ASSIGNMENT 2 - Service Details

MTRN3500 Computing Applications in Mechatronic Systems - 2023

Alexander Cunio & Jay Katupitiya

1 Network Addresses

- Platform Address: “weeder” (192.168.1.200)
- Laser Port: 23000
- GNSS Port: 24000
- Vehicle Control Port: 25000

2 Authentication Scheme

The on-board vehicle control and laser services have a built-in authentication scheme to identify and authorise users connected to the UGV. This protocol is identical for both the vehicle control service and the laser service, and occurs prior to normal service traffic. In the spec shown below, <student id number> is your zID without the z prefix and \n represents the newline character LF. The authentication command should be sent on an established TCP connection to the appropriate port.

- (REQUEST, 8 characters) CLIENT to SERVER: <student id number>\n
- (RESPONSE, 3 characters) SERVER to CLIENT: OK\n

3 Laser Service

REQUIRES AUTHENTICATION. The laser device is accessible using a TCP socket over port 23000, and is set to operate in read-only mode. This device will reject any commands to write to or configure the laser with a **sFA** telegram message. As such, the laser has ALREADY been configured for 50hz 45 to 225 degree (see Figure 1) giving a total operating angle of 180 degrees (with 361 data points over this range). The following commands were used to set this device configuration:

```
sMN mLMPsetscancfg +5000 +1 +5000 +450000 +2250000
sWN LMDscandatacfg 01 00 0 0 0 00 00 0 0 0 0 +1
sWN LMPoutputRange 1 1388 +450000 +2250000
```

These configuration settings may be verified and read from the laser using the `SRN LMPscancfg` or `SRNLMPoutputRange` telegram messages (these two commands are only available on the physical UGV and not in the simulator).

You will need to appropriately request scans from the laser using the command `sRN LMDscandata`. Note that, when sending a command to the Laser (not including authentication) you will need to indicate a start byte (start of transmission) of `0x02` and an end byte (end of transmission) of `0x03`. These will be placed before and after your request respectively.

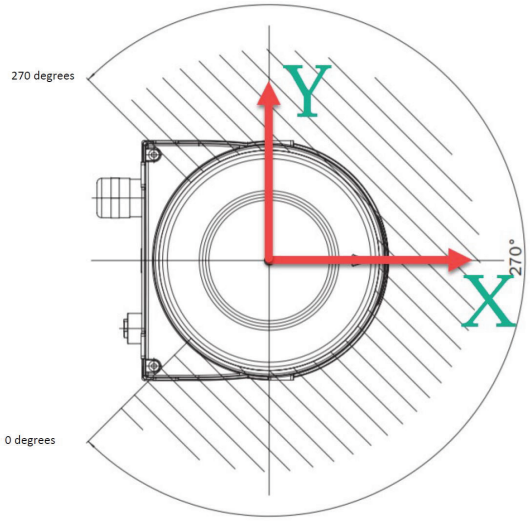

Figure 1: Laser angles

4 GNSS Service

NO AUTHENTICATION REQUIRED. Using a TCP socket over port 24000, the GNSS receiver will transmit a binary stream of GNSS data that will need to be decoded. Refer to Moodle or the hardware manual of the receiver unit for more information about decoding the binary data format. This will include the byte-by-byte structure of this message to know what sections are important to you.

5 Vehicle Control Service

REQUIRES AUTHENTICATION. Over a TCP connection to port 25000, the vehicle platform will receive, but not respond to control messages. The control messages should be formed using the format listed in the assignment specification. To see if the vehicle is responding to your commands, ask a demonstrator for assistance (you will be able to drive it around in later laboratory classes if you have written code for this). The platform is only configured to listen to commands from one student (identified via the zID number) at a time, and a demonstrator must use the platform's built-in X-box controller (deadman and remote latch buttons) to enable drive commands to pass to the platform hardware.

6 Display Engine

The display engine (run through MATLAB) is a TCP server running locally on your machine. As such, the ip address of this is '127.0.0.1' and it can be found at port 28000.