Forum8 World16 Workshop 2019 Presentation

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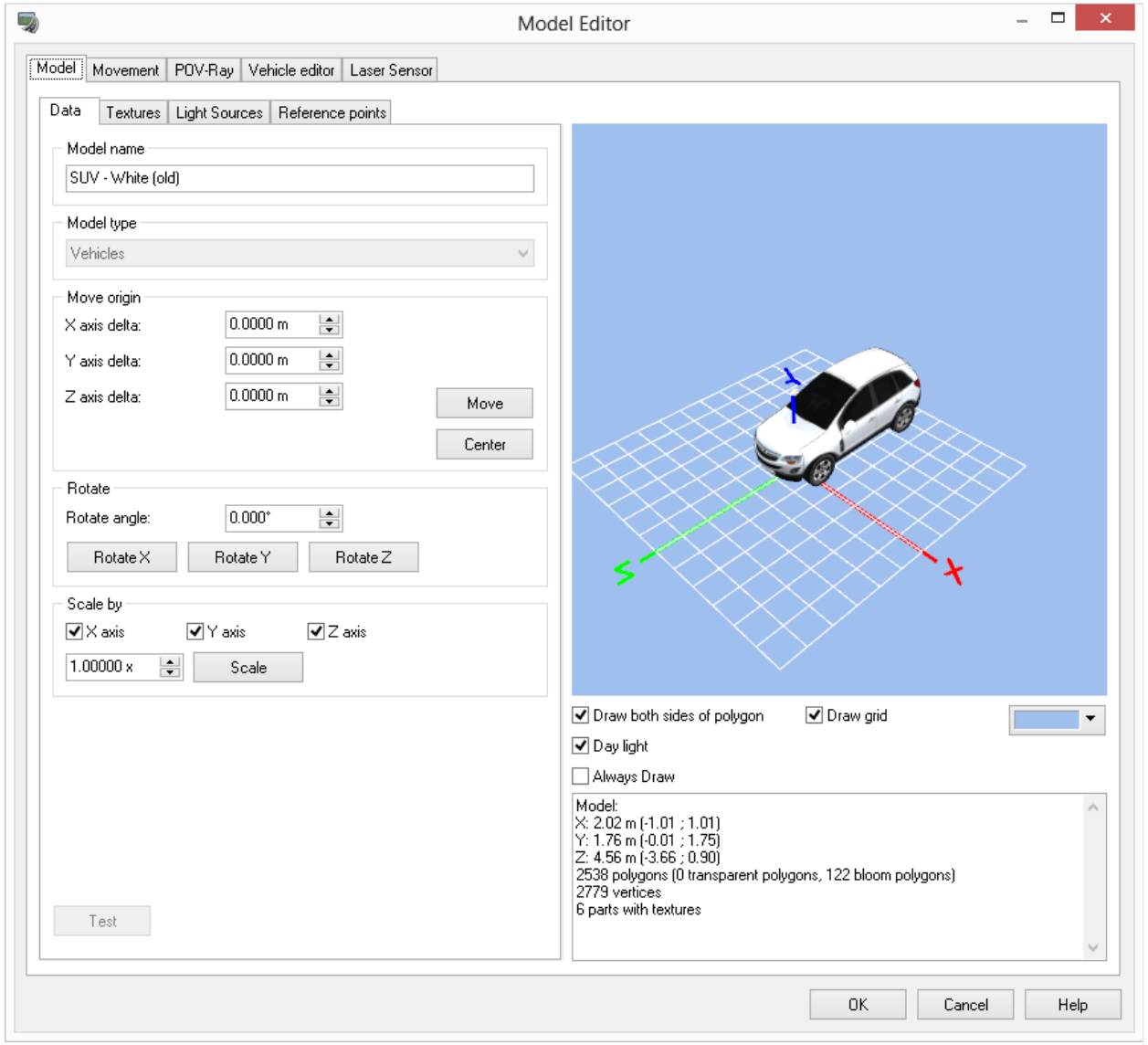
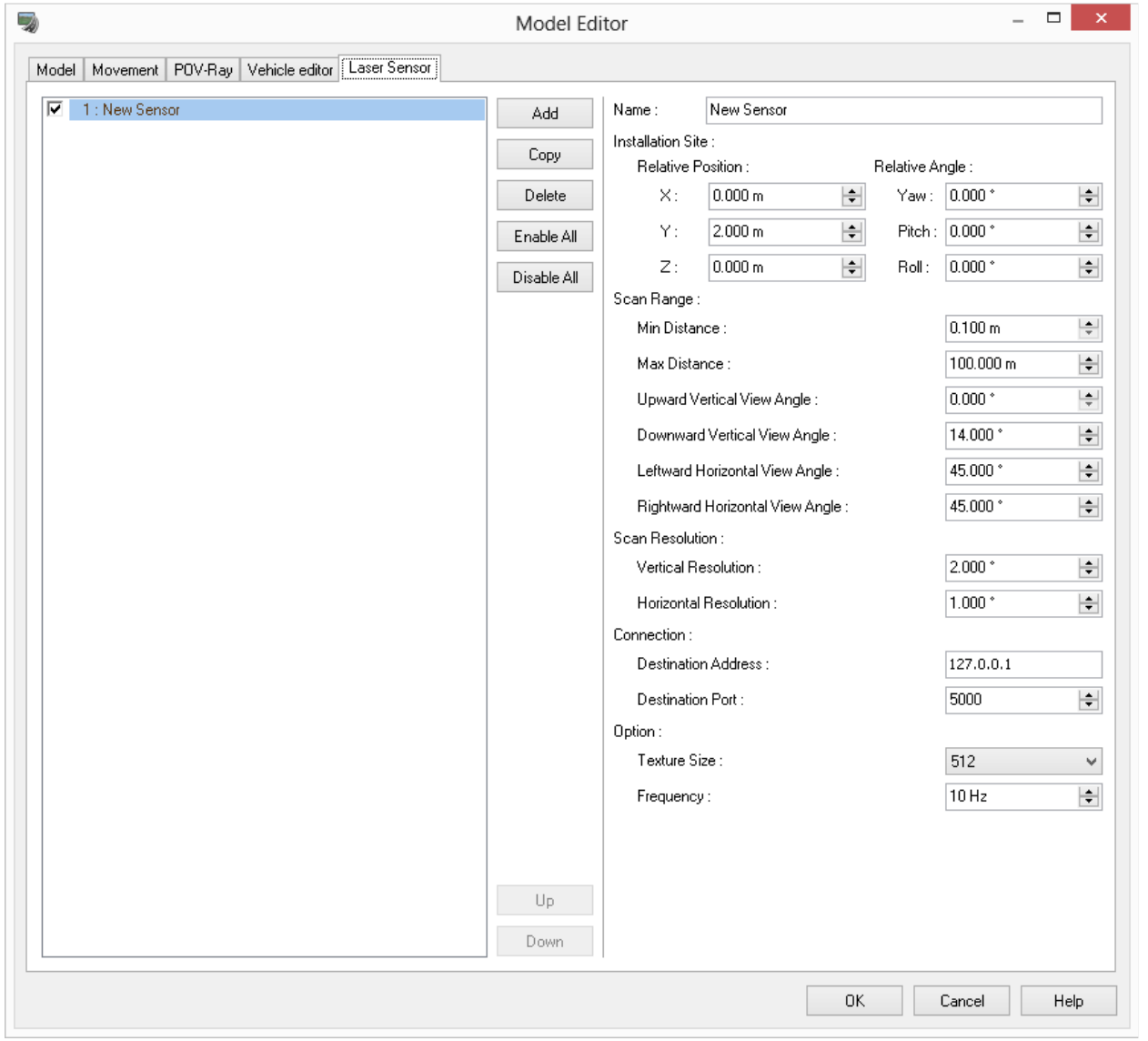
Energy and Sustainability Lab

