



CHARA AO Telescope Infrastructure

Laszlo Sturmann



Max-Planck-Institut für Radioastronomie





CHARA AO DEVELOPMENT

Phase I.

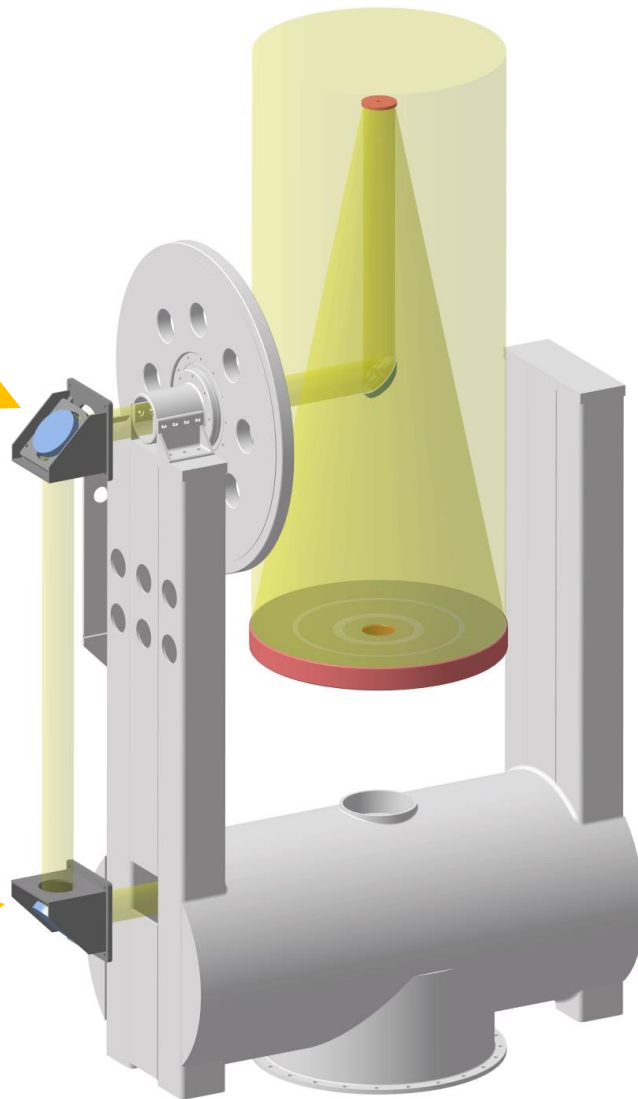
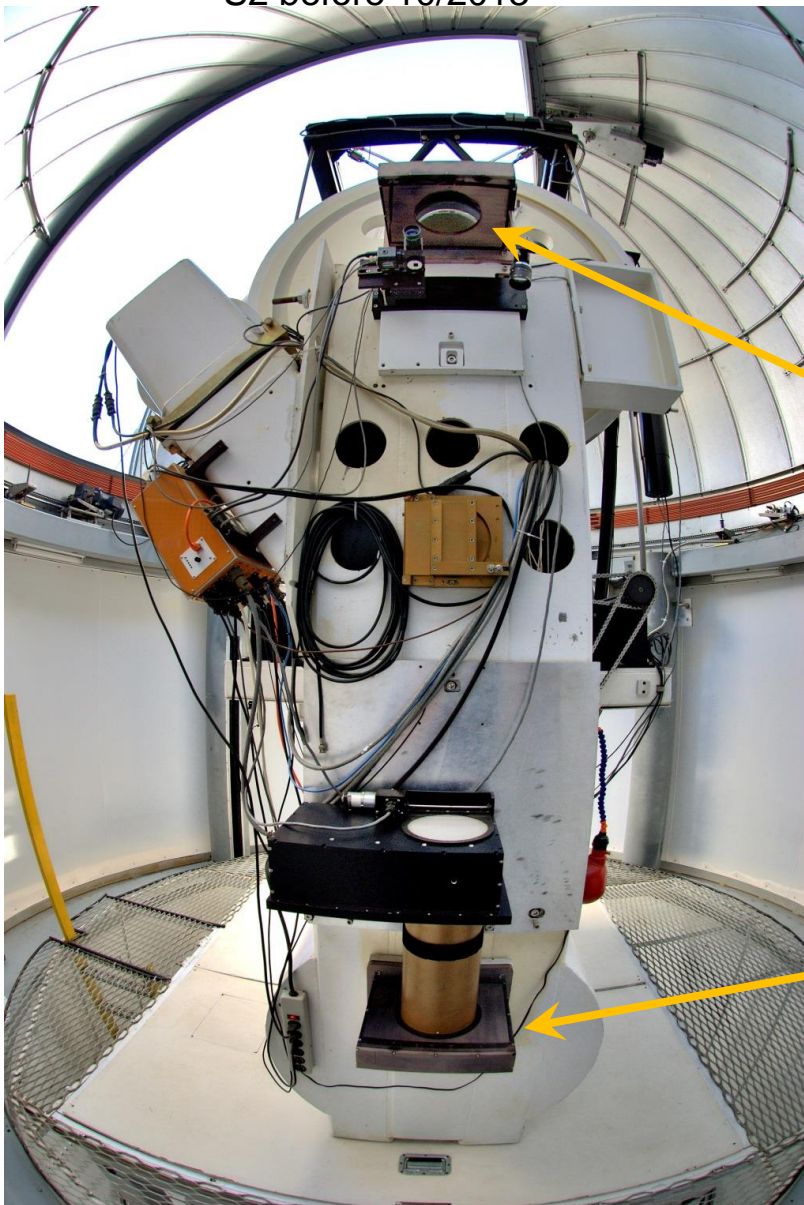
- WFS on the telescopes
- Lab AO

Phase II.

