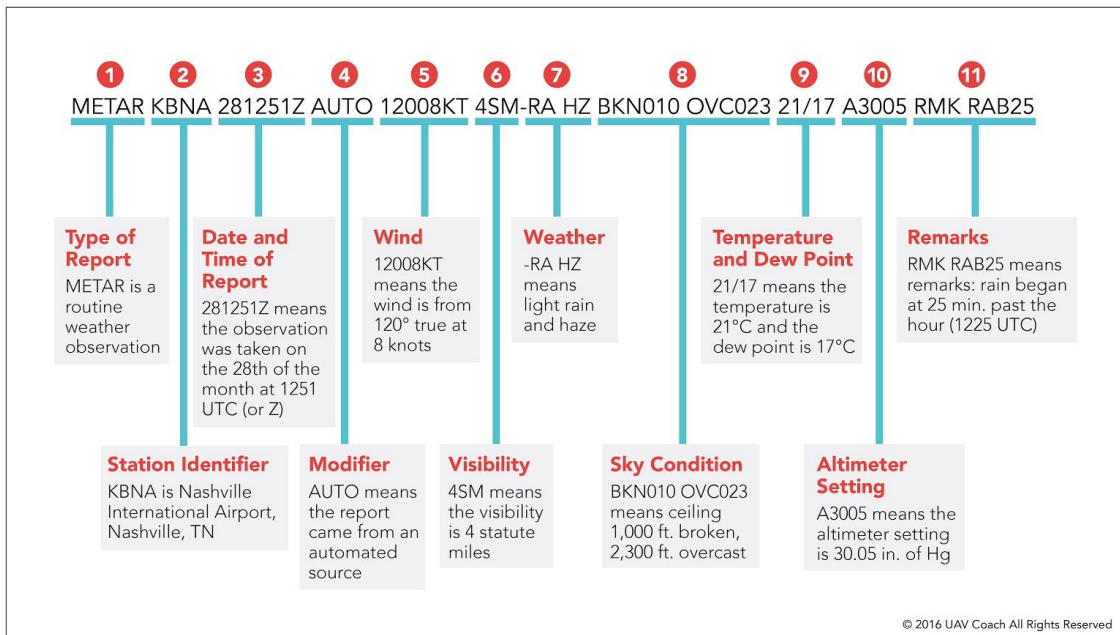


Weather

- Standard Day
- At sea level, the standard air temperature is 15° C (59° F), and the standard air pressure is 29.92” Hg, or inches of mercury (1013 millibars).
- At these standard conditions, your density altitude and your pressure altitude will be equal.
- Altitude
 - Absolute Altitude - the height above ground level (AGL)
 - True Altitude - the height above mean sea level (MSL)
 - Density Altitude - how we measure the density of air.
 - Pressure Altitude - the altitude when the barometric pressure scale is set to 29.92 in Hg.
- Density altitude – The altitude at which your aircraft “feels” like it is flying.
 - Higher density altitude means thinner air.
 - Occurs at higher elevations, higher temperatures, higher humidity, and lower atmospheric pressure.
 - Lower density altitude means thicker air.
 - Occurs at lower elevations, lower temperatures, lower humidity, and higher atmospheric pressure.
- Manmade structures, geological features, and local conditions can change the wind direction and speed.
- Bare ground, farmland, rocks, sand, paved roads, and sidewalks radiate heat. Water, vegetation, and forests absorb heat. The uneven heating causes a localized air circulation called convective currents. At a beach, the sea breeze is cooler air coming ashore heated up by the radiating land. The heated air circulates up and back out to sea where it cools and continues the cyclical process. At night the process is reversed as the land cools. The large body of water stays roughly the same temperature.
- Buildings and large natural structures (mntns and canyons) can affect wind flow. Be aware of unexpected gusts and changing wind direction. An example would be wind on the windward side of a mountain will create updrafts while on the leeward side, unexpected strong downdrafts can occur pushing your drone down and into the mountain.
- Wind Shear – Can occur at all altitudes, and in all directions, and it’s typically characterized by directional wind changes of 180° and speed changes of 50 knots or more. Is usually associated with frontal systems and thunderstorms.
- Microbursts – a localized column of sinking air (downdraft) within a thunderstorm and is usually less than or equal to 2.5 miles in diameter.
- Evaporation – when water changes from a liquid to water vapor.
- Sublimation – when ice changes directly to water vapor (dry ice)
- Relative Humidity – the amount of moisture in the air relative to how much the air could hold if saturated. A high relative humidity percentage will decrease the performance of the aircraft.
- Dew Point – The temperature where the air can hold no more moisture (100% humidity). Clouds form where the dew point and temperature have the same value. Typically, when the temperature and the dew point converge, you will have fog.
- Fog – a cloud that begins within 50ft of the ground. (5 types)
 1. Radiation Fog – forms in low-lying areas like a mountain valley when surrounding air reaches its dew point and the ground cools rapidly as in the evenings with little to no wind.
 2. Advection Fog – coastal areas where sea breezes blow moist air over cooler land or when air masses move inland from the coast. Wind is required.

