Camera Motion System

- Requirement
- Design Details
- FEA

Camera Motion Requirement

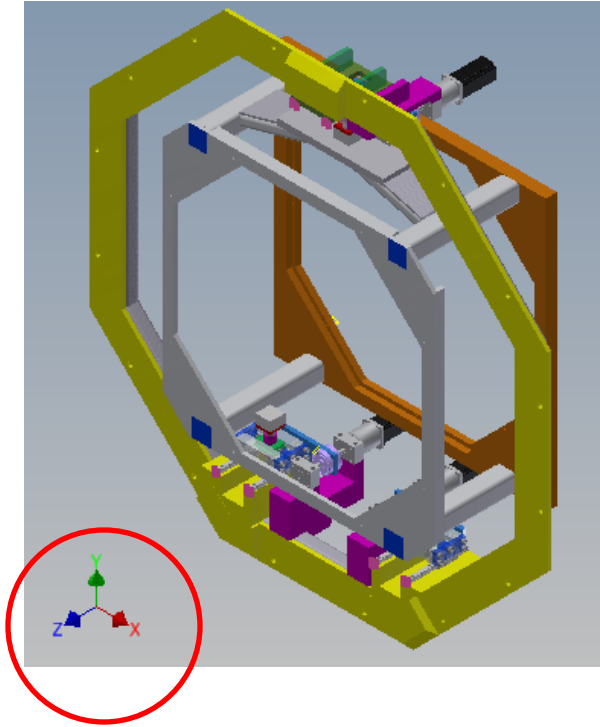**Z positioning:**

Automatic motion over 2 inches total with 0.1mm steps

X&Y positioning:

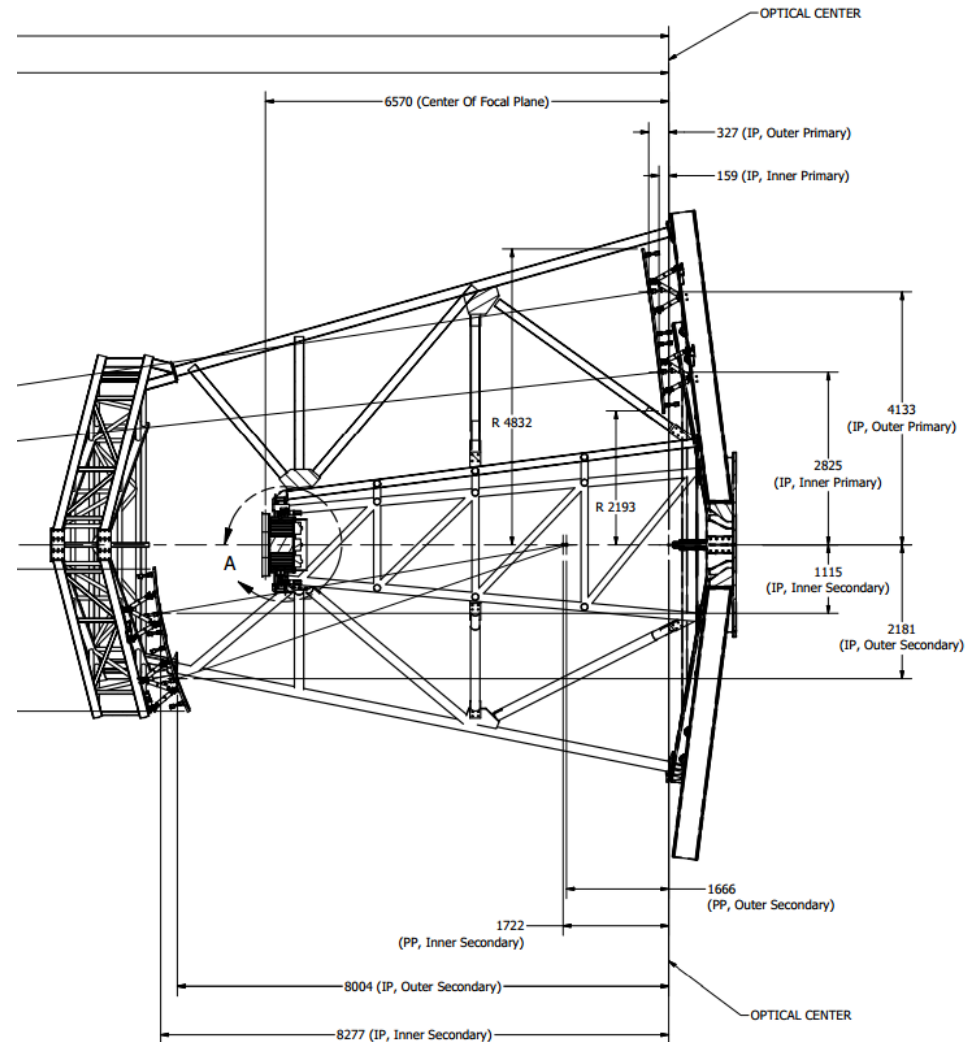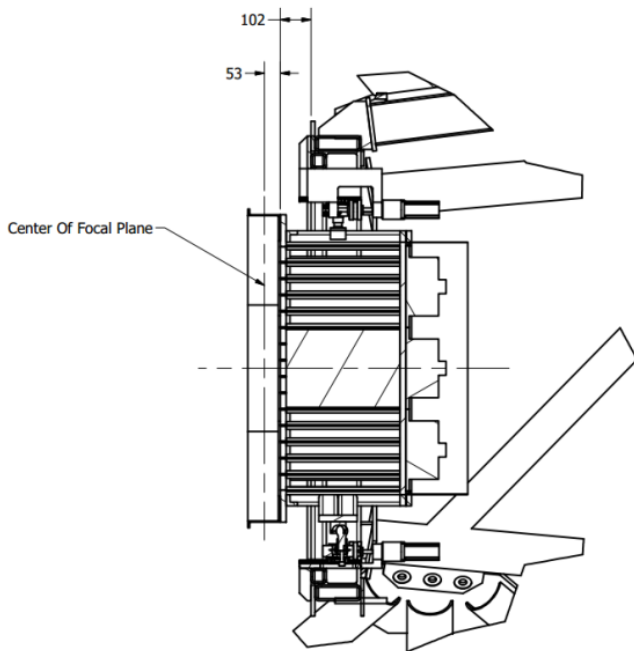Manual motion over 1 inches total with ~0.2mm steps

Angle positioning:

Manual control of rotations in the x/y, x/z, and y/z planes. Need 0,1degree resolution.

Camera Optical Location

- Distance from center of focal plane to Optical center should be 6517.35, it is 6570mm now.

