

Updates from the NPOI

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et al.



Vital Stats

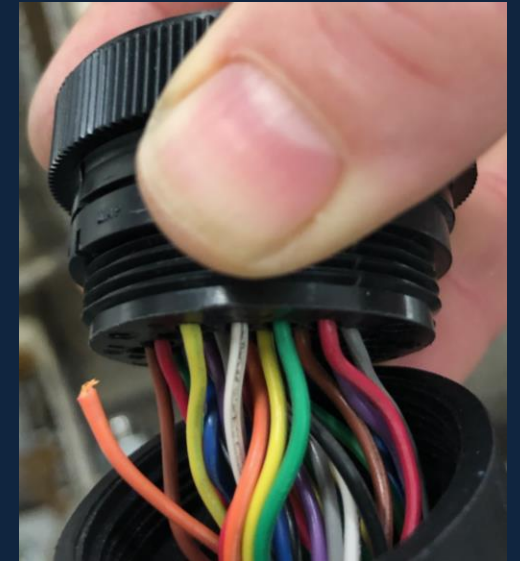
- Navy Precision Optical Interferometer
- Located near Flagstaff, AZ
- Consists of 10 siderostats, 6 reconfigurable
- Combines up to 6 beams
- Baselines now span 16-98 m
- 3 beam combiners, 1 in regular use
- Three 1-m telescopes
- Been offline since Oct. 2021 for Amon Hen
- Lowell left collaboration Jan. 2023



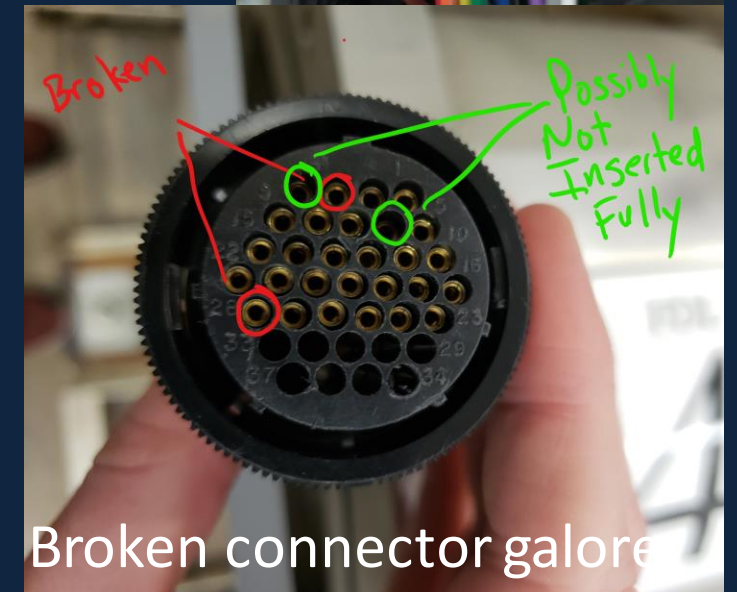
Recovery from Deferred Maintenance

Recovery from deferred maintenance

- IRIG Y2K issue
- FDL losing fiducial
- Metrology optics
- FDL cable management
- Siderostat controllers cross talk
- Fringe tracker boards needed to be reseated
- Revising operational procedures



