# EAA Chapter 237 Flight Simulator – Replay Control Box      (V2)

## Introduction

The replay control box makes it easier to control the operation of the replay functions of X-Plane 11 flight simulator software.  If you don't have this control then you must use the keyboard and mouse to perform the replay functions using a DVR-style control panel near the top of the screen.

What is the replay function?  Any time during a flight in the simulator you can stop the simulation and go back and replay your flight from the start (or from any intermediate point of the current flight).  You can run the replay at normal speed, triple speed or 1/3 speed.  You can also replay backwards (in sim time) at normal speed, triple speed or 1/3 speed.

The box has a duel concentric rotary knob control which includes a momentary push button switch on the small knob, much like the existing 'Knobster' control on the red button box.  Inside the box is an Arduino processor connected to the simulator computer via a long USB cable.

An example use case for this 'hand-held' control might be an instructor observing a student using the simulator.  The instructor could pause the simulation and have a discussion on the current flight situation.  Or maybe to go back and replay the last minute or two of the flight to review what happened or to emphasize a point.

## Operating Procedure/Modes

There are two modes of operation when using the rotary knobs and switch.  The mode is determined by whether the simulator is currently running in normal flight simulation mode or in replay mode.

## Normal Simulation Mode

**Large knob:**  When the simulator is running in normal mode (and normal speed), rotating the large knob clockwise one click will shift the execution of the simulation model to 2X (double speed).   Another clockwise click will set it to 4X speed.  Another click to 8X speed.  And, finally, another click to 16X speed.  Conversely, rotating the large knob counter-clockwise will reduce the execution speed (i.e. back down to 8X, 4X, 2X and 1X).  NOTE:  The flight model will likely not be able to execute at all of these higher speeds due to limitations of the PC hardware.  When this is the case a message will appear on the X-Plane screen indicating the maximum speed it was able to achieve.  Further clock-wise rotations will not make it run any faster.

**Small knob:**  When the simulator is running in normal mode, rotating the small knob counter-clockwise one click will pause the current simulation.  This is functionally the same as pressing the 'p' key on the keyboard.  Rotating the small knob clockwise one click puts the current simulation back into running mode (i.e. un-pause) and is the same as pressing the 'p' key a second time.

**Push button:**  Pushing the button on the small knob once will place the simulator into replay mode.  *Note: Pushing the button again will return the simulator back into normal running mode.*

**Replay Mode**

> **Large knob:**  When the simulator is running in replay mode, the large knob is used to alter the speed of the replay.  When first entering replay mode the sim speed will be paused.  Rotating clockwise one click will cause the replay to move forward in time at 1/3 X speed.  A second click clockwise will set it to normal speed forward.  A third click clockwise will set it to triple speed forward.  Conversely, when starting from the paused position, rotating the large knob counter-clockwise will have the same effect as described above (i.e. 1/3 X, normal, or triple speed) except in a reverse time direction.

> **Small knob:**  When the simulator is first placed into the replay mode (as described under Push Button above), the replay time will remain at the end of the current simulation time.  Rotating the small knob one click in the counter-clockwise direction will jump the time in the replay backwards 1 minute.  Each click counter-clockwise will continue moving the time backwards 1 minute (until the time reaches the beginning time).  Conversely, rotating the small knob clockwise will jump the time forward 1 minute for each click (until the time reaches the ending time).

> **Push button:**  Pushing the button (on the small knob) once will return the simulator back into the normal running mode and set the sim time to the end of the current flight simulation.

Reading the above process may seem a little intimidating at first but, after you "play" with the two knobs and the push button switch for awhile, you will soon become familiar with how it works.   You can't do any harm to the simulator by using this control improperly.  It just may not behave as you expected until you learn how it works.

Note that when you load a previously saved flight, it will automatically set the mode to replay and will, in this case, set the replay time to the beginning of the saved flight (not at the end). You can then turn the large knob two clicks in the clockwise direction start the replay at normal speed.