Co-Pilot

für X-Plane ® 10.25

Version 1.0

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Austrian **X**-Plane **D**esign **G**roup

Content:

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1. General

What Copilot is?
Copilot is a software (LUA scripts) that automatically controls some functions of the aircraft. For this purpose, the flight condition is analyzed and based on that, the functions are controlled. In "wild" maneuvers, it may be that an incorrect flight condition is detected and therefore wrong functions are triggered.

What Copilot not ist?
Copilot is not an "Autopilot". The pilot remains responsible for the control of the aircraft!

2. Installation
Copy the content of the .zip-File to the "Scripts"-directory of FlyWithLua, so that the files "CPT.lua" und "CPT_std.cpt" and the directory "CPT_sounds" an hs content is located at "<X-Plane directory> / Resources / plugins / FlyWithLua / Scripts".

3. Functions

Co-pilot controls the following functions when they are activated:
- Gear
- Squawk
- Altimeter-Settings
- Flaps
- Beacon Lights
- Navigation Lights
- Landing Lights
- Strobe Light
- Taxi Light

All functions can be used individually or the entire copilot can be disabled. If "Voice" is activated, an acoustic feedback is given when important function are switched.

Note: Requires at least FlyWithLua in version 2.3 or higher!

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4. Display

When you start X-plane, the CPT field is displayed in the lower right corner. By default, all features are enabled and the Voice-feedback is turned on. By clicking on this box, the function display can be activated (see Figure 1) and also deactivated. The functions are indicated by one field. If the function is displayed with a red background, the feature is disabled. If the function is active, the background is green.

5. Operation

The three lowest fields are only ON / OFF switches. In the remaining fields, the function is activated or deactivated by clicking on the upper half of the field, the lower half is used as display and for other functions (see following chapter).

The co-pilot remains active even when the display-window is closed by clicking in the CPT field. When this field is disturbing, it can be disabled also via the menu "Plugins / FlyWithLua Macros" and disable the entry "copilot tab". The co-pilot is operating in the mode set on, even if there is no display.
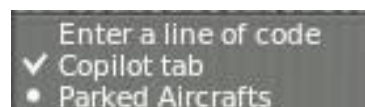
Hint: As with active display, this must be displayed at each frame, this may affect the fps. I recommend that you configure the co-pilot before the start and then turn off the display. Then only the calculations of the flight status are running and that only happens once per second.

5.1.   ON/OFF

This field enables or disables the entire copilot. If it is off, it goes into the pantry for a coffee. In this case, the current state is saved and restored when the co-pilot is switched back ON.

5.2.   Voice

This field switches the audible notification on or off.

5.3. Gear

If this field is enabled, the gear is retracted when reaching a height of 200 ft above ground. At the bottom of the display the status of the landing gear is shwon (black: retracted and locked, orange: in motion, green: down and locked). It shows always the max. 6 possible gears, which X-Plane allows.

When this function is activated, the corresponding joystick axis is decoupled. Disabling the feature the joystick function is reactivated.

5.4. ATC (Squawk, Transponder)

Once the aircraft is in motion on the ground (taxiing) the transponder is activated to Mode "Standby". Of course, the pilot can do this already by taxi clearance granted :-)

As soon as the ground speed increases 20 kts, the transponder is set to "active".

If the speed drops under 30kts on the ground after landing, the standby mode is activated again.

The display panel where the set Squawk is displayed is divided into four areas. If the cursor is in one of the four fields, can be adjusted with the mouse wheel to the appropriate value.

5.5. Flaps

During the landing approach - but also in the flight path - the angle of attack of the aircraft is monitored. If this exceeds the value "d1" (default: 3.5 degrees), the flaps are extended one level. During the landing approach (final, below 2000 ft above ground level), this is done only at the value d2 (default: 7 degrees).

If the angle of attack is less than "u" (default: -0.5 degrees), the flaps are retracted again.

Because some aircraft react quite slowly to the change of the Flap-position, a "waiting period" (default: 10 sec) is built in, the "co-pilot" waits before it checks to see if a change in the flap is required. This value must (such as the angle of attack values) be flown individually for the aircraft. The best manner is to perform an ILS approach and correspondingly reduce the flight speed with the autopilot. In this case, check if the angle-of-attack values fit. If the flaps are repeatedly extended and then retracted again, the waiting time is too short. If the angle is too large and it threatens a "stall", the waiting time is too long. The possible setting of the values is described below.

The display shows the flap position by a yellow bar.

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By clicking in the display area of the flap, the above values can be set by turning the mouse wheel.

It is the order:

"position indicator" -> "d1" -> "d2" -> "u" -> "t" -> "position indicator"

d1:   max. angle-of-attack in the flight path
d2:   max. angle-of-attack at landing approach
u: min. angle-of-attack for Flaps UP
t: Waiting time before renewed operation of the flaps

For the values themselves:

-1,0 < Flaps UP < Flaps DOWN flight path < Flaps DOWN final < 19.9

It is recommended to "check-fly" these values for each aircraft, and save a custom config file (see Section 5).

