Gemini Queue Operation
From Phase I to Archive

SAGDW – Brazil)ctober 27–30, 2011

Introduction

- Proposal preparation and submission – Phase I Tool
- Queue Construction – TAC/ITAC process
- Programme Definition – Observing Tool, NGO/Contact Scientist checks
- Programme execution – queue coordinator and staff observer
- Data distribution – data quality checks and Gemini Science Archive

Phase I process

- PhaseI Tool

mean.

Observing Constraints

- There are four observing constraints:
  - **Cloud cover** (sky transparency)
  - **Image quality** (delivered EED = natural seeing + aO + closed loop guiding)
  - **Sky background**
  - **Water vapour content** (sky transparency)
- Must also consider airmass (zenith distance) as it affects some of the above.
- Some effects are **wavelength dependent** (eg. water vapour content).
- Given in **percentiles**: IQ =20%, 70%, 85%, Any

Observing Constraints

Image Quality (non-AO) - MK and CP

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given month (or two, or five…)

Wavelength regime	WFS	Constraint			
		20%-ile	70%-ile	85%-ile	"any" (100%-ile)
V (0.5µm)	peripheral	0.45	0.80	1.20	1.90
	on-instrument	0.45	0.80	1.10	
I (0.9µm)	peripheral	0.45	0.80	1.10	1.70
	on-instrument	0.40	0.75	1.05	
J (1.2µm)	peripheral	0.40	0.60	0.85	1.55
	on-instrument	0.35	0.55	0.80	
K (2.2µm)	peripheral	0.35	0.55	0.80	1.40
	on-instrument	0.30	0.50	0.75	
L (3.4µm)	peripheral	0.35	0.50	0.75	1.25
	on-instrument	0.30	0.45	0.70	
N (11.7µm filter)	peripheral	0.31-0.34	0.37	0.45	0.75
Q (18.3µm filter)	peripheral	0.49-0.54	0.49-0.54	0.49-0.54	0.85

Cloud Cover

- CC=50% – photometric or cloudless · stable flux (usually monitored using the guide star counts).
- CC=70% – patchy clouds. Transparent patches among thicker clouds and/or thin cirrus · variable flux, loss of transmission by 0.3mag relative to nominal extinction. In practice, 25% flux variation.
- CC=80% – cloudy. All sky covered with clouds, transmission poorer by 1 mag relative to nominal, and variable (60% flux variation). Stable guiding can be difficult. Background too high for thermal IR.
- Any – whatever else while we can still guide. For the ITCs, 3mag loss of transmission/94% flux variation.

Image Quality

- Values are for the **telescope pointing at zenith**. So, 70% of the time the IQ=0.8″ or better in I-band at zenith.
- But if the target is at AM=1.5, delivered image quality for 70% is IQ=1.02″ or better in i-band
- Performance degradation is taken into account in the ITCs as a **dependence of wavelength and airmass**
- In the mid-IR, bins are defined as percent of the time IQ is within 10/20/50% of the **diffraction limit** at 10·m.
- If programme requires absolute image quality, remember to **take into account the elevation** when selecting the IQ bin and request an elevation constraint.

Water Vapour

- Sky transparency in **thermal IR** (L, M and mid-IR).
- Atmospheric absorption is strongly wavelength dependent.
- ITCs use **model transmission spectra** with 0.04nm resolution.
- **Not relevant** in the optical!
- In the near-IR (JHK) only relevant between bands in lower resolution or if feature of interest near strong H2O band in higher resolution

Sky Background

- In the optical, created by moonlight and zodiacal light.
- In the near-IR, by OH airglow and thermal background emission. It is colour dependent, but **assumed constant** for the entire night.
- Therefore, only relevant for **optical observations.**
- Roughly speaking, Moon is below the horizon half the time in queue mode. Thus SB=50 is dark time.
- For queue scheduling purposes, the computed background on a given night takes into account relative position of target to the Moon, and the Moon phase.

