Motion Stage for Optical Coherence Tomography

Dan Frost
William Stanford
Client: Carol Rasmussen
Advisor: Dr. Tom Yen

Agenda

- Introduction to OCT
- Why we need a motion stage
  - Specifications and constraints
- Solutions
  - Last semester's work
  - Goals for this semester
  - Testing the device
- Future Work

Optical Coherence Tomography: Background

- Micrometer resolution
- Allows diagnosis of conditions like macular degeneration
- Uses principles of low coherence interferometry

# Problem Statement and Specifications

- Main problem: restricted motion

- Patients may not be responsive to instructions

- Need following degrees of motion
  1. Vertical
  2. Horizontal
  3. Rotational

BUSINESS WIRE COMMERCIAL PHOTO

http://cache.daylife.com/imageserve/0bS97VJbYyfaB/610x.jpg

Design Constraints

- Height, angle and rotation

- Distance from patient's eye

- Resolution of movement

- Loading (weight of machine 83 lbs)

- Ergonomic interface with patient and technologist

- Animals and humans

http://www.oct-ophtalmo.fr   Hôpital Lariboisière Paris
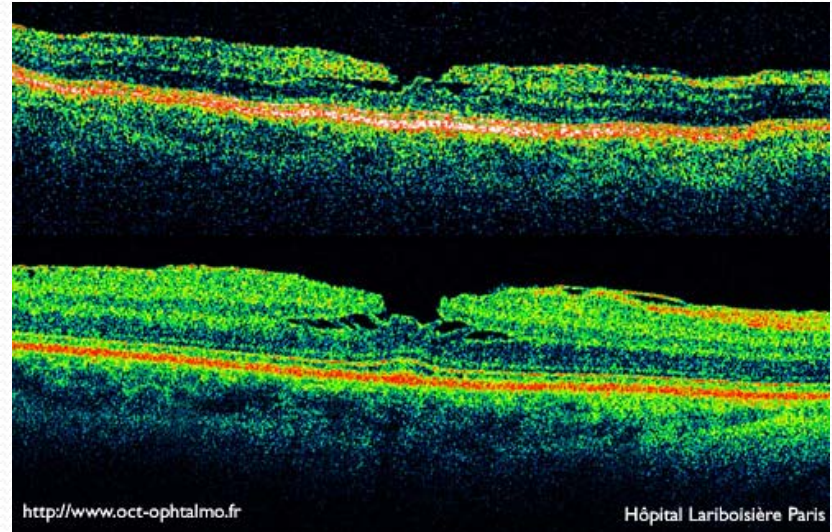
Last Semester's Work

• Purchased cross slide table and casters

• Assembled angle iron base
    • Bolts attached table to base

• Configured casters and front mounting pivot point
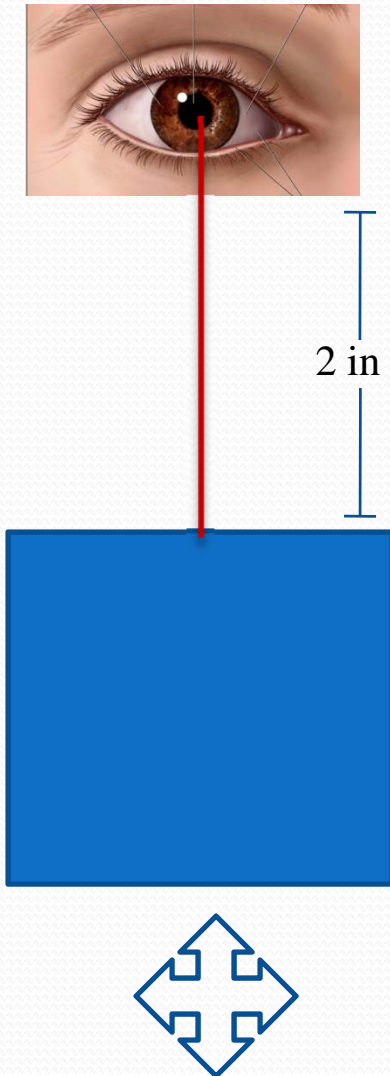   • Caster attach to base for easy rotation
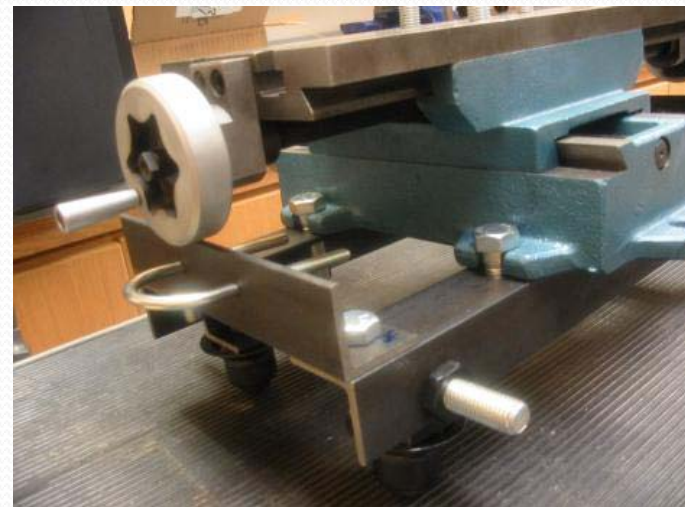
Goals for the Semester

- Convert manual control to electronic control
    - Purchased three 1075 RPM motors
    - Attach motors to three axis joystick

- Stabilize the device through rotation mechanism
    - Pivot point and worm drive to prevent unwanted rotation

- Test the device in clinical setting

Testing

2 in
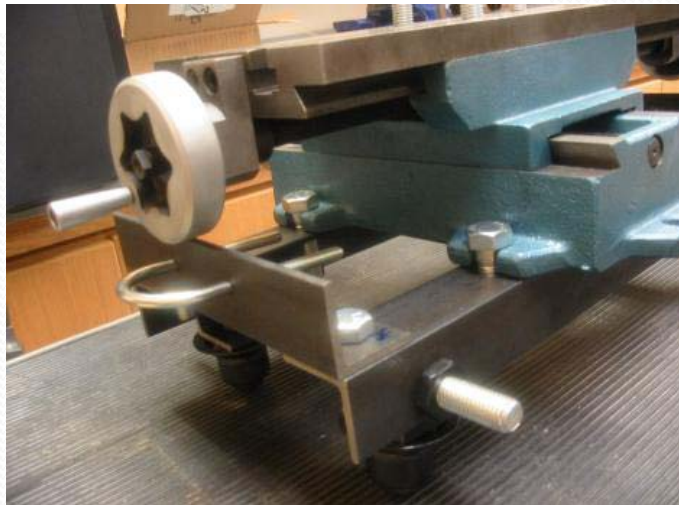
- Current alignment time is 15 minutes

- Attach laser to camera

- Develop target with similar size to retina

- Record alignment times with manual and electronic system

Future Work

- Configure motors to work with cross slide table

- Develop rotation mechanism

- Consolidate controls to work with single joystick

- Configure stop device to prevent excessive movement

http://www.chproducts.com

Questions?