Subaru Internal Meeting for Instrument Plan: Decommission of Facility Instruments

2013/10/08 I. Iwata

Objectives of Today's Meeting

- Share Basic Ideas and Goals
  - Why we need to establish the instrument plan including decommission
  - Considerations for Building a Plan
    - Steps and Schedule
    - What We Need to Know
- FMOS
  - Current Status of PFS and Its Floor Plan (Takato-san)
- Today we are *not* going to discuss decommission of specific instruments except FMOS.

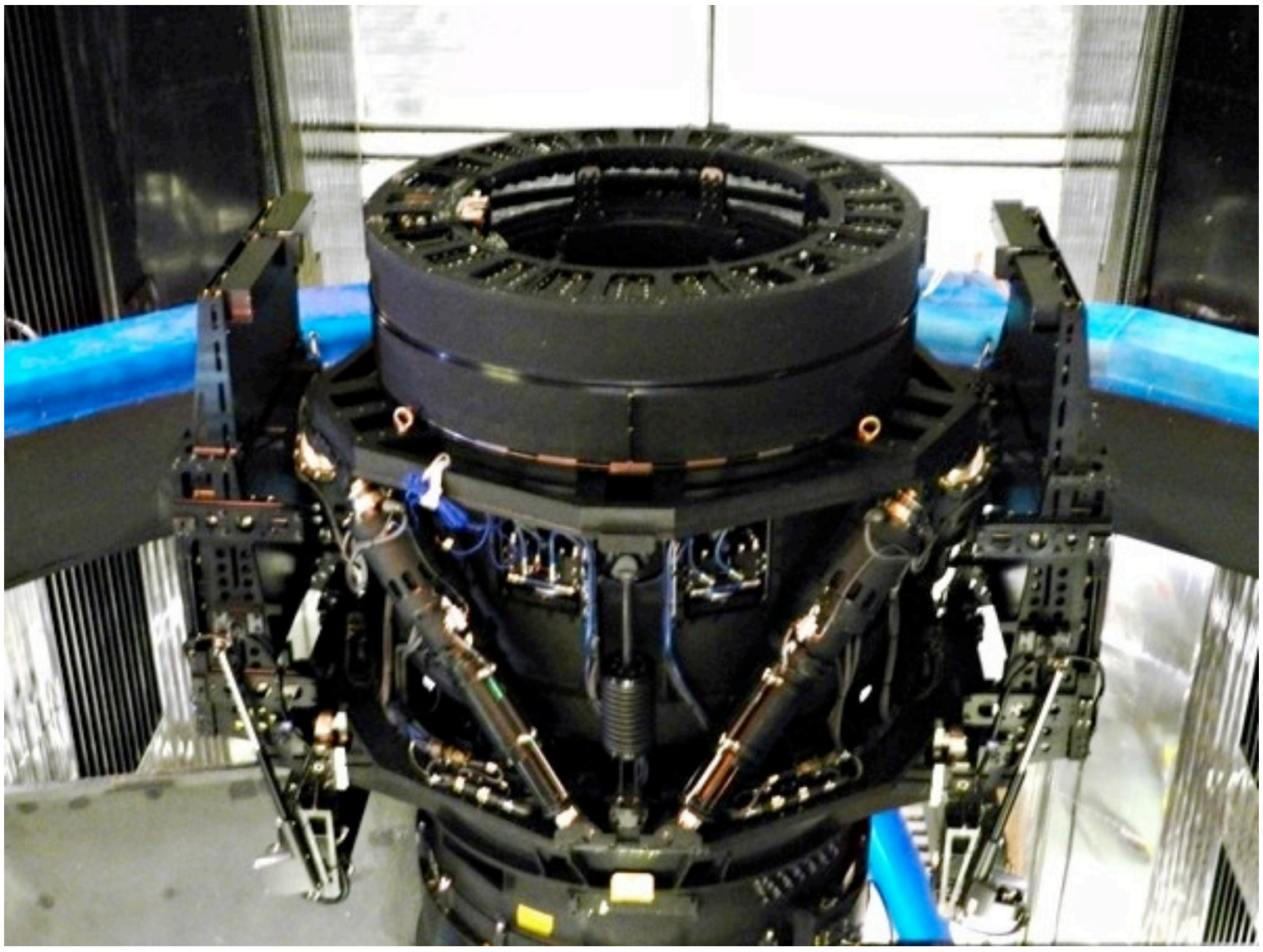
Why we need to establish the instrument plan

Why we need to establish the instrument plan

- Subaru's new facility instruments and strategy
  - More emphasis on 'Survey'-type instruments
  - Complimentary role in the TMT era
    - Feeding sample to be observed by TMT

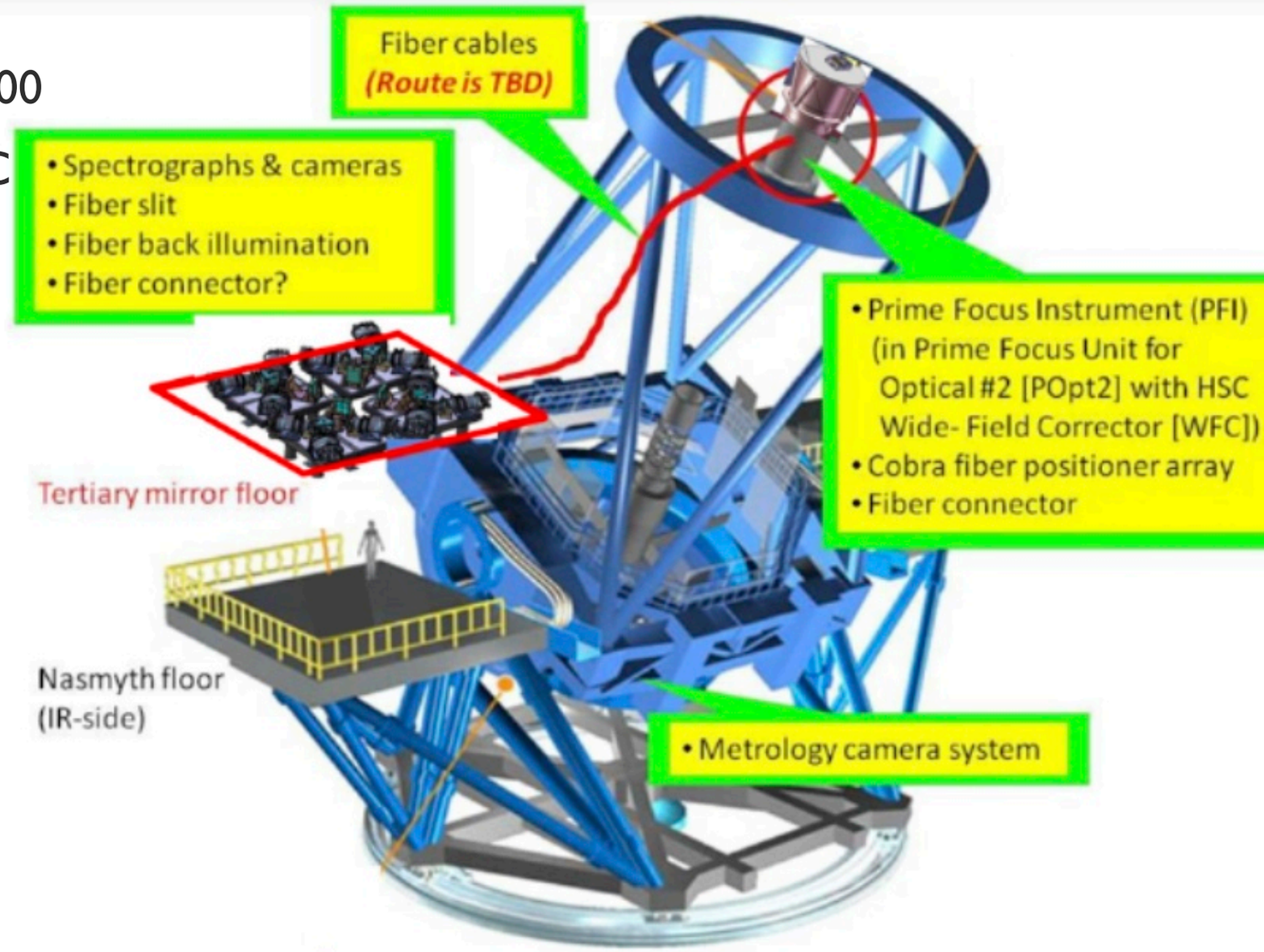
Hyper Suprime-Cam

- 1.5 deg. Field of View Optical Imager
  - Six filters at one time including Narrow-band Filters
- 300 nights Strategic Survey Program starting from S14A

