Higher Living

Welcome to 2024!

First welcome three additional flight instructors who joined us in the closing weeks of 2023. Braeden Pharo, Iara Spencer Melo, and McMillan Abernethy.

Macmillan received his training with EFTS and was hired upon earning his CFI certificate. Iara is a CFII who also flies professionally out of RDU. Braeden is a CFI who will also be available for instructing at our KHRJ location. We welcome each of them to EFTS.

2023 was a successful year with 14 first solo flights and 21 certificates earned. My congratulations to each of those people. Their successes represent dedication and perseverance.

Sadly I want to make note of the passing of Bobby Cox, who was the builder of Cox field (NC81), designer of his own custom, award winning, airplane the Cox Hawk, builder of several kit built airplanes, a 14,000 hour pilot with at least 9 cross country flights to Alaska as well as numerous flights to the Bahamas and even Europe. He constructed the EAA meeting building at Cox Field at no cost to the EAA members and built his own home and a two-story log cabin on the Cox Field property. I attended his Lifetime Achievement Award ceremony from the EAA and just before Christmas, his funeral, in Apex. The aviation community will miss him.

Come fly with us.

- David Williams, Editor

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Contact Us

Phone: 919-897-8882

Schedule your next aviation adventure at www.ExecFT.com

Located in the FBO at 700 Rod Sullivan Road, Sanford, NC.

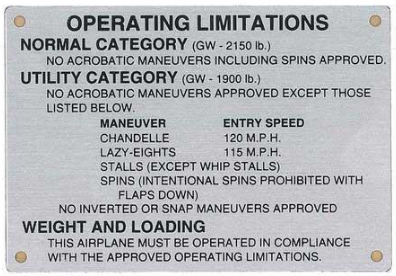
Airplane & Instructor Rates

Discovery Flight	$119
Wet rate for rentals. Tax is included.	
Cessna 172 N30617	$205/hr
Warrior N41669	$185/hr
Warrior N9626C	$180/hr
Cherokee N720FL	$165/hr
Cherokees N515DH, N711FL	$155/hr
Cessna 172 N3816Q	$170/hr
Instructor time	$50/hr
CFI/CFII training	$60/hr
Redbird TD2	$40/hr

What is the Utility Category?

You have seen mention of the utility category on placards in airplanes and in the weight & balance information in the POH. What does it mean to be in the utility category and when would we want it to be that way?

The airplane utility category is a classification used in aviation to describe the intended use and limitations of certain aircraft.



Aircraft are placed into various categories based on their design, performance characteristics, and intended operations. The utility category is one such classification and is primarily associated with general aviation aircraft. Here's an overview of the use of the airplane utility category:

Aircraft in the utility category are designed to be versatile and capable of performing various tasks, including routine non-aerobatic flight, as well as limited aerobatic maneuvers. This category is often associated with general aviation aircraft that can be used for recreational flying, flight training, and some specialized tasks.

One of the distinctive features of aircraft in the utility category is their ability to perform limited aerobatic maneuvers. These aircraft are designed to withstand the stresses associated with basic aerobatics, such as loops, rolls, and spins, within specified limitations. The POH indicates how a small aircraft would need to be configured to place it in the utility category and defines which maneuvers would be allowed.

While utility category aircraft are designed for very basic aerobatic flight, there are still limitations on the types and extent of aerobatic maneuvers that can be performed. These limitations are specified by the aircraft manufacturer and outlined in the aircraft's operating manual. Pilots must adhere to these limitations to ensure safety.

Pilots who intend to perform aerobatics in utility category aircraft are often required to have specialized training in aerobatic flight. In many cases, they must hold an appropriate pilot certificate or endorsement to demonstrate their competence in aerobatics.

Aircraft that are commonly found in the utility category include many general aviation and sport aircraft. Examples may include certain models of the Cessna 152, Cessna 172, and Piper Cherokee, among others.

Aircraft in the utility category must comply with regulatory standards set by the FAA to ensure that they meet the requirements for structural integrity and operational safety in both routine and aerobatic flight.