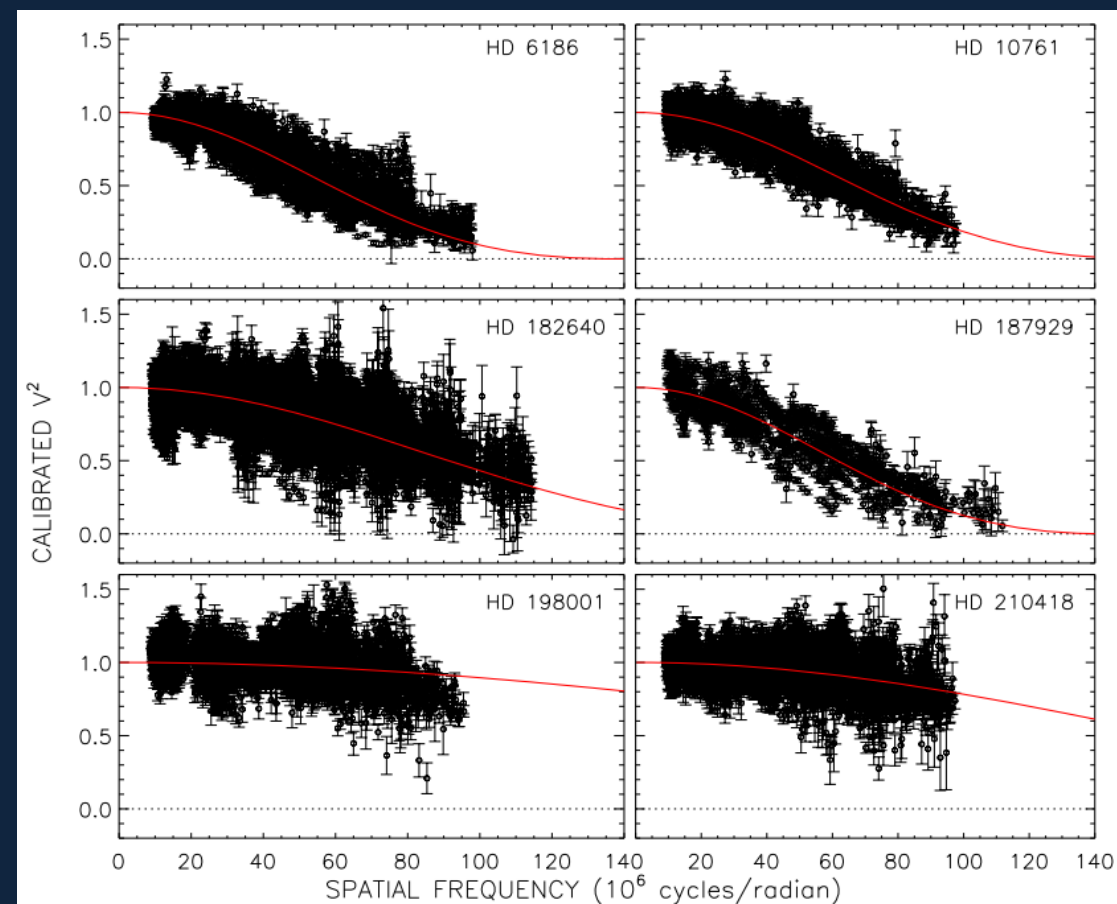
FDL rail inspection



Broken connector galore

Return to 6-way

- Data shown at the last meeting has been published
- The use of 6-way allows for faster UV-coverage at the cost of reduced SNR with CLASSIC
- For high precision measurements with CLASSIC a reduced number of baselines is preferable, 1 to 3 per spectrograph.
- Good for imaging and will be explored in the future in conjunction with fast array reconfiguration and VISION+IRC
- 6 FDLs Used for Amon-Hen



Amon-Hen

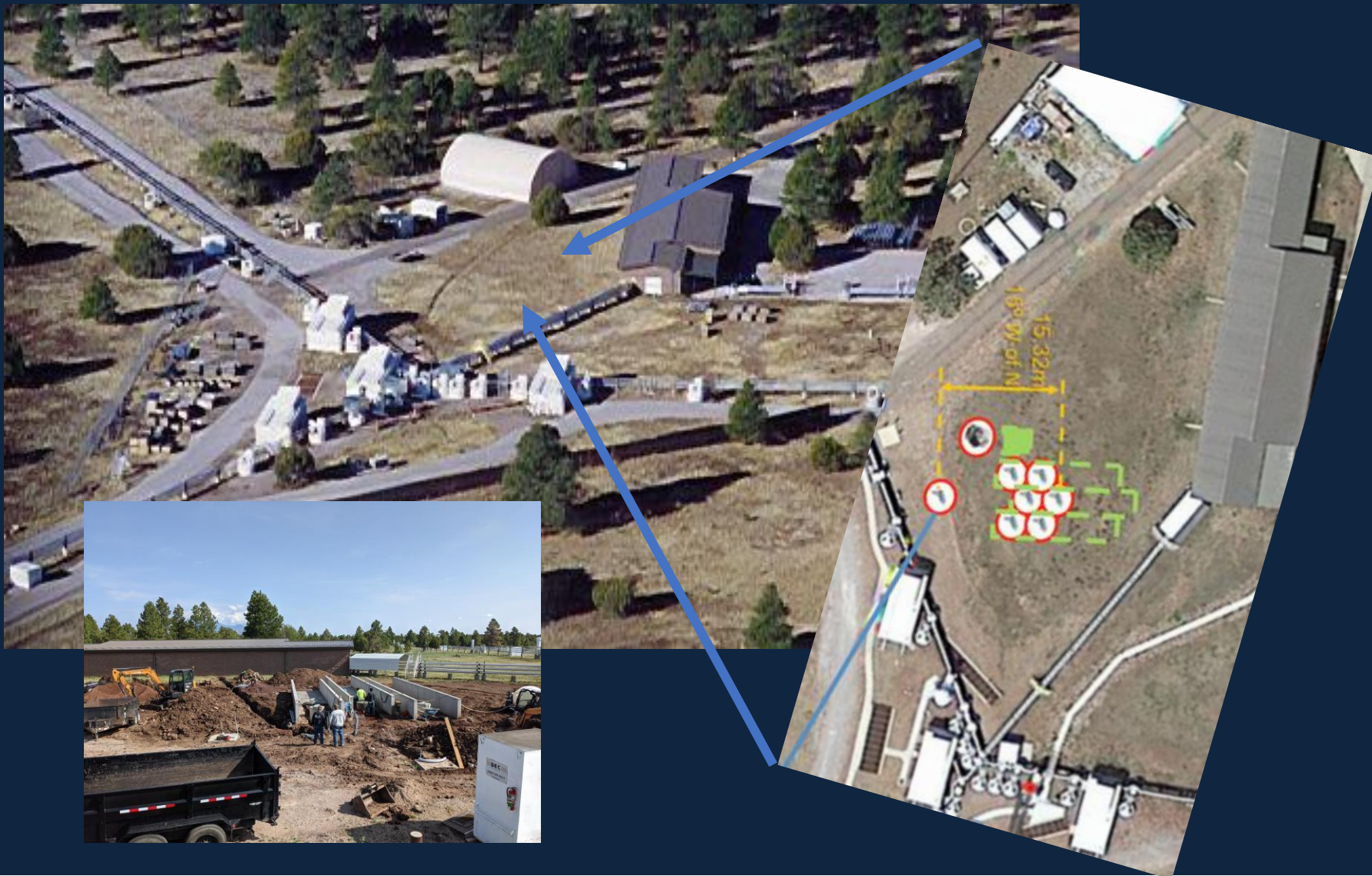
We didn't pick the name. But yes, we like it, we are that nerdy.

