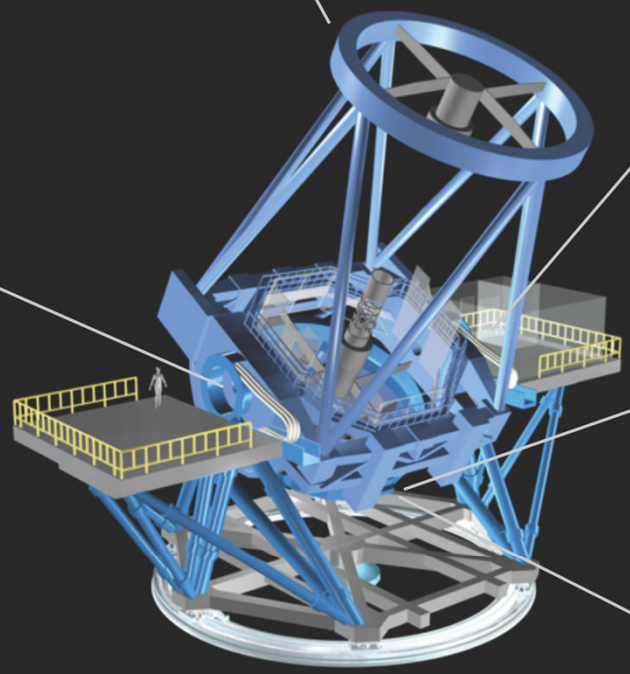
Status of Existing Facility Instruments

Takashi Hattori (Instrument Division, Subaru Telescope)

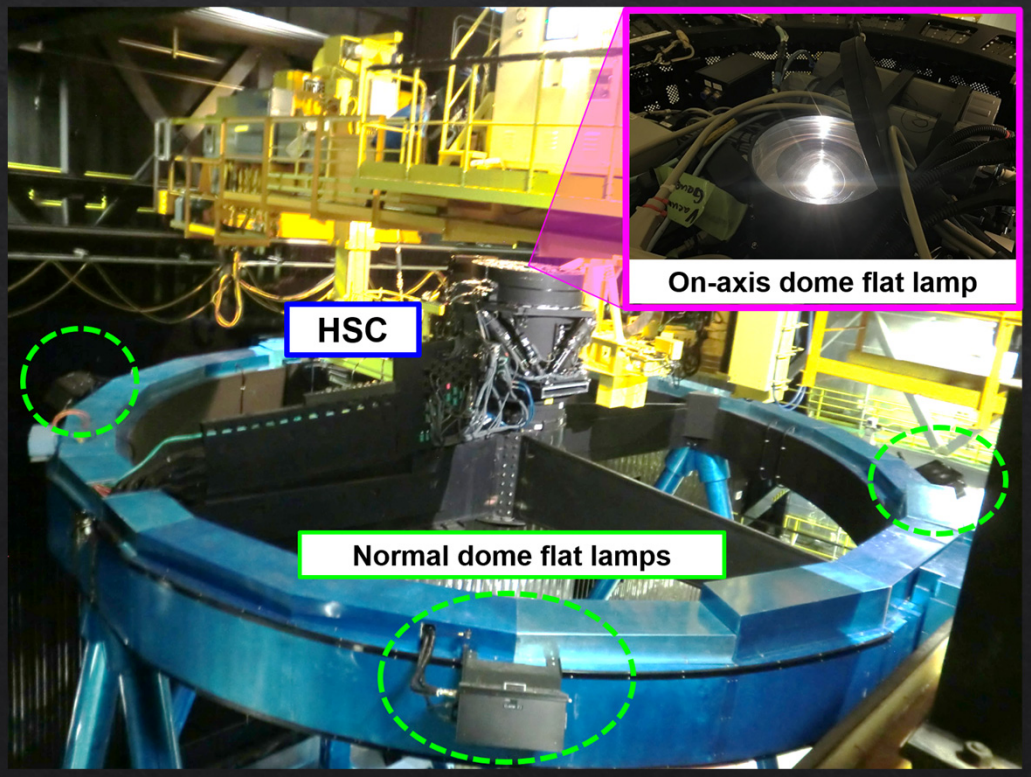
Subaru User's Meeting 2020 (3/3/2021)

