



HSC Queue-mode: Introduction and Important Policies

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for HSC Queue-mode Observation WS, 2015/06/16 in Mitaka
(updated on 2015/06/16 JST)

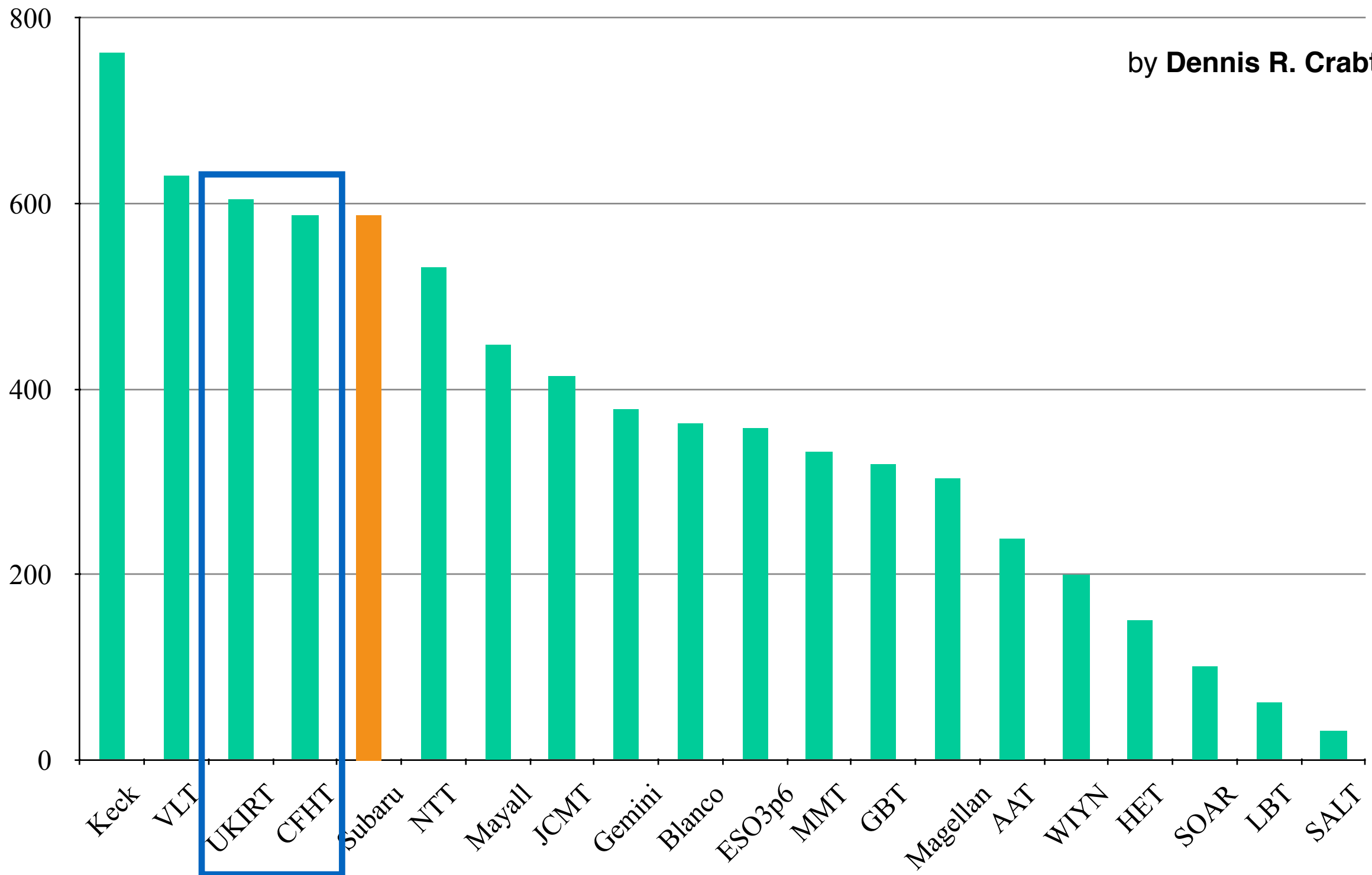
Outline

- Intro
 - Goals and challenges
 - User survey results
- Key points
 - Terminology / OB / Constraints / QA / GRADE and Carry-over
- More Details
 - Sukima / Early execution / Cadence and time-critical observations

HSC Queue-mode: Background, Goals, Challenges

Total Papers per Telescope: 2008-2012

by **Dennis R. Crabtree**



Subaru in 2020s: Survey-oriented Telescope

Queue will be the major observing mode of future Subaru Telescope

- Large surveys: observing efficiency can be maximized with queue-mode
- Current Scope of queue-mode operation is just for HSC.
 - Starting from small portion of open-use programs.
 - no Intensive for S16A
 - Expect majority of HSC observation will be made in Queue-mode, including SSP and UH, in a few years.
- PFS will be also operated in Queue-mode.

