UPGRADES & FIXES

by

Laszlo Sturmann

OUTLINE

UPGRADES

RS-485 bus on the telescopes is operational

automatic control for the heater and dehumidifier in the domes

gain, exposure and gamma of the acquisition and finder cameras

FIXES

balancing the telescopes in AZ

AO phase 1 is coming

HUMIDITY AND TEMPERATURE CONTROL

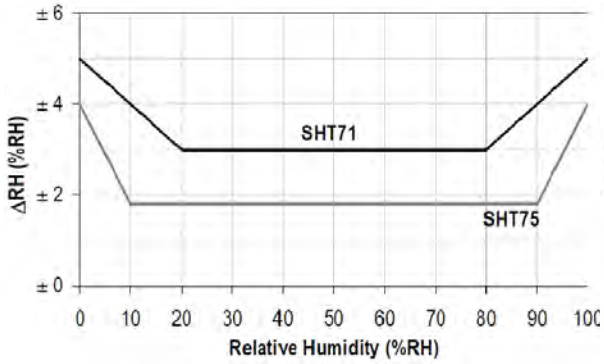
PC

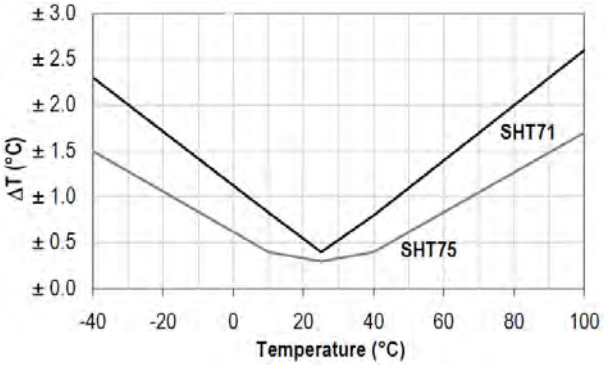
FINDER

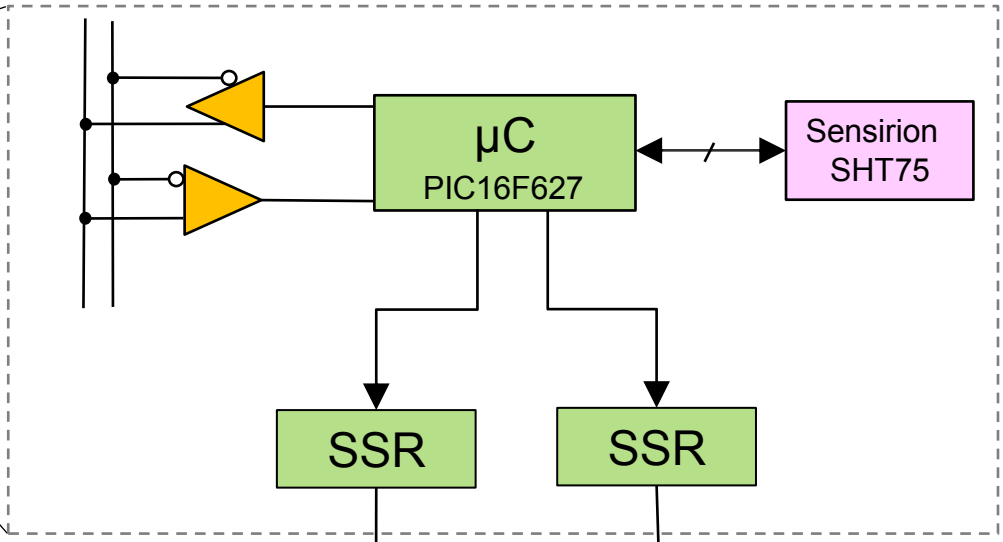
ACQUSITION

HuT

RS-485





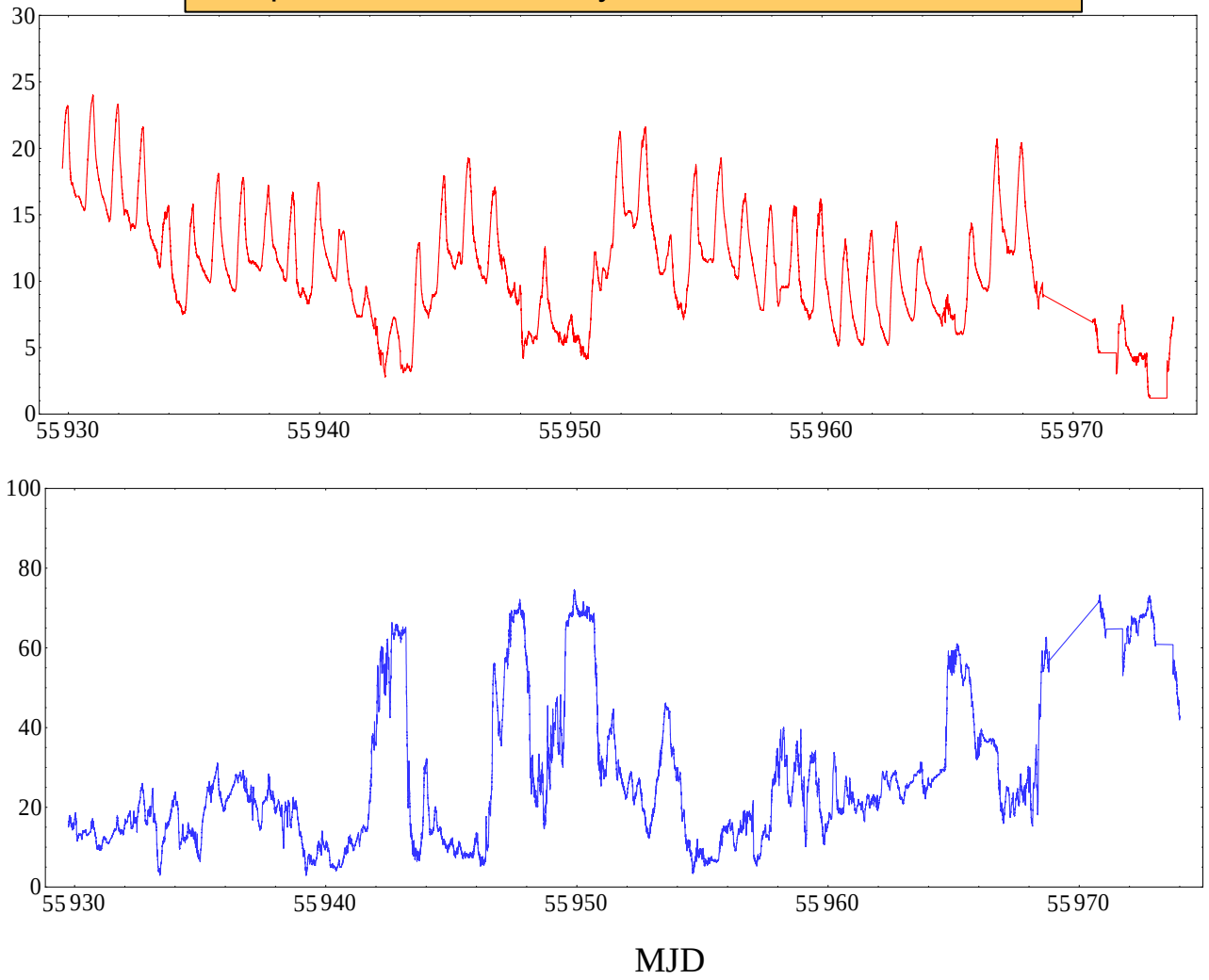


COMMANDS

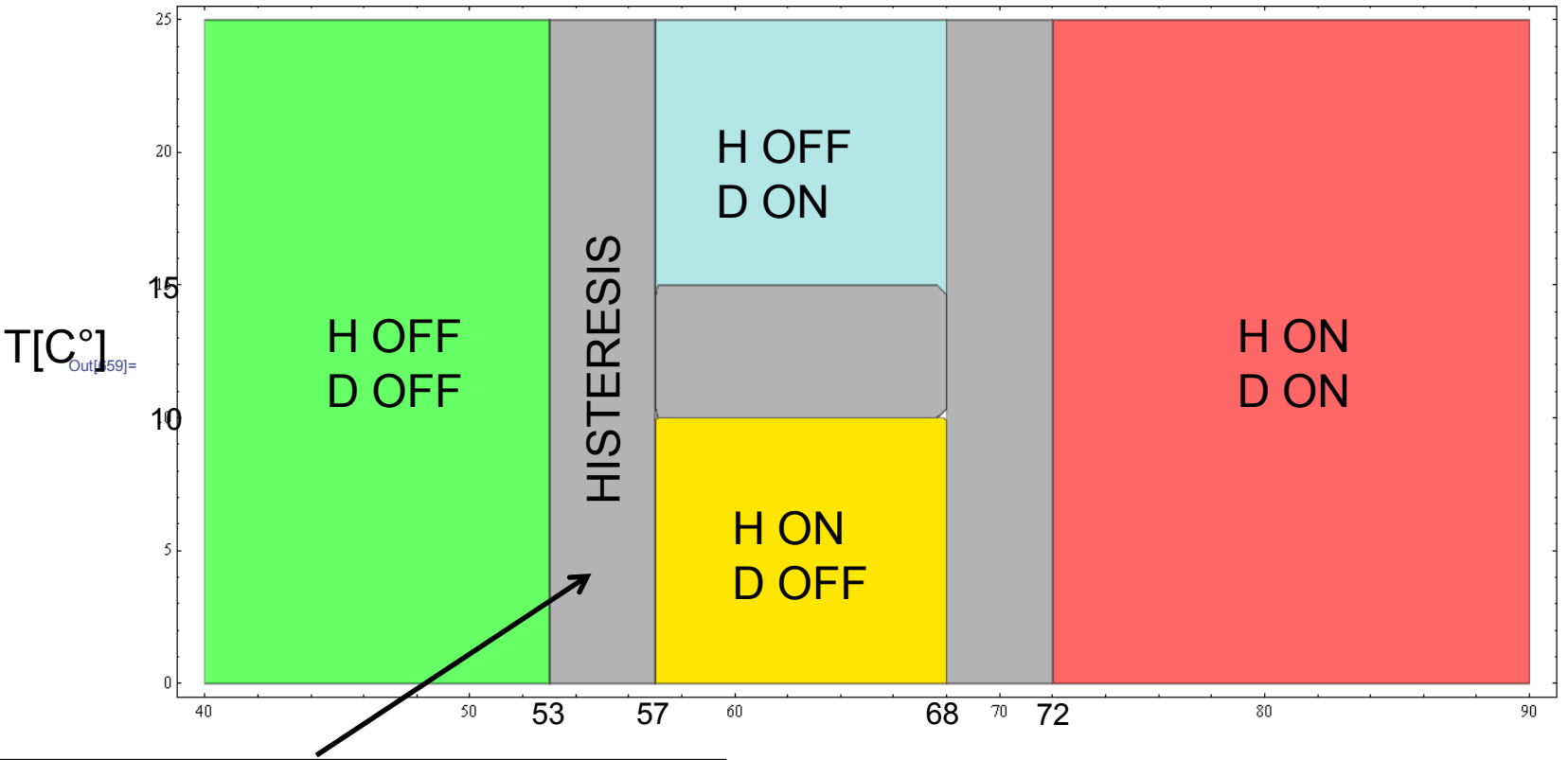
RESET
GET HUT
HEATER ON
HEATER OFF
DEHUMI ON
DEHUMI OFF
AUTO ON
AUTO OFF

HUMIDITY AND TEMPERATURE CONTROL

Temperature and Humidity Inside the S2 Dome in 2012