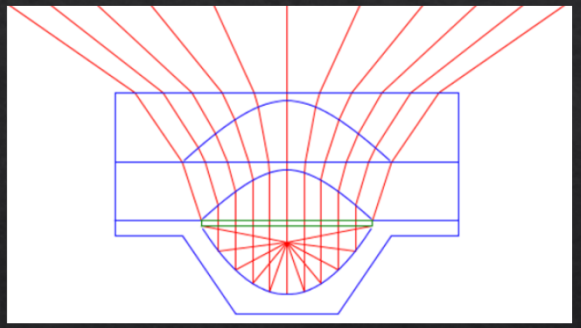
Facility Instruments

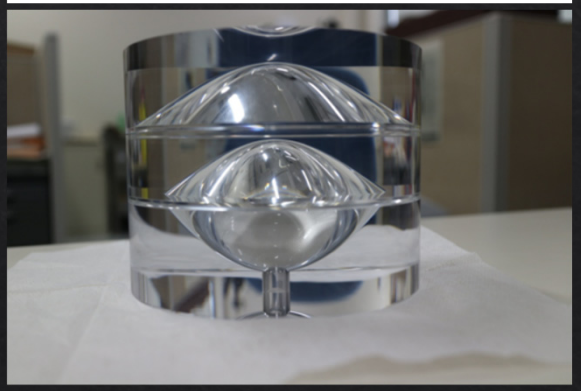


HSC

- On-axis dome flat lamp



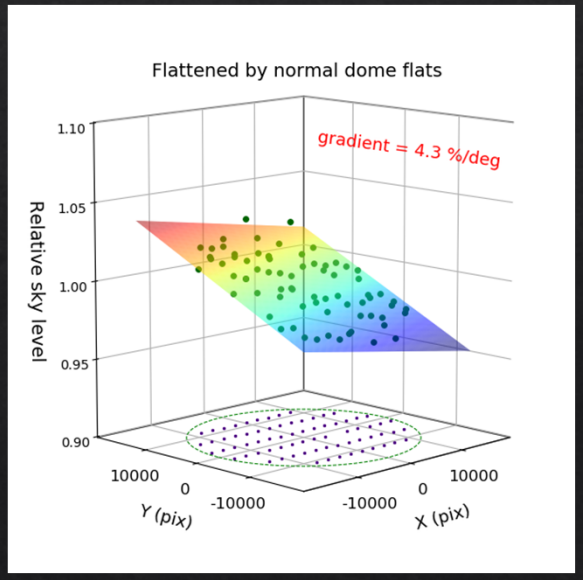




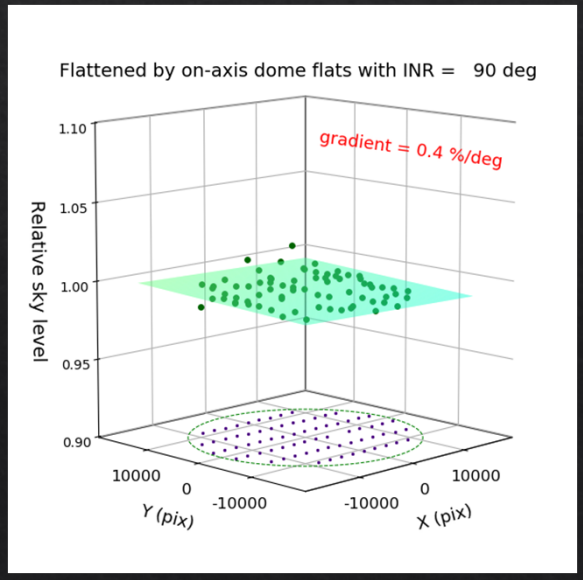
HSC

- On-axis dome flat lamp
  - better flatness compared to the conventional four-lamp system
  - started regularly using the on-axis dome flat lamp from Feb. 2021 observing run

sky value after flat-fielding



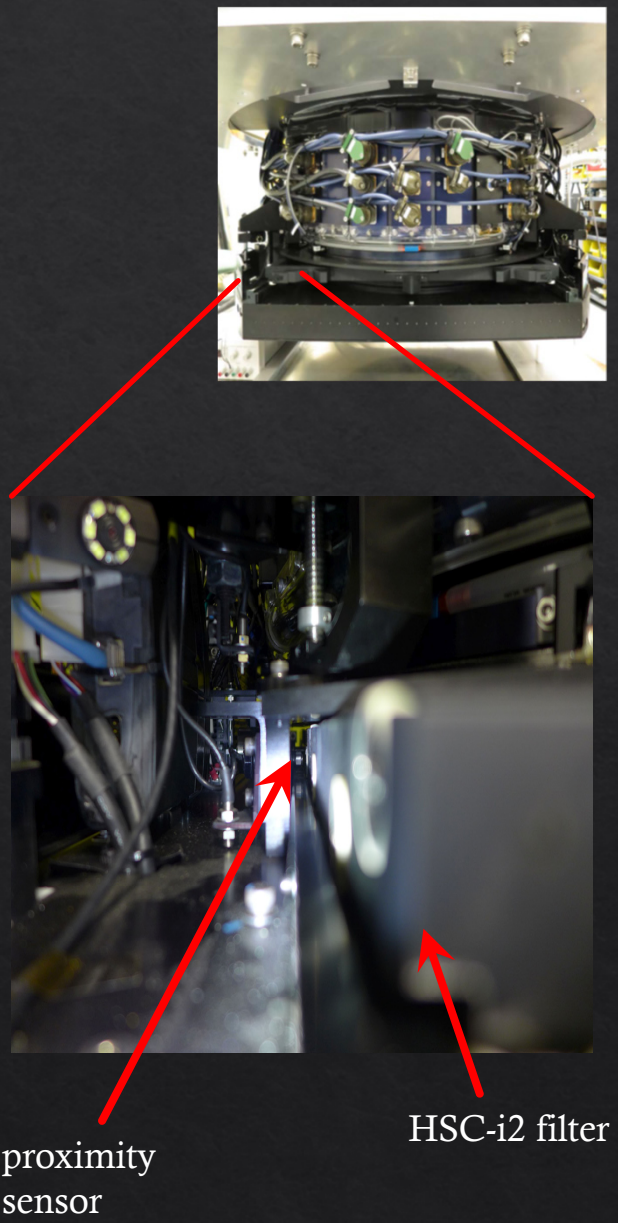
conventional



on-axis

HSC

- issues
  - a sensor hitting the filter-frame
    - a sensor was found to be hitting the filter frame and preventing HSC-i2 filter to be removed from the camera
    - almost no filter exchange in the January, 2021 observing run
  - collision signal from CCB
    - multiple collision signals from POpt2, WFC, and FEU on 1/10/2021
    - a cable from the CCB controller touched the surface of the box, which caused fake collision signals
    - half night was lost



