



X-Plane 塞斯纳奖状X霍尼韦尔 FMZ 飞行管理系统

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X-Plane Cessna Citation X Honeywell FMZ Flight Management System

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飞行管理系统

Flight Management Systems



飞行管理系统（FMS）是一种集中式计算机系统，广泛应用于客机及其他高性能航空器，用于管理包括（但不限于）飞行计划在内的多项飞机系统。现代客机依赖FMS自动化执行大量任务，这些任务过去由领航员和机械师完成。FMS的存在降低了驾驶舱工作负荷，使得通常仅需两名机组人员即可操作飞机。

为实现其任务，FMS会与多个飞机系统交互，包括发动机、燃油、液压、电气以及导航设备（如GPS和机载系统）。

惯性导航系统和“导航”无线电设备。

飞行管理系统是由多个组件集成而成的，包括：

- ✓ 多功能控制与显示单元 (MCDU)

这是一个小型屏幕和触控键盘，为飞行员操作飞行管理系统（FMS）提供了界面。

- ✓ 飞行管理计算机

运行该系统的计算机硬件和软件。这些设备飞行员在驾驶舱内看不到，通常位于飞机的其他位置。

- ✓ 主飞行显示器 (PFD) / 导航显示器 (ND) / 发动机指示 / 机组警示系统 (EICAS)

一台或多台电子显示器（通常为CRT或LCD），可向飞行员提供导航指引和信息、发动机性能以及飞机系统信息（具体内容取决于所选模式）。



A Flight Management System (FMS) is a centralized computer system used in airliners, and other high-performance aircraft, to manage many of the aircraft systems, including (but not limited to) the flight plan.

Contemporary airliners rely on the FMS to automate a wide variety of tasks, previously performed by navigators and flight engineers. The presence of an FMS reduces the workload in the cockpit, allowing the aircraft to be operated by (usually) just two crew members.

To accomplish its assigned tasks, an FMS will interface with many aircraft systems, including engine, fuel, hydraulic, electrical, and navigation devices such as GPS, the on-board Inertial Navigation System, and the "Nav" radios.

A Flight Management System is an integration of several components, including:

- ✓ Multipurpose Control & Display Unit (MCDU)

A small screen and touch-keypad that provides the interface through which the pilot operates the FMS.

- ✓ Flight Management Computer

The computer hardware and software that runs the system. This is not visible to the pilot in the cockpit and is usually located elsewhere in the aircraft.

- ✓ Primary Flight Display (PFD) / Navigation Display (ND) / Engine Indication / Crew Alerting System (EICAS)

One or more electronic displays (usually CRT or LCD) that provide the pilot with navigation direction and information, engine performance, and aircraft system information (depending on the mode selected).

X-Plane西塔申X 飞行管理 System

Laminar Research/X-Plane 的 Citation X 飞行管理系统与霍尼韦尔 FMZ 系统相似，该系统被广泛应用于多款公务机，包括赛斯纳、湾流、庞巴迪、达索和霍克等制造商的产品。

竞争系统由泰利斯和柯林斯制造。尽管存在差异，这些系统执行的许多功能是相同的。

由于现实生活中的飞行管理系统极为复杂，X-Plane 中所建模的版本进行了简化，并不支持所有功能。然而，用于编程和执行飞行计划的必要功能都已具备，包括使用已发布的进场和离场程序（SID 和 STAR）以及仪表进近。

“弹出式”MCDU和无线电面板

为了方便起见，X-Plane 塞斯纳奖状 X 提供了弹出式 MCDU 和无线电面板。这些二维面板可以根据飞行员的需求进行移动和调整大小。本文指南将仅介绍弹出式 MCDU 和无线电面板。然而，同样的指令也可以通过内置于三维驾驶舱中的面板输入。

调用、“弹出”窗口的移动、调整大小和关闭 “上方”面板

调出弹出式MCDU和无线电面板



要呼出弹出式MCDU和无线电面板，请将鼠标指针置于3D驾驶舱内任一面板的显示区域并点击。
参见左侧图片中的高亮区域。

The X-Plane Citation X Flight Management System

The Laminar Research / X-Plane Citation X flight management system resembles the Honeywell FMZ system, which is used in many business jets, including those manufactured by Cessna, Gulfstream, Bombardier, Dassault, and Hawker.

Rival systems are built by Thales and Collins. Despite differences, these systems perform many of the same functions.

Due to the immense complexity of a real-life flight management system, the version modelled in X-Plane is simplified and does not support every capability. However, the functions necessary to program and execute a flight plan are present, including the use of published arrival and departure procedures (SIDs and STARs) and instrument approaches.

The “Pop-Up” MCDU and Radio Panel

For convenience, a pop-up MCDU and radio panel is provided in the X-Plane Cessna Citation X. These 2D panels can be moved and sized per the needs of the pilot. For the purposes of this guide, we will present the pop-up MCDU and radio panels only. However, commands may also be input using the same panels built into the 3D cockpit.

Invoking, moving, sizing, and closing the “Pop-Up” panels

Invoking the pop-up MCDU and radio panels



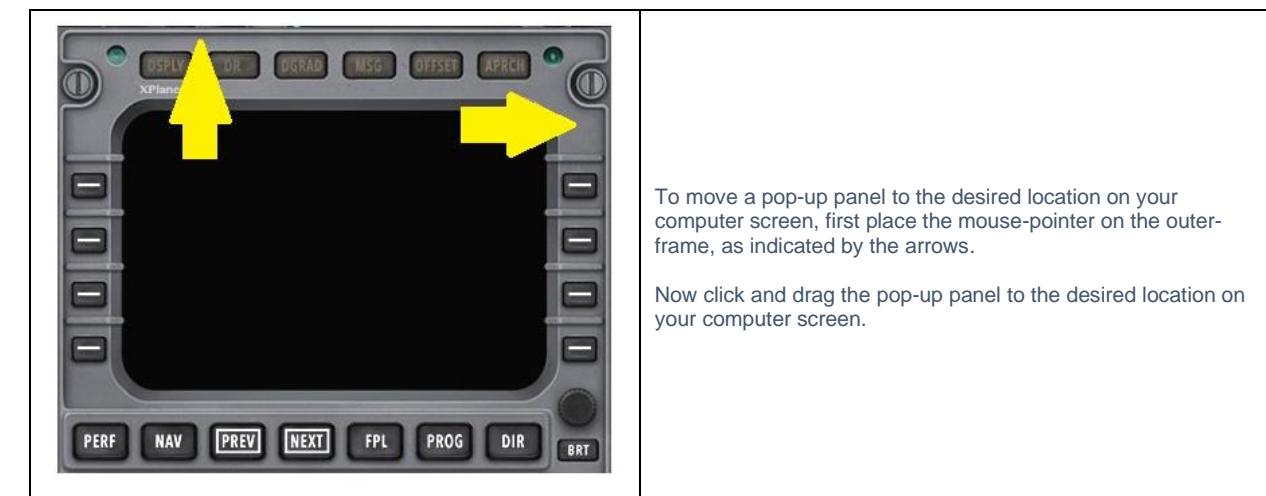
To invoke the pop-up MCDU and radio panels, position and click the mouse-pointer anywhere inside the **DISPLAY** area of either panel in the 3D cockpit.

See highlighted areas in image to left.

