

The Gen2 Observation Control System

What's New 2012

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About Gen2

Gen2 is the second generation Observation Control System for Subaru Telescope. In previous Subaru Users Meetings we have presented on the design and goals of the system, and last year we reported on its current status after five months of operation.

What's New with Gen2?

Gen2 has been in use at Subaru since September 2010. In March of 2011 the last remaining instrument, Suprime-Cam, was brought into general operation with Gen2 and commissioning of all instruments with Gen2 was completed.

In addition to stabilizing nightly operation, the OCS group has continued to develop Gen2 in 2011, mostly working on refactoring, replacing and generally improving the user interfaces. A short list of the main changes for 2011:

- major updates to the new FITS viewer;
- a new quick look (QDAS) interface (not yet deployed);
- a new guiding control interface (not yet deployed);
- new, more efficient telescope commands;
- a new status monitoring and alarm system;
- support for Hyper Suprime-Cam.

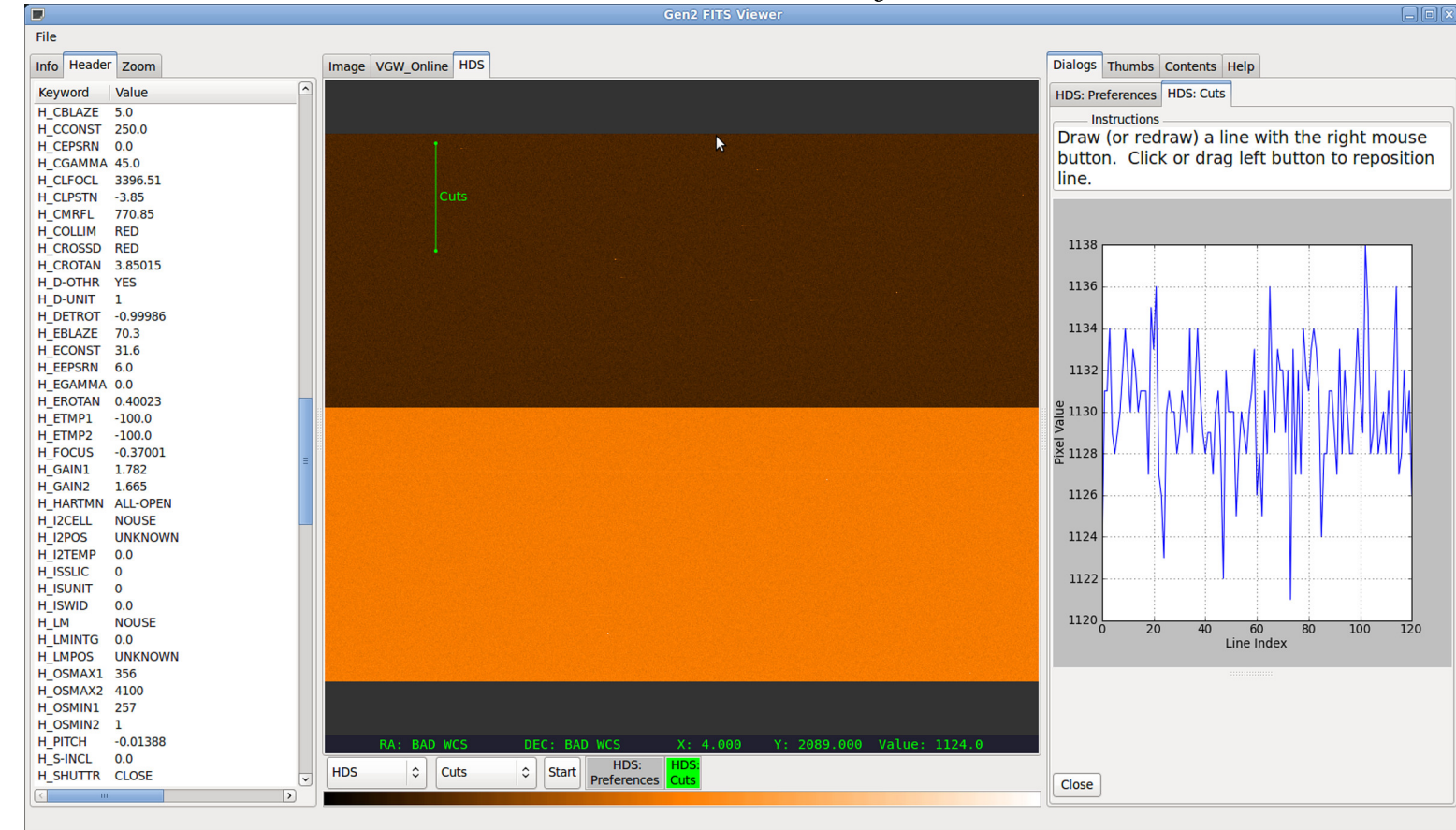
In the following sections we will highlight these changes.

