (zoom level) display). Rotate clockwise to zoom out, and counterclockwise to zoom in. Push in the center to activate or de-activate panning. |
| **12** | **Flight Plan Key Group** | Direct-to Key: Used to establish a direct course to a selected waypoint, or Map Pointer position.<br><br>FPL Key: Invokes the Flight Plan Page, to create or edit the active flight plan.<br><br>CLR Key: Cancel or erase an entry. Click and HOLD this key to clear pages from the main display.<br><br>MENU Key – Displays menu of options that is context-driven.<br><br>PROC Key – Selects approaches, departures and arrivals associated with a waypoint in the flight plan.<br><br>ENT Key – Confirms the current selection or operation. |
| **13** | **FMS Rotary** | Click the center of this control to activate the flight plan cursor (when the Flight Plan Page is displayed). When viewing the flight plan, use the outer rotary to SELECT the next or previous waypoint. Use the inner rotary to commence input of a new waypoint, and to change each character in the waypoint identifier. Use the outer rotary to move to the next or previous character within the waypoint identifier. |

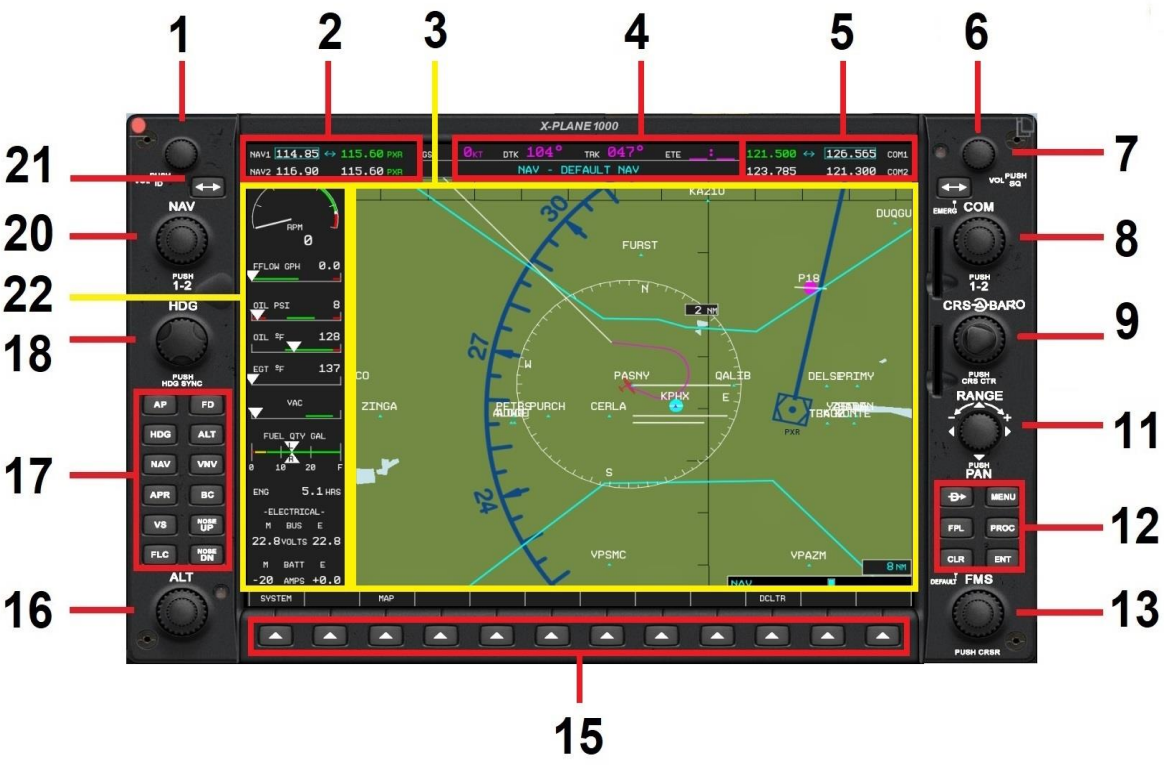
| | | |
|---|---|---|
| **14** | **Horizontal Situation Indicator (HSI)** | Displays the (magnetic) heading currently being flown. Also supported is an adjustable heading bug used together with the autopilot (in HDG mode), and a course indicator (GPS flight plan, or a VOR). Bearing pointers can also be displayed here. |
| **15** | **Soft Keys** | Context-driven keys. The function of these keys will depend on the action being performed by the pilot. |
| **16** | **ALT Rotary** | Used to select the Autopilot Selected Altitude (displayed above the altimeter). The Autopilot Selected Altitude is used by the Autopilot in certain modes and operations, such as altitude hold or altitude capture.<br><br>The outer rotary increments or decrements in units of 1,000 feet. The inner rotary increments or decrements in units of 100 feet. |
| **17** | **Autopilot Key Group** | Autopilot mode control – see Autopilot Panel |
| **18** | **HDG Rotary** | Used to a control the heading bug which forms part of the HSI. Click the center of this rotary to synchronize the heading bug with the current heading.<br><br>Click the rotary at the 9-o'clock position to move the heading bug clockwise, and the 3-o'clock position to move the heading bug counter-clockwise. |