HSC

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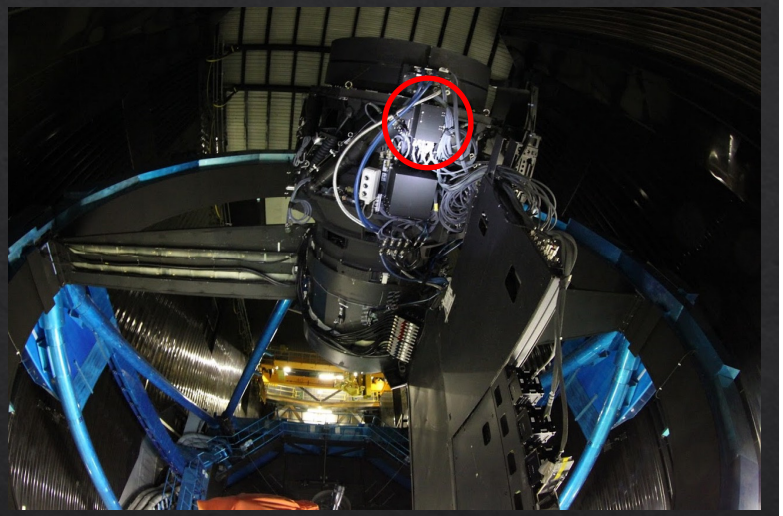
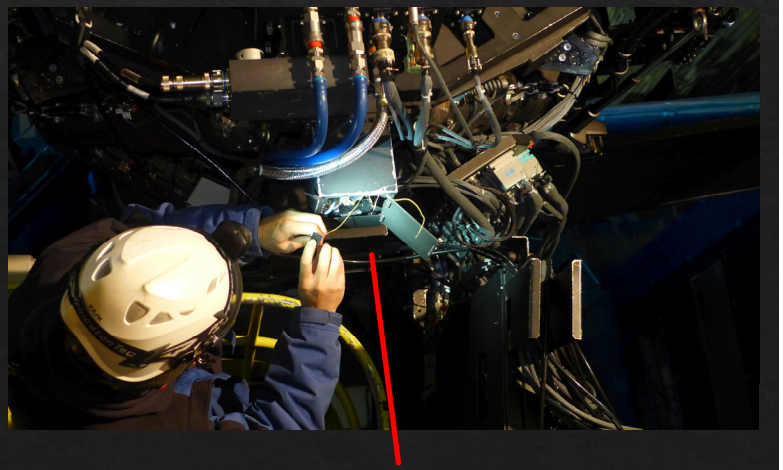
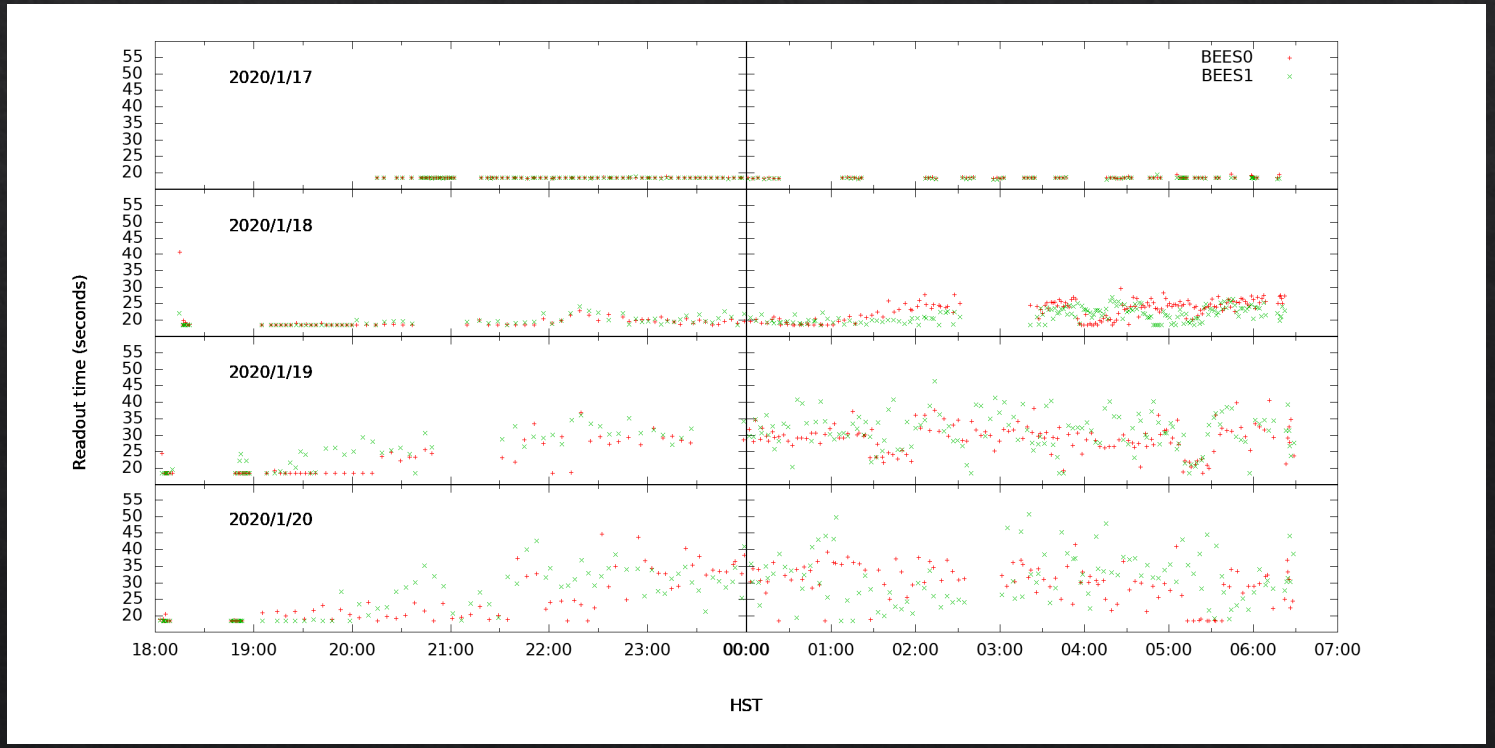