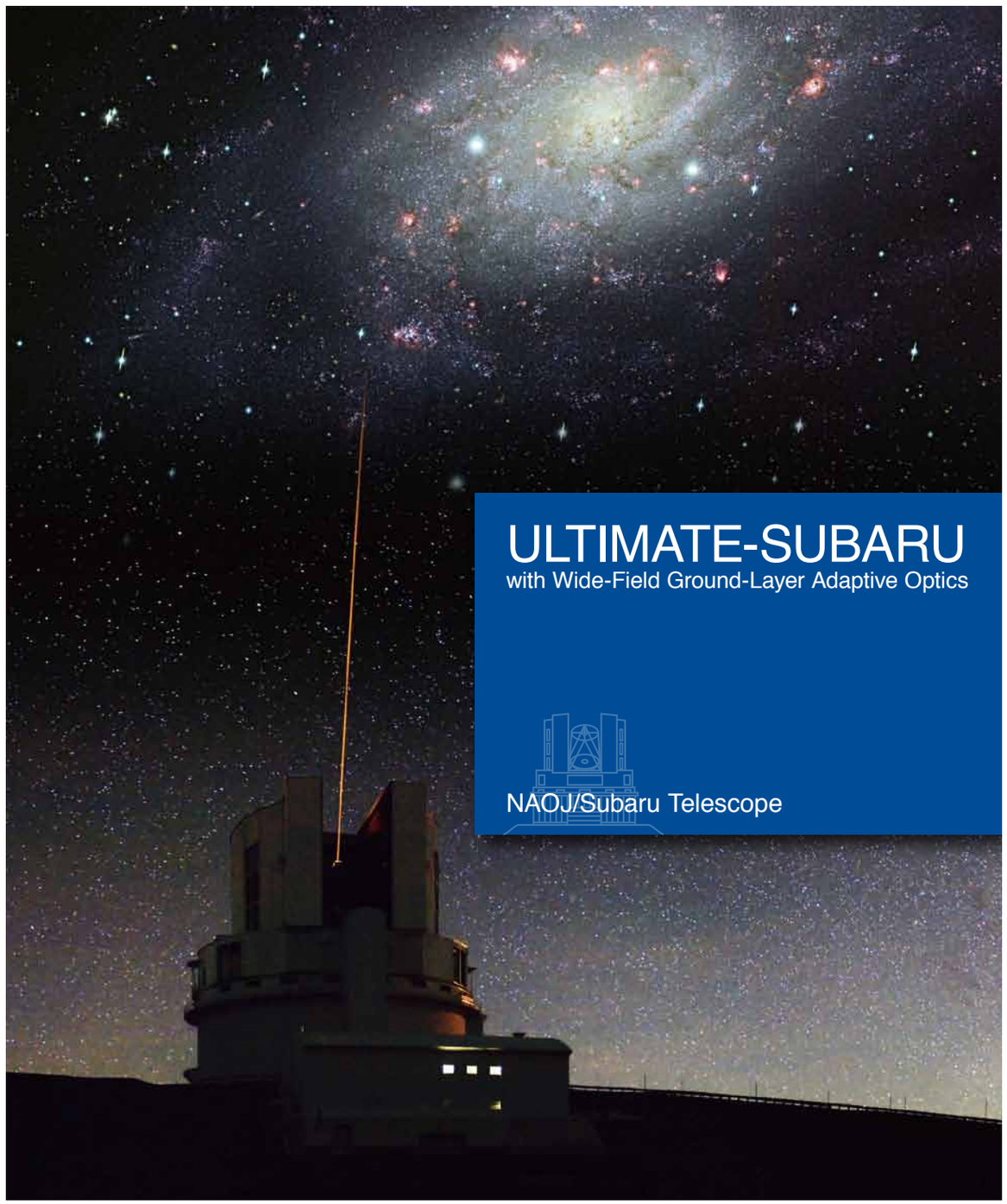


Prime Focus Spectrograph

- 2,400 fibers, 0.38 - 1.26μm, R~3,000
- Sharing the same POpt2 with HSC
- Four spectrographs
- International team led by IPMU, University of Tokyo



ULTIMATE-SUBARU
(Ground-Layer AO and New NIR Instrument)



- Adaptive Secondary Mirror
- Seeing Improvement (about 1/2 image size)
- >10arcmin Field-of-View at Cassegrain
- http://www.naoj.org/Projects/newdev/ngao/

Change of Subaru Operations

Current

Wide variety of instruments
Classical observations
<5 nights per program
Frequent instrument exchange

Future

Emphasis on surveys
Queue observations
Large programs
Smaller number of instruments

Why we need to establish the instrument plan

- Subaru's new facility instruments and strategy
  - More emphasis on 'Survey'-type instruments
  - Complimentary role in the TMT era
    - Feeding sample to be observed by TMT
- We will spend large amount of time for surveys with these new instruments.
- In order to achieve reliable operations of new, large instruments with limited resources, we would have to reduce the facility instruments.
- How we can make this transition? We need to establish an instrument plan.

Various aspects to be considered

- Importance of diversity of instruments
- Scientific harvests with the instrument
- Consistency with the Subaru's strategy
- Load of operation and maintenance. Resource distribution.
- Cooperation with other observatories (time exchange, transfer of instrument(s))
- Accessibilities of instruments with similar (or superior) capabilities (time exchange, future facilities)

How we can prioritize these factors?

Diversity of instruments

Unique capabilities

Back-up for troubles

‘Workhorse’ instruments

Time exchange programs

Transfer of instruments

Workload profiles for new instruments

Loads of operations / maintenance

← More instruments

→ Less instruments

Timeline (in HST)

- 2013/9/18 - DCM
- 2013/10/8 - Internal Meeting
- 2013/10/21 - Subaru Advisory Committee (SAC)
- 2013/Nov. - Internal Meeting #2
- 2013/Nov. - SAC
- 2013/End of Nov. - Project Week
- 2014/1/20-22 - Subaru Users Meeting
- 2014/End of Jan. - Decision on FMOS Decommission
- 2014/Early Feb. - Call for Proposals in S14B

Primary

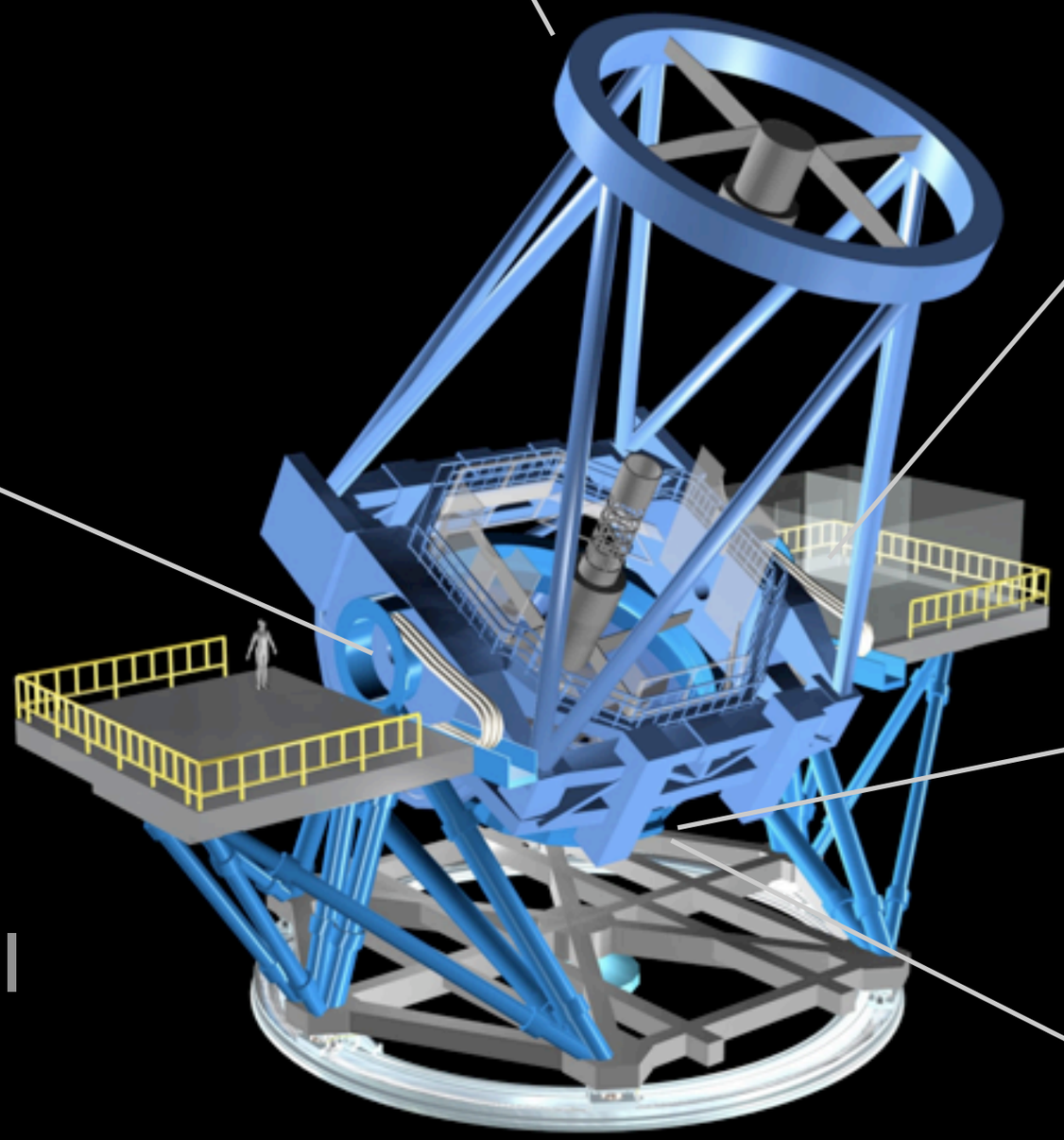
Suprime-Cam
FMOS
Hyper Suprime-Cam

NsOpt

HDS

NsIR

AO188
IRCS
HiCIAO
SCExAO
Kyoto 3DII



CsOpt

FOCAS

CsIR

MOIRCS
COMICS

TMT Instruments (maybe obsolete)

Name	IRIS - Imager	IRIS - IFS	IRMS	WFOS
Wavelength	0.8-2.5μm	0.8-2.5μm	0.8-2.5μm	0.31-1.0μm
Plate Scale	0.004”	0.004”-0.05”	0.06-0.08”	0.12”
FoV	17.2”x17.2”	0.064”x0.512” - 2.2”x4.55”	2’x2’	9.6’x4.2’
Sp. Resolution etc.		R~4,000	MOS R~4,000-5,000	MOS R~1,000-7,500

Gemini Instruments

North

GMOS	Optical MOS+Imager
NIRI	1-5μm Imager w/AO
NIFS	1-2.5μm IFS
GNIRS	1-5μm Spectrograph w/AO

South

GMOS	Optical MOS+Imager
GSAOI	0.9-2.4μm Imager w/GeMS
GPI	AO Imaging Polarimeter + IFS
FLAMINGOS-2	NIR MOS+Imager

Future instruments:

Remote access to ESPaDOnS, GHOS (High-dispersion optical spectrograph)