We know we're among friends.



Lord of the Rings: Hill of Sight

Amon Hen Open Sky test



Amon-Hen

- IARPA-funded effort to image geosats at a resolution of 0.5m
- Open sky demo happening at the NPOI and should produce images with a resolution of 3m
- Uses seven 70cm and one 1m telescope with AO
- Hyper-telescope demonstration with dual-field phase referencing capabilities

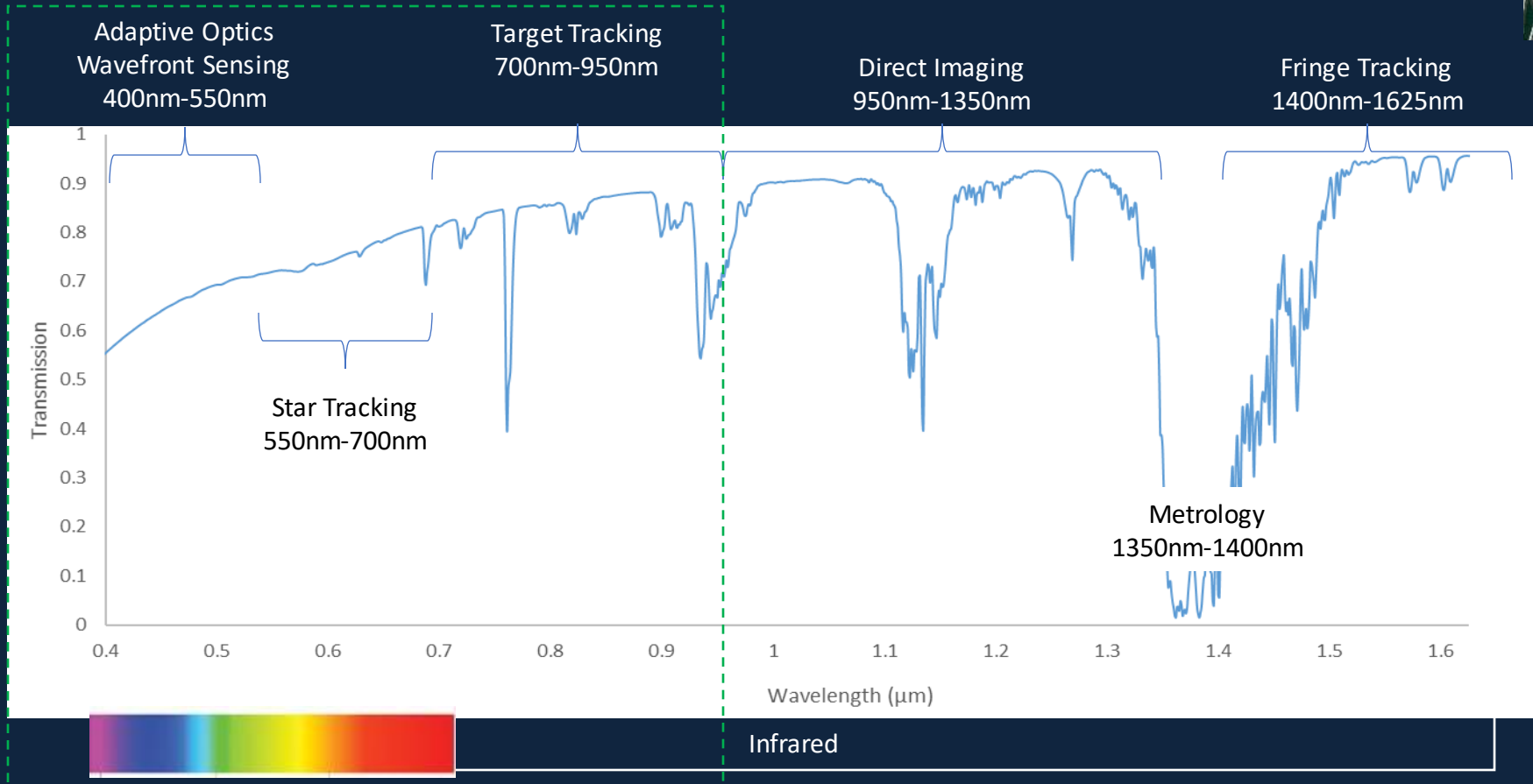


