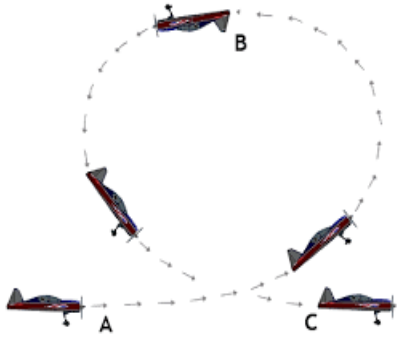
AIR MARSHAL 2.0

TASK: Design and make a fast, light, wireless remote controlled aircraft (using electric motors only), which can manoeuvre around the mentioned path in the least possible time before landing in the specified zone.

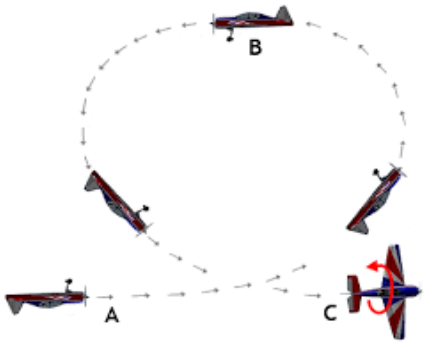
Specifics of the task:

The following order of the task has to be followed:

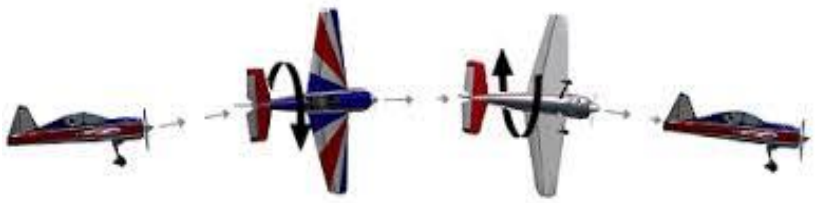
1. Start from the launch/landing zone.
2. Now, participant has done following stunts in air.
   (a) INSIDE LOOP {20 POINTS}



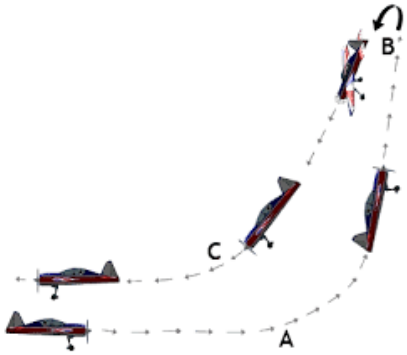
(b) OUTSIDE LOOP {30 POINTS}



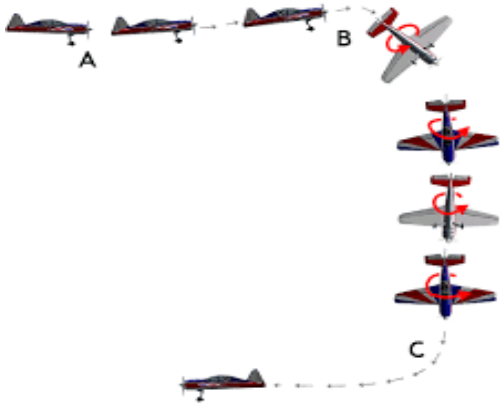
(c) ROLL {30 POINTS}



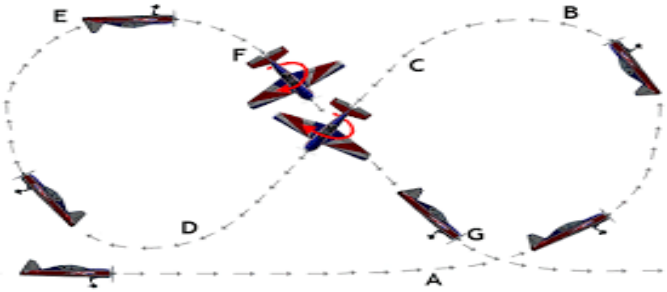
(d) STALL TURN {40 POINTS}



(e) KNIFE EDGE SPIN {80 POINTS}*



(f) CUBAN EIGHT {100 POINTS}*



NOTE*- KNIFE EDGE SPIN and CUBAN EIGHT stunt are optional.

