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What's New in Gen2

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Abstract

We report on recent developments with the Gen2 Observation Control System for Subaru Telescope, maintained by the Software Division, including:

- recent developments of GERS (Gen2 Extended Remote System–for remote observation monitoring from anywhere)
- developments in the 100GB high-speed network for data transfers to Hilo and Mitaka,
- a new "real-time" sound monitoring system, and
- updates on the observation applications for PFS

Gen2 Extended Remote System

The Gen2 Extended Remote System (GERS) was introduced in 2020 as a way to allow observers to continue to conduct observations with Subaru Telescope without traveling to one of the remote sites in Hilo or Mitaka (which were travel limited or locked down by the pandemic). By installing a small python program users can connect and view Subaru's Gen2 Observation Control System screens from their office or home to monitor the observation while video conferencing via Zoom to discuss matters with their Support Astronomer.

GERS proved to be very popular with users and is now the default method of observing for most classical observations with Subaru, even post-pandemic. The system is constructed using a rigorous security model where connections are tunneled and encrypted using strong public key cryptography and 2FA tokens. Keys are inserted for users only during their scheduled observing nights. No holes are opened in the Subaru firewall for this service.

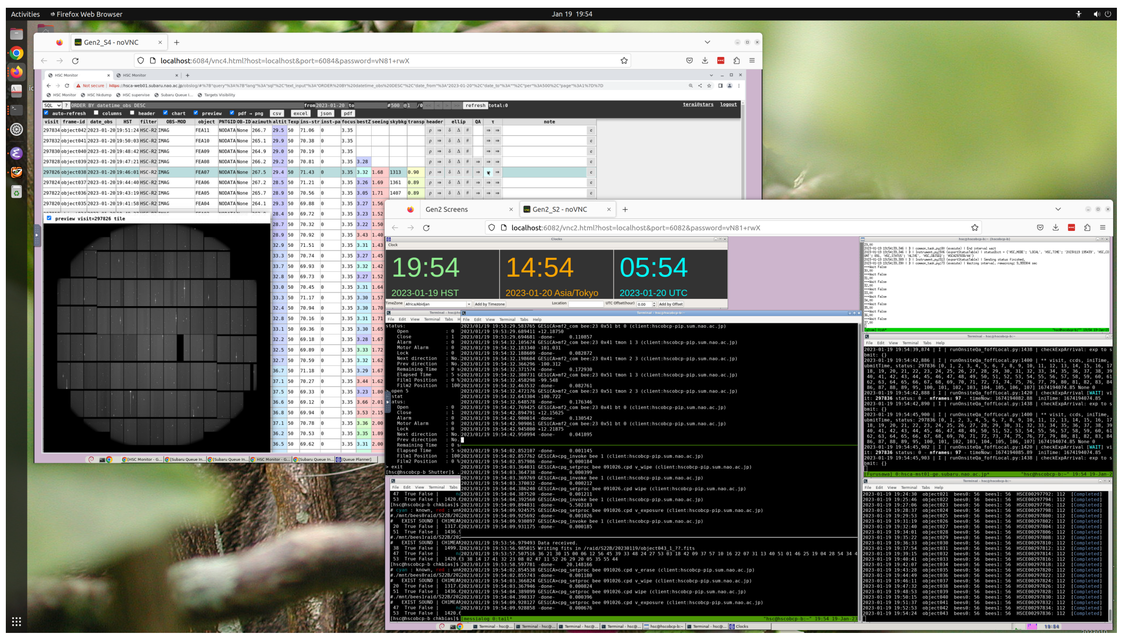

Figure 1: GERS: Gen2 Displays in Web Pages.

Recent developments for GERS include easier installation (and simpler instructions), the ability to view screens in web pages, a new GERS User "self-service" web site where users can upload their key and download config files, and a GERS Admin web site used to coordinate and manage GERS observations by Subaru Science Staff.

Quick Data Access for GERS Users

Another recent development is the ability to download observation data rather simply (in the manner of the old on-site analysis server `sumda` [or `mtkda` in Mitaka], for those who remember using that). Using the same crypto keys generated for GERS, observers can download data from the `gersdata` server using their assigned observation "o-account" and simple tools like `scp` and `rsync`, allowing quick look type actions using their own computers during the GERS observation. This feature became available in late 2022 and has been gradually rolled out to more and more GERS users.

Connection to 100G High Speed Network

Recently, NAOJ has installed a new 100G network circuit between the Maunakea summit, Hilo base facility and Mitaka campus, using some UH infrastructure to do so[1].

