Structure Requirements (Rough Draft)

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This document will describe the structures requirements for the Iowa State University Open UAS project.

1 Wings

1. The wings shall be able to withstand drafts of up to 50 knots.
2. The wings shall be constructed of EPP foam.
3. The wingspan shall be 5 feet.
4. The wing planform area shall be 2 square feet.
5. The maximum coefficient of lift shall be upwards of 1.8.
6. The wing loading factor shall not exceed 3.5 pounds per square foot.
7. The wings shall be attached to the frame of UAS by a 3D printed latch.
8. The wings shall be removable through the printed latch.
9. The wings shall contain a rod through the center to add weight.
10. The wings shall have control surfaces.
11. The wings shall have multiple paths inside to allow wires for control surfaces.
12. The foam wings shall be covered by a balsa wood shell.

2 Fuselage

1. The fuselage shall house the required electronic equipment.

2. The inside of fuselage shall cushion and protect components.

3. The fuselage shall contain custom 3D printed storage containers for components.

4. The inside of fuselage shall be accessible.

5. The fuselage shall be able to withstand minimum impact of 2G.

6. The fuselage shall be aerodynamically efficient (??) .

3 Empennage

1. Empennage shall have appropriate control surfaces (??).

4 Materials

1. The 3D printed components shall be produced by the LulzBot Taz 6 3D printer.

2. The 3D printed structural components shall use ABS filament.

3. The non-structural 3D printed components shall use PLA filament.

4. The foam used for the wings shall be EPP foam.

5. The foam shall only be cut using the hot wire and hot knife.

6. The materials shall be accessible by general public.

7. Alternate materials and printers shall be listed for hobbyists' use.

5 General

1. All components shall be placed such that the center of gravity is stable.

2. All connection points shall be able to withstand minimum impact of 2G.

3. All components shall be modeled and documented in SolidWorks.

4. The weight of the total structural frame without electrical components shall not exceed 2.5 lbs.

5. The entire frame shall be waterproof and protect housed electrical components from water.