"Collision Collection Box" on POpt2

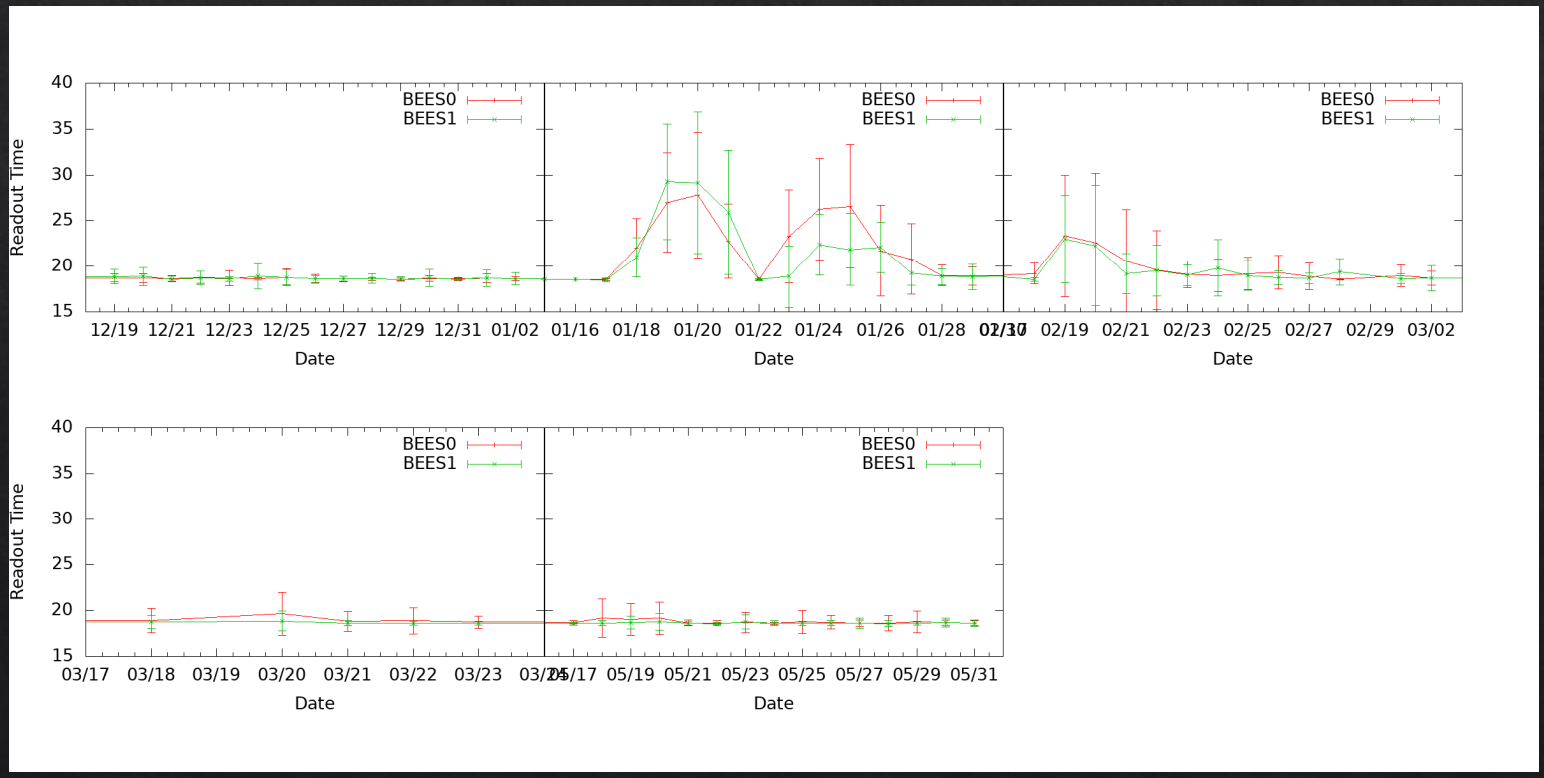
HSC

- issues
  - CCD readout time (January, 2020)
    - it suddenly started showing large variation of readout time
    - normally, it is ~18.5 seconds



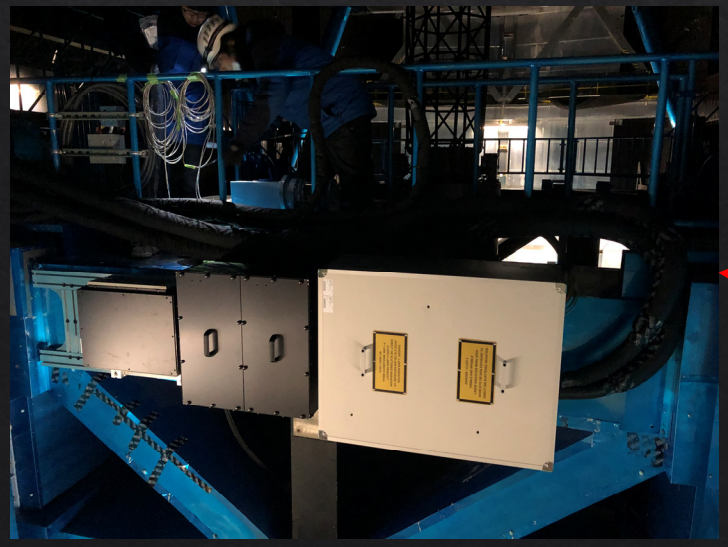
HSC

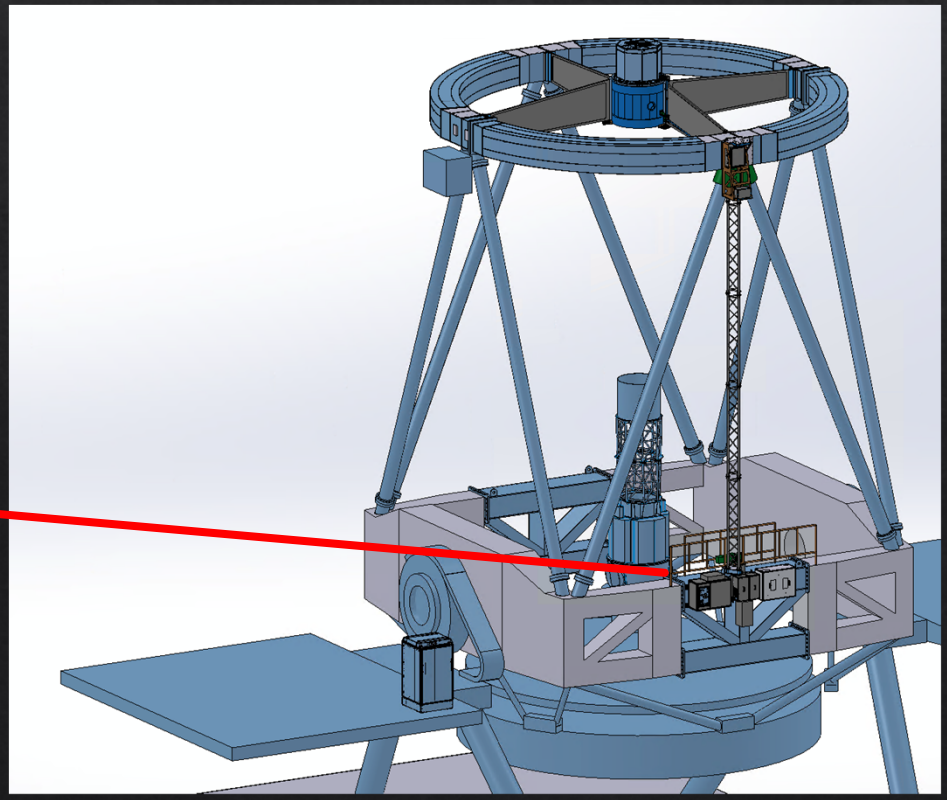
- issues
  - CCD readout time
    - resolved by increasing the “nice value” and priority of Messia server process
    - it has been stable after March, 2021 observing run



LGS/AO188

- Laser Guide Star Upgrade
  - installation of the major components started in February, 2021
  - continues in March, April
  - first on-sky test in April-May
  - “P19 Minowa et al.” for details

