Status of Existing Instruments

Subaru Users’ Meeting 2010

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(Science Operation Division)
Highlight (2010-2011)

Instruments Lineup

2010 June

FMOS joined in the lineup
✓ IRS1 low-resolution only
✓ IRS2 will come in S11A.

2011 May

LGS AO188 will start open use.
✓ Evaluation on-going
Highlight (Downtime)

To keep functional,

In 2009 UM

Less trouble!!

✅ Still functioning well
Executive Summary

To keep operational and competitive,

MOIRCS
- Channel-1 trouble and recovery, and New NBF and ND

Suprime-Cam
- (New CCDs) Better linearity, on-site DA system, and New NBF

AO188+IRCS
- DM failure and recovery, and NGS resumed.
- LGS development (=> Hayano-san’s Talk) and Open in S11A.

HDS
- Image-slicer => Tajitsu-san’s Poster

FOCAS
- FDCCD upgrade

FMOS
- IRS1(LR) open use and HR, IRS2 development => Tamura-san’s talk
MOIRCS (Channel-1 turret-rotation trouble)

- Recognized on Sep. 28, 2010 (before the first S10B obs.).
- Channel-2 side only Operation during the whole S10B.
  - 2 N (Keck[te]), 2 N (Gemini[te]), 1 N (UH), 4 N (Subaru OpenUse[ip])
    [te]: Time Exchange Program, [ip]: Intensive Program
- One month troubleshooting went fairly well.
  - Fixed within Dec., 2010, and will be verified in Jan., 2011.
- Cause – stack of bad screws used in one holder for new grism.

![Image of good and bad screws with labels: Good guy and BAD guy (longer by just 1mm...).]
MOIRCS (New Filters)

- **Br γ** (cw/bw = 2.163/0.025 µm) now available.
- **ND filter** become available.

Main purpose is to provide good-quality Ks-band Dome flats (but can be used to scientific data acquisition).
**FOCAS (CCD Upgrade)**

Engineering Obs: June 2010  
Open use : from Oct. 2010

- Improvements on  
  - higher efficiency,  
  - less fringing,  
  - faster readout,  
  - better cosmetics  
  (only 1 dead column in 2 CCDs)

- However, please note..  
  - extensive cosmic rays  
  - wider CCD gap (50 \rightarrow 70\text{pixel})

Total Efficiency (compared to the MIT CCD)  
\sim0.9@400\text{nm}, \sim1.3@500\text{nm}, \sim2@1000\text{nm}
FOCAS (CCD Upgrade)

Less fringing
domeflat with 0".8+300R+O58

Wavelength (nm)
FOCAS (CCD Upgrade)

Performance Demonstration (high-z QSOs)

VPH900 (7500-10500Å, R~2000, ~2hours)

![Graph showing flux vs wavelength with Ly α, NV, OI/SiII peaks and two QSOs labeled CFHQS J0210-0456 (z=6.44) and CFHQS J2329-0301 (z=6.42).]
HDS (Image-Slicer upgrade)

Engineering Obs:
Jun. and Dec., 2010
1.8 times higher efficiency confirmed!
(under 0”.68 seeing)

✓ Slicing Φ1”.5 image into
  0”.3 x 5 spectra
✓ R=110,000
  (slit width of 0”.3)

=> Please see Tajitsu-san’s poster for details.
Suprime-Cam

Signal at 1-channel of 1 CCD (DET-ID:9)

- Found on Sep. 17, 2010
- After adjusting bias voltage, operation has been okay (since Oct., 2010)
- Please note that gain was changed on the channel.

On-site data analysis system available

- Operation since Mar., 2010
  Data assurance can be done on site (Seeing, sky level, etc.)

Analysis pipeline (SDFRED2) released

For the data obtained after 2008/07.
(http://www.naoj.org/Observing/Instruments/SCam/sdfred/)
Suprime-Cam (New Filters and Grisms)

- Narrow band filter Open
  N-A-L656 (Hα): S10B~
  W-A-Y (Y-band): S11A~
- Grisms will be Open
  Planning in 2011
AO188+IRCS (NGS mode)

Failure and Recovery of DM

Occurred on Jan. 27, 2010
(during LGS Engineering run)

Recovered in late Oct., 2011

13N Backup Programs selected by TAC
4N  IRCS (w/o AO188) Obs.
AO188+IRCS (NGS mode)

Performance w/ New DM

- Confirmed that AO188 performance with new DM is almost same as before its failure.
- Resumed OpenUse since Nov., 2010.

Points w/o circle: before DM failure
Points w/ circle: after DM replacement
AO188+IRCS (LGS mode)

Successful Closed Loop using Laser Guide Star

- Seeing (FWHM ~ 0''.3)
- LGS mode w/R14mag TT GS (SR~0.2 FWHM ~ 0''.08)

✓ Obtained diffraction-limited PSF w/ LGS
✓ Will start OpenUse from May 2011.

Testing is underway.. => Please tune in Hayano-san’s talk
Operations of Existing Instruments

- First generation instrument: (>10 yrs old)
  - Some parts: ~15 yrs old...

- Still succeeding in keeping in good shape
  - Thanks to dedicated works by support staff
  - Once serious trouble occurs, huge resources are required.

- Serious investigation required for the “future” of “Existing instruments” upon ‘Users’” demands.

  Especially in consideration of the future instrumentation in Subaru.

We appreciate your kind cooperation about
Pre-imaging (30min; FOCAS and 1hour; MOIRCS), and
Clear information on MOIRCS MOS masks and S-Cam filters

We look forward to your continued support for these.
AO188+IRCS (NGS mode)

(Complex) Operation Progress

✓ Most of NGS commands can be executed from OCS side
✓ Efficient parameter tuning realized
✓ ADI, Non-sidereal, Parallactic angle spec. ready.

=> LGS operation could be even more complicated…
AO188+IRCS (DM resume)

IRCS 52mas Camera
Red: H2(1-0) 2.122μm, Green: Brγ 2.167μm, Blue: [FeII] 1.644μm

63” x 63”