- Fine tuning is ongoing

Camera Optical Location II

- Distance from the center of focal plane to front plane of inner frame

- Nominal distance of front plane of inner frame to back plane of out frame


Center of focal plane
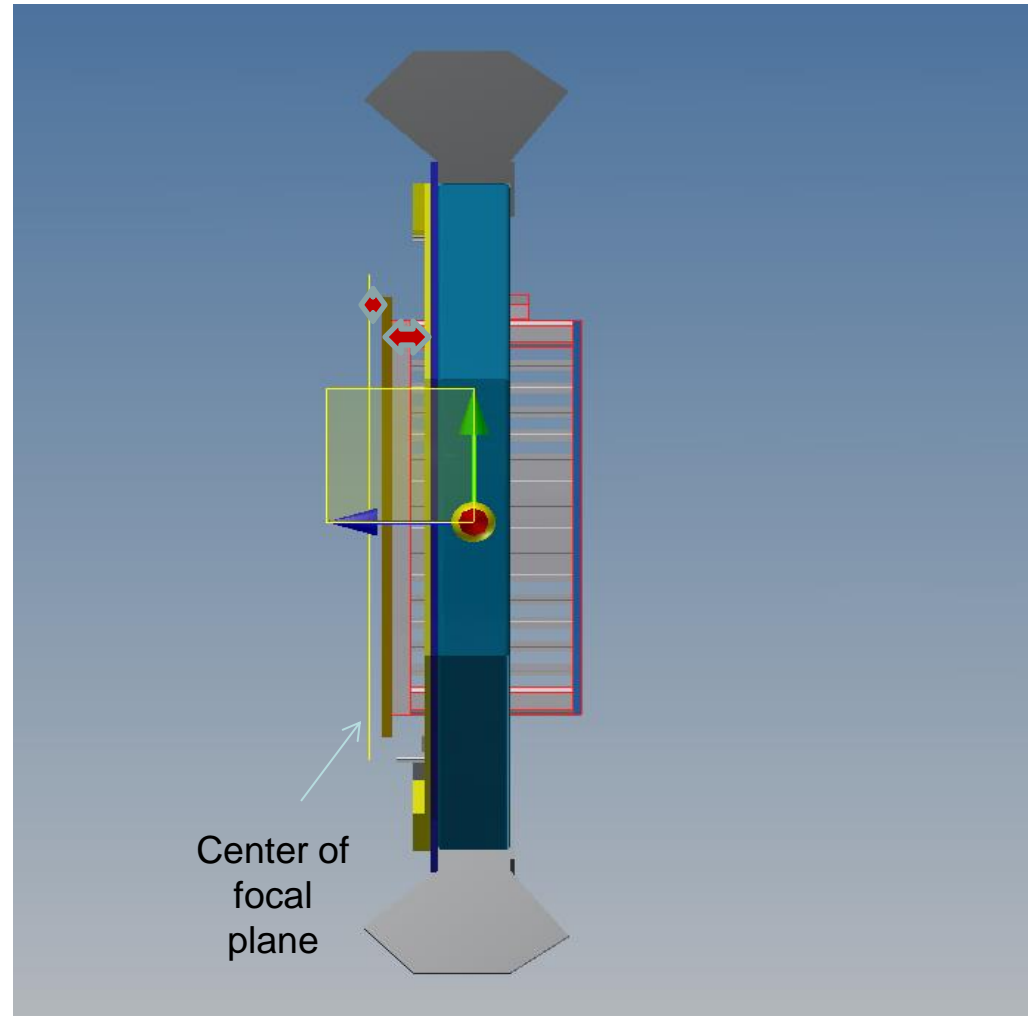
Camera Assembly

- Insert Camera into inner frame of Camera Assembly