3. Upslope Fog – when moist stable air is forced up sloping land features (mountains). Requires wind and can last for days.
 4. Steam Fog (sea smoke) – occurs over bodies of water during the coldest parts of the year. Cold dry air moves over warm water. As water evaporates it resembles smoke. Caution of turbulence and icing.
 5. Ice Fog – occurs in cold weather when the temperature is below freezing and water vapor forms into ice crystals. Usually in low-lying areas with air temperatures colder than -25°F.
- Frost – forms when the dewpoint is lower than 0°C and the temperature of the props (wings) surface is below the dewpoint.
 - METAR Reports – contains the following information and is issued hourly.

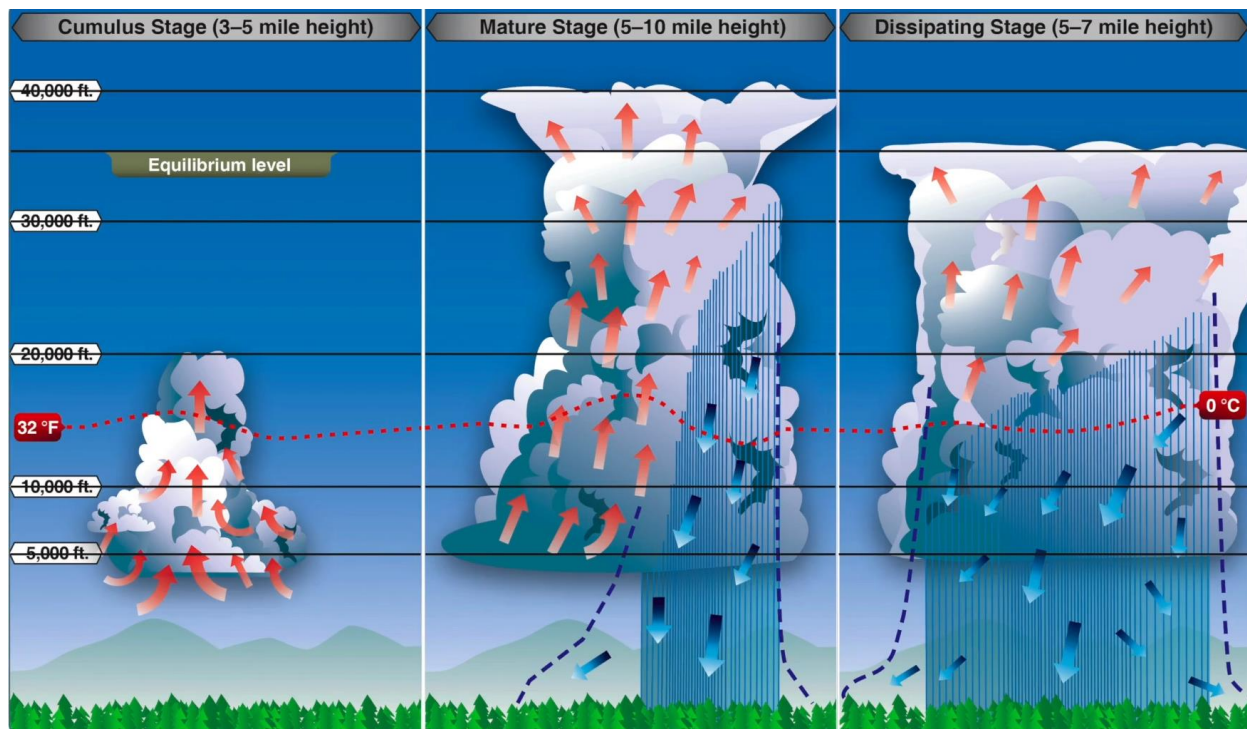


- DronePilotGroundSchool – Offers the following codes that most often appear on tests.
 - BKN = broken
 - OVC = overcast
 - BR = mist
 - SH = showers
 - RA = rain
- Search METAR codes and decoder for a slew of tools to help you with this.
- Terminal Aerodrome Forecast (TAF) – like METAR but only good for areas 5 miles around reporting airport and are issued less frequently than a METAR. Coding is similar to METAR. It includes the following in sequential order:
 - ICAO station identifier
 - Date and time of origin
 - Valid period date and time
 - Forecast meteorological conditions (cumulonimbus clouds (CB) are the only cloud type that's forecast in a TAF.)

KMEM 121720Z 1218/1324 20012KT 5SM HZ BKN030 PROB40 2022 1SM TSRA OVC008CB
 FM2200 33015G20KT P6SM BKN015 OVC025 PROB40 2202 3SM SHRA
 FM0200 35012KT OVC008 PROB40 0205 2SM-RASN BECMG 0608 02008KT BKN012
 BECMG 1310/1312 00000KT 3SM BR SKC TEMPO 1212/1214 1/2SM FG
 FM131600 VRB06KT P6SM SKC=

KOKC 051130Z 0512/0618 14008KT 5SM BR BKN030 TEMPO 0513/0516 1 1/2SM BR
 FM051600 18010KT P6SM SKC BECMG 0522/0524 20013G20KT 4SM SHRA OVC020
 PROB40 0600/0606 2SM TSRA OVC008CB BECMG 0606/0608 21015KT P6SM SCT040=

