Data Display for Assignment 2
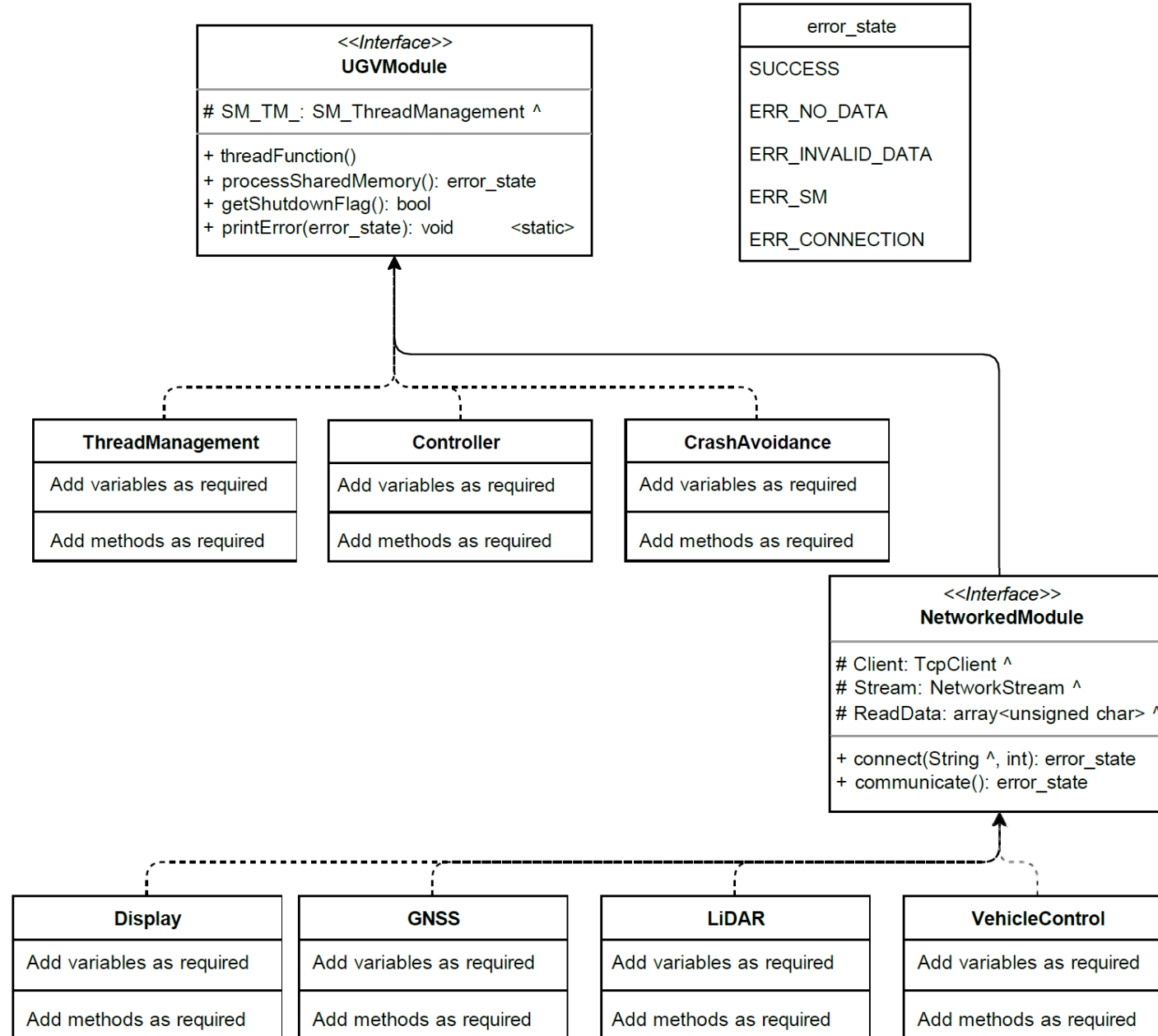
A/Prof Shiyang Tang

