HSC QUEUE MODE
OPERATION PLAN

Tae-Soo Pyo & Queue-mode team
(Subaru Telescope)
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Working Group

[9 members]

Queue Mode Team

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Objective of Queue Mode

Maximize Scientific Output

- **Flexible operation** to take advantage of the conditions (weather, filter, etc.)
- Provide **adequate observation condition** to achieve the scientific goal.
- 2012 SAC report suggested queue observation and **quality assurance to achieve homogeneous data quality of survey data** for HSC and PFS observations.
Current Status

• Studied queue operations of UKIRT/JAC, CFHT, Gemini Telescope
• Studying feasibility by simulation [P19]
• Define Procedures [P21]
• Developing Policies [P21]
• Design software [P20]
• User survey
• Regular meeting every two weeks.
Queue Presentations in UM 2014

[P19]: HSC Queue Mode Observation Simulation

[P20]: Queue Software

[P21]: HSC Queue Mode Operation Plan
**STAGEs for Queue Implementation**

**STAGE I: S16 A & B (Beginning)**
- Only applicants of queue Mode in OPEN USE

**STAGE II: S17 A & B (Stabilizing)**
- 50% Queue + 50% Classical in OPEN USE only

**STAGE III: S18 A & B (Settle down)**
- 80% Queue + 20% Classical in both OPEN USE and SSP
Schedule for STAGE I (S16A)

Jan 1/13 - 15 : Subaru UM 2014

Jan 1/13 - Feb 1/15 : HSC Queue Mode User Survey

May or June : Queue Mode Workshop [TBD]
  How to use Phase II tools
  What is Queue mode.

July : Preparing for S16A Call for proposal (CfP)

Aug : CfP S16A
HSC queue mode observation survey

HSC queue mode observations allow dynamical scheduling to optimize the use of telescope time, and observers do not take data themselves. The operation will begin in Semester 16A; fill out this survey to help us plan a smooth transition. For more information about HSC queue mode operation, visit http://goo.gl/5sFbUp

* Required

Q1: How do you access Subaru Telescope time? *
- Subaru open use normal program/service program/intensive program
- Gemini exchange time
- Keck exchange time
- University of Hawaii
- Other: 

Q2: Have you had queue mode observation experience using ground-based telescopes? *
- Yes (continue to Q3)
- No (skip to Q4)

Q3: Which observatories and instruments?
Then continue to Q4.

Q4: As a prospective HSC user, do you plan to apply for queue mode observing time in S16A? *
Leave your comments below.

1 2 3 4 5
Not likely ○ ○ ○ ○ ○ Very likely

Tell us why. *
Provide us with more details on how queue mode may be helpful for your programs, what the biggest concerns of using queue mode are, how we can address the reasons, etc.

Just 10 minutes!!
Please go to this Queue Mode survey webpage and give your precious opinions. Thanks!

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• English version
  http://goo.gl/forms/2lrwQ4swrj

• Japanese version
  http://goo.gl/forms/Y9yxNTXNh8
STAGE I: S16A and B

• OPEN USE only (not SSP)
• In CfP, open “Subaru Open Use queue mode program” for HSC.
  – Queue mode will be allocated at “Sukima” (隙間時間) in classical mode program and several queue mode nights.
    • No additional target request of classical programs.
    • In bad weather, Queue program has higher priority than back-up programs.
    • The number of queue observation night depends on the number of the accepted queue programs.
  – Referees give science justifications for queue proposals.
  – SAs give technical justifications for queue proposals.
STAGE I: Queue Mode Programs

- Normal and Intensive Queue mode
  - Normal Queue Program: No lower limitation of observing time = 1 hrs to more 5 nights (50 hrs)
  - Intensive Queue Program: more than 5 nights per each semester
  - Referee will judge the science.

- Short term Queue mode
  - Replace the service observation within 4 hrs
  - Users submit Requirement of observation in Text format like service observation
  - Priority is lower than Normal Queue Program but it will be useful for Queue filling
  - TAC members will give scores.
STAGE I: Queue Operation Resources

Manage of Queue Schedule and Complete rate
- Operation Center: Nakano, Imanishi, Pyo
- With Queue Schedule program

Queue Observers
- SA, SSA, Operators, HSC Astronomers

Queue Software Management
- OCS team

Quality Assessment
- 1st QA during observation with HSC quick look programs by SAs
- In the next morning, the frames commented by Queue observers will be re-checked.