HUMIDITY AND TEMPERATURE CONTROL



STATES DO NOT CHANGE IN GRAY AREA

H-HEATER
D-DEHUMIDIFIER

ASTROVID CONTROLLER

PC

RS-485

FINDER

ACQUSITION

HuT

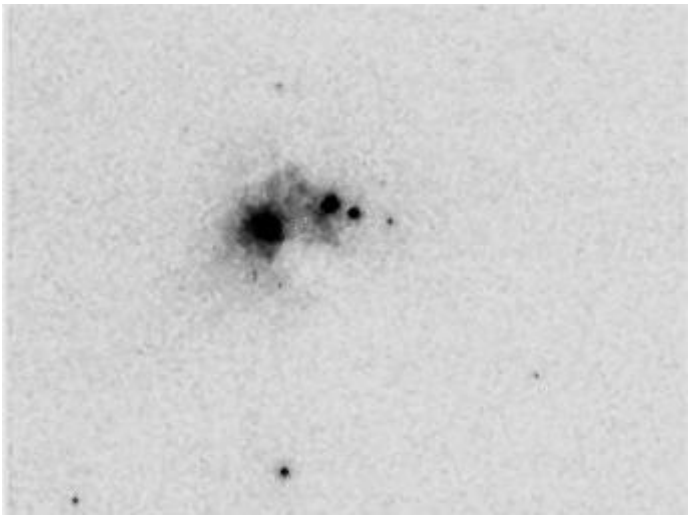
MOTIVATION

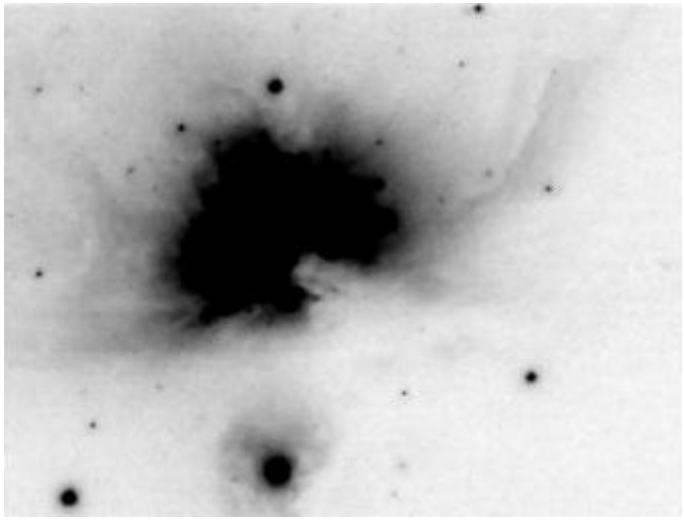
FINDING AND ACQUIRING FAINTER TARGETS

MAX GAIN, 4 FR. STACKED

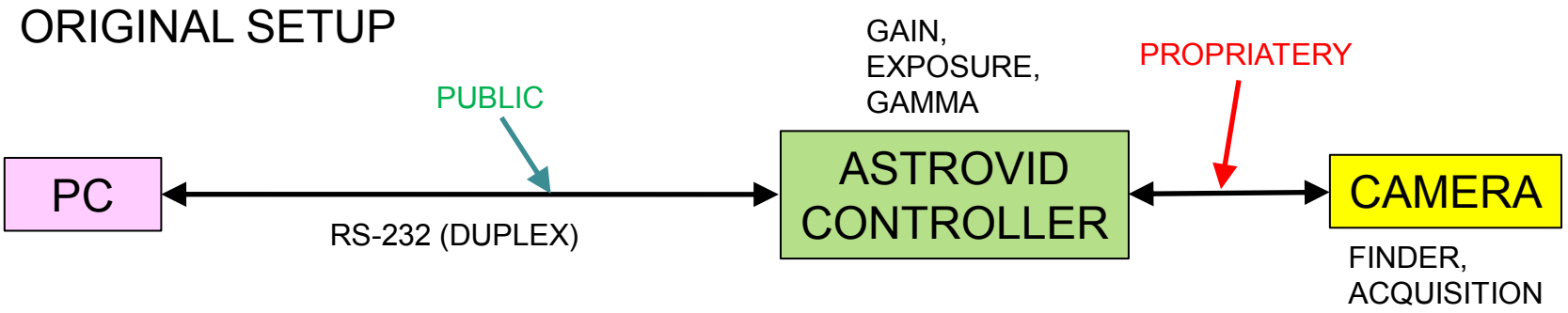
LOW GAIN, 256 FR. STACKED

FINDER



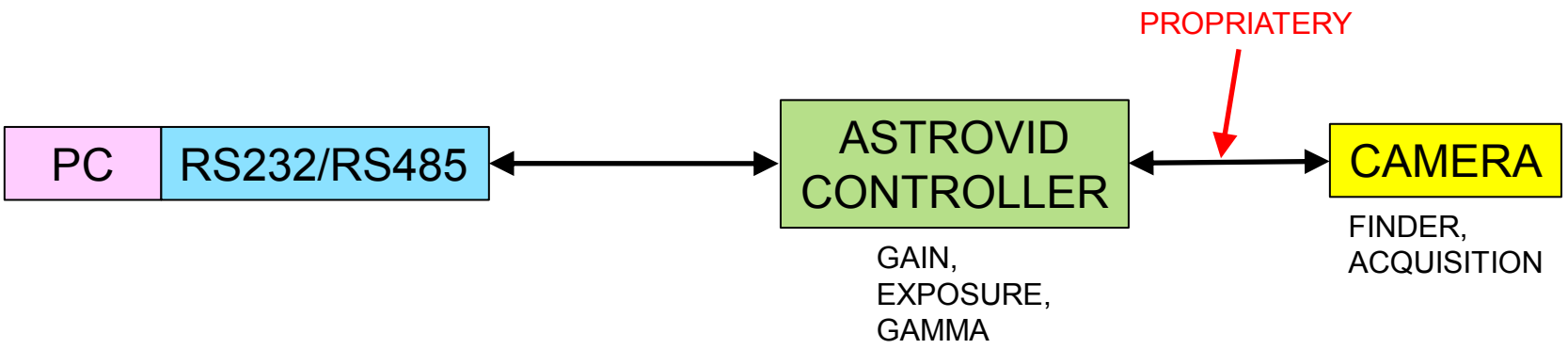


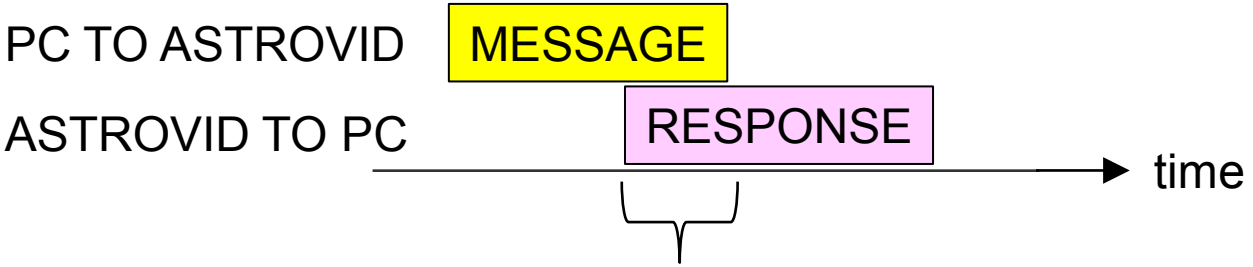
ASTROVID CONTROLLER



Two cameras would require two serial ports and two cables from the bunker to the cameras. A better solution would be to use a RS-232/RS485 converter and communicate with the cameras through the new RS-485 bus.