New FITS viewer upgrades

The old SOSS “fast” FITS viewer is becoming difficult to maintain due to the 32-bit specific coding and old Sun XView widget set. The Skycat FITS viewer is also going to be increasingly difficult to maintain going forward due to the reliance on the old Tcl widget set. The OCS group has been developing a new FITS viewer toolkit that supports a 64-bit OS, a modern widget set such as Qt or Gtk, a plugin architecture and good integration with Python. During the last year, the viewer has reached or exceeded feature parity with Skycat. It is now a viable option for implementing a variety of graphical tasks that involve visualizing FITS files.

The viewer centers around a new FITS display widget which supports zooming and panning, color and intensity mapping, a choice of several automatic cut levels algorithms and canvases for scalable geometric forms. In addition to this widget, the FITS viewer provides a flexible plugin framework for extending the viewer with many different features. A fairly complete set of “standard” plugins are provided for features that we expect from a modern viewer: panning and zooming windows, star catalog access, cuts, star pick/fwhm, thumbnails, etc.

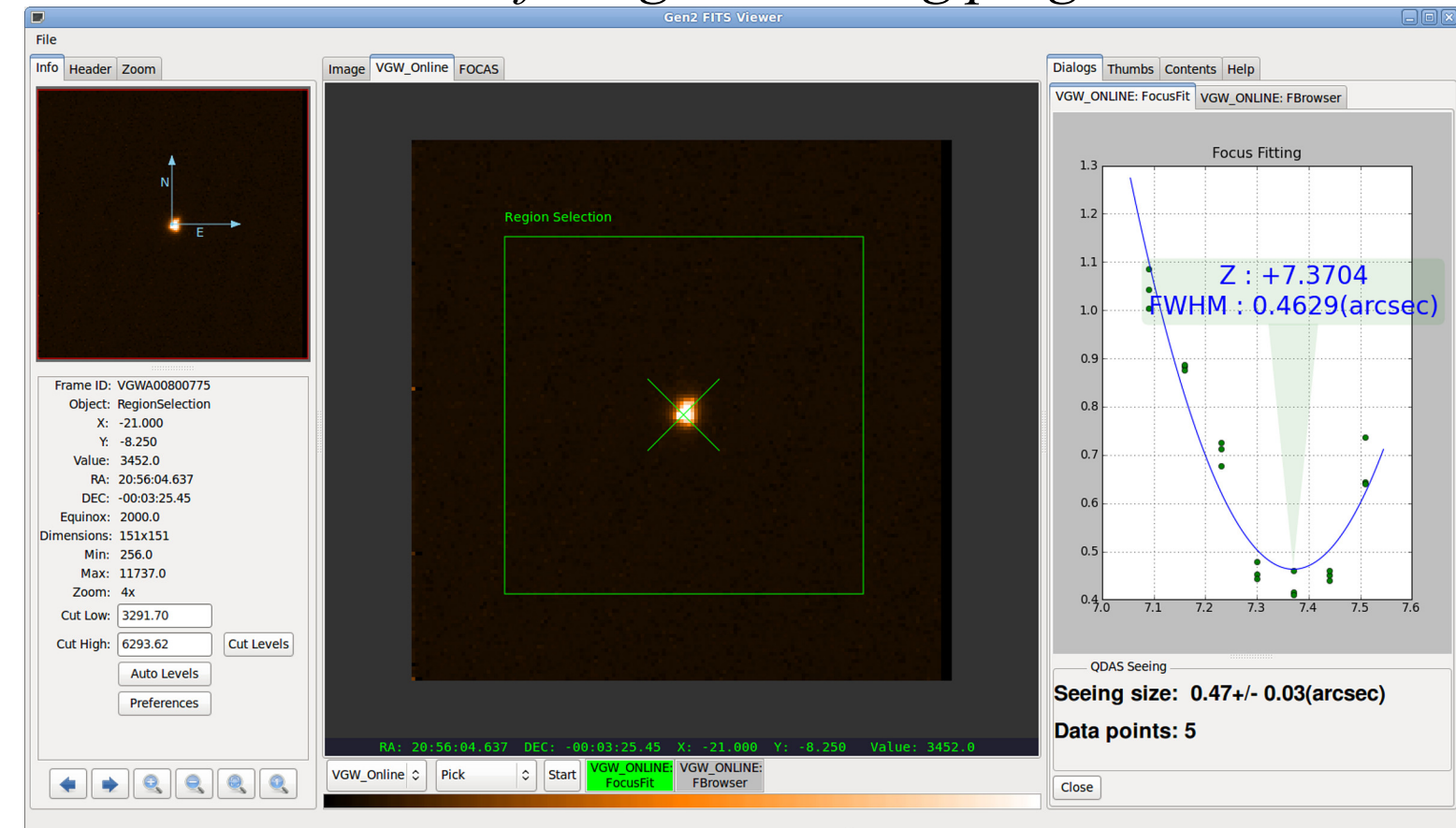
New fits viewer, showing header and cuts pixel data for an HDS calibration frame



