

### **Running ROS and basic commands:**

Start running ROS - this starts your OS and must remain running while using system  
\$ roscore

Create a catkin workspace:

```
$ mkdir -p ~/catkin_ws/src
```

```
$ catkin_make
```

Create a new package in catkin\_ws:

```
$ catkin_create_pkg <name> <depends1> <depends2> ...
```

Show list of active nodes:

```
$ rostopic list
```

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```
$ rostopic list
```

Run a package and name:

```
$ roslaunch <package_name> <node_name>
```

Run a script:

```
$ roslaunch <script>
```

Print path to ROS info - includes distort

```
$ printenv | grep ROS
```

### **Payload Sensing Commands:**

**The names of the cameras we have are published as:**

**mv\_26803584 ( the color camera )**

**mv\_30000337 ( the grayscale camera / IR camera )**

The cameras use two sets of drivers to work with ROS. The first is the mvBlueFOX USB 2.0 drives. These can be

installed by a script on the manufacturers website or by the instructions in the MatrixVisionBluefox folder. The second is the Bluefox2 ROS package.

To launch the cameras with ROS you need to start roscore and then launch the camera individually:

```
$ cd ~/catkin_ws/src/bluefox2/launch
```

```
$ roslaunch single_node.launch device:=30000337
```

```
$ roslaunch single_node.launch device:=26803584
```

To view the camera feed ROS provides a nice display. To launch an instance of the display:

```
$ rviz
```

## Using ROSbag:

Rosbag allows us to record the published topics which includes the display from the camera. Rosbag does not produce a video file. You will output a rosbag that can be played back which includes the images aka video feed from the camera.

Record a bag file with the contents of specified topics

```
$ rosbag record <topic_names>
```

Record all topics:

```
$ rosbag record -a
```

Displays a summary of the contents of the bag file- Useful to figure out the name of the topics you need to play back:

```
$ rosbag info <bag_name.bag>
```

Determine whether or not a bag is playable in the current system:

```
$ rosbag check <bag_name.bag>
```

Play a bag:

```
$ rosbag play <bag_name.bag>
```

### **\*Specifically to watch back the bag files that we record with our cameras:**

```
$ rviz
```

```
$ rosbag play <bag_name.bag>
```

The video feed from both cameras should be visible and playing

**The cameras provide many adjustable parameters, many of which need to be adjusted to get a nice video.**

**There is an Ros page on this and it has a few commands but its not that helpful and doesn't explain the purpose of each parameter or the full name**

To get the parameters:

```
$ rosin dynamic_reconfigure dynparam list
```

Get particular param:

```
$ rosrun dynamic_reconfigure dynparam get <param>
```

To set a particular parameter:

```
$ rosrun dynamic_reconfigure dynparam set <camera name> <param> <value>
```

i.e. `rosrun dynamic_reconfigure dynparam set /mv_26803584 web 4`

some helpful parameters abbr meanings that we were able to figure out:

wbp: controls white balance. needs an integer value. default is 1 but has been changed to 4

- 1 - wbp\_unavailable

- 0 ~ 5 - wbp\_tungsten and friends

- 6 - wbp\_user1

7 - wbp\_calibrate, calibrate next time for white balance

aec: enables automatic exposure control. needs an integer value. Default is 0

- 0 - aec\_off, fixed exposure time
- 1 - aec\_on, auto control by driver
- 2 - aec\_fix, auto determined by driver and set to a fixed value
- 3 - aec\_clamp, auto control by driver, but clamped to expose time set by used in

expose\_us

fps: frames per second. needs a double. default is 20. camera dependent

cbm: camera binning mode. needs boolean. default false , true uses BinningHV which is horizontal and vertical binning. changing distorts image

ctm: camera trigger mode. 0 or 1 integer value. 0 is ctm\_continuous, 1 is ctm\_on\_demand. recommend 1

dcfm: dark current filter mode. default 1. needs int

- 0 - dcfm\_off
- 1 - dcfm\_on
- 2 - dcfm\_calibrate
- 3 - correction\_image

hdr: high dynamic range. 0 or 1 integer value.

expose\_us: exposure time. The number of microseconds each frame is exposed for. Default is 5000. changed to 23336

gain\_db: adjust camera gain. artificially increases brightness of image. needs a double. default is 0.0

r\_gain: adjust red camera gain. needs a double

b\_gain: adjust blue camera gain. needs a double

mm: mirror mode . can only be adjusted in launch file, not dynamically. 0 is default.

- 0 - mm\_off, no mirroring
- 1 - mm\_topdown, resulting image will be flipped around a horizontal axis
- 2 - mm\_leftright, resulting image will be flipped around a vertical axis
- 3 - resulting image will be flipped around a horizontal axis and a vertical axis