Spectral Bandpasses

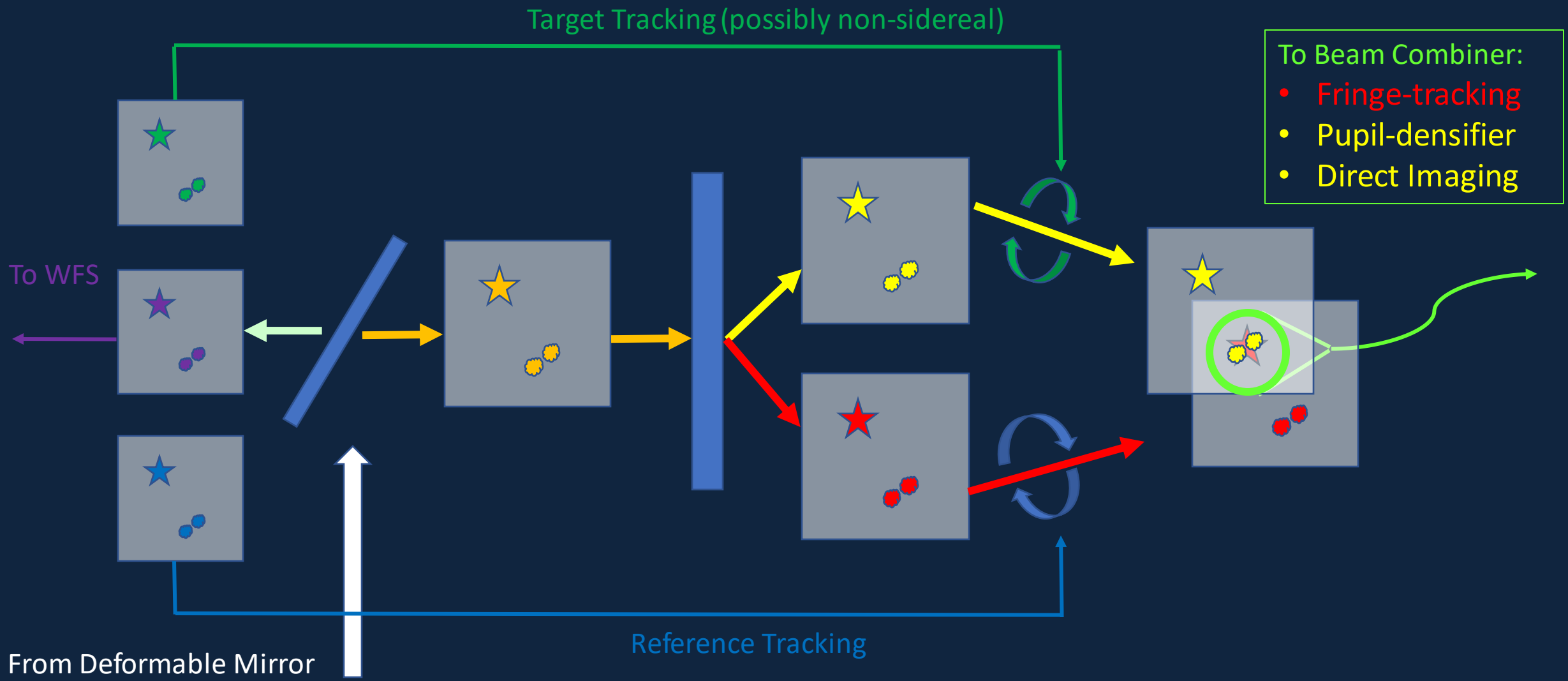


Telescope Backplane

Single Mode PM980B-XP Fiber



Dual-Field Phase Referencing with Single-mode Fibers



Inner-Room re-alignment for Amon-Hen



Do you want to work offline?

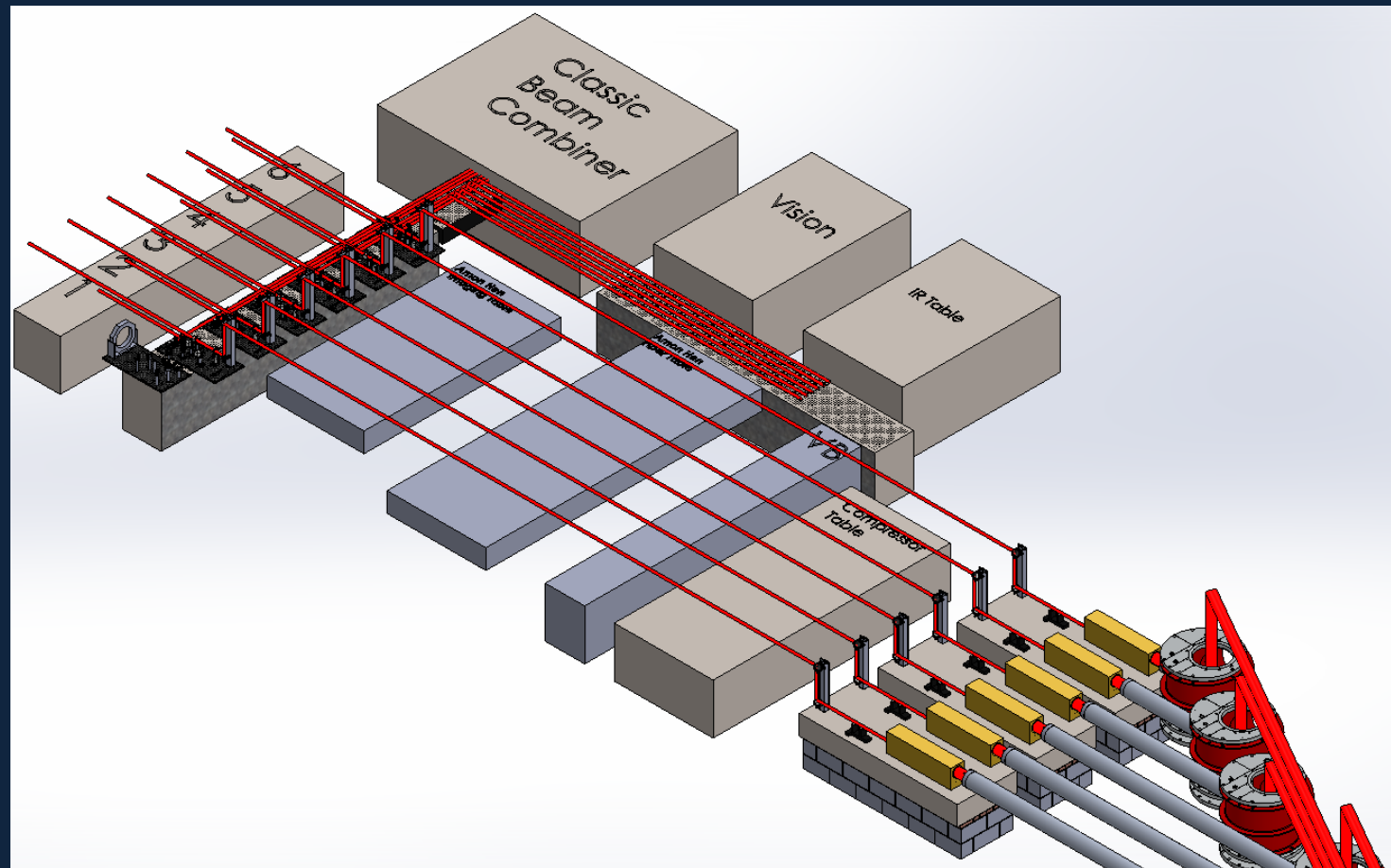
- Amon-Hen bypass periscopes
- IR beam combiner
- VISION improvements
- CCD-based Angle Tracking
- 1m AO systems
- NPOI data archive

