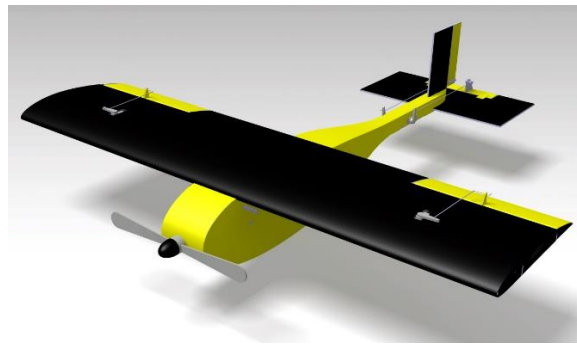


2020 Bronze Propeller Competition - Team Hurrycane Project Summary

Mission

The mission of the competition is to design “a storable semi-storable emergency supply aircraft,” which needs to be delivered in a (11 x 7 x 36) inch box, assembled and hand-launched within 5 minutes. The aircraft needs to fly a total of 5 laps and land safely, with the first 2 laps full onboard with payload, which must be dropped autonomously within the target zone after the 2nd lap.

Aircraft Overview

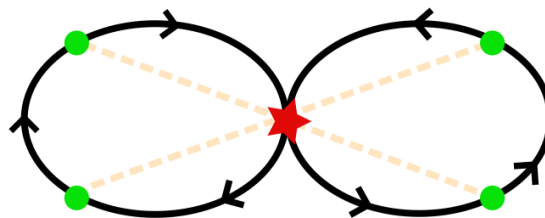


The key concept of our aircraft T-17 is “simple and fast”. The aircraft has the following key features:

- Removable high wing for storage requirement, connected to fuselage with dowel rod connectors
- Streamlined boom design fuselage to reduce drag and maximize payload capacity
- Powerful propulsion system capable of performing multiple missions with a single charge
- Constant aircraft stability before and after payload release
- Payload capacity of 3 tennis balls, released through permanent opening at bottom of fuselage

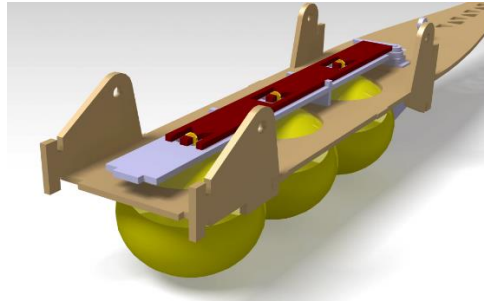
Competition Strategy and Flight Plan

The competition score is dependent on two critical factors: mission time and number of payloads in the target zone. To achieve the highest score possible, the complete mission time will be less than 120s and utilize a rapid payload release mechanism with multiple payloads. The autonomous system will track the flight trajectory as shown below, identify the drop zone, and trigger the release mechanism.



Payload Release Mechanism

The release mechanism can carry 3 tennis balls, which are loaded to the aircraft with rubber bands and a small keychain ring that is hooked to the release rake. The rake is connected to the payload servo, which is triggered by the onboard autonomous system. The mechanism is designed to release payloads simultaneously to prevent loss of stability from non-synchronous deployment.



Technical Specifications

Wingspan	34"
Chord	9"
Empty Weight	1.2 lb
Max speed	78 ft/s
Static margin	9%
Endurance	240 s

Team Hurycane Members

Aerodynamics by Yee Min Choo

ymchoo97@hotmail.com, 316-226 5906

- NACA 4412 airfoiled high wing design for gradual stall characteristic, better ground clearance and stability.
- Streamlined fuselage (shape referred to NACA 0024 airfoil) for drag reduction.

Stability & Control by Chun Yu Lim

barrychunyu@gmail.com, 316-253 9611

- Payload located near center of gravity to ensure flight stability before and after payload drop.
- Lower static margin to achieve more maneuverability.

Propulsion by Jongwon Lee

jlee15@shockers.wichita.edu, 316-518 1814

- Powerful for all flight maneuvers
- Venom LiPo Battery - 3 Cell, 11.1V, 1500mAh
- E-Flite 910Kv Motor at 8800RPM
- EAPC 10X7 Propeller

Structures by Scott Thompson

Scottmath13@gmail.com, 316-648 4172

- Semi-monocoque wing design to reduce weight.
- Fuselage loads carried through balsa side skins and keelson structure.

Autonomous System by Rebecca Rogers

becky.rogers26@yahoo.com, 651-285-0651

- Arduino Micro microcontroller + MPU-6050 6-axis gyroscope and accelerometer
- 3 redundant algorithms reduce risk of premature release, with failsafe timer to guarantee drop