Keck Instruments

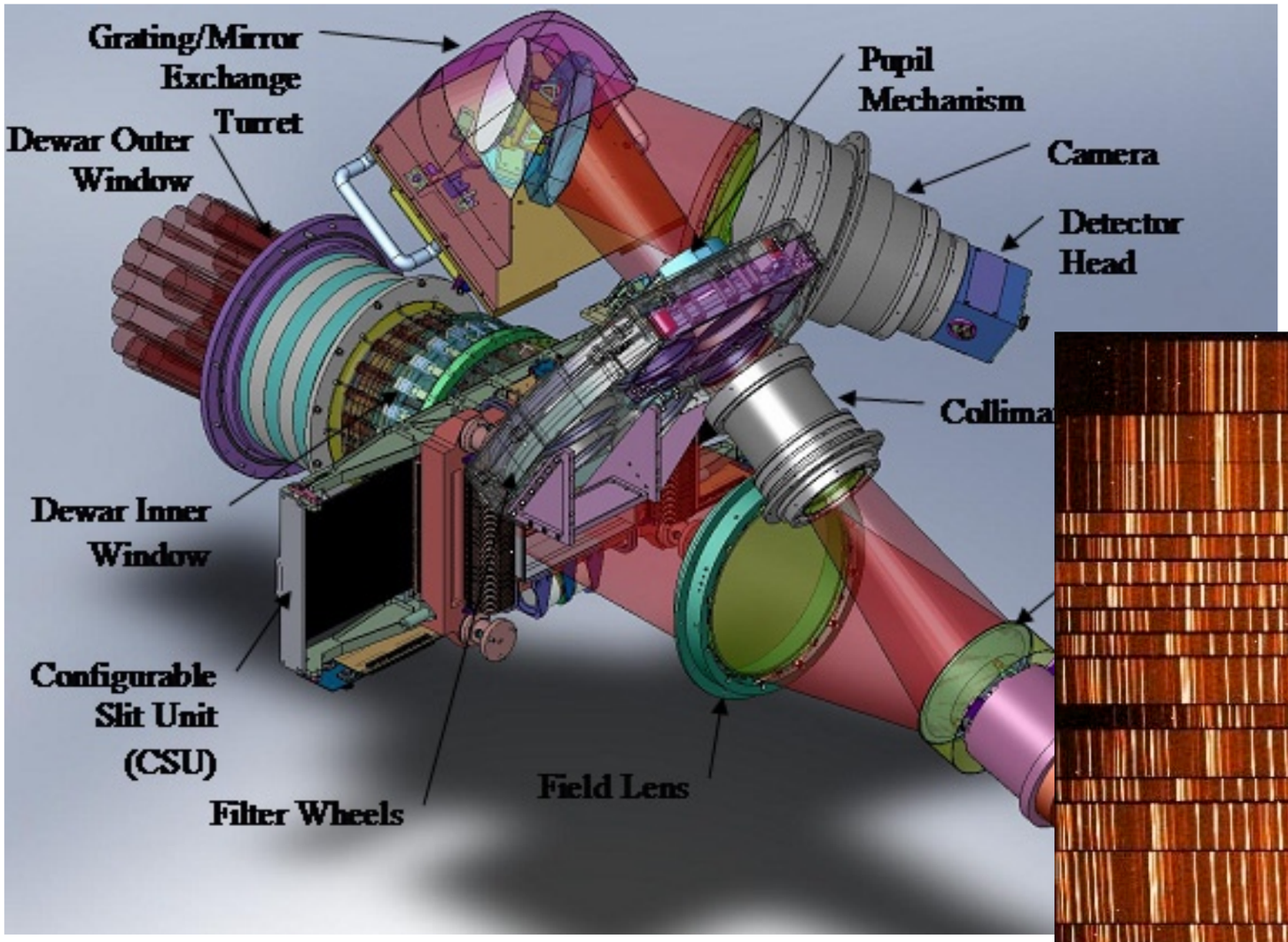
Keck I

HIRES	0.3-1.0μm High-dispersion Sp.
LRIS	0.3-1.0μm MOS+Imager
MOSFIRE	0.9-2.5μm MOS+Imager
OSIRIS	NIR IFS w/AO

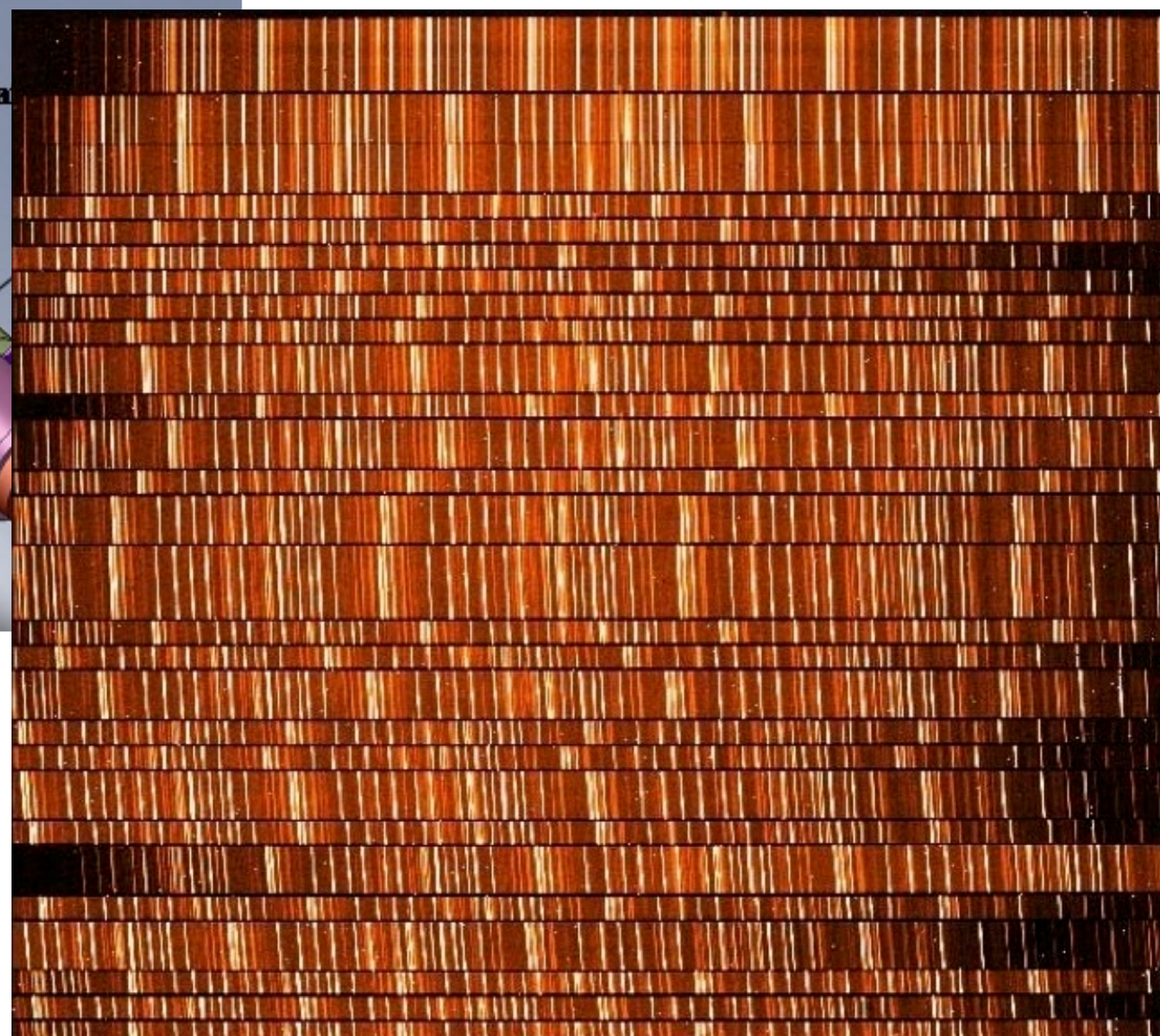
Keck II

DEIMOS	0.4-1.0μm MOS+Imager
ESI	0.4-1.1μm High-dispersion Sp.
NIRC2	0.9-5.3μm Imager+Sp. Coronagraph
NIRSPEC	0.9-5.5μm Echelle Sp.