When this function is activated, the corresponding joystick axis is decoupled. Disabling the feature the joystick function is reactivated. In a "crash" it may be that the joystick is not activated again. Either disable them before starting the flaps and gear in the co-pilot and check the joystick configuration menu of X-Plane whether the axes are assigned or use the tool "X-assign" from "barbarossa".
http://forums.x-plane.org/index.php?app=downloads&showfile=12551


5.6.   QNH, Altimeter

Below the Transition Altitude (default: 5000 ft), the altimeter is set to the current local barometric pressure. Above the Transition Altitude the standard air pressure of 29.92 inHg is set.

By clicking the display shows the Transition Altitude instead of the air pressure value currently set. The Transition Altitude can be adjusted with the mouse wheel in 1000 ft increments.

Another click in the display field shows show which unit of air pressure. With the mouse wheel can be switched between "inHg" and "mB".
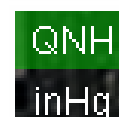
5.7.   Bcn, Beacon Lights

The Beacon Lights are switched on automatically when the first engine is started and stay on until the last machine is turned off. As with all ads following the on-state is indicated by a yellow circle.

5.8. NavL., navigation lights

The navigation lights are turned on with switching on the first battery and switches off when disconnecting the batteries.

5.9. Land.L, Landing Lights

These are automatically activated when you take off and stay on up to FL100. There they are turned off. When the flight level drops below FL100, the aircraft's landing lights are turned on again until landing.

When the lights are on, a yellow dot is shown.

5.10. Strobe, Strobe Lights

When rolling (speed less than 30 kts, height above ground less than 10 ft), the strobe lights are automatically activated and remain lit until the plane is slower than 30 kt after landing and on the ground (taxiing).
When the lights are on, a yellow dot is shown.

5.11. Taxi L, Taxi Light

When rolling (speed less than 30 kt, height above ground less than 10 ft) the taxi lights are activated automatically. When lifting or "OnBlocks" they are off again.
Dass sie eingeschaltet sind, ist an einem gelben Punkt im Anzeigefeld erkennbar.

6. Usage as "Mini-Panel"

The copilot panel can also be used for direct switching of functions.

6.12. Lights

The lights (taxi, strobe, landing, navigation, beacon) can be switched on or off by clicking in the respective display. The "Automatic" will be disabled. To enable it again, click into the caption field.

6.13. Gear

Even the gear can be raised and lowered by clicking into the display field. Here, too, the "automatic" is disabled and re-enabled by a mouse click to the label field.

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6.14.   Flaps

If the flaps should be controlled manually, the mouse pointer must be under "flaps". Then the flaps can be extended by the mouse wheel. Here, too, the "automatic" is disabled and re-enabled by a mouse click to the label field.

7. Save / Load Settings

When you start the program, all settings from the file "<X-Plane-Aircraft-Folder> / <Aircraft-Name>. cpt" are loaded. If this file is not (yet) available, the settings from the "CPT_std.cpt" file in the "Scripts" directory will be loaded.

Thus, it is possible to use different settings of the copilot for each aircraft.

To create the settings-file of the aircraft, first all desired settings should be made. By clicking on the "ACF"-field the configuration file is then written to the Aircraft directory.

By clicking in the "STD" field the default configuration file in the "scripts" directory is re-created. If the default configuration file is accidentally deleted, the plugin starts with fixed preset default values that can be stored as the default configuration file again.

8. Alarms

If the the script detects a critical state (and as a feedback when you save the configuration files) instead of the header an corresponding information will appear with a red background and you will hear an attention tone (if "Voice" is active).

9. Note on flaps and landing gear

Beacause X-Plane does not provide a Dataref to "override" the flaps or landing gear "co-pilot" must delete the axis assignment of a possibly defined joystick axis when "flaps" or "Gear" function is activated. This mapping is stored and put back when you disable the functions.

Nevertheless, it may happen that these assignments can not be restored correctly.

In this case, either disable the functions and save the Aircraft configuration by clicking on "ACF".

Or: Load the Airplane, deactivate "Flaps" and "Gear" function, check the setting of functions "flaps" and "Gear" in the menu "Settings / Joystick & Equipment" and assign joystick axes properly, close the menu. Now activate the functions "flaps" and "Gear" again. Now the assignment should be properly stored and function properly.

The assignment of keys (X-Plane default) is not affected.

10. Credits

LAMINAR RESEARCH®   X-Plane®
X-Friese   for FlyWithLua and the various example scripts

11. Betatester-Team

DanielMan, greuff, PAA196, PetJedi, grissley, kalle
alle Mitglieder der AXDG.

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Have fun flying with your Copilot

oe3gsu, Gerhard