| | | |
|---|---|---|
| **19** | **Airspeed Indicator** | Displays the Airspeed in knots (relative to the air around the aircraft).<br><br>Numeric labels are shown at intervals of 10 knots. Minor increments are shown at intervals of five knots.<br><br>A color-coded speed range is also displayed, which differs for individual aircraft. The colors denote flaps operating range (white), normal operating range (green), caution range, and never-exceed speed (red). A red range is also present for airspeeds that are dangerously low.<br><br>On twin-engine aircraft, a red mark for $V_{MC}$ and a blue mark for $V_{YSE}$ will be displayed on the speed tape. |
| **20** | **NAV Rotary** | Click the center of this control to switch between COM1 and COM2 in the 'Active & Standby COM Frequencies' area.<br><br>Use the outer and inner rotary controls to adjust the numeric and decimal portion of the stand-by NAV frequency respectively. |
| **21** | **NAV Frequency Toggle** | Toggles between the active and stand-by COM1 or COM2 radio frequency. |

## MFD Controls & Features

This section identifies the controls and features of the (pop-up) X1000 MFD (Multi-Function Display). A detailed manual for the operation of the X1000 avionics system is available here: https://x-plane.com/manuals/G1000_Manual.pdf

*Note: The button groups described below are also located in the (upper) 3D center console of this aircraft.*



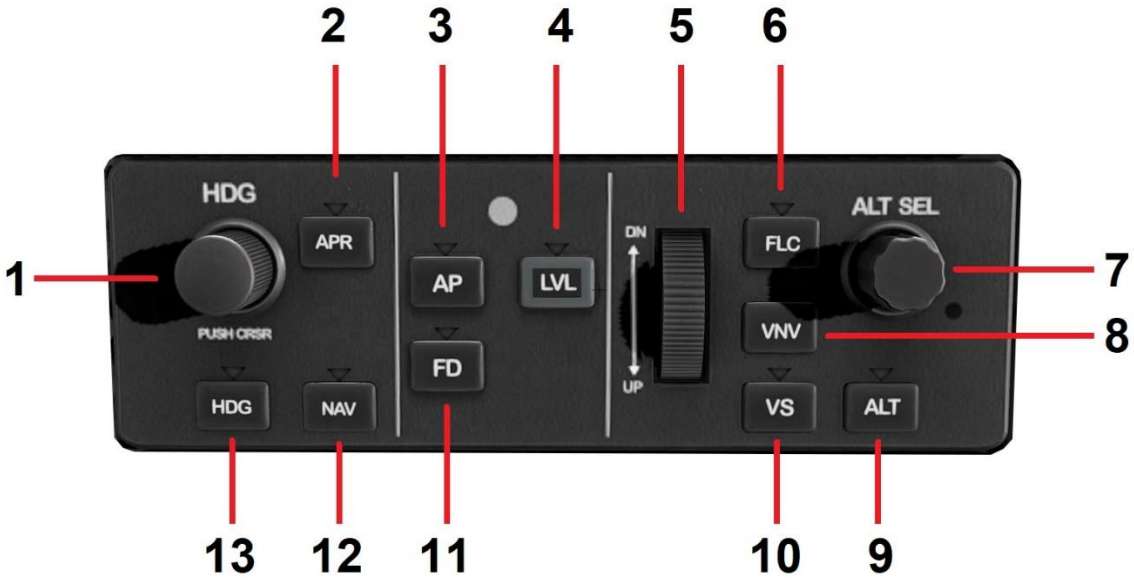

| | | |
|---|---|---|
| **1** | **NAV Audio Squelch** | Toggles the Morse code audio identifier (of the selected NAV radio frequency) ON and OFF. Note that when toggling to 'Off', the Morse will finish its cycle before the audio is cut. |
| **2** | **Active & Stand-by NAV1 and NAV2 Frequencies** | This area of the display panel features the active and stand-by frequencies for the NAV1 and NAV2 radios. The active frequency is on the right, and the stand-by frequency is on the left. |

