Robot Navigation and mapping using Lidar sensor

Necessary components:

1. Robot chassis
2. Arduino
3. Stepper motor ( or maybe servo motor)
4. Lidar sensor
5. Bluetooth (wireless) connector for Arduino

Software:

1. Arduino IDE
2. Matlab

To be able to do the mapping and navigation in need of several stages of data collection from the sensor, robot position estimation, map creation and navigation. The sensor is rotated 360 degrees using a stepper motor. Arduino retrieves data from LIDAR sensor using PWM communications. The data from the sensor is taken each step of the stepper motor rotation. Data from the sensor is sent by Bluetooth and the data is taken using serial communication by Matlab software. After the data obtained, then Matlab change the data to be processed into a map and navigation. Each movement of the stepper motor is controlled by a command from Matlab which is sent via Bluetooth with serial communication.

Project examples:

<https://www.researchgate.net/publication/330362469_Lidar_Application_for_Mapping_and_Robot_Navigation_on_Closed_Environment>

<https://journals.telkomuniversity.ac.id/index.php/jmecs/article/view/1696/965>

<http://www.qcontinuum.org/lidar>

<https://www.researchgate.net/publication/328273101_3D_indoor_mapping_system_using_2D_LiDAR_sensor_for_drones>

<https://github.com/Vishnuparammal/3D_mapping/blob/master/README.md>