W5300 IP 3D Camera over Single Pair Ethernet "ToffeCam" ToF Sensors Matrix Part

19th August 2023

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VL53L7CX Sensors Matrix Geometry

VL53L7Cx is a time-of-Flight 8x8 multizone ranging sensor. Its field of view is 60 x 60 degrees. Seven sensors are needed to cover the entire hemisphere. Six are arranged in a circle every 60 degrees, the seventh looks vertically upwards.
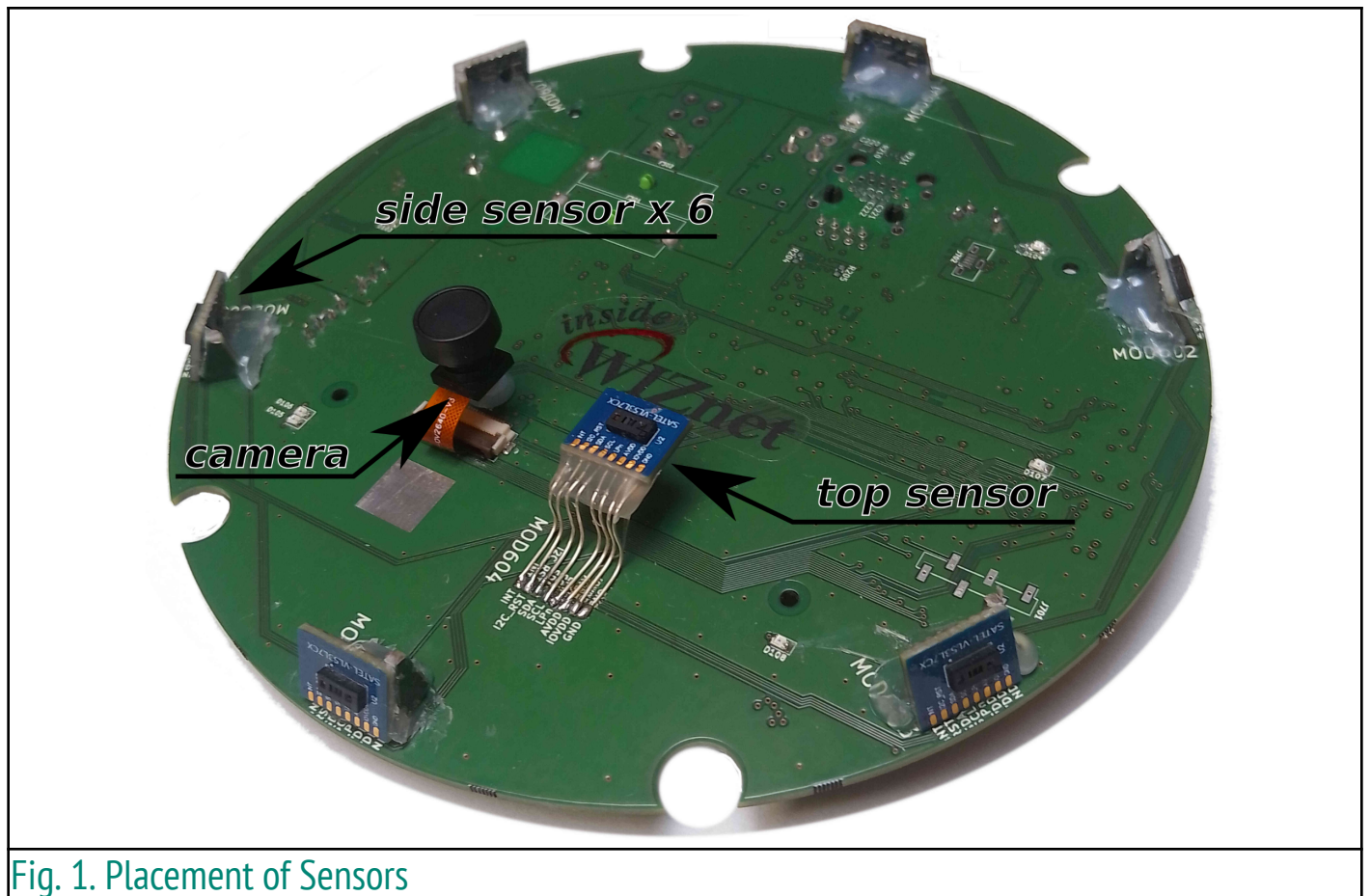