Advantages of Queue-mode over Classical

- **Observing efficiency**: data will be taken under expected conditions
- **Higher priority to programs highly scored by referees and TAC**: higher probability of obtaining data for programs recognized as more important
- **Data uniformity**: standard procedure is defined. Scheduled acquisition of calibration data.
- **Priority for Stronger Science Programs.**
- **Enhance Legacy Values.**

Disadvantages / Challenges of Queue-mode

- Users are not present at observations: observing strategy cannot be changed by checking obtained data.
- Less flexibility (in some aspects):
 - Users needs to fix observing plan in Phase 2 (well in advance to the actual observations).
 - No one can predict when an observation will be made.
 - Some difficulties in execution of time-critical observations
- Extra Man-power to carry out Scheduling and Quality Assessment

Phased Implementation - Challenges

- SI 6AB: ~20% of HSC open-use observations will be in queue-mode.
 - **Shared-Risk Basis** - No guarantee on obtaining quality controlled data.
 - Some key components in queue-mode operation may be missing.
 - e.g., proposal submission and phase-2 tools are not final.
 - We would limit nights for Queue-mode; we may need to ask PI to change from Queue to Classical.
 - Please apply with these condition in mind.
- **Queue operation is subject to change** during shared-risk periods
- Lack of man power in implementation

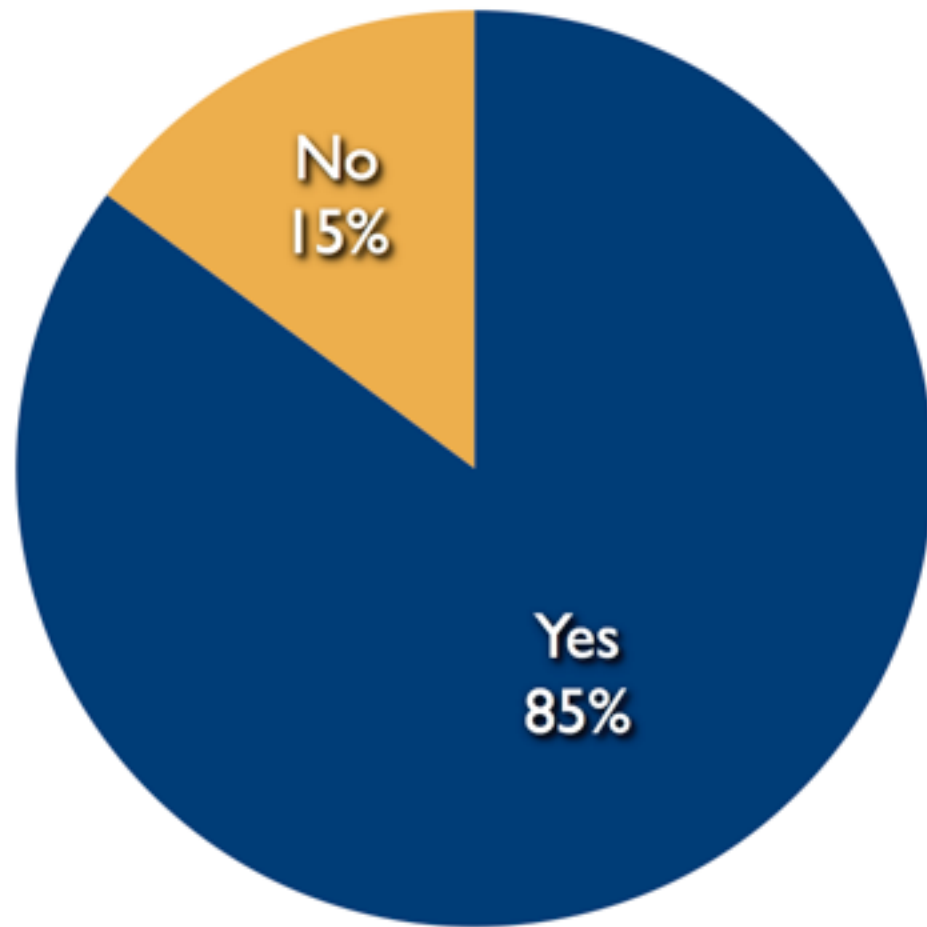
HSC queue survey stats

60 replies, 33 JP and 27 EN

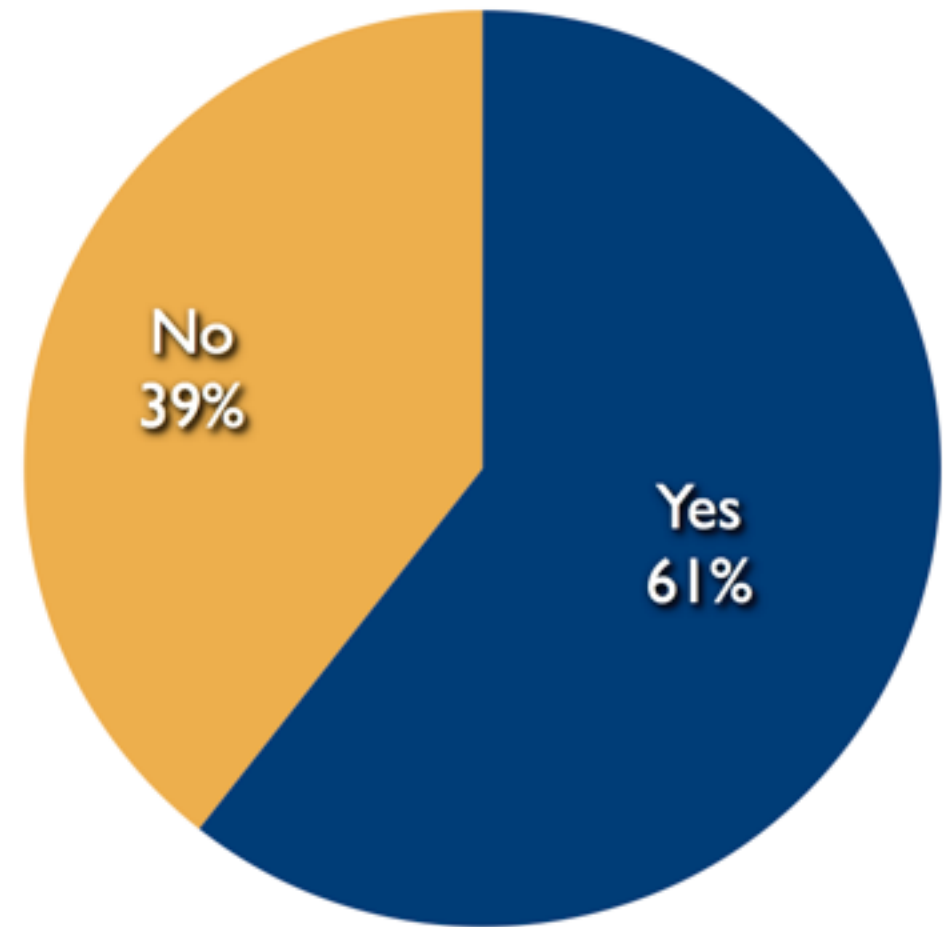
Many thanks for participants.