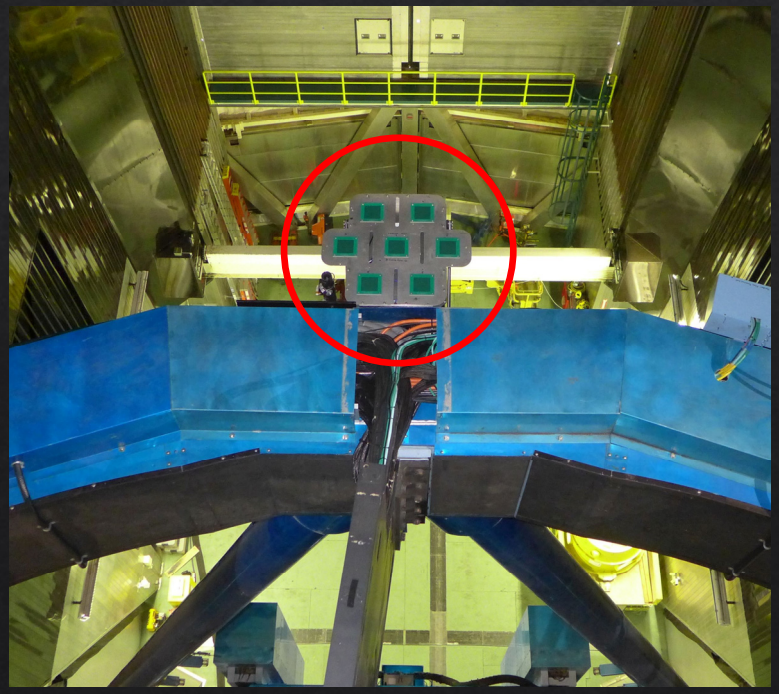




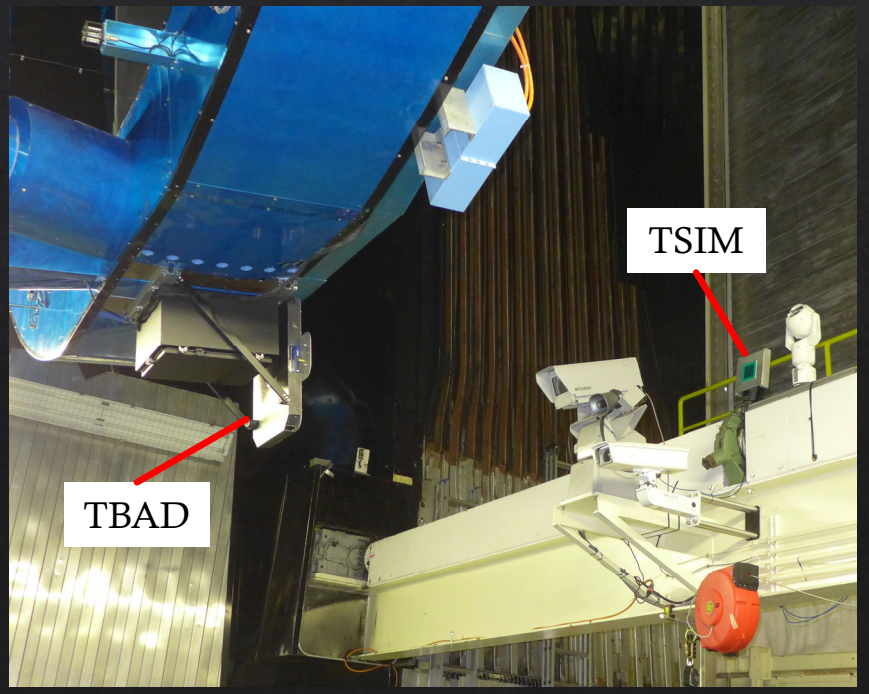
LGS/AO188

- TBAD (Transponder-Based Aircraft Detector)
  - system to detect airplanes and shut off the LGS automatically

TBAD on the telescope

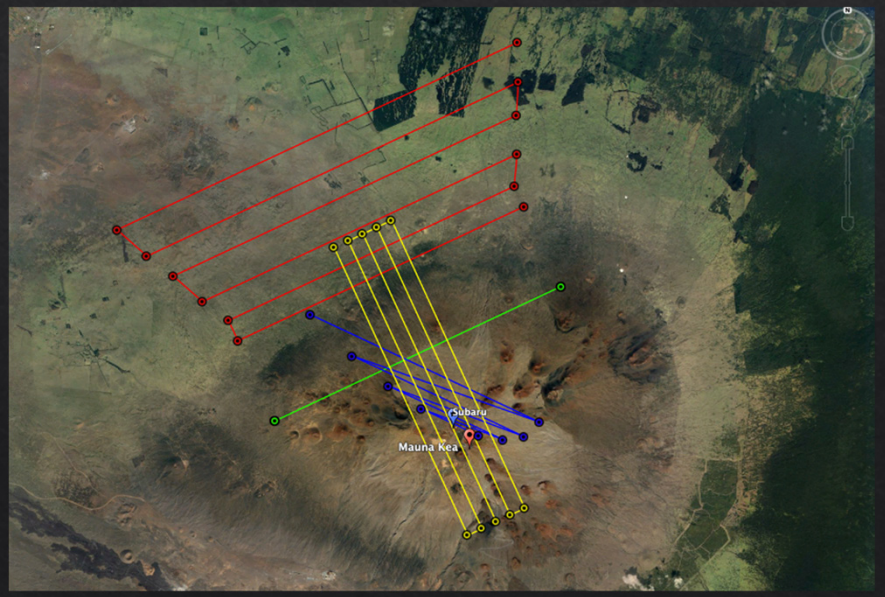


TBAD and TSIM



LGS/AO188

- TBAD (Transponder-Based Aircraft Detector)
  - validation
    - Maunakea fly-over test
      - attempted on 2/20/2021 but was postponed due to bad weather
      - planned on 3/6/2021
    - 6 months operation with spotter

