

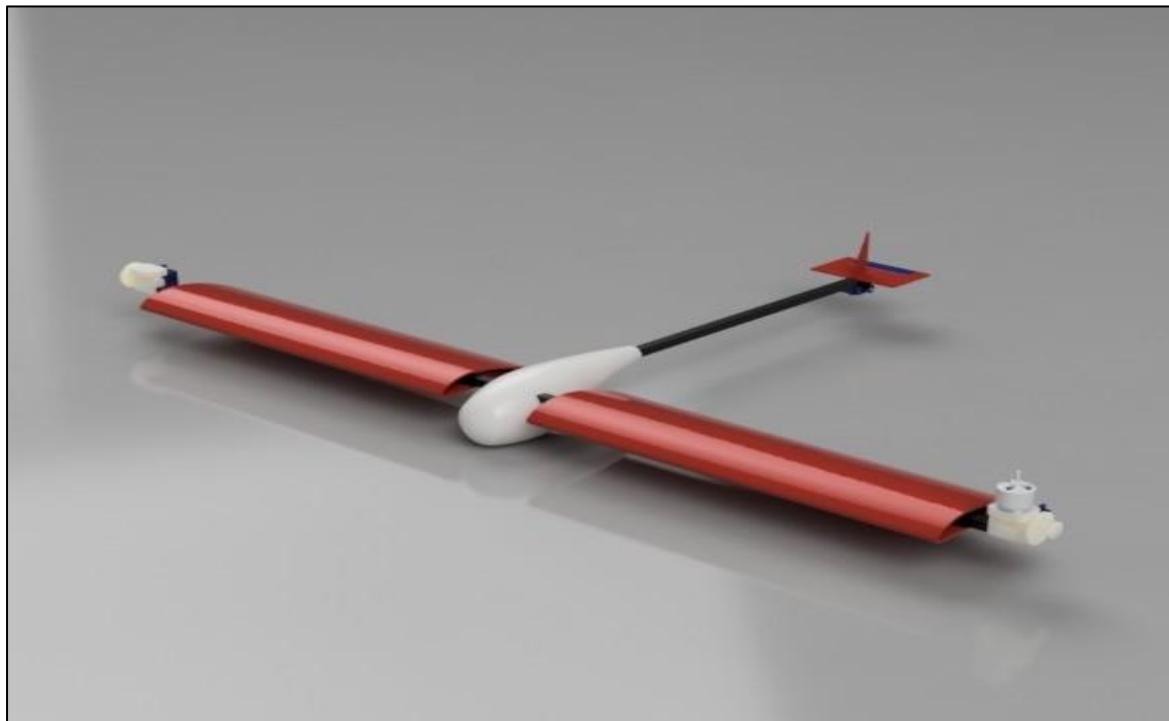
Tilt-Rotor VTOL Aircraft Model

Abstract:

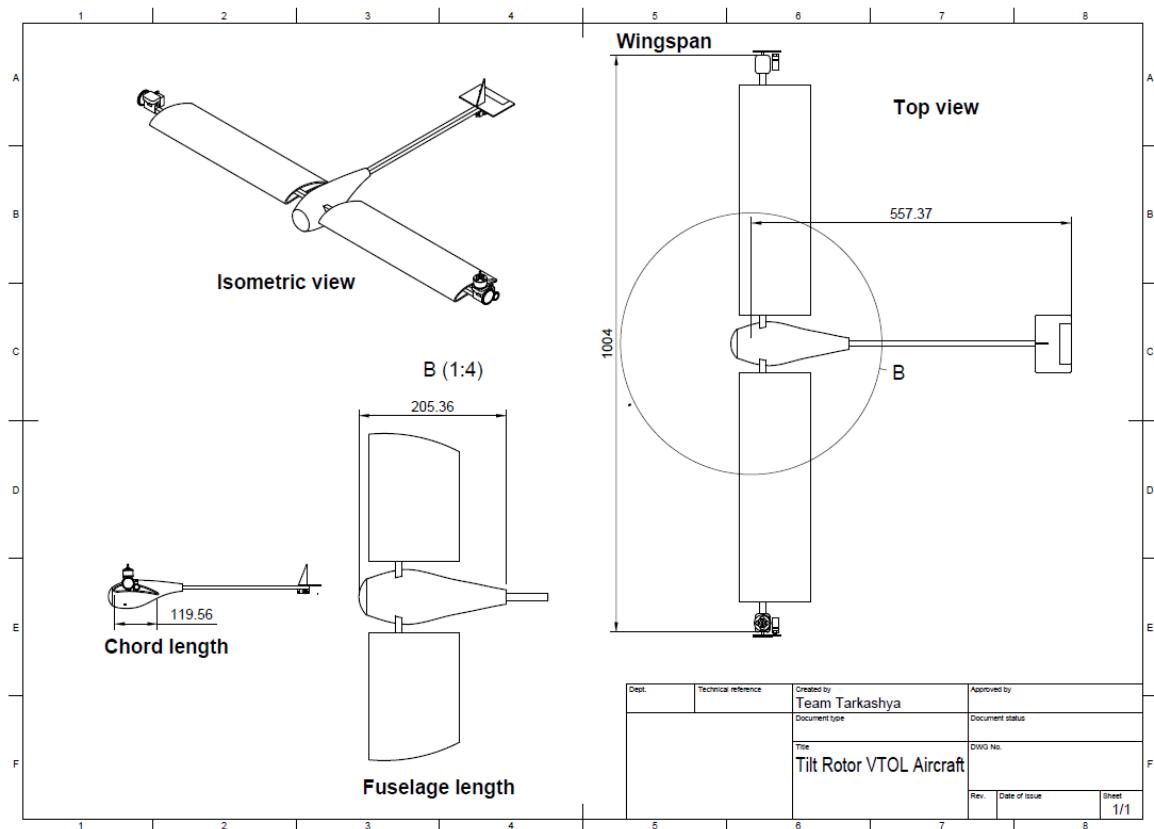
This project focuses on the conceptualization, design, and prototyping of an electric-powered Tilt-Rotor VTOL (Vertical Take-Off and Landing) aircraft by Team Tarkshya. The primary objective is to develop a lightweight, low-cost UAV capable of transitioning between vertical lift and horizontal forward flight using tilt-rotor actuation and remote control.

This project explores the development of a student-designed **electric tilt-rotor VTOL aircraft**, aimed at combining simplicity, affordability, and functionality. Unlike conventional multirotor drones, tilt-rotor VTOLs offer enhanced aerodynamic efficiency during forward flight by allowing the transition from rotor-borne vertical lift to wing-borne horizontal flight. This hybrid capability increases range, flight time, and payload efficiency, making it a valuable design configuration for future UAV systems.

Proposed Design:



Assembly Drawing:



Specifications:

- Airfoil profile: NACA 6409.
- Wingspan: ~100cm
- Aspect Ratio: 8.33
- Chord length: 12cm
- Fuselage length: 20cm

Equipment needed:

S.No.	Parts Needed	No. of Parts Needed
1	A2212 BLDC Motor	2
2	SG90 Micro Servo Motor	3
3	1040 Propellers	2
4	Receiver	1
5	3S LIPO 4500mah	1
6	ESC 30-40 Amps	2
7	Carbon Fibre Rods/Tubes (10 x 8 x 1000mm)	2
8	Depron Sheets (2mm)	
9	3D Printer (ABS/PLA filament)	