# DroneMOM

*Drone Model Output Machine*

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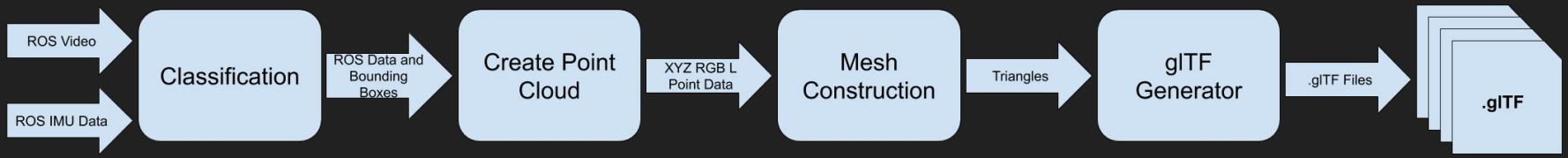
# Problem Statement

Collecting 3D object datasets involves a large amount of manual work and is time consuming. Can we build a system that is more automated?

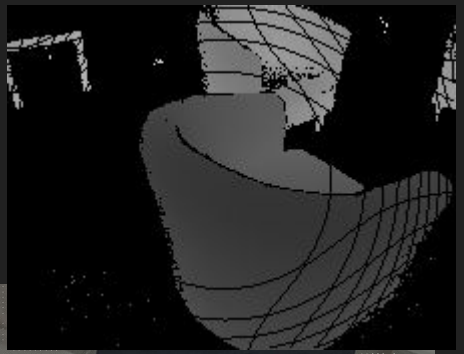


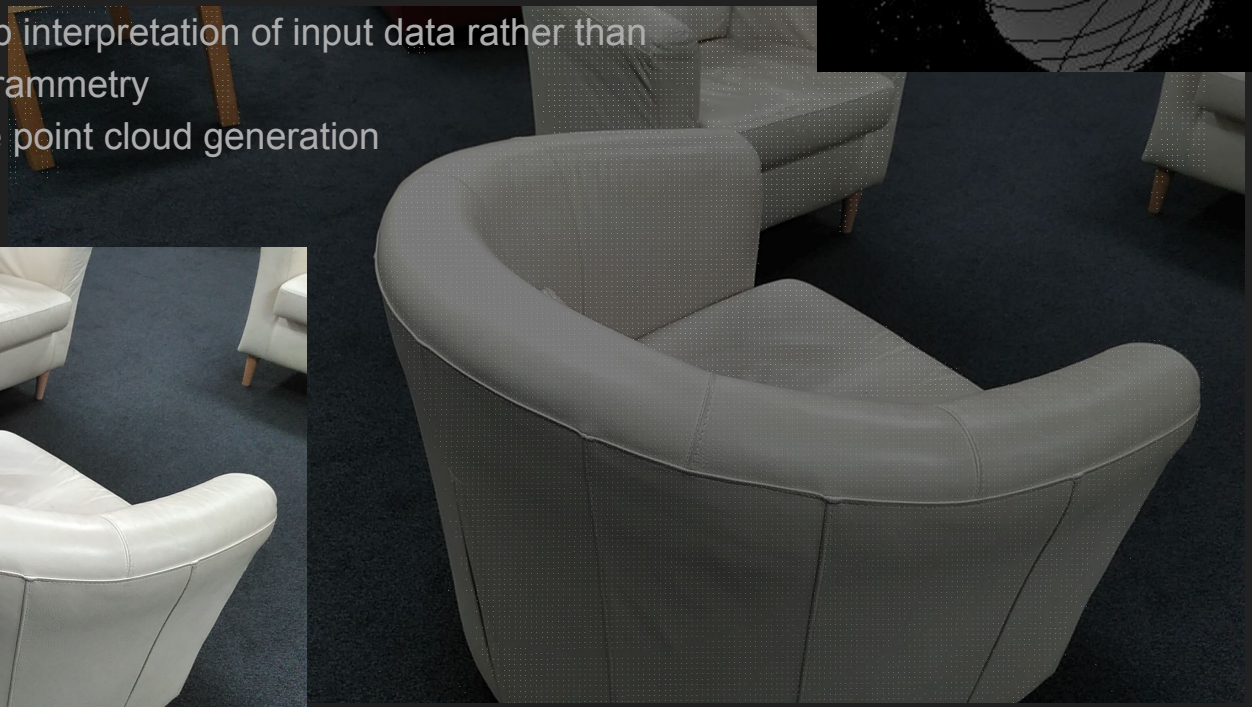
# Classification

- Accomplished
  - Figured out how to get position accurately for point cloud (Thanks shadow team)
  - Started gluing components together for merge
  - Time synchronized all ROS messages in pipeline
  - Added Streams and zero copy memory to Image Classification
  - ~50ms to do inference ( ~20FPS)
- Challenges
  - Integrating
  - Likes to classify the chair as a bed (is it really wrong though?)
- Next Week
  - Start integrating