New quick look interface (QDAS)

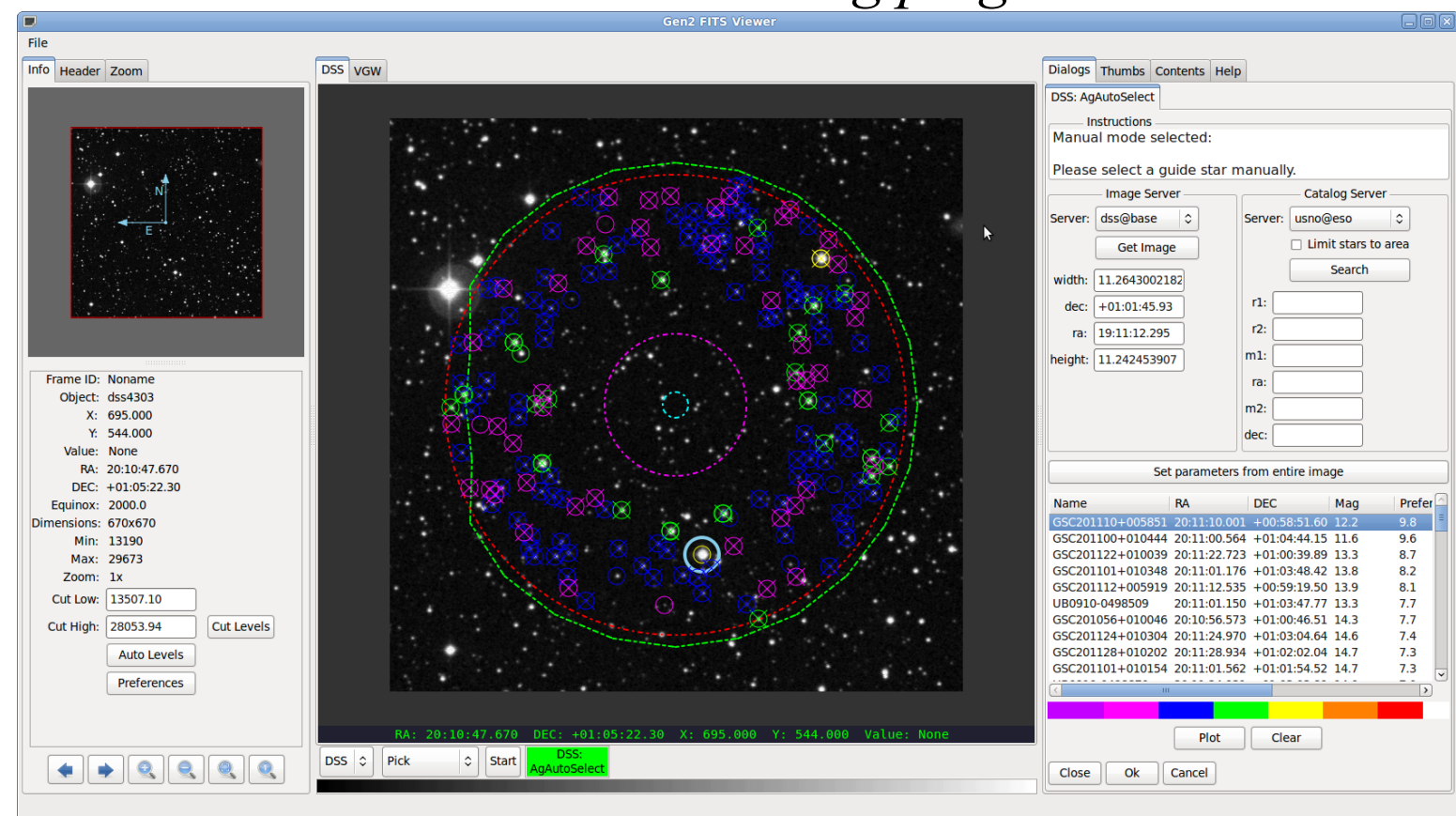
The SOSS “QDAS” (Quick look Data Analysis) functions which were handled by customized Skycat interfaces are being ported to plugins written for the new FITS viewer.

