



USGP

U.S. GEMINI PROGRAM

Status of the Gemini Telescopes

Bob Schommer

During 2001A, Gemini North has been striving to operate in 50% science and 50% engineering mode. Telescope engineering has included work on efficiency improvements in acquisition and guiding, active optics improvements, mirror cover mechanical work, and high-resolution wavefront sensor performance.

Classical observing runs have been scheduled and executed with the visitor teams for OSCIR and Hokupa'a. See the telescope schedule at: www.us-gemini.noao.edu/sciops/schedules/schedIndex.html. Two US observers received data from the "mini-queue" operated by USGP, and more mini-queue observations are scheduled in June.

During the acceptance tests of NIRI (the University of Hawaii Near-InfraRed Imager) on Gemini North over the past several months, it was found that NIRI exhibited "flexure." This image motion instability problem was far larger than expected and outside the original NIRI science requirements. Though various attempts at correcting the problem have led to gradual improvements, none of these has achieved an acceptable performance. Both the IfA and Gemini accepted that further commissioning of NIRI would be suspended and that priority would instead be directed at fixing its image motion problems. This fix involves redesigning and re-engineering the steering motor that is responsible for the majority of the flexure. The IfA and the Gemini Observatory will proceed on the assumption that NIRI will be available for Semester 2001B, although NIRI will not be formally scheduled before September 2001.

GMOS, the optical imager and spectrograph, passed laboratory acceptance testing in Edinburgh and arrived in Hilo in mid-April. Lab testing with the combined UK and Canadian instrument teams will proceed through May, and first telescope tests are scheduled for the (northern) summer.

The Gemini South telescope is undergoing commissioning tests now and will ramp up to 25% science time starting in semester 2001B. Current efforts include pointing and tracking tests, active optics system work, and implementation of the closed

cycle helium system. NOAO is shipping a near-IR imager (Abu) to Gemini South in May, and commissioning images are due to be taken near the end of the month.



GMOS-N (the Gemini Multi-Object Spectrograph for Gemini North) is delivered! Here, Gemini staff members Chas Cavedoni, James Patao, and Wendy Mays unpack and inspect the new instrument.

Learning about how to make best use of Gemini and keeping up with the fast pace of new instrumentation can be challenging, but USGP is here to help. NOAO staff involved with the US Gemini Program are available to visit your institution to give colloquia and seminars on Gemini and to provide hands-on training for submitting Gemini proposals and learning to use the Phase II tool for planning observations. If you would like to schedule a visit from one of us, please contact the USGP Administrative Support Officer, Sally Adams, at sadams@noao.edu.

In addition to presentations and training, visiting staff are interested in hearing your views on the future directions of Gemini. How can Gemini play a more important role in your scientific research? Visiting staff will also schedule discussion panels to explore future options for Gemini and to identify goals important to US astronomers.



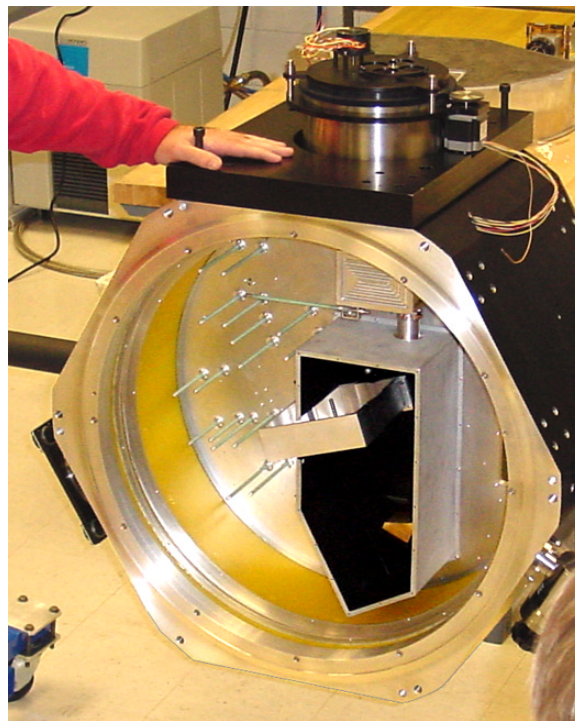
US Gemini Instrumentation Program Update

Taft Armandroff, Mark Trueblood, and Ken Hinkle

T-ReCS, the Thermal Region Camera and Spectrograph, is a mid-infrared imager and spectrograph for the Gemini South telescope, under construction at the University of Florida by Charlie Telesco and his team. The T-ReCS optics have been mounted together and tested at room temperature, demonstrating good optical performance. Mechanical parts fabrication is essentially complete. The dewar has been vacuum tested, has had its mechanisms installed, and has undergone cold tests that have demonstrated good thermal performance. Software development for mechanism control is nearing completion, and electronics development is progressing well. The team is in the midst of system integration and testing, which will culminate in T-ReCS's Pre-Ship Acceptance Test. A USGP Quarterly Review of GNIRS occurred on April 19, and USGP expects the Pre-Ship Acceptance Test to be completed this summer.

