Point clouds
- obstacle detection and localisation

Velodyne LiDAR
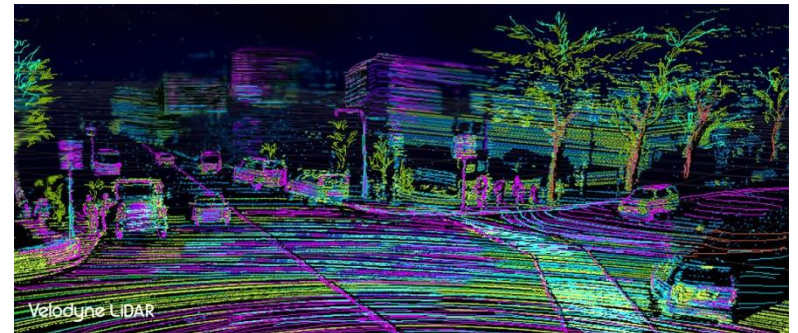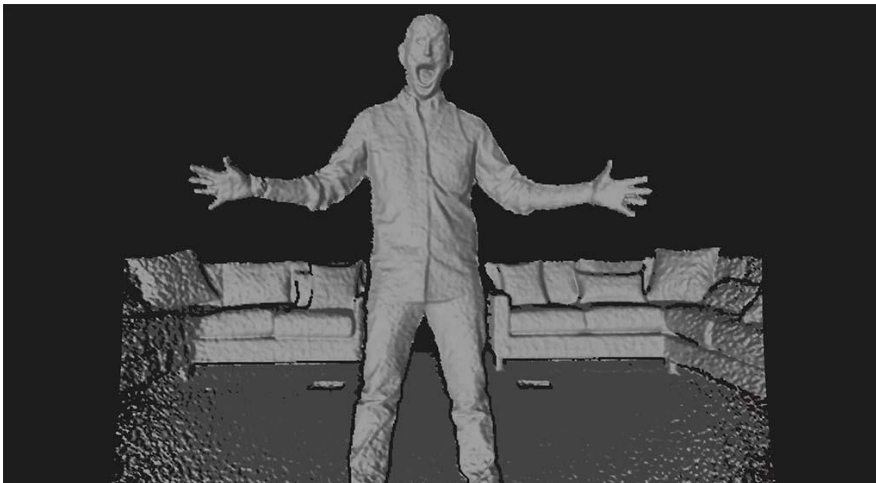
"Real" 3D Point clouds

Depth maps

Right IR Camera   RGB Camera   IR Laser Projector   Left IR Camera

9.5mm

102mm

Color   Infrared L & R   Depth
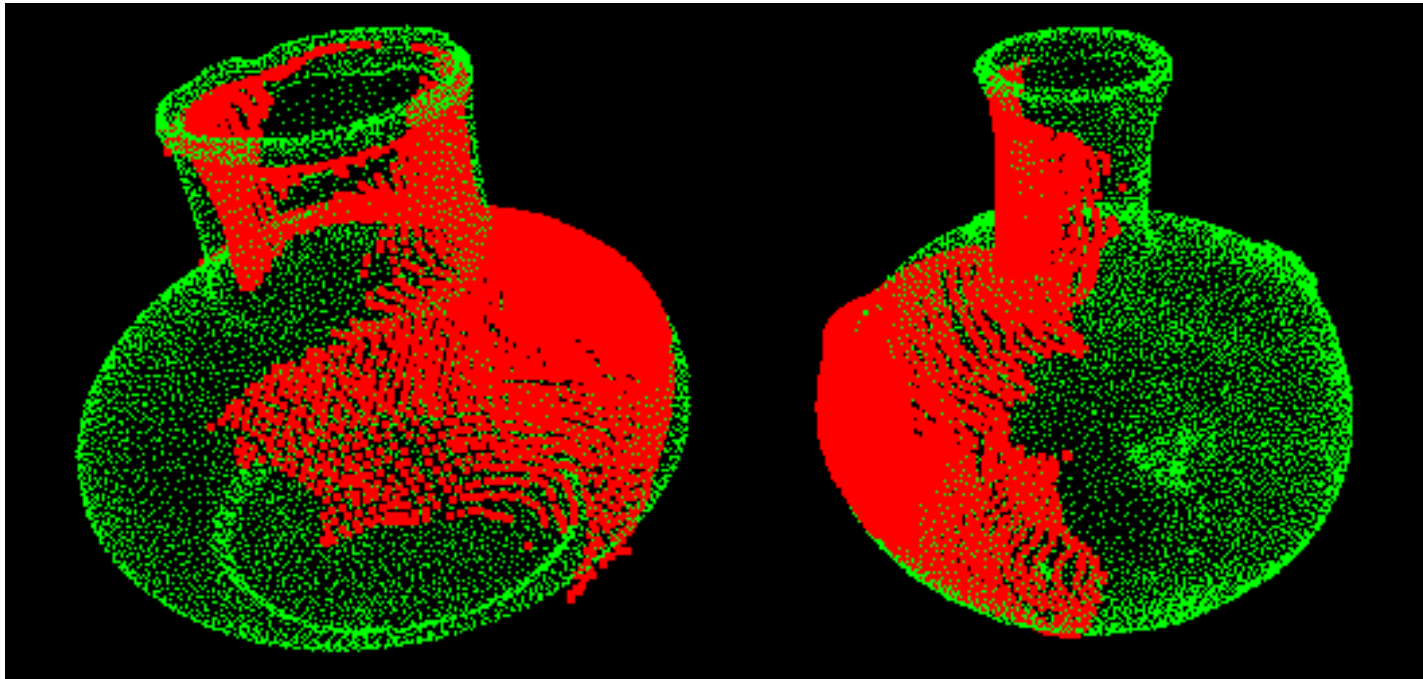
Depth from "ordinary image"