queue experience?

EN

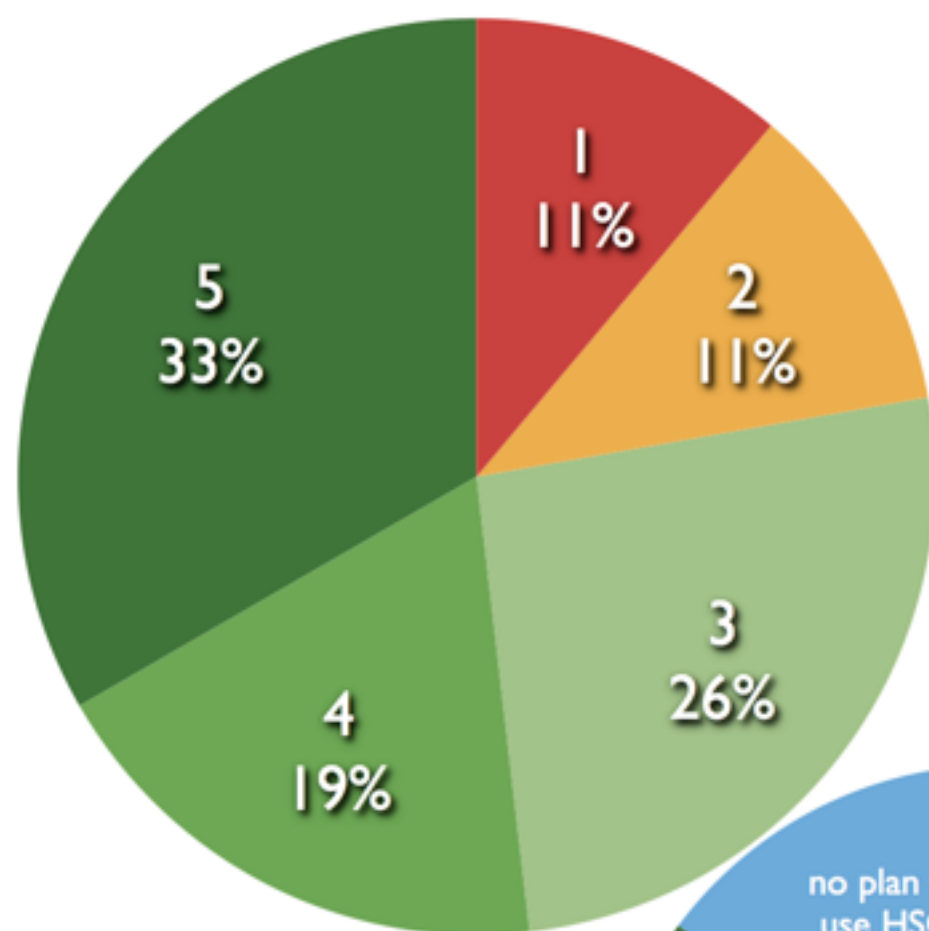


JP

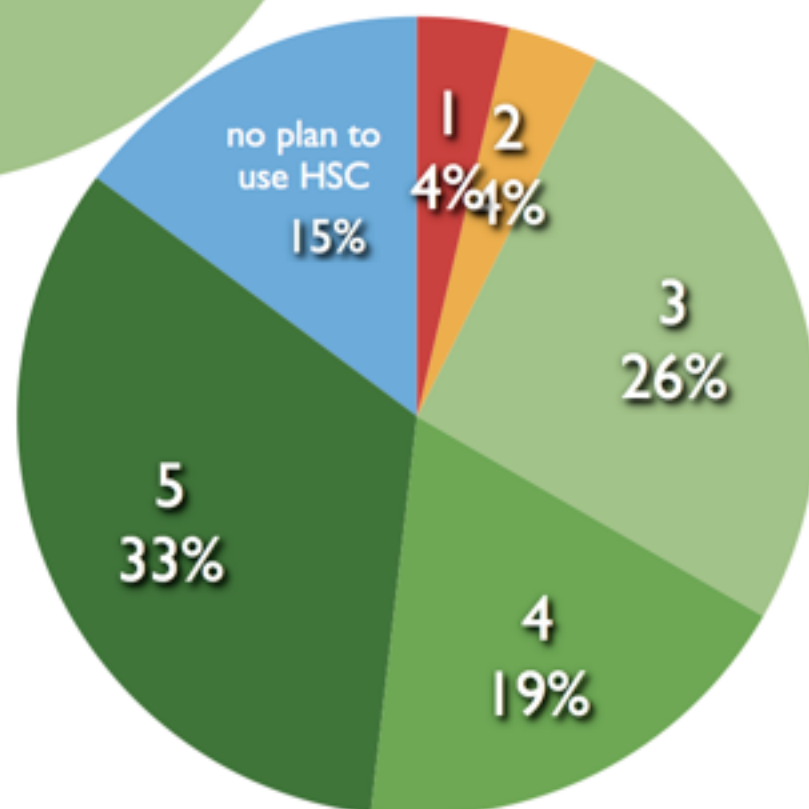