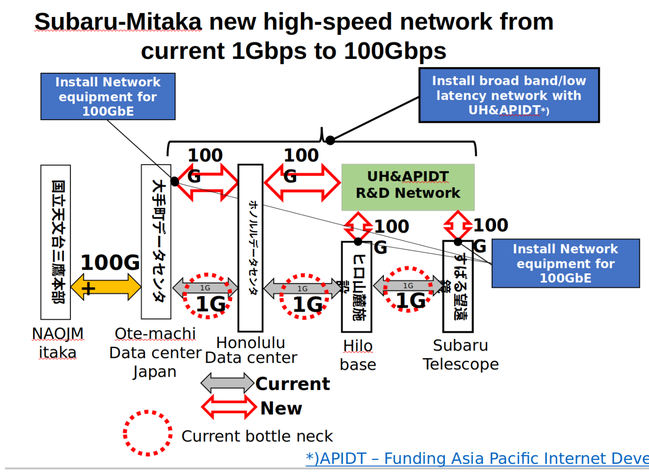

Figure 2: 100G Network (Figure by Oe-san. Used with Permission)

Gen2 has been connected to this network and we have conducted an initial trial of transmission of HSC data to Mitaka during observation for quick transient analysis (by Tominaga-san's observation). While several segments of the network still need to be improved (and some data handling tuning done) to see the full benefit of the 100G bandwidth, the trial succeeded to transfer HSC exposures to an HSC cluster in Mitaka in about the same time (or less) than it takes to transfer an exposure to the HSC Hilo base cluster using the existing summit-base 1G network link. This opens up many interesting possibilities for quick data analysis in Japan for large data instruments. This is an exciting development which we hope to leverage further in 2023.

Subaru "Real-Time" Sound System

A new "real-time" sound transmission system has been added to Gen2 that can be used to transmit mic'ed or networked sound sources to observing sites within a couple of hundred milliseconds. The sound system can transmit individual streams, create mixed streams, record streams and can do sound processing to monitor streams (e.g. frequency analysis) for abnormal sound signatures, amongst other things.

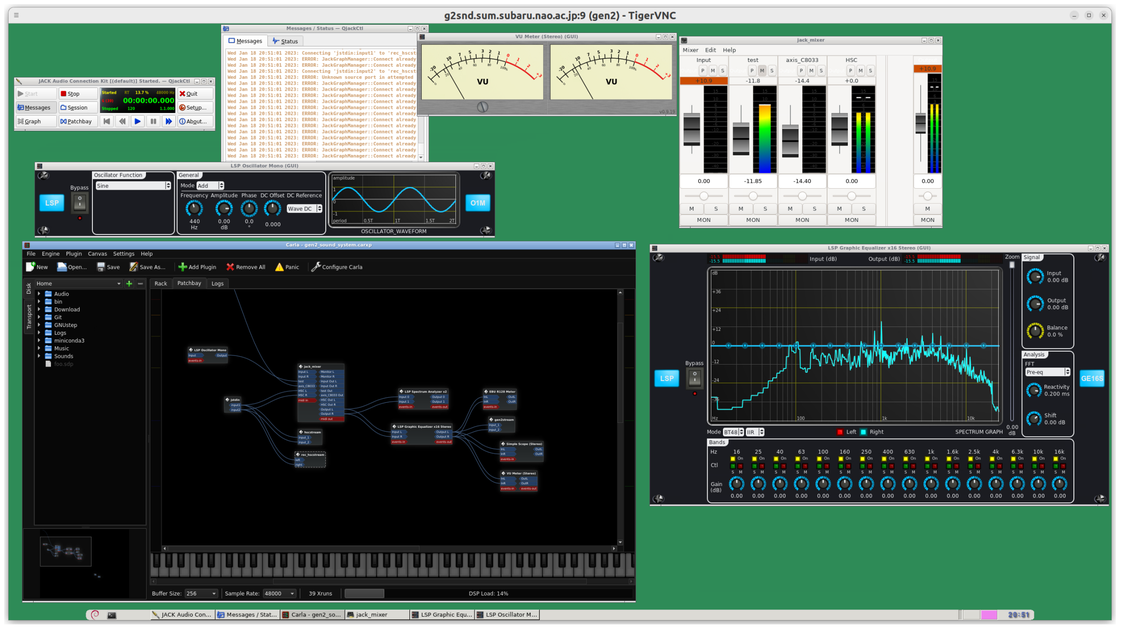

Figure 3: Screenshot showing the Subaru Real Time Sound System UI.

The goal of this system, like Gen2 itself, is to provide a shared resource that can be used efficiently by multiple instruments and for multiple uses, and prevent "re-inventing the wheel" repeatedly for sound monitoring solutions. We hope to incorporate future uses including other instruments, dome and control building monitoring for future OHIA (fully remote–no one at summit) observation. We also plan to use this system to allow GERS users to monitor observation sounds. See the accompanying poster on the Subaru Real-Time Sound System for more details about it's development and implementation.