- Insert motherboard

- Bolt Camera Assembly to OSS frame

- Bolt back cover

- Bolt front cover

Structure + Motions Components

Motherboard

Back Cover

OSS Frame

Camera

Front Cover
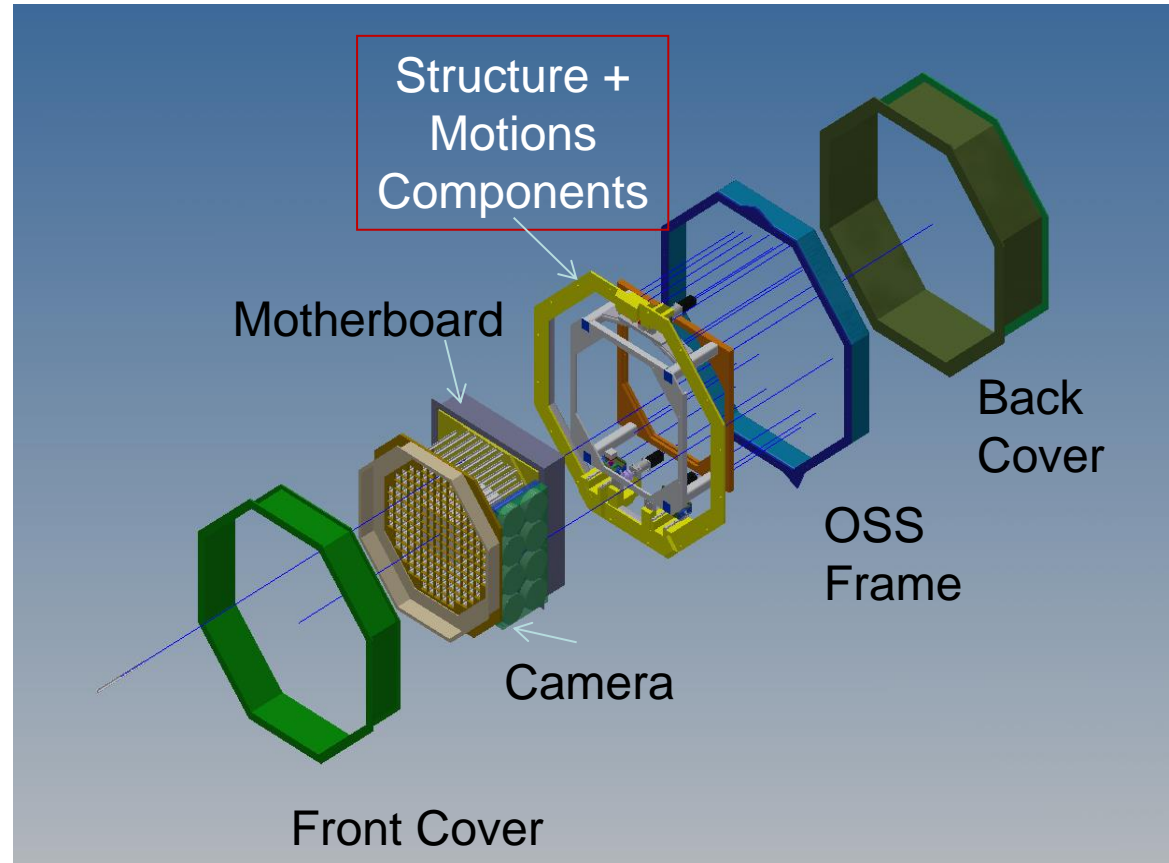
Camera Frame and Motion

- Inner Frame and out Frame are welded first and then precisely machined to Spec.