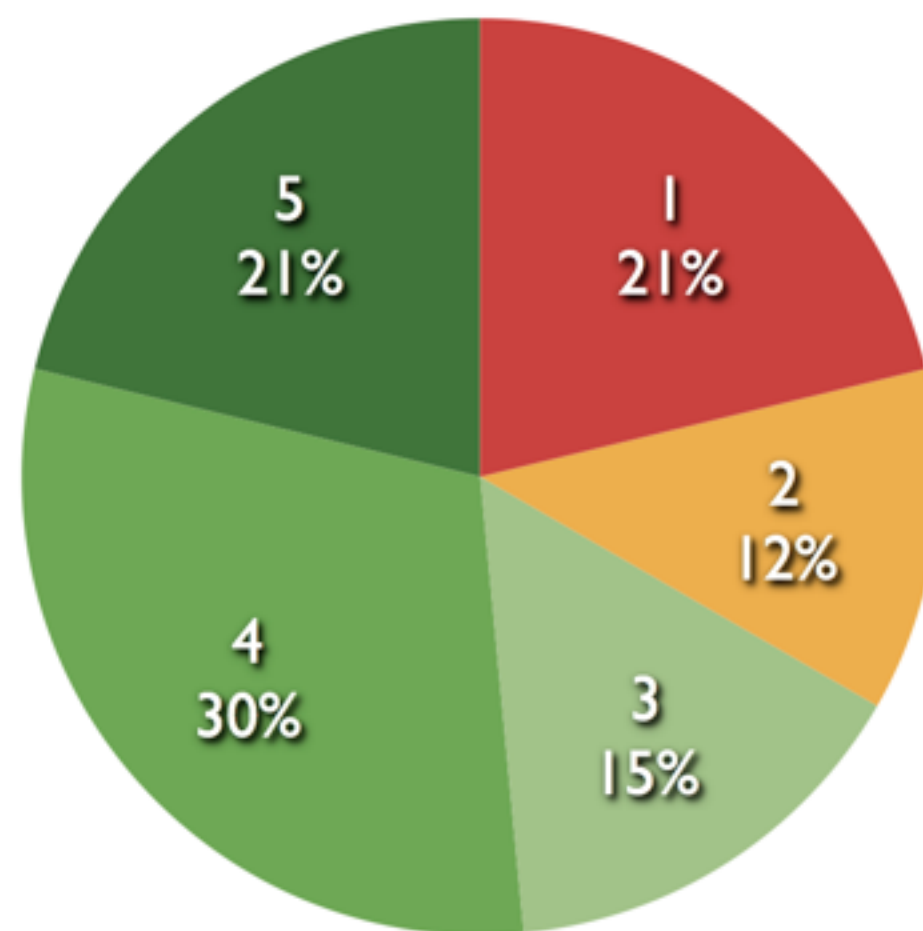


would you apply for queue time?
[5] (very likely) to [1] (not likely)