Fig. 1. Placement of Sensors

The sensor is mounted on a separate board SATEL-VL53L7CX, its axis is directed at an angle of 30 degrees to the horizontal (Fig.2).
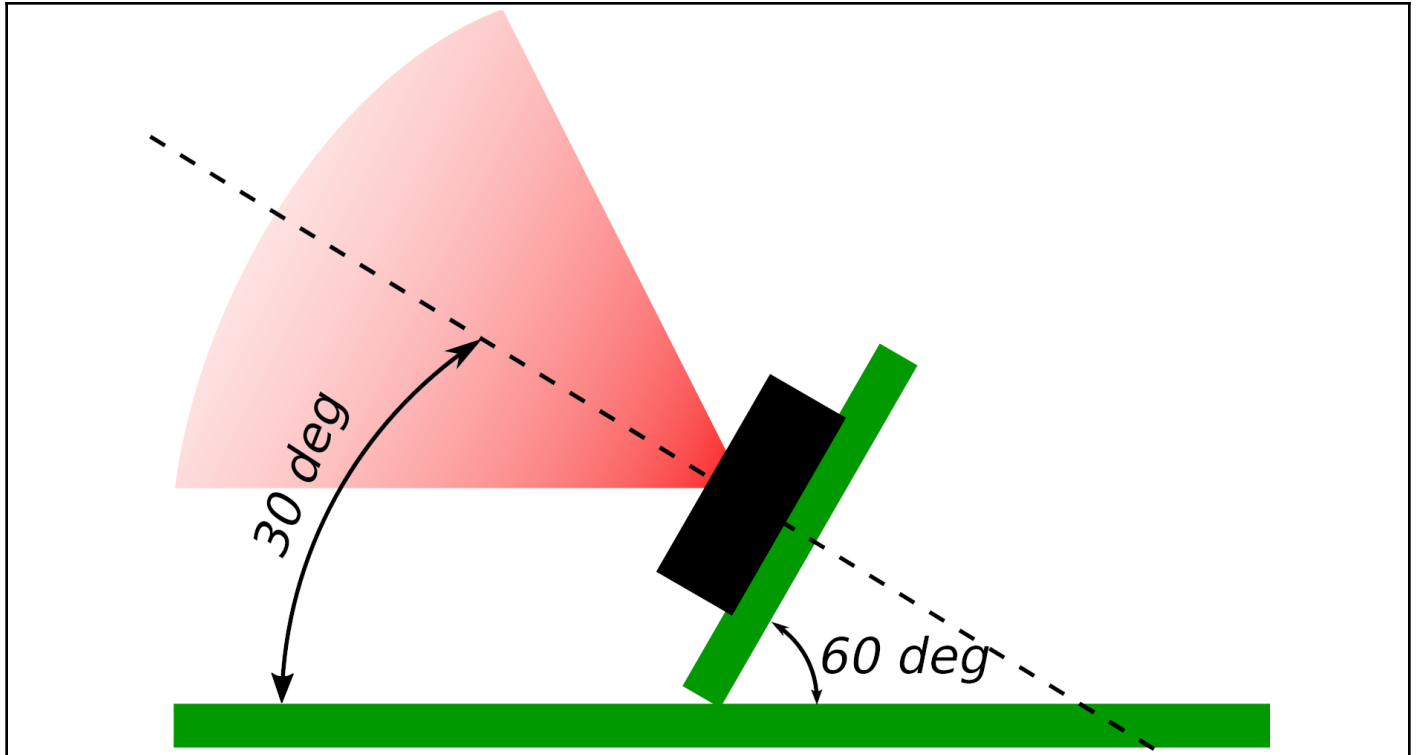

