STEAMVR™
Tracking Training

STEAM® VR

Tracking Training

Initial Testing

Overview

- Many errors could stop a device from tracking
- Take a measured approach to bring-up
- We can test the following from the command line
  - USB or wireless connectivity
  - IMU data
  - Optical data

lighthouse_console

- Command line access to tracked objects
- Functions
  - Download and upload JSON files
  - Test connectivity
  - IMU statistics and data
  - Optical statistics and data
  - And more…
- Part of the HDK
  - `...\SteamVR Tracking HDK\tools\bin\win32\lighthouse_console.exe`
- Add this directory to the system path environment variable

Connect to your device

- Connect your device
- Run lighthouse_console.exe
- If only one object is plugged in, connection happens automatically
- If more that one is connected, use `serial` and the serial number

```
lh> serial
Attached lighthouse receiver devices:
        LHR-684A4E27
        LHR-71D20826
        69F2CECEEE
lh> serial 69F2
Attempting HID Open IMU: 69F2CECEEE
hid_open_nths
        vid=0x28de, pid=0x2101, sn=69F2CECEEE
HID opened: VID 28de PID 2101 serial 69F2CECEEE seq 1 | if -1
Lighthouse IMU HID opened
```

Download the JSON File

- Download the JSON file and save it in a safe place
- `lh> downloadconfig <filename.json>`

```
lh> downloadconfig object_config.json
LHR-1746C5F5: Read config of 3519 bytes from [vid:28de, pid:2000] (LHR-1746C5F5) and inflated to 16659 bytes
Wrote 16659 bytes to object_config.json
```

- Upload new JSON files
- `lh> uploadconfig <filename.json>`

IMU Data

- Raw IMU data is available using the `dump` command
  - `lh> dump`
  - `lh> imu`
- Data should stream until `imu` is entered again
- Shake the object and rotate it to see the data change
- Resting devices
  - gyro should be near 0.00
  - accel should be near 9.81 (magnitude)

```
0.698666 316531          gyro -0.03 +0.01 +0.02 accel -1.05 +0.43 +9.76
```

IMU Statistics

- Statistical data about the IMU is available using `imustats`
  - `lh> imustats`
- The rate changes when wirelessly connected
  - USB: rate = 1000 Hz
  - Wireless: rate = 250 Hz

```
imu 183947 rate 995.7Hz interval 1.0ms sigma 0.138ms  grav 9.78m/s/s sigma
0.037
```

Optical Data

- Enable the disambiguator
  - `lh> dis`

```
lh> dis
Enabled tdm disambiguator.
```

- Raw optical data is available using the `dump` command
  - `lh> dump`
  - `lh> sample`
- Data should stream until `sample` is entered again
  - `sample` indicates the sensor channel ID
  - `width` is the number of clock ticks for an individual sensor hit

```
30.012599 l=28404 r=28544          sample 05 width  140
```

Optical Statistics

- Statistical data about the sensors is available using `period`
  - `lh> period`
- Look for missing sensors or sensors with unusually low hits
- Clear the counts by entering `clear`

```
lh> period
base:C4054792 axis:0 min_sensor_ppm: 3.33
 id 3: hits 1 angle 1.88791 sigma 0 var 0 ppm 0.00
 id 4: hits 2136 angle 1.96758 sigma 3.19073e-005 var 1.01807e-009 ppm
5.08
 id 5: hits 4894 angle 1.97183 sigma 2.21614e-005 var 4.91127e-010 ppm
3.53
base:C4054792 axis:1 min_sensor_ppm: 4.05
 id 4: hits 617 angle 2.04503 sigma 3.16112e-005 var 9.99266e-010 ppm 5.03
 id 5: hits 4896 angle 2.03978 sigma 2.693e-005 var 7.25222e-010 ppm 4.29
 id 7: hits 4899 angle 2.03563 sigma 2.75024e-005 var 7.56381e-010 ppm
4.38
```

Summary

- Use lighthouse_console to test initial connectivity
- `dump` with `imu` streams IMU data
- `dump` with `sample` streams optical data
- `imustats` prints IMU statistics
- `period` prints sensor statistics

- Once the data looks good, there are two options
  - Try the object in SteamVR™
  - Calibrate the IMU and optical sensors