In summary, the airplane utility category encompasses aircraft designed for versatility and the ability to perform limited aerobatic maneuvers. These aircraft are well-suited for various general aviation activities, including recreational flying and flight training. Pilots operating utility category aircraft should be aware of the specific limitations and requirements associated with their aircraft and adhere to safety guidelines for aerobatic flight.

What Does a Quick Turnaround Mean?

Aircraft quick turnaround, also known as a "quick turn" or "quick change," refers to the efficient and rapid process of servicing an aircraft during the time it spends on the ground between flights, typically at an airport or maintenance facility. The primary goal of a quick turnaround is to minimize the aircraft's ground time, allowing it to depart for its next flight as soon as possible. This process is crucial for airlines and charter operators to maximize aircraft use and maintain tight flight schedules.

The following items are all included in the considerations for accomplishing quick turnarounds.

Passengers need to disembark the aircraft quickly and board the new set of passengers efficiently. This process involves deplaning, cleaning, and restocking the cabin, as well as conducting necessary security and safety checks.

Efficient unloading and loading of passenger baggage is essential to minimize turnaround time. Baggage handling systems and personnel must work quickly and accurately.

Aircraft require refueling between flights to ensure they have enough fuel for the next leg of their journey. The fueling process should be expedited while ensuring safety and accuracy.

Food and beverage services may need to be restocked for the next flight. This includes restocking the galley and catering storage areas with meals, snacks, and beverages.

Cleaning crews need to quickly clean the aircraft's interior, including emptying trash bins, wiping down surfaces, and ensuring the cabin is presentable for the next set of passengers.

Quick turnarounds might include minor maintenance tasks, such as visual inspections, tire checks, or other routine procedures to ensure the aircraft is airworthy.

In some cases, there may be a change in flight crew, especially on long-haul international flights where there are regulatory restrictions on crew duty hours.

For cargo aircraft or passenger planes carrying cargo, loading, and unloading cargo and freight must be completed efficiently.

Security procedures, including aircraft inspections and screening of cargo, are conducted to ensure the safety and security of the aircraft and its passengers.

Effective communication and coordination among ground personnel, including ground handling crews, flight crew, and air traffic control, are crucial for a successful quick turnaround.

Weather conditions and air traffic must be monitored to account for potential delays and adapt the turnaround process as needed.

A well-executed quick turnaround enables airlines to maximize aircraft utilization and reduce operational costs. However, it requires careful planning, training, and coordination among various airport and airline personnel to ensure that the aircraft departs on time while maintaining safety and service quality. Delays or inefficiencies during quick turnarounds can disrupt flight schedules and impact the overall operation of an airline.

How Does a Magneto Work?

An aircraft magneto is an essential component of the ignition system in most piston engine aircraft. It provides the high-voltage electrical spark needed to ignite the air-fuel mixture in the engine's cylinders. Here's how an aircraft magneto works:

Inside the magneto housing, there is a rotating magnet called the rotor. The rotor is connected by gears to the engine's crankshaft, which causes it to rotate at the same speed as the engine. This rotational motion generates electrical energy.

The magneto contains an induction coil or transformer, which consists of a primary coil and a secondary coil. The primary coil is made up of a few turns of thick wire, and the secondary coil has many more turns of thinner wire. The primary coil is connected to the rotor, and the secondary coil is connected to the spark plugs.

As the rotor spins, it generates a magnetic field that moves past the primary coil. This changing magnetic field induces a current in the primary coil due to electromagnetic induction. The primary coil briefly stores this electrical energy.

Within the magneto, there are breaker points that open and close at specific times in the rotation of the rotor. When the points open, it interrupts the current flowing through the primary coil, causing a rapid collapse of the magnetic field within the coil. This change in magnetic field induces a much higher voltage in the secondary coil due to its greater number of turns.

The high-voltage electrical energy generated in the secondary coil is then sent to the spark plugs. When the voltage reaches the spark plugs it creates a spark. This spark ignites the compressed air-fuel mixture in the engine's cylinders, leading to combustion and power generation in the engine.

The timing of the magneto's spark is carefully synchronized with the engine's crankshaft position to ensure that the spark occurs at the correct moment in the engine's four-stroke cycle (intake, compression, power, and exhaust strokes).