Fig. 2. Single sensor assembly

The field of view of a single sensor forms a 60x60 degree square on the surface of the sphere (Fig. 3.)
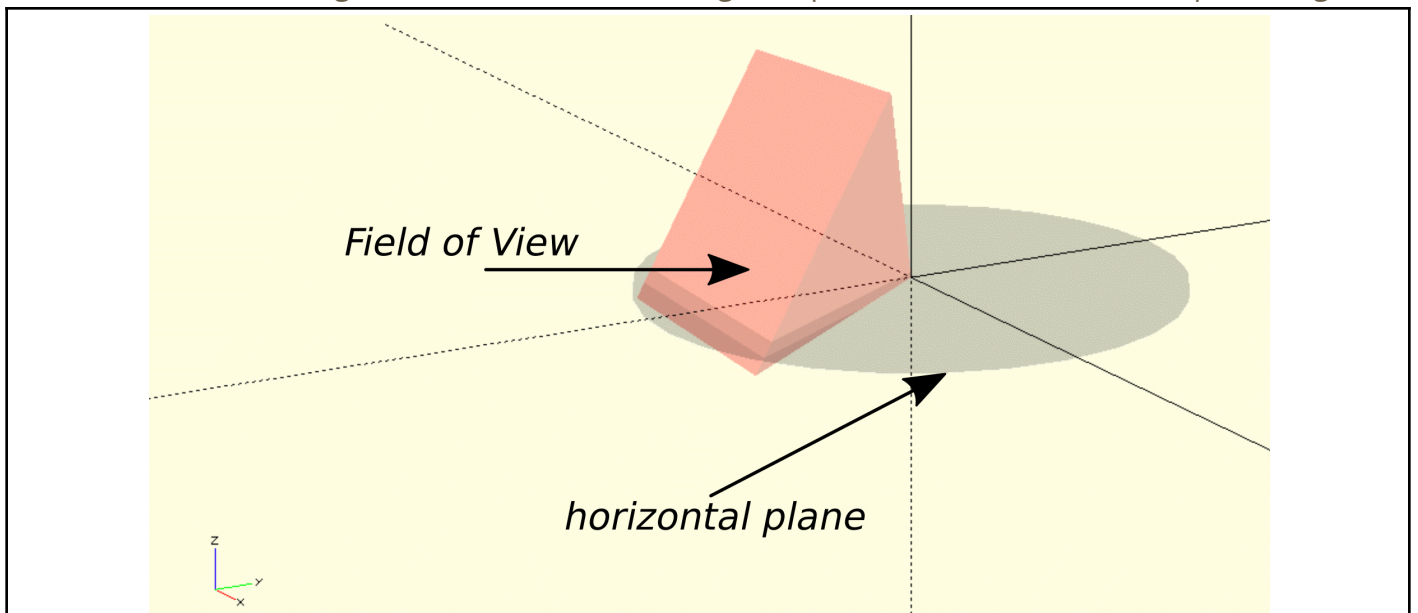

Fig. 3. Single sensor FoV

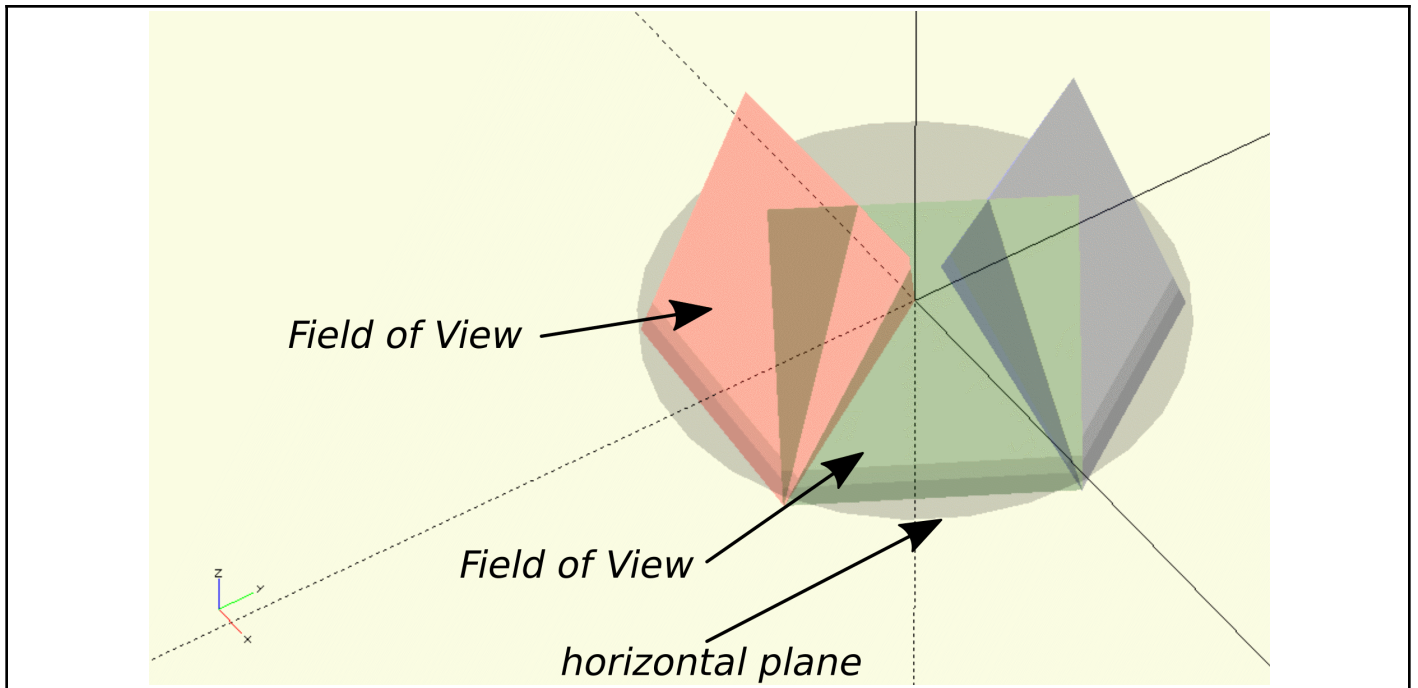The fields of view of adjacent sensors overlap (Fig.4.).