Keck MOSFIRE



- FoV: 6.1’ x 6.1’
- 46 Slit Masks

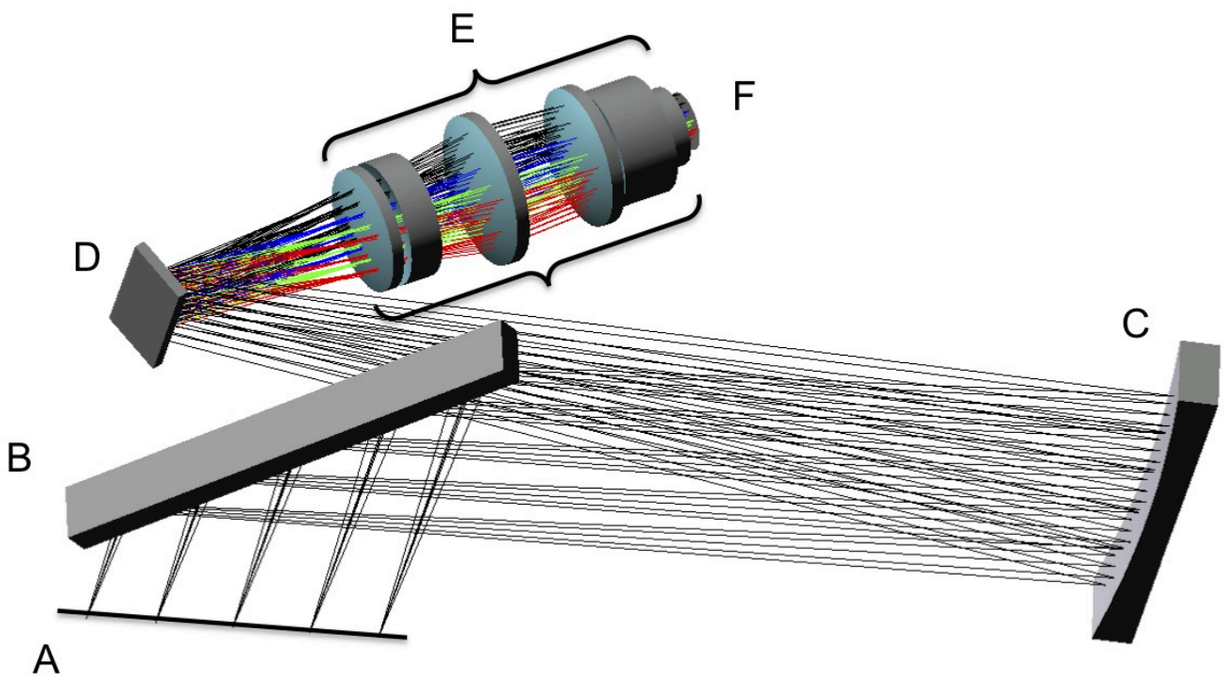


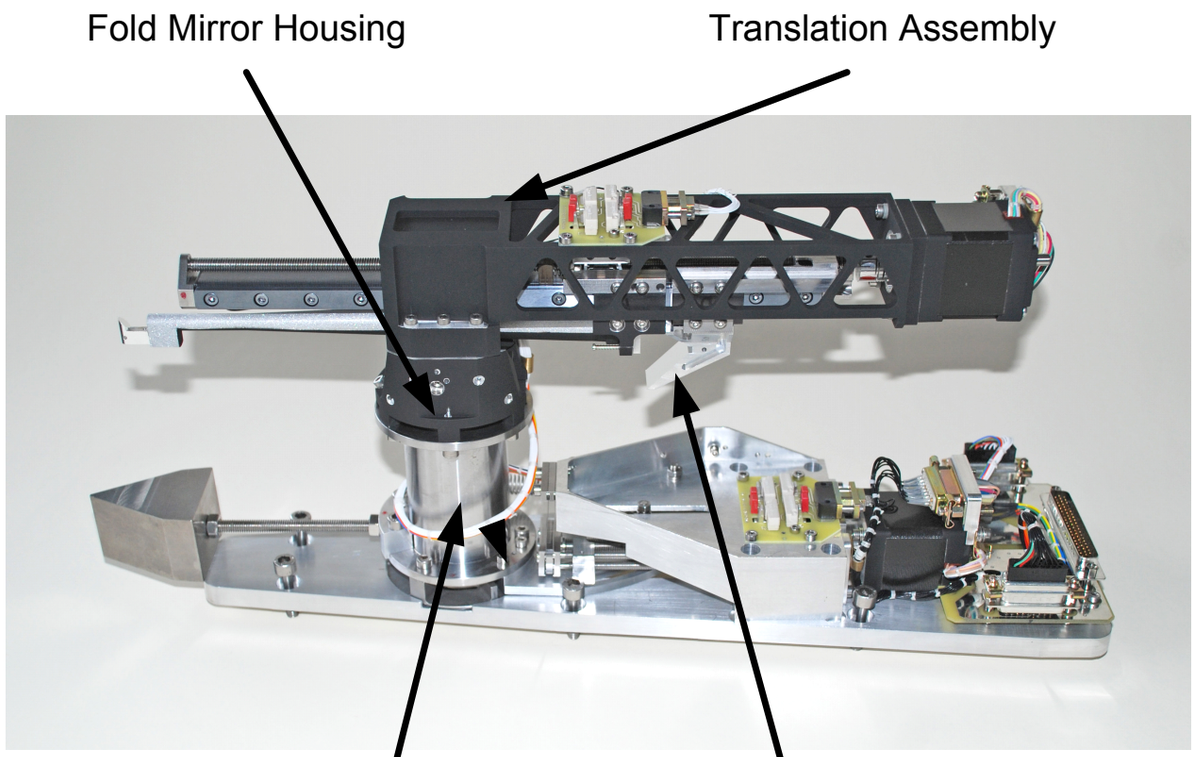
MOSFIRE CSU
(Configurable Slit Unit)

Swiss Center for Microelectronics (CSEM)

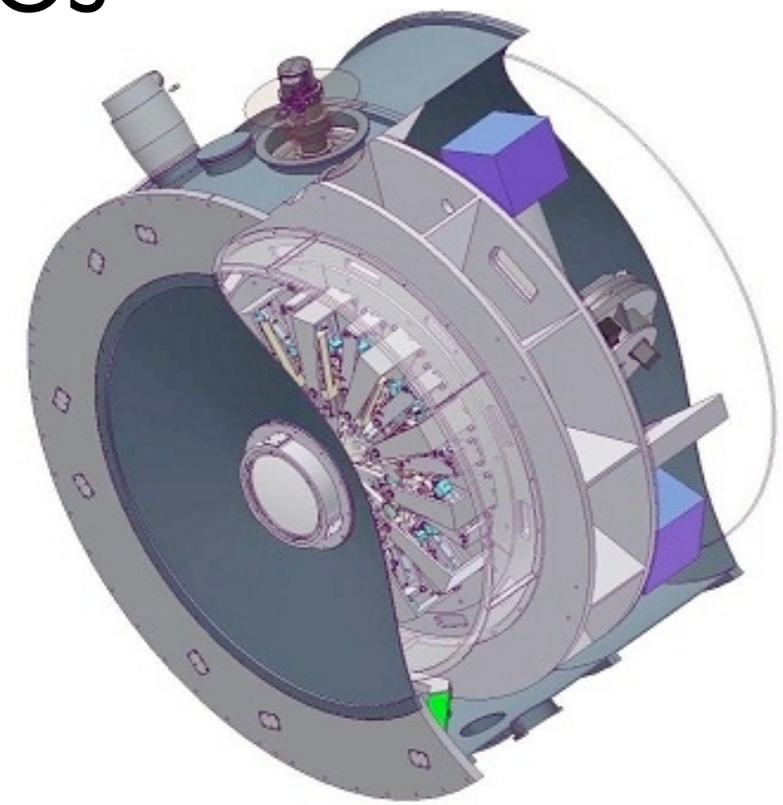
KMOS for ESO/VLT

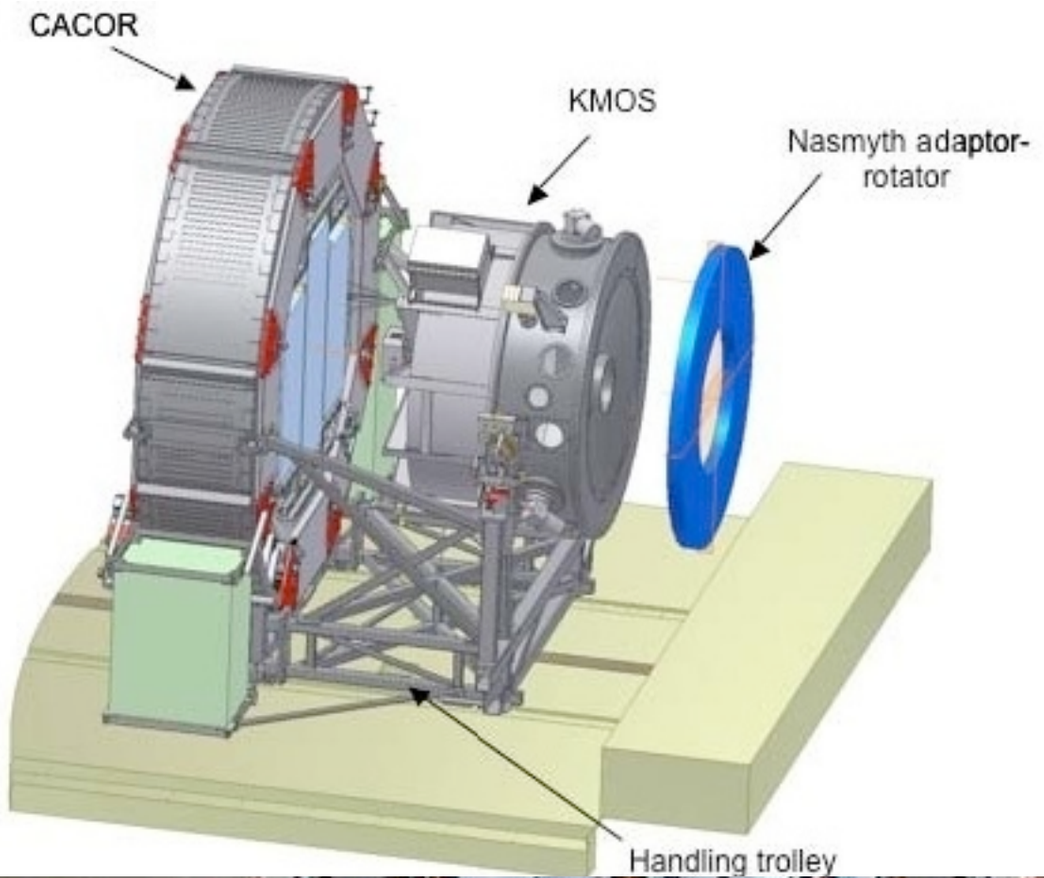
- 24 Deployable IFUs
- 0.2” Sampling, 2.8”x2.8” FoV
- 7.2 arcmin Patrol Field
- R: 3300 (IZ), 3400 (YJ), 3800 (H), 3800 (K)
- Pick-off Arm + Image Slicer
  - Pick-off Arm operated at 140K