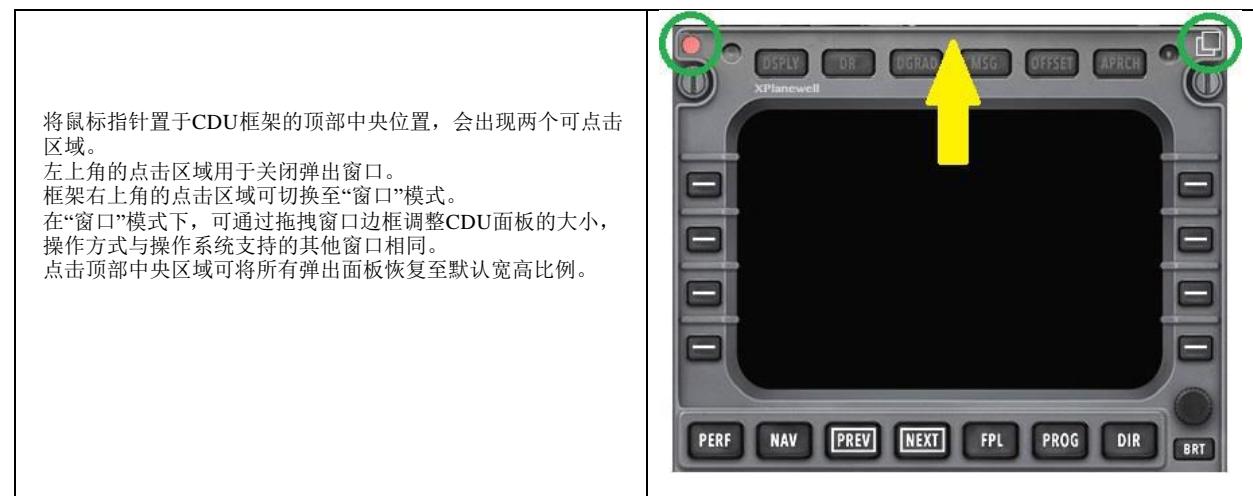
移动弹出面板



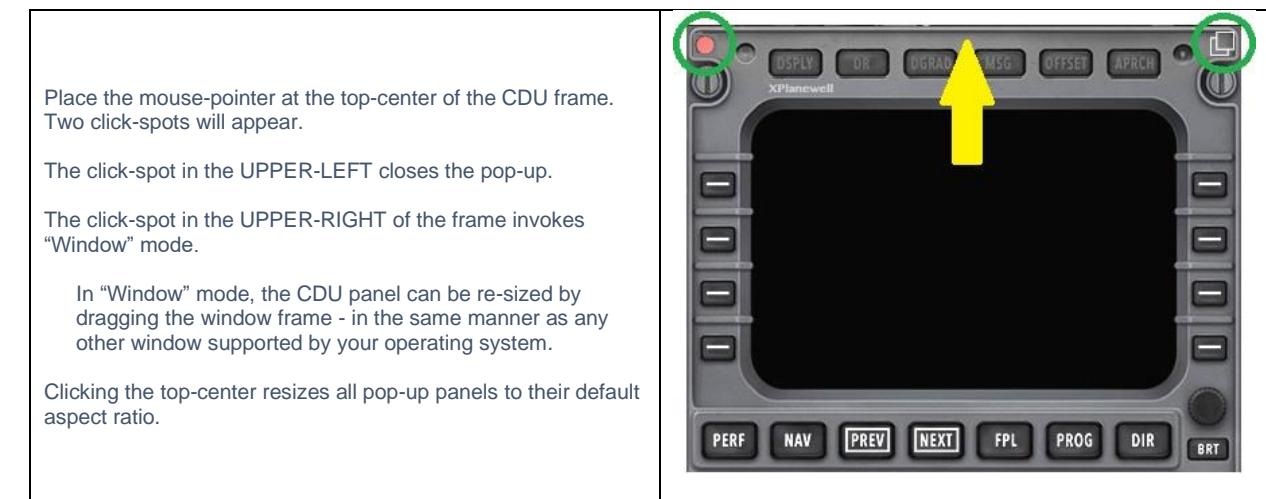
Moving a pop-up panel



调整和关闭弹出面板



Re-sizing and closing a pop-up panel



MCDU 的组成部分

控制显示单元（CDU）为飞行员与飞行管理计算机（FMC）之间提供接口。它由一个显示面板，以及一组根据功能分组排列的按键。



显示

该面板提供简单输出向飞行员显示允许他编程该单元，制作指令，并选择可用选项

选项。



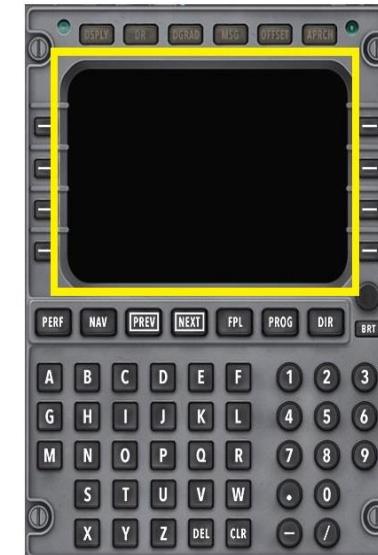
草稿板

MCDU的这一区域显示用于键盘输入。
模拟飞行游戏的输入操作飞行员初始此处显示，之前
线路选择键选定，移动此将文本翻译至合适位置
MCDU行显示（在

草稿板

Components of the MCDU

The Control Display Unit (CDU) provides the interface between the pilot and the flight management computer (FMC). It consists of a display panel, and a series of keys that are grouped together according to their function.



Display

This panel provides a simple output display to the pilot, allowing him to program the unit, make commands, and select available options.



Scratch Pad

This area of the MCDU Display is used for keypad input.
Inputs made by the pilot are initially displayed here, before a Line Select Key is chosen, to move this text to the appropriate line of the MCDU display (above the scratch pad).



Line Select Keys

These keys are used to make selections from the options provided alongside them, in the MCDU Display.



Keypad

Used to input text into the scratch pad area on the MCDU display.



航线选择键这些按键是用来制作模拟飞行游戏提供的选项在他们旁边，MCDU显示屏。

左侧按键设备侧面对齐选项开启时左侧的显示，反之亦然

反之亦然。



键盘

用于输入文本到便笺区

在MCDU显示屏上。



清除键

这些按键用于清除文本
当前显示于



“草稿板”

通过“页面”



Page Keys

These keys are
used to select the
page presented in
the Display Area.

The primary
functions of the
CDU are grouped
by "Page". This
simplifies the
presentation and
provides a logical
workflow to the pilot.



Clear Key

These key clears text
currently displayed in
the "Scratch Pad"

编程CDU

在本指南的本节中，飞行员将使用初始化数据对CDU进行编程，随后手动输入飞行计划。本例中使用的飞行计划始于EDDS（斯图加特），终点为EDDF（法兰克福）。

我们将从EDDS机场的25号跑道起飞，并采用ETAS4B标准仪表离场程序（SID）。

飞行计划中的航路段将沿着“Z12”空中航路飞往TOSTU。

我们将通过CHA过渡航路点和SPES3B标准进场程序（STAR）抵达法兰克福机场（EDDF），随后执行25号跑道的仪表着陆进近（ILS）。

完整航线如下：

EDDS25 ETAS4B KETEG Z12 TOSTU CHA SPES3B ILS25L

重要

飞行计划中的航路点和程序会随着时间而变化。此处使用的示例飞行计划可能已不再是最新的，其中一些这些航路点在飞行过程中可能无法选择，因此不建议尝试复制。

以下步骤适用于X-Plane——但请将下方示例仅作为输入和管理个人飞行计划的参考指南。

加载之前保存的飞行计划将在本指南后续的“加载（已保存）飞行计划”部分进行讨论。

Programming the CDU

In this section of the guide, the pilot will program the CDU with initialization data, followed by a manually input flight plan.

The flight plan used in this example originates at EDDS (Stuttgart) and terminates at EDDF (Frankfurt).

We will depart runway 25 at EDDS and use the ETAS4B Standard Instrument Departure (SID).

The route-segment of the flight plan will be via the “Z12” AIRWAY to TOSTU.

We will arrive EDDF via the CHA transition waypoint and the SPES3B Standard Instrument Arrival (STAR), followed by the ILS approach to runway 25.

The full route is as follows:

EDDS25 ETAS4B KETEG Z12 TOSTU CHA SPES3B ILS25L

Important

Flight plan waypoints and procedures change over time. The sample flight plan used here may no longer be current, and some of these waypoints may not be available for selection during your flight. Therefore, it is not recommended you attempt to duplicate these steps in X-Plane - but instead use the examples below as guidelines for inputting and managing your own flight plan.

Loading a previously saved flight-plan is discussed later in this guide, in the section [Loading a \(saved\) Flight Plan](#).

飞行计划（FPL）页面

“FPLN”按钮用于调出飞行计划（FPL）页面，以输入和显示航路及相关程序。接下来的飞行。



点击FPL按钮调出飞行计划页面。此页面用于输入和显示:

- ✓ 离场程序
进场程序
- ✓ 航路飞行计划

Flight Plan (FPL) Page

The “FPLN” button is used to invoke the FLIGHT PLAN (FPL) page, for inputting and displaying the route and procedures for the upcoming flight.



Click the FPL button to invoke the FLIGHT PLAN page.

This page is used to input and display the:

- ✓ Departure procedure
- ✓ Arrival procedure
- ✓ En-route flight plan

起飞机场



在草稿栏中输入起飞机场代码。
点击相邻于“ORIGIN”的行选键以填充此项。

Origin Airport



Input the origin airport code into the scratch pad.

Click the line-select key adjacent to ORIGIN to populate this.

目的地机场



在便签中输入目的地机场代码。点击DEST旁边的行选键以填入该信息。

Destination Airport



Input the destination airport code into the scratch pad.

Click the line-select key adjacent to DEST to populate this.

起飞程序设定



提示：如果未显示“离场”选项，请点击FPL页面键以调用飞行计划页面。
点击“离场”旁边的行选键。



点击所需跑道旁的行选键。在本示例中，我们将从25号跑道起飞。
提示：如有需要，可使用PREV（上一页）和NEXT（下一页）键滚动至目标跑道。

Programming the Departure



Hint: Click the FPL Page Key to invoke the Flight Plan page if the 'Departure' option is not already presented.