Bypass Periscopes

Adding 4 reflections: operate Amon-Hen and NPOI array without moving optical tables

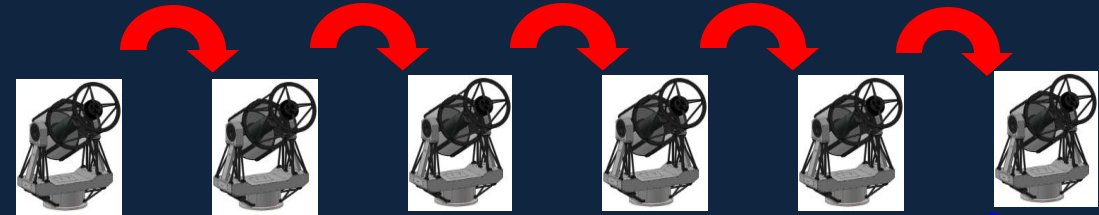


Current Bypass Method- Solidworks Isometric View

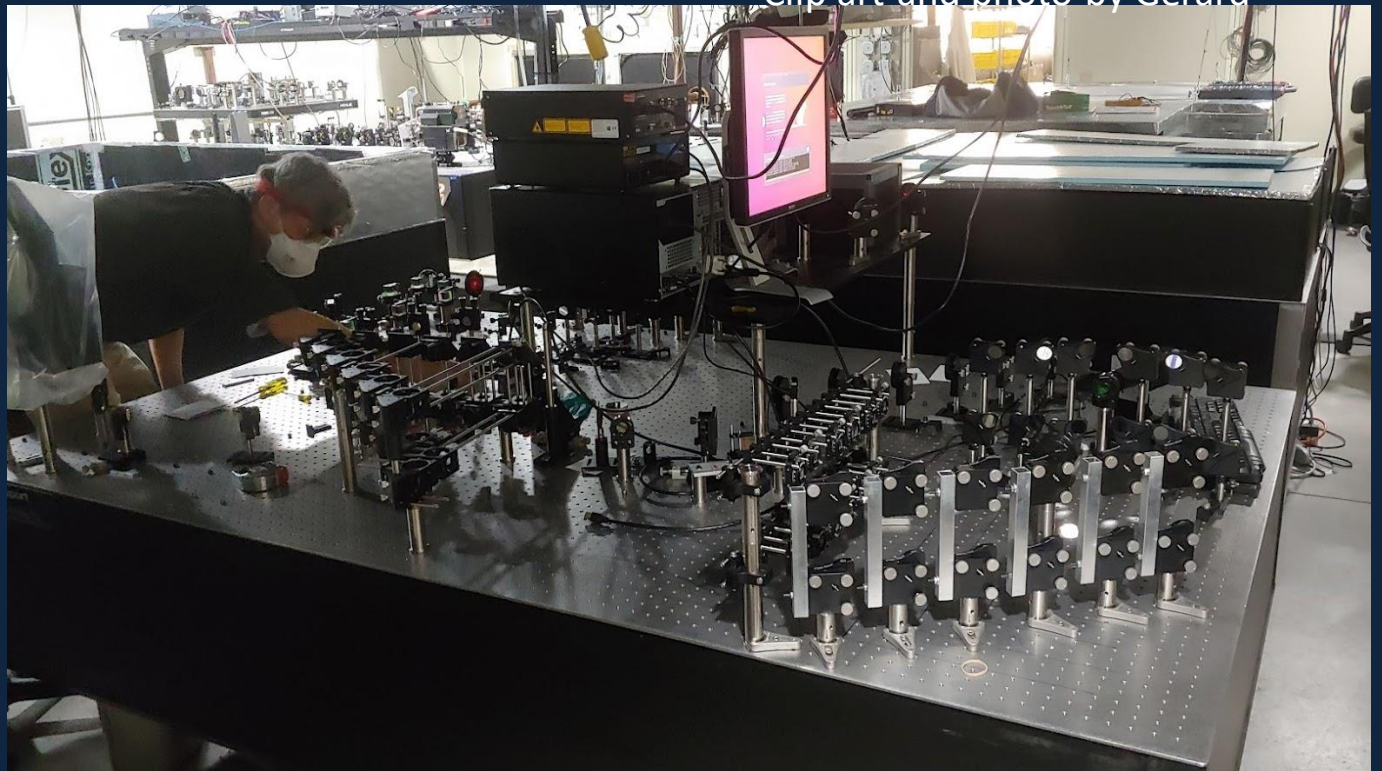


Near-Infrared Fringe Tracker

- How to collect interesting data?