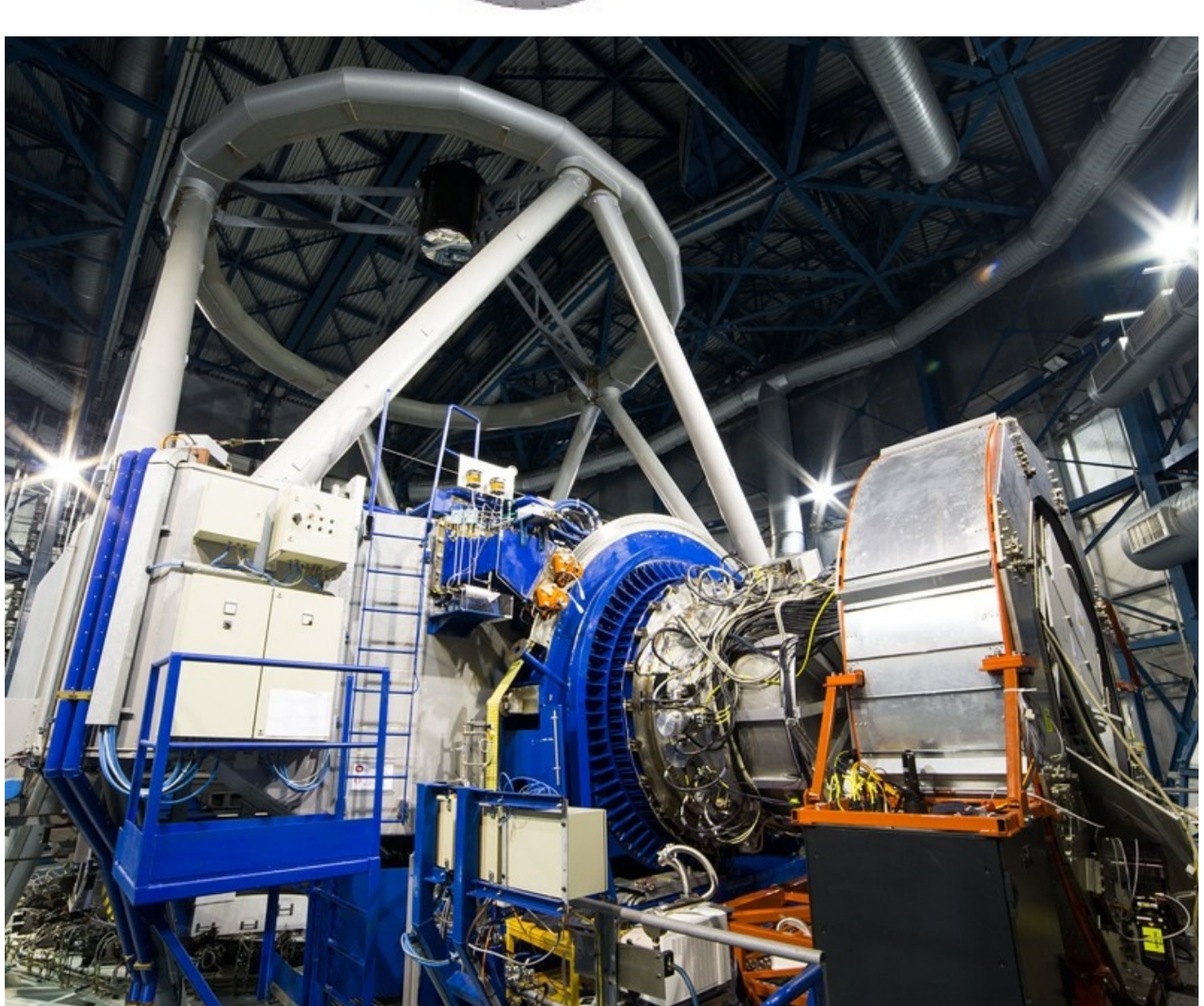


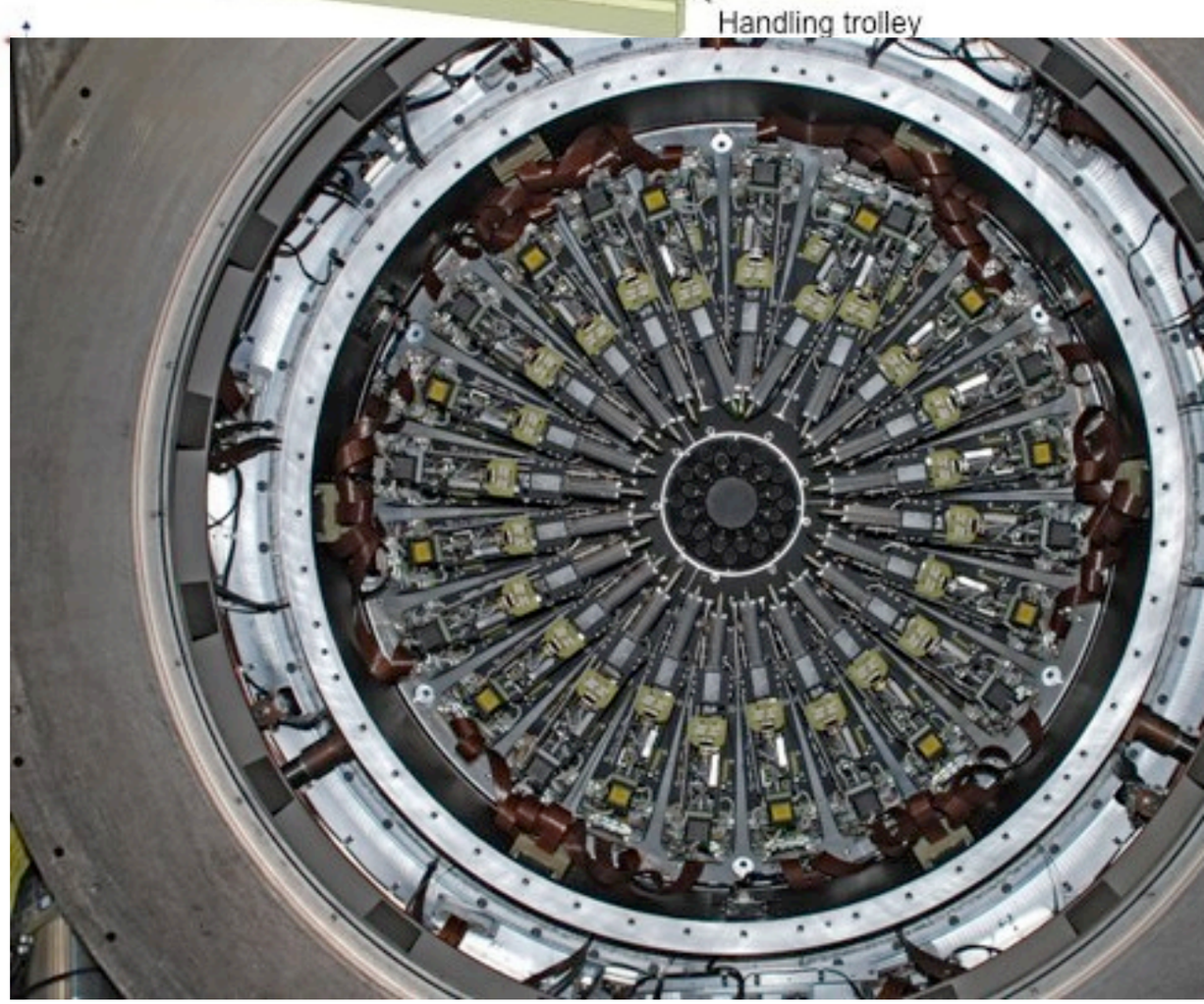


KMOS

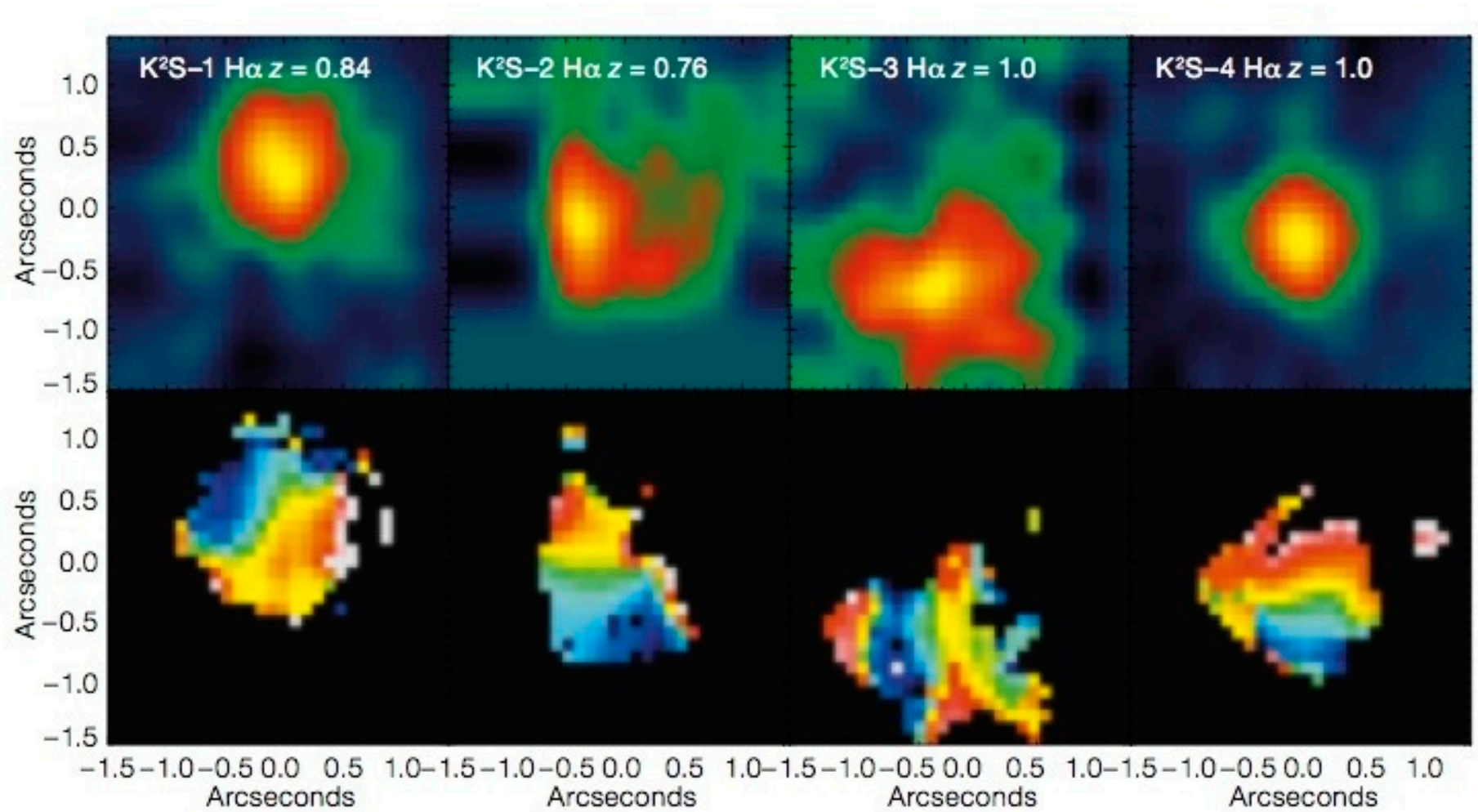








KMOS First Light Image

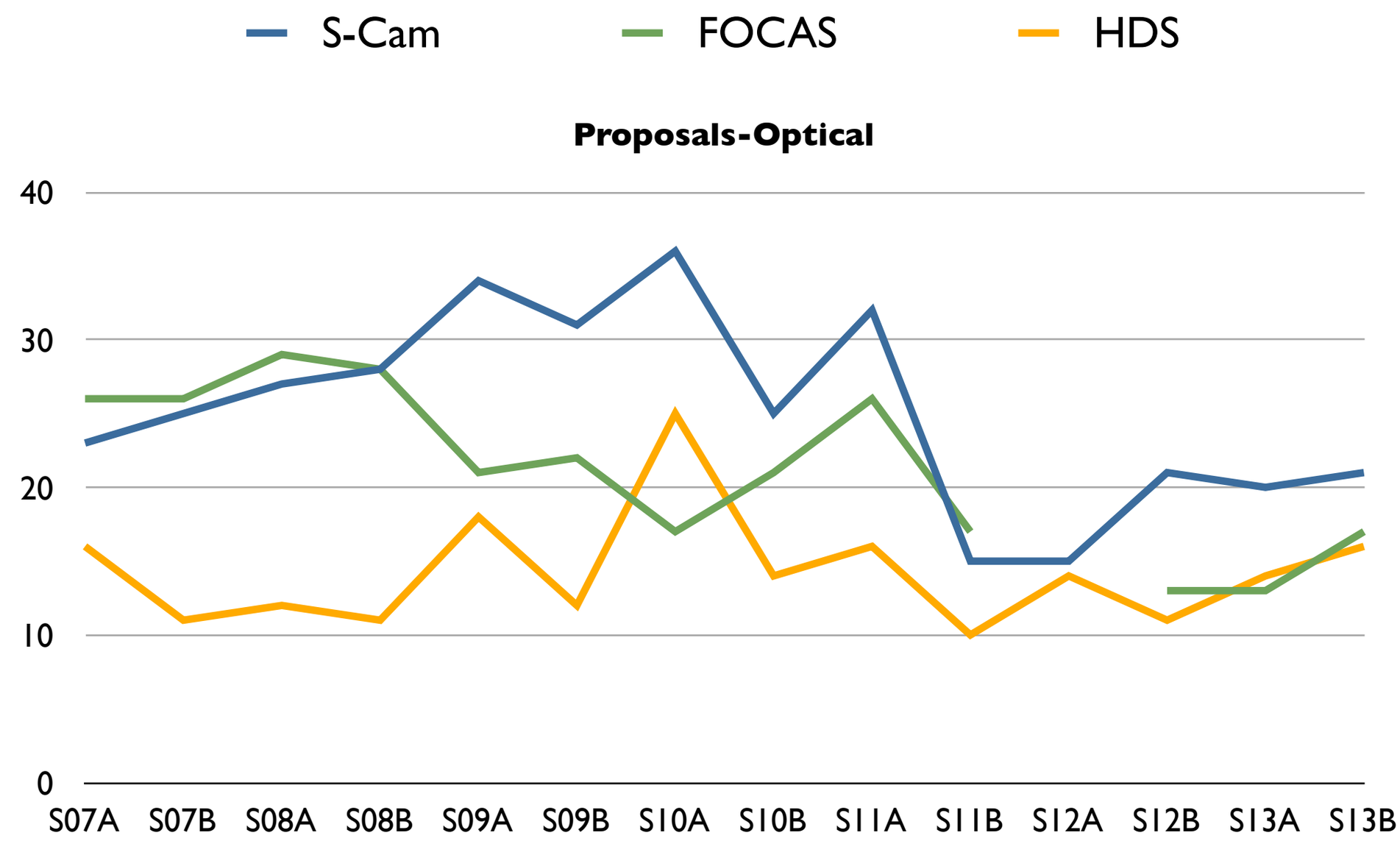


Sharples et al. 2013 ESO Messenger 151, 21