Δr = 100 pixels, k = 500, z = 50 m :

$\quad$ Δx = 10 m

Δr = 100 pixels, k = 500, z = 1 m :

$\quad$ Δx = 0.2 m

$$\Delta r = \frac{f}{s_x}\frac{\Delta x}{z} = k\frac{\Delta x}{z}$$

Depth from "3D cameras"

99 mm x 20 mm x 23 mm
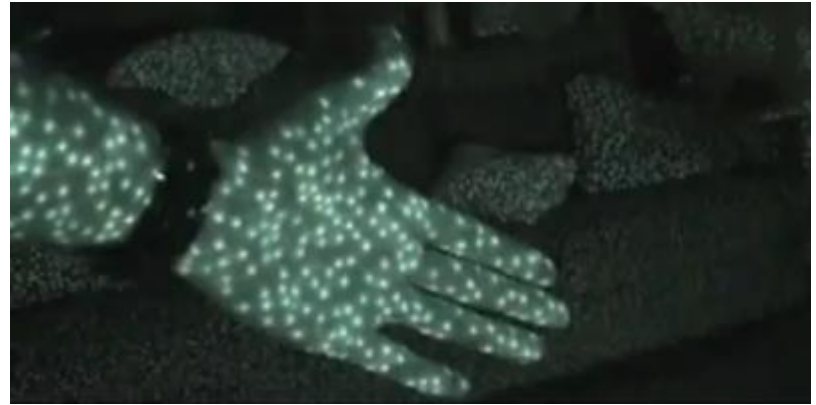
Base Lenght

Camera-object distance

TOF

Stereoscopic 3D