- Solution: Wavelength-Baseline Bootstrapping
 - Track in the near-infrared with short baselines, short coherence times
 - Image in the visible with medium, long baselines, long coherence times
- Pairwise fringes spanning J-H bands.



Clip art and photo by Gerard

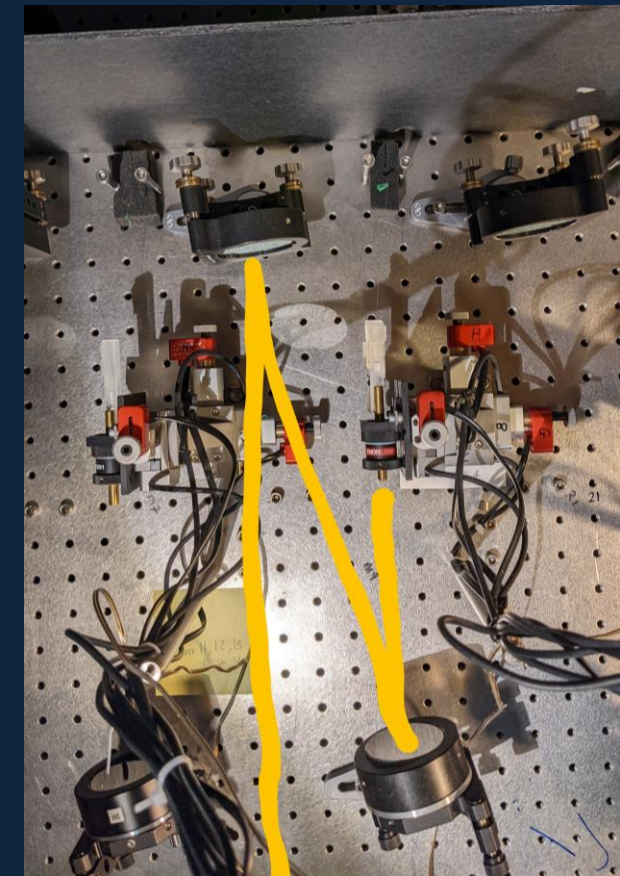
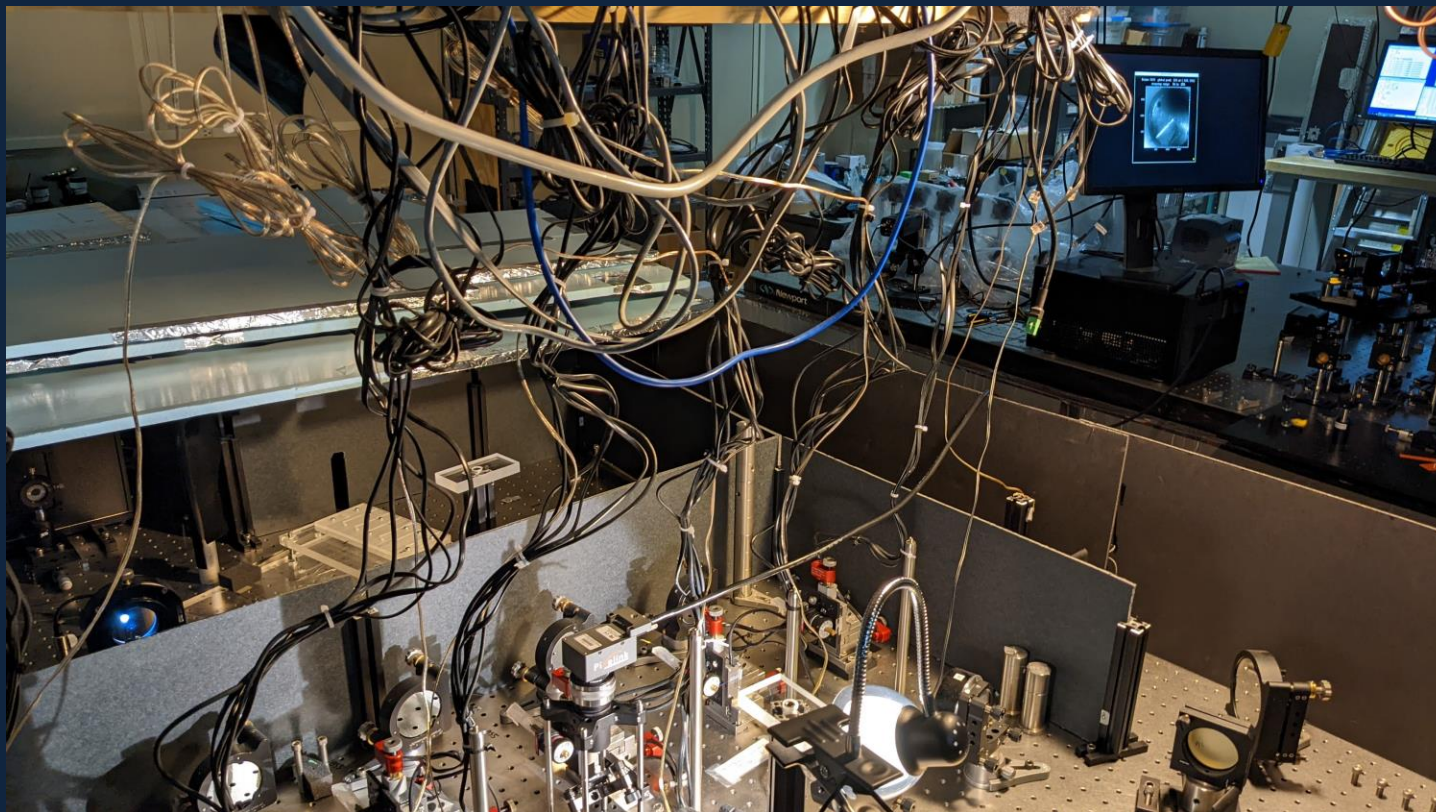