Field of View

Field of View

horizontal plane

Fig. 4. Adjacent sensors FoV

The hemisphere is closed by the last sensor mounted horizontally (Fig. 5.).

Field of View
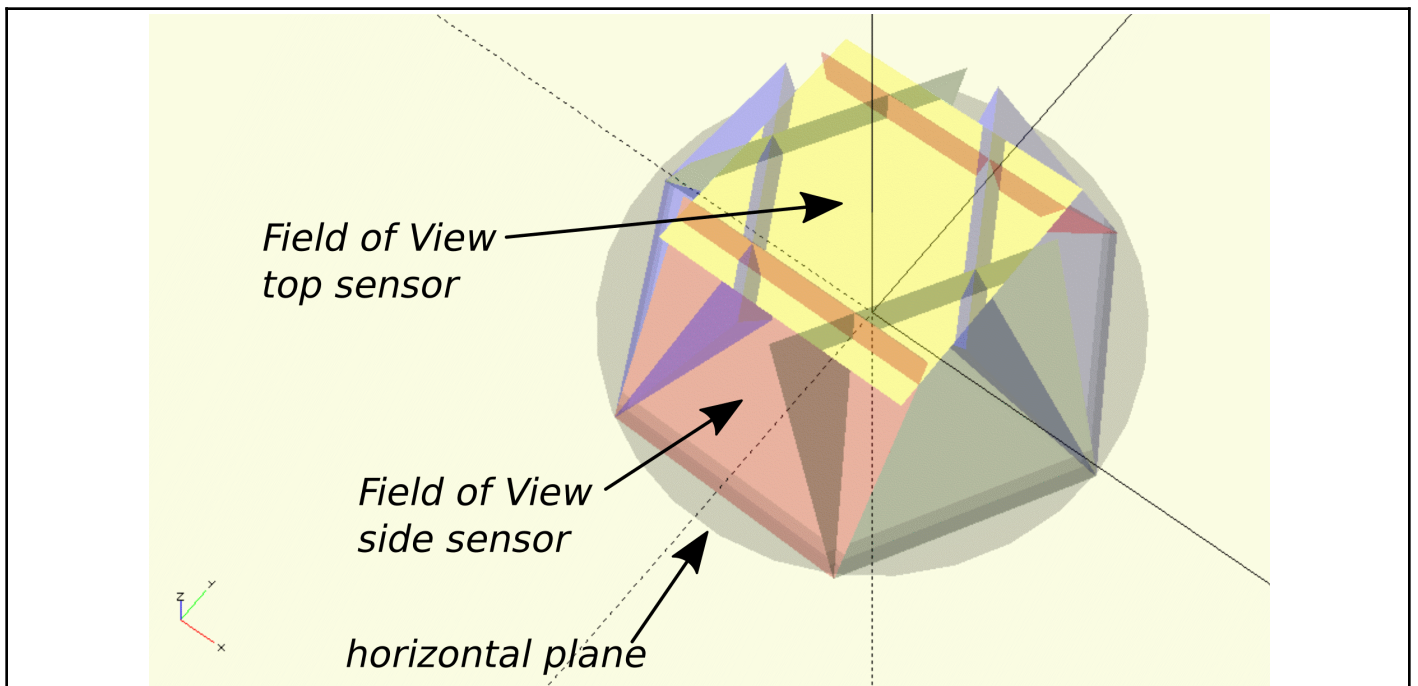top sensor

Field of View
side sensor

horizontal plane

Fig. 5. All sensors FoV