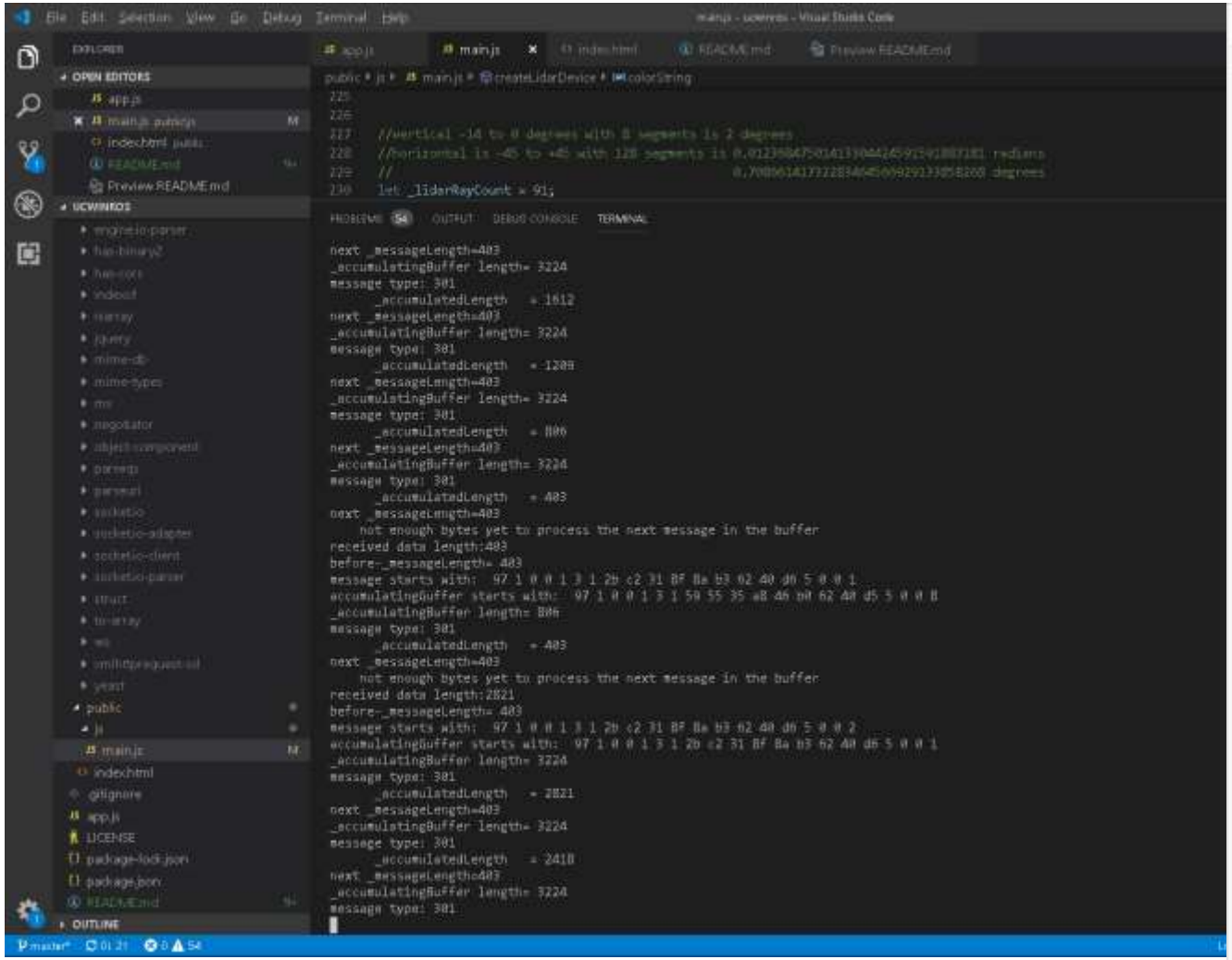
Create and Attach Sensor Model to Vehicle