- DM replaces M4



S2 before 10/2013



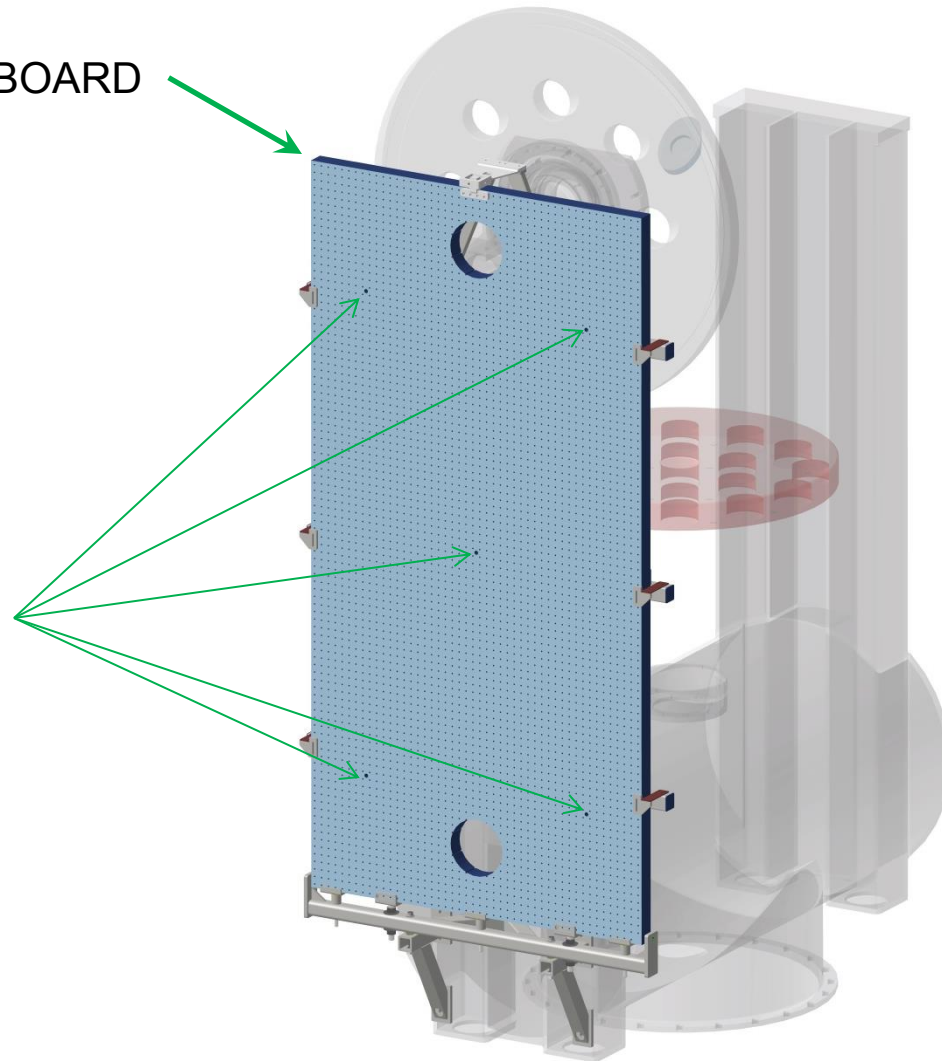
CUSTOM NEWPORT 4'x8' IG BOARD

CARBON STEEL HONEYCOMB
BETWEEN 0.13 in SS 430 PLATES

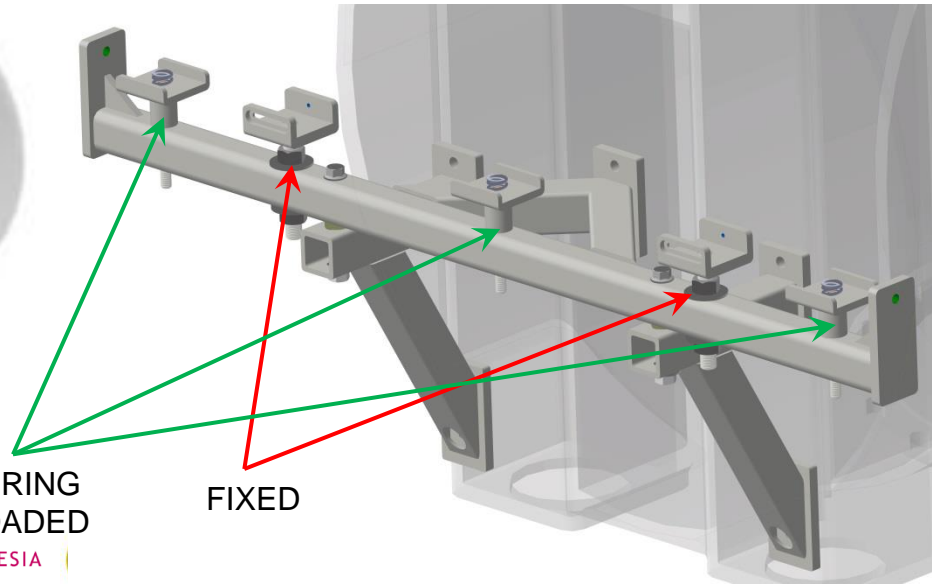
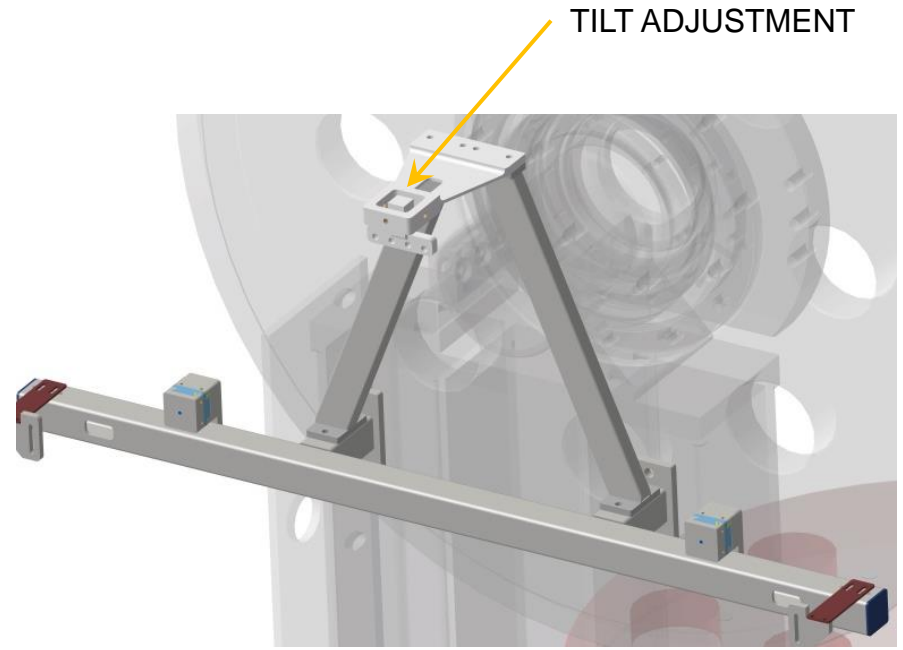
2.7 in TOTAL THICKNESS