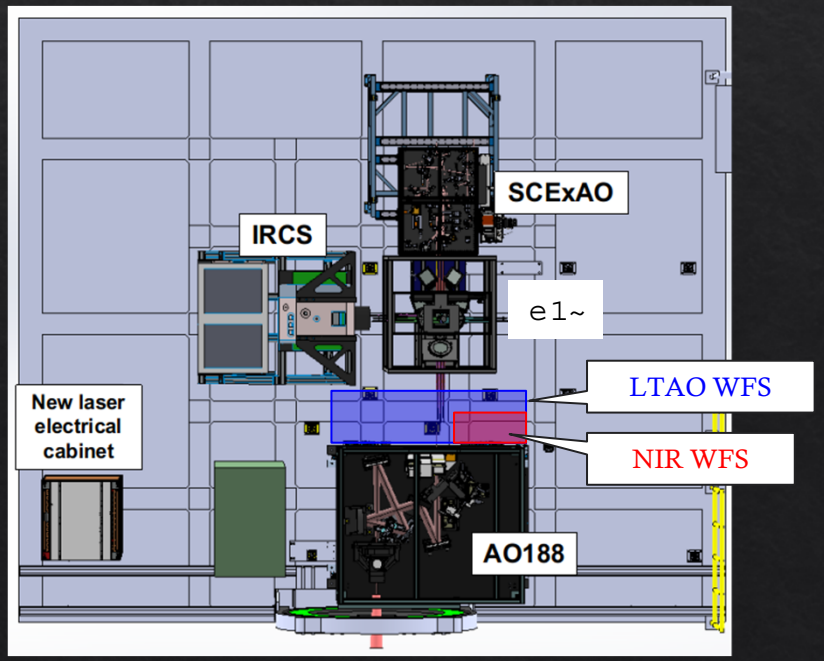


TBAD fly-over test plan

LGS/AO188

- AO188 related upgrades
  - new Deformable Mirror
    - ALPAO DM3228 (64x64)
    - arriving in this summer
  - Near Infrared Pyramid WaveFront Sensor
    - test and installation in this year
  - Nasmyth Beam Switcher
    - final design by AAO is still ongoing
    - fabrication cost is being requested
  - ULTIMATE-START
    - Grant-in-Aid project (PI:Akiyama)
    - Laser Tomographic AO with 4 LGS
  - o28 Ono et al., p02 Akiyama et al.

ALPAO DM3228



LGS/AO188

- new Real Time System (RTS)
  - replace the current RTS computer
    - NGS mode validation was completed
    - LGS mode validation is not yet completed
      - stability issues after software upgrade, laser upgrade works, etc.
      - bug fixes
    - concerns on possible damage on the aging deformable mirror (~15 years old)
      - during the software development phase
      - discussions with the DM manufacture
      - possible development of safety mechanism
  - advanced control
    - predictive control, 2kHz loop, joint control with AO188 and SCExAO
    - difficulty in continuing those developments with the current DM

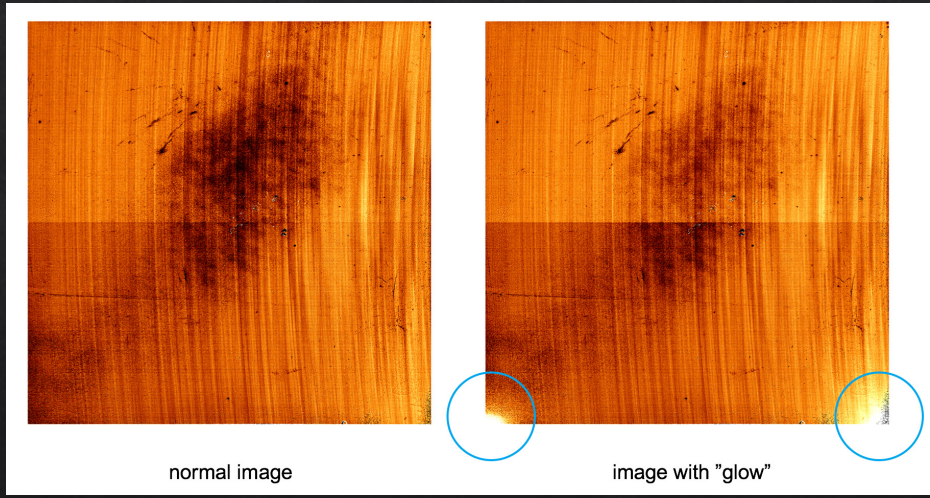
    → focus on the development with the new ALPAO DM (under discussion)

LGS/AO188

- hardware issues in 2020
  - replacements
    - ADC Hall sensor (to be done)
    - XPS controller (for image rotator, LOWFS)
    - temperature monitoring unit
    - SMC chiller parts
  - aging of hardwares is now an ongoing issue with AO188...
    - continue to replace and upgrade the subcomponents

IRCS

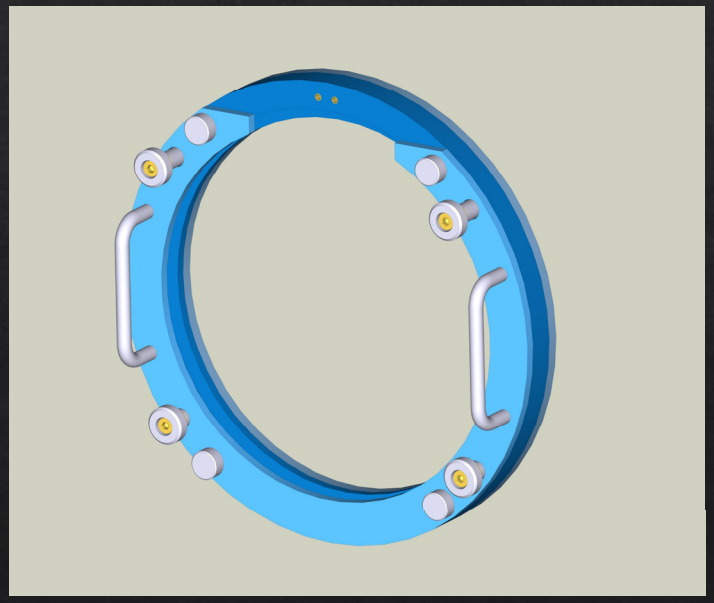
- Some issues with the detector electronics (same as last year…)
  - unstable behavior (especially after instrument exchanges)
  - glow-pattern
    - can be suppressed by changing voltage settings
    - test is still ongoing

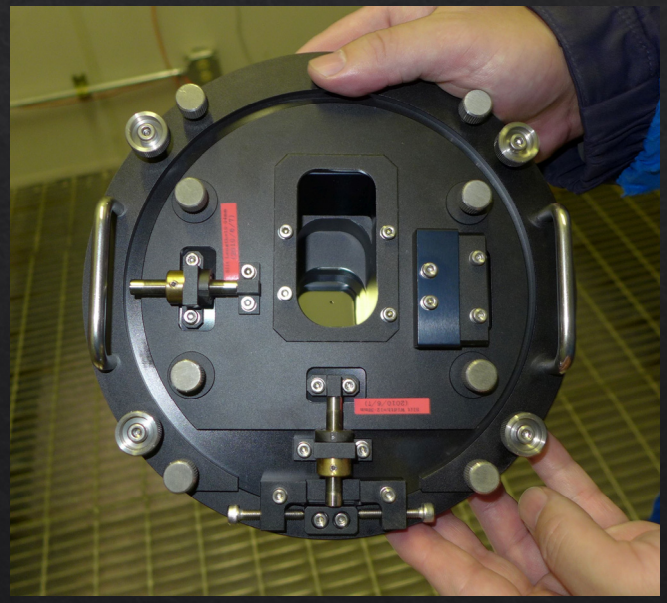


- new user filters
  - NB 1984 (already installed)
  - NB 1189 (possible installation in this summer)