Usually in the left magneto there is an impulse coupling which, when the starter cranks the engine, a spring-loaded flyweight catches on a stationary stop pin and will suddenly release to give the magneto an extra fast spin to generate a high voltage spark to aid in starting the engine.

Aircraft magnetos are designed to be self-contained and independent of the electrical system. The redundancy of having two magnetos ensures that the ignition system remains operational even if the aircraft's electrical system fails. All our, and most, aircraft have two magnetos, with each providing electrical power to one of the two spark plugs in each cylinder, providing redundancy and increased reliability. Pilots can switch between the two magnetos or use both for optimal engine performance.

Calculation of Percent MAC

Percent MAC, which stands for "Percent of Mean Aerodynamic Chord," is a measure used in aviation to determine the position of the center of gravity on most large aircraft. It is essential for ensuring the aircraft's stability and control during flight. To calculate percent MAC, you need the following information:

The aircraft's center of gravity (CG) Position: This is the point where the aircraft balances longitudinally, usually specified as some distance aft of the reference datum (a fixed point on the aircraft).

The MAC or Mean Aerodynamic Chord is the average chord length of the wings. For wings with a constant airfoil section, the MAC is the distance from the leading edge to the trailing edge of the wing.

Here are the steps to calculate Percent MAC:

1. Determine the CG Position: You should have information about the aircraft's CG position, typically provided in inches or millimeters aft of the reference datum. The reference datum is a specific point on the aircraft where all CG measurements are taken from.

2. Find the Mean Aerodynamic Chord (MAC): The MAC is the average chord length of the wings. If your aircraft has wings with a constant airfoil section, you can measure the MAC directly. If not, you may need to consult the aircraft's documentation or manuals to find the MAC value for your specific aircraft type.

3. Perform the Calculation: Divide the distance from the CG to the reference datum by the MAC length and then multiply the result by 100 to get the percentage.

4. Interpret the Result: The calculated value is the percentage of the MAC that represents the CG's position. The CG should be within a specified range to ensure the aircraft's stability and control. This range is usually provided in aircraft manuals and is often expressed as a percentage of MAC. A common range for most general aviation aircraft is between 5% and 25% of MAC.

In larger aircraft, weight and balance is often expressed as a percentage of MAC, rather than inches from a datum. For example, assume the leading edge of the MAC is 62 inches aft of the datum. Therefore, the CG of 94 inches lies 32 inches aft of the leading edge of the MAC. If the MAC is 80 inches in length, the percentage of MAC is 32 / 80 = 40%. If the allowable limits were 15% to 35%, the aircraft would not be properly loaded. In large aircraft with complex station positions it is just simpler to work with the percentage figure rather than remembering the number of inches which are acceptable.

Make sure the CG is within the recommended range to ensure safe and stable flight. If the CG is outside of the recommended range, adjustments need to be made, such as redistributing cargo or fuel, to bring the CG within acceptable limits. It's important to consult the aircraft's documentation and follow the specific procedures provided for your aircraft type to fly safely.

The Performance Envelope Explained

An airplane performance envelope diagram, often referred to as a "flight envelope" or "V-n diagram," is a graphical representation that illustrates the safe operating limits of an aircraft in terms of its speed, load factor (G-forces), and altitude. This diagram is essential for understanding the aircraft's performance characteristics and ensuring safe flight operations. It provides a visual depiction of the aircraft's capabilities and limitations.

Here's a description of the key elements of an airplane performance envelope diagram:

The diagram typically consists of two perpendicular axes.

The horizontal axis represents airspeed (usually in knots) or Mach number (Mach). This axis shows the range of possible air speeds.

The vertical axis represents load factor (G-forces). Load factor is a measure of the load or stress on the aircraft expressed in multiples of the acceleration due to gravity (1 G). It includes both positive G-loads (pulling up or turning) and negative G-loads (pushing over or diving).

The flight envelope diagram includes various curves or lines that define the aircraft's performance limits. These curves typically include the following. The Stall Speed Curve represents the lowest airspeed at which the aircraft can maintain controlled, level flight at a given load factor.

