

# Pointcloud data sources

## Real Data

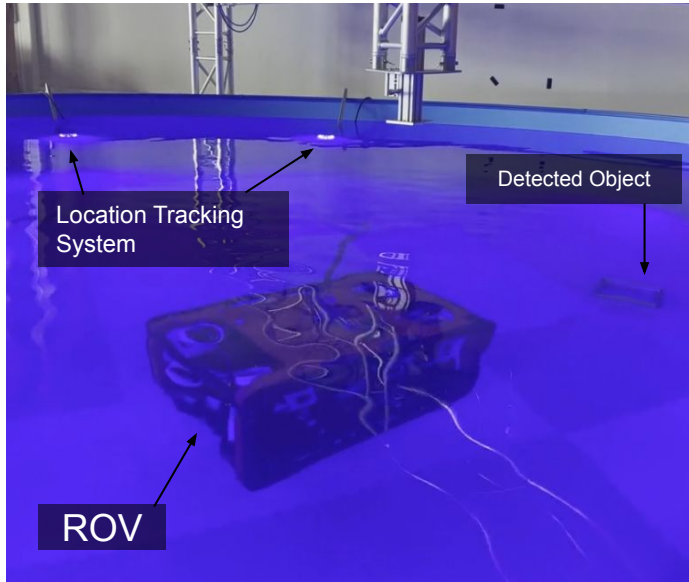


Institut für  
Automatisierungstechnik

Universität  
Rostock



Traditio et Innovatio



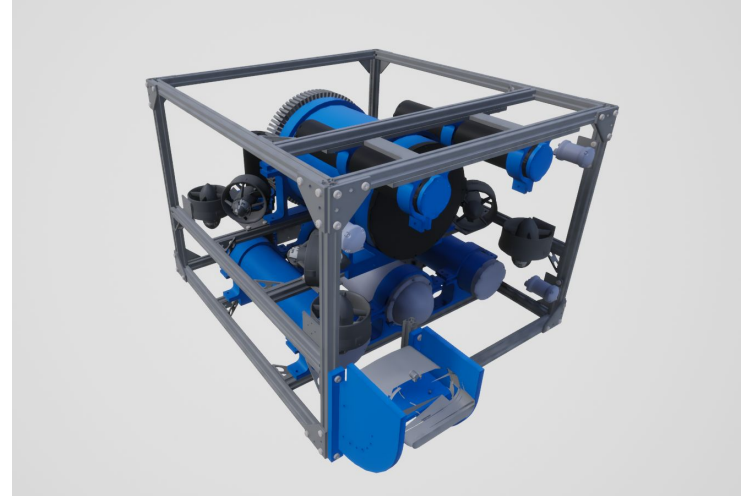
## Simulated Data

### HoloOcean Underwater Simulator



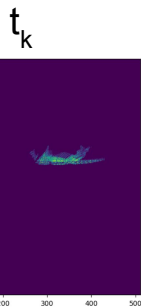
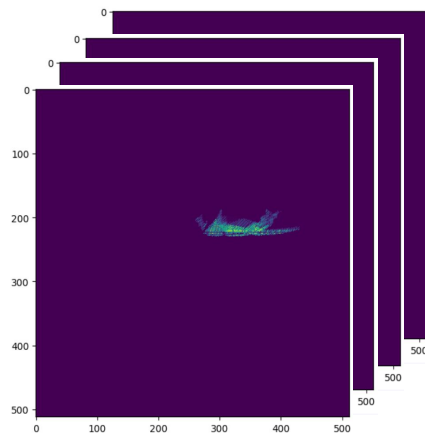
Electrical and Computer Engineering  
Field Robotic Systems Lab