VISION: fiber-fed 6-way visible-wave combiner

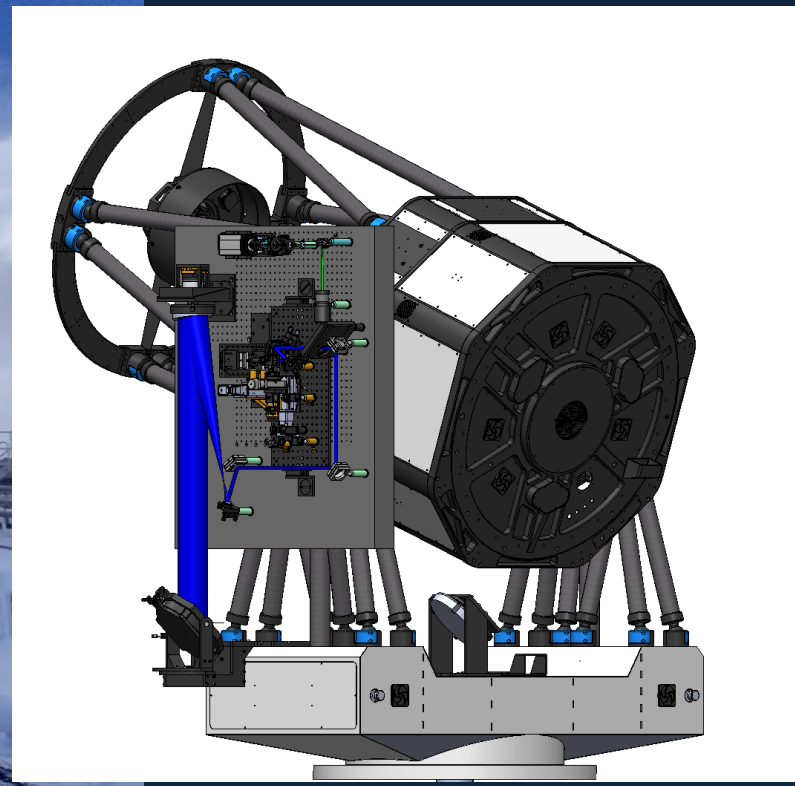
Fiber coupling and fiber head positioning troubles.

Will add closed-loop actuators to off-axis parabolas (hardware in hand)

Adding periscopes to feed CCD Angle Tracker



1-m telescopes AO-system delivery



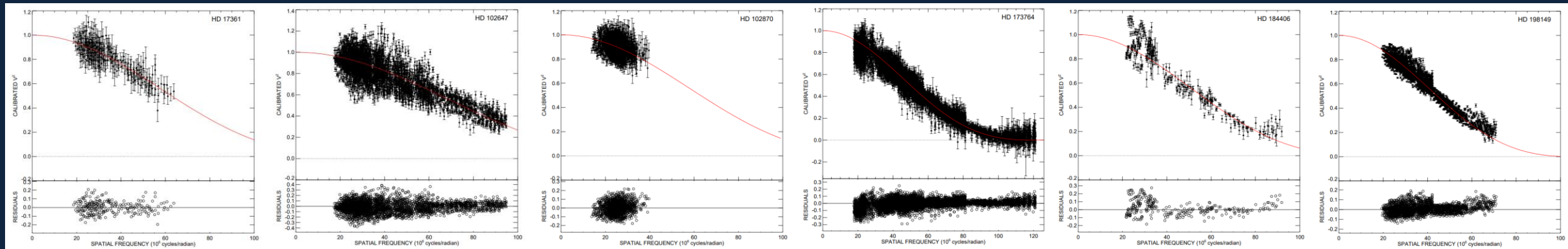


NPOI Archive: The gift that keeps on giving

- 87 diameters in Baines et al. 2018AJ....155...30B
- 44 diameters in Baines et al. 2021AJ....162..298B