MTRN3500
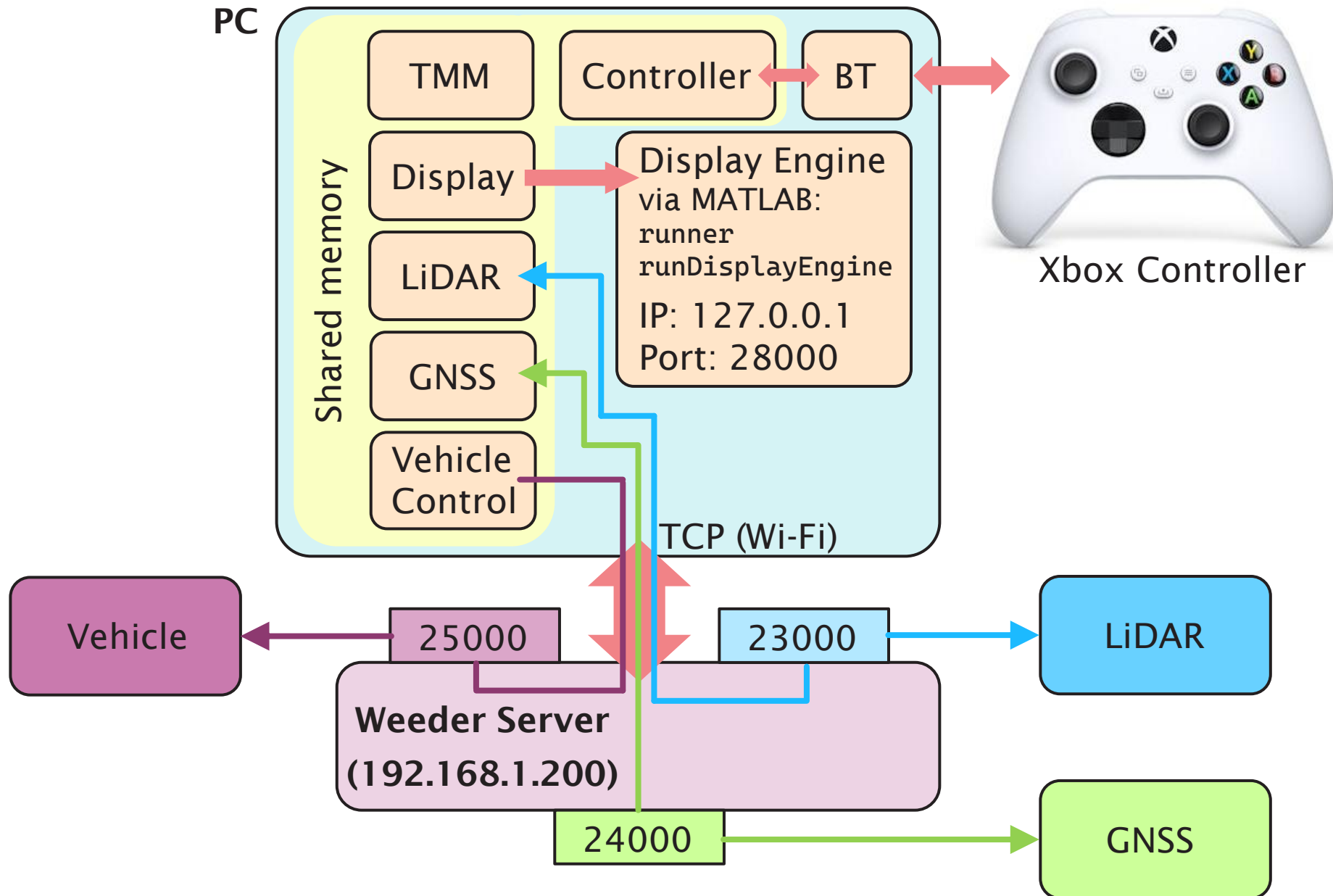
Computing Applications in Mechatronics Systems