EN

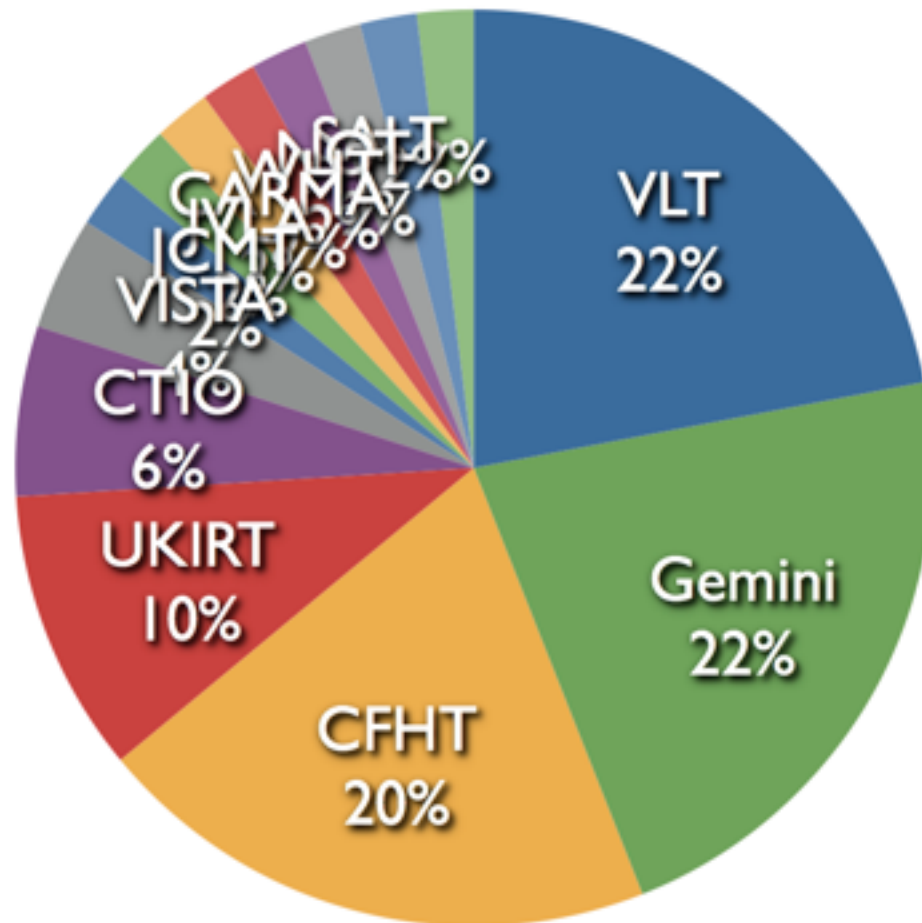


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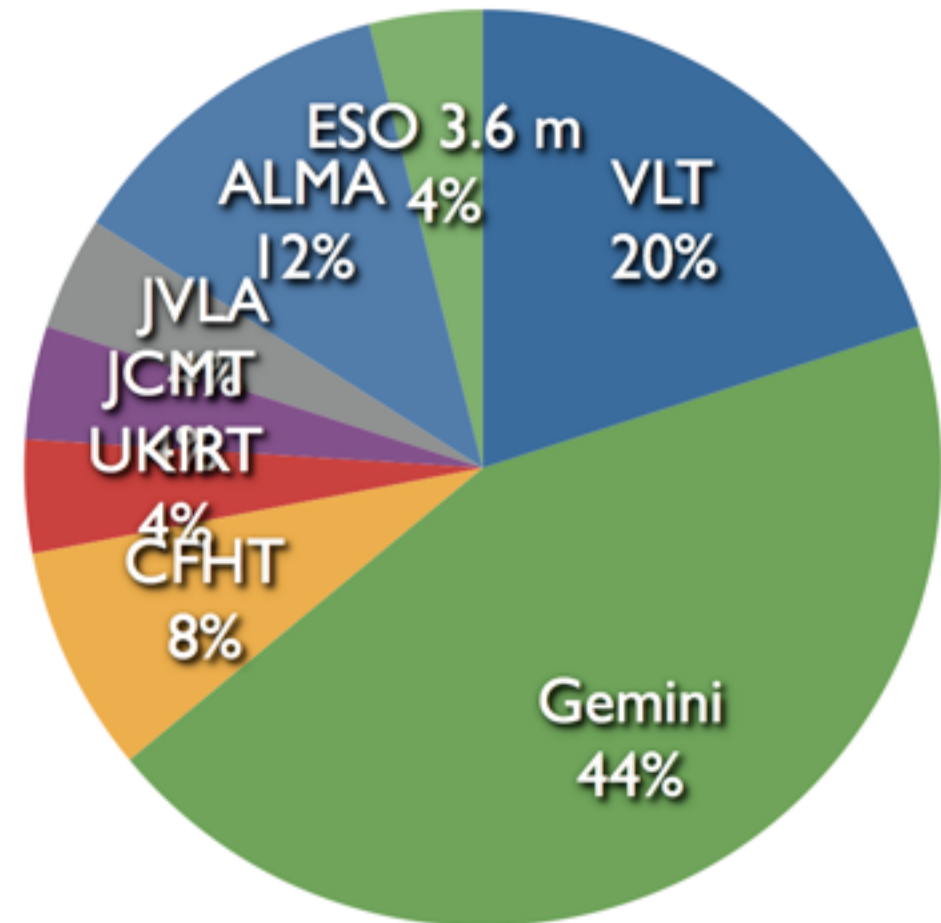


which ground-based, queue mode telescope have you used?

EN



JP



Comments from User Survey (1/3)

Positive:

- Expect obtaining good data regardless of weather (for highly ranked programs)
- No need of travel to Hawaii (save research time)
- Improvement of observing efficiency
- Execution by skilled staff
- Enables observing programs difficult in classical observations, such as long-term monitoring or time critical observations (each observation ends in a few hours)

Comments from User Survey (2/3)

Negative:

- Concern on quality of user support
- Bad experiences with other observatories' queue-mode
 - Priority is neglected. No explanation.
 - Improper calibration data
 - Phase 2 preparation tool is complex and difficult to use
 - Ignorance of constraints (e.g., seeing)
- Difficulty of doing time critical observations
- Classical observation is more efficient to achieve observer's goal with limited amount of time
- Loss of chance for students to learn observations

Comments from User Survey (3/3)