Phase I Constraints

- **Airmass restrictions** must be clearly stated in PhaseI or will require approval from the corresponding site Head of Science Operations.
- Airmass/Elevation constraints are used to preserve delivered IQ or reduce atmospheric diffraction effects.
- **Improving** constraint bins also require approval. Relaxing constraints do not (BUT check your science!)
- Classical programmes with restrictive conditions are required to submit a backup programme and targets in case of poorer conditions.
- **Guide star brightness** must be appropriate for conditions.

Time Allocation

- Proposal preparation and submission – Phase I Tool
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Time Allocation

- National TACs review all submitted proposals for technical feasibility, then grade on science merit.
- The graded list is passed to the International TAC.
- ITAC "merges" the queue:
  - goes through the TAC lists, cycling through the partners.
  - available time for each condition constraint is updated after each allocation. When a bin runs out of time, all subsequent programmes requiring that constraint are skipped.
  - RA distribution in now included – commissioning, etc.
  - Programmes allocated in Science Ranking Bands (1to 3)
- Succesful programmes are given an unique ID, Phase II skeletons are created and distributed to PIs.

Programme Definition

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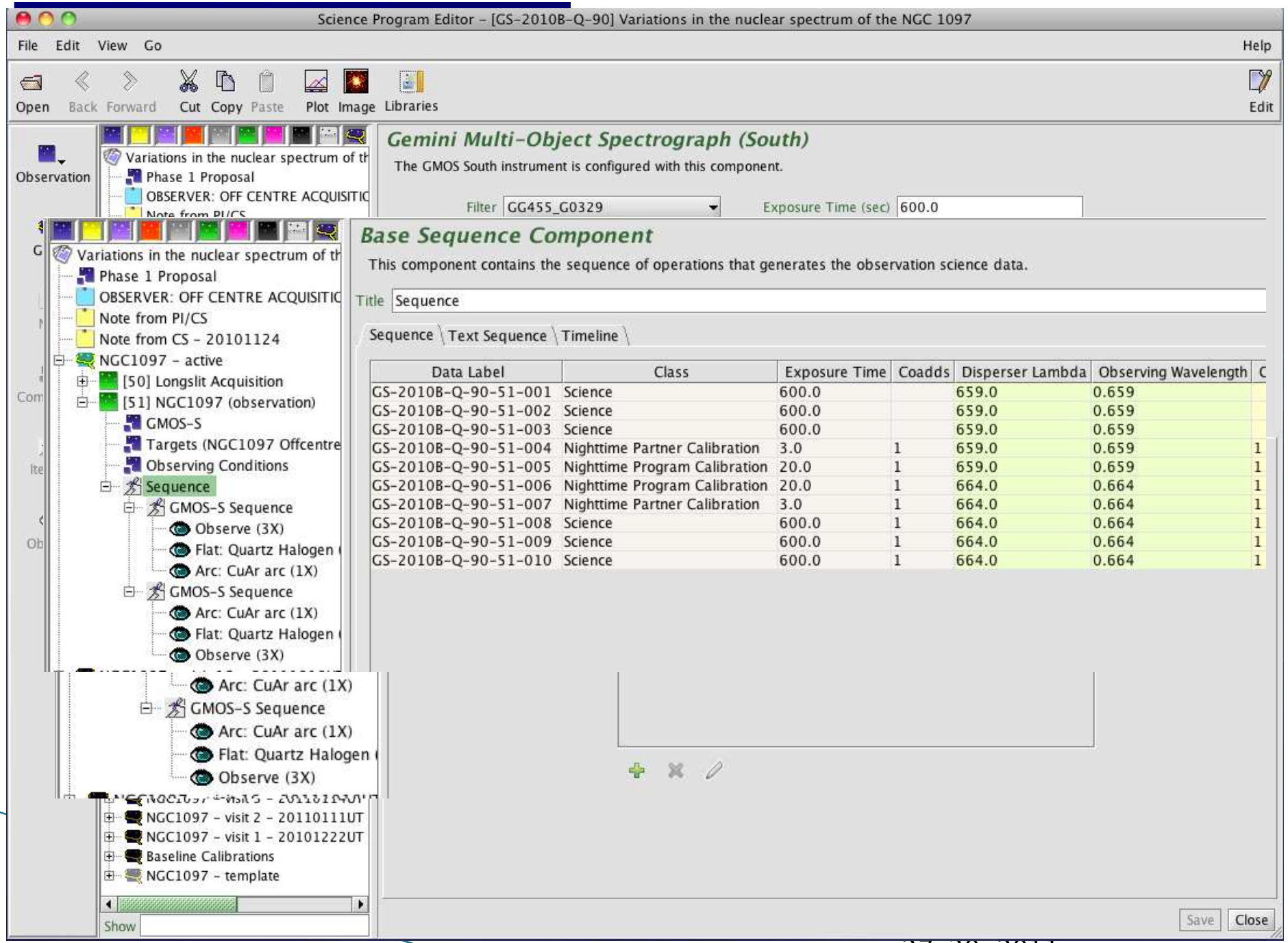
Science Program Editor - [GS-2010B-Q-90] Variations in the nuclear spectrum of the NGC 1097
File Edit View Go Help
Open Back Forward Cut Copy Paste Plot Image Libraries Edit
Observation
Variations in the nuclear spectrum of th
Phase 1 Proposal
OBSERVER: OFF CENTRE ACQUISITIC
Note from PI/CS
Note from CS - 20101124
NGC1097 - active
[50] Longslit Acquisition
[51] NGC1097 (observation)
GMOS-S
Targets (NGC1097 Offcentre
Observing Conditions
Sequence