Developments for PFS

There are a couple of new developments in Gen2 for the ongoing PFS instrument development and commissioning. A couple of new plugins for monitoring PFS guiding are being developed for the GuideView application. One of them shows all six AG camera images and can overplot the guiding error vectors on them. The other is used to fit a PFS focusing sequence to find the best secondary mirror Z axis focus position. These have been tested in the last couple of PFS engineering runs.

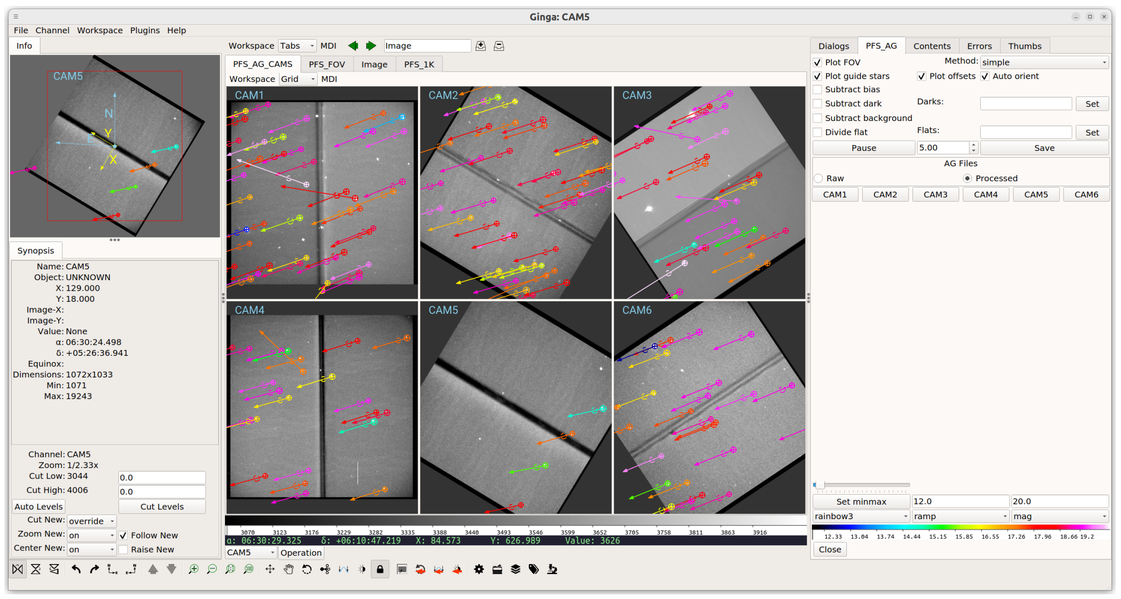

Figure 4: Screenshot showing one of the new PFS AG plugins for GuideView.

We have also developed a more sophisticated guiding error X/Y plot that shows the trending of guiding error by changing the color of the error points as they age. We are calling this application GuideMon and it can be used with any guiding instrument at Subaru. It is part of an effort to break up the single StatMon window into more specialized windows covering guiding, environmental monitoring and general telescope attributes.

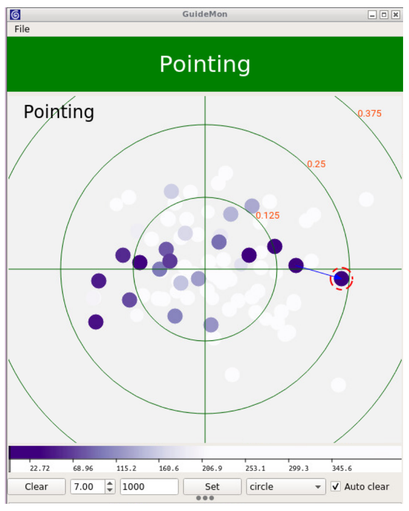

Figure 5: New Error Plot in GuideMon.

Changes for PFS Queue

Work has been ongoing in the PFS "obsproc" working group to establish a practical workflow and tools for open-use observing with PFS, mostly with an eye toward queue observations.

Software Division is working to modify the Subaru Queue database and software to accomodate PFS Observing Blocks in addition to HSC. This will make it possible to maintain an integrated system to quickly check the progress of all queue programs operating at Subaru.

Changes have also been made to the Queue Planning tool ("QPlan") to schedule blocks of OBs–field centers for PFS fields that have been configured by the PPP tool–for visibility, priority, efficient slewing and potentially for instrument or environmental constraints.

[1]Huge Mahalo and acknowledgement to Oe-san, Takami-san, Kiaina-san (and CDM!), Furusawa-san and Tominaga-san for their work to accomplish this. 100G is maximum and may vary due to traffic on the network.