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STAGE I : Software for S16A & B

**Phase II Tools**
- Input observation plan and parameters (See, P19 (Sherry))
- Target Information (RA, DEC, Target Name)
- Observation Information (Filter, Exposure time, Dithering pattern)
- Observation Constraints (Sky brightness (Moon phase and distance), Seeing, Extinction)
- Make Observation block files and submit to observatory

**Queue Scheduler**
- Drafting Queue mode schedule
- Semester base, Each two weeks base
- Checking and Modifying Queue mode Schedule
- Weekly base & Daily base
- Make Queue List satisfying the observation constraints (Seeing, Extinction, Sky Brightness. Etc.)
- Update with the completeness of the queue proposals

**Queue Selection & Execution tools**
- Show queue list satisfying conditions [sorted by priority] : JAC style
- Referee rank, seeing, photometric condition
- Marking OBs which were done

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STAGE II: S17 A & B

• Allocate Queue programs in fixed rate
  – 20% Queue + 80% Classical (S17A)
  – 50% Queue + 50% Classical (S17B)
  – The allocation rate can be changed by the results of S16A & B queue observations
  – Increase the queue observation rate up to 50%

• OPEN USE only [ SSP is independent]

• Allocate proposals to Queue mode in TAC or Sci. Div.
  – High ranking proposal in referee judgment
  – Proposals
    • strict requirements for scientific achievement (best seeing, photometric sky, dark night)
    • Targets with wide spread over the all sky area

• Regular Queue scheduling is required
STAGE II: Queue Scheduling

• Weekly base scheduling check
  – One week before
  – Check Queue filling and queue lists updated
  – Check the availability of queue list for the environment conditions

• Daily base scheduling with fine tuning
  – Update and fine tune prepared queue lists in the afternoon until 4 pm
STAGE II: Queue Operation Resources

Manage of Queue Schedule and Complete rate
- Operation Center: Nakano, Imanishi, Pyo

Queue Observers
- SA, SSA, Operators, HSC Astronomers

Queue Software Management
- OCS team

Queue Scheduling
- SSA + HSC Astronomers
- Weekly base schedule check and daily base schedule revision

Quality Assessment
- NAOJ post docs
- In the next morning, check frames commented by Queue observers with QA tools
STAGE II: Software for S17A & B

Phase II Tools

Queue Scheduler

Queue Selection and Execution Tool

Automatic Log analyzer

- Gen2 log analyzer
- Automatic Estimate and summarize times for each execution of proposal (OB), overhead, trouble down time

Quality Assessment tool

- 1st Queue Assessment during observation with HSC software by Queue observers
- 2nd Queue Assessment after observation by Queue Assessment Checker

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STAGE III: S18 A and B

- Both Open USE and SSP
  - 80% Queue + 20% Classical
  - Dead time of SSP will be increasing, so mixing with Open USE queue and SSP
  - The policy of how to take balance OPEN USE and SSP with queue should be determined.
Thanks!

Just 10 minutes!!
Please go and join the queue survey.
http://goo.gl/forms/2lrwQ4swrj [English]
http://goo.gl/forms/Y9yxNTXNh8 [Japanese]
## Constraints for Queue Observation

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Best</th>
<th>Good</th>
<th>Possible</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeing</td>
<td>$&lt;0.5''$</td>
<td>$&lt;0.75''$</td>
<td>$&lt;1.0''$</td>
<td>$&gt;1.0''$</td>
</tr>
<tr>
<td>Photometric? Extinction</td>
<td>Photometric: Stable and clear</td>
<td>Thin Cirrus and patchy Cloud: $dm&lt;0.3$ mag</td>
<td>Cloudy: $dm&gt;0.3$ mag</td>
<td>N/A</td>
</tr>
<tr>
<td>Sky background (Moon phase and distance)</td>
<td>Darkest ($&lt;+/-3$)</td>
<td>Dark ($&lt;+/-7$)</td>
<td>Grey ($&lt;+/-11$)</td>
<td>Bright ($&lt;+/-14$)</td>
</tr>
<tr>
<td>Air mass</td>
<td>Sky background transparency decreases and brightness increases with air mass. Image quality (seeing) is proportional to $\text{airmass}^{0.6}$.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>