The Maximum Load Factor Curve (G-Limit Curve) indicates the maximum positive and negative G-forces that the aircraft can safely withstand at various airspeeds.

The Maneuvering Load Factor Curve represents the load factor the aircraft can handle during certain maneuvers (e.g., turns or banks) at different airspeeds.

The Never Exceed Speed (VNE) is represented by a vertical line on the airspeed axis showing the maximum airspeed beyond which the aircraft should never be flown.

The Coffin Corner is a combination of the stall speed curve and the never-exceed speed (VNE) line. This region is where the stall speed and VNE are close, making it a high-risk area for the aircraft.

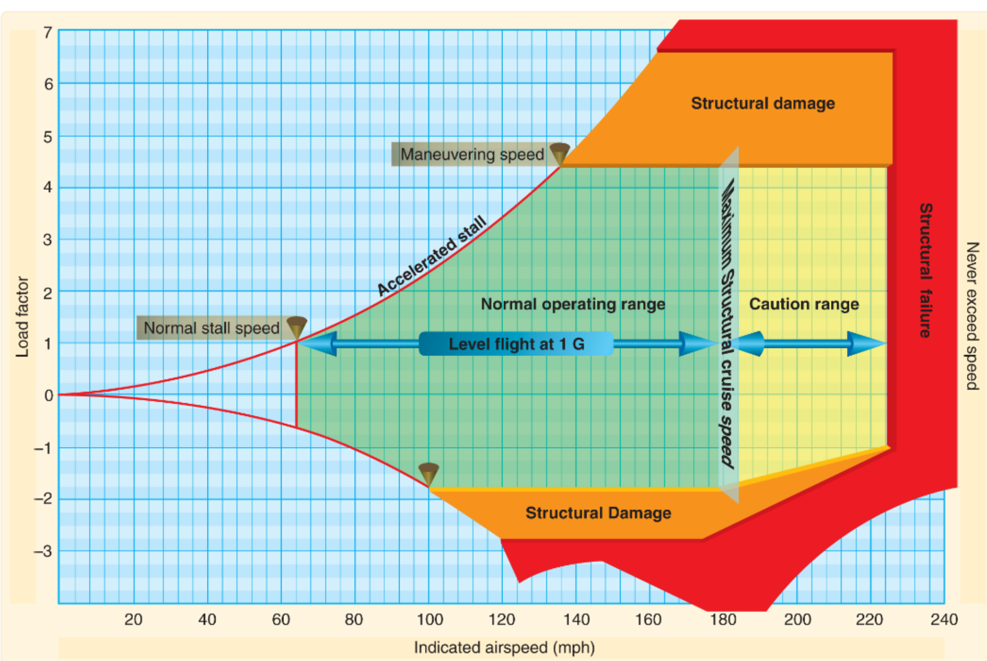
The diagram divides the performance envelope into several regions, including:

The Normal Flight Region (shown in green in the image) where the aircraft typically operates during routine flight. It is bounded by the stall speed curve, the maximum load factor curve, and other relevant performance limits.

In the Stall Region, below the stall speed curve, the aircraft is at risk of stalling if it exceeds the critical angle of attack.

The Excessive Load Region located above the maximum load factor curve, the aircraft is at risk of structural damage due to excessive G-forces.

The Never Exceed Region exists to the right of the VNE line,



where the aircraft may experience structural failure if it exceeds the maximum speed.

The flight envelope diagram provides safety margins to account for variations in aircraft performance and environmental conditions. These margins help ensure that the aircraft operates safely within its limits.

Pilots use the flight envelope diagram to make real-time decisions during flight, such as avoiding areas where the aircraft's performance limits are approached or exceeded. The diagram is also a valuable tool for training and understanding an aircraft's operational capabilities and limitations. It is an important element in aviation safety and risk management.

Question of the Quarter

How many Commercial aircraft are in the air, on average, at any time?

Answer:

Based on figures from FlightAware there are always somewhere between 7,782 and 8,755 commercial flights underway. This figure does not include cargo, military, and private aircraft. Commercial flights make up about 46% of all flights so the total number of planes in the air may be double the quoted figure.

You just learned something new.