

Spring 2004 Aerial Competition

Objectives, Scoring Methods, and Constraints

13 Feb 2004

Competition Objectives

- To design/build/fly an electric propulsion radio controlled aircraft to do the following:
- Fly two laps around the Johnson track area, 30 points maximum. Lap scoring starts upon takeoff from the ground and ends upon landing after two complete laps.
 - Two pylons will be setup at opposite ends of Johnson. The planes must pass beyond and circle around the pylons.
 - Scoring algorithm:

| | |
|-----------------|-------------|
| – Up to 1:20 | - 30 points |
| – 1:20 to 1:40 | - 25 |
| – 1:40 to 2:00 | - 20 |
| – 2:00 and over | - 15 |

Competition Objectives (cont.)

- After completion of the second lap, the ground crew (not including the pilot) will load a cargo of 1 to 4 chicken's eggs (supplied). The time required to re-prepare the aircraft for flight will be logged and deducted from the flight score.
- The aircraft must takeoff again and its flight duration will be measured. Flight does not have to be around pylons. Timing stops when the plane comes to rest or hits a fixed object and is unable to resume flight.
- Scoring:
 - One egg: 1 point/second
 - Two eggs: 1.5 points/second
 - Three eggs: 2 points/second
 - Four eggs: 3 points/second
 - 0 points for damaged cargo!

Constraints

- No limitations on wing span or area
- Motor battery: 350 mah, 8 cells NiCd (supplied)
- No hollowed out wings
- Standard 4-function radios and servos to be supplied
- Direct drive S-400 motors (no gearboxes)
- Selection of propellers to be provided
- Change processes: engineering changes to airframe must be documented and justified.

Tips and hints

- Design for robustness, reliability, stability and handling as well as aerodynamic performance
- Weight matters!
- Design by redesign and experience: schedule sufficient time to test fly and make necessary changes
 - Pilot familiarity
 - Ground crew operations
 - Hardware durability
 - **Confidence in the System! (people, product, process)**

Closing Thoughts

- “Community property” sharing
 - Tools, adhesives, numerous small parts
- See T A’s or staff immediately if radios or motors don’t work -- don’t disassemble the radio equipment!
- *PLEASE maintain a tidy workspace!*
- When in doubt, ask!