



Gemini Update

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Gemini Observatory:
Operating two twin 8m telescopes
on Mauna Kea and Cerro Pachón:
providing access to the entire sky

We are Here

We are Here

We are Here

We are Here

We are Here

We are Here

We are Here

Cerro Pachon
since 2000



La Serena, Chile

What is AURA?

AURA manages major operating observatories

Gemini Observatory

National Optical Astronomy Observatory (NOAO)

incl. Kitt Peak, CTIO, SOAR

National Solar Observatory (NSO)

Space Telescope Science Institute (STScI)

AURA participates in construction of new astronomical facilities

Daniel K. Inouye Solar Telescope (DKIST) - construction

Large Synoptic Survey Telescope (LSST) - construction

James Webb Space Telescope (JWST) - operations

The Future

Our Board of Directors is generating an updated *Strategic Vision*

The emerging framework is to:

- Allow Gemini North and South to diverge if advantageous to do so
- Allow each site to evolve within their surrounding systems
- Allow some specialization while keeping $> \sim 50\%$ for general use

We are looking at operating **Gemini South** as part of an AURA Southern network of telescopes. **Gemini North** could be part of that structure, part of a new *Maunakea confederation*, or both.

Gemini's strengths will include its operational flexibility and always available broad range of instrument capabilities.

We won't fully specialize, so you can! (Scot's unofficial motto)

What we did on our summer vacation

Completed our transition program

Reduced operating costs by 25%

Operate from base facilities at both sites

Many other cost saving initiatives

New international partnership agreement takes us to 2021

South Korea and Australia currently in as limited term partners

New cooperative agreement between NSF & AURA through 2022

Completed Gen 4#3 Design and Build RfP

Expanded visitor and community instrument programs

Completed second call for facility instrument upgrades

Started procurement for new lasers for both telescopes

Proposing for time at Gemini

The regular proposal: *once per semester*, through the national Time Allocation Committees (TAC)
for regular proposals
(moderate oversubscription)

70%

Large & Long Programs: *once per year*, through the Large Program TAC
for large and/or long **ambitious** proposals
(high oversubscription)

20%

Fast turnaround programs: *once per month*,
peer reviewed, no TAC
for short, rapid, immediate and/or follow-up proposals
(higher oversubscription than regular TAC)

10%

You have access to all of this.

Observing at Gemini

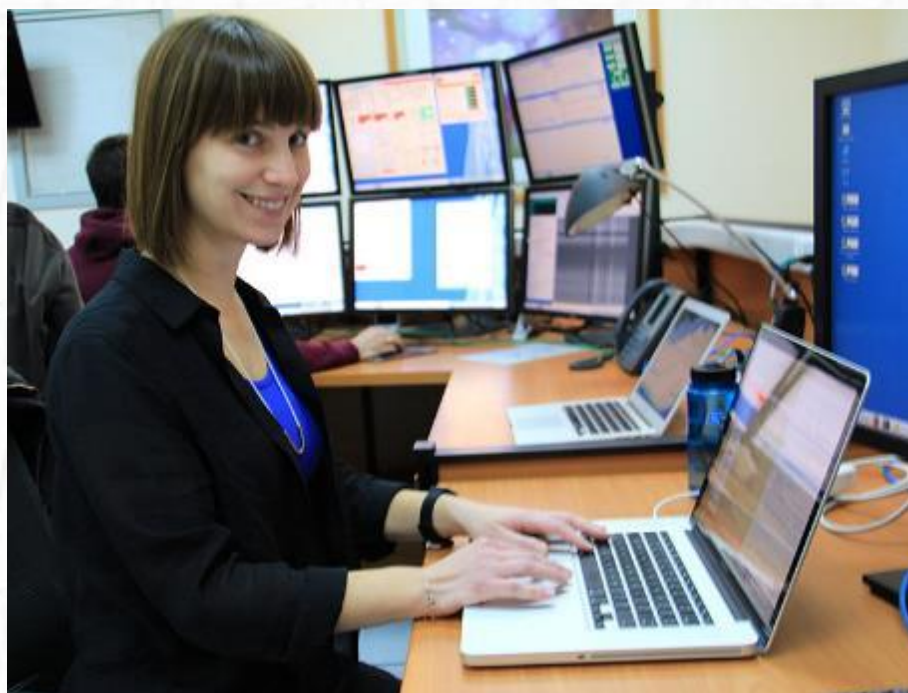
Queue mode: (opening the time domain)

You submit your observations, we observe for you

You can look over our shoulders by *Eavesdropping!* 

Classical mode: (allowing real-time decision)

You visit the observatory and conduct your observations
(You can also come and just run the queue)



First 'BOGO', Allison Noble (U.Toronto), at Gemini South

Priority Visitor Observing: you can come for as long as you want and choose the best time for your observations!

Bring One, Get One: If you come observing and bring your student, we will subsidize her/him with US\$2,000

You have access to all of this, too.