GNIRS, the Gemini Near-Infrared Spectrograph, is a long-slit spectrograph for the Gemini South telescope that will operate from 1 to 5 microns and will offer two plate scales and a range of dispersions. The project is being carried out at NOAO in Tucson under the leadership of Neil Gaughan (Project Manager) and Jay Elias (Project Scientist). Fabrication of GNIRS parts is underway at NOAO and at subcontractor facilities. In

particular, the construction of the GNIRS optical benches, that provide support for the optics and mechanisms, is nearly complete. GNIRS held a Mid-Fabrication Review on March 7. The review committee examined the GNIRS team's progress on mechanical design, mechan



The T-ReCS dewar during mechanism attachment on 19 April 2001. The window changing mechanism is shown on top, with the aperture wheel mechanism, the filter wheel box, and one of the diamond-turned mirrors also visible. The forearm of the T-ReCS mechanical engineer, Jeff Julian, provides a perspective of scale.

ical fabrication, electronics design, electronics fabrication, software, and procurement, and delivered a positive report. The team expects to begin subsystem integration late this summer, with delivery expected in the fall of 2002.

NICI, the Near-Infrared Coronagraphic Imager, is funded by the NASA Origins Program. NICI will provide a 1-5 micron infrared coronagraphic imaging capability on the Gemini South telescope. Mauna Kea Infrared (MKIR) was the successful competitive bidder for the NICI conceptual design study and the only respondent to an RFP for building the instrument. NOAO awarded a contract to MKIR for the detailed design and fabrication of NICI. USGP visited the contractor in February to review the development of a Management Plan consisting of a Project Plan, Work Breakdown, and a detailed schedule; the complete Management Plan was delivered in early April. The Preliminary Design Review is scheduled for March 2002.

Phoenix is a high-resolution near-infrared spectrograph that has been in productive scientific use on the KPNO 4-m and 2.1-m telescopes. Phoenix yields spectra with resolution up to $R=70,000$ in the wavelength range 1 to 5 microns. Phoenix will be shared equally between Gemini South and CTIO/SOAR and offered as a Visitor Instrument on Gemini. An IGP-provided ALAD-DIN InSb array has been installed in Phoenix. Additional mechanical upgrades were performed, and Phoenix was used on the Kitt Peak 4-m telescope for twelve nights in March. The modified Phoenix performed well, and the high quality of the new

continued



Instrumentation Update continued

InSb array has yielded a significant improvement in Phoenix's sensitivity. The fabrication of the interface unit and counterweights that will attach Phoenix to the Gemini Instrument Support Structure is nearing completion. Phoenix will be shipped to Gemini South during the northern summer of this year.

Phoenix will be offered to users starting in the 2002A semester. While Phoenix is a very good optical and scientific match to the 8-meter Gemini telescopes, it originally was designed for use on the 4-meter Mayall telescope at Kitt Peak. Similar in size and weight to other instruments on the Mayall telescope, Phoenix nearly fills the 4-meter Cassegrain cage and weighs slightly over a half ton. To be mounted on Gemini, Phoenix must match much larger weight and moment specifications, which require that about one ton of counter weights be mounted with Phoenix.



Phoenix instrument scientist Ken Hinkle sits on the handling frame for mounting Phoenix on Gemini, holding one of the 60-pound steel counter weights. The pallets to the right hold additional counter weights and handling equipment.

GMOS CCDs

NOAO is responsible for procuring the CCDs for the two GMOS spectrographs, and for integrating the CCDs with a dewar provided by the GMOS team, Gemini-provided CCD controllers, and other Gemini subsystems. For GMOS II for Gemini South, the CCD dewar was

shipped for integration with the spectrograph in March 2001, completing the deliverables from NOAO and GMOS. Next, the NOAO team, including Richard Wolff and Rich Reed, plans to work on the CCD hardware and software for the bench HROS for Gemini South.

