

Auto-Targetting in a Remote Sentry Turret

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The initial idea for our project was to create an auto-targetting system for a Nerf Vulcan, an automatic, belt-fed gun that shoots small foam darts. The weight of the Vulcan, however, makes it somewhat unfeasible to do this without spending a large amount of effort engineering a system to handle the gun's bulk, so the plan is to do a proof of concept using laser pointer and small servo motors. The project is divided up into three parts: the GUI, video processing, and the actual movement module.

A camera mounted below the gun will remain stationary to provide all of the footage necessary for targetting. The plan is to have GUI that would allow users to either set the turret into an automatic shooting mode, where it would shoot at targets when it sensed movement, or to override this and use the gun manually, directing its movement and picking targets using the video feed.

The second module would deal with the actual video processing when the turret is in autofire mode. It would store frames of video and compare them, finding changes between frames and determining whether or not those changes were large enough to constitute a threat that should be shot. This module would also determine the azimuth and elevation of the target and feed that to the third module.

The last module would turn the actual gun using the azimuth and elevation provided by the video processing module. This module would also fire the weapon once it was in

position. An additional feature that we might add would be to mount a range finder onto the platform and use it to determine the actual distance between the laser pointer and the target, and use that distance to calculate the elevation a Vulcan would have to have in order to arc the darts correctly and hit the target. Since our proof of concept is using laser pointers rather than an actual Vulcan, this feature would not be necessary in the first iteration.