Focus fitting and seeing plugin



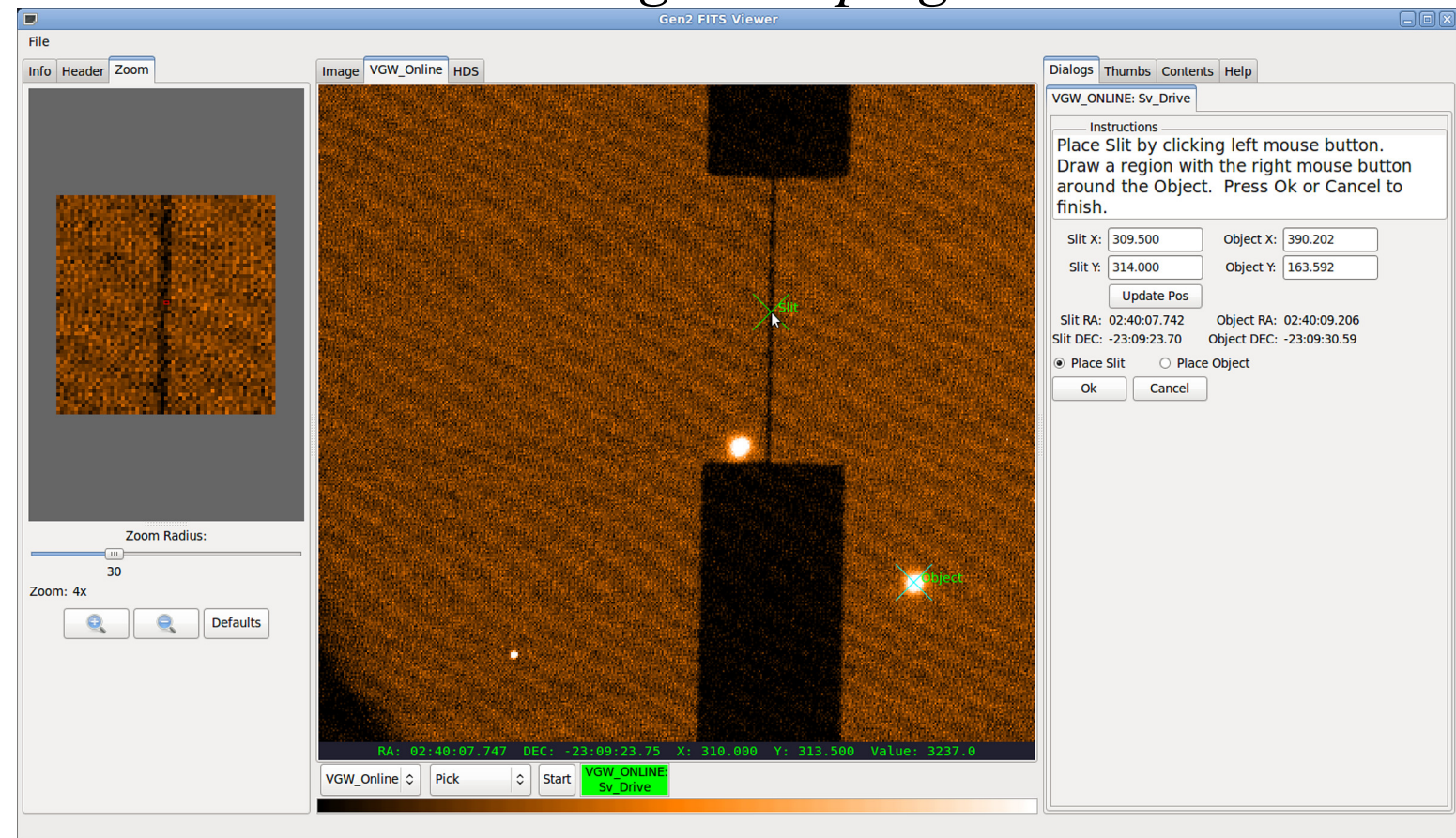
New Guider Interface

Guide star catalog plugin



The new auto guider interface is intended to replace the SOSS VGW subsystem. Like the integrated GUI (integgui), it combines many windows into a coherent block. This prevents a lot of clicking and dragging to move windows around on the screen and allows more efficient operation via the GUI. If desired, tabbed windows can be dragged out of the block to form independent windows if the user prefers or needs that style of operation.

Slit alignment plugin



Like QDAS, the EXEC VGW operations are being written as plugins for the new FITS viewer. The new guider interface provides guide image viewing and guide star selection support for the new Hyper Suprime-Cam and future instruments with their own guider systems.

More efficient telescope commands

Most OCS commands to the telescope system consist of multiple “native” commands running within some kind of sequence with the Telescope Control System (e.g. EXEC TSC . . .). During 2011 the entire telescope command set on the OCS side was refactored. Almost all internal SLEEP commands were removed, which improves the efficiency of many such EXEC TSC commands.