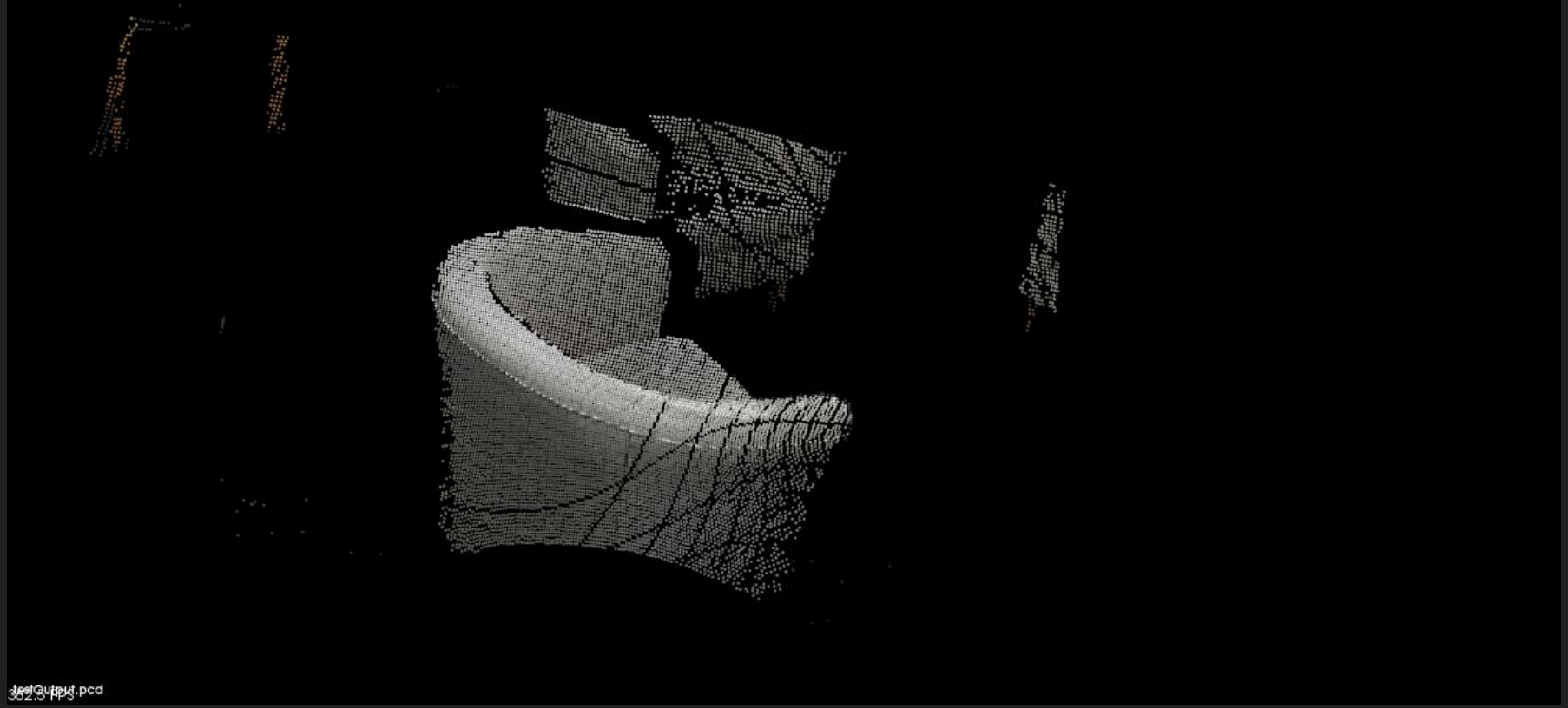
# Point Cloud Generation

- Accomplished
  - Switched to depth map interpretation of input data rather than fighting stereo photogrammetry
  - Achieved single-frame point cloud generation