- Install 3 super joints and Screw systems to the frame

Out Frame

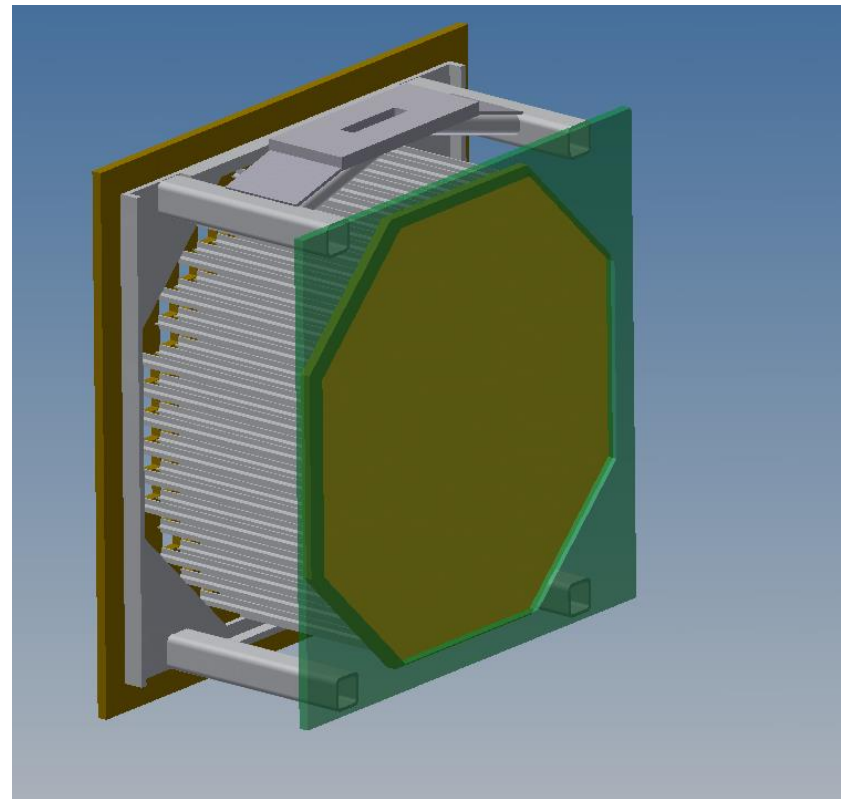Super Joint
+
Screw System

Inner Frame
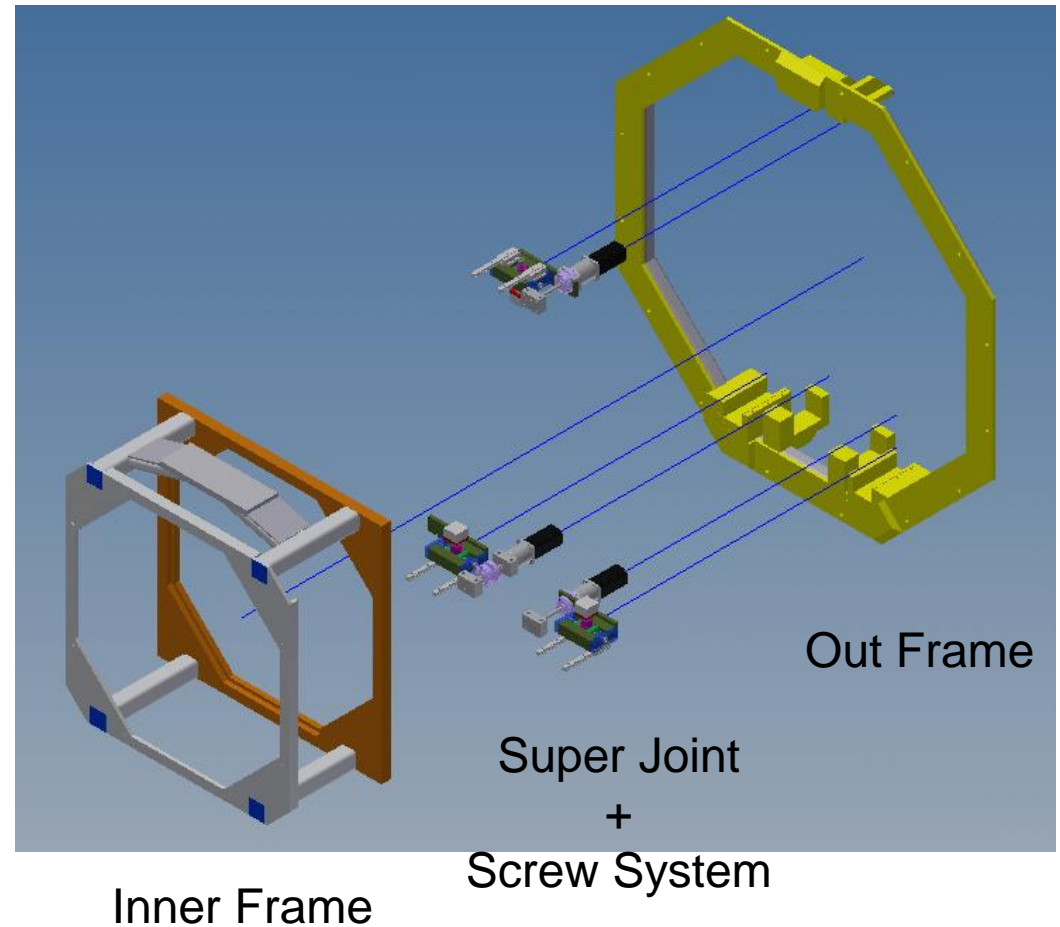
Super Joint

- Have 3 Super Joints
- Each has 6 degrees freedom
- ACME screws move the joints in the Z direction