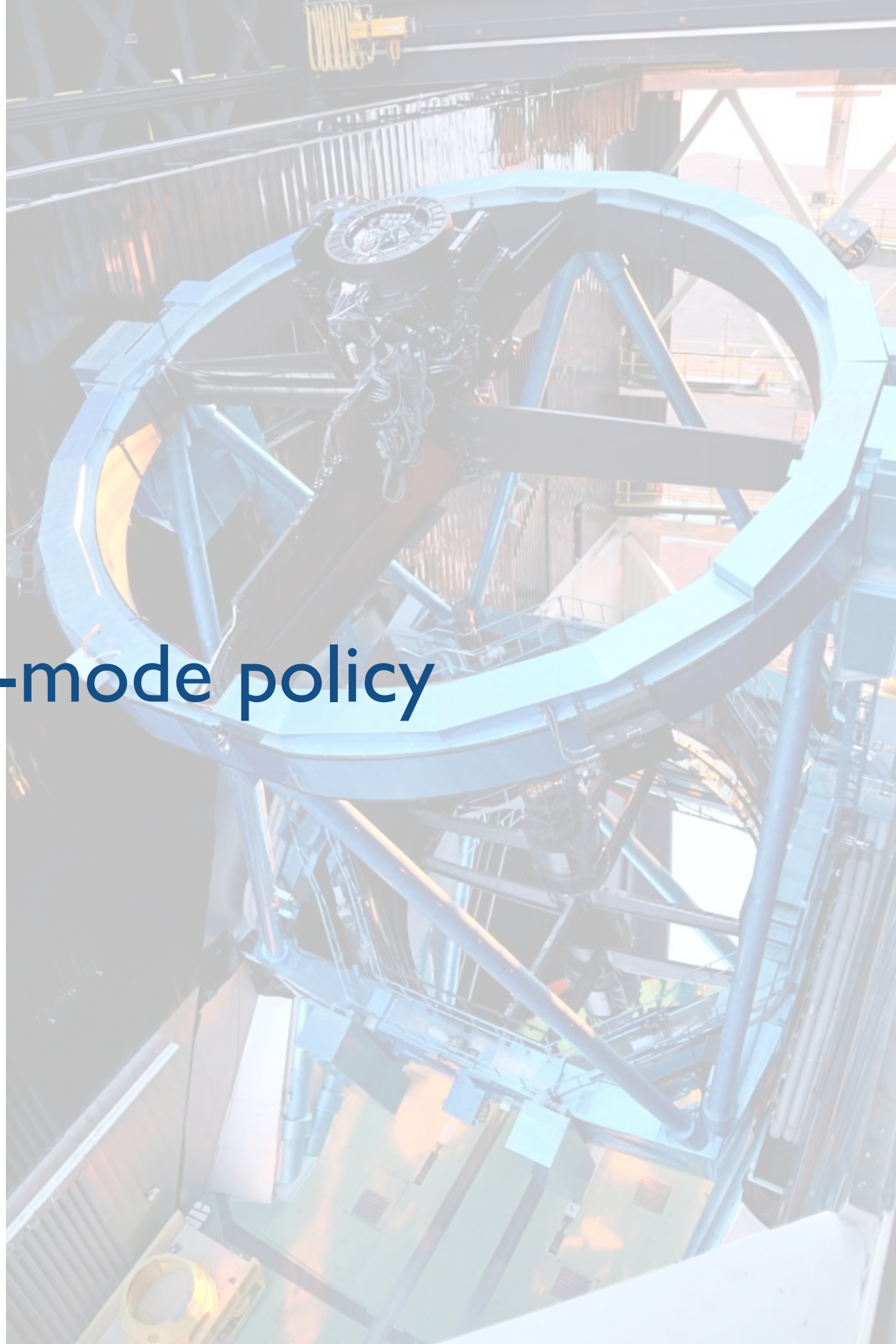
Requests:

- To provide sufficient user support
- Time critical observations
- Carry over
- To understand disadvantage of queue-mode from other observatories
- Training of operators

Challenges to Overcome

- Users' feedback is very important.
- Please understand shared risk. Try and give comments for improvements.