Scientific Demands

- thanks to Chie Yoshida-san at Mitaka. data as of Sept 4, 2013

Number of Proposals Submitted



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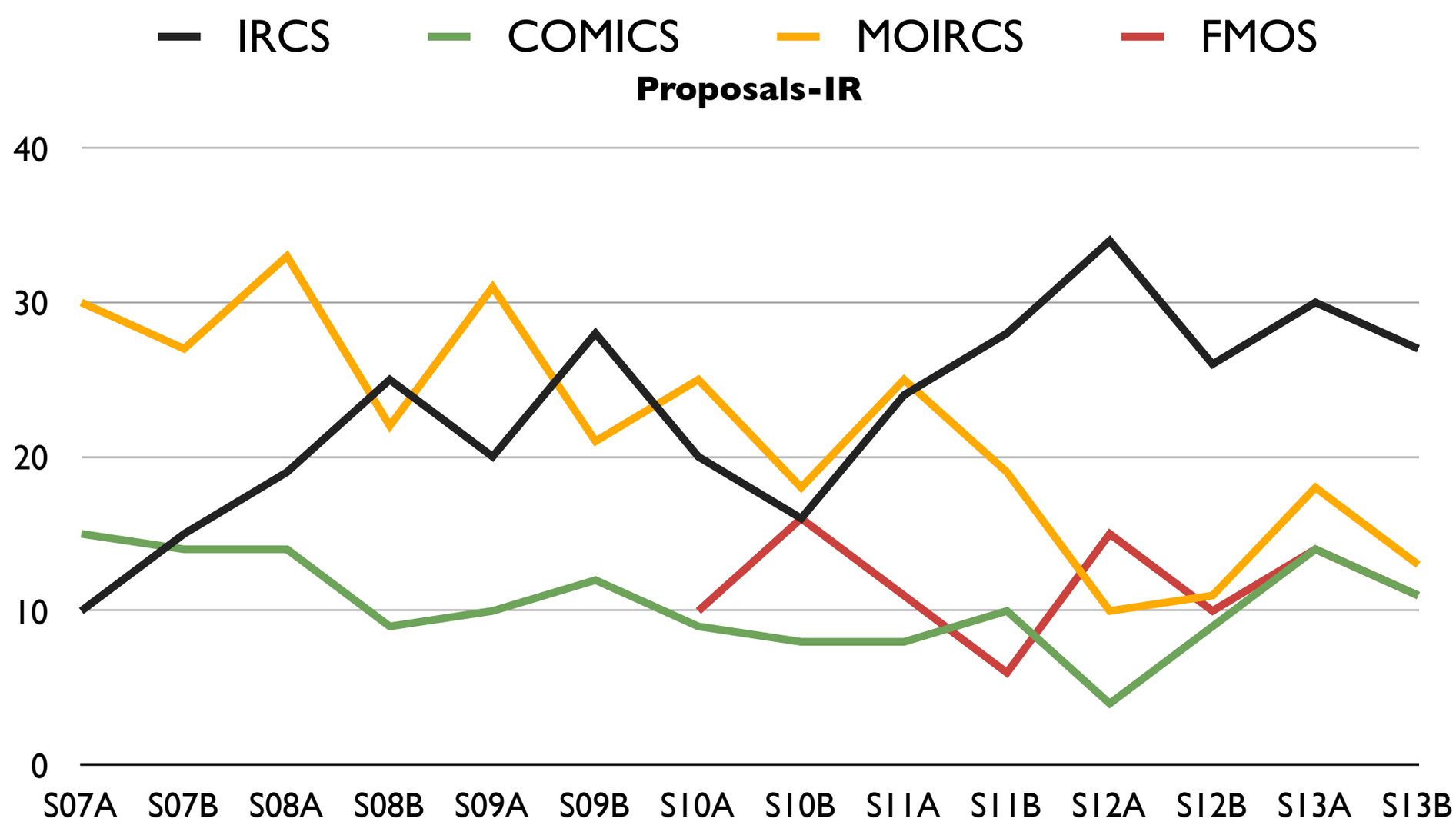
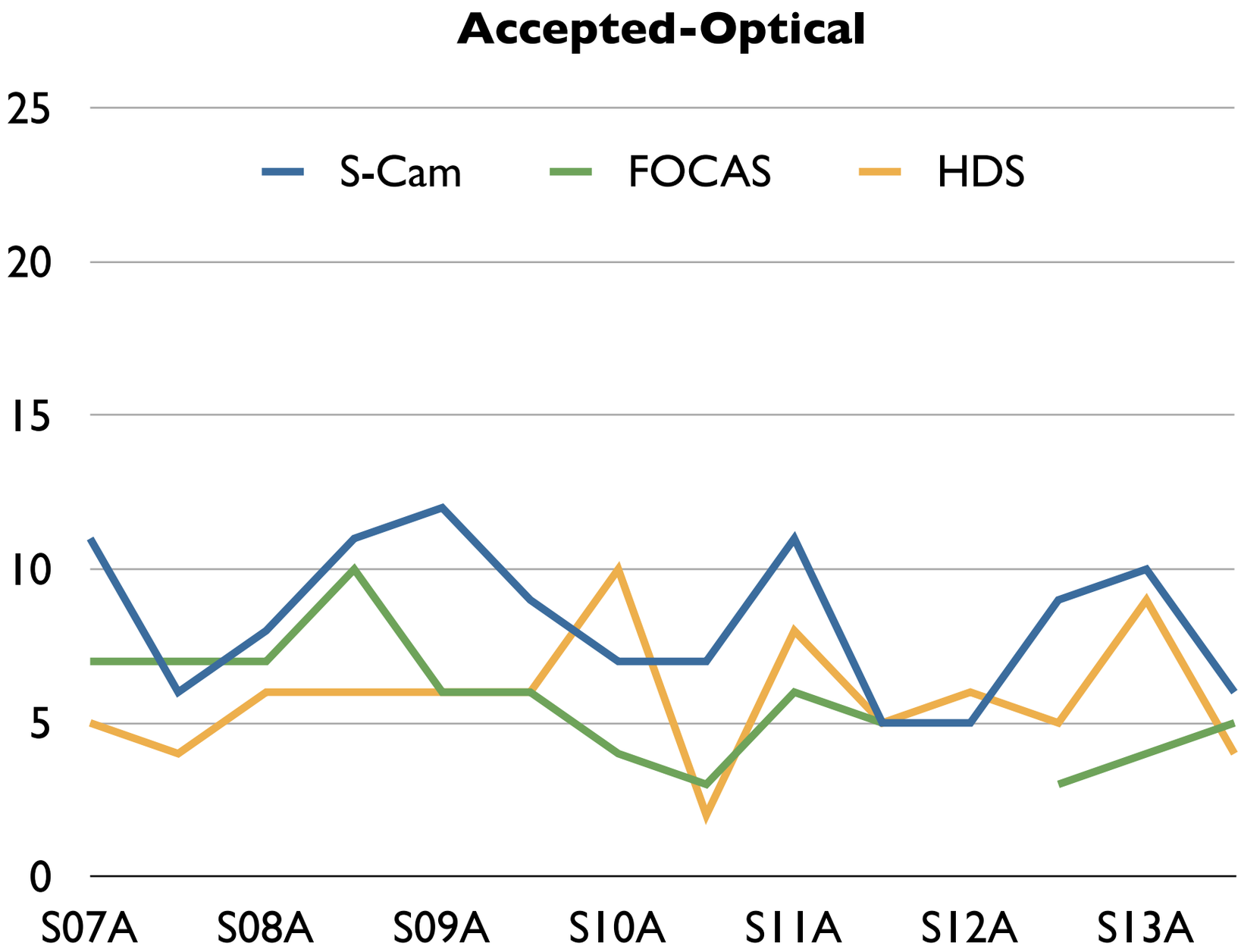