GMOS-S Sequence
Observe (3X)
Flat: Quartz Halogen
Arc: CuAr arc (1X)
GMOS-S Sequence
Arc: CuAr arc (1X)
Flat: Quartz Halogen
Observe (3X)
Arc: CuAr arc (1X)
GMOS-S Sequence
Arc: CuAr arc (1X)
Flat: Quartz Halogen
Observe (3X)
NGC1097 - visit 2 - 20110111UT
NGC1097 - visit 1 - 20101222UT
Baseline Calibrations
NGC1097 - template
Show
Gemini Multi-Object Spectrograph (South)
The GMOS South instrument is configured with this component.
Filter GG455_G0329
Exposure Time (sec) 600.0
Base Sequence Component
This component contains the sequence of operations that generates the observation science data.
Title Sequence
Sequence Text Sequence Timeline
Data Label Class Exposure Time Coadds Disperser Lambda Observing Wavelength
GS-2010B-Q-90-51-001 Science 600.0 659.0 0.659
GS-2010B-Q-90-51-002 Science 600.0 659.0 0.659
GS-2010B-Q-90-51-003 Science 600.0 659.0 0.659
GS-2010B-Q-90-51-004 Nighttime Partner Calibration 3.0 1 659.0 0.659 1
GS-2010B-Q-90-51-005 Nighttime Program Calibration 20.0 1 659.0 0.659 1
GS-2010B-Q-90-51-006 Nighttime Program Calibration 20.0 1 664.0 0.664 1
GS-2010B-Q-90-51-007 Nighttime Partner Calibration 3.0 1 664.0 0.664 1
GS-2010B-Q-90-51-008 Science 600.0 1 664.0 0.664 1
GS-2010B-Q-90-51-009 Science 600.0 1 664.0 0.664 1
GS-2010B-Q-90-51-010 Science 600.0 1 664.0 0.664 1
Save Close

27-30, 2011

Phase II process

- Very important to setup the programme correctly, so you get what you want, not just what you asked for.
  - Observations start at “PhaseII”, where the user can modify as needed
  - When set to For Review and stored, NGO is notified and will do the first round of checking.
  - After some more interaction with user as needed, observations are set to For Activation and stored.
  - Gemini Contact Scientist is notified and will do the second round of checking.
  - After repeating the process if needed, observations are set to Ready and made available to be scheduled in the queue.