Key points from Queue-mode policy

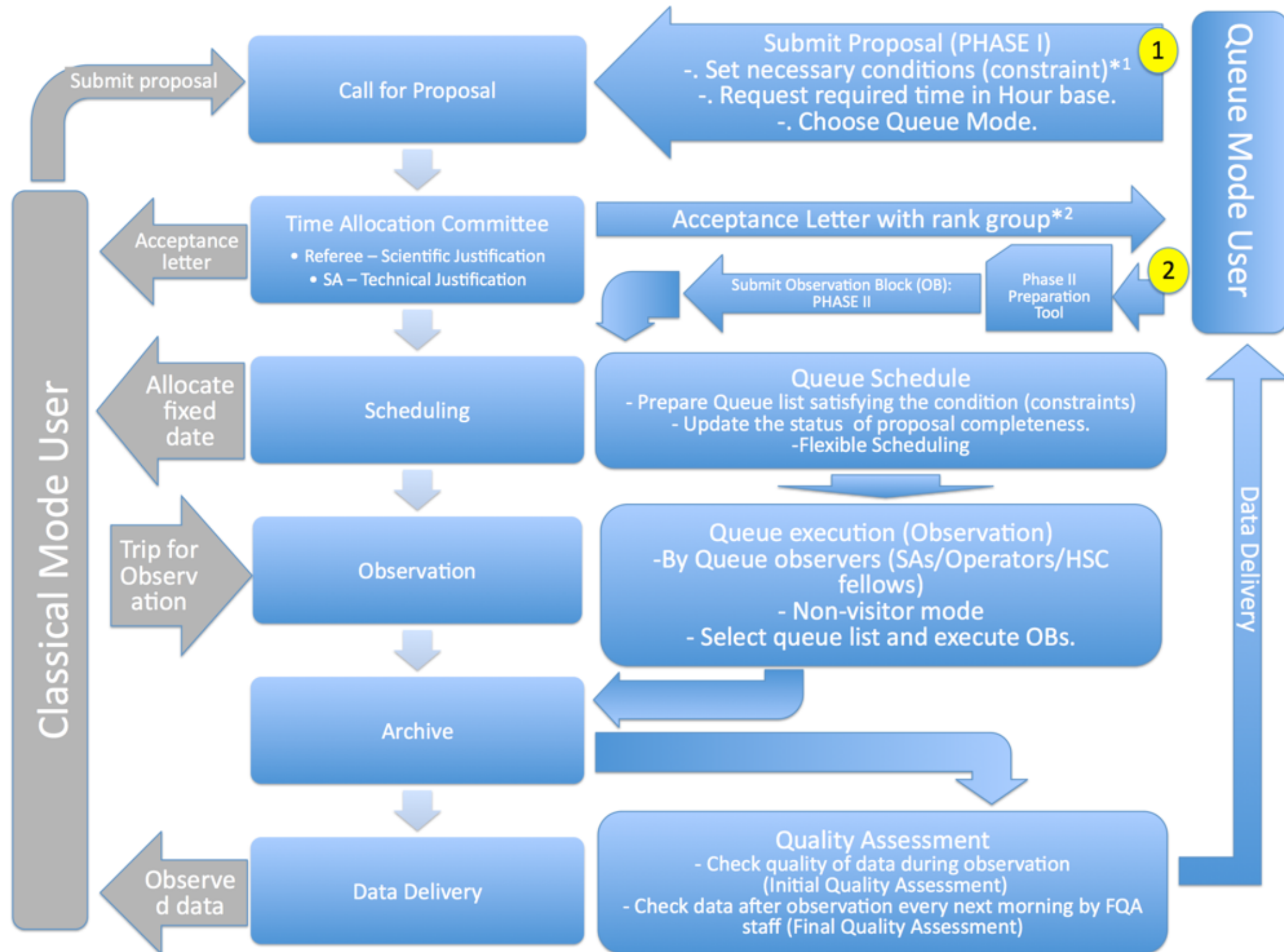


HSC Queue Operation Document and Queue-mode User Document

- HSC Queue Operation Document:
 - Define policies and procedures.
 - For Subaru Telescope staff members. Shared with users.
 - Users do not need to understand the contents of this document.
- HSC Queue-mode Program PI Document:
 - Describe procedures for Program PIs (=open-use users).
- Drafts are available at this WS website.

Steps

Actions



by Pyo-san

Terminology

- See Queue Operation Document / Program PI Document for the full list.
- **OB:** Observing Block
- **QA:** Quality Assessment
- **HSC Support Scientists (SS):** SAs/SSAs who have assignments for HSC observations and HSC research fellows
- **Queue Observer:** Subaru staff who carry out queue observation.
HSC Support Scientists and Operators
- Special Filter: filters other than five broad-band filters (g, r, i, z, Y)

Observing Block (OB): unit of execution

- Minimum unit of Queue-mode operations. Scheduling is based on OBs.
- OBs are only executed when the condition meets constraints defined by users.
- For HSC, one set of dithers (normally 5 shots)
 - Shorter OB has higher probability to be executed.
 - see Yeh's talk
- Maximum 100 minutes on-source time
- OBs should be submitted in Phase2 (before the beginning of the semester)
 - deadline: Dec. 27 (for 'A' semesters) / June 30 (for 'B' semesters)

Observing Block (OB): unit of execution (cont.)

- Once an OB is executed, that should be finished unless any emergency to stop observation (telescope/instrument trouble, weather condition to close dome) happens.
- If constraints do not satisfy requirements or execution is interrupted, the OB will return to queue.
- OB has priority information:
 - priority by PI
 - GRADE by TAC
 - referee score
 - these are used for scheduling.

Constraints

- PIs are asked to define observing condition to execute the OBs.
- Four parameters:
 - Seeing, Transparency, Moon phase, Moon Distance
 - Airmass is an additional constraints. PI cannot set airmass upper limit smaller than 2.0.
- PI needs to define the most severe constraints in their OB in the proposal (Phase-1).
- In Phase-2, PI needs to define constraints for all OBs. PI cannot define constraints more severe than those defined in Phase-1.
- The more severe the constraints are, the less likely the OB is executed.
- Upon HSC SS's approval, PI can relax constraints after Phase-2 submission to increase probability to be executed.

Quality Assessment (QA)

- see Nakata-san's talk
- Two-step assessment: Initial QA and Final QA
- **Initial QA:** carried out during observation by Queue Observer
 - rough estimate of quality: 'good' (=meet constraints), 'bad' (=not meeting constraints), 'marginal' (need more investigation, attention to person who do Final QA)
- **Final QA:** carried out during day-time by HSC SS (who is not observing)
 - will make decision on whether an OB meets constraints.

QA Policy (1/2)

- **Seeing:** based on on-site analysis system
 - 0.1'' margin: if seeing values in an OB is within a range 0.1'' larger than the constraint value specified by PI, the OB will be approved.
 - e.g., if PI specifies 0.8'', data with seeing $<0.9''$ will be approved as completed.
- **Transparency:** based on on-site analysis system
 - For SDSS fields, transparency will be measured by the data themselves.
 - For non-SDSS fields, currently no transparency measurement is available. Execution of an OB is determined based on the latest measurement of transparency on the night, and Final QA will not check transparency.
 - 20% margin is applied to transparency. e.g, if PI specifies $T > 70\%$, data with $T > 56\%$ will be approved as completed.

QA Policy (2/2)

- Other than constraints, basic quality check will be executed. Details are TBD.
 - Image quality (any elongation) - need threshold?
 - Stray light - no guarantee; OB may not be returned to queue?

What will be Delivered to PI

- See talk by Eric Jeschke
- via STARS / MASTARS
- raw FITS
- Observation log
- Result of QA for each shot / OB
- Data of OB which did not meet constraints will be also delivered with note.
- Delivery will be made after Final QA.