Drive Vehicle in Environment and Transmit Scanning Device

Use Custom Schema and TCP Buffer to Organize Message Stream

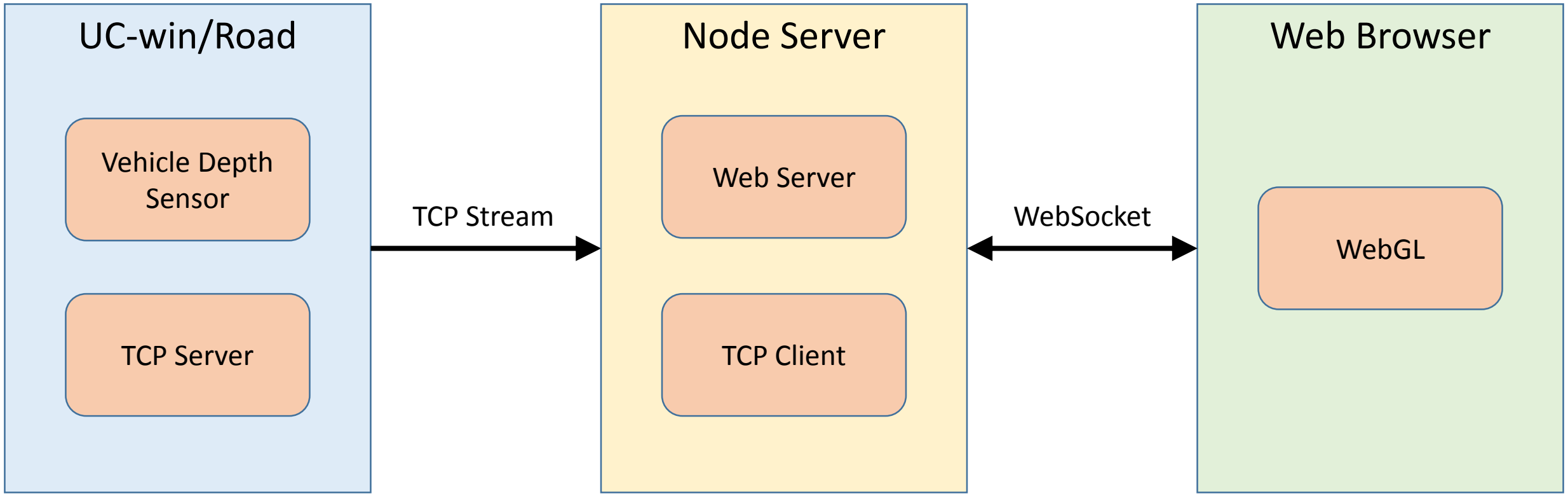


8	Starting Line Number		Long	unsigned	4	[1..(ResolutionWidth)]
9	Ending Line Number		Long	unsigned	4	[starting line number..(ResolutionHeight)]
9a	Pixel color: Blue	0-255	Byte	unsigned	1	
9b	Pixel color: Green	0-255	Byte	unsigned	1	
9c	Pixel color: Red	0-255	Byte	unsigned	1	if it exceeds 8500 pixels data division occurs
10	Footer		footer		4	