Gemini Subaru Exchange Time

29 papers Subaru users on Gemini since 2009

7 already in 2016

T-Recs and Michelle most popular instruments

37 papers from Gemini users on Subaru since 2009

4 so far from 2016

Dominated by Suprime-Cam

2017A

6 nights of Gemini time on Subaru

8.5 nights of Subaru time on Gemini

Subaru users used 1 night of Fast Turnaround in 2016B

Gemini Subaru Exchange Science

The redshifted selected sample of long gamma-ray burst host galaxies: the complete metallicity measurements at $z \leq 0.41^{*\dagger}$

Yuu NIINO¹, Kentaro AOKI², Tetsuya HASHIMOTO¹, Takashi HATTORI², Shogo ISHIKAWA³, Nobunari KASHIKAWA¹, George KOSUGI¹, Masafusa ONOUE³, Jun TOSHIKAWA¹, and Kiyoto YABE⁴

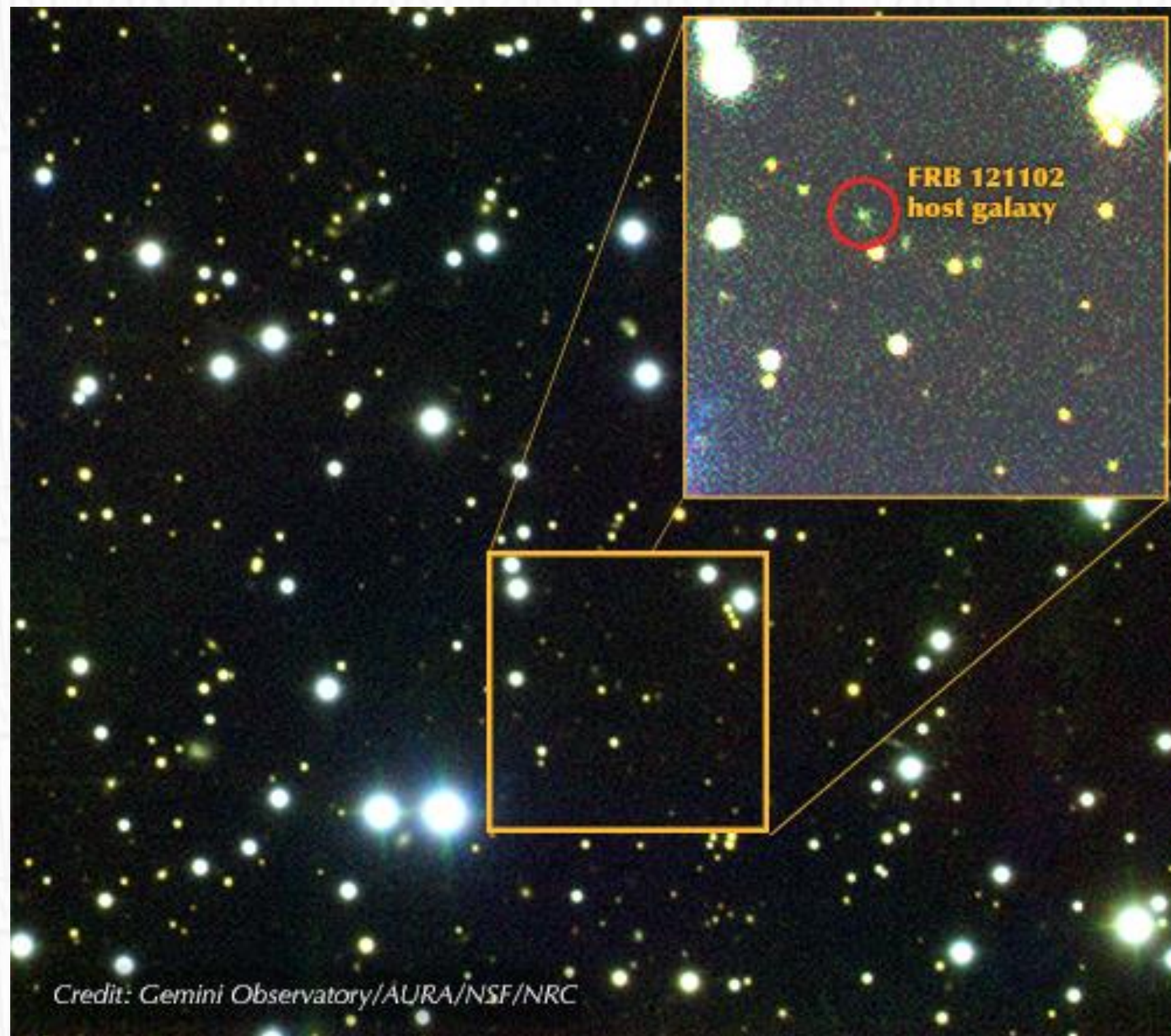
Table 3. Observations of the GRB host galaxies

target host galaxy	instrument	grating + filter	N&S [†]	Integration [sec]
GRB 060614	GMOS-S	B600	No	1000 × 6
	GMOS-S	R400 + OG515	No	1200 × 8
GRB 090417B	GMOS-N	R831 + RG610	Yes	1320 [‡] × 2
GRB 130427A	GMOS-N	R831 + RG610	Yes	1320 [‡] × 2
GRB 130427A ^{††}	FOCAS	300B + Y47	No	1200 × 8
GRB 111225A	FOCAS	U (imaging)	No	360 × 5
	FOCAS	B (imaging)	No	120 × 5
	FOCAS	V (imaging)	No	120 × 5
	FOCAS	R (imaging)	No	120 × 5
	FOCAS	I (imaging)	No	120 × 5

Gemini Science

Source of a recurring Fast Radio Burst (FRB) object identified as a distant ($Z \sim 0.2$) dwarf galaxy through GMOS follow-up imaging and spectroscopy.