HDS

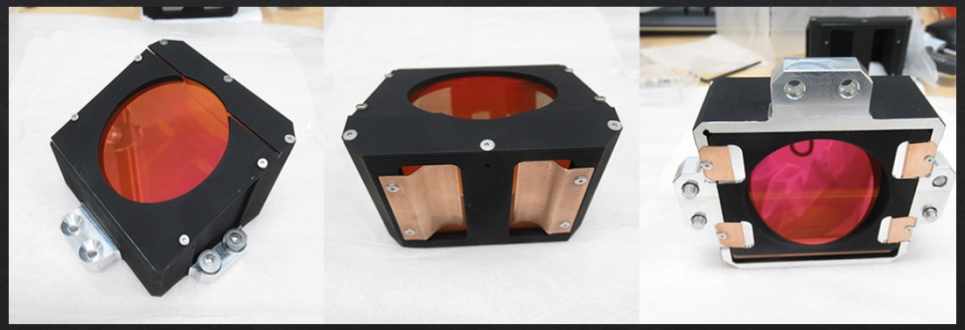
- No major issue/activity
- improvement for image-slicer replacement procedure
  - new handles and fall-protection of screws

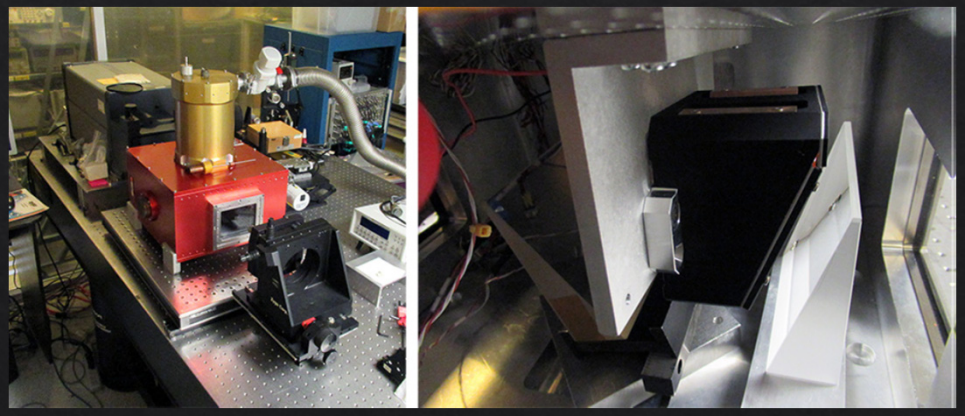




MOIRCS

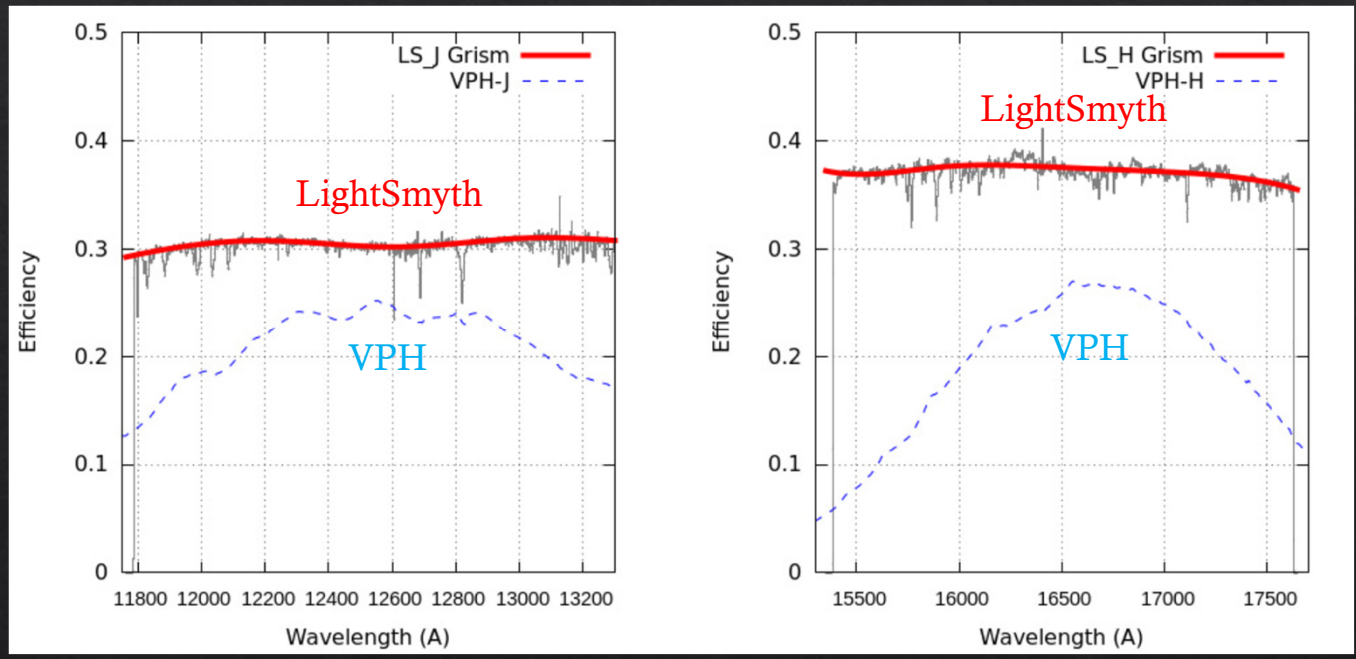
- LightSmyth high efficiency grism
  - Grant-in-Aid (Kakenhi) project (PI:Kodama)
  - J- and H-band grisms
  - assembly and laboratory tests in early 2020





