

ABSTRACT

The goal of this project is to utilize the igus® Robolink arm five degree of freedom modular robot arm, to complete useful tasks for persons with no or limited mobility. These tasks include driving the joystick of a wheelchair, flipping a light switch, and turning the pages of a book. This is done through designing and building a modular interface for mounting the Robolink arm onto an existing wheelchair project and implementing a universal control interface in the software for future expansion of tasks and control methods.

SPECIFICATIONS

- Complete tasks
 - Safely drive the wheelchair
 - Flip a standard height light switch
 - Turn the page of a book
- Design a modular addition to CPS
 - Easily mounted/removed with a useful workspace
 - Completely mobile system

END EFFECTOR DESIGN

- Passive end effector
 - Simple
 - Takes less space
- Designed to be versatile
- Able to manipulate joystick
- Modularly attaches to Robolink®

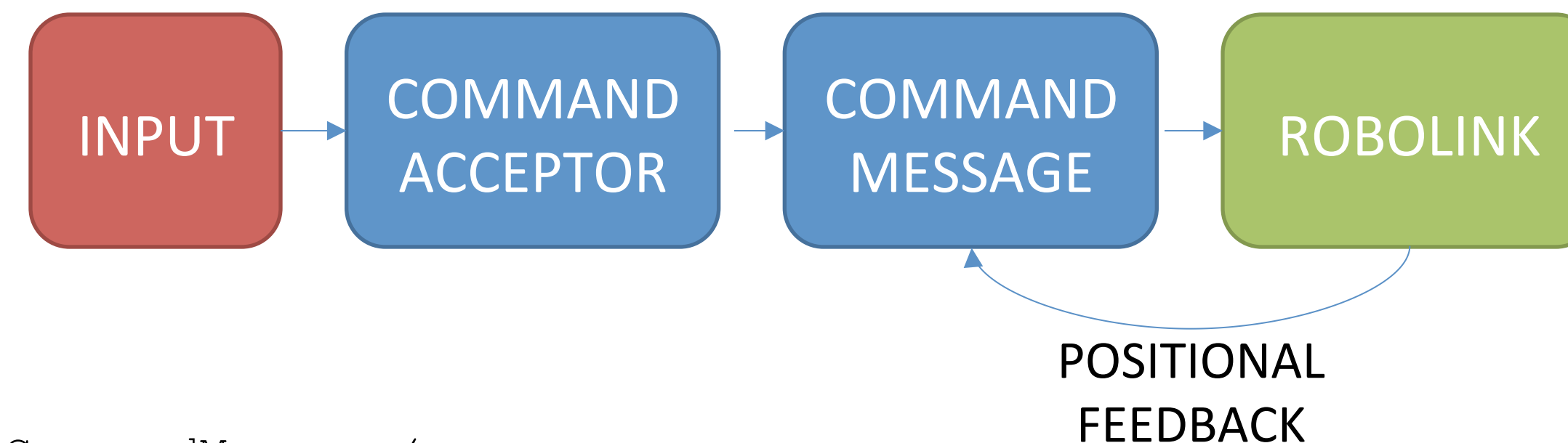


MOUNTING DESIGN

- Uses the original wheelchair mounting points for modularity
- Easily attachable and removable
- Constructed out of 80/20 aluminum for good strength-to-weight ratio



CODE DESIGN



```

    CommandMessage (
      positions = [(-8, 5, 0, 89, 0), (-8, -1, 0, 85, 0)],
      method=None,
      reset=True,
      method_sub_map=METHOD_SUB_MAP_JOINTS,
      control_mode=JOINT_VELOCITY,
      DRO=['drive_stop', 'drive_fwd', 'drive_back'],
      backsteps=[0, 1, 2]
    ),
  
```

RESULTS

- Able to drive wheelchair
- Large workspace
- Unable to flip light switch due to lack of force at end effector
- Desk area manipulation has potential