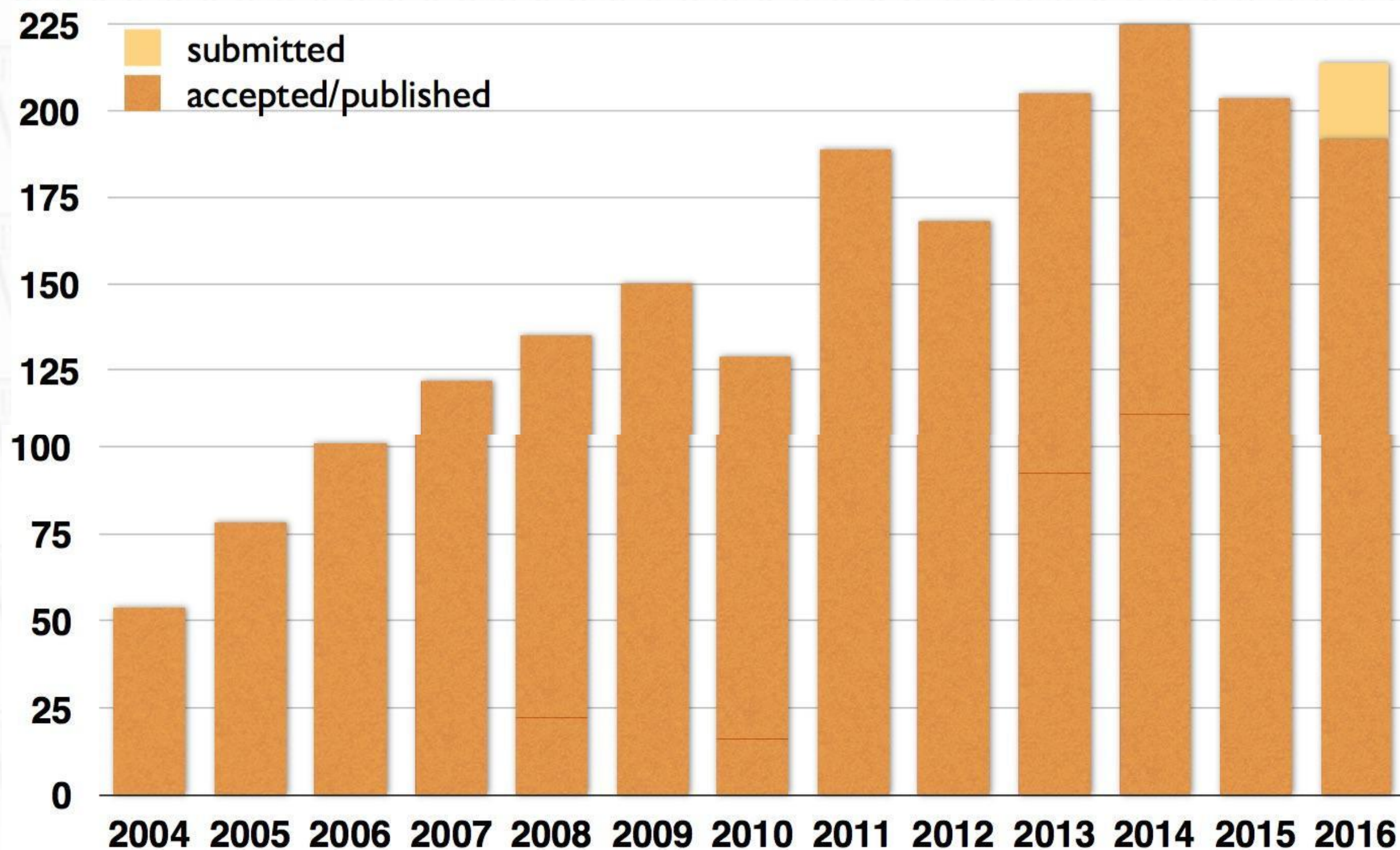
Used Director's discretionary time.



