

We Claim:

1. A lift assembly (300) in an aerial vehicle, the lift assembly (300) comprising:
 - a wing (102) comprising a leading edge (108);
 - at least a vertical rotor (118) disposed below the wing (102);wherein
 - a vertical axis (121) of the vertical rotor (118) is positioned within a span of the wing (102);
 - the vertical rotor (118) is operational during forward flight of the aerial vehicle;
 - a placement distance (122) between the leading edge (108) and the vertical axis (121) of the vertical rotor (118) is a factor of RPM of the vertical rotor (118), angle of attack (116) of the wing, and a wing chord (117); and
 - a combined effect of wing (102) and operating rotor (112) provides a higher lift coefficient compared to the sum of the lift coefficients of the wing (102) and the vertical rotor (112) operated individually.
2. The lift assembly (300) as claimed in claim 1, wherein
 - an optimum place for the positioning of the vertical rotor (118) is in the rear side of the wing (102) along a central axis of the wing chord (117) for maximum lift force; and
 - the lift force decreases as the positioning of the vertical rotor (118) is shifted away from the central axis of the wing chord (117).

3. The lift assembly (300) as claimed in claim 1, wherein
the positioning of the vertical rotor (118) upstream of the wing (102), near the leading edge (108) provides a maximum reduction in drag;
the drag force happens to be acting in the direction of thrust; and
the ratio of lift to drag force is maximum at the rear of the wing (102).
4. The lift assembly (300) as claimed in claim 1, wherein
the lift increases in a linear manner when the throttle is increased from 0 to 100%.
5. The lift assembly (300) as claimed in claim 1, wherein
the lift increase enables the wings (102) to be smaller and hence incur reduced drag for a given payload.
6. The lift assembly (300) as claimed in claim 1, wherein a lift coefficient of the lift assembly (300), at the optimum position of the vertical rotor, is higher when the vertical rotor (118) is operational during forward flight of the aerial vehicle.