Click the line-select key adjacent to 'DEPARTURE'.



Click the line select key adjacent to the desired runway. In this example, we are departing on runway 25.

Hint: Use the PREV and NEXT Page Keys to scroll the desired runway into view if needed.

选择标准仪表离场程序 (SID)



标准仪表离场 (SID) 航线，又称离场程序 (DP)，是遵循IFR飞行计划的飞机在机场起飞后立即执行的已公布飞行程序[来源：维基百科]
为所选跑道选择所需的标准仪表离场 (SID) 程序。本例中我们将遵循ETAS4B程序。
提示：如需查看目标跑道，可使用PREV（上一页）和NEXT（下一页）键进行滚动。

Selecting a Standard Instrument Departure (SID)



Standard instrument departure (SID) routes, also known as departure procedures (DP), are published flight procedures followed by aircraft on an IFR flight plan immediately after takeoff from an airport [Source Wikipedia]

Select the desired Standard Instrument Departure (SID) for the chosen runway. In this example, we will be following the ETAS4B procedure.

Hint: Use the PREV and NEXT Page Keys to scroll the desired runway into view if needed.

选择标准仪表离场程序 (SID) 过渡

注意：EDDS机场的所有离场程序都没有过渡点，因此以下示例是虚构的。示例中所显示的过渡航路点实际上属于另一个机场。



标准仪表离场 (SID) 航路通常包含航路过渡航点。当存在多个过渡航点时，飞行机组将获得多个选项，应选择与预定飞行计划方向一致的过渡航点。这将离场程序与飞行计划航路部分的第一个航点衔接起来。
点击所需过渡航点旁边的行选键。在此示例中，过渡航点为PHASE。

Selecting a Standard Instrument Departure (SID) Transition

Note: None of the departure procedures at EDDS have transitions, so the example below is fictional. The transition waypoints shown in the example below are (in reality) for a different airport.



Standard instrument departure (SID) routes often feature en-route transition waypoints. When these are present, the flight crew will be presented with multiple options and should select the transition waypoint that is in the direction of the intended flight plan. This joins the departure procedure to the first waypoint of the en-route portion of the flight plan.

Click the line-select key adjacent to the desired transition waypoint. In this example, the transition waypoint is PHASE.



所选跑道、程序和过渡点将显示为确认信息。



The chosen runway, procedure and transition will be displayed as confirmation.

提交飞行计划



“回顾”选项显示在行选键旁边。您可以使用此功能查看离场程序，而无需确认操作。
点击“回顾”旁边的行选键即可。



程序包含的航路点会显示出来。
提示：如果需要，可使用“上一页”和“下一页”按键滚动查看航路点。点击“激活”行选键以确认执行该程序。
点击“清除”行选键可退出而不执行。

Committing the Flight Plan



The REVIEW option is displayed alongside a line-select key. You may use this function to review the departure procedure, without committing.

Click the line-select key adjacent to REVIEW.



The waypoints comprising the procedure are displayed.

Hint: Use the PREV and NEXT Page Keys to scroll waypoints into view if needed.

Click the ACTIVATE line select key to commit the procedure.

Click the CLEAR line select key to back out without committing.

输入航路航点

注意：航路点KETEG的使用仅为方便之用，通常只适用于其他飞行计划。



当你的飞行计划中的航路段包含一个或多个航点时，可以逐个输入这些航点。
 [步骤1] 点击FPL按钮打开飞行计划页面。
 [步骤2] 滚动屏幕，直到看到飞行计划中下一个未使用的航点。
 提示：使用上箭头或下箭头按钮滚动查看其他内容。

[步骤3] 在草稿栏中输入航路点标识符。
 [步骤4] 点击VIA.TO旁边的行选键，将航路点插入飞行计划中。

对于每一个额外的航点，重复步骤2到步骤4。

Inputting en-route waypoints

Note: The use of waypoint KETEG is for convenience and would normally be useful only for a different flight plan.



When the en-route segment of your flight plan consists of one or more waypoints, these may be input individually.

[STEP 1] Click the FPL button to invoke the flight plan page.
 [STEP 2] Scroll the display until the next unused waypoint in the flight plan is visible.
 Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.

[STEP 3] Input the waypoint identifier into the scratch pad.

[STEP 4] Click the line-select key adjacent to VIA.TO to insert the waypoint into the flight plan.

Repeat STEP 2 thru STEP 4 for each additional waypoint.

输入航路



当飞行计划中的航路段包含一条或多条航路时，可逐条输入。
[步骤1] 按下FPL按钮调出飞行计划页面。
[步骤2] 滚动屏幕直至看到飞行计划中下一个未使用的航点。

提示：使用上箭头或下箭头按钮滚动浏览更多内容。



[步骤3] 在草稿栏中输入航路标识符和目的地航点（位于该航路上），格式如下：
航路.航点（或 航路.航点.航路——霍尼韦尔FMZ特有格式）



[步骤4] 点击VIA.TO旁边的行选键，将航路段插入飞行计划中。



沿着指定航路的每个航点都将自动插入飞行计划中，直至并包括步骤3中指定的最终航点。

Inputting en-route airways



When the en-route segment of your flight plan consists of one or more airway segments, these may be input individually.

[STEP 1] Click the FPL button to invoke the flight plan page.

[STEP 2] Scroll the display until the next unused waypoint in the flight plan is visible.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.



[STEP 3] Input the airway identifier and destination waypoint (on that airway) into the scratch pad in the format:

Airway.Waypoint (or Airway.Waypoint.Airway – unique to the Honeywell FMZ)



[STEP 4] Click the line-select key adjacent to VIA.TO to insert the airway segment into the flight plan.



Every waypoint along the specified airway will be automatically inserted into the flight plan, up to and including the final waypoint specified in STEP 3.

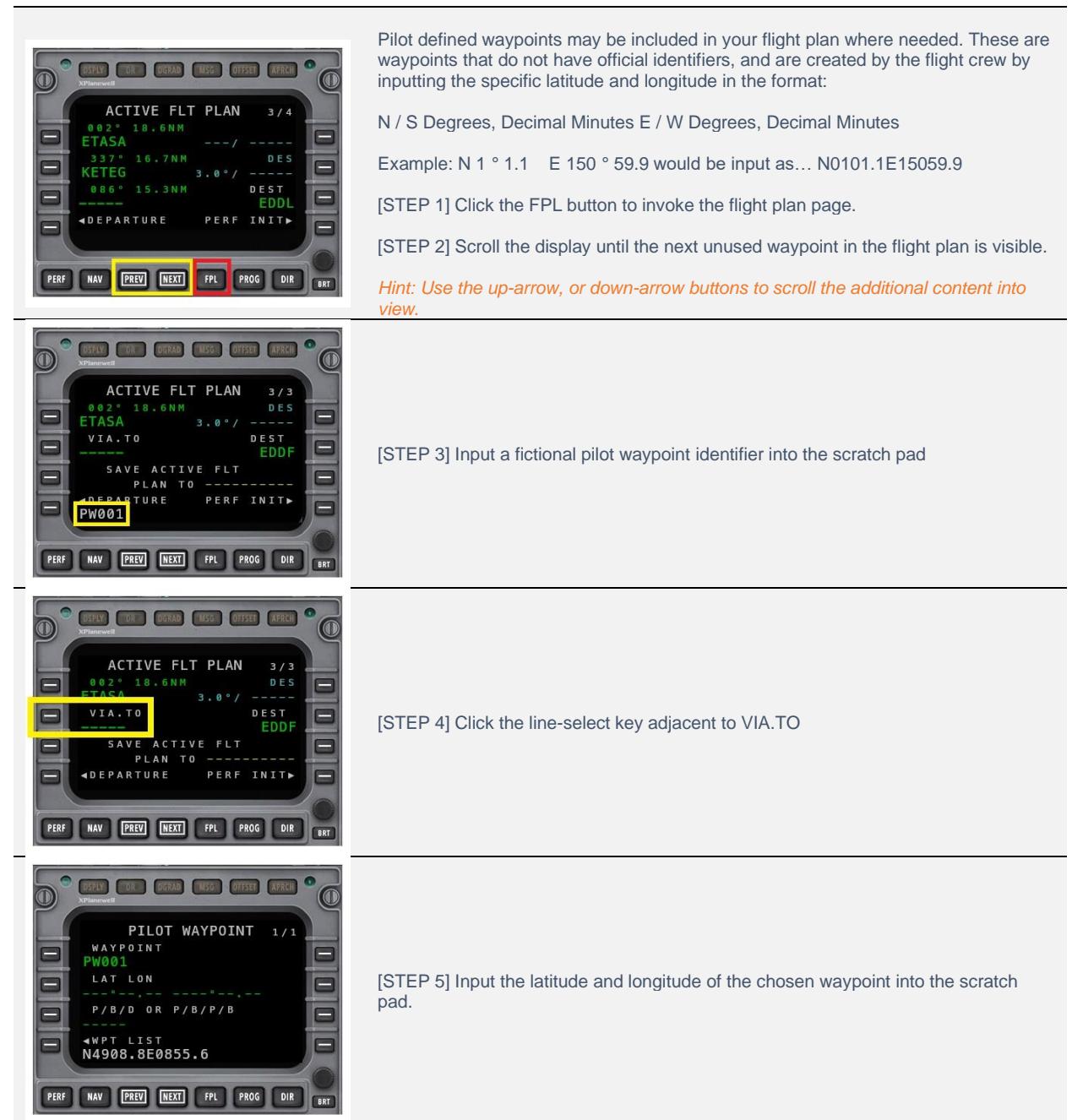
输入飞行员航路点

注意：本例中的航路点并非预定飞行计划的一部分，仅用于演示目的。



Inputting Pilot Waypoints

Note: The waypoint included in this example is not part of the intended flight plan and is used for demonstration purposes only.