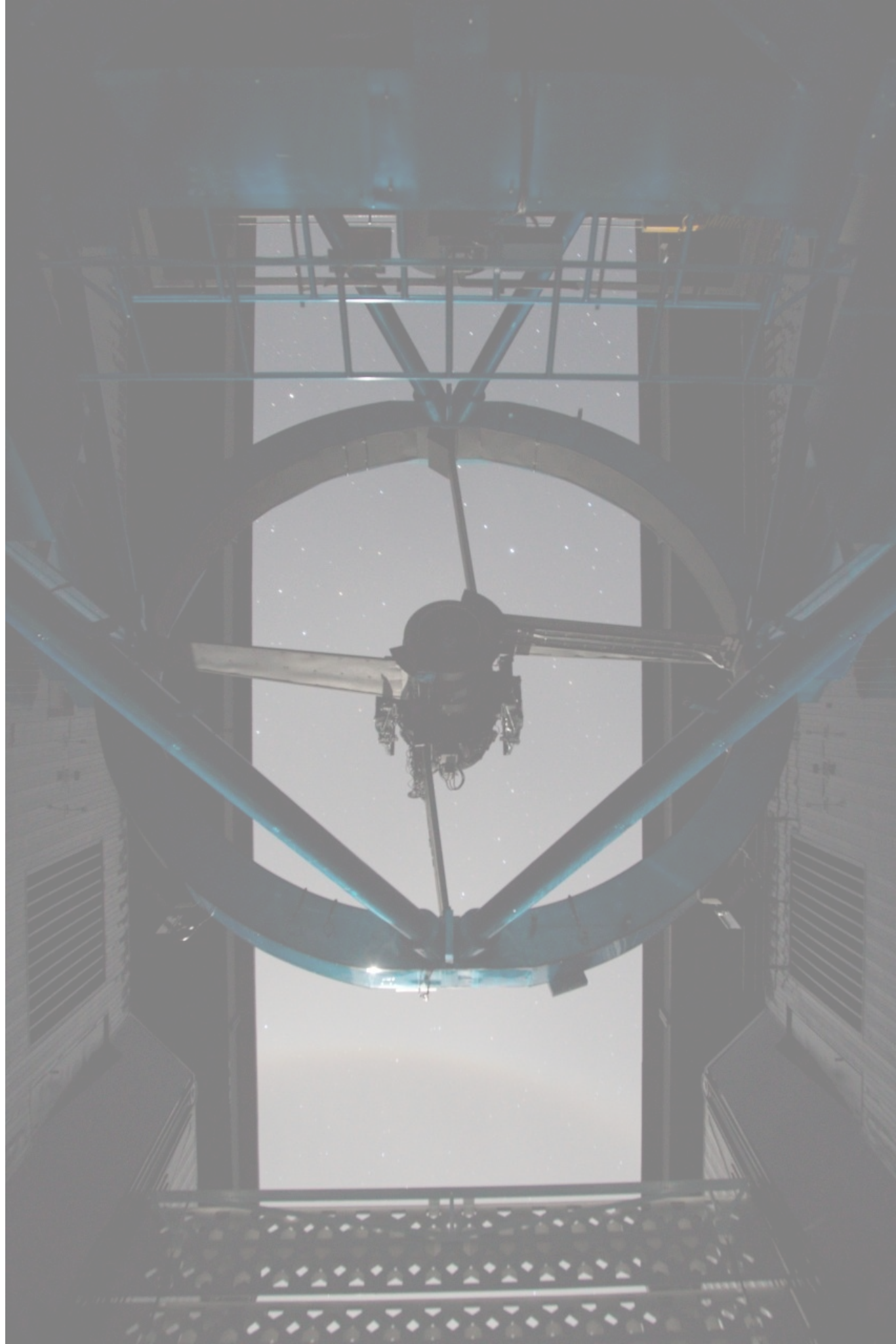
GRADE and Carry-Over

- **A (Highest), B, C (Lowest) and F (Filler).**
 - A: <10% of all HSC open-use programs. If not completed, they will be carried over for two semesters (SI 6A GRADE-A program(s) will be carried over in SI 6B and SI 7A)
 - **No carry-over for OBs with special filter.**
 - B: Accepted programs. **No carry-over.**
 - C: Not accepted but permitted to be executed. Pls need to submit OBs in Phase-2.
 - Queue night assignment is based on hours for A and B programs.
- Filler programs are submitted separately (same schedule as service observations for other instruments).
 - **No filler program in SI 6A.**

GRADE and Carry-Over (cont.)

- **GRADE F**: fillers. only executed when no A, B, C OB can be executed (very poor condition).
 - Seeing constraint must be >1.2 ". Transparency constraint must be <0.5 .
 - Filler programs are submitted separately (same schedule as service observations for other instruments).
 - TAC will only check programs that should not be executed; no priority will be assigned.
 - No carry-over for GRADE F programs.
 - No filler program in S16A.

More Details



Sukima (Dead time)

- Time during classical observation when no target can be observable.
- Sukima will be used for Queue-mode.
- HSC classical programs can't request additional targets.

Early Execution

- OBs may be executed before the beginning of the semester.
- If PI sends his/her OBs earlier and OBs are approved by HSC SS, they will be sent to queue as GRADE C OBs until the semester starts.
- The fact behind the idea of early execution is that in queue simulations we found there could be some observing time with no appropriate target available, especially in the latter part of the semester.

Cadance and Time Critical Observations

- No support of Cadance and Time Critical Observations in SI 6A.
- We understand flexibility in time-critical observation is very important for some users. We will work on implementation of cadence / time-critical observations.

Users contact point

- Users feedback is very important to improve HSC queue-mode.
- e-mail address: queue@naoj.org
- Should be available from the issue of Call for Proposals.