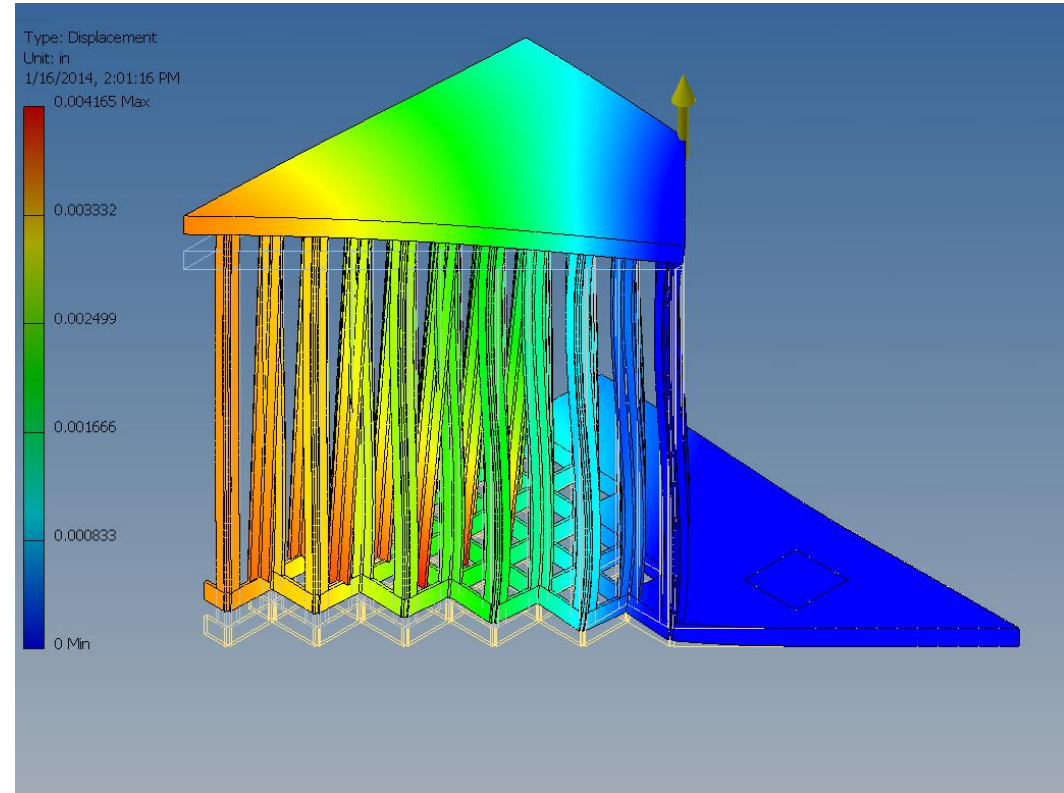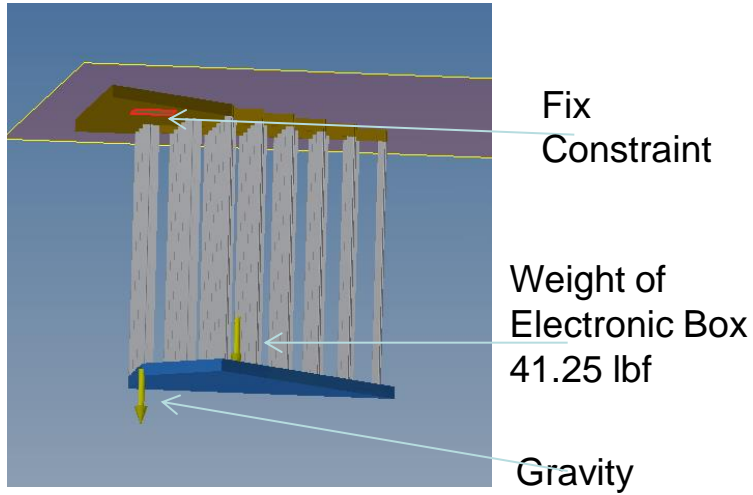- Other motion is done by manually moving screws
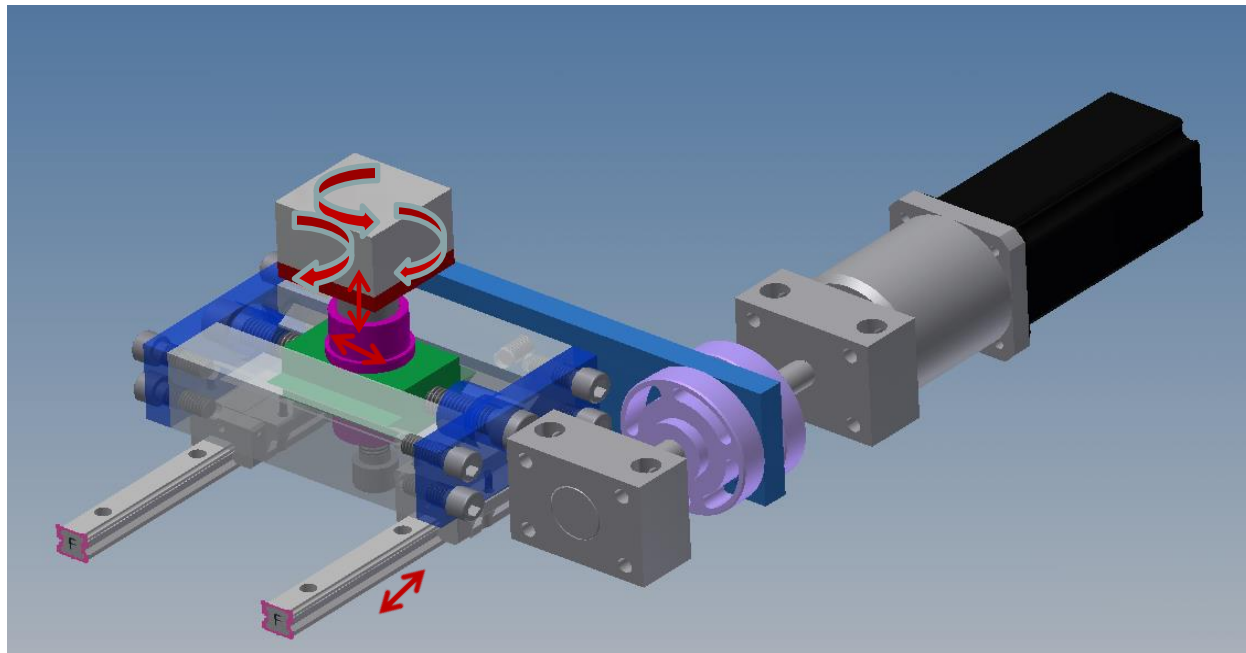
Interface between Camera and Frame

- Front:
  - 4 bolts

- Back:
  - 2 Dowel pins
  - Allow expansion of camera

Camera FEA -1/8 model

Fix Constraint

Weight of Electronic Box 41.25 lbf

Gravity

Type: Displacement
Unit: in
1/16/2014, 2:01:16 PM

0.004165 Max
0.003332
0.002499
0.001666
0.000833
0 Min

Deflection: 0.1mm

Initial FEA

- Frame faces up and is subject to weight of its own and weight of camera
- Optimization is ongoing