Communication Architecture
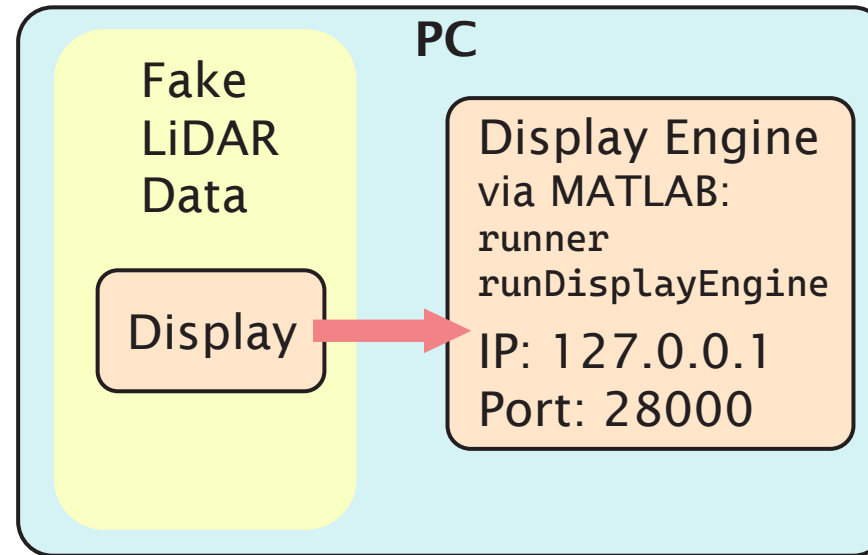
Example 1

PC

Fake LiDAR Data

Display → Display Engine via MATLAB: `runner` `runDisplayEngine`

IP: 127.0.0.1
Port: 28000

Example 2

Ethernet

PC

SM_LiDAR

LiDAR

Display → Display Engine via MATLAB: `runner` `runDisplayEngine`

IP: 127.0.0.1
Port: 28000

4

```
<STX>sMN mLMPsetscancfg +5000
+1 +5000 0 +1800000<ETX>
<STX>sRN LMDscandata<ETX>

       ...
```

Direct binary conversion

```
array<unsigned char>
(in SendData buffer)
```

To LiDAR
(via Ethernet)

Encoding::ASCII
->GetBytes(...);

```
array<unsigned char>
(in ReadData buffer)
```

Received data
(via Ethernet)