Improvement for each command ranges from a few fractions of a second to in a few cases several seconds. Although it is difficult to quantitatively measure the overall global effect, since these commands can make up a large percentage of an observing night's commands, overall observing efficiency should be improved.

New telescope commands savings

EXEC TSC Command	Savings
ADC	0-1 sec
ADC PF	0-1 sec
AG	0-1 sec
AGSH PROBE	0-1 sec
AGSH PROBE LOCAL	0-1 sec
AG CENTROID	0-3 sec
AZELDRIVE	0-1 sec
CAL PROBE	0-3 sec
IMGROT	0-1 sec
INSROT	0-1 sec
INSROT PF	0-1 sec
IRM2	0-7 sec
SH	0-1 sec
SV	0-1 sec
SV CENTROID	0-3 sec
TELDRIVE	0-1 sec
TELCAL	0-1 sec
TOPSCREEN	5-16 sec
WINDSCREEN	0-6 sec

A new status monitoring and alarm system

The devastating glycol spill accident of July 2011 had a dramatic effect throughout Subaru Telescope. One of the goals of the recovery effort was to improve the monitoring of the dangerous “second limits” of the telescope system by operators and staff.

Working with the Telescope Engineering Division and the Instrument Division and it's engineers, the OCS group developed a new alarm monitoring system for Gen2. This system monitors many of the important status items representing second limit switches that, when tripped, indicate visually and audibly that severe damage could