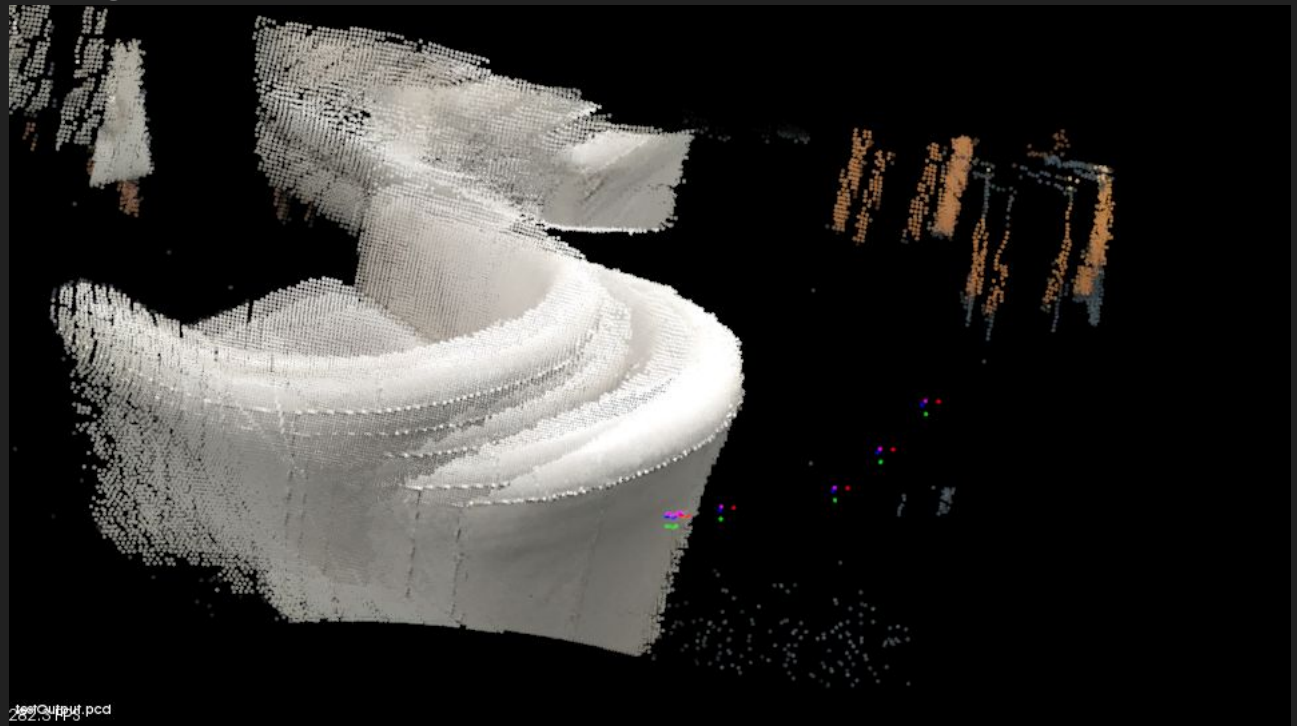


# Point Cloud Generation



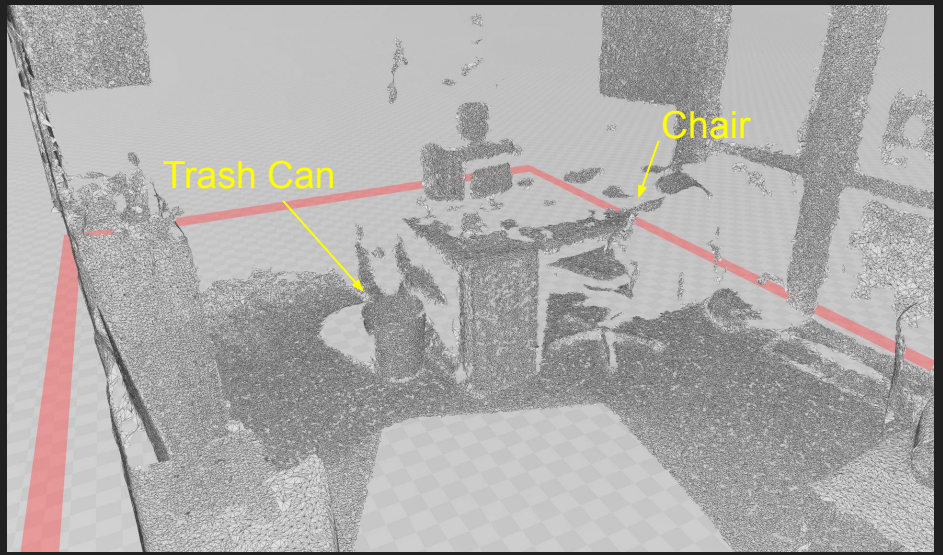
# Point Cloud Generation - Next Steps

- Accurate per-frame world space transformations
- Point culling in subsequent frames to reduce workload



# GLTF Mesh Construction

- Accomplished
  - GLTF files generated from PCL PolygonMesh.
- Issues
  - Still too many holes and too much geometry.
  - Some GLTF verification problems.
    - Normals
    - Floating-point precision
- Next Week
  - Improve Mesh Quality.



# End

Questions?

# EXTRA SLIDES

# GLTF Mesh Construction

1. Remove Statistical Outliers
2. Downsample using a Voxel grid
3. Smoothing through Moving Least Squares
4. Point Normal Estimation
5. Mesh Construction