| | | |
|---|---|---|
| **3** | **Navigation Map** | The Navigation Map displays aviation data (airports, VORs, airways, airspaces), geographic data (cities, lakes, highways, borders), topographic data (map shading indicating elevation), and hazard data (traffic, terrain, weather) |
| **4** | **Data Fields** | This area of the display panel shows information pertaining the activate navigation leg. It shows ground speed (GS), desired track (DTK) to the active waypoint, ground track (TRK) and estimated time enroute (ETE) to the active waypoint. |
| **5** | **Not applicable to this aircraft** | |
| **6** | **COM Frequency Toggle** | Toggles between the active and stand-by COM1 or COM2 radio frequency. |
| **7** | **COM Audio Squelch** | Toggles the audio of the selected COM radio frequency ON and OFF. Note that when toggling to 'Off', the message will finish before the audio is cut. |
| **8** | **COM Rotary** | Click the center of this control to switch between COM1 and COM2 in the 'Active & Standby COM Frequencies' area.<br><br>Use the outer and inner rotary controls to adjust the numeric and decimal portion of the stand-by COM frequency respectively. |
| **9** | **CRS/BARO Control** | Use the outer rotary control to set the altimeter barometric pressure.<br><br>Use the inner rotary control to adjust the CDI (Course Deviation Indicator) when the HSI is in VOR/LOC or GPS-OBS mode.<br><br>Pressing the inner rotary will reset the selected course to the bearing or the localizer front course, depending on selected navigation source. |

| | | |
|---|---|---|
| **11** | **Joystick** | This rotary control adjusts the map range (zoom level) display). Rotate clockwise to zoom out, and counterclockwise to zoom in. Push in the center to activate or de-activate panning. |
| **12** | **Flight Plan Key Group** | Direct-to Key: Used to establish a direct course to a selected waypoint, or Map Pointer position.<br><br>FPL Key: Invokes the Flight Plan Page, to create or edit the active flight plan.<br><br>CLR Key: Cancel or erase an entry. Click and HOLD this key to clear pages from the main display.<br><br>MENU Key – Displays menu of options that is context-driven.<br><br>PROC Key – Selects approaches, departures and arrivals associated with a waypoint in the flight plan.<br><br>ENT Key – Confirms the current selection or operation. |
| **13** | **FMS Rotary** | Click the center of this control to activate the flight plan cursor (when the Flight Plan Page is displayed). When viewing the flight plan, use the outer rotary to SELECT the next or previous waypoint. Use the inner rotary to commence input of a new waypoint, and to change each character in the waypoint identifier. User the outer rotary to move to the next or previous character within the waypoint identifier. |
| **15** | **Soft Keys** | Context-driven keys. The function of these keys will depend on the action being performed by the pilot. |

| | | |
|---|---|---|
| **16** | **ALT Rotary** | Used to select the Autopilot Selected Altitude (displayed above the altimeter). The Autopilot Selected Altitude is used by the Autopilot in certain modes and operations, such as altitude hold or altitude capture.<br><br>The outer rotary increments or decrements in units of 1,000 feet. The inner rotary increments or decrements in units of 100 feet. |
| **17** | **Autopilot Key Group** | Autopilot mode control – see Autopilot Panel |
| **18** | **HDG Rotary** | Used to a control the heading bug which forms part of the HSI. Click the center of this rotary to synchronize the heading bug with the current heading.<br><br>Click the rotary at the 9-o'clock position to move the heading bug clockwise, and the 3-o'clock position to move the heading bug counter-clockwise. |
| **20** | **NAV Rotary** | Click the center of this control to switch between COM1 and COM2 in the 'Active & Standby COM Frequencies' area.<br><br>Use the outer and inner rotary controls to adjust the numeric and decimal portion of the stand-by NAV frequency respectively. |
| **21** | **NAV Frequency Toggle** | Toggles between the active and stand-by COM1 or COM2 radio frequency. |
| **22** | **Engine Indication System (EIS)** | Displays dial gauge(s), horizontal bar indicators, and other readouts for critical engine and electrical systems. This is context-driven and depends on the aircraft-type. See: [MFD] Engine Indication System (EIS) |