Number of Approved Programs



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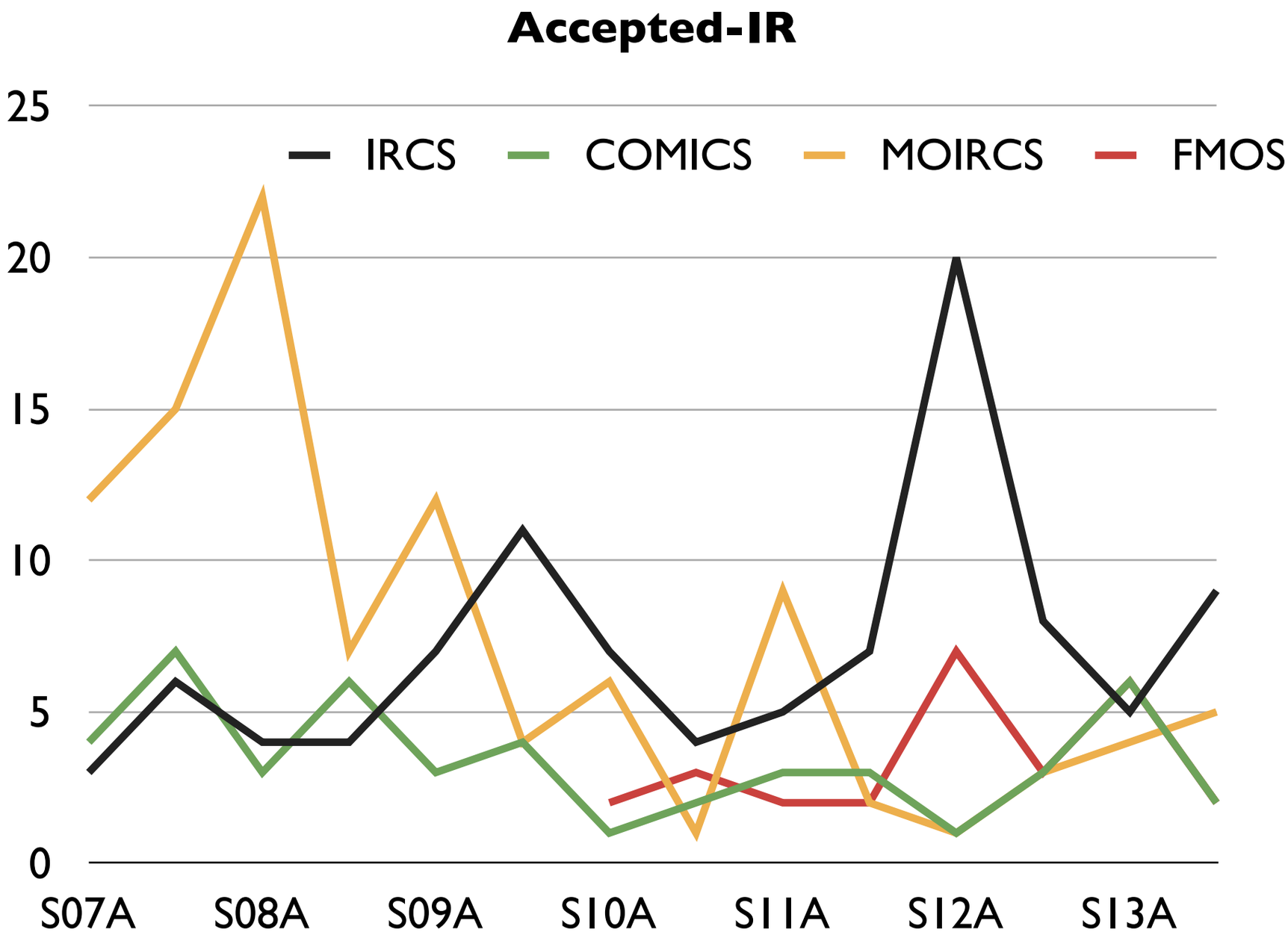
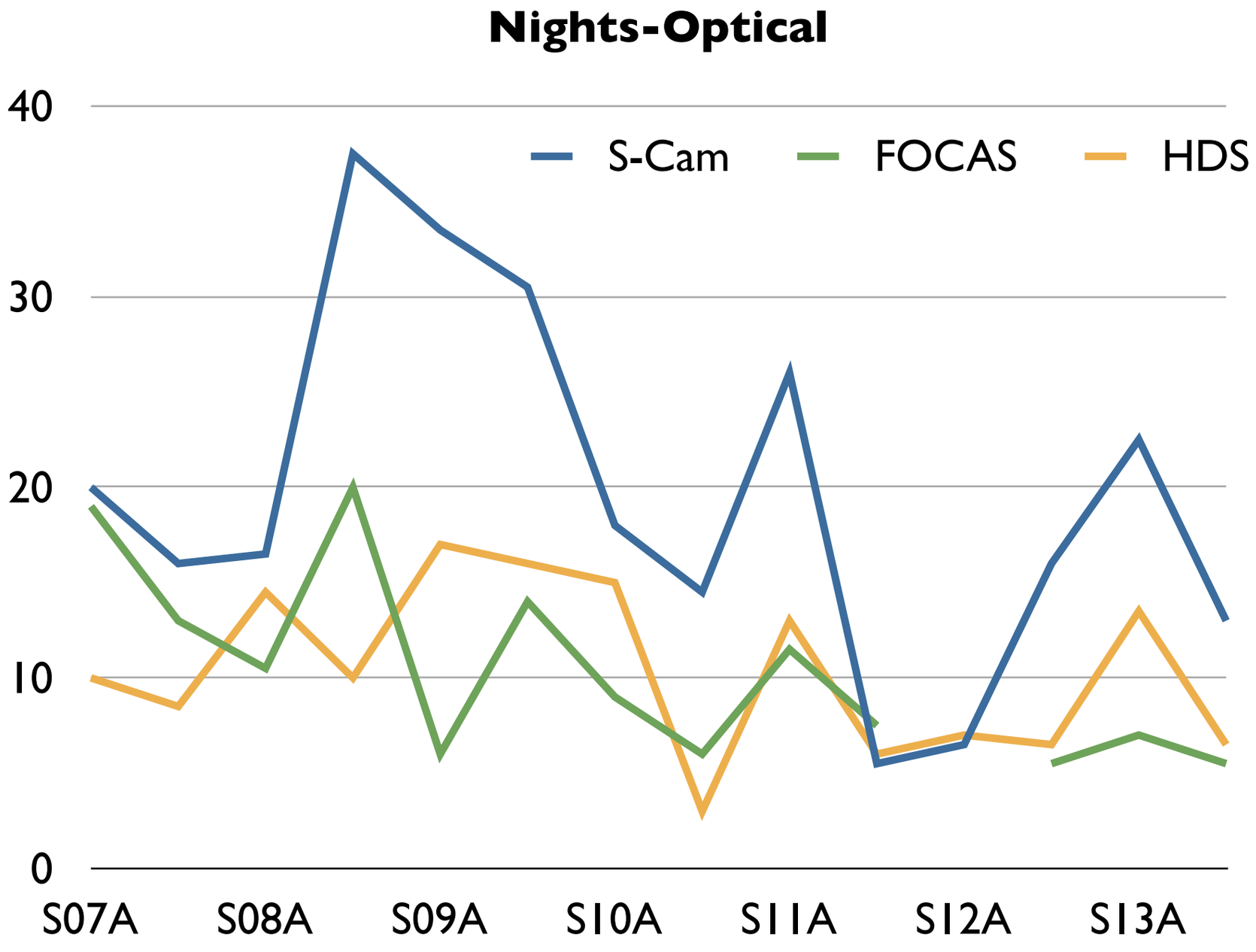


