The Different Types of Altitudes

True Altitude

This is your height above "mean sea level", a mostly arbitrary reference point. (By "mean" we mean "average", because sea levels do vary with the tides, and the wind causes waves, so mean sea level averages out all these effects to a single "mean" sea level). You're primarily interested in this because terrain and obstacles are charted with reference to MSL altitudes, and you want to make sure you're well above these when flying over them.

If we were on the ground, we'd call this "elevation".

Unfortunately, nothing in your plane is likely to measure this (a really accurate GPS would come the closest), so we instead rely on something that's a pretty good approximation...

Indicated Altitude

Since nothing in your plane measures true altitude, we use "indicated altitude" as the next best thing. This is what your altimeter gives you when you have the current "altimeter setting" plugged in.

We use indicated altitude for 2 things, maintaining terrain/obstacle clearance and maintaining vertical separation between planes that pass over each other. For terrain/obstacle clearance, we're using indicated altitude as a substitute for true altitude, which we're usually not equipped to measure in our plane.

If you're very close, both laterally and vertically, to the weather monitoring site from which you got your altimeter setting, then this is a pretty good approximation of true altitude, which is what you really want. An altimeter takes the pressure measured at a nearby ground station (the altimeter setting), measures the pressure it's feeling in the air around the plane, takes the difference, and by making an assumption of about how quickly air pressure drops as you get higher, it makes an estimate of what your true altitude might be. But the rate at which air pressure drops as you get higher is variable, and the higher you get from the weather station the greater this error can be, and the worse your estimate gets.

Also, as you gain lateral distance from the reporting station, the ambient pressure can change slightly, such that a closer reporting station would report a different number.

Our clearance from terrain is most critical when doing instrument approaches, as we can't see the terrain in IMC to know if we're clear of it. Fortunately, coming in low and close to a weather reporting station gives us the most accurate approximation of true altitude.

A worst-case example might be flying at night over mountains. Our altimeter setting might be from a ground station both laterally many miles away, but also from an elevation much lower than our altitude. This could lead to a significant altimeter error, and maybe we're closer to the top of that tall tree on the top of that tall mountain than we think we are.

Below 18000ft. we also use indicated altitude to ensure 2 planes flying over each other have "vertical separation"; in other words, two planes might be heading directly towards each other, but as long as one is flying higher than the other, there's no risk of collision. The planes may be far from the nearest weather reporting station, and high above it, so we may be getting a poor approximation to true altitude, but in this case all we care about is that both planes are a particular vertical distance from each other. So while each might have a large error relative to true altitude, they each necessarily have the same error, assuming they're both using the same altimeter setting (as they should be), and so vertical separation can be assured.

Pressure Altitude

Consider the "vertical separation" argument above and run with it. Up above 18000 feet planes are flying very fast and very high, getting up-to-date altimeter settings isn't very practical, and the error relative to true altitude is very high due to the height above the reporting stations. But up here we don't have terrain to contend with (with only a few exceptions), so we're only interested in vertical separation, and not particularly about flying a particular height above the ground. So up here we fly "pressure altitudes". Everybody puts 29.92 into their altimeters, and flies whatever altitude ATC assigns. When our altimeter reads 34000, we know we're probably not particularly close to 34000 feet MSL, but we don't care, all we care about is that the other guy coming in the other direction whose altimeter reads 33000 is really about a 1000ft below us.

A plane flying at FL180 is riding along whatever level in the atmosphere yields a particular atmospheric pressure, namely the pressure that we expect to see at 18000MSL under conditions of standard temperature and pressure. It will be flying higher above the ground on a high pressure (or high temperature) day, and closer to the ground on a low pressure (or low temperature) day. On a day with particularly low pressure, it's possible for the true altitude associated with FL180 to be so low that it can conflict with pilots flying an indicated altitude of 17500. When this happens, ATC will not assign FL180.

Absolute Altitude

Absolute altitude is your height above the ground. If you fly a constant altitude per your altimeter, your absolute altitude could be varying dramatically. If you fly over a big mountain, your height above the ground drops; if you then fly over a big valley, your height above the ground rises. You may be flying a constant indicated altitude, but since the height of the ground varies rapidly, your height above the ground varies as well.

You're very interested in your height above the ground when you're flying low and running the risk of actually running into something down there. You'd like to know how clear you are of terrain and obstacles. When doing an instrument approach, you'd really like to know with precision your height above the ground, because in IMC you can't see what might be rising up to smite thee.

A device to measure absolute altitude is a radar altimeter. Note that your absolute altitude can fluctuate dramatically as the terrain rises and falls, even though your "regular" barometric altimeter is rock steady. Most little planes don't have radar altimeters, and most civilian little planes only fly IMC along well-charted paths, so absolute altitude doesn't come into play much in little plane flying. Instead we use indicated altitude as an approximation to true altitude, and reference our indicated altitude against charts that list MSL values.

Density Altitude

Density altitude is a yardstick by which we can reference the "density" of air. Air density is a measure of the number of gas molecules (nitrogen, oxygen, etc., whatever we've got in our atmosphere) within a given volume of space. We care about the density of air because our wings and prop use these air molecules to generate lift and thrust, and because our engine needs oxygen for combustion. As density decreases (i.e. density altitude increases), our engines generate less power because they have less oxygen to mix with fuel and burn, and our wings and prop generate less lift, so we accelerate slower and have higher stall speeds. This means longer takeoff and landing runs, and slower climbs.

What we're really interested in here is density, how many air molecules there are in an imaginary box of any given size. The actual altitude associated with density altitude is meaningless, it's not something we fly, it doesn't really measure the distance between the aircraft and anything useful. Expressing air density in terms of altitude just gives us a handy reference, something more meaningful than some generic chemistry class measure like "moles per liter", and since density altitude does vary quite directly with altitude, it makes some sense. An airport at an elevation of 5000ft and seeing a surface temperature (today) that's standard for 5000MSL ("15C at sea level, minus 2C for each thousand feet above sea level, so that's 15-2*5 = 5C at 5000MSL") will have a density altitude (today) of 5000ft. If it's warmer than standard, then the current density altitude will be higher than the airport's elevation (e.g. 6000ft, 7000ft), and if it's colder than standard, then the current density altitude will be lower than the airport's elevation. So, for example, an airport at an elevation of 5000ft on a warmer than standard day might have a density altitude of 7000ft, and thus it has the same air density as we'd see at an airport at an elevation of 7000ft on a standard temperature day.

Note that while we express density altitude as, well, an altitude, using units of ft, density altitude isn't really "used" as an altitude, you'd never fly a density altitude, for instance.