Binary-to-string decoding

Encoding::ASCII->GetString(RecvData)

```
Range [i]
```

```
sRA LMDscandata ...
(ASCII string)
```
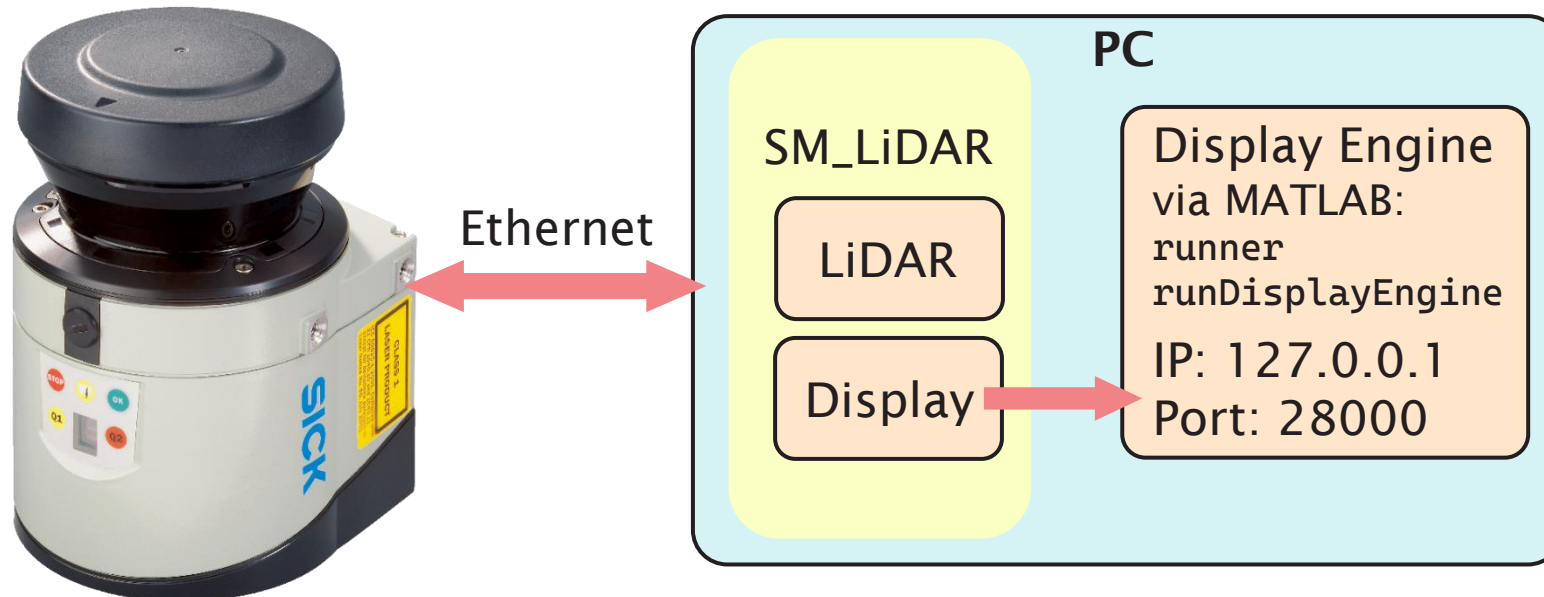