# Autopilot Operation




| | | |
|---|---|---|
| 1 | **HDG (Heading Rotary)** | Used together with the PFD heading bug.<br><br>Sets the desired heading. |
| 2 | **APR (Approach)** | Approach mode is engaged to fly an ILS approach. NAV mode will also engage by default. The autopilot will capture the localizer and glideslope associated with the active NAV1 or NAV2 frequency (highlighted in the upper-left corner of the MFD).<br><br>When the aircraft captures the glideslope, and begins descending, the pilot is responsible for managing the airspeed (using the throttle).<br>Note: The autopilot may not capture the ILS if extreme maneuvers are required to accomplish this. The pilot should therefore position the aircraft close to the localizer and glideslope, and in stable flight, before engaging APR mode. |
| 3 | **AP (Autopilot)** | Used to couple or disable the autopilot. |
| 4 | **LVL (Level)** | Used to engage the autopilot in (wing) level mode. The autopilot will level the wings (and maintain this condition) only. |
| 5 | **DN / UP (Vertical Speed Rotary)** | Used together with VS or FLC modes.<br><br>Sets the desired vertical speed. |

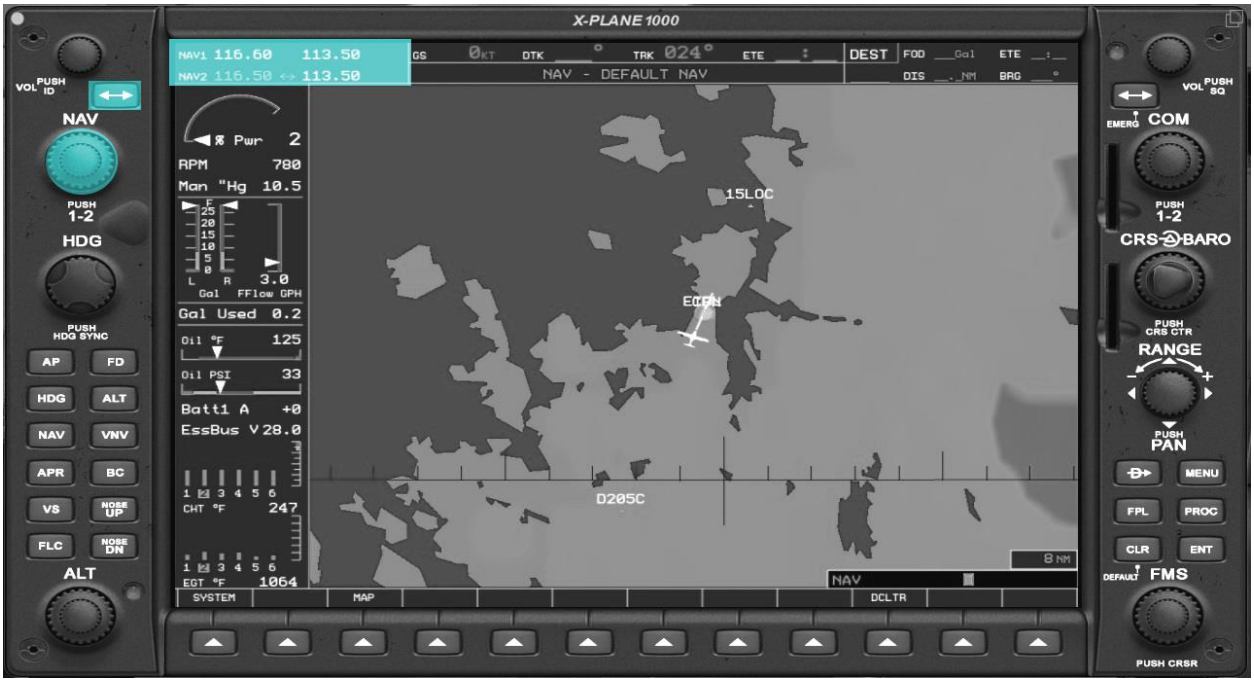
| | | |
|---|---|---|
| **6** | **FLC (Flight Level Change)** | Used together with a pre-selected altitude.<br><br>FLC mode maintains (current) airspeed when climbing or descending to the pre-selected altitude. The pilot will need to change the throttle setting to initiate a climb, or descent as required. |
| **7** | **ALT SEL (Altitude Select Rotary)** | Used together with VS or FLC modes to ascend or descend to a pre-selected altitude.<br><br>Sets the desired altitude. |
| **8** | **VNV (VNAV)** | Used together with a flight plan.<br><br>Maintains the vertical component of the current flight plan. |
| **9** | **ALT (Altitude Hold)** | Holds the current altitude. |
| **10** | **VS (Vertical Speed Set)** | Used together with a pre-selected altitude and the **DN / UP** rotary.<br><br>Maintains the selected rate of climb or descent (vertical speed). |
| **11** | **FD** | Toggles Flight Director mode on the PFD. |
| **12** | **NAV (Navigation)** | Used in conjunction with a flight plan, VOR or ILS.<br><br>Maintains the horizontal component of the current flight plan.<br><br>Maintains the selected VOR radial or ILS localizer associated with the active NAV1 or NAV2 frequency (highlighted in the upper-left corner of the MFD). |
| **13** | **HDG (Heading Hold)** | Used together with the HDG (heading) and heading bug on the PFD.<br><br>Maintains the selected heading. |