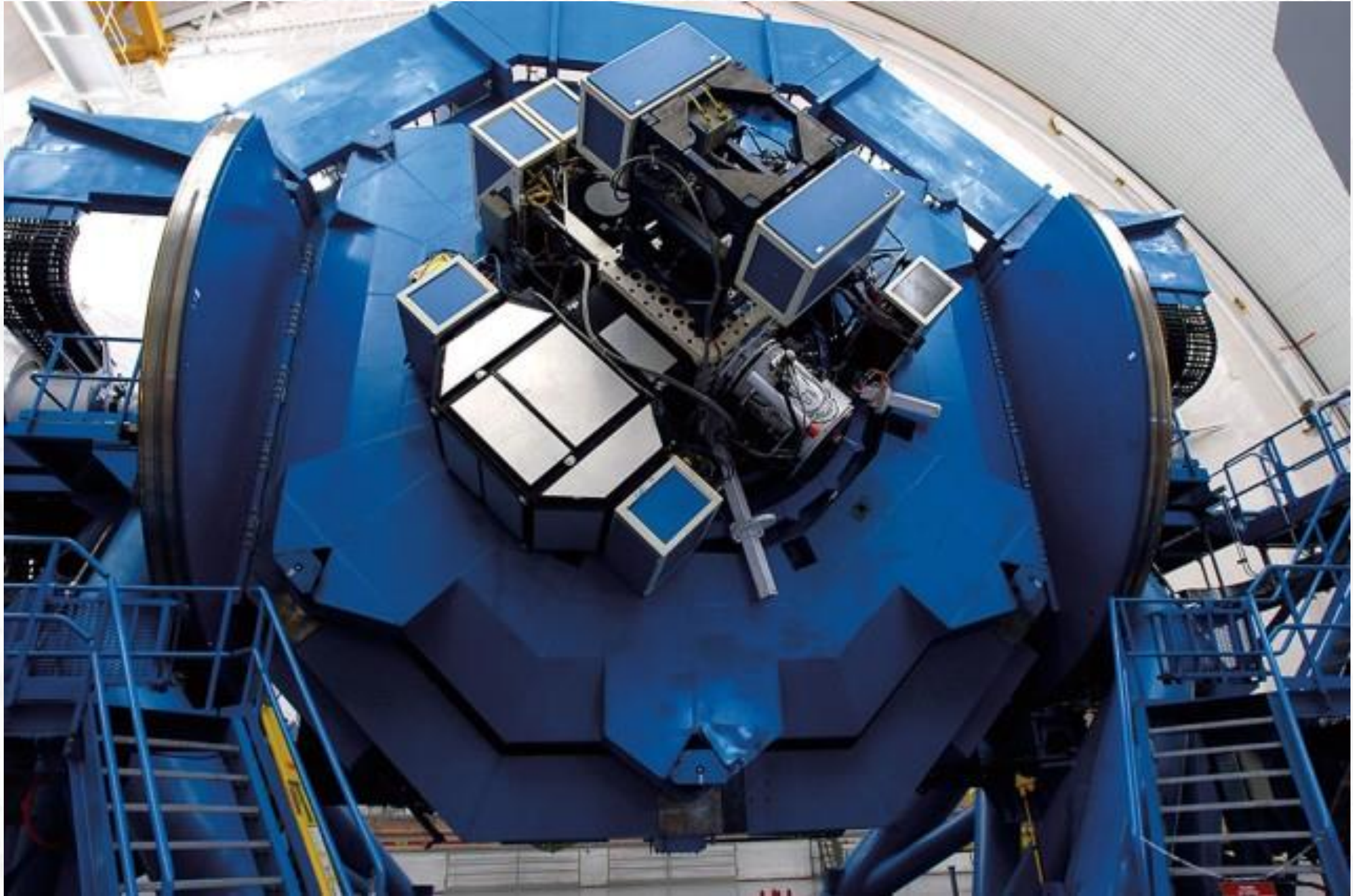
Tendulkar et al., 2017

Gemini Publications

~20% use Adaptive Optics



Gemini Instruments



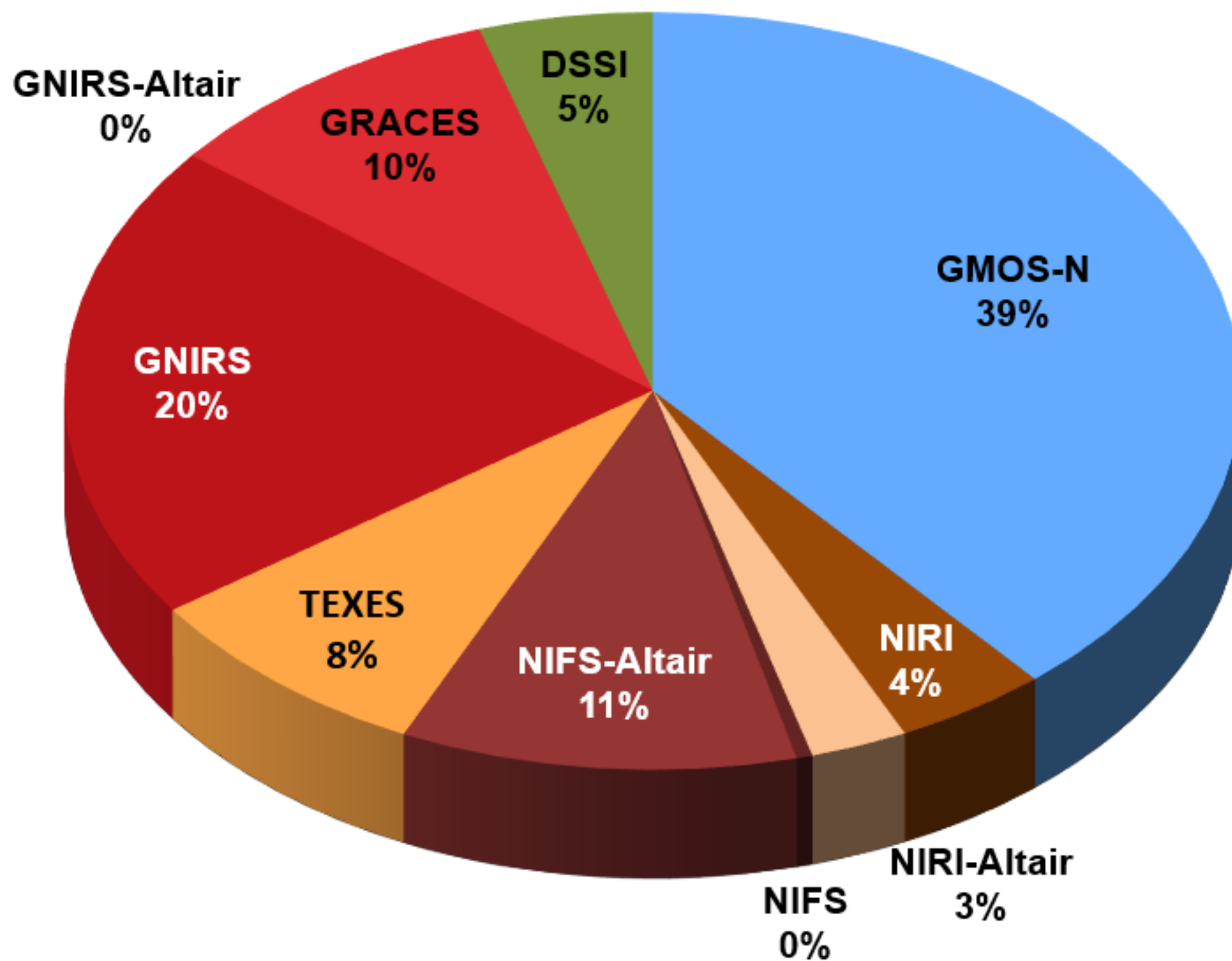
Instrumentation 2016+

Site	Instrument		FoV, Mode, Resolution	AO Support
Gemini-N up to 2018	GMOS-N NIRI NIFS GNIRS	360-940 nm 1-5 μm 950-2400 nm 1-5 μm	img 5.5'x5.5' LS, MOS, IFS (5"x7") R:600-4,000 img 20"x20" - 120"x120" IFS (3"x3") R:5000 LS R:1,800-18,000 (+img)	(ALTAIR) ALTAIR TAIR TAIR
Gemini-S GN in 2018	GMOS-S GSAOI FLAMINGOS-2 GPI	360-940 nm 950-2400 nm 950-2400 nm 900-2400 nm	img 5.5'x5.5' LS, MOS img 85"x85" img 85"x85" R: 1,200-3,000 contrast: 10^7 at 0.4"	(GeMS) GeMS (GeMS) XAO
~2018 ~2022	GHOST (GS) Gen4#3 (GS)	360-1000 nm Visible + NIR	2 IFUs in 7' $\emptyset$ R: 50,000 + 75,000 aimed to be an LSST follow-up instrument	(None)
Visitor INS 2016 2017 2018 2018 (TBC) 2019 (TBC) 2020 (TBC)	TEXES (GN) DSSI (GN/GS) GRACES (GN) Phoenix (GS) POLISH2 (GN) HIPPI (TBC) IGRINS (GS) TIKI (GS) MAROON-X (TBC) G-IRMOS (GS)	5-25 μm 400-1000 nm ~500-1000 nm 1-5 μm optical optical H+K mid-IR 500-1000 nm IR	LS R: 4,000 - 85,000 Dual EMCCD imaging, 20 mas res see CFHT/ESPaDOnS - 1 LS R: 50,000 high resolution, mid-infrared planet imager precision radial velocity (~ 1 m/s) deployable IFUs	no AO no AO no AO own XAO no AO GeMS