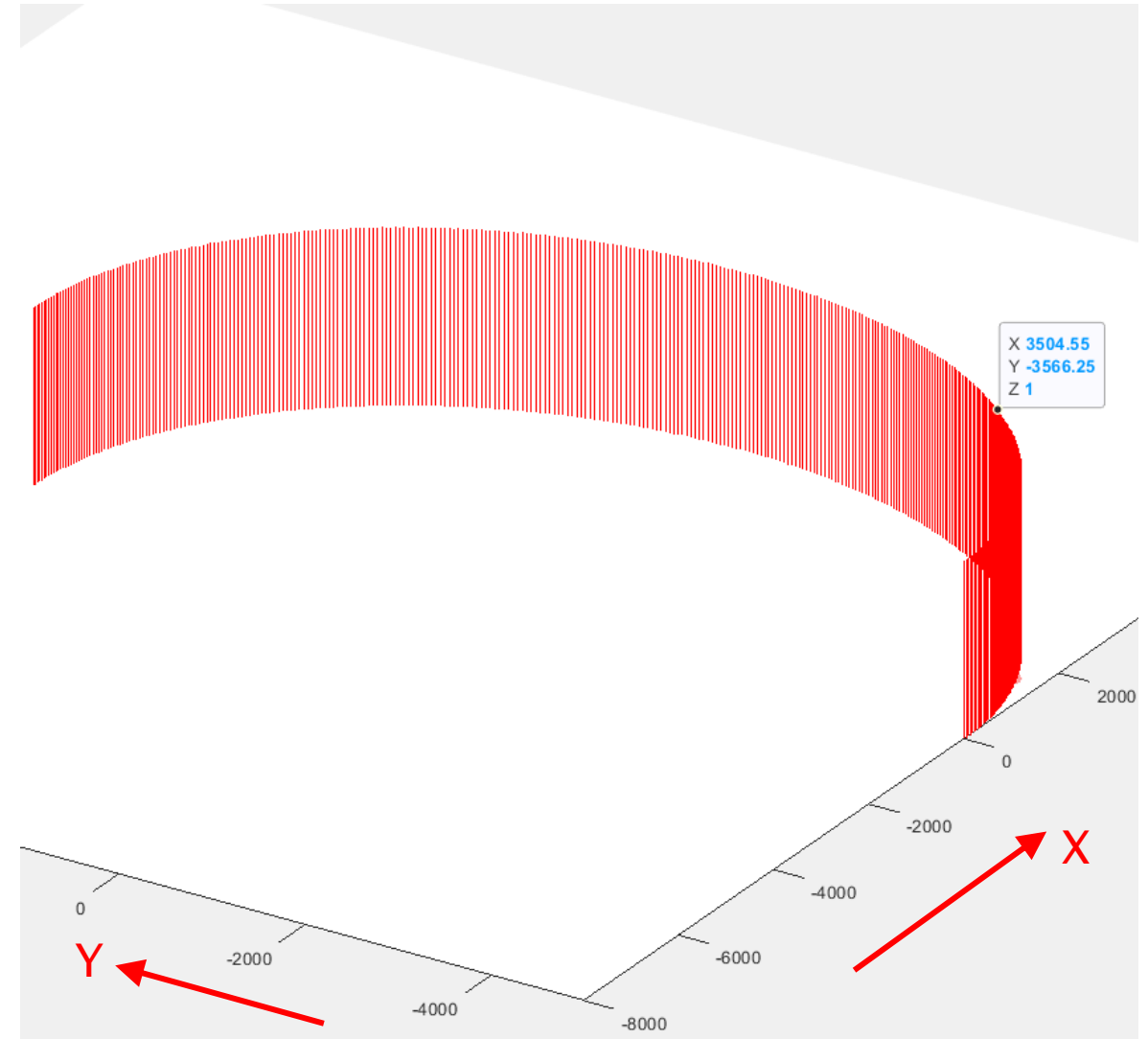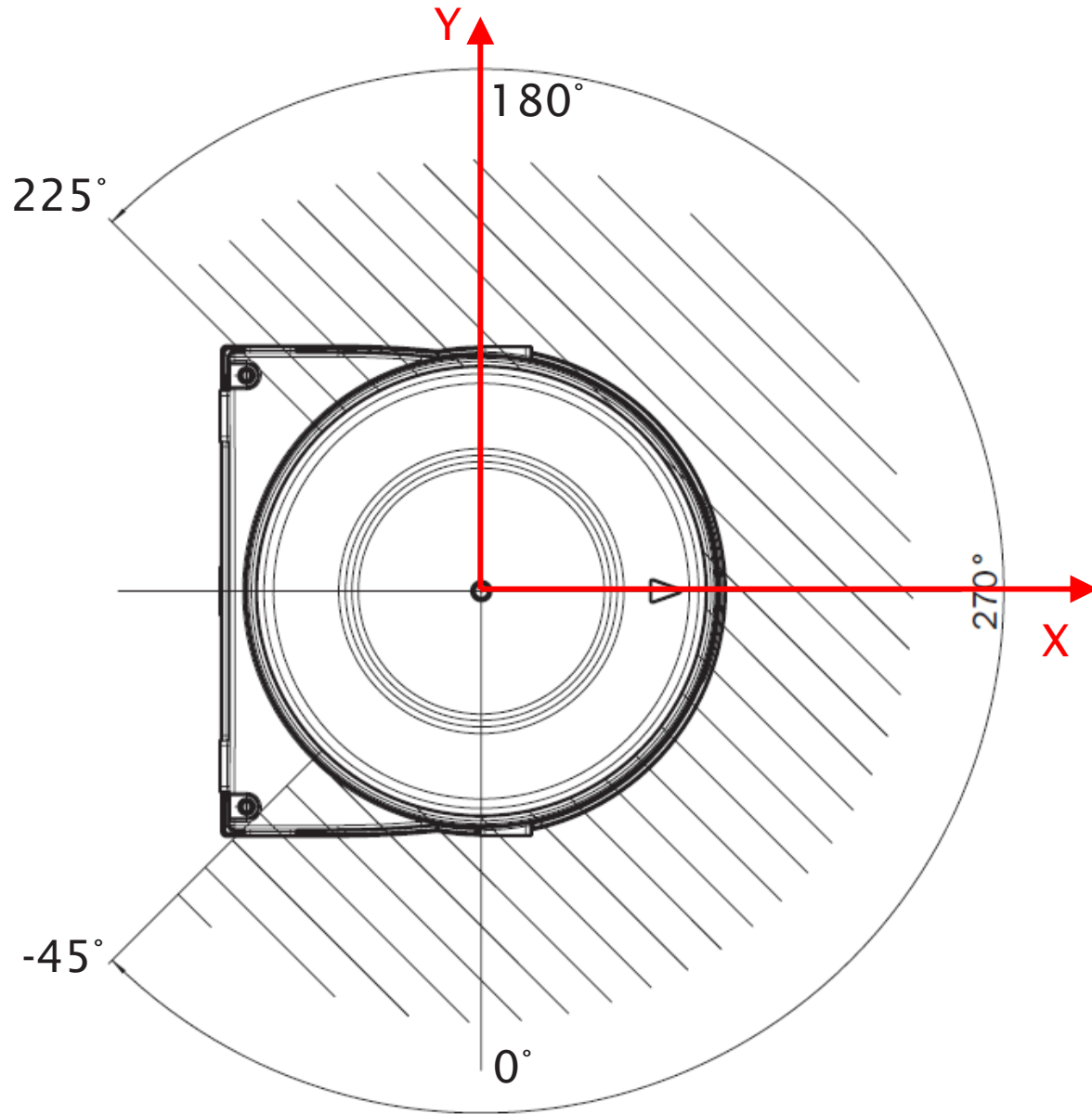
String-to-integer conversion
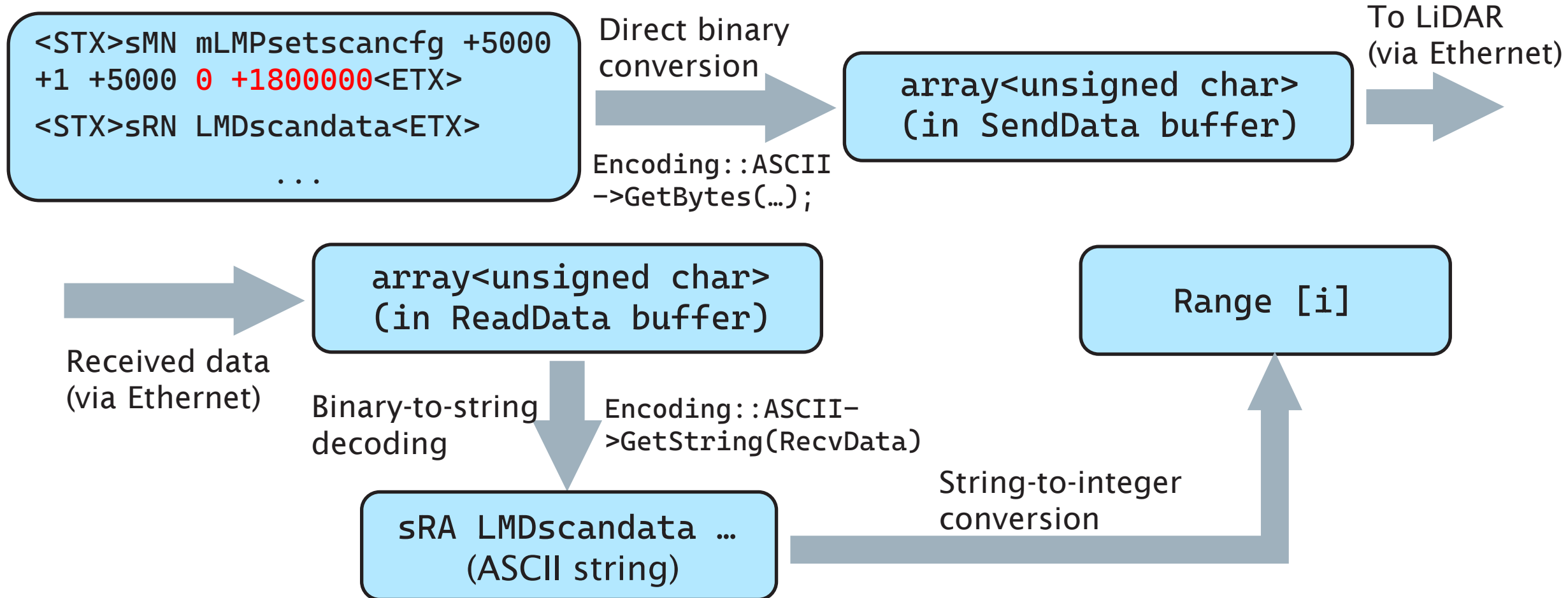
Request:	<STX>sMN{SPC}LMCstartmeas<ETX>
HEX string:	02 73 4D 4E 20 4C 4D 43 73 74 61 72 74 6D 65 61 73 03
Answer:	<STX>sAN{SPC}LMCstartmeas{SPC}0<ETX>
HEX string:	02 73 41 4E 20 4C 4D 43 73 74 61 72 74 6D 65 61 73 20 30 03