保存飞行计划

已保存的飞行计划存储在 Output/FMS Plans 文件夹中。

飞行计划可以保存以便日后再次使用。在 X-Plane 中，已保存的飞行计划使用 .fms 扩展名。

重要提示：

Honeywell FMZ系统的一个特点是，一旦飞行计划被关闭（参见：关闭飞行计划），则无法保存飞行计划。这与真实设备的操作方式一致，因此在X-Plane中也有此限制。



[步骤1] 点击FPL按钮调出飞行计划页面。
[步骤2] 滚动至飞行计划末尾，此时可见“保存当前飞行”提示。
提示：使用上箭头或下箭头按钮可滚动查看隐藏内容。



[步骤3] 在便签栏输入飞行计划文件名（无需包含路径名，如本例所示）。



[步骤4] 点击PLAN TO旁边的行选键。这将使用输出/FMS计划文件夹中指定的文件名保存飞行计划。

Saving a Flight Plan

Saved flight plans are stored in the [Output/FMS Plans](#) folder.

Flight plans may be saved for use again later. A saved flight plan in X-Plane uses a .fms extension.

Important:

A feature of the Honeywell FMZ system is that flight plans may not be saved once they have been closed (see: [Closing the Flight Plan](#)). This is how the real device operates, and therefore this restriction applies in X-Plane.



[STEP 1] Click the FPL button to invoke the flight plan page.

[STEP 2] Scroll to the end of the flight plan. The SAVE ACTIVE FLT prompt is now visible.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.



[STEP 3] Input the flight plan file name into the scratch pad (without any pathname, as shown in this example).



[STEP 4] Click the line-select key adjacent to PLAN TO. This will save the flight plan using the filename specified in the [Output/FMS Plans](#) folder.

关闭飞行计划

霍尼韦尔FMZ系统要求您在编程进场程序之前“关闭”飞行计划。实现这一操作的方法为将目的地机场代码选择为飞行计划中的最后一个航路点。



- [步骤1] 点击FPL按钮调出飞行计划页面。
[步骤2] 滚动屏幕，直至飞行计划中下一个未使用的航点可见。
提示：使用上箭头或下箭头按钮滚动查看额外内容。



- [步骤3] 点击目的地(DEST)旁边的行选键，将目的地机场代码填入草稿栏。



- [步骤4] 点击VIA.TO旁边的行选键，将目的地机场代码作为航路点插入飞行计划中。

Closing the Flight Plan

The Honeywell FMZ system requires that you 'close' the flight plan before programming the arrival. This is accomplished by selecting the destination airport code as the final waypoint in the flight plan.



- [STEP 1] Click the FPL button to invoke the flight plan page.
[STEP 2] Scroll the display until the next unused waypoint in the flight plan is visible.
Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.



- [STEP 3] Click the line-select key adjacent to DEST to populate the scratch pad with the destination airport code.



- [STEP 4] Click the line-select key adjacent to VIA.TO to insert the destination airport code as a waypoint in your flight plan.

性能初始化 (PERF) 页面组

“PERF”（性能）键用于初始化飞行管理系统在整个飞行过程中所需的性能参数。

提示: 只有在关闭飞行计划后, 这些条目才会生效。

注意: 如果未输入性能数据, 其他FMS页面中的相关数据可能不会显示。



点击PERF按钮, 接着点击PERF INIT按钮, 即可调出五个性能初始化页面中的第一个。这些页面用于更改FMS (飞行管理系统) 使用的默认计算参数。
性能初始化页面 1 / 5

✓ 仅供参考

提示: 使用“下一页”和“上一页”按钮来翻页。



性能初始化 第2页/共5页

本页支持更改以下选项:

- ✓ 爬升速度与马赫数
- ✓ 巡航速度与马赫数
- ✓ 下降速度、马赫数及默认垂直路径角度

当自动驾驶仪处于VNAV模式时, FMS会将这些数值传递给飞行指引仪 (用于显示)。
注: Citation X没有自动油门功能, 因此推力必须始终由机组人员设置。

提示: 请按照当前格式将新数据输入 (至草稿板)

人口稠密, 然后点击相邻的线路选择键。



性能初始化 第3页/共5页

本页支持修改以下选项:

- ✓ 爬升增量 (千英尺)

阶梯爬升是指在飞机性能允许 (由于燃油消耗) 时, 进行的一系列逐步的高度调整。
此参数定义了飞行管理系统 (FMS) 用于计算下一次阶梯爬升可行性的增量。
提示: 以当前显示的相同格式输入新数据 (至暂存区), 然后点击相邻的行选择键。

Performance Initialization (PERF) Page Group

The “PERF” (Performance) key is used to initialize the performance parameters used by the flight management system for the duration of the flight.

Hint: The flight plan must be closed for these entries to have any effect.

Note: Failure to input performance data may lead to unpopulated data in other FMS pages.



Click the PERF button followed by the PERF INIT button to invoke the first of five PERFORMANCE INIT pages. These are used to change the default computation parameters used by the FMS.

PERFORMANCE INIT Page 1 / 5

- ✓ Information only

Hint: Use the NEXT and PREV buttons to cycle through the pages.



PERFORMANCE INIT Page 2 / 5

This page supports the option to change:

- ✓ Climb speed and Mach number
- ✓ Cruise speed and Mach number
- ✓ Descent speed, Mach number and default vertical path angle

The FMS will pass these values to the flight director (for display) when the autopilot is engaged in VNAV mode.

Note: The Citation X doesn't have an auto-throttle, so thrust must always be set by the crew.

Hint: Input the new data (into the scratch pad) in the same format as currently populated, and then click the adjacent line-select key.



PERFORMANCE INIT Page 3 / 5

This page supports the option to change:

- ✓ Step Climb Increment (thousands of feet)

A step-climb is a series of incremental altitude changes that occur when the aircraft performance allows (due to fuel burn). This parameter defines the increment that will be used by the FMS to compute when the next step climb is feasible.

Hint: Input the new data (into the scratch pad) in the same format as currently populated, and then click the adjacent line-select key.

编程进场

注意：在编程进场程序之前，Honeywell FMZ系统要求你先“关闭”飞行计划。这可以通过以下步骤完成：
将目的地机场代码输入为飞行计划中的最后一个航路点。参见：结束飞行计划



[步骤1] 点击NAV按钮调出导航索引页面。



[步骤2] 点击靠近ARRIVAL（进场）选项的行选键。



[步骤3] 点击跑道旁边的线路选择键。



[步骤4] 选择所需的进场跑道。在本示例中，我们将使用25L跑道。
提示：使用向上箭头或向下箭头按钮滚动查看更多内容。

Programming the Arrival

Note: The Honeywell FMZ system requires that you 'close' the flight plan before programming the arrival. This is accomplished by inputting the destination airport code as the final waypoint in the flight plan. See: [Closing the Flight Plan](#)



[STEP 1] Click the NAV button to invoke the NAV INDEX page.



[STEP 2] Click the line-select key adjacent to ARRIVAL.



[STEP 3] Click the line-select key adjacent to RUNWAY.



[STEP 4] Select the desired arrival runway. In this example we will be using runway 25L.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.



[步骤5] 选择所需的进近类型。在本示例中，我们将使用跑道25L的ILS（仪表着陆系统）。
提示：使用向上或向下箭头按钮滚动以查看附加内容。



[STEP 5] Select the desired approach type. In this example we will be using the ILS to runway 25L.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.



[步骤6] 选择所需的过渡航路点。在本示例中，我们将使用CHA。
提示：使用向上或向下箭头按钮滚动以查看附加内容。
注意：过渡航路点CHA适用于非RNAV飞机，此处为方便使用。对于本飞机和飞行计划，更可能的过渡航路点是DF626，随后由空管指挥进行捷径飞行。



[STEP 6] Select the desired transition waypoint. In this example we will be using CHA.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.