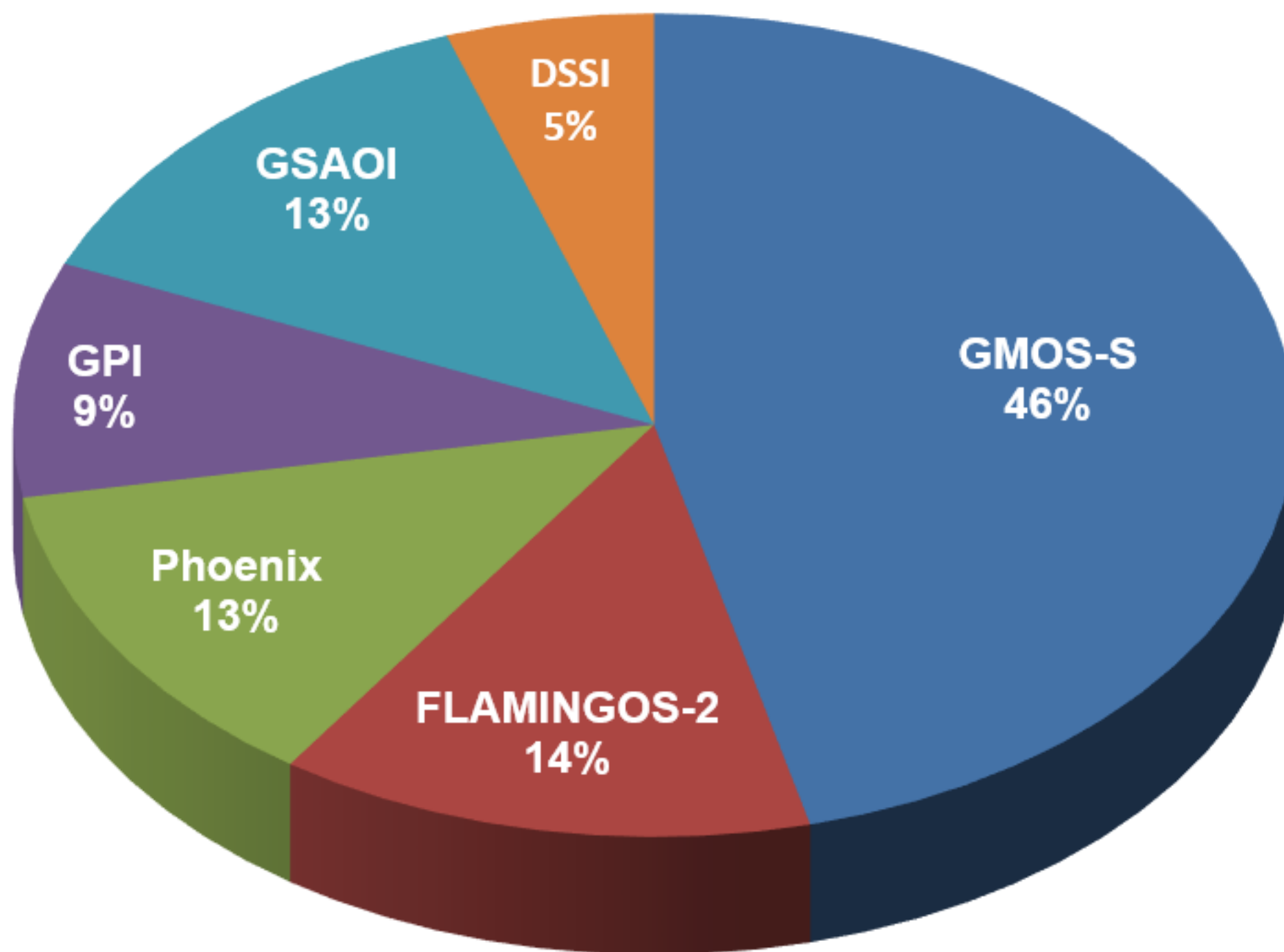
Strategic Instruments

Tactical Instruments
Strategic Instruments

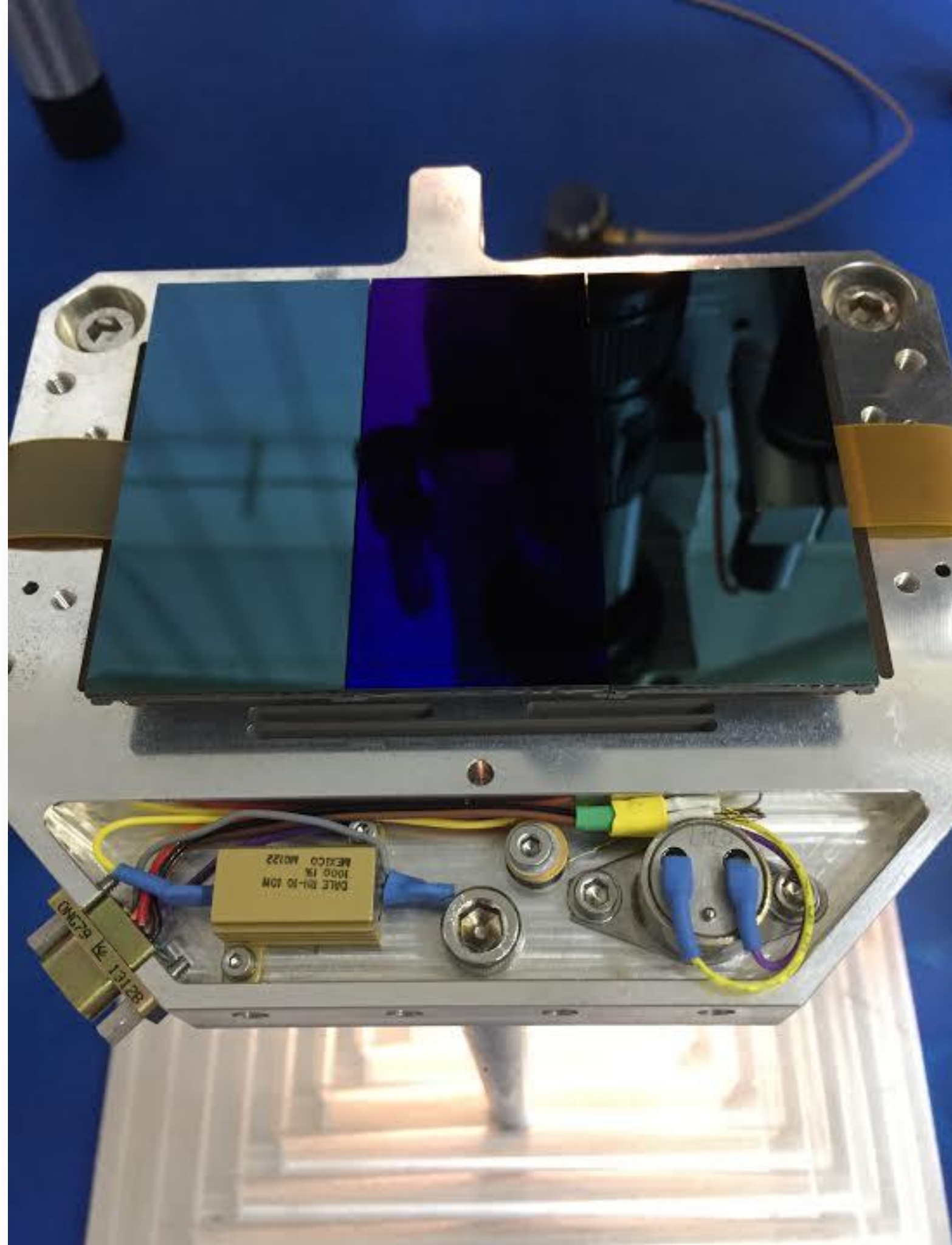
Fraction of Time by Instrument: Gemini North