ASTROVID CONTROLLER

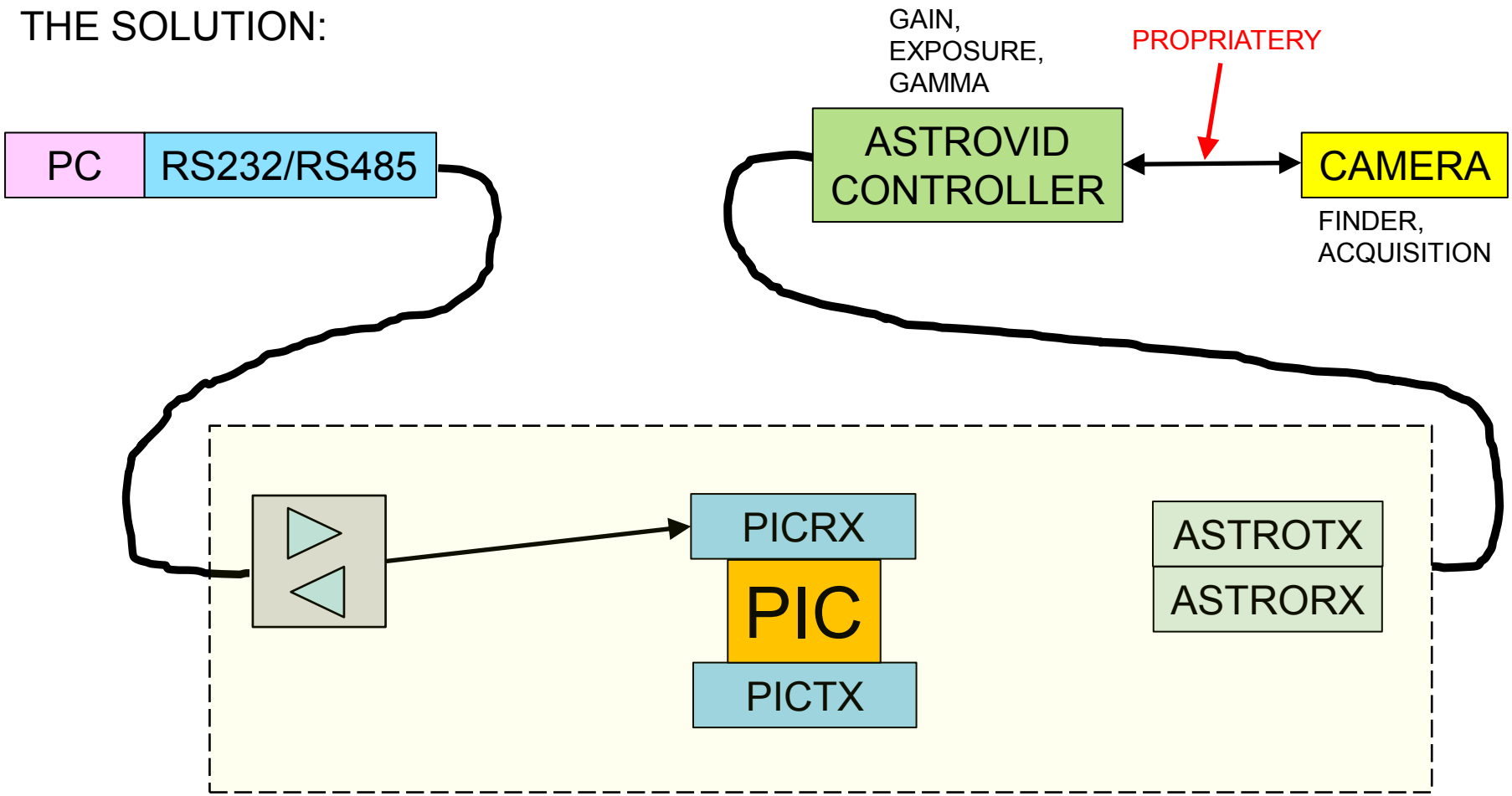




REQUIRES DUPLEX COMMUNICATION
BUT RS-485 IS SIMPLEX SO THIS DOESN'T WORK

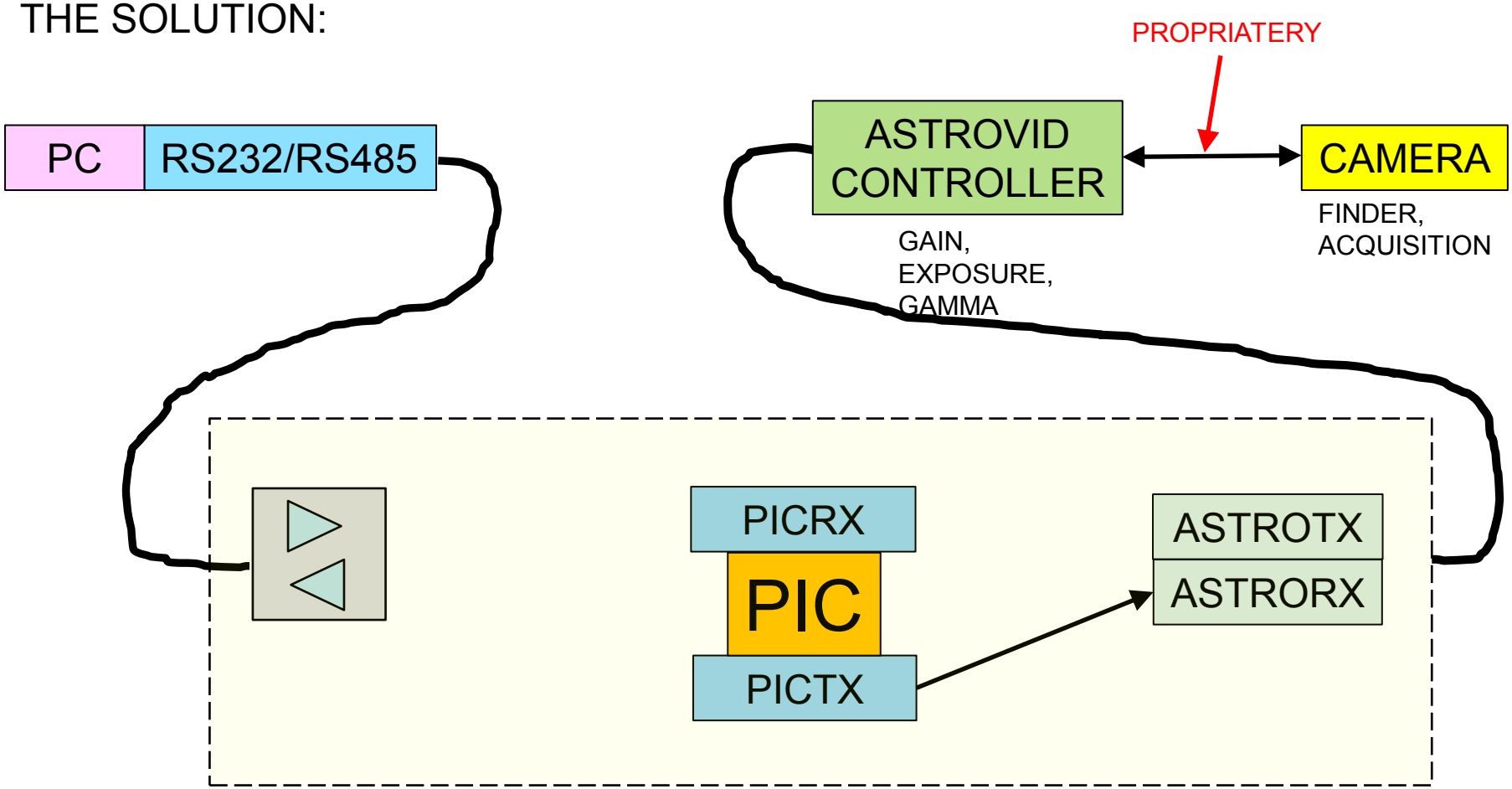
ASTROVID CONTROLLER

THE SOLUTION:



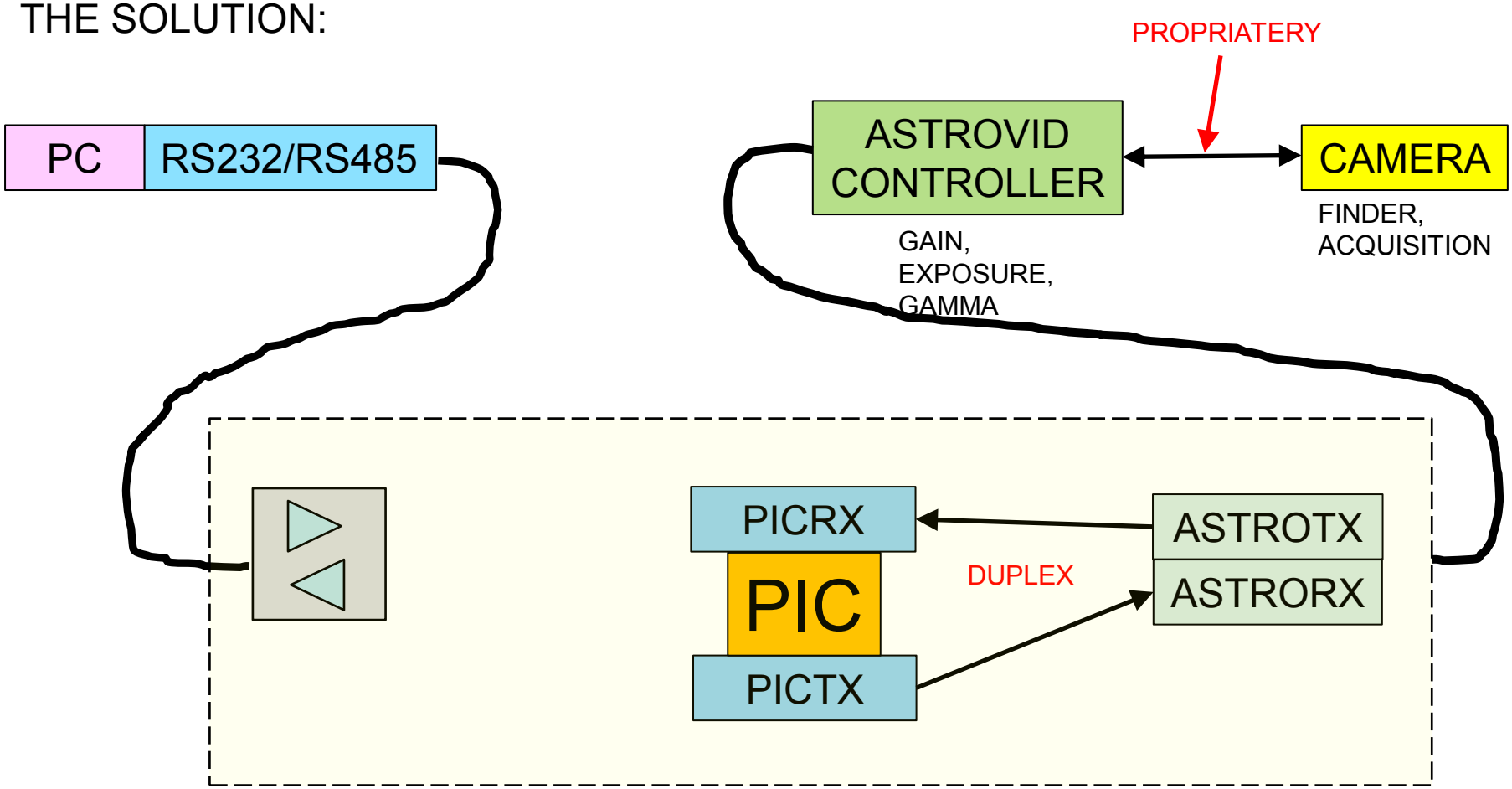
ASTROVID CONTROLLER

THE SOLUTION:



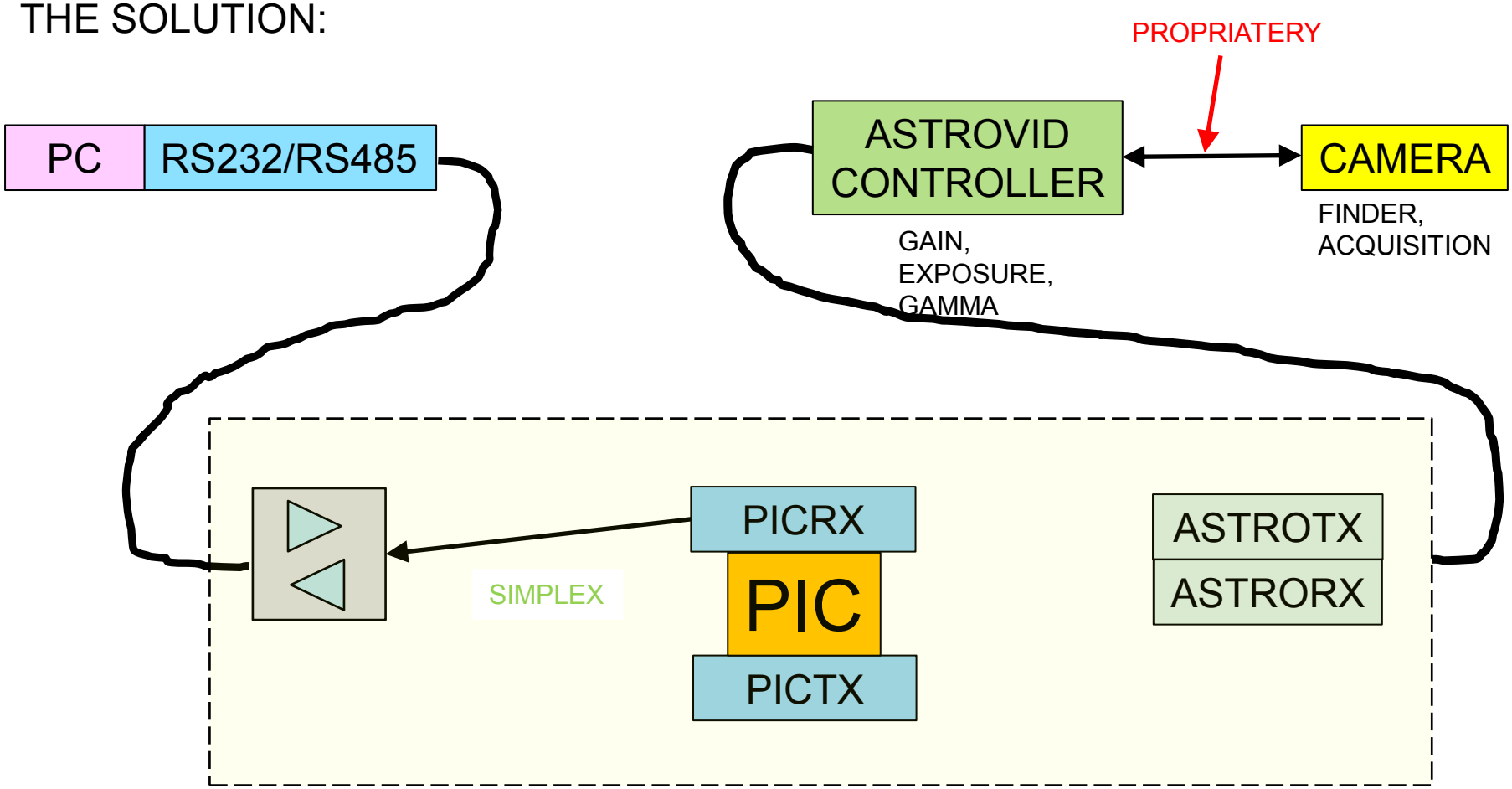
ASTROVID CONTROLLER

THE SOLUTION:

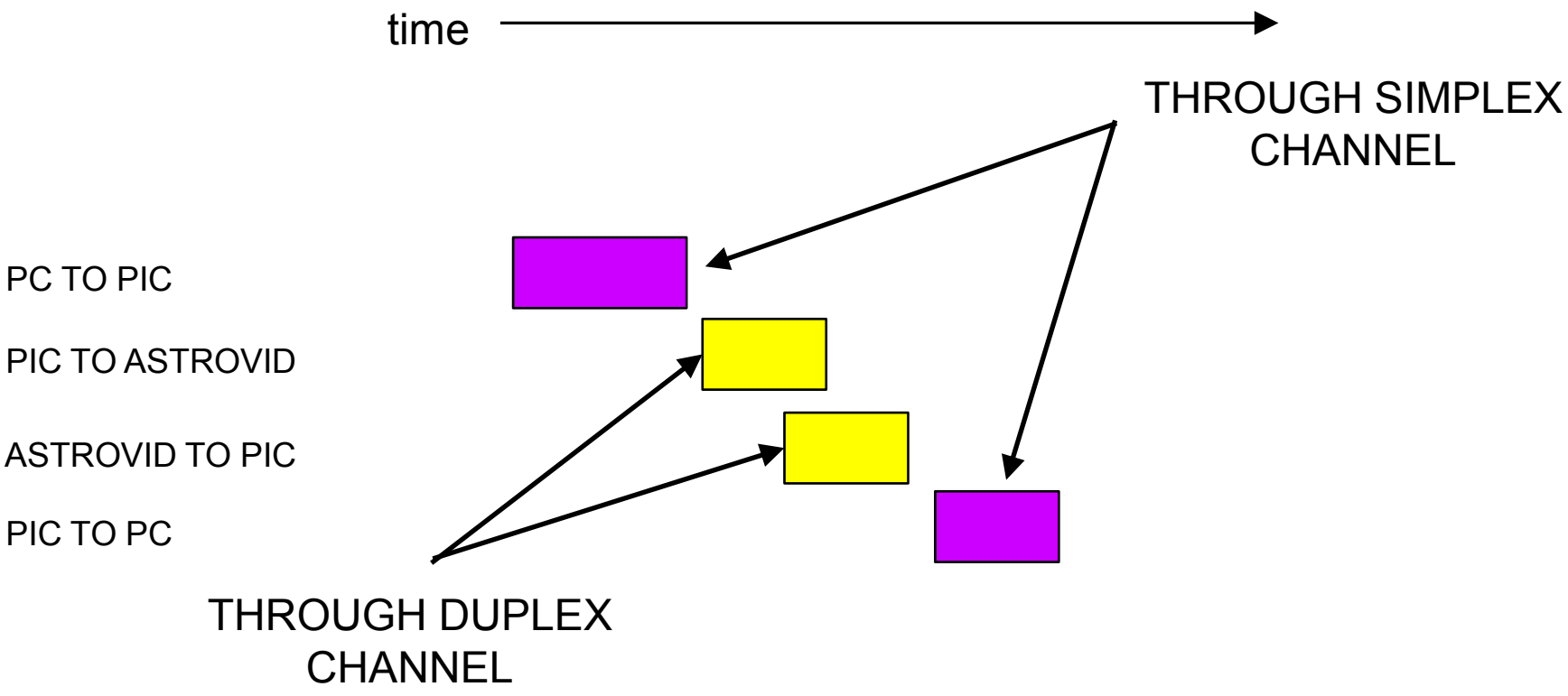


ASTROVID CONTROLLER

THE SOLUTION:



ASTROVID CONTROLLER



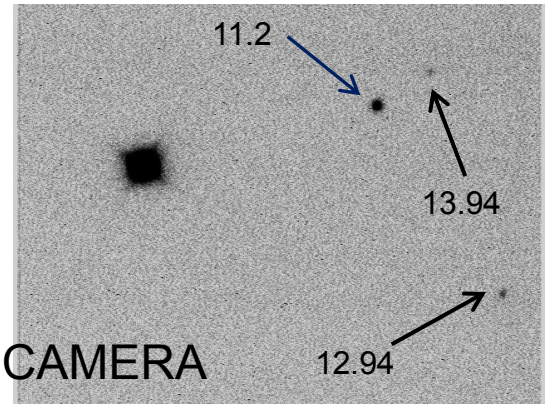
The full duplex channel is sandwiched in a simplex channel.

ASTROVID CONTROLLER

6.18

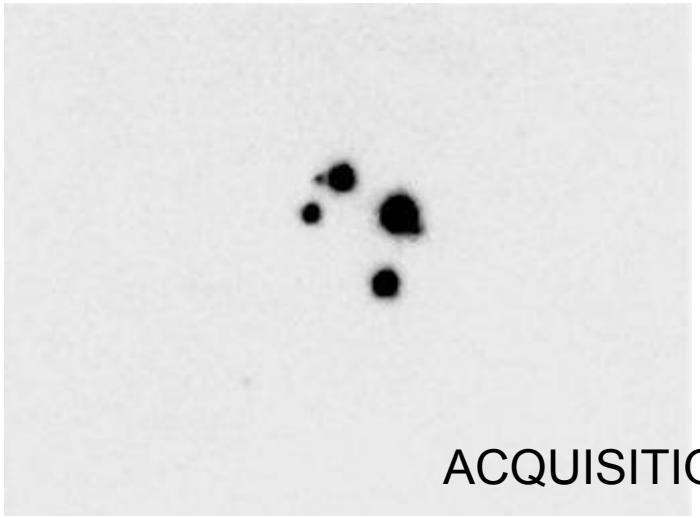
HR1725 (V=6.18)

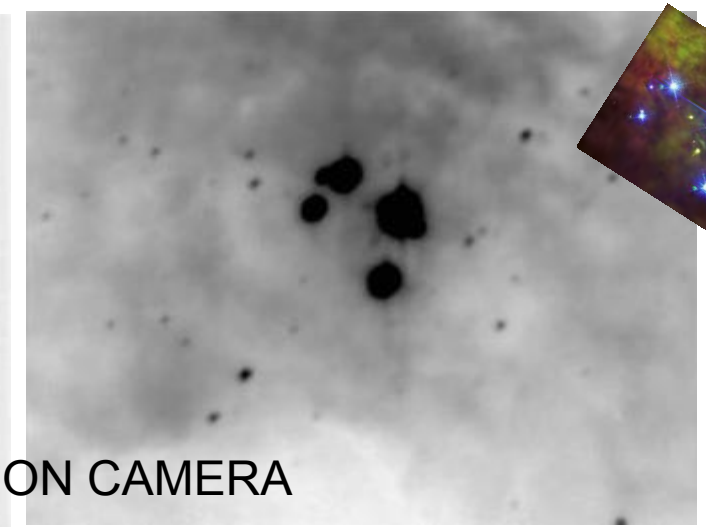
Out[200]=



FINDER CAMERA

Trapezium





HST

ACQUISITION CAMERA

BALANCING THE TELESCOPES

PROBLEMS:

POINTING IS NOT GOOD ENOUGH

VIBRATION WHEN SLEWING/TRACKING

POTENTIAL SOURCE OF LOOSING OPTICAL ALIGNMENT

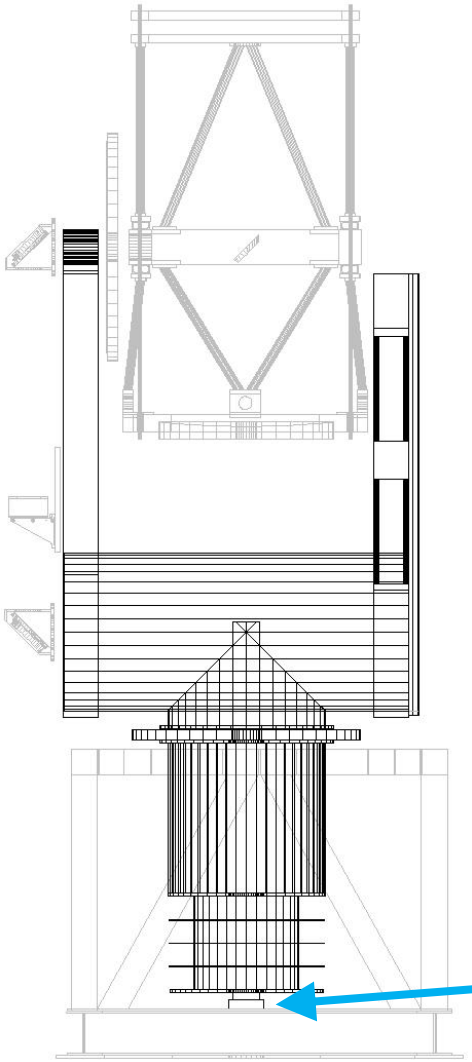
SOLUTIONS:

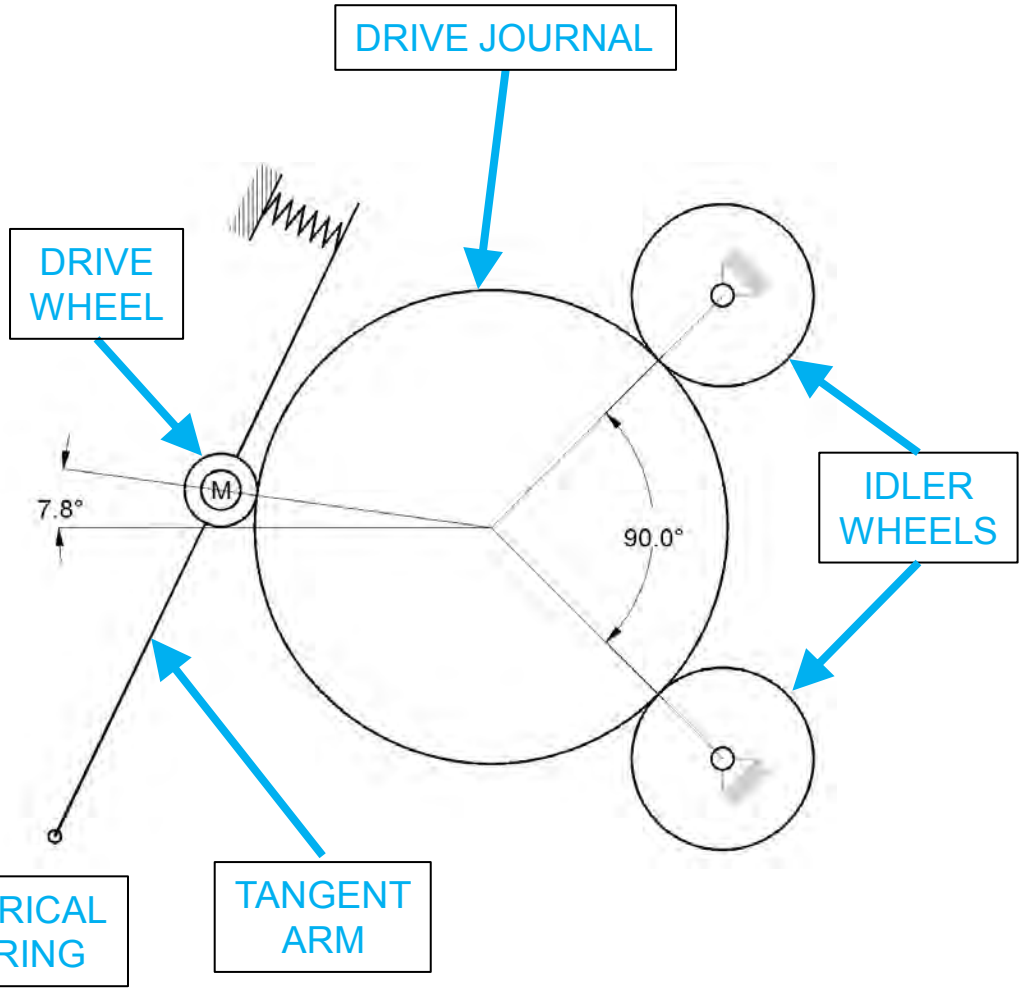
BETTER SERVO CONTROL

HEATING THE MOTORS IN COLD WEATHER

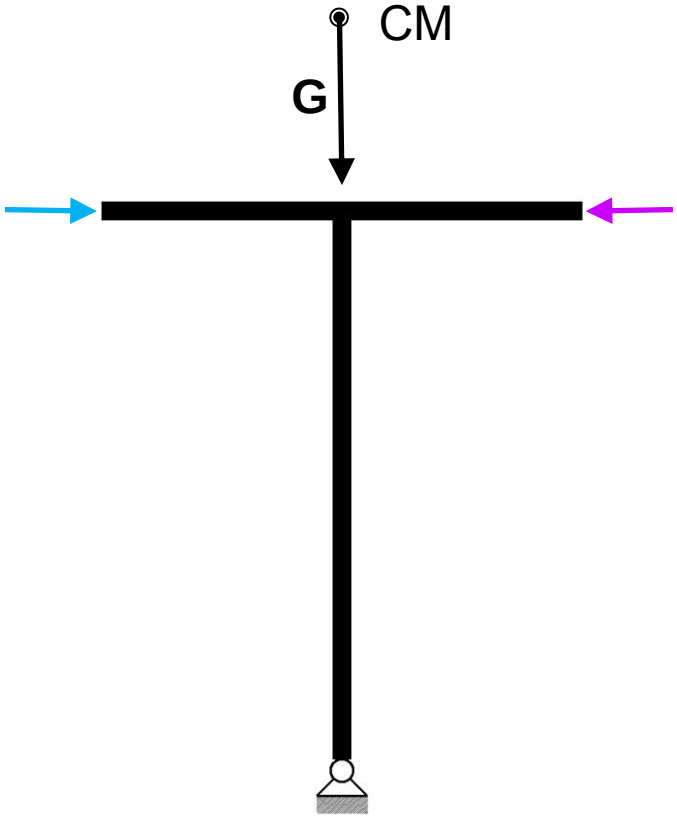
BALANCING THE TELESCOPE

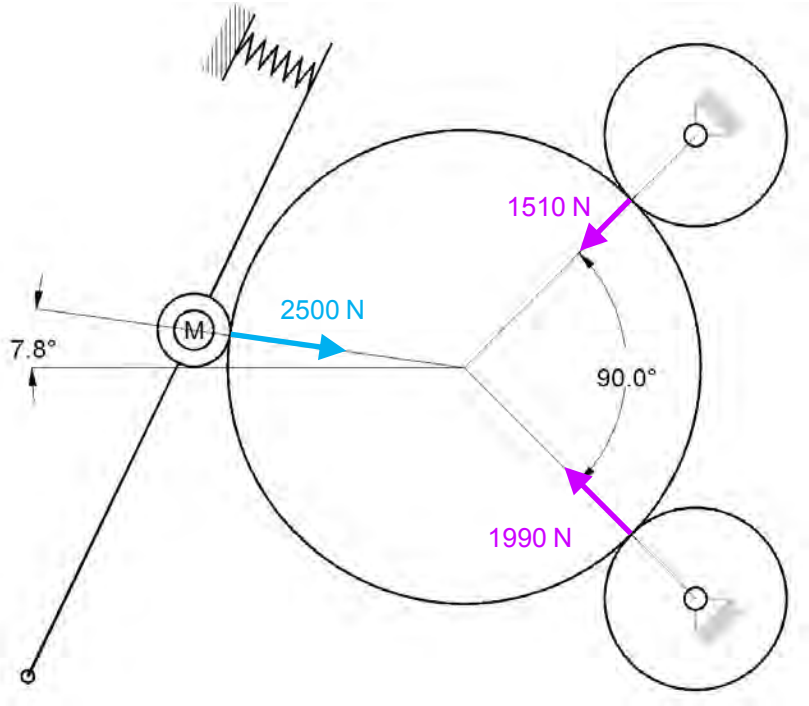
BALANCING THE TELESCOPES IN AZ



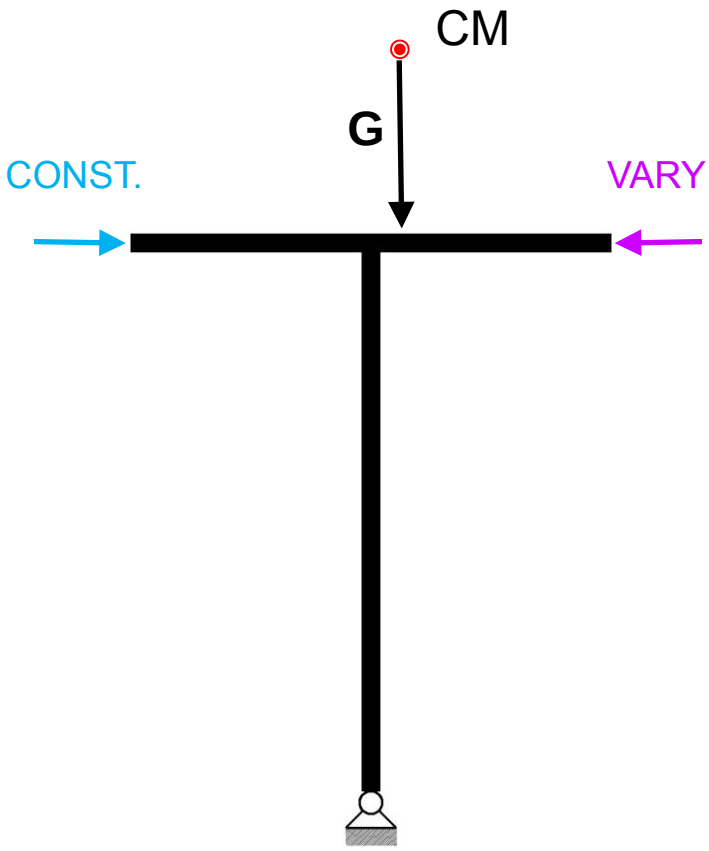


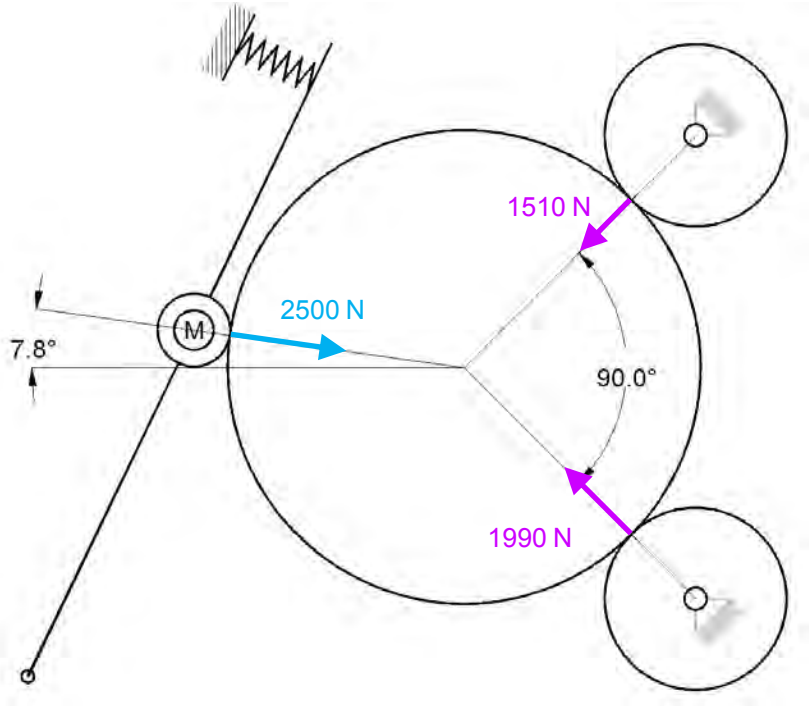
BALANCING THE TELESCOPES IN AZ



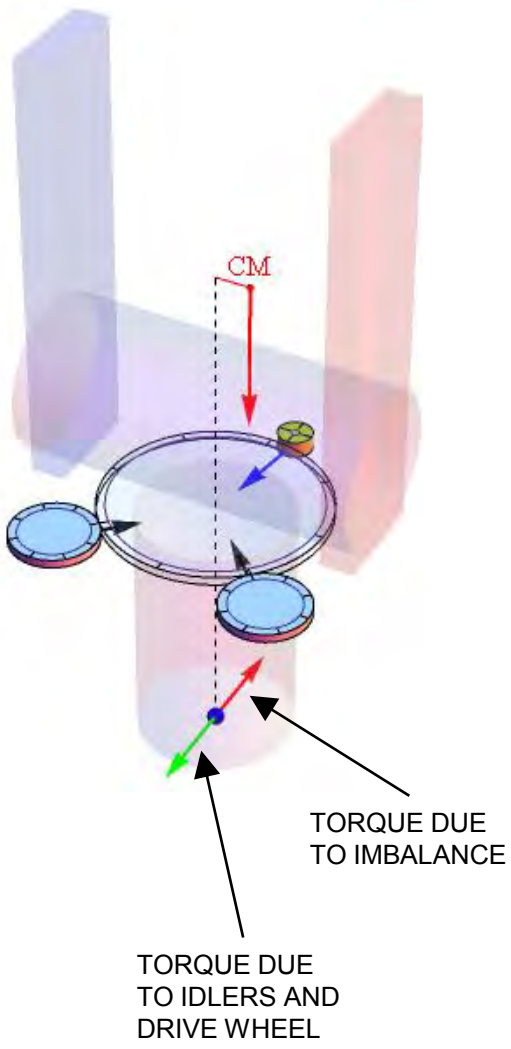


BALANCING THE TELESCOPES IN AZ





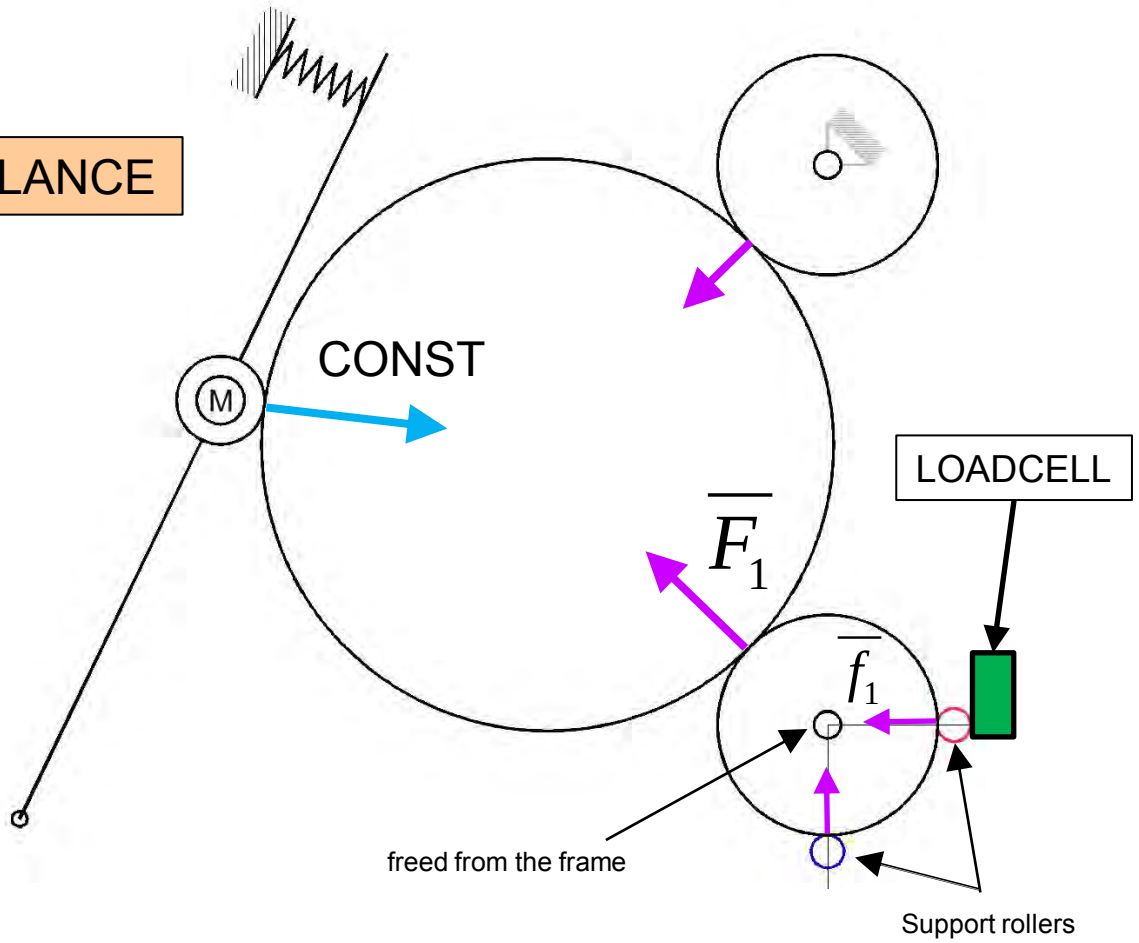
The AZ axis of the telescope is defined by the spherical bearing, the two idler wheels and the drive wheel. If the center of mass (CM) of the rotating parts of the telescope is not on the axis of rotation, the forces the idler wheels exert on the drive journal vary as the telescope turns. The force exerted by the drive wheel stays constant as long as drive journal and idlers are in contact. When the CM is far enough from the axis of rotation, the drive wheel is no longer capable of providing the necessary force to push the drive journal against the idler wheels. The drive journal and one or both idler wheels can separate. Then the AZ axis is no longer well defined that allows the telescope to easily fall in a resonant mode when accelerates.



