Design Overview

Design Considerations

Based on the suggestions on the Issue List 2023 the following design considerations were made :

- Suspension has to be revisited. A simpler and more robust design. Connecting plates using multiple standoffs (in some instances, inconsistent combinations of standoffs) is undesirable. Custom parts may be necessary.
- Modular design. In the previous design, the gimbal-chassis connection was too complex for quick assembly or repair. The connection must be simplified so that we can work on each part separately and reassemble the robot when needed. Similarly, the feeding system and the shooting mechanism should be somewhat modular with respect to each other.
- Vibration feeder. Gravity feeding replacing existing motor driven feeder. Feeding against gravity using a rotational motor is prone to jamming.
- Carbon fiber instead of metal (gimbal only). Reducing the weight of the gimbal can be very beneficial. In addition to simplifing the design, using carbon fiber parts instead of aluminum can reduce the weight without compromising integrity.

The complete design manual can be found at this link : Robot Building Specifications Manual v2.0

HERO should be designed to the following spec (the column titled review notes are some noticed points based on current plans and past experience) :

ITEM	LIMIT / SPEC	REMARKS	Review Notes
Operating Mode	There is no restrictions. One remote control and one Custom Controller can be configured at most		
Maximum Power Supply Capacity (Wh)	265		

Maximum Power Supply Voltage （V）	30		
Launching Mechanism	• A Fixed 42mm Launching Mechanism • The Optional 17mm Launching Mechanism can be mounted		Currently our design will only be working around the 42mm projectile.
Maximum Weight (kg)	35	Includes battery weight, but not the weight of the Referee System	
Maximum Initial Size (mm, L*W*H)	800*800*800	Its orthographic projection on the ground should not exceed a 800*800 square	A cube of 800*800*800 will be placed on the bot to see if it fits the standard size.
Maximum Expansion Size (mm, L*W*H)	1200*1200*1200	Its orthographic projection on the ground should not exceed a 1200*1200 square	

Referee System	• Large Armor Module • Speed Monitor Module (42mm Projectile) • VTM Transmitter • RFID Interaction Module • Positioning System Module • Main Controller Module • Power Management Module • Light Indicator Module • Super-capacitor Management Module	Weight is 4.21 kg	

Subsystems

The 2023 RMUC Competition Hero Design Model is linked here. To see it create an Onshape account with your NYU email and sign in. If request is asked feel free to email one of the senior members and they can share it with you.

The subsystems will be elaborated once the brainstorm sessions are wrapped up.

1.GIMBAL

2. AMMO TANK & FEEDER

3.SUSPENSION AND WHEELS

4. CHASSIS