# ILS Approach

An I**nstrument Landing System** (ILS) is a ground-based instrument **approach** system that provides precision lateral and vertical guidance to an aircraft approaching and landing on a runway, using a combination of radio signals and, in many cases, high-intensity lighting arrays to enable a safe landing during instrument conditions. The system provides the pilot with a 'localizer' (for lateral guidance) and a 'glideslope' for vertical guidance.

Note: The method illustrated here utilizes the 'pop-up' G1000 avionics panels.

**Set the Nav1 or Nav2 frequency for the ILS approach**

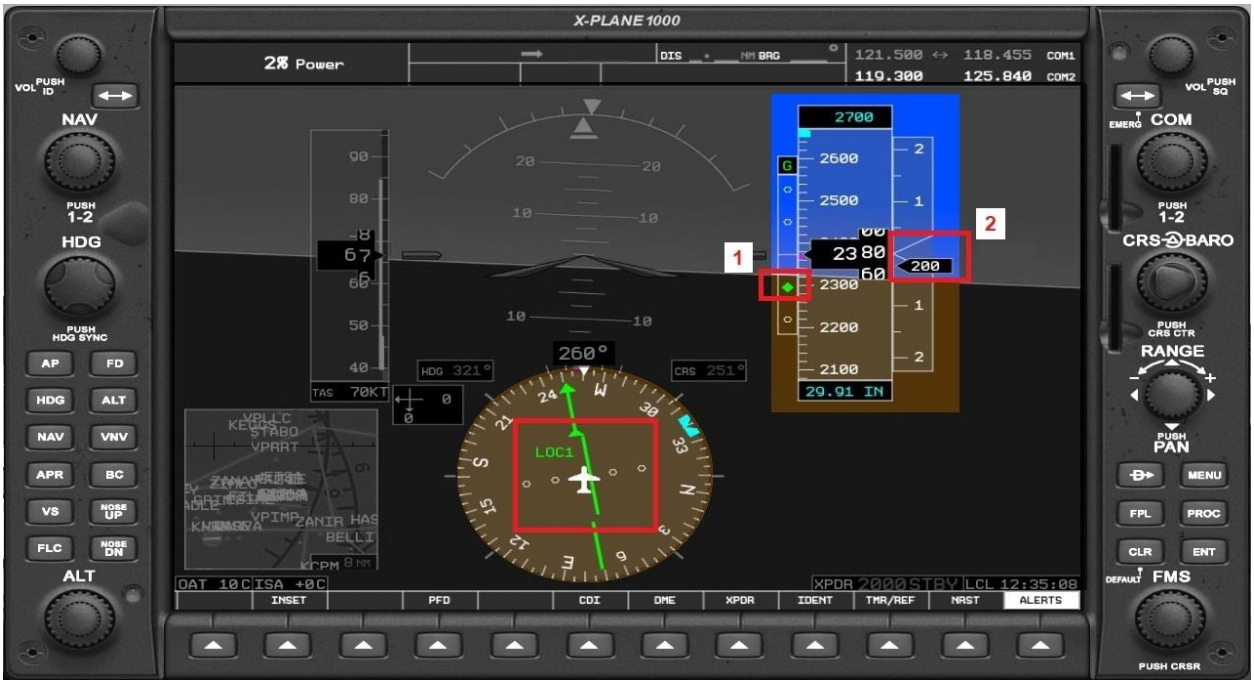



- Click the CENTER of the NAV Rotary to select either NAV1 or NAV2.
- Click the NAV Outer Rotary at the 3 O'clock or 9 O'clock position to increment/decrement the frequency - numeric portion.
- Click the NAV Inner Rotary at the 3 O'clock or 9 O'clock position to increment/decrement the frequency - decimal portion.
- Click the NAV Frequency Toggle Key to swap the standby and active NAV frequency.

**The Course Deviation Indicator (CDI)**

If the ILS frequency was tuned to NAV1, click the CDI button once to select LOC1. If the ILS frequency was tuned to NAV2, click the CDI button again, to select LOC2.

With the appropriate selection made (LOC1 or LOC2), the ILS localizer course deviation indicator (CDI) is superimposed on the Horizontal Situation Indicator (HSI).