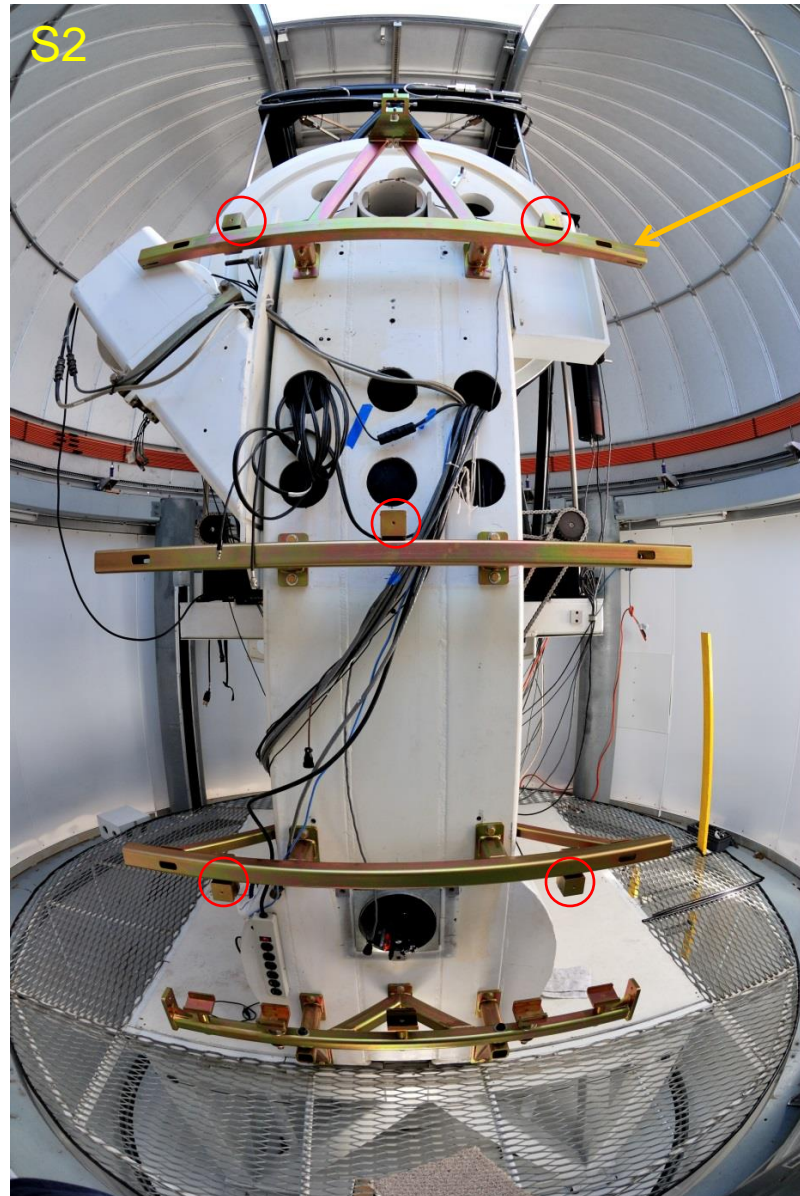
WEIGHT: 450 lb

only 5 MOUNTING POINTS



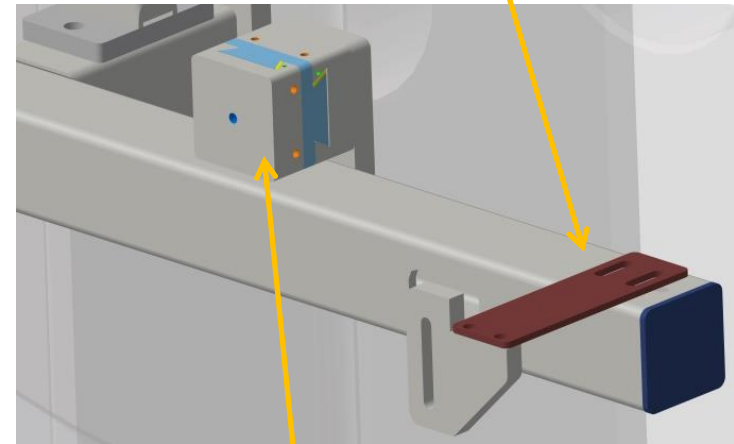
The board was not intended to be used vertically, i.e. supported on its edge.