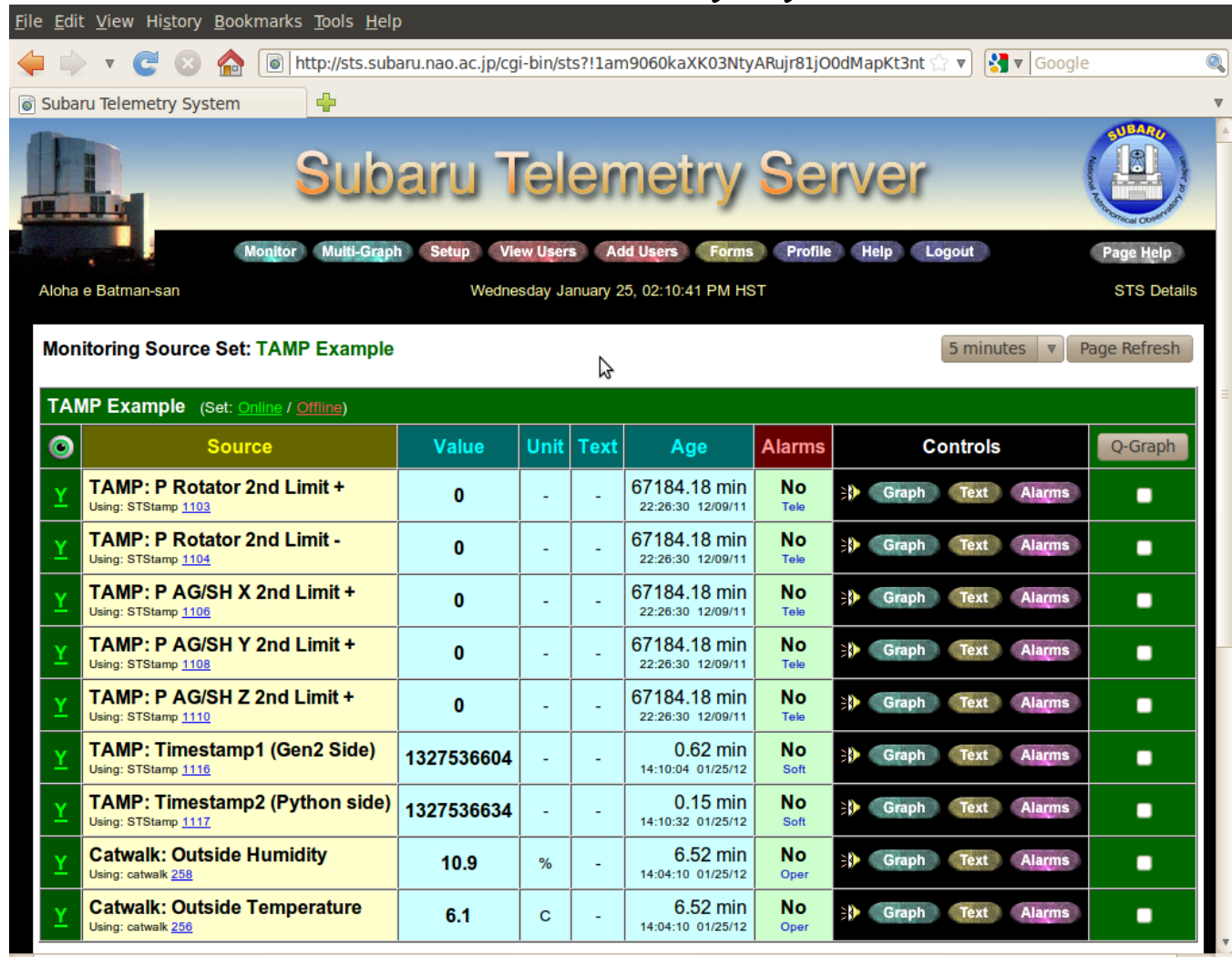
occur. This application will run along side of Telstat and provide a secondary source of alarms besides the TWS (telescope control system workstations) interface.

Telescope and Alarm Monitoring

Time	ID	Name	Severity	Mute
2012-Jan-25 14:23:56	Melco_0037029	P AG/SH X 2nd Limit -	Critical	☐
2012-Jan-25 14:23:34	Melco_0004045	Rotator NsOpt 2nd Limit +	Critical	☐
2012-Jan-25 14:24:09	Melco_000C006	Weather Humidity	WarningHt	☐

As a part of this overall effort Gen2 has also been linked to the Subaru Telemetry System (STS). STS can now be configured to notify staff, particularly in the Telescope Engineering Division, when important alarms have been triggered at the summit. This notification can be done by page, text messaging, email, or a verbal phone call.

