Tech Dummy

All Credit to Google

Density Altitude

Density Altitude…..why must you keep it in mind!
Ref: http://en.wikipedia.org/wiki/Density_altitude

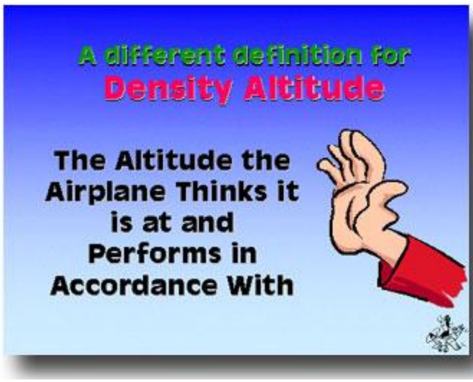
Air density is perhaps the single most important factor affecting aircraft performance. It has a direct bearing on:

- The lift generated by the wings — reduction in air density reduces the wing's lift.
- The efficiency of the propeller or rotor — which for a propeller (effectively an airfoil) behaves similarly to lift on wings.
- The power output of the engine — power output depends on oxygen intake, so the engine output is reduced as the equivalent "dry air" density decreases and produces even less power as moisture displaces oxygen in more humid conditions.

Aircraft taking off from a "hot and high" airport such as the Quito Airport or Mexico City are at a significant aerodynamic disadvantage. The following effects result from a density altitude which is higher than the actual physical altitude:[1]

- The aircraft will accelerate slower on takeoff as a result of reduced power production.
- The aircraft will need to achieve a higher true airspeed to attain the same lift - this implies both a longer takeoff roll and a higher true airspeed which must be maintained when airborne to avoid stalling.
- The aircraft will climb slower as the result of reduced power production and lift.

Due to these performance issues, a plane's takeoff weight may need to be lowered or takeoffs may need to be scheduled for cooler times of the day. Wind direction and runway slope may need to be taken into account.



Calculation (For the pilots with brains…(Keith, Hendrik)… well to complicated for me!)

Density altitude can be calculated from atmospheric pressure and temperature (assuming dry air).

$$\mathrm{DA} = 145442.156\left[1-\left(\frac{P/P_{SL}}{\mathrm{T}/T_{SL}}\right)^{b}\right]$$

where

DA = density altitude in feet
P = atmospheric (static) pressure
P_{SL} = standard sea level atmospheric pressure (1013.25 hPaISA or 29.92126 US))
T = true (static) air temperature in Kelvin (K) [add 273.15 to the Celsius (°C)] figure
T_{SL} = ISA standard sea level air temperature in Kelvin (K) (288.15 K)
b = 0.234969

Note that the leading coefficient is the ratio of the ISA sea level temperature (288.15 K) to ISA Temperature Lapse Rate (6.5 K/km), converted into feet.

National Weather Service Equation

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OK... in short DA

- Density Altitude (this is the altitude it feels like you are flying in- based on the barometric pressure or density of the air, the temperature, and the humidity).
- One must develop "rules of thumb" to use air density effectively in tuning carburetors for optimal performance. One such rule of thumb is that a five percent (5%) change in air density may require re-adjustment of the carburetor jetting. High air density readings indicate more oxygen in the air, thus more fuel is needed (richer tune), while low readings indicate less oxygen, requiring less fuel (leaner tune).
- ***A surprisingly accurate rule of thumb***
  - For every 8.5 deg C from Std Sea level temp 15 Deg C add an estimated 1000 feet to your altitude
  - Example. Grassland Sport Facility at 4600 feet, 32 deg mid day, DA(GSF) = ((32-15) x1000) + 4600 = 6600 feet DA

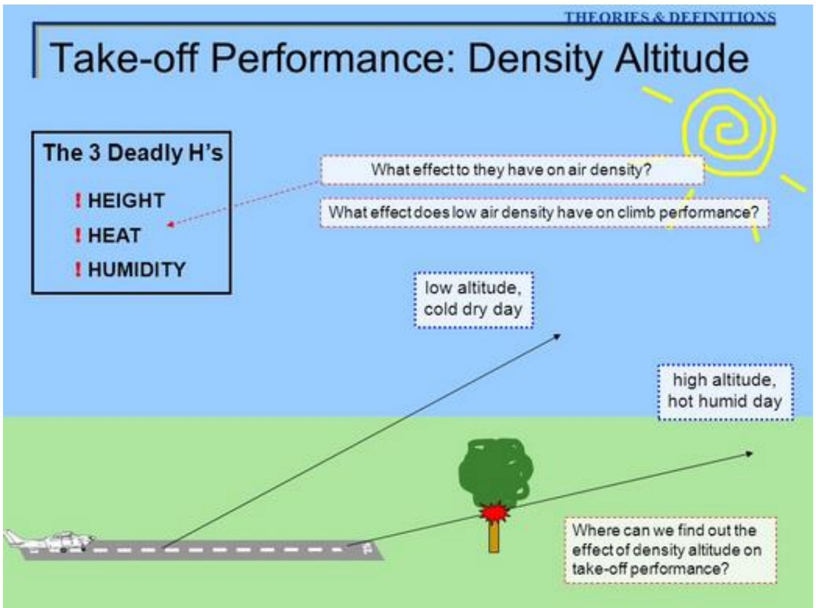
OK....why bother?

- The hotter it is the more you have to RUN
- The higher it is, the bigger motor you need for thrust.
- Less power on motor, less lift.
- Engine will be running either to lean or to rich, to lean will DAMAGE your motor!

SOME NICE APPS to use for weather:

IPhone

- WEATHERSA
- AIRNAV Pro
- WIND GURU
- ACCU Weather



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