Note: Transition waypoint CHA is for non-RNAV aircraft and is used here for convenience. A more likely transition waypoint for this aircraft and flight plan would be DF626, followed by a short-cut from ATC.

续见下一章：选择标准进场程序（STAR）

Continued in next chapter: [Selecting a Standard Instrument Arrival \(STAR\)](#)

选择标准进场程序 (STAR)

接上章节：设置进港程序



[步骤7] 选择STAR（标准进场）程序。在本示例中，我们将使用SPES3B。
提示：使用向上箭头或向下箭头按钮滚动查看额外内容。



[步骤8] 跑道、过渡、进近类型和进场程序（STAR）将显示以供确认。
提示：如需滚动查看航路点，可使用PREV（上一页）和NEXT（下一页）按键。点击ACTIVATE（激活）行选键以确认执行该程序。

Selecting a Standard Instrument Arrival (STAR)

Continued from previous chapter: [Programming the Arrival](#)



[STEP 7] Select the STAR (Standard Arrival) procedure. In this example we will be using SPES3B.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.



[STEP 8] The runway, transition, approach type and arrival procedure (STAR) are displayed for confirmation.

Hint: Use the PREV and NEXT Page Keys to scroll waypoints into view if needed.

Click the ACTIVATE line select key to commit the procedure.

清除断点信息



使用上下箭头键滚动查看“>>DISCONTINUITY<<”信息。
点击“DEL”按钮启用删除功能。

点击紧邻“>>DISCONTINUITY<<”信息上方航点的行选键，删除该提示并将上下两个航点直接连接。
此时，“>>DISCONTINUITY<<”两侧的航点已成功衔接。



Clearing Discontinuity Messages



Use the up-arrow, or down-arrow buttons to scroll the >>DISCONTINUITY<< message into view.

Click the DEL button to enable the DELETE function.

Click the line-select key adjacent to the waypoint immediately above the >>DISCONTINUITY<< message to remove this and stitch together the flight plan waypoints immediately above and below.



The two waypoints either side of the >>DISCONTINUITY<< are now joined together.

高度限制



当高度限制生效时，这些限制会显示在飞行计划相关航点旁边。
以小字体显示的高度由飞行管理系统（FMS）根据性能数据计算得出。
以大字体显示的约束（如此处所示）来源于该航点所属的特定离场或进场程序，此类约束始终优先于计算得出的限制。

Altitude Constraints



When altitude constraints are in effect, these are displayed adjacent to relevant waypoints of the flight plan.

Altitudes displayed in small font are computed by the FMS using performance data.

Constraints displayed in large font (shown here) are sourced from the specific departure or arrival procedure to which that waypoint belongs. These always take precedent over computed constraints.

当自动驾驶仪处于VNAV模式，并且航班处于爬升阶段时，机组人员可以使用高度选择旋钮设置爬升顶点高度，FMS会在到达相应航路点时，指令飞机爬升至飞行计划中的每一个高度限制。请注意，FMS绝不会指令爬升超过高度选择旋钮所设定的高度。

当自动驾驶仪处于VNAV模式并且航班处于下降阶段时，机组人员可以使用高度选择旋钮设定下降终点高度，飞行管理系统（FMS）将在每个相关航路点到达时，指令飞机下降至飞行计划中各个高度限制。请注意，FMS绝不会指令飞机下降到低于高度选择旋钮所设定的高度以下。

注意：Citation X没有自动油门。在爬升过程中，机组人员必须将油门前推到CLB（爬升）位置；在平飞时，将油门收回至CRZ（巡航）位置，或根据平飞时的速度限制进一步收回油门。在下降过程中，机组人员必须手动调整油门以保持所需的空速。

When the autopilot is in VNAV mode, and during a climb phase of the flight, the crew may set a top of climb altitude using the Altitude Select Rotary, and the FMS will command climbs to each of the altitude constraints in the flight plan, as the associated waypoint is reached. Note that the FMS will never command a climb beyond the altitude set by the Altitude Select rotary.

When the autopilot is in VNAV mode, and during a descent phase of the flight, the crew may set a bottom of descent altitude using the Altitude Select Rotary, and the FMS will command descents to each of the altitude constraints in the flight plan, as the associated waypoint is reached. Note that the FMS will never command a descent below the altitude set by the Altitude Select rotary.

Note: The Citation X has no auto-throttle. During climb the crew must advance the throttle to the CLB (Climb) position and retard it to the CRZ (cruise) position for level flight or retard the throttle further to comply with any speed restriction in level flight. During descent, the crew must manually adjust the throttle to maintain the desired airspeed.



手动输入高度限制



机组人员可以手动为某个或多个航路点输入高度限制。

[步骤1] 点击FPL按钮调出飞行计划页面。

[步骤2] 滚动屏幕直至飞行计划中下一个未使用的航路点可见。

提示：使用上箭头或下箭头按钮滚动查看更多内容。



[步骤3] 输入以千英尺为单位的高度限制或飞行高度层（例如FL180）
[步骤4] 点击与适用高度限制的航点相邻的行选键。

Manual Input of Altitude Constraints



Altitude constraints may be manually input by the crew for a given waypoint, or waypoints.

[STEP 1] Click the FPL button to invoke the flight plan page.

[STEP 2] Scroll the display until the next unused waypoint in the flight plan is visible.

Hint: Use the up-arrow or down-arrow buttons to scroll the additional content into view.



[STEP 3] Input the desired altitude constraint expressed as thousands of feet or a flight level (e.g. FL180)

[STEP 4] Click the line-select key adjacent to the waypoint to which the altitude constraint applies.

速度限制

注意：本示例中包含的速度限制为虚构，仅用于演示目的。



当速度限制生效时，这些限制会显示在飞行计划相关航点旁。
以小字体显示的限速（如图）由飞行管理系统(FMS)根据性能数据计算得出。
以大字体显示的限速则源自该航点所属的特定离场或进场程序，此类限制始终优先于
系统计算的限速值。
由于赛斯纳Citation X未配备自动油门系统，下降阶段的速度限制仅作提示，需由机
组人员手动控制。

Speed Constraints

Note: The speed constraint included in this example is fictional and is used for demonstration purposes only.



When speed constraints are in effect, these are displayed adjacent to relevant waypoints of the flight plan.

Constraints displayed in small font (shown here) are computed by the FMS using performance data.

Constraints displayed in large font are sourced from the specific departure or arrival procedure to which that waypoint belongs. These always take precedent over computed constraints.

The Citation X does not feature an auto-throttle, and therefore speed constraints during descent are for information only and must be managed by the crew.

速度限制的手动输入



机组人员可以为特定航点或多个航点手动输入速度限制。
[步骤1] 点击FPL按钮调出飞行计划页面。
[步骤2] 滚动页面，直到飞行计划中下一个未使用的航点可见。
提示：使用上箭头或下箭头按钮滚动查看更多内容。



[步骤3] 按照示例格式输入所需的速度限制。
[步骤4] 点击与适用速度限制的航点相邻的行选键。

Manual Input of Speed Constraints



Speed constraints may be manually input by the crew for a given waypoint, or waypoints.

- [STEP 1] Click the FPL button to invoke the flight plan page.
[STEP 2] Scroll the display until the next unused waypoint in the flight plan is visible.
Hint: Use the up-arrow or down-arrow buttons to scroll the additional content into view.



- [STEP 3] Input the desired speed constraint in the format shown in the example.
[STEP 4] Click the line-select key adjacent to the waypoint to which the speed constraint applies.

查看已完成的飞行计划

MCDU 复习



点击FPL按钮调出“当前飞行计划”页面。使用NEXT按钮可逐页浏览计划中的每个航路点。

Reviewing the completed Flight Plan

MCDU Review



Click the FPL button to invoke the ACTIVE FLT PLAN page.

Use the NEXT button to scroll through each waypoint in the plan



注意飞行计划中任何速度和高度限制的位置。
同时注意飞行计划末尾的复飞航路点——以防需要中止着陆。



Note the location of any speed and altitude constraints in the flight plan.



Note also the missed-approach waypoints at the end of the flight plan - should the landing be aborted.

多功能显示器 (MFD) 概览



检查多功能显示屏 (MFD) 上的飞行计划形状，确保其与电子飞行包 (EFB) 或其他文件相符。
有关使用MFD的说明，请参阅：

MFD Review



Examine the shape of the flight plan on the Multi-Function Display (MFD) to ensure it corresponds with your Electronic Flight Bag (EFB) or other documentation.