Steer a course to intercept the localizer. If this is displayed to the left of the aircraft (within the HSI), steer left. If this is displayed to the right of the aircraft, steer right. In the example above, the aircraft is currently to the left of the localizer - the pilot must steer right to intercept.

**The Glide Slope Indicator and Vertical Speed Pointer**

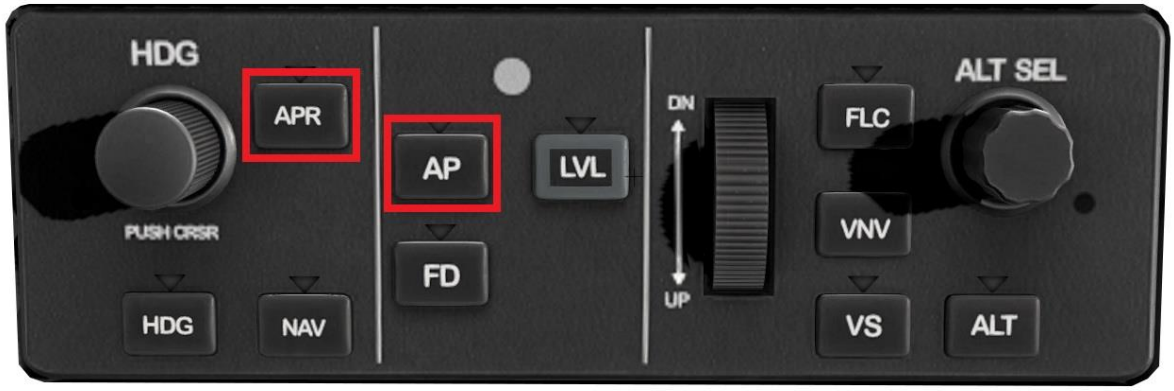
Climb, or descend, to intercept the glideslope. If the Glide Slope Indicator (1) is above center, you are low, and should increase the rate of ascent. If the Glide Slope Indicator (1) is below center, you are high, and should increase the rate of descent.

The Vertical Speed Pointer (2) indicates to the pilot if the aircraft is currently ascending (above center) or descending (below center). The value displayed inside is the current rate of ascent, or descent, in feet per minute.

In the example above, the aircraft is currently above the glideslope and descending at a rate of 200 feet per minute.

**Autopilot Assisted ILS Approach**

After following the steps earlier in this chapter to establish an ILS approach, the pilot may elect for the autopilot to execute this. With the autopilot armed (AP button), and in Approach mode (APR button), the autopilot will follow the localizer and glideslope.




However, during the approach the pilot must maintain the appropriate airspeed manually using the throttle. At the runway threshold the pilot should dis-engage the autopilot (AP button) and conduct a manual flare and braking maneuver.