➢ **Select user level** (`sMN SetAccessMode 03 F4724744`)

User level	Password	Hash value
Maintenance personnel	main	B21ACE26h
Authorised client	client	F4724744h

Tab. 30:   Hash values of the passwords

Request

Message structure: **sMN SetAccessMode** User level password

Message part	Description	Variable type	Length (byte)	Value range
Type of command	Request (SOPAS method by name)	string	3	sMN
Command	Select user level	string	12	SetAccessMode
User level	A valid user level must be included in the transmission. Otherwise the LMS declines the command.	int_8	1	02h maintenance personnel 03h authorised client 04h service
Password	E.g. encoded value for "client"	uint_32	4	00000000h ... FFFFFFFFh

➢ **Scan configuration setup** (`sMN mLMPsetscancfg +5000 +1 +5000 +0 +1800000`)

Message part	Description	Variable type	Length (byte)	Value range	
Type of command	Request (SOPAS method by name)	string	3	sMN	
Command	Configuration of scanning frequency and angular resolution	string	14	**mLMPsetscancfg**	
ScanningFrequency	Information in 1/100 Hz, the transmitted value can be 25 Hz or 50 Hz.	uint_32	4	**2,500** ... **5,000**	25 Hz 50 Hz
NumberSegments	For the LMS100 always 1	uint_16	2	**1**	1 segment
AngleResolution	Information in 1/10.000 degrees, the transmitted value can be 0.25° or 0.5°	uint_32	4	**2,500** ... **5,000**	0.25° 0.5°
Starting angle	Not currently possible, in future information in 1/10,000 degree	int_32	4	**−450,000 ... +2,250,000**	
StoppingAngle	Not currently possible, in future information in 1/10,000 degree	int_32	4	**−450,000 ... +2,250,000**	

➢ **Configure scan data output** (`sWN LMDscandatacfg 01 00 0 0 0 00 00 0 0 0 0 +1`)