Gemini Proposals for 2001B and 2002A

Caty Pilachowski

NOAO received 77 proposals for time on the Gemini telescopes during the 2001B semester, requesting 94 nights on Gemini North and 33 nights on Gemini South. Oversubscription factors are about 2.5 on Gemini North and 2 on Gemini South. The most popular instruments were NIRI and GMOS on Gemini North and OSCIR on Gemini South. For 2001B, proposers had the option of using either the NOAO proposal form or the Gemini Observatory Phase I Tool, and we received five proposals submitted with the Phase I Tool.

US Gemini proposals were reviewed by the NOAO TAC in early May, and accepted proposals were immediately

forwarded to the International Gemini Observatory for review by IGO's International TAC in mid-June. The Gemini schedules will be posted in late June, following e-mail notification to investigators.

We anticipate the next call for proposals for time in the 2002A semester on the Gemini North and South telescopes will occur in late August, with proposals due on 30 September 2001. Interested observers should keep a close watch on the NOAO Web site at that time. The instrumentation to be available on each telescope will be announced then as well.



Gemini Remote Observing Center Underway

Caty Pilachowski

The USGP is establishing a Remote Observing Center in Tucson with high-speed Internet connections to both Gemini sites at Mauna Kea and Cerro Pachón. The Remote Observing Center will be used by NOAO staff for instrument commissioning and support of US observers on both Gemini telescopes. This facility will enable NOAO staff to participate more fully in the support of Gemini users and in support of US instrumentation efforts on Gemini. Staff will also use the Observing Center for training and for conducting engineering programs to enhance the productivity of Gemini observing. Although the Gemini Observatory as yet has no policy on

remote observing, we hope eventually to offer the Center for use by visiting observers.

The NOAO Gemini Remote Observing Center will be located in the IRAF Lab in the basement of the Tucson headquarters. In addition to high-speed Internet connections, the Center will be equipped with voice and video communications to Gemini control rooms. We anticipate that the Remote Observing Center will begin operations within the next few months to allow NOAO/Tucson staff to assist with commissioning of Abu and Phoenix on Gemini South, and with support of other NOAO-supplied instrumentation, such as array controllers and CCDs.

Gemini Phase II Observing Tool Released

Caty Pilachowski (NOAO) and Phil Puxley (IGO)

The International Gemini Observatory has announced the release of the Gemini Phase II Tool. The tool is to be used for all queue-mode programs using Gemini facility instruments and is recommended for classically-scheduled programs as well.

Data are extracted from successful Gemini proposals and imported into the Phase II Database at the Gemini Observatory. The Phase I information forms a skeletal description of each observation that must be further refined in Phase II. Investigators are notified by e-mail that their proposal has been ingested and provided with a password for access to their own observations. Observing plans can then be downloaded and refined off-line (i.e., disconnected from the Gemini site) using the Observing Tool. The Tool

is the only supported means of generating complete observing plans and of ensuring their validity.

After completion of the detailed definition, the observing plans are uploaded back into the Phase II Database by the investigator, who notifies the Gemini Contact Scientist by e-mail. The Contact Scientist then performs a verification that all necessary information is present and copies the observations into the Active Observing Database. Once in this database, the observations are available to be executed.

NOAO's USGP staff are available to assist Gemini users prepare their Phase II programs. The Tool itself can be obtained from the Gemini website at: www.us-gemini.noao.edu/sciops/ObsProcess/ObsProcIndex.html.

Plans for the bHROS

Bob Schommer

The High Resolution Optical Spectrograph (HROS) project encountered significant setbacks over the past year, including loss of critical personnel. In early January, the UK instrument team opted to rescope HROS into a fiber-fed bench spectrograph (labeled bHROS). The baseline design is for an R=150,000 (3-pixel resolution) instrument with an iodine cell option; an extension to R=300,000 was regarded as "straightforward." An aggressive schedule and new management plan proposed that this instrument be delivered to Gemini South in mid-2002.

The baseline design is a fiber-fed image slicer, with 0.7-arcsec and 1.0-arcsec focal plane implementations being explored. Of course, this will not be as efficient as the original beam-fed Cass instrument design. Current cal-

culations, however, show a relatively efficient system with throughputs (including fiber losses and focal ratio degradation) approaching 16% to 17% between 5500-7000 Å. S/N ratios for 0.33 arcsec spatial binning (unbinned pixels are 0.033 arcsec), for a 3600s integration give about 10/1 on a B=17th mag object. This is about one magnitude brighter than the R=120,000 camera that was an original HROS option.

The R=300,000 option adds a Barlow lens before the camera (and relocates the camera). This looks to be inexpensive and very attractive. A third option called "oneshot" involves using the original HROS camera to give full coverage and R=34,000. Since this option involves a second camera and detector system, it will require significant additional resources to implement. This new bench HROS is scheduled to undergo a design review in mid-May.