Phase II Changes

- Once an observation is set to “Ready” it cannot be modified by the PI or NGO.
- However, no observation is totally frozen:
  - Minor changes (small changes in central wavelength, exposure times, filters) can be done by contacting the Gemini CS and the NGO so the programme can be set back to PhaseII
  - Major changes (improving condition constraints, change of targets) need approval by the Head of SciOps of the respective site.
- Programme can be fetched at any time from Observing Database to check on progress.

Programme Execution

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Queue execution

- All “Ready” observations are available from the observing database.
- Each observation has a weight defined by the SRB, observability window, PI priority, programme status (started or not), target of opportunity, etc.
- **Completion rate requirements and goals endorsed by the Gemini Board and the Operations Working Group**
- Focus on high completion of Band 1 & 2 programs
- Focus on delivery of useful datasets:
  - Complete started Band 2 programmes
  - Reach minimum time defined by PI or complete started Band 3 programmes.

Cerro Pachon - 20111021 - QPT 1.0.22

File Edit Plan Candidate Visit Help

Plan Variants

Name	IQ	CC	WV	Wind
NICI C/H >= 2 : CC50 IQ20 WVA	20	50	A	
NICI C/H >= 1 : CC50 IQ50 WVA	70	50	A	
GMOS w/ 08B-Q-7 : CC50 IQ70 WVA	70	50	A	
GMOS : CC50 IQ70 WVA	70	50	A	
Photometric, Poor Seeing, Wet : CC50 IQ85 WVA	85	50	A	
Thin Clouds, Good Seeing, Wet : CC70 IQ70 WVA	70	70	A	
Thin Clouds, Poor Seeing, Wet : CC70 IQ85 WVA	85	70	A	
Poor Weather Planning : CC80 IQ70/85 WVA	70	80	A	
Poor Weather Planning : CC50/70/80/A IQA	A	A	A	
Calibrations and Standards	A	A	A	
Windy, NICI : CC50 IQ50 WVA	70	50	A	330°±30°
Windy, GMOS : CC50 IQ70 WVA	70	50	A	330°±30°

Double-click a variant to edit it.