- SIGMET Advisories (Significant Meteorological Information) – info on significant weather like thunderstorms and turbulence.
- AIRMET Advisories (Airmen's Meteorological Information) – lower significance the SIGMET but potentially unsafe flying conditions.
- Flying in Cold – aside from the physical effects on the body that can also affect your flight performance, cold can affect flight proficiencies. LIPO batteries will have reduced efficiency.
- Thunderstorms – formed by cumulonimbus clouds. They form when there is high humidity, unstable conditions, and lifting forces at the start of the system. There are 3 stages:
 - Cumulus stage – lifting action begins.
 - Mature stage – most violent time period.
 - Dissipating stage – when downdraft spreads out and replaces the updraft.



- Tornadoes – clouds connected to a thunderstorm can produce tornadoes.
- Icing – This can occur when temps are near freezing and there is visible moisture. Remember the temperature goes down at altitude.
- Hail – Anticipate near thunderstorms. Can happen in clear air miles away from thunderstorms.
- Lightning – Bad news.
- Clouds
 - Lenticular clouds – winds can be strong.
 - Most dangerous – cumulonimbus (thunderstorm)
- Ceilings – the lowest part of the cloud
 - Must remain 500ft below and 2000ft horizontally from clouds.
- Visibility – Must be able to see 3 statute miles. Use a METAR report to be sure.
- Unstable air
 - Cumuliform clouds
 - Turbulent air
 - Good visibility
 - Showery precipitation
- Stable air
 - Stratiform clouds
 - Smooth air
 - Fair-to-poor visibility – no movement so particles can't rise out of air mass.
 - Continuous precipitation
- Air Mass – large bodies of air.
 - categorized is based on moisture content (maritime or continental) and temperature characteristics (arctic, polar, or tropical). When an air mass passes over a warm surface it is warmed from below which causes the air to rise creating unstable air with good visibility.