

Aircraft Instruments

Airspeed Indicator



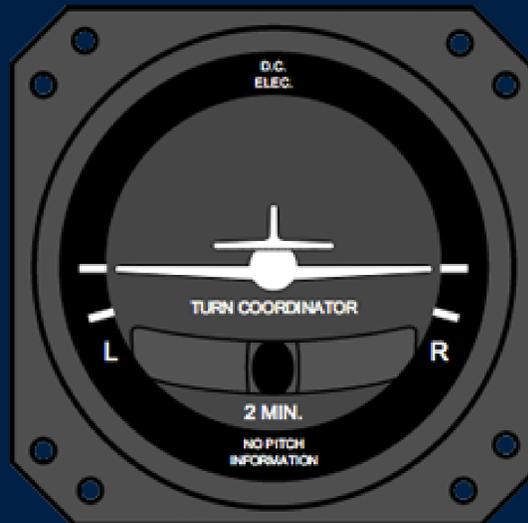
Artificial Horizon



Altimeter



Turn Coordinator



Direction Indicator



Vertical Speed Indicator



Air Speed Indicator

The Airspeed Indicator, or ASI, displays the aircraft's indicated air speed, or how fast it is travelling through the air. The ASI in most aircraft displays the speed in Knots, but yours may be different and show Miles Per Hour.

You will see that the instrument has a number of different colours in a band around the speed numbers. These are important and tell you important information about safety of the aircraft.

The green band indicates normal safe operating speeds for flight. The start of this band is known as V_{s1} , or the stalling speed with flaps up.

The white band indicates a safe speed to deploy wing flaps. Never do this when your speed is greater than the white band as it may damage your flaps. The start of this band is known as V_{s0} , or the stalling speed with flaps and landing gear deployed.

The yellow band indicates that you are travelling faster than the aircraft is designed for. This is known as the caution range, and ends with a red bar. Anything beyond this red bar is beyond the aircraft's maximum safe speed and should be avoided.



Artificial Horizon

The Artificial Horizon, or Attitude Indicator, is a useful cockpit instrument if you ever find yourself in conditions that preclude you from full visual flying, such as when caught in cloud or when doing instrument flying. It gives you an instant, truthful indication as to whether your aircraft is turning, climbing or descending, and should be trusted over all other senses if you are disorientated or lost.

The instrument shows a basic view of your aircraft and wings, and the horizon. If the aircraft is turning, the wings will tilt in relation to the horizon. If the aircraft is descending, the aircraft will move below the horizon, and if climbing it will be above the horizon.

The markings around the edge of the attitude indicator show the angle of bank as an additional reference when turning the aircraft in non-visual conditions



Altimeter

One of the simplest instruments to understand, the Altimeter displays your aircraft's current altitude.



The large hand indicates hundreds of feet, whilst the small hand indicates thousands of feet.

Also on this instrument is your pressure setting, which should be adjusted as directed by air traffic control to the current QNH or QFE in the area you are operating. If you alter this, you will notice your altitude change in line with that pressure setting, and it is of vital importance to do this in order to maintain safe separation from other aircraft.