NPOI Archive: The gift that keeps on giving

- 87 diameters in Baines et al. 2018AJ...155...30B
- 44 diameters in Baines et al. 2021AJ...162..298B
- 33 – you guessed it! Diameters! – in preparation
 - Data spans 1996 – 2021
 - θ_{LD} spans 0.72 – 10.14 mas
 - Sample includes 3 exoplanet hosts, 2 RS CVn binaries, 3 δ Sct variables, a star with several different temperature dust regions, a “problem” Hipparcos binary, one of the “Big Three” yellow hypergiants, etc.

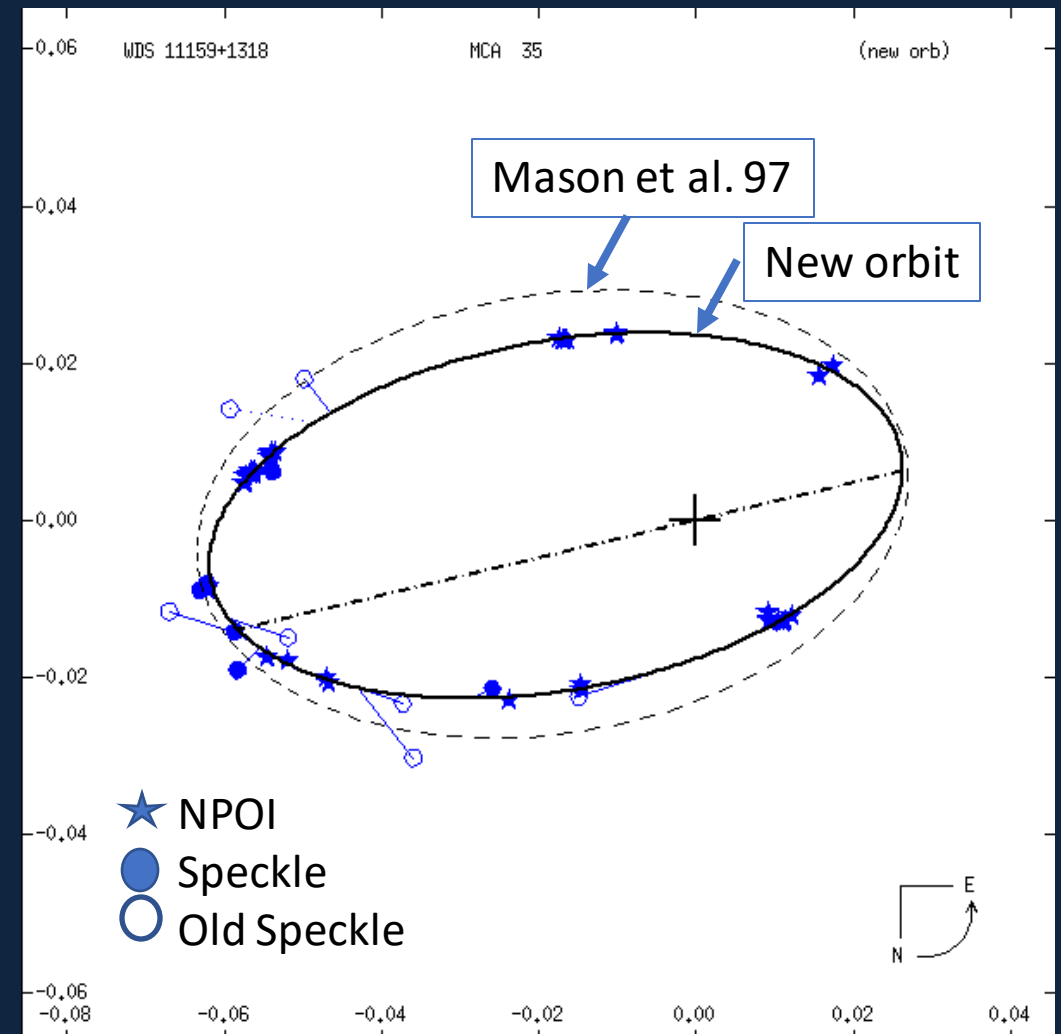


Binary Work

73 Leo: NPOI + RV from Elizabeth Griffin

<i>P</i>	8.1042 ± 0.0023 y
<i>a</i>	$0.0454700 \pm 0.000068''$
<i>i</i>	$58.03 \pm 0.16^\circ$
<i>e</i>	0.4251 ± 0.0013
<i>ω</i>	$332.7 \pm 2.5^\circ$
<i>T</i>	1998.2320 ± 0.0056

Stay tuned - γ Per is up next!



Summary

- Archive continues to produce science
- Amon-Hen
 - Dual-field imaging interferometer
- 6-way Imaging Mode
 - IR-fringe tracking short baselines
 - VISION
- AO-corrected 1-ms