This document describes the design and operation of the gimbal used for orienting the motor. The gimbal is manufactured by 3D printing. ABS or PLA is a suitable material. It is recommended to use an infull level between 20 and 65%. This ensures structural strength while reducing the weight of components. For information regarding rocket CAD design and simulations, see here for the rocket CAD document. An overview of rocket operation and test launches and results can be found here.

Launch 1 - G-Max MK4

Motor Gimbal

The rocket is actively stable with the use of the gimbal with its outer ring and support structures directly connected with the rocket body. The gimbal used for this launch is the G-Max MK4, designed by the 2017 team. The gimbal's outer ring is screwed into the airframe's support structures. The gimbal motor mount is designed to fit an E-class model rocket motor. We have modified the motor mount to improve stability of the motor placed in it. A motor adapter allows the gimbal to fit a D-class motor. Gimbal and adapter viewable at: OnShape Document

Hardware Required

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* 2X HC2422T Servo
* 2X Servo arm
* 2X control rod (paper clips were cut and reshaped to make these control rods,
however, a slightly thicker metal rod of 1-2 mm diameter is recommended)
* 2X M3x10mm
* 2X M3x12mm
* 4X M3x20mm
* 4X M3x35mm
* 4X M3 hex nut
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Launch 2 - G-Max MK4V2

Motor Gimbal

The gimbal used for this launch will be based off the G-Max MK4, further modifications reduce the weight and increase the range of motion of the motor. The gimbal's outer ring is screwed into the airframe's support structures. The gimbal motor mount is designed to fit an E-G class model rocket motor. A motor adapter will be used to allow the gimbal to fit a D-class motor. Gimbal and adapter viewable at: OnShape Document

Two minor changes will be made to the design of the gimbal. Please refer to the rocket CAD documentation for more information on the OnShape model of both the existing and the versions to be modified. The OnShape model can be found [here.]

The 2017 team's design of the gimbal had a hole in the support structure to allow for the control rod from the servo to fit through, using a dual ring gyroscopic system. This gimbal design provided the ability to operate rockets using up to a G class rocket motor, i.e. much larger rockets. This is present at each of the axes of movement. The support structure will be reshaped to remove the hole, improving the strength of the part.

- The two axes of movement, pitch and yaw, should be marked as such on the gimbal next to the servos - embossed into the gimbal as part of the CAD design.
- Optimise size taking the servos into account - aim to reduce weight by adding cutouts and reducing the infill level.

Hardware Required

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* 2X HC2422T Servo
* 2X Servo arm
* 2X Control rod: 1.6 mm Steel rod 50 mm
* 2X M3x10mm
* 2X M3x12mm
* 4X M3x20mm
* 4X M3x35mm
* 4X M3 hex nut
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