Tiltrotor VTOL Fleet For Wildfire Suppression

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Abstract

NASA's Aeronautics Design Challenge aims to reduce the effects of rampant wildfires by giving student groups an opportunity to design and submit a Very Short Takeoff and Landing (VSTOL) aircraft for the task of fighting wildfires. The University of Minnesota research group has designed a competitive aircraft that can deliver 118,000 gallons of water per day on an average mission. The design processes included researching aerial firefighting tactics, current VTOL aircraft, home baked mission performance simulations, and aerodynamic analysis. With the prospect of many advanced air mobility projects coming to fruition before the EIS of 2030, this vehicle is designed to offer flexible performance modes to suit a wide range of differing mission demands. This innovative vehicle combines the flexibility of a helicopter with the endurance of a fixed wing aircraft. The vehicle is designed to be unmanned pending future developments in the realm of unmanned aerial vehicles. The vehicle will be able to complete a total of twenty-seven water drops with a capacity of 1800 gallons per drop before returning to the airport to refuel and replenish the water tanks. This vehicle will be able to compete with current aerial firefighting solutions such as the Canadair CL-415 and Sikorsky S-64 Skycrane, offering competitive water delivery capability, improved maneuverability, and a wider range of acceptable water sites.