Plan Variants | Instruments

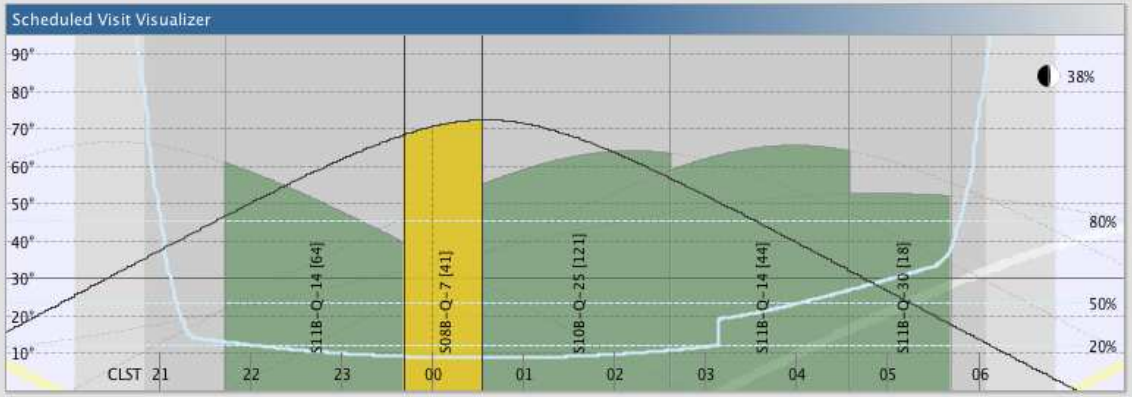
Candidate Observations

SB	P	Score	Observation	Target	RA	Inst	Dur
1	L	4218	S08B-Q-7 [41]	Haro15	0:48:35	GMOS-S	0:51:27
1	L	3375	S11B-Q-17 [14]	CXOJ033831.8-...	3:38:31	GMOS-S	3:19:22
1	L	2812	S11B-Q-500 [26]	CD-53_544	2:41:46	NICI	0:34:30
1	H	2700	S11B-Q-30 [3]	SNR0519-69.0	5:19:35	GMOS-S	1:37:38
1	L	2109	S10B-Q-22 [27]	NGC1705	4:54:14	GMOS-S	0:37:13
1	M	1875	S11B-Q-24 [68]	J18420694-555...	18:42:06	NICI	0:50:19
1	M	1875	S11B-Q-24 [69]	J18420694-555...	18:42:06	NICI	0:17:31
1	H	1875	S11B-Q-500 [46]	HN_Peg	21:44:31	NICI	0:59:43
1	L	1687	S11B-Q-14 [44]	HfluxHz_4-1 Po...	4:12:19	GMOS-S	1:58:14
1	L	1687	S11B-Q-14 [45]	HfluxHz_4-1 Po...	4:12:19	GMOS-S	1:58:14
1	L	1687	S11B-Q-14 [61]	HfluxHz_4-1 Po...	4:12:19	GMOS-S	1:58:14
1	L	1687	S11B-Q-14 [62]	HfluxHz_4-1 Po...	4:12:19	GMOS-S	1:58:14
1	L	1687	S11B-Q-14 [64]	HfluxHz_20-2 P...	20:44:02	GMOS-S	1:58:14
1	L	1687	S11B-Q-36 [11]	NGC 92	0:21:27	GMOS-S	1:42:36
1	H	1687	S10B-Q-25 [121]	XCS022517	2:25:17	GMOS-S	2:03:28
1	M	1406	S11B-Q-2 [12]	HD16743	2:39:07	NICI	0:51:24
1	H	1406	S11B-Q-24 [39]	J05335981-022...	5:33:59	NICI	0:17:31
1	H	1406	S11B-Q-24 [42]	J04571728-062...	4:57:17	NICI	0:17:31
1	M	1406	S11B-Q-24 [45]	J03050976-372...	3:05:09	NICI	0:17:31
1	M	1406	S11B-Q-24 [48]	J02485260-340...	2:48:52	NICI	0:17:31
1	M	1406	S11B-Q-24 [51]	J02224418-602...	2:22:44	NICI	0:17:31
1	H	1406	S11B-Q-24 [53]	J02155892-092...	2:15:58	NICI	0:50:19
1	H	1406	S11B-Q-24 [54]	J02155892-092...	2:15:58	NICI	0:17:31
1	M	1406	S11B-Q-24 [57]	J02070176-440...	2:07:01	NICI	0:17:31
1	L	1406	S11B-Q-24 [60]	J02045317-534...	2:04:53	NICI	0:17:31
1	L	1406	S11B-Q-24 [63]	J01123504+170...	1:12:35	NICI	0:17:31
1	H	1406	S11B-Q-24 [66]	J01484087-483...	1:48:40	NICI	0:17:31
1	H	1406	S11B-Q-24 [80]	J19233820-460...	19:23:38	NICI	0:50:19
1	H	1406	S11B-Q-24 [81]	J19233820-460...	19:23:38	NICI	0:17:31
1	H	1406	S11B-Q-24 [84]	J04440099-662...	4:44:00	NICI	0:17:31
1	H	1406	S11B-Q-35 [13]	HD199509	21:09:20	NICI	1:55:08
1	H	1406	S11B-Q-35 [16]	HD207700	21:54:45	NICI	1:55:55
1	H	1406	S11B-Q-35 [19]	HD212330	22:24:56	NICI	1:43:18
1	H	1406	S11B-Q-35 [22]	HD217958	23:04:32	NICI	0:32:32

Double-click an observation to view it in context.