Field	Meaning	Value	Explanation
OutputChannel	Select channels	01	Channel 1 (DIST1 only)
Remission	Output intensity (RSSI)	00	Disable RSSI
Resolution	RSSI resolution	0	Ignored (RSSI disabled)
Unit	Unit of remission	0	Ignored
Encoder	Output encoder data	00	Disable
Reserved/legacy field	Not used in LMS151	0	
Position	Output position	0	Disable
DeviceName	Output device name	0	Disable
Comment	Output comment	0	Disable
Time	Output timestamp	0	Disable
Reserved	Future extension slot	0	
Output interval	Output every scan	+1	Every scan

```
sRA LMDscandata 1 1 E8B2A2 1 0 5B05 4021 2171645B 21716F29 0 0 0 0 0 1388 168 0 1 DIST1 3F800000
00000000 FFF92230 1388 21D 51 55 45 53 49 43 47 46 4C 4F 52 4F 4E 4D 52 52 4A 57 51 4B 55 50 52 52
5A 53 66 60 62 60 6C 64 68 6A 76 6A 73 73 77 77 74 72 7F 8D 145 1C7 2FF 49E 49F 49B 49F 4A8 490
490 496 4A2 49A 482 486 488 490 48D 475 474 47F 474 485 46A 46D 472 478 47C 463 475 463 46A 468
46E 45D 474 46D 476 45C 468 464 462 458 464 45E 468 461 463 46C 473 460 469 465 470 46C 480 46C
467 471 46A 47A 471 471 47D 48D 47E 475 487 48C 48D 47B 48F 4AD 4C8 4CD 4B7 4CC 4C3 4C0 4CB 4E1
4D4 4E7 4E9 4F3 4E8 4FC 4EC 4F4 4FC 4FF 50D 50C 516 510 528 51F 525 52E 534 53D 550 546 54D 54F
557 560 568 56E 583 585 587 587 596 59E 5B8 5B6 5BE 5CD 5DE 5DA 5E6 5F8 602 60E 62F 623 62E 63F
650 65A 676 687 684 6A4 6A6 6BB 6CD 6D7 6EC 6FE 705 71C 72A 762 76B 757 751 75F 784 78F 7AE 7DB
7E9 815 82B 833 857 882 899 8BA 8C8 8D4 8F2 8EA 8E7 8DA 8D7 8D0 8C6 8C8 8AE 8AC 8C6 89F 893 88B
885 878 884 87B 87D 873 861 856 84F 846 84F 83E 831 84B 84E 830 83A 820 81D 81B 81B 80E 826 827
814 7F9 810 7FB 810 805 7F1 80A 7F3 7FA 7F2 7F4 7EE 7EE 7F3 7E5 7F8 7FE 80C 7E3 7EE 801 7F6 7FA
7EE 7F9 802 7F4 7ED 7F7 7FC 7FB 802 7FD 810 80F 80B 807 811 813 81D 810 818 836 829 829 82D 82B
83D 85F 832 84E 856 84E 84F 85B 85F 879 874 873 891 880 88F 892 897 8A0 8CD 8AE 8C4 8E6 8D5 8DC
8E5 8ED 908 919 912 932 930 93A 946 955 95E 97D 97A 989 9A0 9AE 9BE 9C5 9D2 9FA 9FB A08 A27 A29
20D 1EC 1D6 1C4 1C3 1C1 1B3 1AA 1A1 18E 185 178 17B 182 179 16E 134 F8 B6 8C 5E 57 5D 5F 54 61 52
58 54 57 44 50 41 53 50 42 48 47 47 4F 4B 42 4B 38 4D 42 3F 50 40 3C 4D 33 48 48 38 3F 42 4A 4A 51
4D 54 49 52 40 46 3D 49 44 34 4F 4F 53 4D 40 3B 4C 47 48 46 3E 3F 3C 3E 3E 3D 3E 3E 3E 4B 47 46 29
29 2C 3F 3D 3D 31 3C 3B 49 30 37 34 39 3F 41 26 2C 28 28 43 3D 42 3F 41 44 3E 34 39 39 35 3A 35 3B
36 33 2F 2A 3A 3E 3A 4C 49 29 47 2B 30 3A 3B 51 4A 45 43 2C 30 33 39 36 35 3A 37 33 31 31 43 3D 42
45 43 44 32 2F 36 3E 43 3D 57 55 3D 46 4B 4A 58 57 5A 5D 5E 5B 4B 4F 48 4F 56 53 5F 5A 54 52 52 56
44 46 47 59 54 55 50 55 0 0 0 0 0 0
```