

# Progress Report

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Robotic Vision Lab

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## 1 Specific Research Goals

- VPQEKF (April 13th): Work on the paper.
- DLO Manipulation Dataset (ICRA - Sept. 1st)

## 2 To Do

- QEKF Paper - 30% extension (April 13th):
  - Edit VEst section and add updates.
- QEKF/QuEst+VEst Implementation (April 13th):
  - Implement and test QEKF in Matlab. Done.
  - OOP Integration: QEKF is done, QuEst is done but not tested, and VEst is remaining.
  - Feature point extraction: implement semantic segmentation
  - Address scale factor (depth-scale) issues: DL solutions?
  - Address "hand off" issue when objects enter or leave field of view
  - Real-time streaming images for real-time operation (optional)
  - Experiments
  - Noise issue: noise cannot be modeled - revisit
- DLO Manipulation: Sept. 1st
  - Related work literature review
  - Real dataset + paper (ICRA - Sept. 1st):
    - \* Design, discuss and build a data collection and test rig.
  - Unity dataset
    - \* Recreate virtual duplicates of physical test material
    - \* Model dynamics and deformity

## 3 Progress

The following items are listed in the order of priority:

- VPQEKf ([RAL - April 1st, 2022](#)): No update.
- DLO Manipulation and Milestones: No update.
- 3D Scanner: I think it might best if buy one or borrow one from UTARI.
- Pose Estimation ([DLO-01](#)): On-going under VPQEKf.
- Semantic segmentation ([DLO-02](#)): Per my discussion with Dr. Gans, I will explore DL methods for the depth or scale problem.
- Grasping Project ([DLO-03](#)): I am making this a part of the DLO project.
- PyTorch Tutorials: Transfer learning.

#### **4 Intermediate Goals - Fall 2021:**

- QEKf: Finish paper.
- UR5e: Do the tutorials.