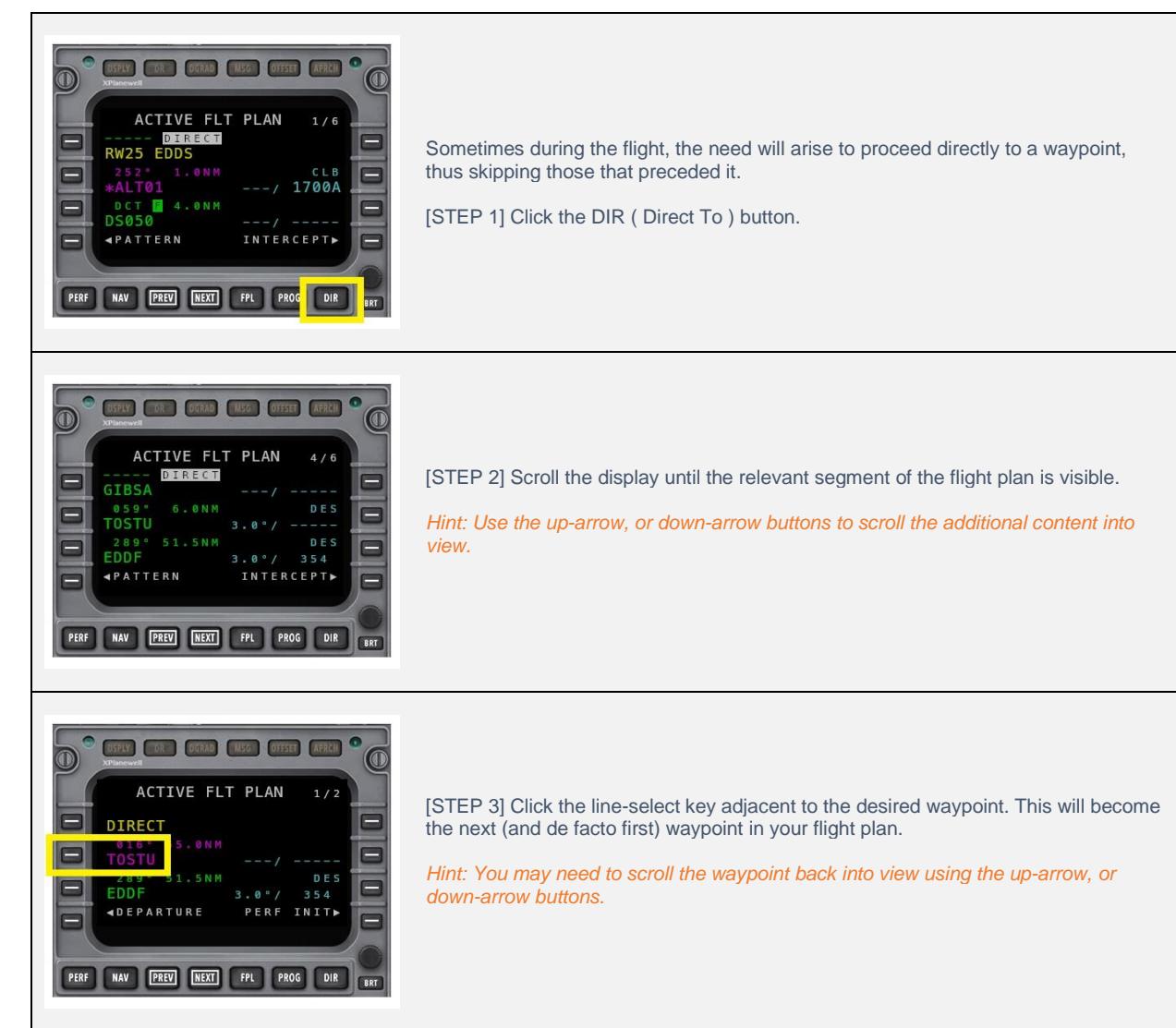
For instructions using the MFD, see:

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

直接飞往航路点



Direct to a waypoint



Sometimes during the flight, the need will arise to proceed directly to a waypoint, thus skipping those that preceded it.

[STEP 1] Click the DIR (Direct To) button.

[STEP 2] Scroll the display until the relevant segment of the flight plan is visible.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.

[STEP 3] Click the line-select key adjacent to the desired waypoint. This will become the next (and de facto first) waypoint in your flight plan.

Hint: You may need to scroll the waypoint back into view using the up-arrow, or down-arrow buttons.

Sometimes during the flight, the need will arise to proceed directly to a waypoint, thus skipping those that preceded it.

[STEP 1] Click the DIR (Direct To) button.

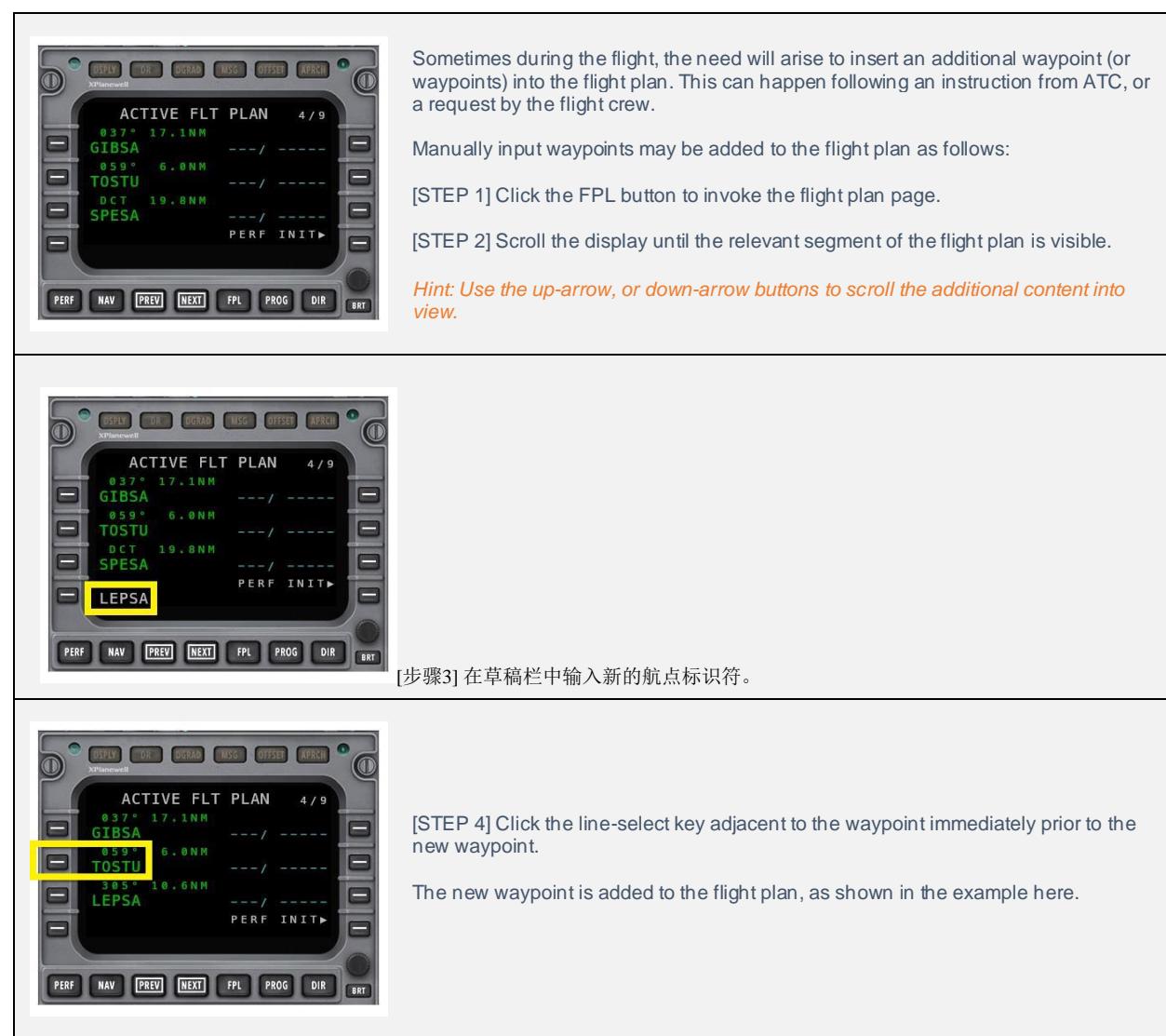
[STEP 2] Scroll the display until the relevant segment of the flight plan is visible.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.