# Flight Planning

Flight planning is the process of determining a route from origin to destination that considers fuel requirements, terrain avoidance, Air Traffic Control, aircraft performance, airspace restrictions and notices to airmen (NOTAMS).

General information about flight plans is available on Wikipedia at http://en.wikipedia.org/wiki/Flight_planning

Flight plans can be generated by onboard computers if the aircraft is suitably equipped. If not, simulation pilots may elect to use an online flight planner. A web search for the phrase “Flight Planner” will yield a great many options, many of which are free services.

A good online flight planner will utilize the origin and destination airports, together with the aircraft type and equipment, the weather conditions, the chosen cruise altitude, known restrictions along the route, current NOTAMS, and other factors to generate a suitable flight plan. The waypoints incorporated into the flight plan can be subsequently input into the aircraft’s Flight Management Computer (FMS), or Global Positioning System (GPS). Some online flight planners provide the option to save the plan as an X-Plane compatible file, with an ‘fms’ extension. A saved flight plan can be loaded into the GPS or Flight Management System (FMS).

It is recommended the pilot generate a flight plan for the chosen route before using the FMS or GPS units.

***Instructions for operating the Laminar Research FMS and GPS units can be found in separate (dedicated) manuals.***

# Weight & Balance

THIS CHAPTER IS DELIBERATELY LEFT BLANK PENDING REVISIONS TO WEIGHT AND BALANCE UI EXPECTED IN XP12.

# Checklists

The following check lists are designed with the convenience of the simulation pilot in mind and customized to the X-Plane Lancair SR22T. These differ from those of the real aircraft.

### Pre-Flight Exterior Inspection

A Pre-Flight Inspection should always precede flight in any aircraft. The purpose of this inspection is to ensure the aircraft is in a state of readiness for the upcoming flight.

In X-Plane, a pre-flight inspection is not merely undertaken to simulate reality, but does in fact have real purpose, because the control surfaces of the aircraft interact directly with the airflow over and around them, just as in real life. As such, correct movement of all control surfaces is necessary for normal flight.

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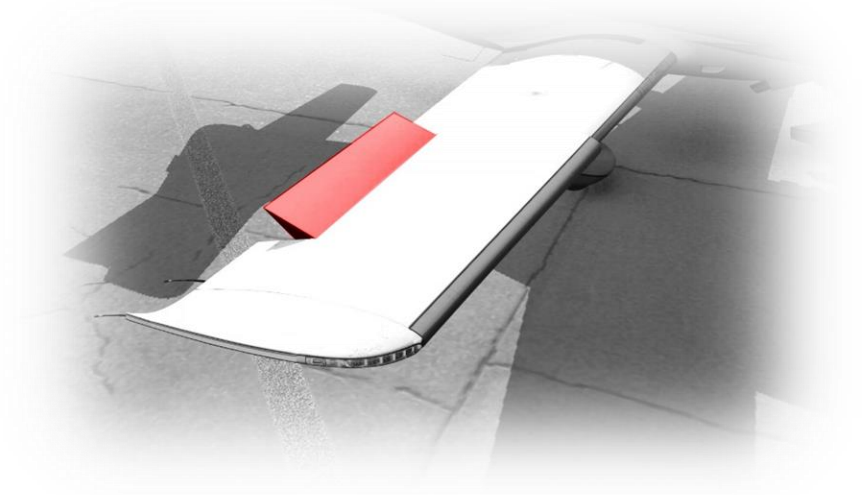
Hold roll axis at full deflection.

Visually check corresponding movement of ailerons.



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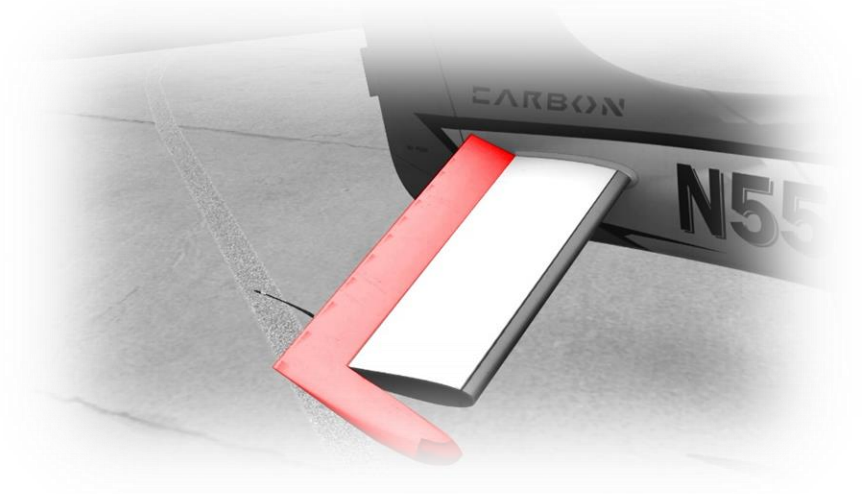
Hold pitch axis at full deflection.