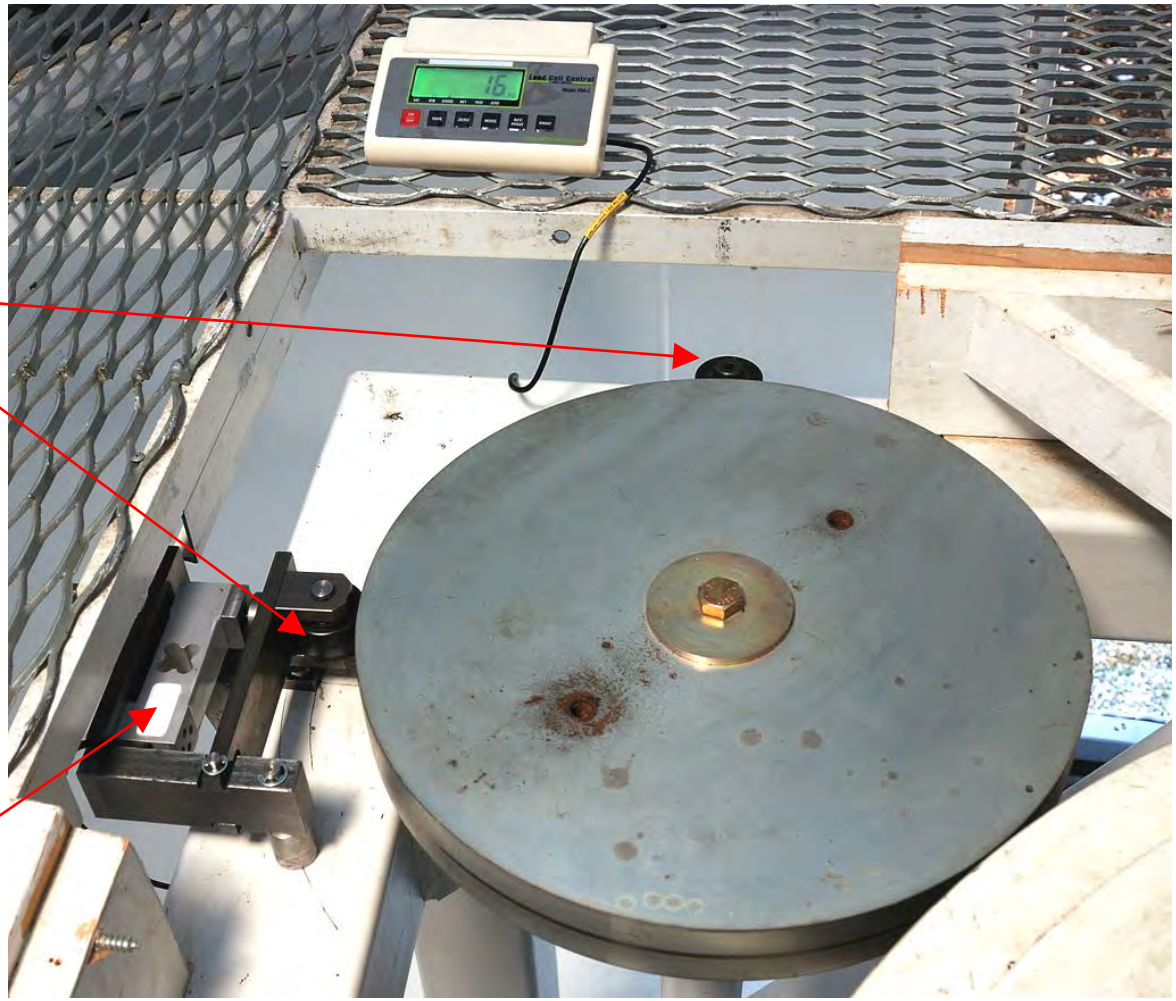
BALANCING THE TELESCOPES IN AZ

MEASURING AZ IMBALANCE

$$f_1 \cong \frac{F_1}{\sqrt{2}}$$

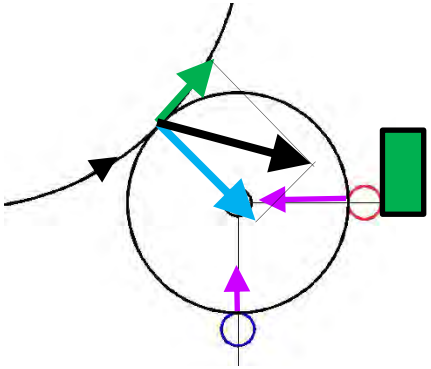


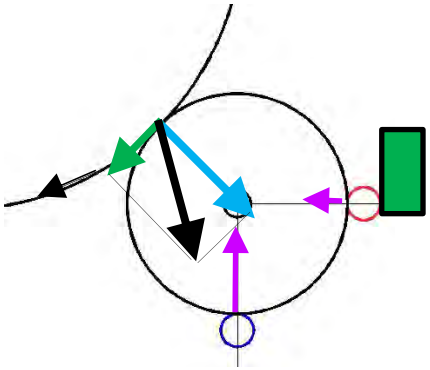
BALANCING THE TELESCOPES IN AZ

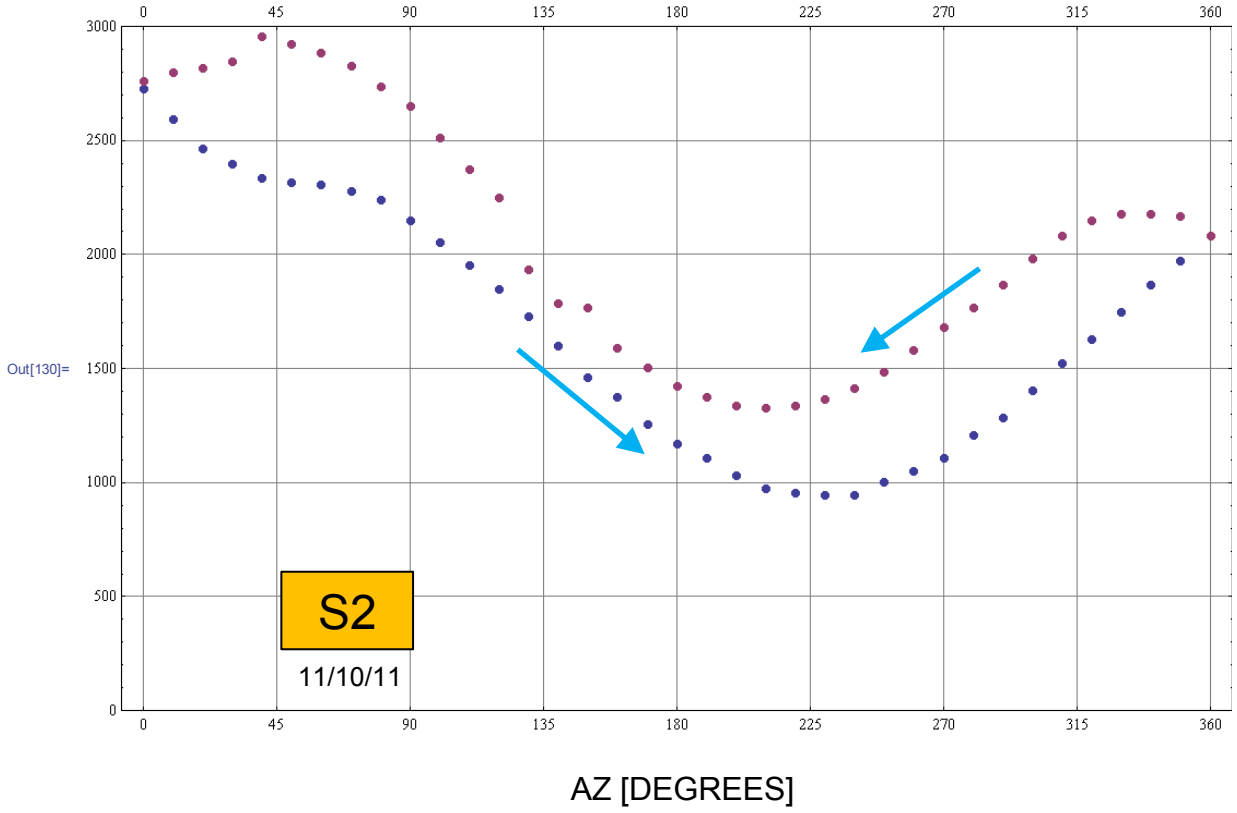


BALANCING THE TELESCOPES IN AZ

The hysteresis is because a finite amount of torque is needed to turn the idler wheel. Thus the load on the load cell is different depending on the direction of rotation.