Fraction of Time by Instrument: Gemini South



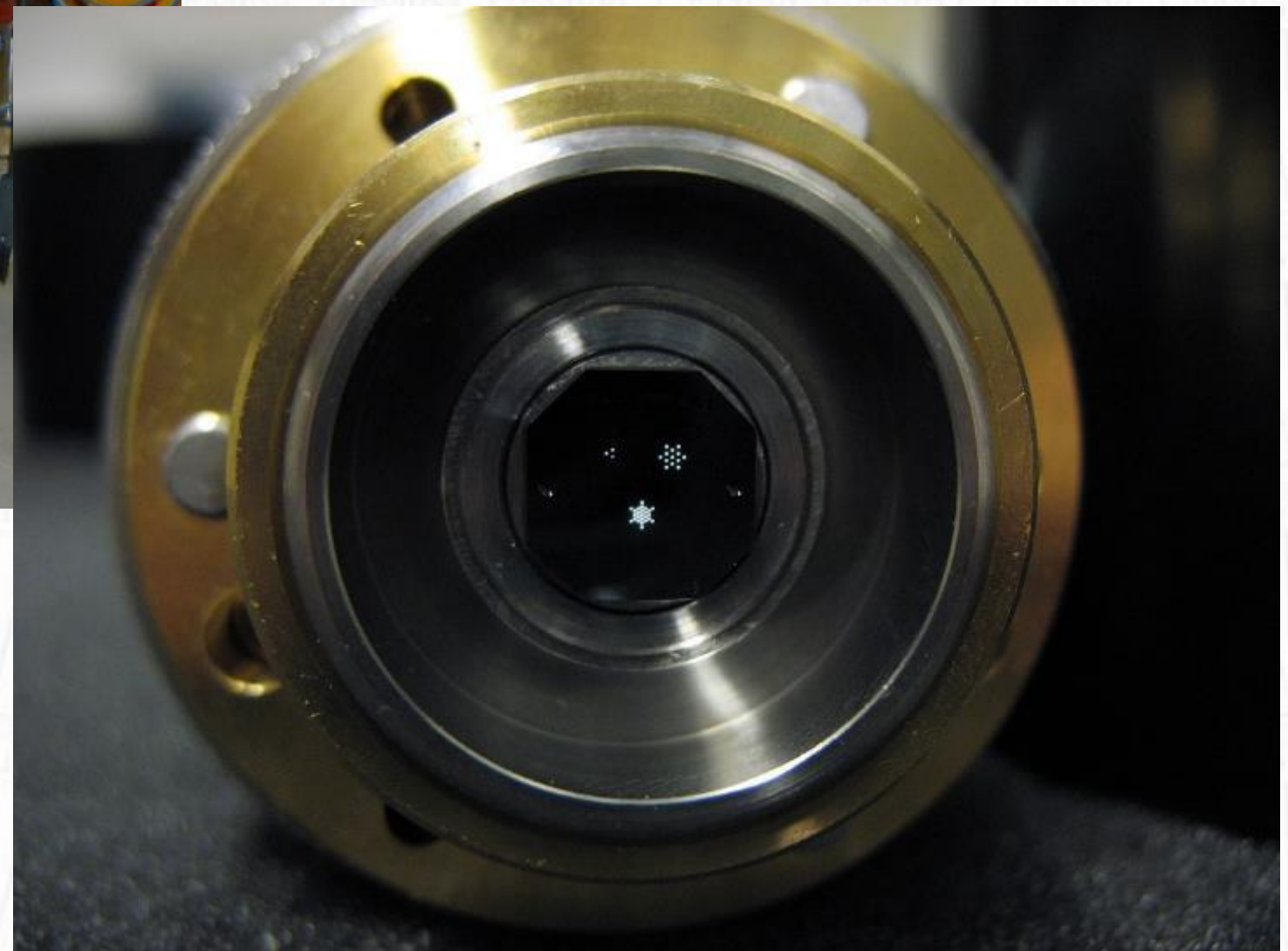
GMOS- N CCDs



GHOST



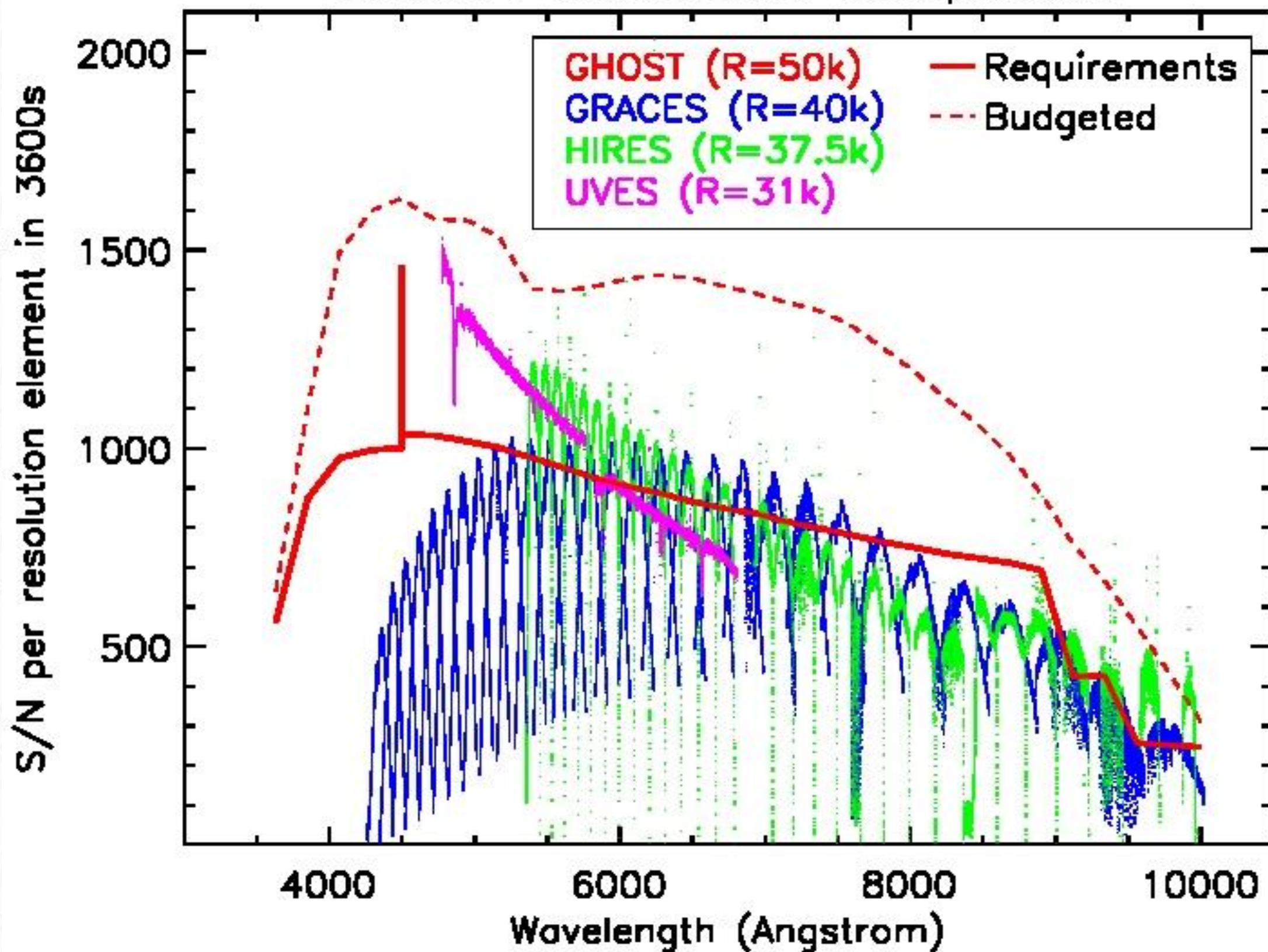
We are into the build phase!



IFUs

GHOST Estimated Performance

GHOST Performance Comparison



GHOST Schedule

Milestone	Date (Previous)
Critical Design Review	December 2015
Delta Critical Design Review	February 2016
Final Design Review	May (April Mar) 2016
Start Build Phase	May (Apr) 2016
Start Test Phase	Nov (Aug) 2017
Delivery to Gemini	Apr (Jan) 2018
Start Commissioning	Jul (May) 2018
End Commissioning	2018B [Sep (Aug) 2018]

Does not include three months of schedule contingency.

GS Laser at Toptica



Gemini's Next Instrument: Gen4#3

A moderate resolution, broad bandwidth spectrograph

Baseline parameters

R ~4000

λ ~400-1600nm

Highly efficient

Throughput

Acquisition and observing overhead

On-sky by start of LSST main survey (2023)

GIFS Studies Enhancements

Extension to 2.5 μ m and 369nm

IFU

Multi-object

Simultaneous imaging

Higher resolution

Very long slit mode for planetary transit observations

Spectropolarimetry

EMCCD

RfP Completed. Hoping to start this quarter!

Hope to see you on the Gemini Bus!



Fast Turnaround
Long and Large
Queue and Classical
Both hemispheres
Multi-Instrument
New capabilities

どうもありがとうございました。