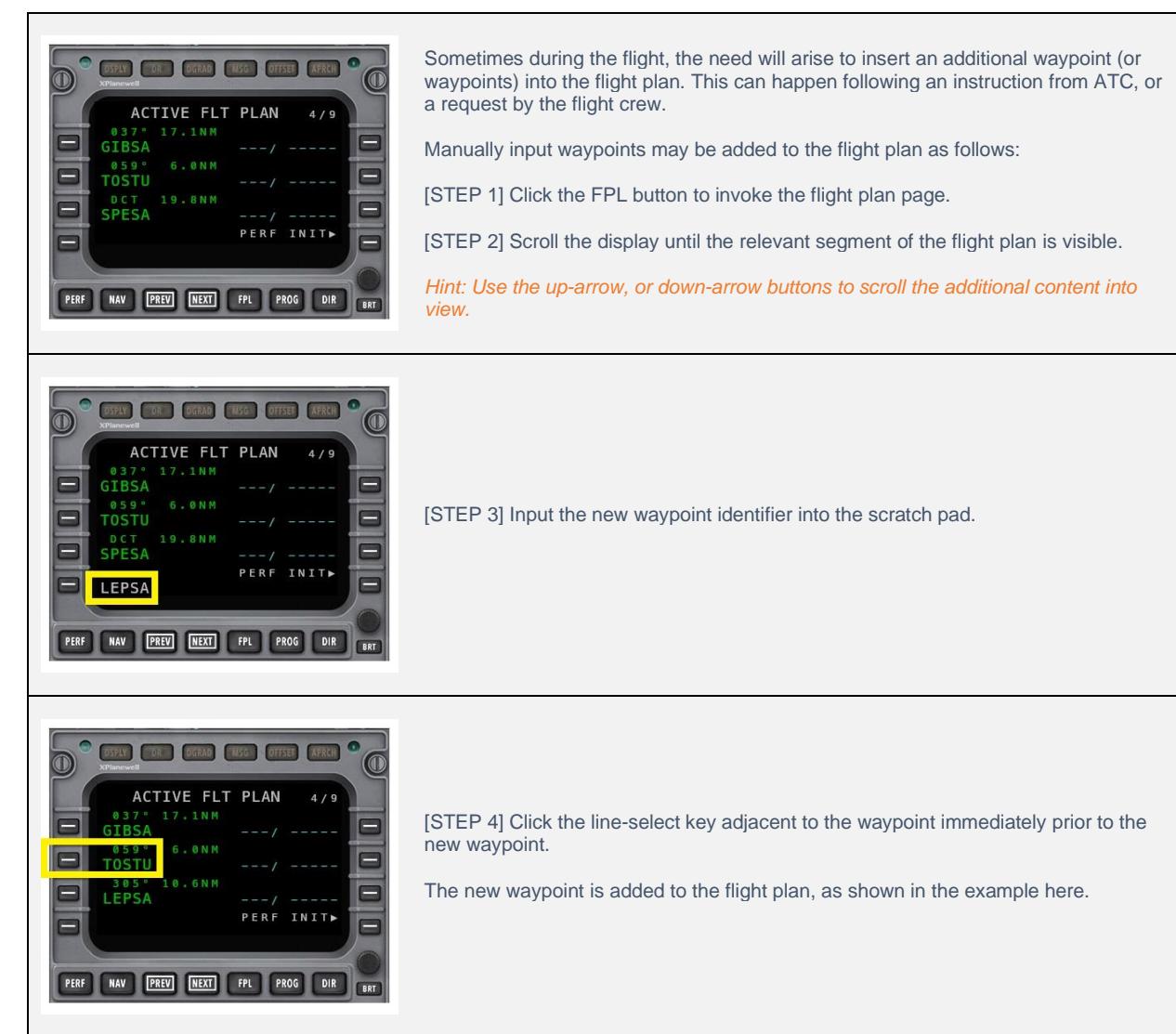
[STEP 3] Click the line-select key adjacent to the desired waypoint. This will become the next (and de facto first) waypoint in your flight plan.

Hint: You may need to scroll the waypoint back into view using the up-arrow, or down-arrow buttons.

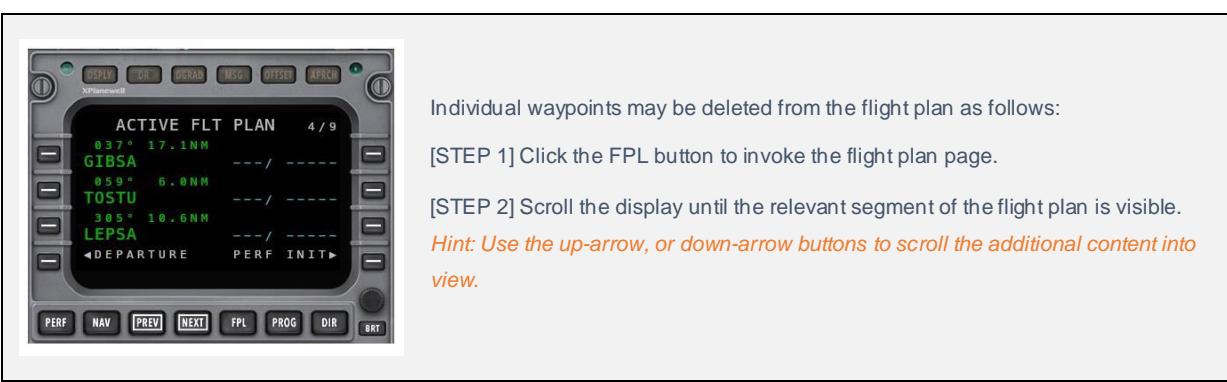
在现有飞行计划中插入航路点



Inserting a waypoint into an existing flight plan



从现有飞行计划中删除航路点



Individual waypoints may be deleted from the flight plan as follows:

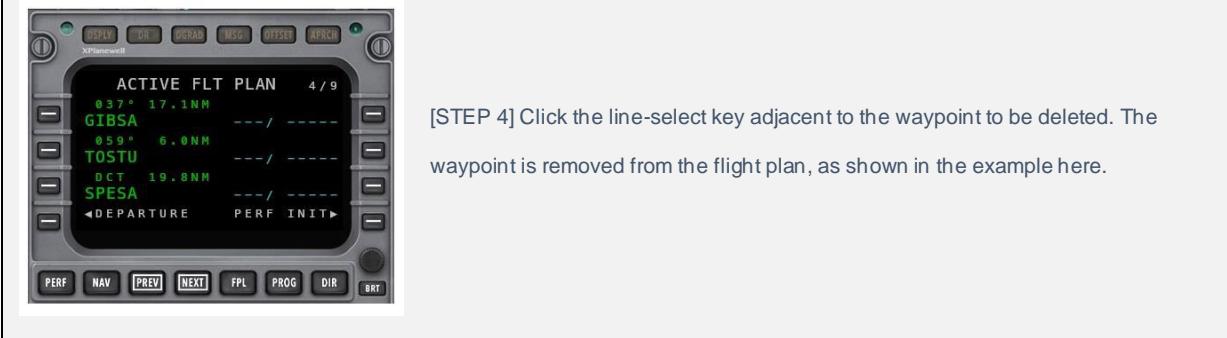
[STEP 1] Click the FPL button to invoke the flight plan page.

[STEP 2] Scroll the display until the relevant segment of the flight plan is visible.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.

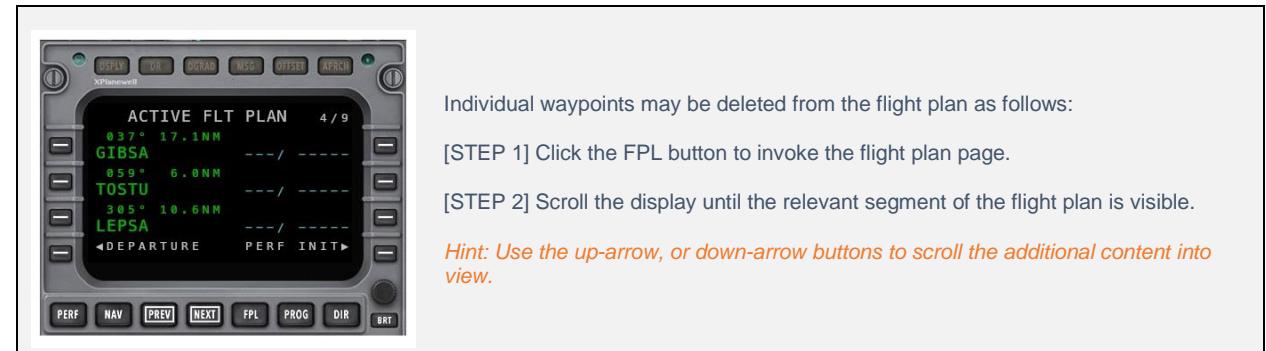


[步骤3] 点击DEL（删除）按钮。



[STEP 4] Click the line-select key adjacent to the waypoint to be deleted. The waypoint is removed from the flight plan, as shown in the example here.

Deleting a waypoint from an existing flight plan



Individual waypoints may be deleted from the flight plan as follows:

[STEP 1] Click the FPL button to invoke the flight plan page.

[STEP 2] Scroll the display until the relevant segment of the flight plan is visible.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.



[STEP 3] Click the DEL (Delete) button.



[STEP 4] Click the line-select key adjacent to the waypoint to be deleted. The waypoint is removed from the flight plan, as shown in the example here.

