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Vertical takeoff and landing (VTOL) refers to the ability of an aircraft to take off and land vertically without the need for a runway or any external support. This means that the aircraft can lift off directly from the ground or any other flat surface and can land in the same way, without requiring any forward speed or landing gear. The most common types of aircraft that use vertical takeoff and landing capabilities are helicopters, tiltrotor aircraft, and vertical takeoff and landing (VTOL) aircraft. These types of aircraft use different mechanisms to achieve vertical flight.

Helicopters use a rotor blade to generate lift and propulsion, allowing them to hover in place and maneuver in any direction. Tiltrotor aircraft, on the other hand, use rotors that can tilt, allowing them to take off and land like a helicopter, but then transition to a more efficient airplane mode for forward flight. VTOL aircraft typically use jet engines or other propulsion systems to generate lift and forward motion, allowing them to take off and land vertically. aircraft have a number of advantages over traditional fixed-wing aircraft, including the ability to operate in confined spaces, the ability to operate from remote locations or ships, and the ability to quickly respond to emergencies or other time-critical situations. However, they also tend to be more complex and expensive to operate and maintain than traditional aircraft.

They are several solutions that have been proposed to address these challenges in designing an autonomous air travel taxi

Tilt-rotor technology: This involves using rotors that can tilt from a Vertical to a horizontal position, allowing the aircraft to takeoff and land like a helicopter, but fly like a fixed wing aircraft. The V-22 osprey is an example of an aircraft that uses tilt-rotor technology.

Thrust vectoring: This involves using variable geometry nozzles on the engines to direct the thrust in different directions, allowing the aircraft to control its pitch, roll, and yaw. The F-35B Lightning II is an example of an aircraft that uses thrust vectoring.

Lift-fan technology: This involves using a fan or set of fans to provide lift, while the engine provides thrust for forward flight. The Harrier Jump Jet is an example of an aircraft that uses lift-fan technology.

Signature – Name – Date

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