TUBULAR STEEL STRUCTURE FASTENED TO THE FORK

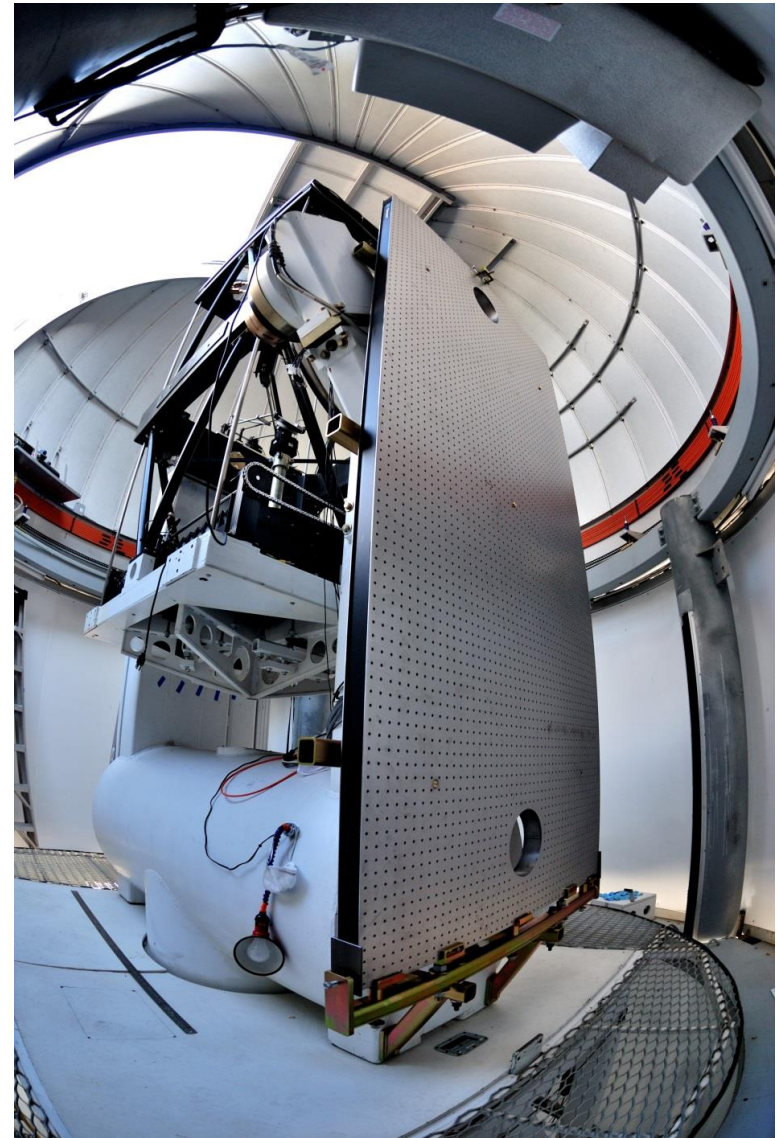
6 LEAF SPRINGS ALONG THE EDGES FOR DAMPING VIBRATIONS

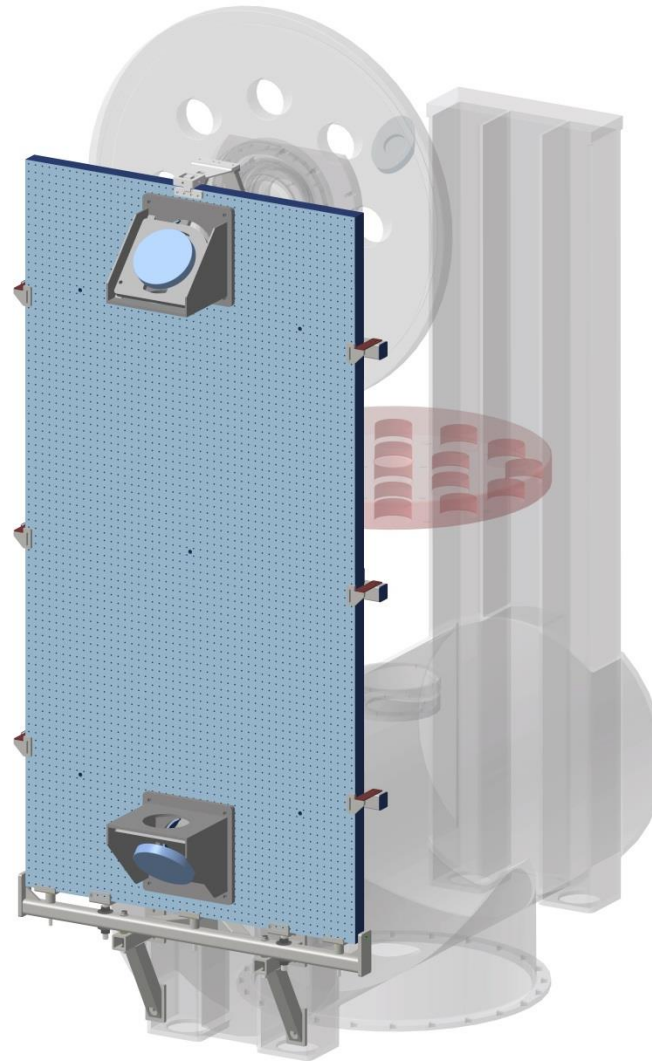


DOUBLE DOVETAILED AT EACH MOUNTING POINT TO ALLOW THERMAL EXPANSION/CONTRACTION

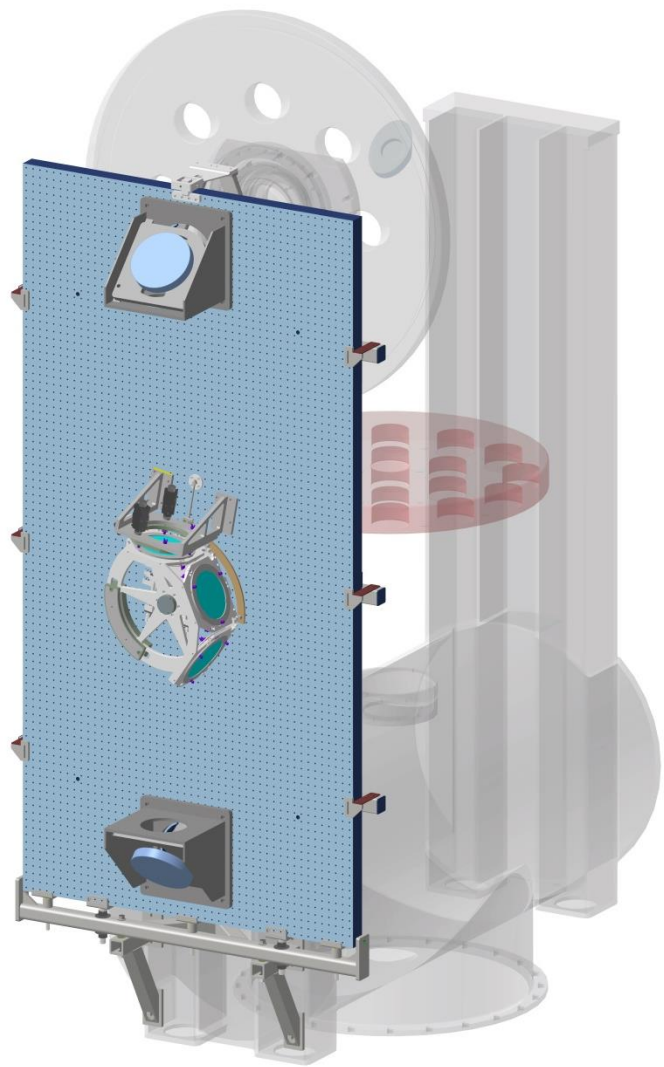


S2 TABLE INSTALLATION 10/3/2013

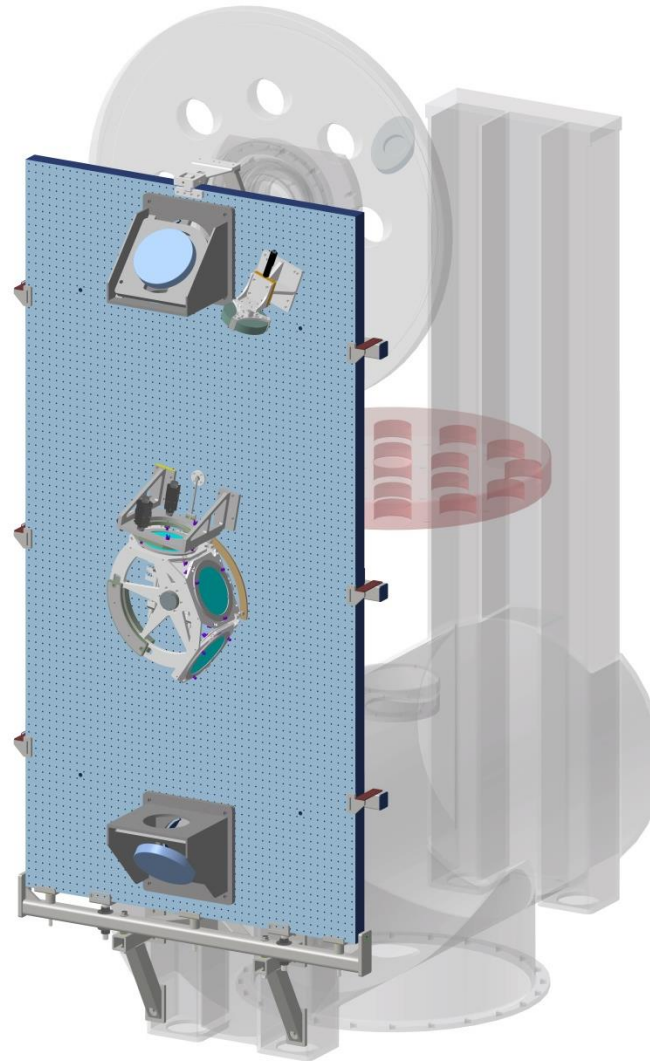




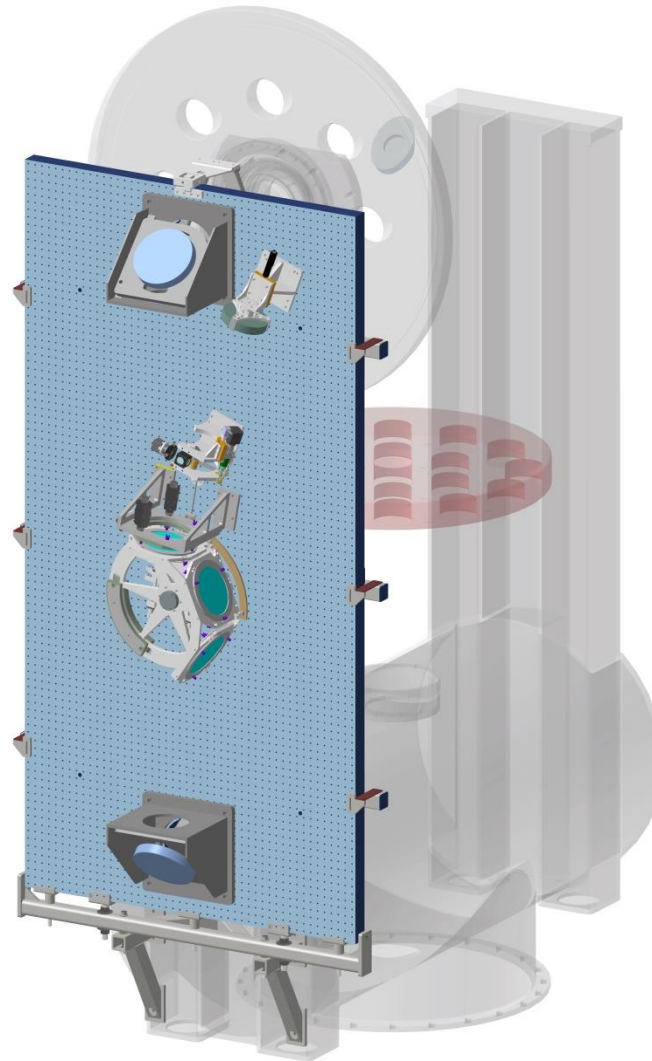
CAROUSEL



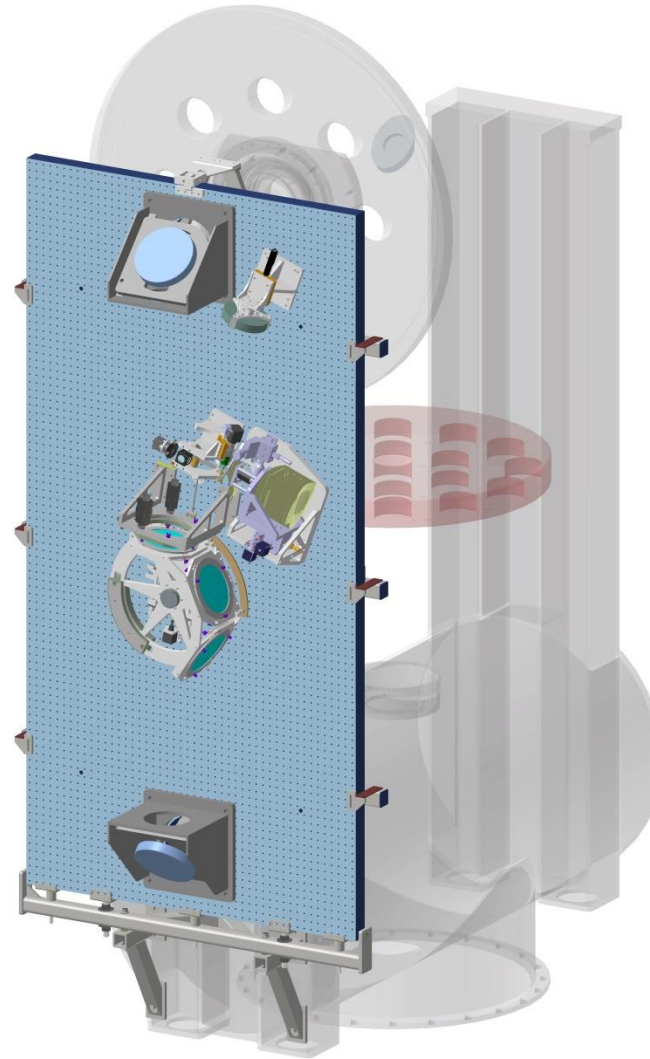
CAROUSEL F/4 MIRROR



CAROUSEL F/4 MIRROR ACQUISITION

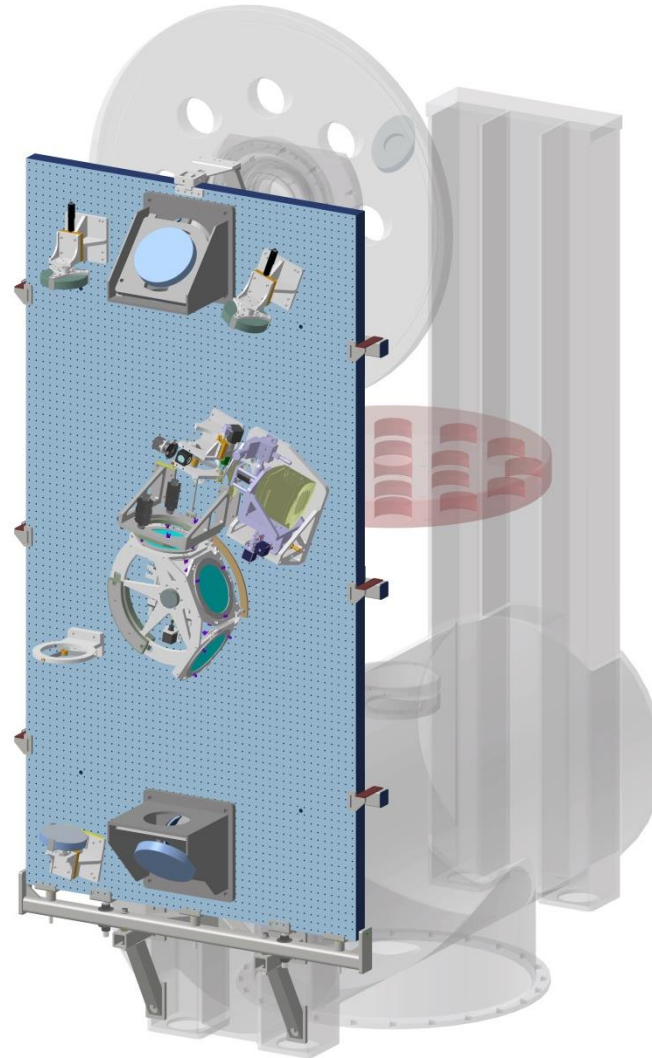


CAROUSEL
F/4 MIRROR
ACQUISITION
WFS



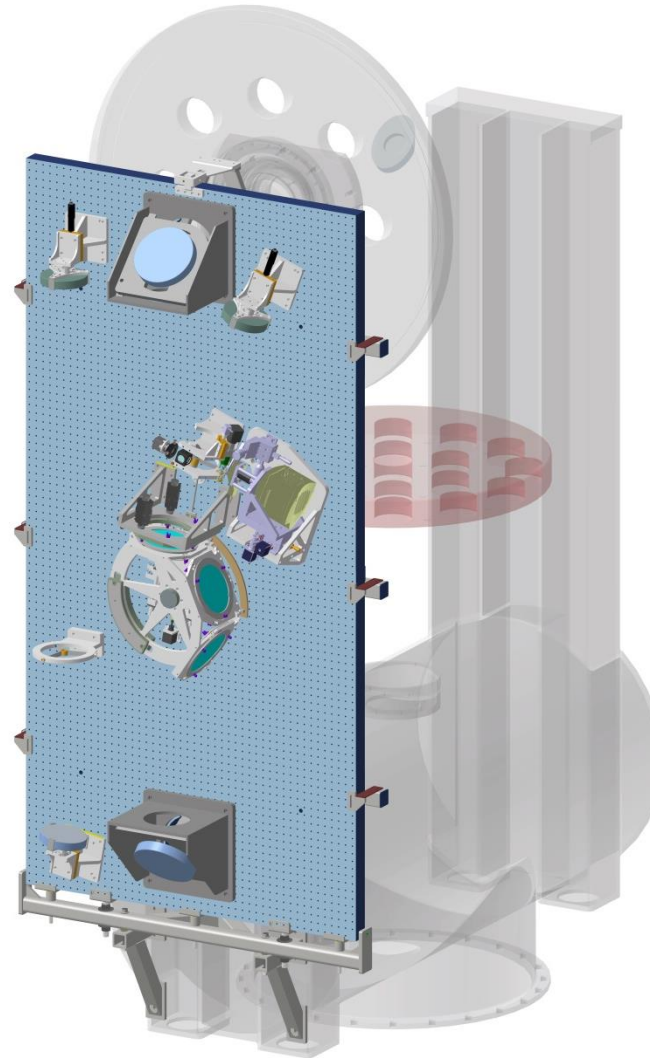


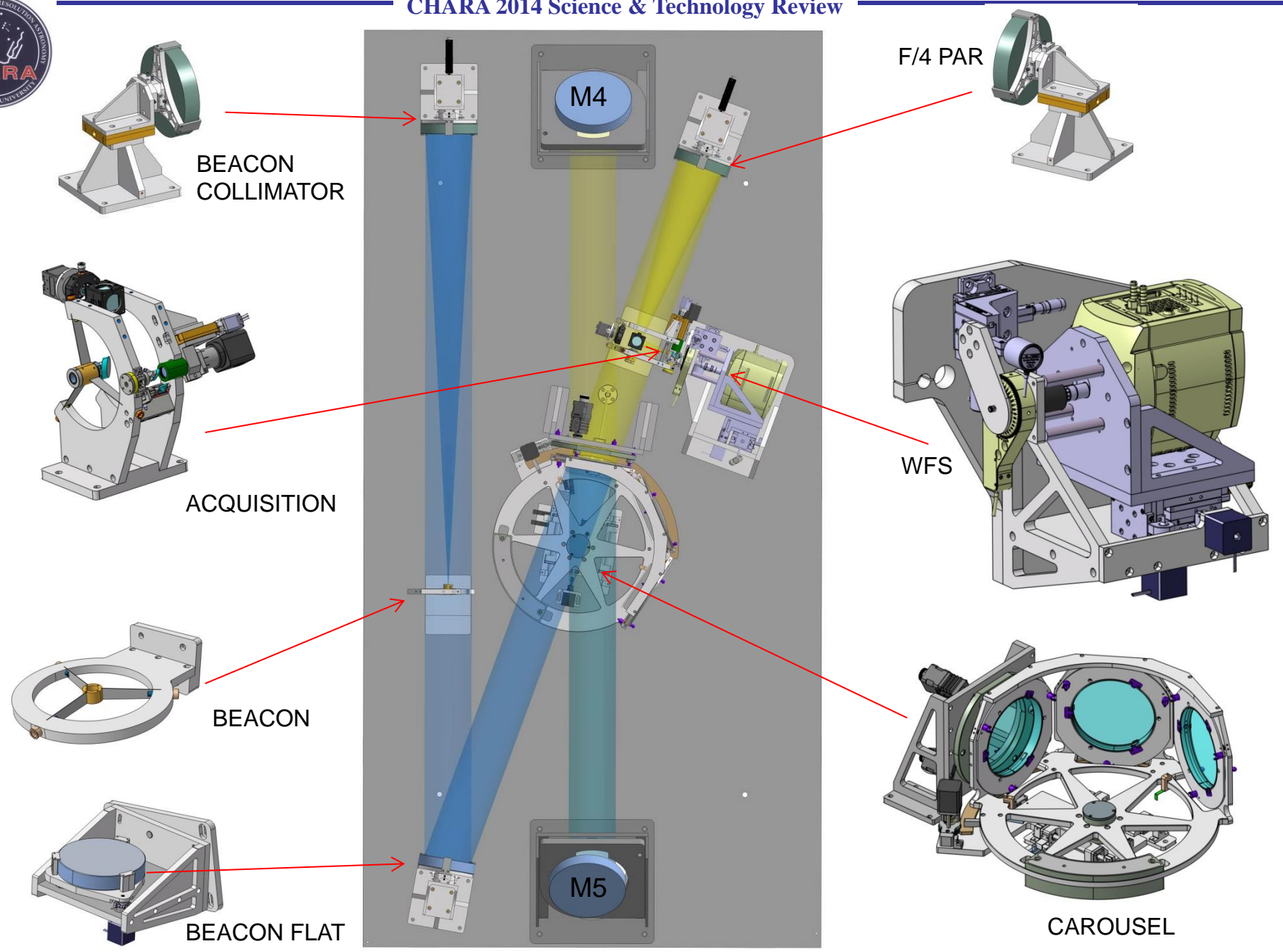
CAROUSEL
F/4 MIRROR
ACQUISITION
WFS
BEACON





CAROUSEL
F/4 MIRROR
ACQUISITION
WFS
BEACON
COVERS







FIRST OBSERVATIONS → MODIFICATIONS

- CLAMPING PARTS ON THE BOARD WAS NOT A GOOD IDEA
- MOTORIZED ACTUATORS ARE BEING ADDED TO THE BEACON FLAT MIRROR
- MODIFIED BASE PLATE FOR THE WFS
- ACQUISITION TELESCOPE WAS MODIFIED TO MAKE ROOM FOR A WFS
- REFINED ALIGNMENT PROCEDURE