Subaru Telemetry System



Support for Hyper Suprime-Cam

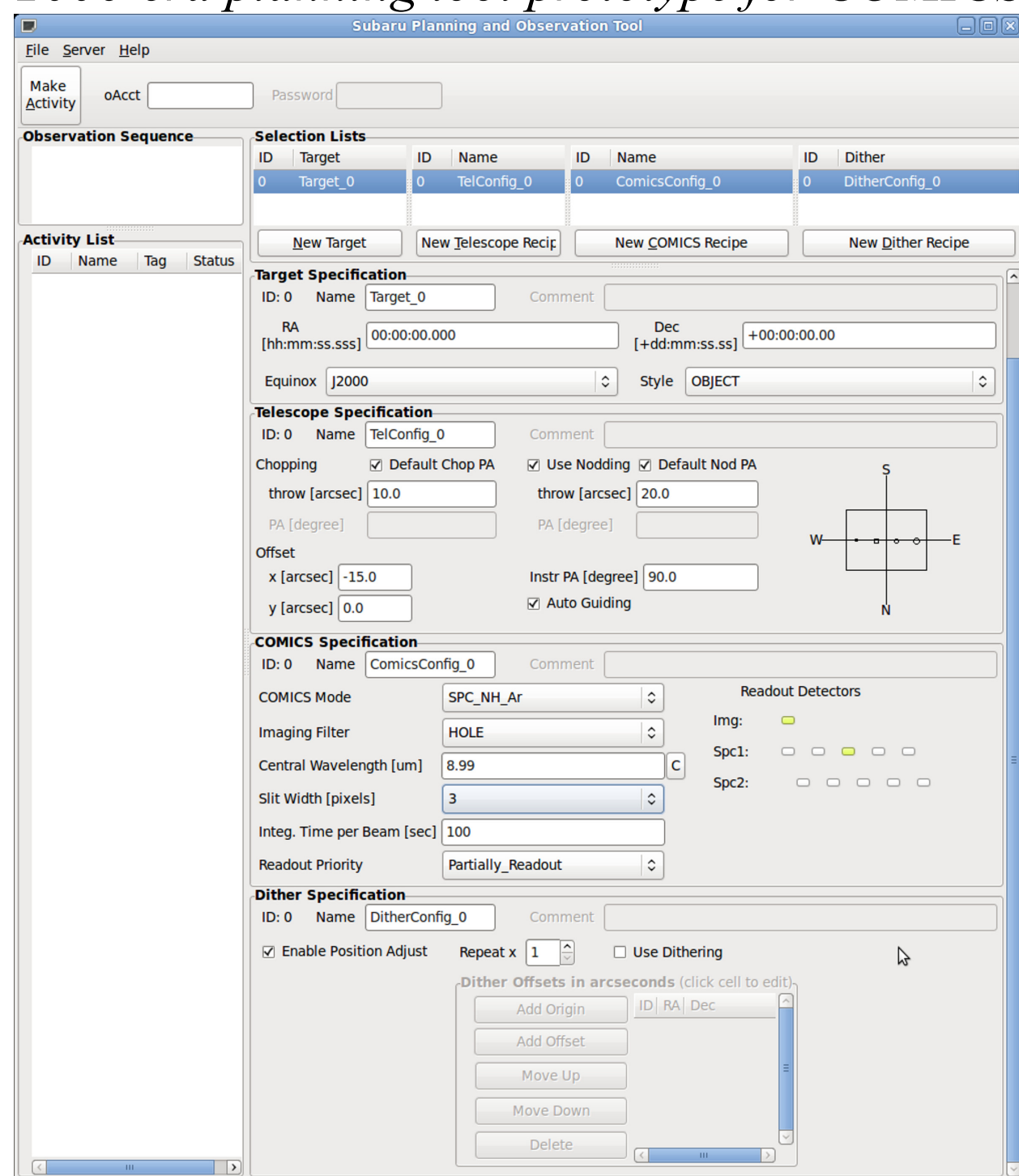
The arrival of Hyper Suprime-Cam necessitates some changes to the OCS system:

- Telescope status packets will change format
- New status aliases/values will be needed on the OCS side
- New telescope commands are provided for POpt2
- New auto guiding channels will be needed for HSC guiders
- Emphasis on data space and performance of file transfer

We are modifying Gen2 to handle these new developments.

Future work

2006-era planning tool prototype for COMICS



Gen2 continues to evolve to meet the needs of Subaru Telescope. In the coming year we hope to finally begin work on a new observation preparation tool, or to extend or combine several such existing tools that are already available for certain instruments. We also hope to refactor the Telescope Status (TelStat) interface into something that is more flexible and customizable by instrument. We also plan to improve certain aspects of the existing GUIs to make them more intuitive.

The Gen2 Advisory Committee is working with the OCS group and *your* input to improve the operation and experience for Subaru observers. If you have any questions, feedback or comments, please send it to any one of the email addresses shown at the top, or to gen2@naoj.org.