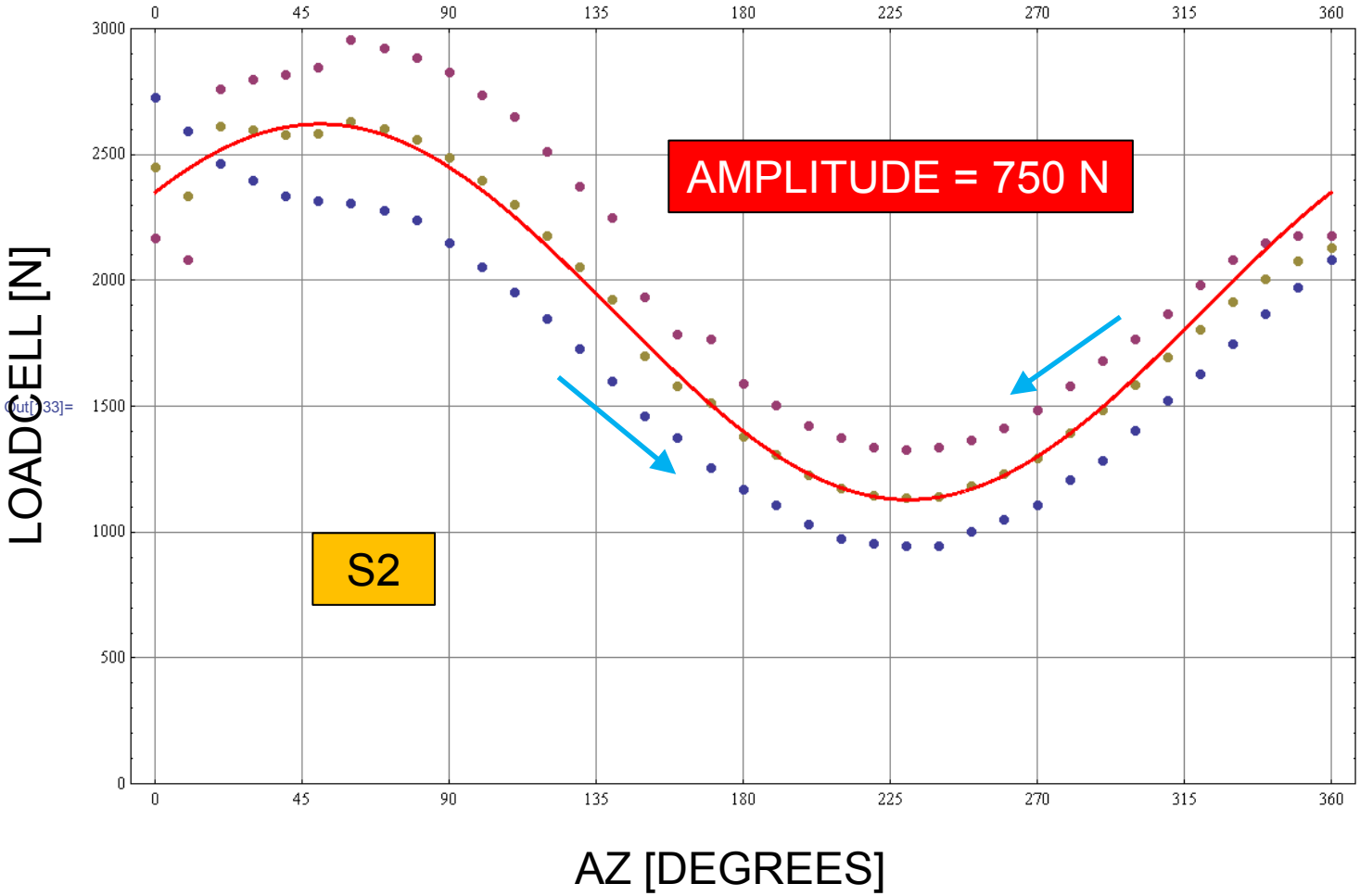




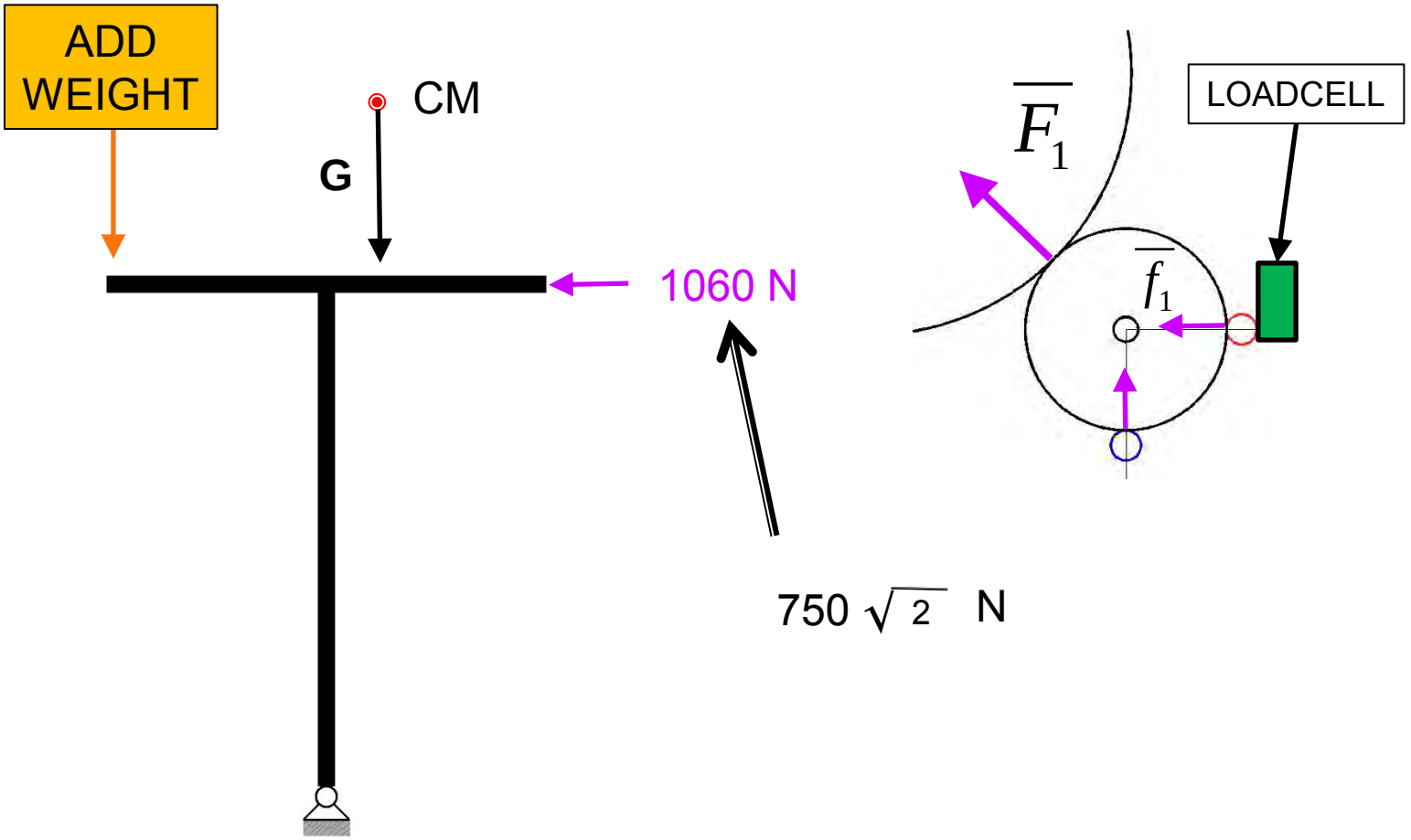


The amplitude of the average of the two branches is of interest.

