

### **Personal Opinion (What I think is needed):**

Priority on making the bot easy to drive manually.

- POV Camera placement on grabber (if not done already)
- Throttle control to balance speed and precision as needed with a multiplier
- Dialed in lift presets
- Incremental manual lift adjustments of about an inch at a time per-button-press

Secondary Priority:

- Pneumatics:
  - Pressing the HAT button could toggle the lift preset buttons to become solenoid controls
    - Figure out the specific controls needed
    - Put a text box with mode indicator on camera feed OR some kind of LED indicator (it will be really bad if the mode gets changed on accident while trying to load cargo... but not sure what else to do when buttons are so limited, use the keyboard instead for the pneumatics???)

Resulting ToDo:

- Relocate camera (if not done already)
- Software: Joystick Re-mapping (see image below)

Primary:

- Create a speed multiplier variable and tie the joystick throttle to it, use it to control the overall speed of the mecanum drive by pitting the multiplier against the joystick values just before passing them to the drive function. Full throttle should have a multiplier of 1 (no change/original speed/fast), throttle up/down should vary the multiplier between 0 and 1.
- Change trigger to be a Grab state changing button (create a private variable to save its state and another storing whether or not it is pressed). When pressed it should change state (grabbing / un-grabbing). The "isPressed" variable is needed to ensure actions only happen once per-press.
- Side thumb button should set the target lift to zero / drop the lift. Notes: Switching between field and robot oriented drive seems unnecessary, and we need that button. Should also only need to zero the yaw on initial startup.
- A couple of the top buttons should be adjusted to add or subtract about an inch worth to the "target" lift variable. More "isPressed" variables will be required here to ensure 1 press = 1 adjustment.

Secondary:

- Create a variable to store a "Mode" state for the lower six buttons. On startup the default mode would be lift height presets. Pressing the HAT button switches the buttons to control pneumatics instead. Again, use an isPressed variable pattern to make sure one click = one mode change.
- If possible, a text box should be drawn on the camera feed indicating the mode, but this may be tricky since the feed is running in another thread. A possible faster secondary solution would be a color LED indicator on the robot visible to the team that shows the second mode is selected. Pilot needs to be careful not to accidentally switch modes too soon.
- Map the lower six buttons to the needed solenoid controls. I don't know yet what these specifically are.

## Joystick Mapping:

