

Project Ideas and External Resources

A compilation of offseason projects and additional capabilities we would like for Team 3176

- [Brainstorming Landing Page](#)
- [Cool links and articles](#)

Brainstorming Landing Page

An initial list of projects will be organized more into topics later!

Projects

- Photon Vision
 - Medium
 - Using a raspberry pi or a orange pi try loading photon vision. Allows for higher resolution cameras and higher performance for less. Possibly look into getting a global shutter camera similar to mechanical advantage
 - 2MP Arducam OV2311 has 1200x1600 greyscale
 - photon vision should soon support ArUro if not possibly look into northstar
- Localization and filtering
 - hard
 - Log tags positions and experiment with the pose estimator class to integrate wheel odometry with vision.
 - log replays will be critical to testing new strategies for this. This also goes hand in hand with the photon vision
- improved LEDS
 - easy
 - see this comment for mechanical advantages LED options
 - implement additional LED states think about also splitting up segments to represent different data
 - blue flash for end game was one of my favorites
- Swerve Tuning
 - take another deep dive now that many other teams have swerve systems in how performant our swerve is
 - how much error do the pods usually have in operation
 - practice with the loggedtunablenumber
 - Swervepod zeroing procedure for setting absolute offsets is also critical
- Mechanism2d Simulation
 - look into first driving a 3d model of the 2023 robot from a Mechanism2d described in Advantagescope documentation
- Override switches for driver station
 - easy

- integrate a series of override switches that can be used to switch off autonominations or trigger fallback options for drivers to gain manual control
- on the fly trajectory generation
 - look into either using path planner or a custom "trajectory" generator to create path planning that can be dynamically generated at runtime
 - think auto scoring and autoalignment for game piece pickup
- CAN connector investigation
 - probably should move away from the current connectors since they have a highish failure rate with our current methods. Look into what other teams use and what tools we might need to invest in to make sure we have high quality crimps
- Mini-offseason low bot
 - many teams have created micro bots that are only low game piece shuttlers. This could be a cost effective way to do another system integration before build season

Business and Admin Project Ideas:

- evaluate and choose cloud storage service for team photos and videos
 - gather and upload existing photo and video archive from various team devices and storage locations
 - do a call out for alumni and parent gathering of team photos and videos
- Off-season facilitated discussion on team Mission, Vision, and Goals.
 - Refocus on the Why and just make sure what's previously been documented still holds.
 - I'd start with SAB perhaps over the summer and then relaunch in the fall with the entire team.



Cool links and articles

1678 strategic design: https://www.youtube.com/watch?v=j-wOaF65cTU&t=4s&ab_channel=CitrusCircuits

- some of the gold standard of how we want to build robots!

Effective First Strategies:

https://www.youtube.com/watch?v=Y9B0Khob0Xk&t=25s&ab_channel=FirstUpdatesNow

- Karthik is the best there is and this is an updated talk from the famous 2014 one

Advantage kit:

https://www.youtube.com/watch?v=mmNjKjG8mw&t=573s&ab_channel=LittletonRobotics

- A good introduction into why we log and the system we use

Command based paradigms: <https://www.chiefdelphi.com/t/commandbase-subsystembase-depreciation/438975>

- control motors either in the periodic as a state machine OR only command motors inside commands which are mutex locked to prevent multiple assignment of the same subsystem
- For the most part I am a fan of command mutex locking but sometimes it makes more sense to do a state machine