BALANCING THE TELESCOPES IN AZ

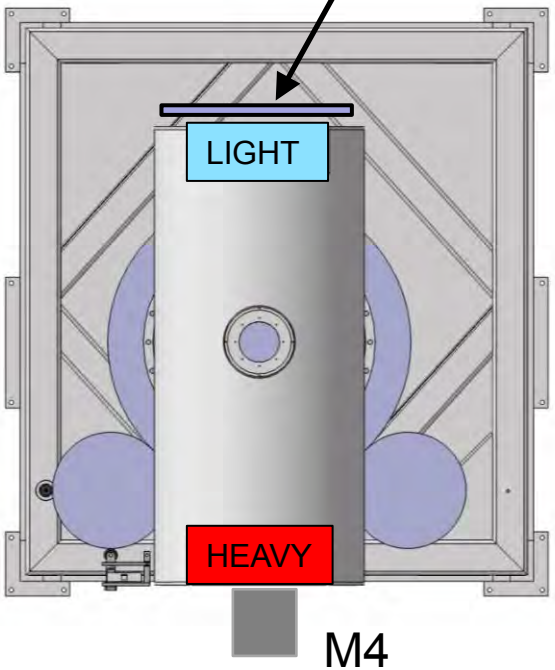


BALANCING THE TELESCOPES IN AZ

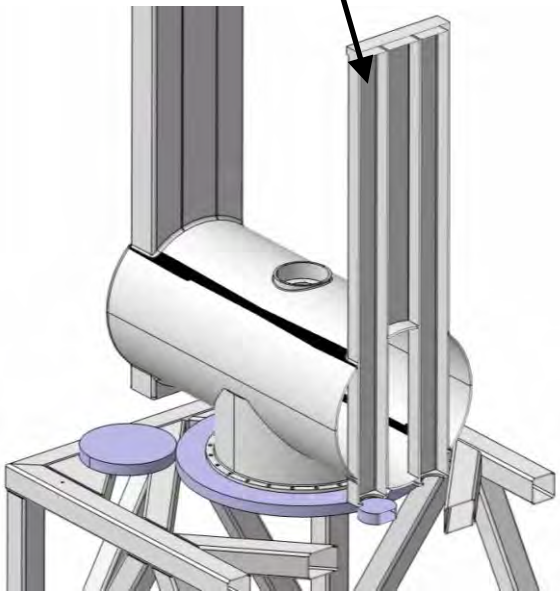


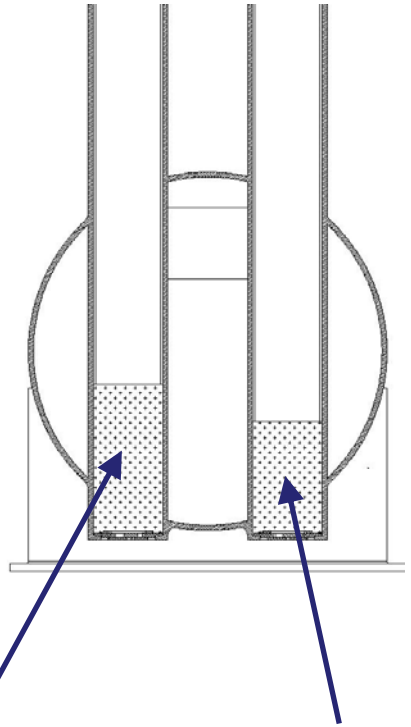
BALANCING THE TELESCOPES IN AZ

MOUNTED
STEEL PLATES
NO MORE ROOM HERE



HOLLOW TUBE

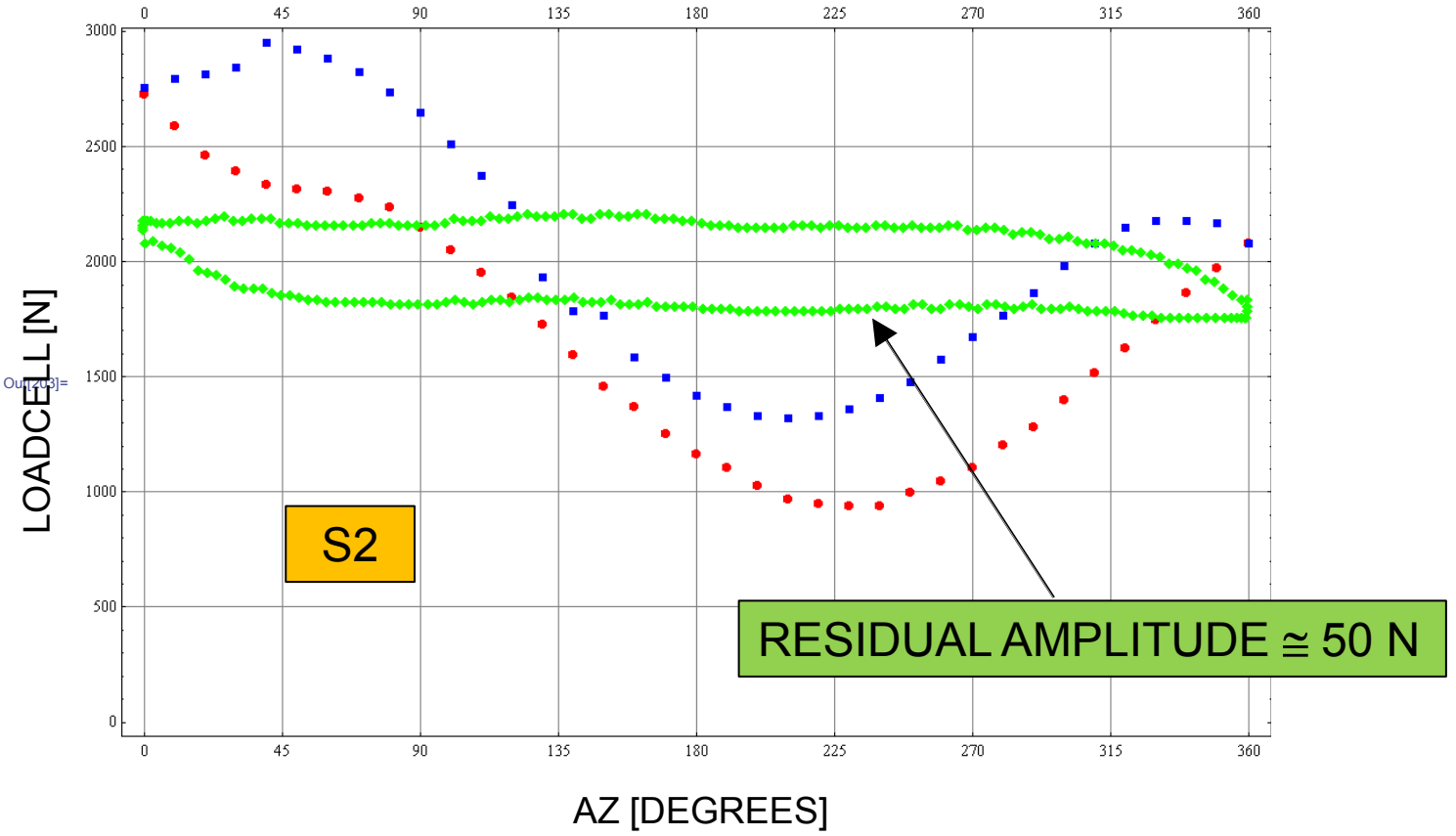




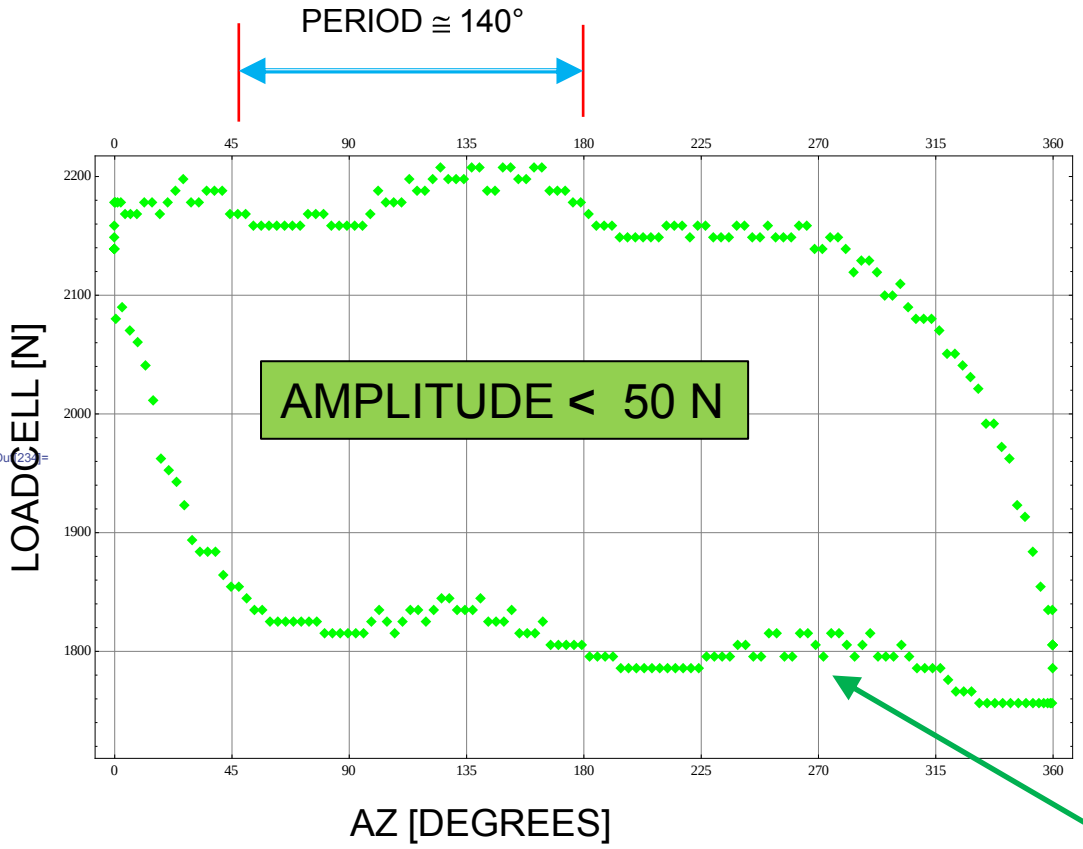
LEAD SHOTS ADDED

BALANCING THE TELESCOPES IN AZ

AFTER ADDING LEAD SHOTS



BALANCING THE TELESCOPES IN AZ



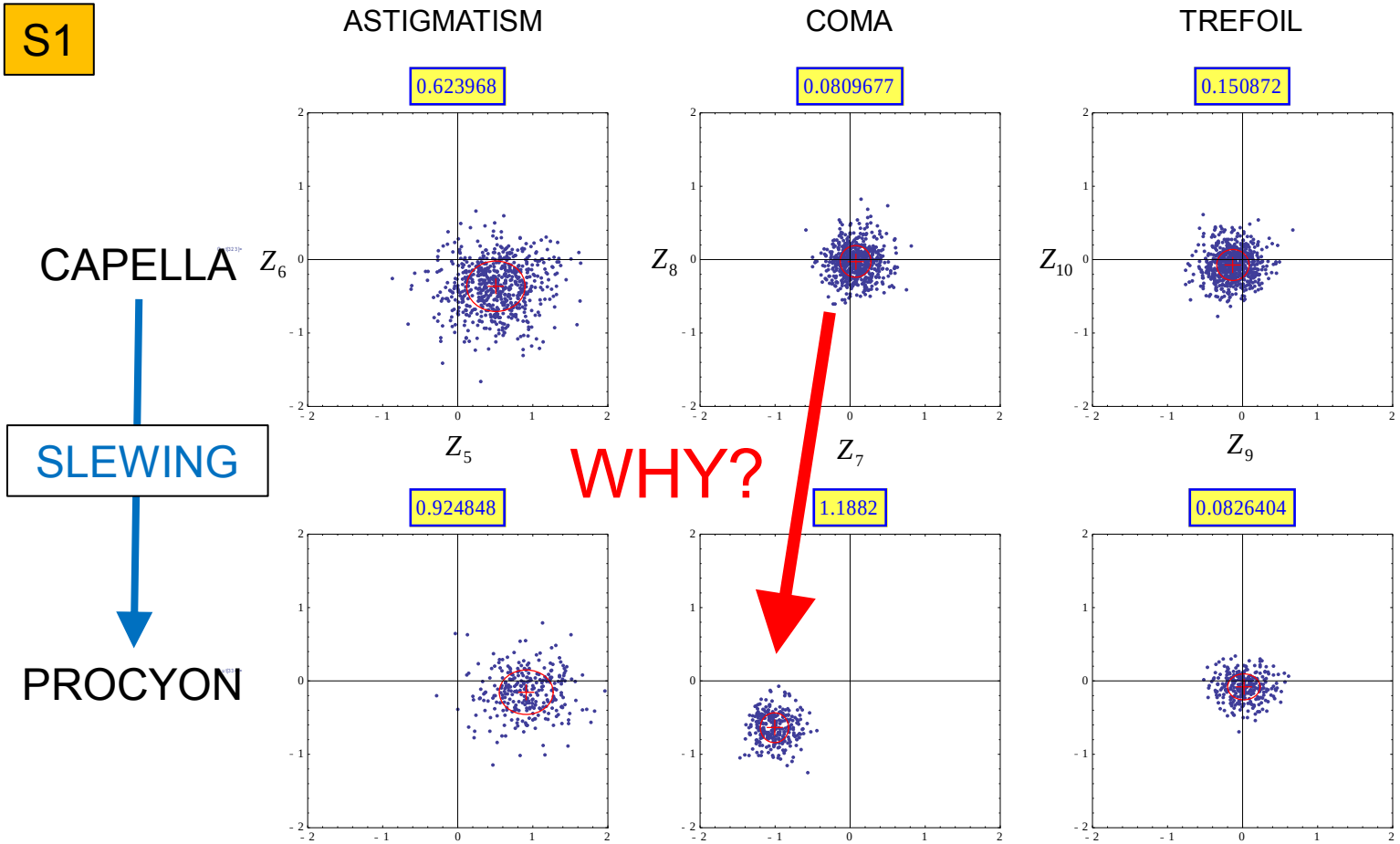
$$\frac{360^\circ}{140^\circ} \cong 2.6 =$$

$$\frac{\text{DIAM. DRIVE JOURNAL}}{\text{DIAM. OF IDLER}}$$

IDLER RUNOUT

BALANCING THE TELESCOPES IN AZ

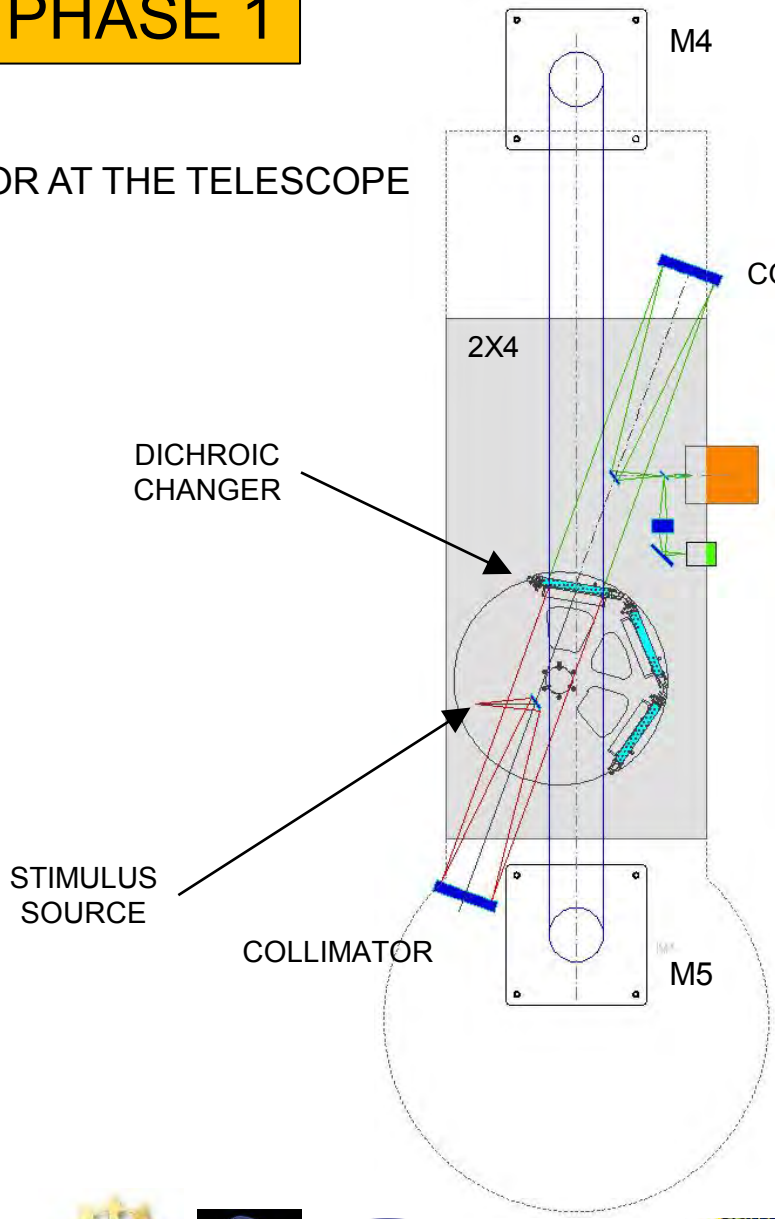
S1

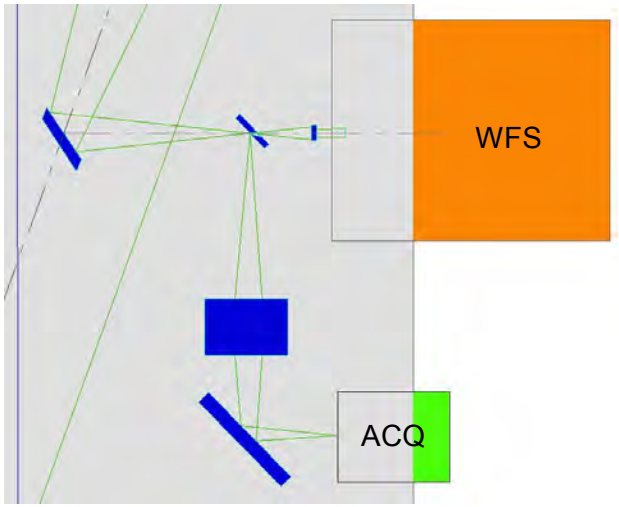


NOTHING WAS OBVIOUSLY LOOSE WHY DID COMA CHANGE?

AO PHASE 1

TIP/TILT SENSOR AT THE TELESCOPE





THANK YOU FOR YOUR ATTENTION

THE END