X-IFR Introduction

This series of lessons is designed to take you from VFR pilot to IFR pilot, from a clear-skies flyer to a zero-zero flyer.

These lessons assume you are already familiar with basic handling techniques, as taught in the first 9 X-PPL lessons, ie you can fly straight and level, make balanced turns, climb and descend precisely, and take-off and land reliably.

Flying amongst the weather, airline style.

This series will begin with basic instrument flight, including how to fly with nil visibility out the window, and proceed to the use of radio navigation aids, and how to fly real, published IFR procedures.

The lessons are designed to be used in-order, however they may also stand alone if you are already familiar with the content of earlier lessons. For the inexperienced, it is obviously a good idea to learn how to tune and use a VOR before attempting to carry out VOR/DME approaches!

Each lesson will guide you step-by-step through what you need to know to carry out the procedure, and through a practice using it. There is usually some theory to begin with to assist you to understand what you are doing, and why.

Many people -myself included- have found that experience in flight simulators, such as X-plane, has helped with real flying later on. While your experience may vary, it is hoped that this will at least give real-world students a head-start. The lessons follow a similar sequence and method as training to fly a real aircraft in a real flight school. This is possible because they are written by a real instructor from a real flight school.

Actual methods and sequence of lessons at different flight schools will vary, and this series will vary some things to better suit the application – desktop flight simulation. If you take real flying lessons, and your instructor tells you something different from what you have learned here, ALWAYS do what your real-world instructor says!
Making approaches to minima - We'll do that.

The lessons are created using the most up-to-date version of X-plane at the time of writing. At present, that is 9.67. However, the tutorials should apply just as well in any version, though the sequence and layout of dialogs and menus may vary.

For the most of the tutorials, there will be a text description, and usually an image to illustrate. Where action is required by the end user (you!) the text will be red. Probably the best way to use these tutorials will be to read through each one before you go back over it completing the exercises prescribed.

If you don't already have it, it is worthwhile downloading the X-Plane Keys reference guide from the download manager.

These tutorial threads will be locked, so no comments are possible here. The goal is to provide the best 'learn to fly in X-plane' series that is possible, so if you would like to comment, make a suggestion, or point out an error, please PM or email me (Voidhawk9).

I realize there are already some lessons and contributors to this subject out there. This series is not intended to replace anyone else's work, but rather to provide a systematic and consistent series of lessons in their own unique style. It is expected that where overlap with the work of others occurs, that the two or more will be complementary.
Getting Started: The Instruments

**Artificial Horizon (AH)**

- Primary Information: Pitch and roll
- Secondary information: Airspeed
- Adjustment: The knob can move the reference ‘wing bars’ up or down.

This is the primary instrument used in instrument flight, creating, as the name suggests, an artificial horizon to reference to the same way we would usually reference the real one out the window.

Rough airspeed information can be derived by comparing the attitude and altitude: If the attitude is high, but the aircraft is not climbing, you are SLOW. If the attitude is low, but you are climbing, you must be going FAST.
Airspeed Indicator (ASI)

- Primary information: Airspeed
- Secondary information: Pitch
- Adjustment: TAS scale

Aside from clearly indicating airspeed, the ASI can also give clues about the aircraft's pitch attitude. In normal, straight and level flight with a constant power setting, airspeed should remain constant. If we notice the airspeed increasing, when we haven't changed the throttle setting, it's probably because the pitch attitude has gone down, causing the acceleration (and vice-versa).

Altimeter (ALT)

- Primary information: Altitude
- Secondary information: Pitch
- Adjustment: Reference pressure (QNH)

Altitude is directly indicated. If altitude begins increasing, pitch attitude must have gone up. If altitude begins to decrease, the attitude has moved down.

Turn Coordinator (TC)

- Primary information: Rate of turn, sideslip
- Secondary information: Roll

Assuming the 'ball' in centred, and therefore you are in-balance, the turn indicator will also indicate direction of roll.
Vertical Speed Indicator (VSI)

- Primary Information: Rate of climb / descent
- Secondary information: Pitch

If you're going up, presumably your nose is up. If you're going down...

Directional Gyro (DG)

- Primary information: Heading
- Secondary information: Roll
- Adjustment: Heading 'bug'

If your heading is changing to the left, you're probably rolled to the left.

And that's the standard six, all you need to fly your aircraft and keep it under control, even with zero visibility out the window (yes, navigating accurately requires a little more. We'll come to that later). The secondary information will be important later, as well, when we simulate the failure of a primary instrument.

The techniques for flying the aircraft are the same as for visual flight. But because the information you require to keep things where you want them and under control are on various instruments, it is critical to develop an effective 'scan' between the instruments, and avoid the easy but potentially deadly trap of focusing too long on just one.
The Scan

The artificial horizon (AH) is the instrument that you'll need to spend the most time looking at. With it you can set the attitude and roll angle of the aircraft as desired, much the same as if you were looking out the window. In the standard instrument scan, you'll look back to this after looking at any other instrument.

Specific scans for specific manoeuvres will be discussed as they arise. For now, the scan is always AH – something else – AH – something else – AH and so on, in a radial pattern.

The Radial Scan.
Scan along RED arrows more often, YELLOW arrows less often.

The faster you scan between instruments, the better, as you will detect any deviation from altitude / airspeed / direction / pitch / roll / etc sooner, and be able to correct it while the deviation is still very small and insignificant.

Conversely, if your scan gets too slow, or even stops, you can lose track of at least one aspect of your flight, and the deviation can become significant before you detect it.

For example, if you are struggling to get the altitude just right, it is easy to focus almost entirely on the altimeter. Meanwhile, your heading may be drifting away! Perhaps the roll angle is increasing without you noticing; this will make altitude control even harder, perhaps strengthening your desire to focus on the altimeter.

This can easily get 'out of control', as you can imagine. So keep a proper, thorough scan going at all times.

In the next lesson we will learn how to fly straight and level, make climbs, descents, and turns, using only instruments, and how to properly adjust our instrument scan in these maneuvers.

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