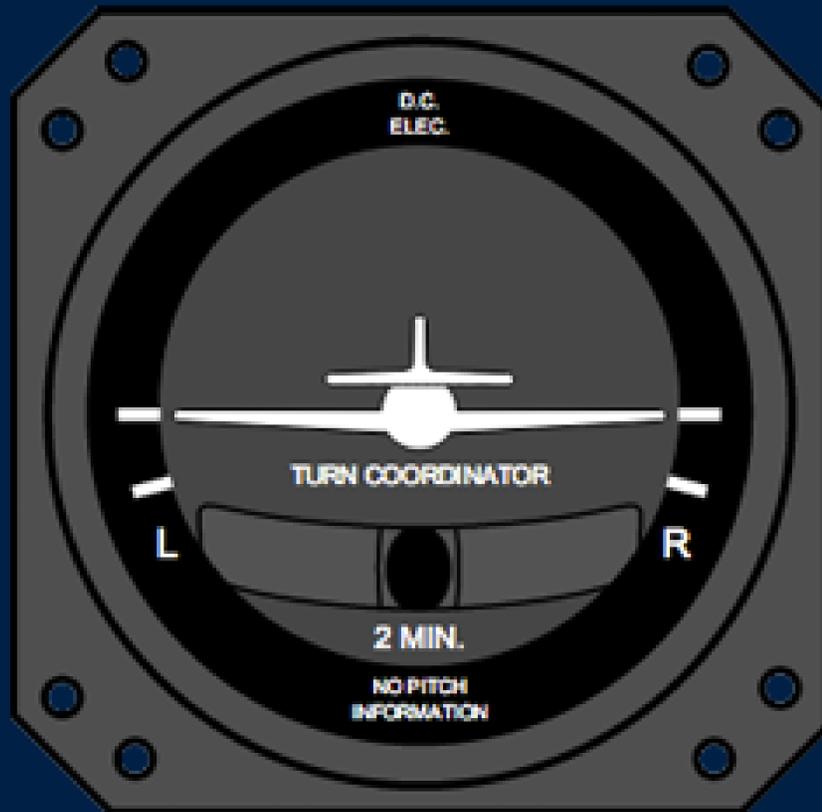
It is wise to include the altimeter in a regular scan of your instruments to get a picture of whether your aircraft is climbing or descending, or has already climbed or descended from your cleared or intended altitude. It is common for many trainee pilots to find that they have drifted, but you will be required to stay within defined altitude limits when taking your test, so it's good to keep an eye on this!

Turn Coordinator

This unassuming instrument is really quite useful for refining your flying, and also understanding what the aircraft is doing in poor visibility or instrument flying conditions. The turn coordinator, as the name suggests, shows the level of bank of your wings by tilting the small plane left or right. What appears like straight and level flight to your eyes may actually be a turn when you reference this instrument, even in good visibility.

The markings on the edge of the indicator show the rate of turn, with the first mark indicating straight-and-level, and the second mark Rate 1. You can use this to time a turn if you want to make a new heading (useful if you need to make a 180 degree U-turn) – simply bank the aircraft until the wings on the turn coordinator line up with the Rate 1 mark. Then time the number of seconds you have been turning. It takes 30 seconds to turn 90 degrees, 1 minute to turn 180 degrees, or 2 minutes to do a full 360 degree turn.

Also shown on the turn coordinator is a balance ball in a small white box. This shows whether the aircraft is travelling efficiently and in balance, or whether it is slipping or skidding in a turn. You should aim to keep the ball in the centre, especially during turns, by pressing the rudder pedal in the direction the ball has moved. As well as making your turns more efficient, it will also make the flight more comfortable for you and your passengers!



Direction Indicator

The Direction Indicator shows the entire compass range in one view, spinning as you turn to show your current heading. It doesn't suffer from external forces like the magnetic compass, and does not speed up or slow down as it turns. It clearly marks headings in 30 degree intervals, with N, S, E and W also marked.

You will notice a small knob underneath this instrument. The Direction Indicator is prone to getting out of sync quite easily, as it is influenced by forces of movement and vibration. Therefore you must correctly align this instrument regularly by referencing the magnetic compass. Do this before taking off, and regularly during flight when the wings are level and your speed is steady.



Vertical Speed Indicator



Also known as the climb indicator, the VSI is useful in conjunction with your Altimeter to determine if your aircraft is currently climbing or descending. The needle will display how many feet per minute in climb or descent, and can therefore also be used when in controlled descent, and when trimming the aircraft for straight and level flight. Naturally it is very useful when in instrument flying conditions to ensure the aircraft is not risking collision with ground objects, or climbing into a stall. Reference it as part of your regular scans to ensure the aircraft is flying as you want it to.

Checks before Stalling or Aerobatics

HASELL

Height	Height => Time => Safety
Airframe	Are the flaps etc. as we want them
Security	No loose articles, everything secure
Engine	Are the "T's & P" (Temperatures & Pressures) in the green, set at the power setting we expect.
Location	Do we know where we are? & Are we clear of built up areas?
Lookout	Normally done with a 360 turn, no planes coming anywhere near us any time soon are there?

HELL

Given the airframe won't change and it's unlikely things will become unsecured. Future maneuvers can be performed with the abbreviated HELL Check.

Height	Height => Time => Safety
Engine	Are the "T's & P" (Temperatures & Pressures) in the green, set at the power setting we expect.
Location	Do we know where we are? & Are we clear of built up areas?
Lookout	Normally done with a 360 turn, no planes coming anywhere near us any time soon are there?