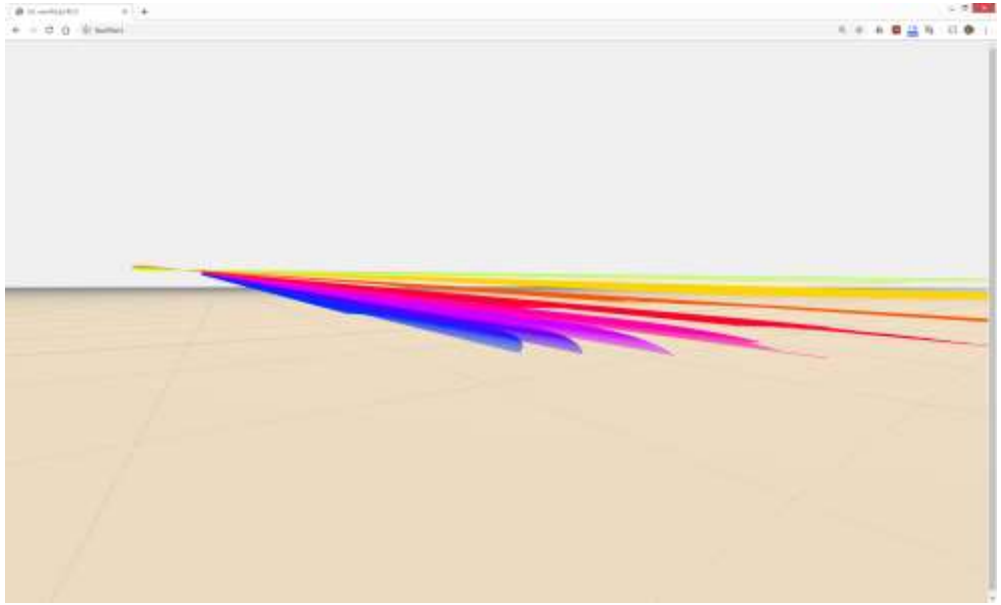
Lidar Message Schema 0x0301

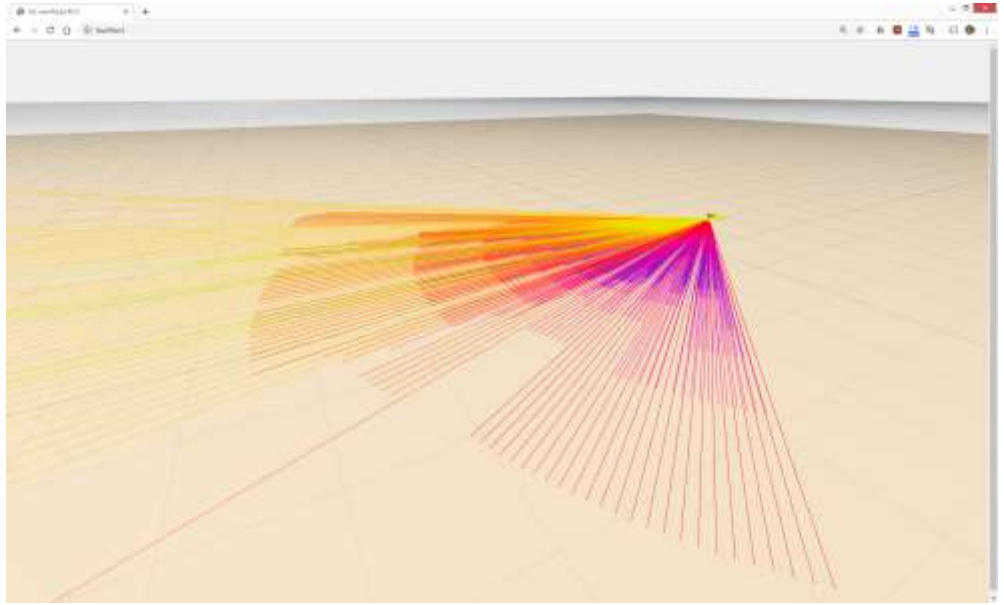
No	Content	Unit	Type	Sign	Bytes	Notes
1	Header		header		4	
2	Message Type		short	unsigned	2	enum
3	Lidar Sensor Id		Byte	unsigned	1	id for each lidar sensor
4	Timestamp	seconds	Double	signed	8	scanned time from plug-in communication start
5	Scan Number: Horizontal		Long	unsigned	4	number for each scan data, [1..*]
6	Scan Number: Vertical		Long	unsigned	4	number per scan, [1..*]
7	Vertical Angle	radians	Single	signed	4	
8	Start Horizontal Angle	radians	Single	signed	4	horizontal angle of first point
9	Horizontal Resolution	radians	Single	signed	4	
10	Number of Points		Long	unsigned	4	
10a	distance	meters	Single	signed	4	
11	Footer		footer		4	

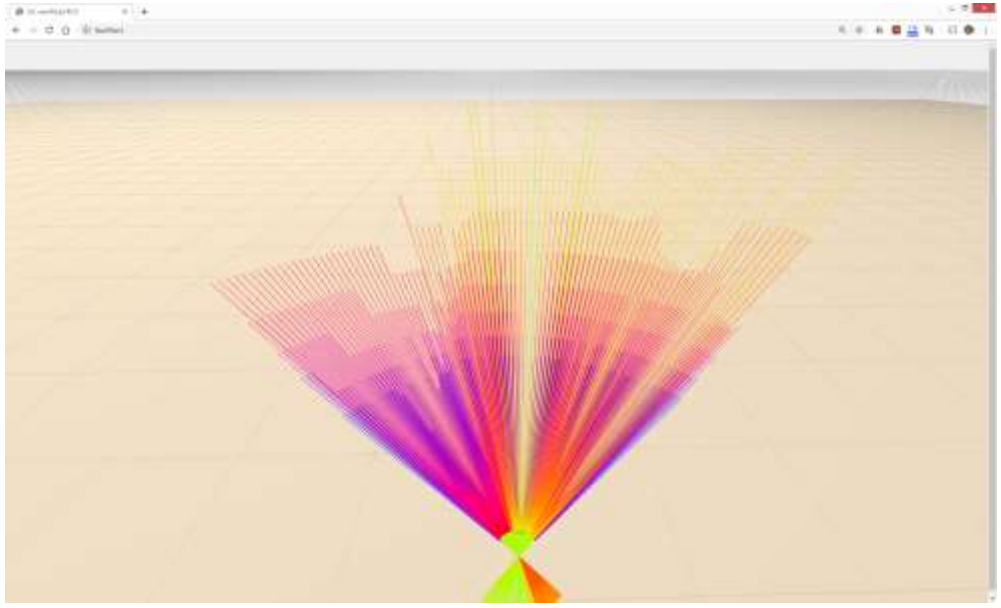
Diagram of the TCP Data Stream Process



Output in Separate Application for Algorithm Development







Future Steps

- Implement Reverse Vehicle Control Schema to allow vehicle input
- Implement Odometry readout from UC-win/Road
- Implement IMU readout from UC-win/Road
- Add (Gaussian) noise function to depth sensors in UC-win/Road
- Connect to SLAM Algorithm which supports limited sensor data
- Add multiple depth scanners to a model in UC-win/Road
- Implement color camera streams for vehicles that don’t use Lidar
- Connect to ROS for more complex control mechanisms

https://github.com/Forum8World16/ucwinros