Laser scanner 3D
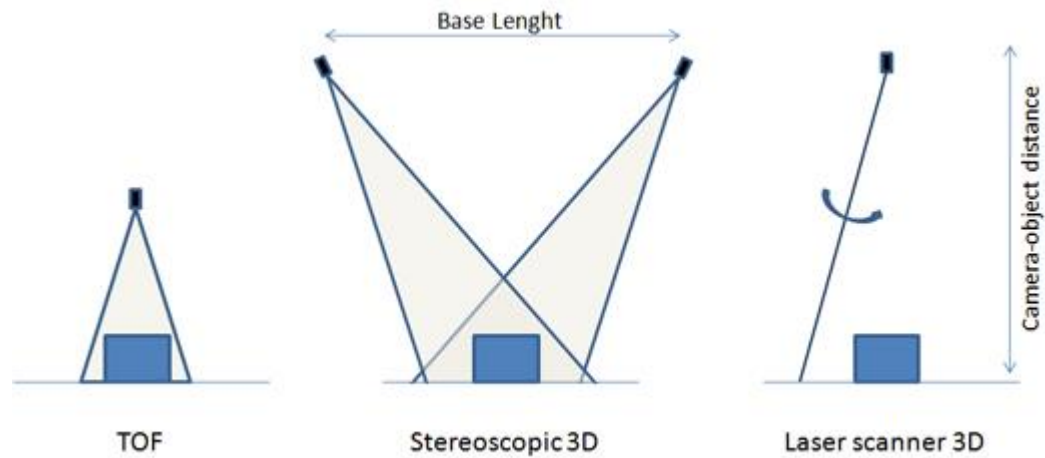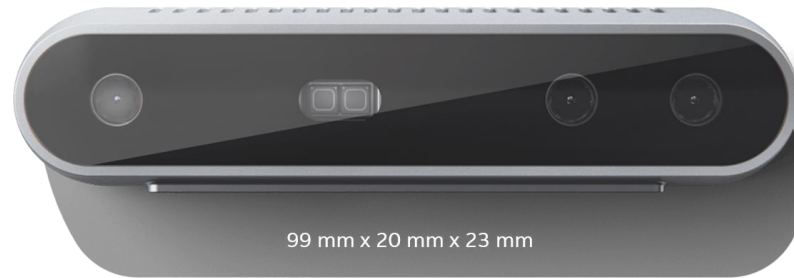
Asus Xtion Pro Live / Kinect
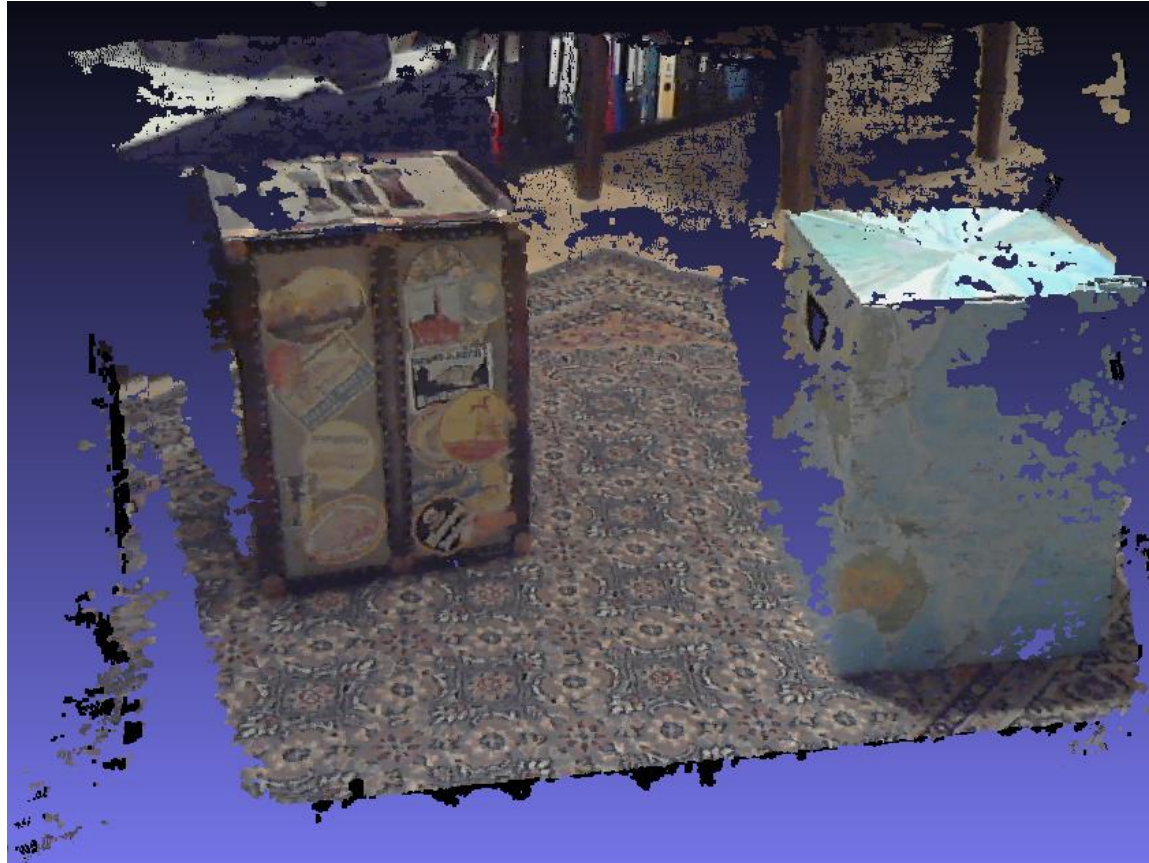# - Structured light imaging

What can we use point clouds for ?

- Navigation
  - obstacle detection

- Localisation
  - walls, corners, other fixed objects in map, ..