**BYU**  
BRIGHAM YOUNG  
UNIVERSITY

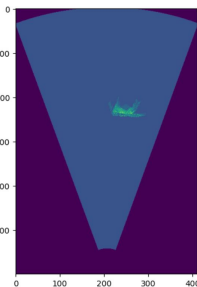


# Pointcloud creation pipeline

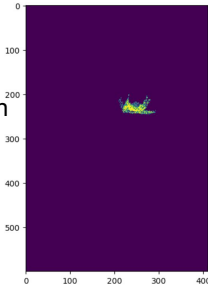
Raw sonar data



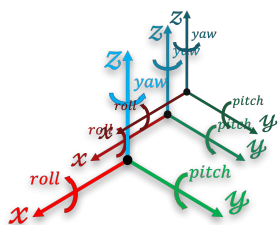
Projection



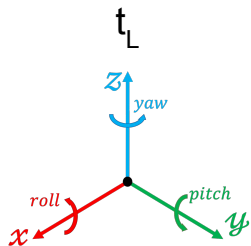
Binarization



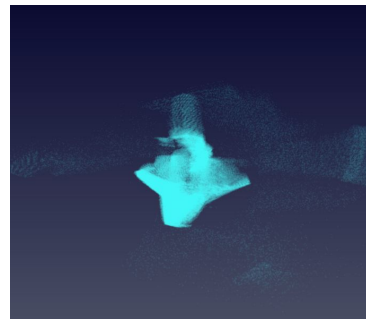
Orientation data



$$\operatorname{argmin}_L |t_L - t_k|$$



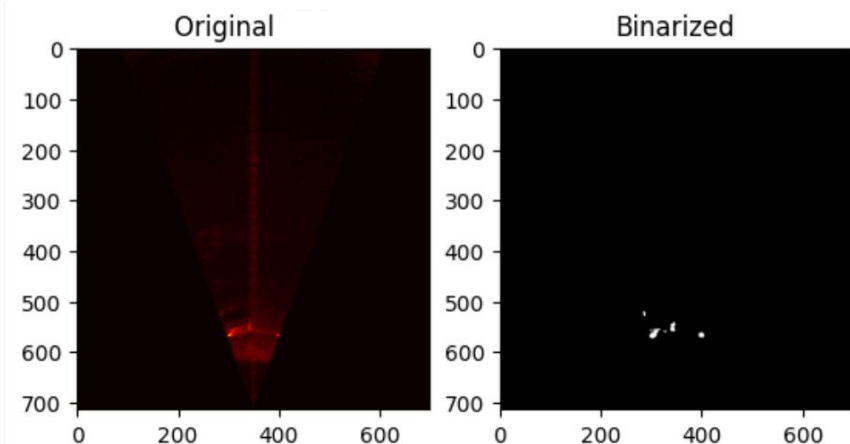
Add points  
to the pointcloud



# Binarization

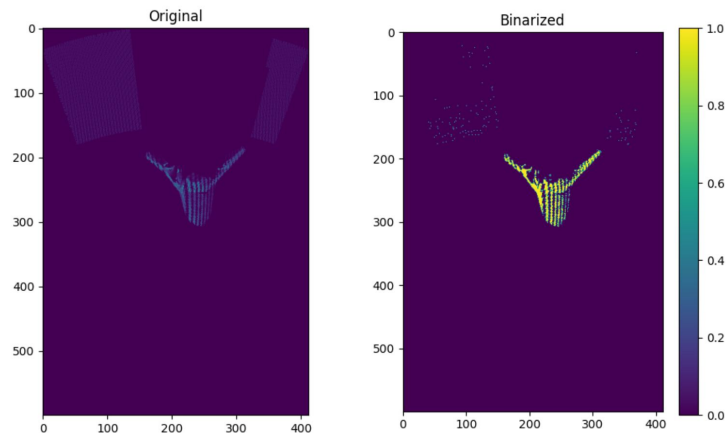
## Real Sonar Data

1. Excluding far sonar regions (cut off past ~4 meters)
2. Mean bilateral filtering (image blurring)
3. Local median thresholding (block size = 13)



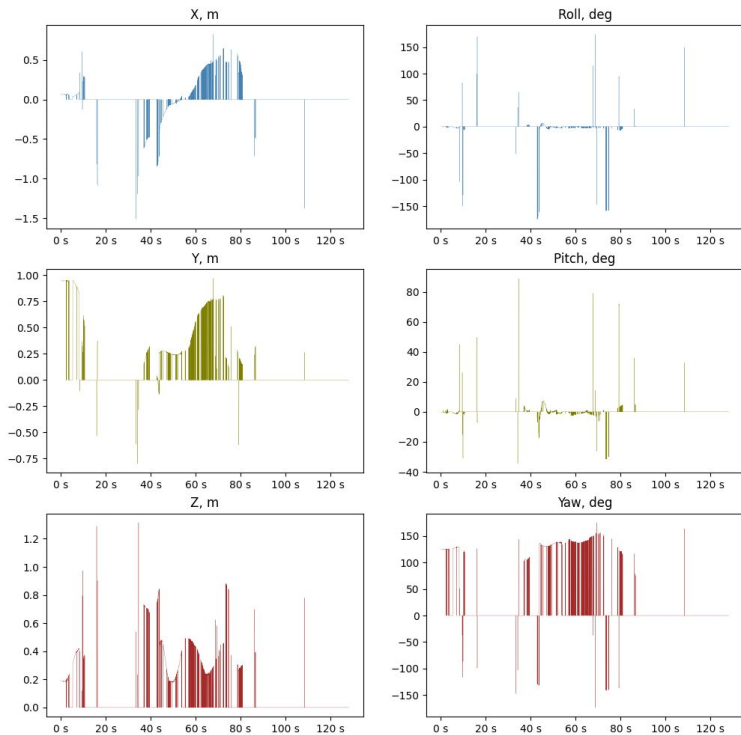
## Simulated Sonar Data

Simple thresholding  
(`img[x][y] > 0.1`)

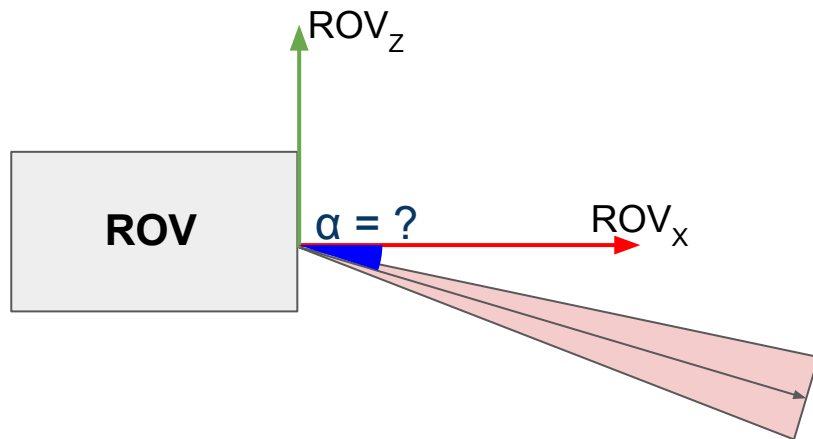


# Real data issues

## Unreliable Orientation Data



## Unknown ROV geometry



# Real data issues

## Noisy Sonar Data (?)