Candidate Observations | Science Program | RA Distribution

Scheduled Visit Visualizer



Scheduled Visits

Start	Dur	BG	Observation	Steps	Inst	Config	WFS	Target
21:43	01:58	50%	S11B-Q-14 [64]	1-5	GMOS-S	IFU-1-R, B1200, none	OIWFS	HfluxHz_20-2 Pos2
23:41	00:51	20%	S08B-Q-7 [41]	15-18	GMOS-S	IFU-1-R, B1200, none	OIWFS	Haro15
00:33	02:03	20%	S10B-Q-25 [121]	1-4	GMOS-S	GS2010BQ025-06, R400, OG515	OIWFS	XCS022517
02:36	01:58	50%	S11B-Q-14 [44]	1-5	GMOS-S	IFU-1-R, B1200, none	OIWFS	HfluxHz_4-1 Pos1
04:34	01:07	80%	S11B-Q-30 [18]	1-4	GMOS-S	2.0arcsec, R400, none	OIWFS	SNR0509-67.5

Properties

Name	Value
Type/ID	Science Observation Visit S08B-Q-7 [41] (Band 1)
Title	Haro 15 IFU-R B1200, redo
Rem. Program Time	-3:20:58
Flags	[SCHEDULED, IN_PROGRESS, OVER_ALLOCATED]
Coordinates	00:48:35.384, -12:43:00.72 J2000
Instrument	GMOS-S / IFU-1-R, B1200, none
Constraints	SB = 50 / CC = 50 / IQ = 70 / WV = any
Timing Windows	«none»

Comment

08B-Q-7 : needs <0.6" at target position, or "IQ50". If on high-side of IQ70, see the GMOS variant below

Comment for S08B-Q-7 [41] S15-18 Top

Problems | Comment

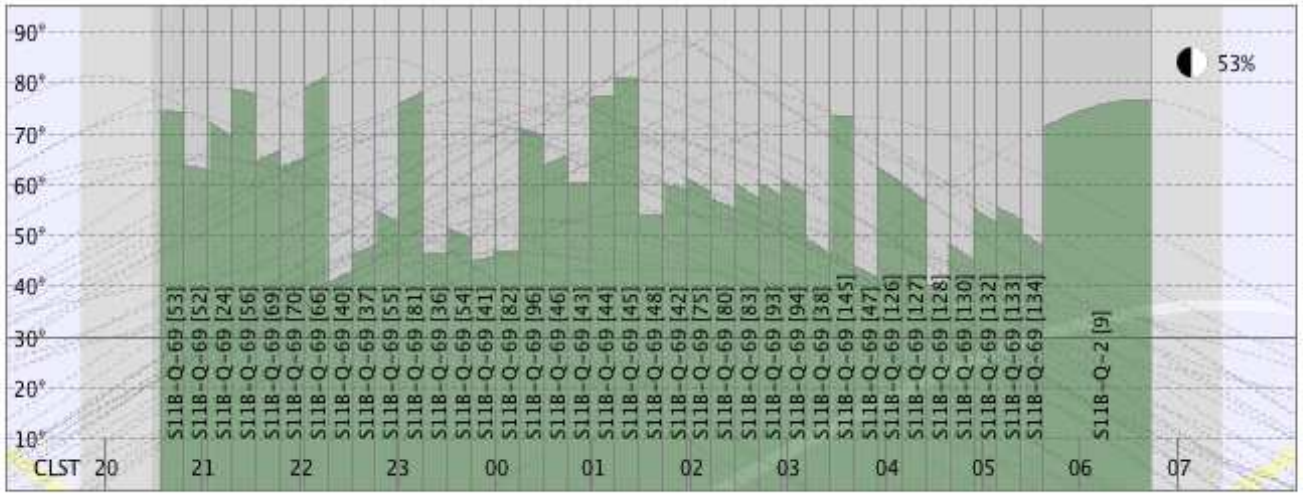
Nightly Plans

Photometric, Super Seeing, Dry : CC50 IQ20 WV50
SB = unconstrained / CC = 50 / IQ = 20 / WV = 50