VL53L7CX Sensors Matrix Schematics

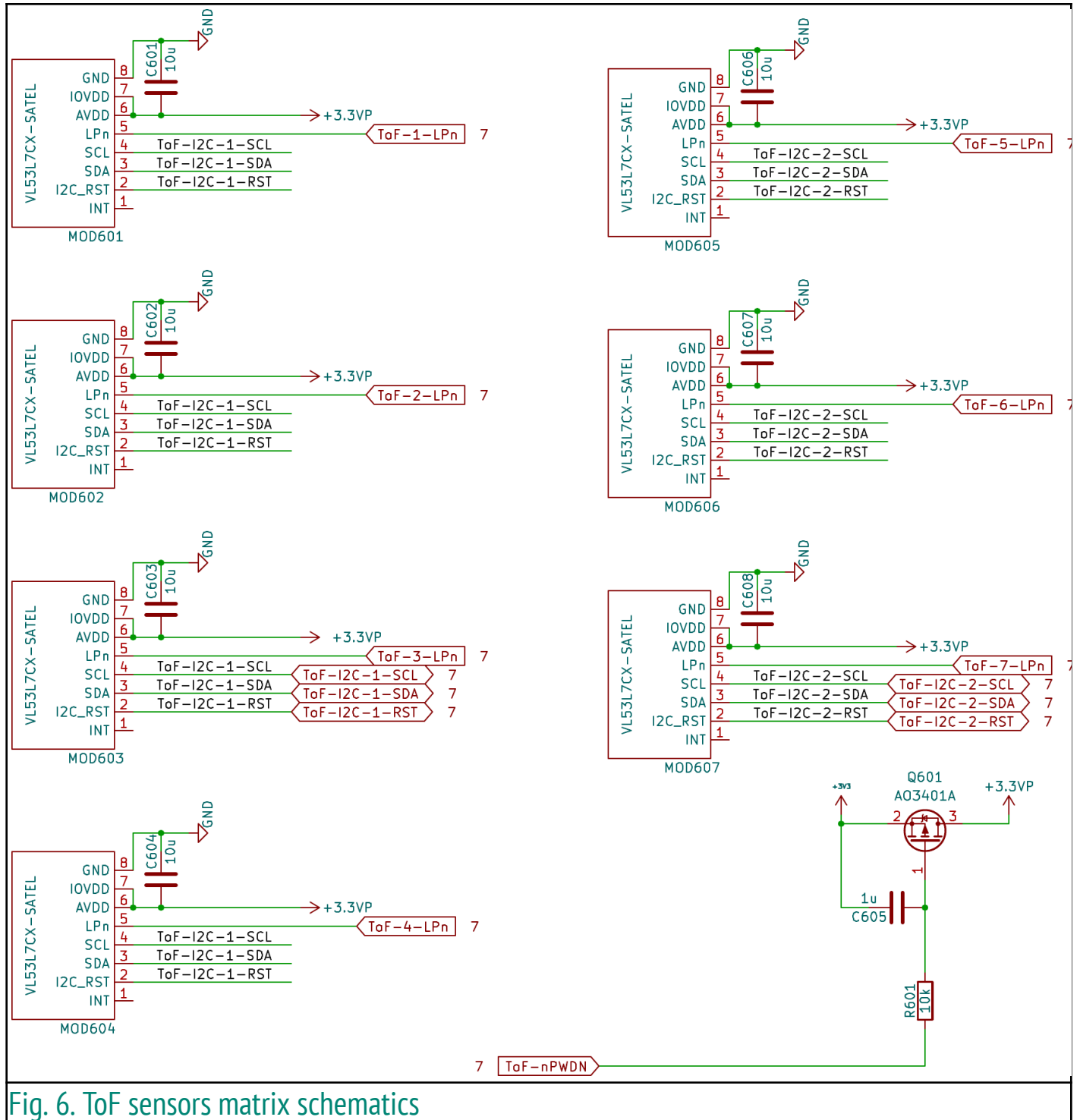The sensors share two I2C buses. Power-off reset is common to all sensors. Each sensor has its own LPn signal mainly needed to change the address on the I2C bus (Fig.6.).

Fig. 6. ToF sensors matrix schematics