- Robotic tasks
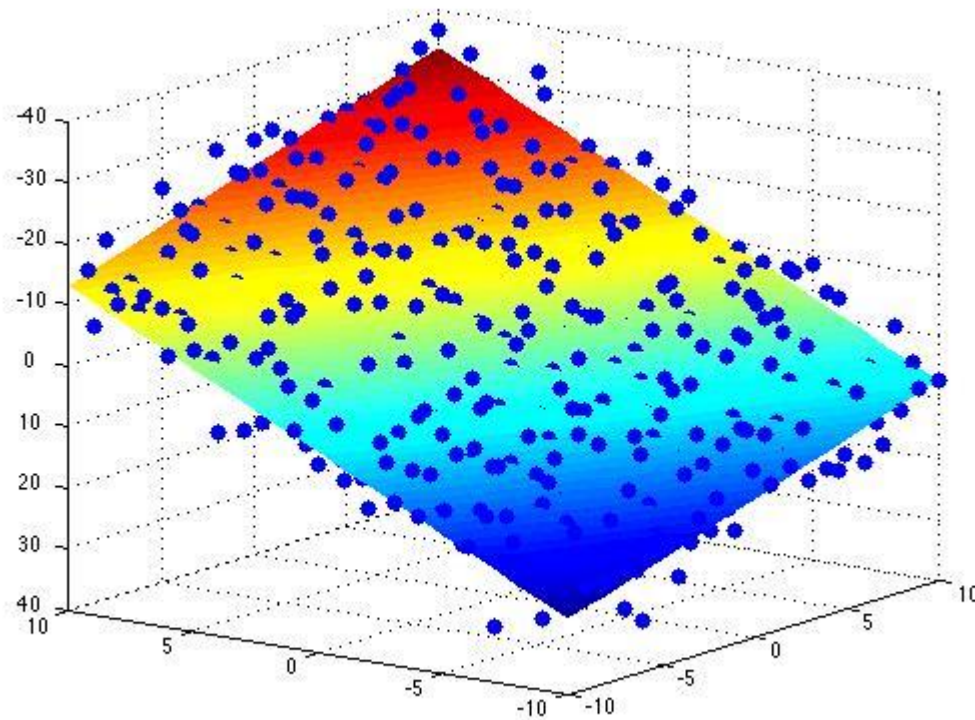 - target recognition, object manipulation, ..
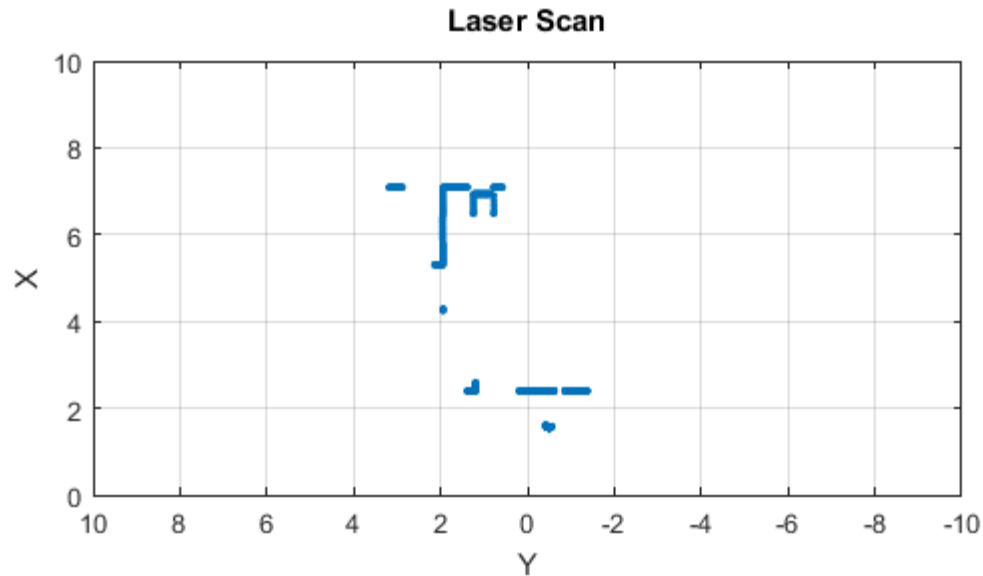
Obstacle detection

Plane detection in 3D point clouds

Turtlebot – "Laser scan"

Laser Scan

[scan,scanMsg] = getLaserScan(tbot);
Plot(scanMsg)