Photometric, Good Seeing, Dry : CC50 IQ70 WV50
SB = unconstrained / CC = 50 / IQ = 70 / WV = 50

Thin Clouds, Good Seeing, Wet : CC70 IQ70 WVA
SB = unconstrained / CC = 70 / IQ = 70 / WV = any

NICI - Thin Clouds, Good Seeing, Wet : CC70 IQ70 WVA
SB = unconstrained / CC = 70 / IQ = 70 / WV = any



Observing

- Staff observer for queue nights and first night of classical runs.
- All available instruments may be scheduled during any queue night.
- Change between instruments takes a couple of minutes.
- Rapid response for Target of Oportunity.
- Standard set of calibrations defined with the programme, and taken as part of observation or at the end of the night.

Visitors

- User demand for classical time historically around 10% ▪ emphasis on optimizing queue operations.
- Visitors in queue, particularly students with active programmes, are welcome and encouraged.
- Gemini covers expenses of students at the summit, but not travel and boarding at base.
- Queue coordinator will attempt to schedule programme during visitor summit run.
- Execute own programme with full support and without risk of being “weathered out”!

Data Distribution

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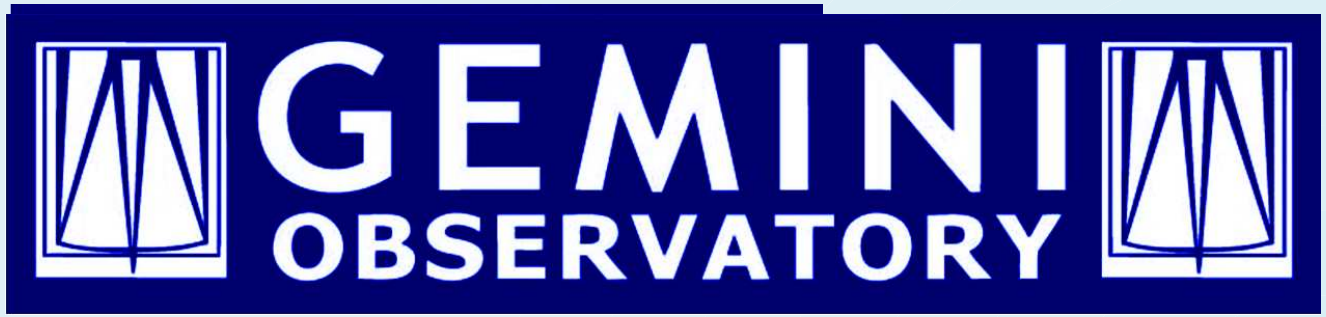
Quality Assesment

- By the observer during the night: inspection of calibrations (saturation/faint arcs and flats), check of data integrity, monitoring of weather conditions (seeing, cloud cover, sky background, water vapour).
- By the Data Analyst Specialist the next day: check instrument configuration, check IQ from the data when possible, check flux level when possible (CC). Check calibrations and request repeat of any that may be missing.
- Processing of GMOS pre-imaging – distributed to users for mask design.
- No general processing to check for achieved S/N.

Data Distribution

- "Raw" (not QA-ed) data are transferred to the Archive in real-time (as observation progresses).
- Transfer time varies between 2-10min (dependent on transfer speed between sites and CADC in Canada)
- Once data checked and properly flagged as PASS (charged) or USABLE (not charged), are re-transferred to the Archive with updated headers.
- Processed GMOS pre-imaging also distributed from the Archive, and users notified by e-mail.
- Immediate notification of new data available upon request (check with your Gemini CS) - or just wait for the standard GSA notification.



Questions?