PROBABLY MORE WHEN WE HAVE MORE EXPERIENCE WITH THE SETUP



ELECTRONICS/REMOTE CONTROL

≈ MIN. 8 ACTUATORS / AO BOARD

≈ 48 ACTUATORS + CONTROLLERS + DRIVERS + POWER SUPPLIES + CABLES

≈ \$1k/AXIS

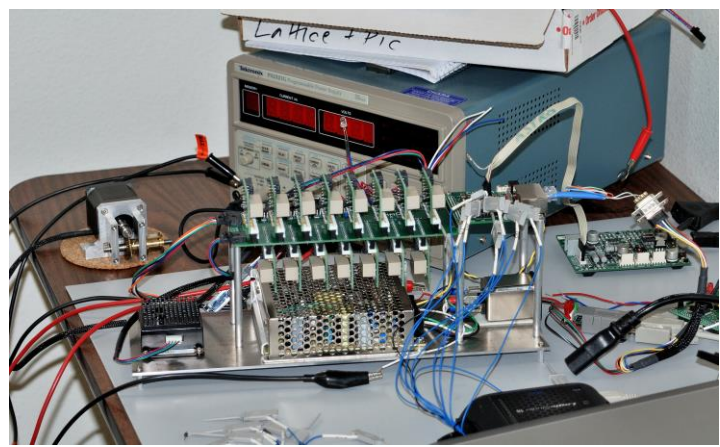
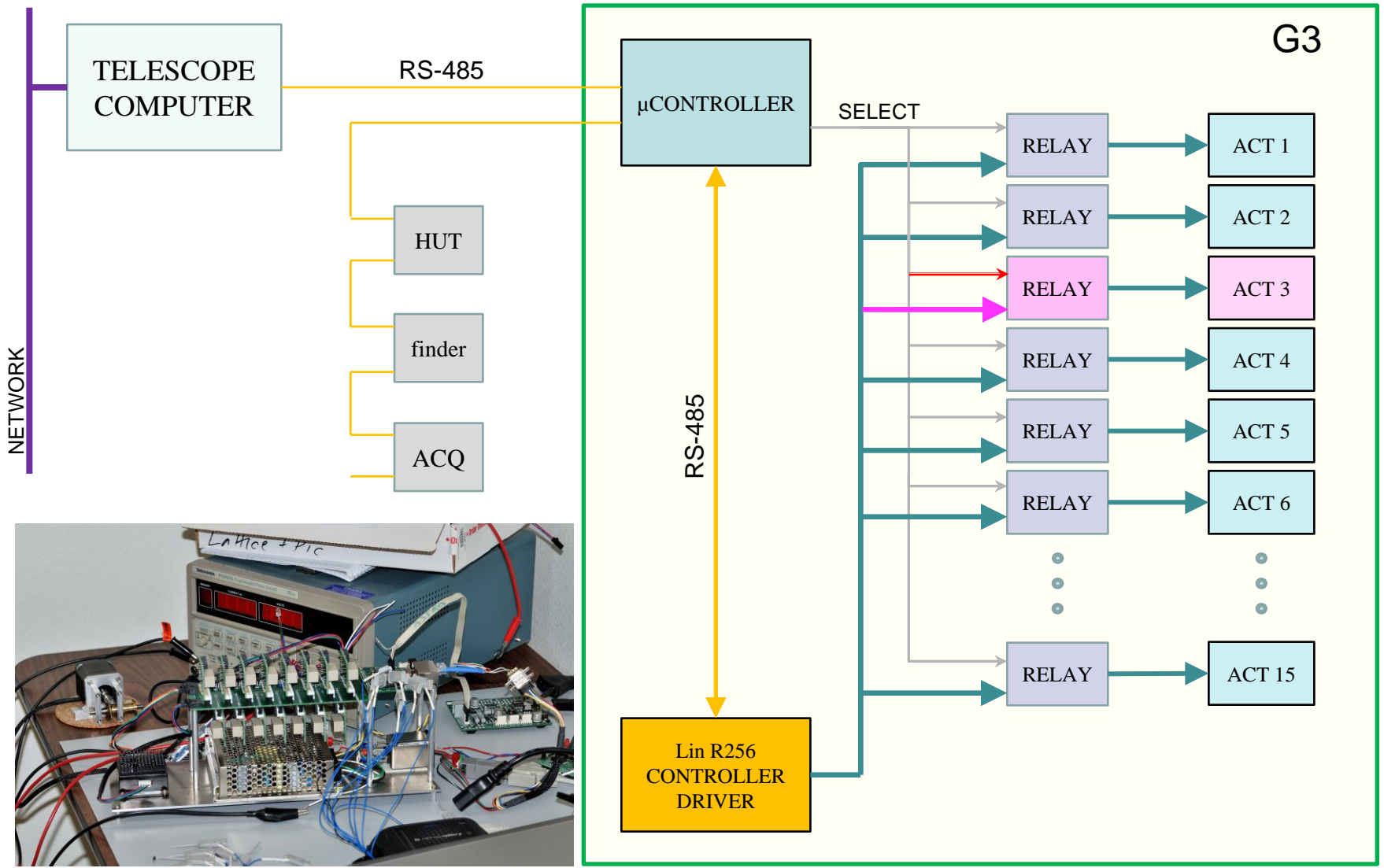
1. THE ACTUATORS WOULD BE VARIOUS STEPPER MOTORS WITH LIMIT/HOME SWITCHES
2. NO NEED TO OPERATE THEM SIMULTANEOUSLY
3. ACTUATORS SOLD BY NEWPORT/THORLABS/ZABER ARE EXPENSIVE



ONLY **ONE** CONTROLLER / DRIVER / PS CAN BE SWITCHED TO DRIVE ANY OF THE ACTUATORS AND THE ACTUATORS DON'T HAVE TO BE NEWPORT/THORLABS/ZABER

CONSIDERABLE COST SAVINGS

15-CHANNEL ACTUATOR CONTROLLER/DRIVER





SCHEDULING

By April 1. - S2 with new HW in *old mode*

2-nd week of April - remaining 5 tables delivered

Since the new HW won't be ready before Summer the boards will be installed one by one starting with S1 in April but the *old HW* will be re-installed (E1-early May, W1-early July, W2-late September, E2-early October).

The new HW will be installed as it becomes available.

We expect no or only minimal interruption in operations during the transition.

- *old mode*: T/T in lab, bare substrate in carousel, new acquisition

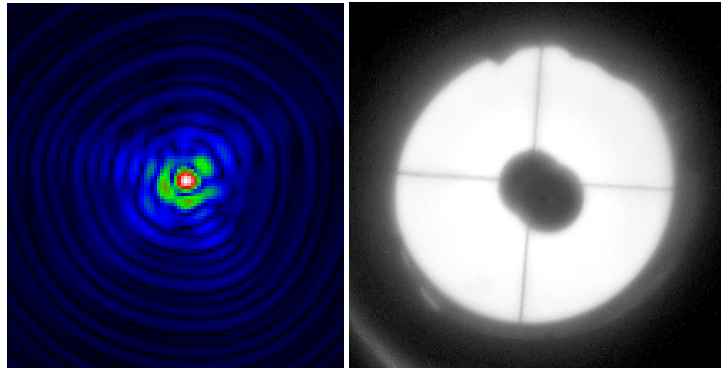
- *old HW* : T/T in lab, old acquisition



NEW APPROACH IN TELESCOPE ALIGNMENT

M1 ASTIGMATISM WAS CONTROLLED BY INTENTIONAL MISALIGNMENT

WORKS BUT...



THIS YEAR S2 WILL HAVE SYMMETRICAL PUPIL AND WE ATTEMPT CONTROLLING THE RESIDUAL ASTIGMATISM BY THE LAB AO