MOIRCS

- LightSmyth high efficiency grism
  - first light in July, 2020



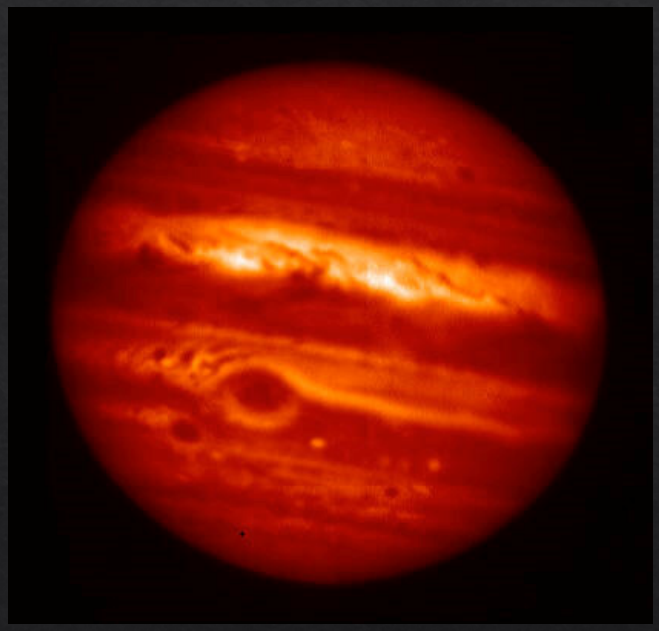
  - has been used for open-use observation

MOIRCS

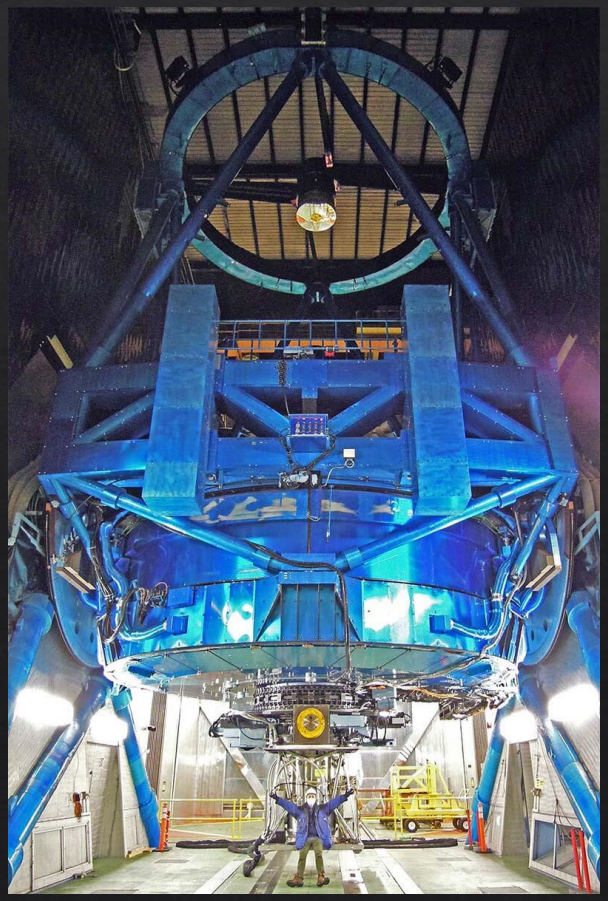
- Hibernation
  - following the successful commissioning of SWIMS
    - p10 Konishi et al.
  - from S21A to S22B
  - minor activities during the hibernation
    - replacement of grisms and filters
    - improvement of K-band VPH grism
      - to remove large spatial shift and tilt
      - depends on budget availability
    - resolve software issues

COMICS

- Decommissioned after S20A
  - pictures from the last observing night, 7/30/2020

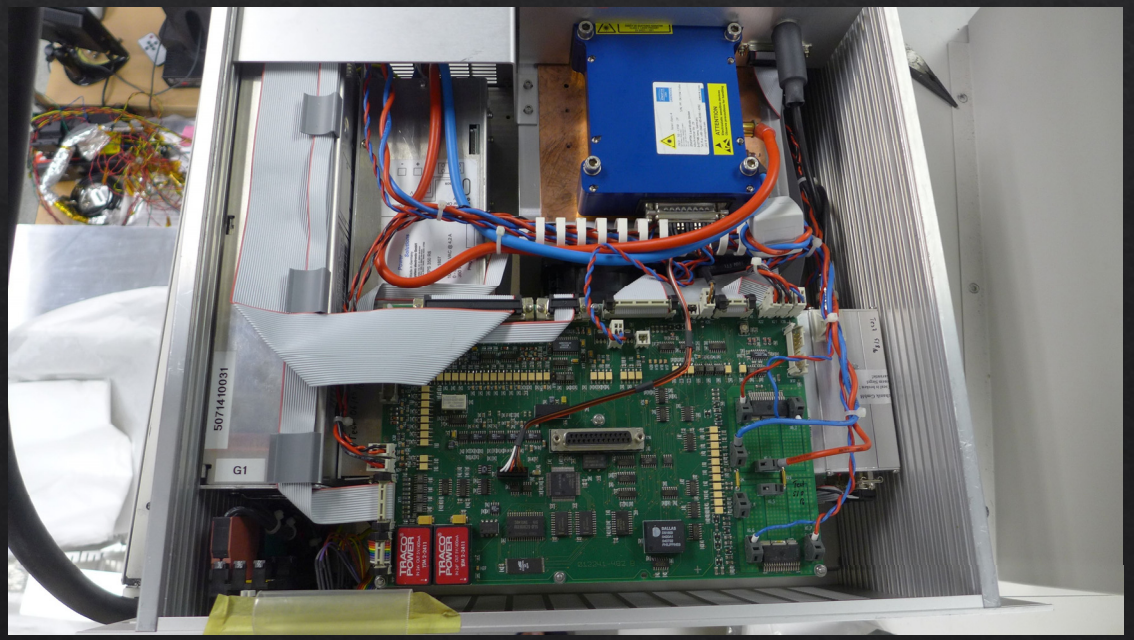


https://subarutelescope.org/en/news/topics/2020/08/19/2893.html



FOCAS

- No major issue/activity on the instrument
- Trouble with the laser cutter (MOS mask cutting)
  - happened in November, 2019
  - laser-diode current-driver was replaced in January, 2020



Summary 2020

Prime Focus

HSC	On-Axis dome flat, FEU and readout issues

Nasmyth

AO188	LGS upgrade, various upgrades on NsIR, hardware issues
IRCS	Issues with detector electronics, new user filters
HDS	No major issue/activity

Cassegrain

MOIRCS	LightSmyth grisms, hibernation
COMICS	Final light on 7/30/2020
FOCAS	Laser cutter trouble