3. Enter the safe landing zone and land. Try and land as close as possible to the innermost spot of the spot landing zone.

4. Complete the whole task in the least time possible.

Machine Specifications:

1. An aircraft is defined as an object that has the four forces of flight, namely lift, drag, weight (gravity) and thrust due to propeller acting on it at any point of time.
2. The aircraft is to be designed in such a way that it travels quickly in air, is easily manoeuvrable and has the maximum payload fraction.

3. The use of launching mechanisms is prohibited. The aircraft should be hand launched.
4. The use of IC engines is prohibited. Only electrical motors are allowed.
5. The participants are free to use the materials of their choice. However the use of Balsa wood/foam (sunboard)/sunpack is advisable. Balsa wood is light, easy to handle and fabricate the aircraft making it the best choice.
6. Participants must make all parts of the aircraft themselves. Usage of **Ready-to-Fly (RTF)** and **Almost-Ready-to-Fly (ARTF)** kits is strictly prohibited. However, the kit comprising of unassembled cut-pieces of Balsa wood is allowed.
7. Use of ready-made actuators/motors, remote controls and propellers are allowed.
8. Any dimension of the aircraft should not exceed **900 mm** i.e. maximum allowed dimension is 90cm, whether it is the wingspan or the length of the aircraft. Any exception to this rule will render the participant disqualified.
9. The weight of aircraft must not be more than **500 grams**.
10. Use of gyroscopes (gyros) is prohibited.
11. The empty weight of the plane should not exceed 500 grams at any point of time during the competition.
    The empty weight of the plane would be checked by the coordinator before every run.
12. Anyone found not following the above rules will be disqualified

Game Rules:

1. The participant will be considered for scoring only if his plane follows the mentioned path. Otherwise, his score stands at zero.
2. During departure and approach to landing, the pilot must not fly the aircraft in a pattern that will allow the aircraft to enter any of the no-fly zones. The run would be counted as null and void in the event the plane enters into any one of the no fly zones. The participant shall then have no further flying attempts.
3. All parts must remain attached to the aircraft during flight and landing.
4. Broken propellers are allowed, and will not invalidate a flight attempt.

Competition Rules:

1. The time of flight for a run is defined as the time taken by the aircraft to follow the mentioned path, reach the Safe Landing Zone and land there.
2. A maximum time of 5 minutes will be given to complete the stunts.
3. The aircraft has to be hand launched i.e. the aircraft will be launched in the air with hand and no

other launch devices.

4. The timer will start from the moment the aircraft is in the air.
5. The timer will stop only when the aircraft finally comes to a halt.
6. If any part detaches after the landing, it will not result in any penalty.
1. As soon as the timer signals more than 5 minutes, only the points gathered by the aircraft up to that moment are considered. For example, if after following the mentioned path the plane is still in air when timer stops, it will be considered to have scored the structure quotient only and no more even if it lands after the allotted 5 minutes.
2. Each team will be given two runs and the better of the two will be considered for the calculation of points.

General Requirements during the game:

1. **Radios:** The use of 2.4 GHz radio is required for all aircraft competing in the competition.

2. **Metal Propellers Prohibited**: Metal propellers are not allowed.

Judging:

Participants will be considered for the scoring only if they are able to cross any of the pole,

Otherwise his score will be considered as zero.

Score= Take off +Stunts point + Landing

a) **Take off = 50 points.**
b) **Stunts point = 300 points.(maximum)**
c) **Landing = (Safe Landing) + (Spot Landing)**

In case of tie, preference is given to the participant whose flight time is minimum. Time is the time calculated by the organizer in seconds from the moment the plane is in the air to when it finally lands in the Safe Landing Zone.

Safe landing:

Safe landing is defined as a smooth landing where the propeller of the plane is undamaged and also the remaining parts are intact after the plane touches the ground. The participant is allotted 50 points for '**Safe Landing**' in the **Safe Landing Zone**.