进度页面组

PROGRESS Page Group



点击PROG按钮调出三个进程页面的第一个。这些页面会随着飞行进程实时更新数据。
进程页面 1 / 3

- ✓ 下一航点标识符
- ✓ 到下一个航路点的距离
- ✓ 预计到达下一个航路点的时间
- ✓ 下一航点剩余燃油（单位：千磅）

提示：使用“下一页”和“上一页”按钮来翻页。



进度 第2页 / 共3页

- ✓ 距离爬升顶点 (TOC) 若在飞行计划中指定
- ✓ 如果飞行计划中指定了下降顶点 (TOD) 的距离
- ✓ 剩余燃油量
- ✓ 总重量 (磅)

提示：使用“下一页”和“上一页”按钮来翻页。



进度 第3页 / 共3页

- ✓ 横侧偏航误差 (XTK)
- 偏离预定航线的距离 (海里)
- ✓ 当前地面航迹 (度)
- ✓ 当前航向 (度)
- ✓ 漂移 (航向与航迹之间的角度差, 单位为度)
- ✓ 计算出的风向 (度) 和风速 (节)
- ✓ 地速 (节)

提示：使用“下一页”和“上一页”按钮来翻页。



Click the PROG button to invoke the first of three PROGRESS pages. These provide real-time data as the progress of the flight unfolds.

PROGRESS Page 1 / 3

- ✓ Next Waypoint Identifier
- ✓ Distance to next waypoint
- ✓ Estimated time to next waypoint
- ✓ Fuel remaining at next waypoint (x 1000 lbs.)

Hint: Use the NEXT and PREV buttons to cycle through the pages.



PROGRESS Page 2 / 3

- ✓ Distance to Top of Climb (TOC) if specified in flight plan
- ✓ Distance to Top of Descent (TOD) if specified in flight plan
- ✓ Remaining Fuel Quantity
- ✓ Gross Weight (lbs.)

Hint: Use the NEXT and PREV buttons to cycle through the pages.



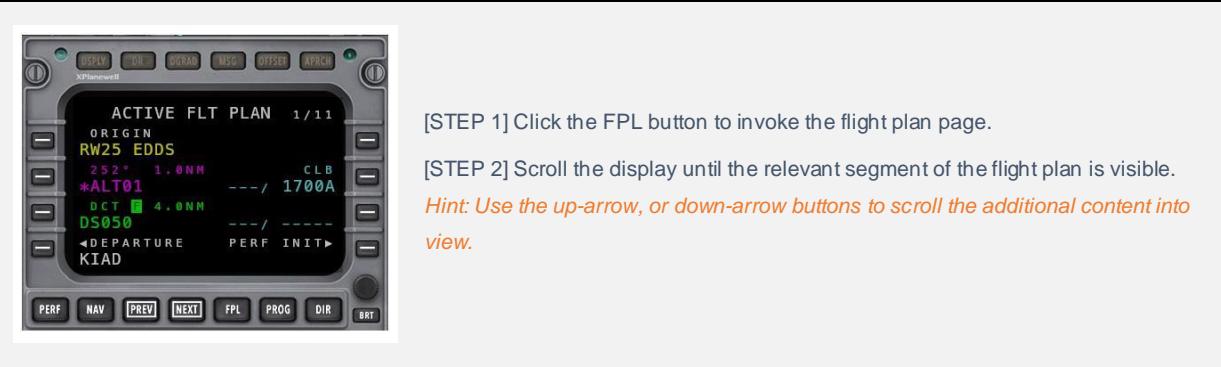
PROGRESS Page 3 / 3

- ✓ Cross Track (XTK) Error
- The deviation distance (nautical miles) from the desired course track
- ✓ Current Ground Track (degrees)
- ✓ Current Heading (degrees)
- ✓ Drift (difference between heading and track in degrees)
- ✓ Computed wind direction (degrees) and speed (knots)
- ✓ Ground Speed (knots)

Hint: Use the NEXT and PREV buttons to cycle through the pages.

重置飞行计划

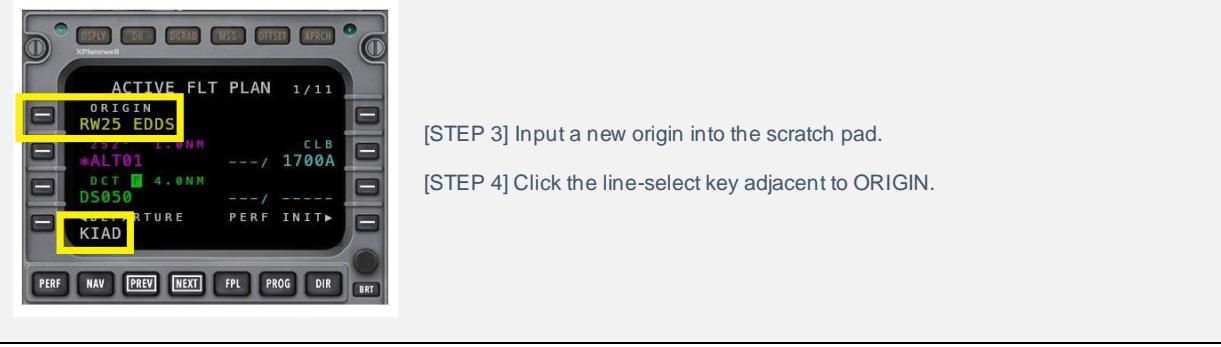
Resetting the Flight Plan



[STEP 1] Click the FPL button to invoke the flight plan page.

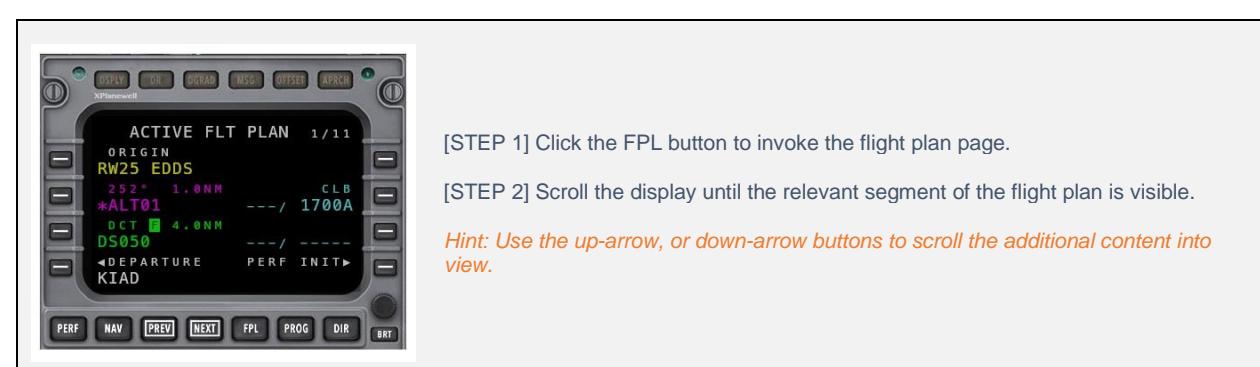
[STEP 2] Scroll the display until the relevant segment of the flight plan is visible.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.



[STEP 3] Input a new origin into the scratch pad.

[STEP 4] Click the line-select key adjacent to ORIGIN.



[STEP 1] Click the FPL button to invoke the flight plan page.

[STEP 2] Scroll the display until the relevant segment of the flight plan is visible.

Hint: Use the up-arrow, or down-arrow buttons to scroll the additional content into view.



[STEP 3] Input a new origin into the scratch pad.

[STEP 4] Click the line-select key adjacent to ORIGIN.

加载（已保存的）飞行计划

已保存的飞行计划存储在

Output/FMS Plans 文件夹中。

先前生成的飞行计划（并已以X-Plane所需的格式保存）可以加载到飞行中。管理系统。可接受以下文件（扩展名）类型：

- ✓ 飞行计划（兼容X-Plane及其他模拟器的机型，支持航路）
- ✓ 飞行管理系统（兼容X-Plane，支持航路和程序）



[步骤1] 点击FPL按钮调出飞行计划页面。



[步骤2] 点击与FPL列表相邻的行选键。



[步骤3] 点击所需飞行计划文件名旁边的行选键。

Loading a (saved) Flight Plan

Saved flight plans are stored in the [Output/FMS Plans](#) folder.

Flight plans that have been generated previously (and saved in the appropriate format for X-Plane) may be loaded into the Flight Management System. The following file (extension) types are acceptable:

- ✓ FLP (compatible with aircraft for both X-Plane and other simulators, supports airways)
- ✓ FMS (compatible with X-Plane, with support for airways and procedures)



[STEP 1] Click the FPL button to invoke the flight plan page.



[STEP 2] Click the line-select key adjacent to FPL LIST.



[STEP 3] Click the line-select key adjacent to the file name of the desired flight plan.



[步骤4] 点击与“ACTIVATE（激活）”相邻的行选键。



[STEP 4] Click the line-select key adjacent to ACTIVATE.