Number of Nights



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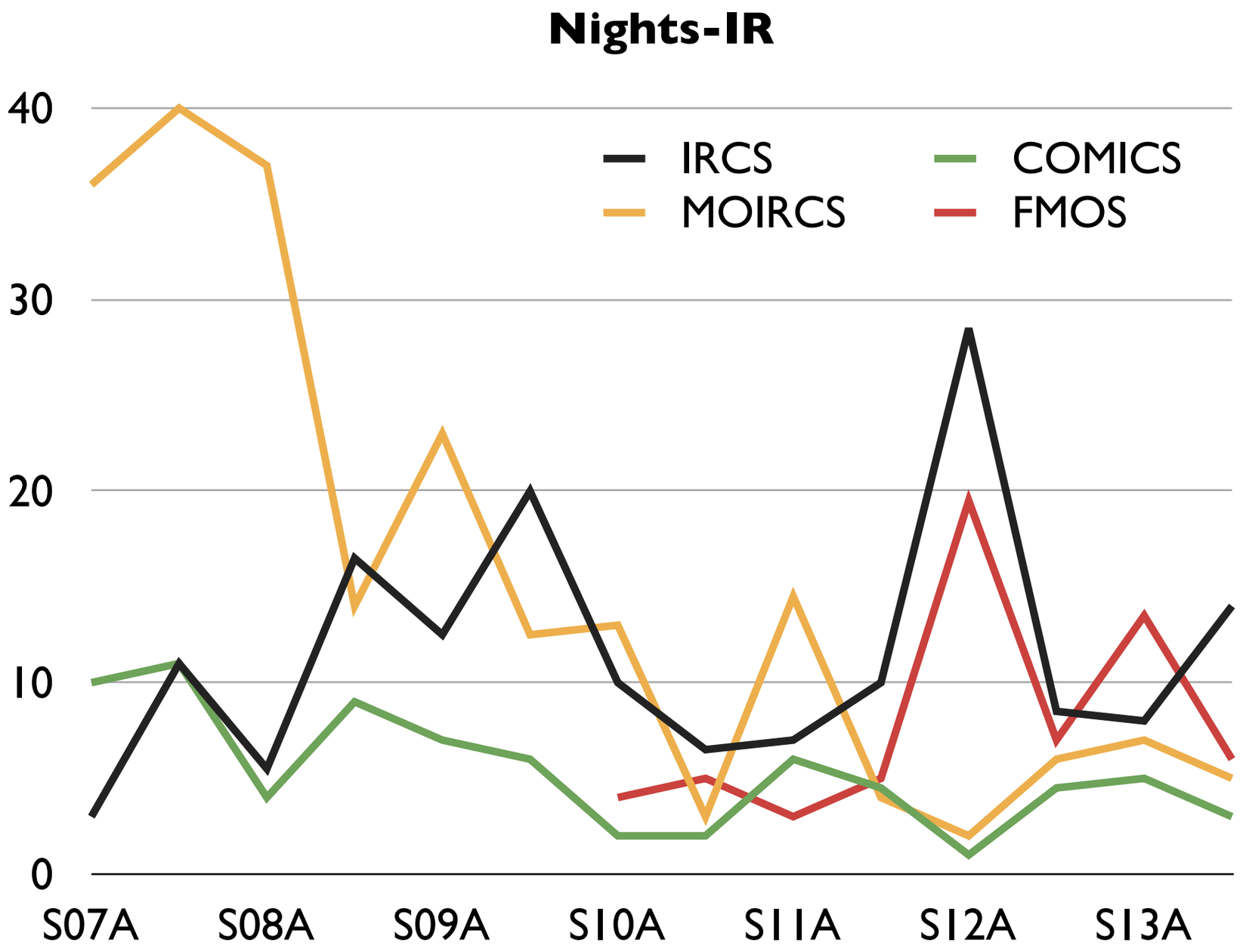
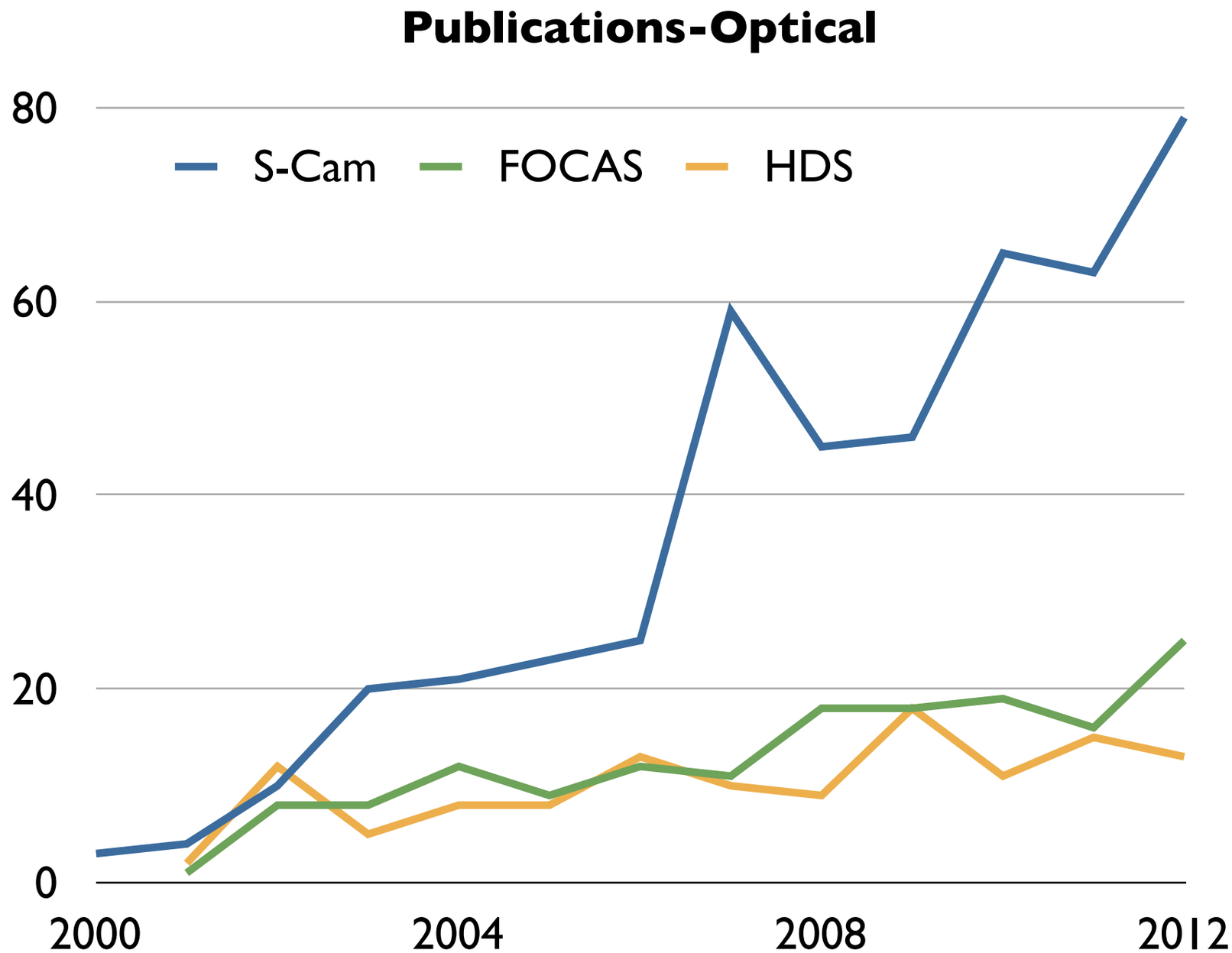
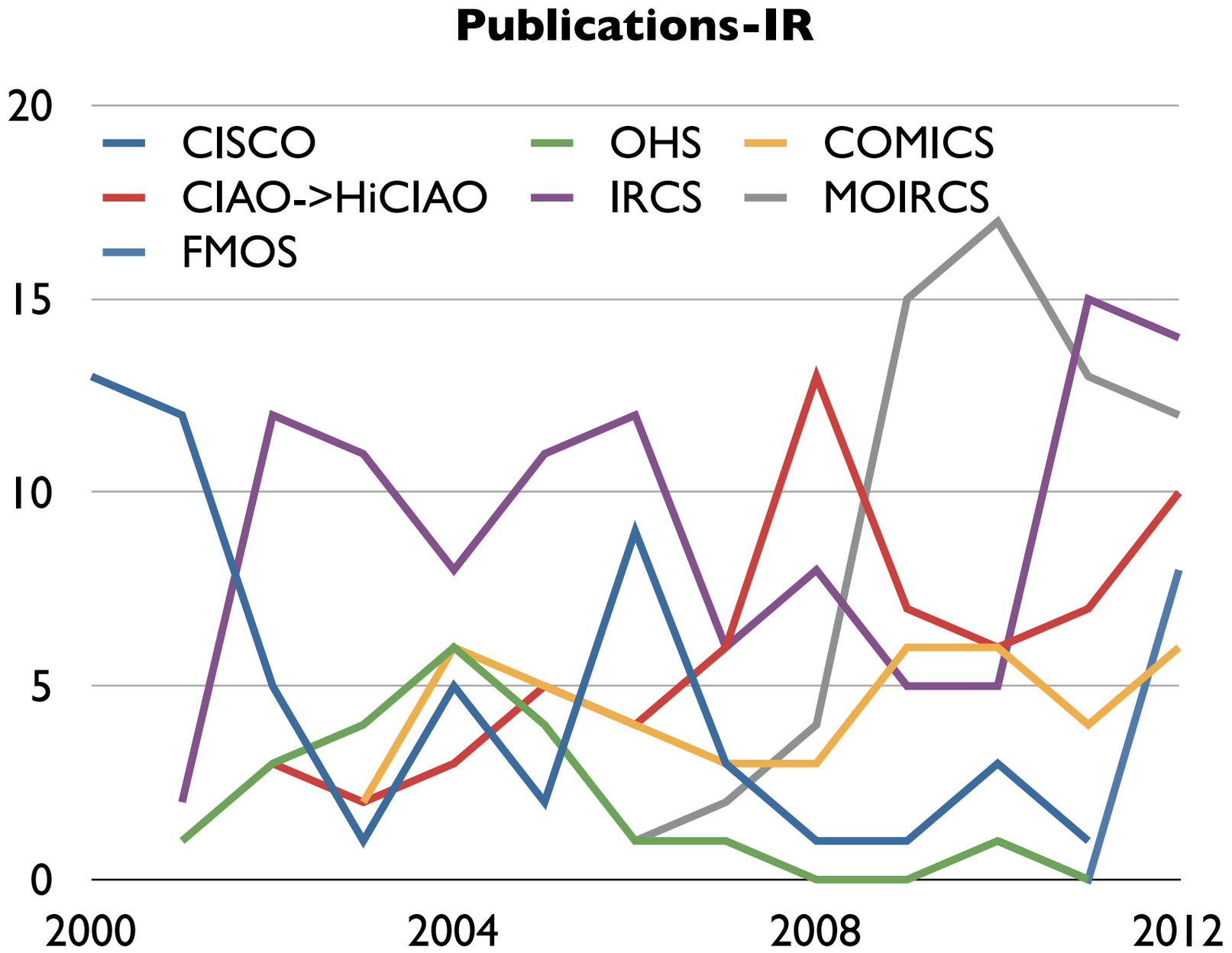


Annual Publications



Annual Publications



Instrument Troubles

Nights Lost due to Instrument Troubles

- Instrument troubles after 2012 which caused cancellation of observations
  - FMOS: 2 nights (2013/02/15, 2013/07/26)
  - MOIRCS: 1 night (2013/01/04)
  - Suprime-Cam: 13 nights (2013/09/27-10/09)
- MOIRCS: single channel operations - 38.5 nights (from 2007 to 2013)
- FMOS: single channel operations - (data not yet available)

Instrument Troubles and Loads to Operations

- Support Astronomers have sent lists of instrument troubles.
- It may be difficult to quantify the work load of each instrument for maintenance (in future).

Steps forward

- What is the most important factor we should consider to determine the instrument plan?
- Information required for decisions?
- Schedule
  - What we need to show in the ‘Project week’ (late Nov.)?
  - What we can show in Subaru UM (1/20-22)?

Steps forward

- What is the most important factor we should consider to determine the instrument plan?
- Information required for decisions?
  - Timeline and workloads required for new facility instruments
  - Anything else?
- Schedule
  - What we need to show in the ‘Project week’ (late Nov.)?
    - Outline of procedures and timeline
  - What we can show in Subaru UM (1/20-22)?
    - The first draft plan toward 2020s
    - FMOS decommission plan

FMOS decommission

FMOS decommission

- Currently the PFS project considers the IR-M3 floor for their spectrographs.
- If we remove FMOS spectrographs, PFS spectrographs could be placed in the IR-TUE floor.
  - Inputs from Takato-san
  - IR-TUE floor should be ready by late 2015.
- If we are going to decommission FMOS before PFS comes in, FMOS open-use should end in S15A.

		2011	2012	2013	2014	2015	2016	2017	2018	2019
P	S-Cam									
	FMOS									
	HSC									
	PFS									
Cs	FOCAS									
	MOIRCS									
	COMICS									
	* K3DII									
	* SWIMS									
	* MIMIZUKU									
	GLAO									
Ns Opt	HDS									
	*IRD									
Ns IR	AO188									
	IRCS									
	* HiCIAO									
	* SCExAO									
	*CHARIS									
	* K3DII									
	* RAVEN									
	* GIGMICS									

Slide by Takato-san