Visually check corresponding movement of elevators.

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Hold yaw axis at full deflection.

Visually check corresponding movement of rudder.

## Cold and Dark to Engine Start

The following check list is a sub-set of the real procedures, and includes only the essential steps leading to engine start:

---

**CABIN DOOR – CLOSED**

Hint: When inside aircraft, use click-spot on interior door handle to open or close cabin door.

---

**MIXTURE – FULL RICH**


---

**THROTTLE - IDLE**


---

**FUEL SELECTOR – AS REQUIRED**

**( LEFT OR RIGHT TANK )**


**BATTERY 1 – ON**

**BATTERY 2 - ON**


**FUEL QUANTITY - CHECK**

**STROBES – ON**

Note: This aircraft does not have a beacon light. The FAA allows the use of strobe lights in place of a beacon, to warn persons in the area that engine start is imminent.

**ENGINE - START**

**ALTERNATOR 1 – ON**

**ALTERNATOR 2 – ON**

**AVIONICS - ON**

## Before Taxi

**ELEVATOR TRIM – TAKEOFF**

Hint: This aircraft does not feature a trim wheel.

Map a peripheral device to the 'Trim Up' and 'Trim Down' commands to move the elevator trim.

Use the pitch indicator on the side stick to determine trim position.


**FLIGHT CONTROLS – CHECKED**

(Pitch / Roll / Yaw)

See: Assigning peripheral devices

**NAV LIGHTS – ON**

**LANDING LIGHTS – ON**

Note: This aircraft does not have separate taxi and landing lights. Landing lights are therefore used for both purposes.

**TRANSPONDER – ON**


**PARKING BRAKE – OFF**

## Before Takeoff

**FLAPS – SET**

(50%)

**ALTIMETER - SET**

**TRANSPONDER – ALT**

## After Takeoff

**FLAPS – RETRACTED**

**THROTTLE – SET AS REQUIRED**

## Cruise

**LANDING LIGHTS - OFF**

**MIXTURE – LEAN AS REQUIRED**


**ALTIMETER - SET**

## Before Landing

**ALTIMETER - SET**


**LANDING LIGHTS - ON**

**MIXTURE – FULL RICH**

**FLAPS – AS REQUIRED**

## Landing

**FLAPS – SET**

(100%)

## After Landing

**FLAPS – RETRACTED**

**TRANSPONDER – ON**

## Parking

**THROTTLE - IDLE**


**PARKING BRAKE – ON**


**MIXTURE – CUT OFF**

**FUEL SELECTOR – OFF**


**TRANSPONDER – STBY**


**ALTERNATOR 2 – OFF**

**ALTERNATOR 1 – OFF**

**AVIONICS - OFF**

**BATTERY 2 – OFF**

**BATTERY 1 - OFF**

# Operating-Speeds

| | | |
|---|---|---|
| Rotate Speed * | Vr | 73 KIAS |
| Stall Speed, Flaps 100%, Power Off | Vso | 60 KIAS |
| Minimum Controllable Speed | Vs | 70 KIAS |
| Best Angle of Climb | Vx | 88 KIAS |
| Best Rate of Climb | Vy | 101 KIAS |
| Best Glide Speed | Vbg | 88 KIAS |
| Maximum flaps Extended Speed | Vfe | 150 KIAS |
| Maximum Maneuvering Speed | Va | 133 KIAS |
| Maximum Structural Speed | Vno | 178 KIAS |
| Never Exceed Speed | Vne | 204 KIAS |
| Maximum Demonstrated Crosswind | | 21 KNOTS |

- *Representative value depending on conditions*