



CTIO

OPERATIONS

CTIO TELESCOPE AND INSTRUMENT COMBINATIONS— THE FUTURE

Alistair Walker

CTIO presently operates the Blanco 4-m, the 1.5-m, and the 0.9-m, and has shares in the YALO 1.0-m and the Curtis Schmidt. The SOAR telescope (30% share for NOAO) should begin science operations early in 2003, preceded by Gemini South in 2001B. Other southern-hemisphere facilities soon to come on-line and be available to US investigators are Magellan I (2001) and Magellan II (2003). We note that CTIO will be operating SOAR out of its present budget. Therefore, we need to make radical changes in our Cerro Tololo operations to compensate for the extra responsibilities.

Some three years ago we formulated plans to evolve our instrumentation, particularly on the Blanco 4-m, to complement the new facilities. At the same time, we actively pursued creative ways of running the smaller telescopes, which led to the MACHO agreement on the 0.9-m telescope and the YALO consortium running the 1.0-m in fully queue-scheduled mode. We are now only a few months away from the initial ramp-up of CTIO staff at SOAR. The pressure is not only on the Telops and ETS staff; the scientific staff are stretched thin as well, with participation in US Gemini, SOAR, and various activities newly being undertaken by NOAO as recommended by the AASC report "Astronomy and Astrophysics in the New Millennium."

We are moving rapidly to a model for the Blanco 4-m where we offer a suite of state-of-the-art wide-field instruments, with few or no instrument changes. We no longer make available the f/30 chopping secondary, as its installation (for visitor instruments) involves removing both the Mosaic Imager and the prime focus corrector assembly. The Blanco will continue to be run in classical mode, with astronomers coming to the telescope to observe. Its instruments will complement both SOAR and Gemini, which will have instruments optimized for relatively narrow fields at high resolution.

We will continue to operate the 1.5-m and are considering two low-maintenance operational modes. The first would involve transferring the YALO operation from the 1.0-m to the 1.5-m. This mode, referred to as YALO II, would operate the dual IR-CCD Imager ANDICAM built by Ohio State University in queue-scheduled mode, with Yale and Obs. Lisbon as partners, and with a much greater NOAO share of time (approx 60%) than at the 1.0-m. The partners would pay for two telescope operators who would run the queue. YALO II would start after the present YALO agreement terminates in December 2001. The second operational mode being considered would be to schedule the telescope classically, with two instruments offered in

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SOAR UPDATE

Construction of the SOAR enclosure is now progressing rapidly after a three-week delay due to late delivery of fabricated steel and inclement weather. Current images of the site can be viewed with SOARCam (<http://www.soartelescope.org>). At the same time, substantial progress has been made on fabrication of the telescope mount at RSI Universal Antennas facility in Richardson, Texas, and Raytheon has begun figuring of the primary mirror at their plant in Danbury, Connecticut. The project continues on track for first light in June 2002.



severely blocked mode. Large, long-term programs would be encouraged or mandated; there would be no telescope operator, and Telops assistance would be limited. The instruments under construction are the Cassegrain spectrograph and a CCD imager. In any case, we will retire the Bench-Mounted Echelle (BME) spectrograph at the end of Semester 2000B, ASCAP at the end of 2001B, and IR imaging when ISPI is available on the Blanco.

The smaller telescopes (1.0-m, 0.9-m, and Curtis Schmidt) will be either completely privatized, i.e., operated under shared agreements that require essentially zero CTIO operations load, or closed. The Curtis Schmidt telescope will be last offered to NOAO users for Semester 2001A, with 2001B reserved for Michigan users only as discussed in an accompanying article. We fully realize that some science programs will be difficult or impossible with these changes; hence, we will make every effort to avoid disrupting long-term and survey programs. These types of programs will, if needed, be provided with extra time in the last two semesters of an instrument that is to be retired. Alternatively, we will try to make the transition to another telescope-instrument combination as seamless as possible. We are also very keen to hear from groups who might be

interested in operating the smaller telescopes, and we will act as brokers in assembling consortia if need be.

We are sure that the new facilities will create many opportunities. The infrared imager ISPI will mount at an f/8 sideport on the Blanco, delivering a 10×10 arcmin field and 0.3 arcsec pixels with a 2K HgCdTe array, while the IFU (Integral Field Unit) feed to the Hydra Bench Spectrograph will provide a finely sampled focal plane to the virtual slit of the bench-mounted spectrograph, which can be configured to simulate many of the present capabilities of the RC and Echelle spectrographs. We will continue to operate Hydra and Mosaic for at least another five years. A mid-life upgrade of CCDs and controllers for Mosaic that permits much faster read time is a possibility, as is moving to a 16K array with new corrector. The latter is an expensive proposition, and one we would not contemplate if an 8-m class wide-field telescope were to be built on Cerro Pachón. Such a telescope is recommended in the Decadal Survey Report.

Two instruments under study by the NOAO-Tucson instrumentation group are of future interest—NGOS and NEWFIRM. NGOS (Next

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Generation Optical Spectrograph) is a high-efficiency beam-fed multi-object spectrograph, which could replace Hydra. NEWFIRM is a 4K IR imager. It is likely that one or both of these instruments would be shared with KPNO or other partners.

For SOAR, there is strong interest in adaptive optics within the partner community; CTIO has an instrumentation development wedge opening for this project in 2001 and is in the process of forming a project team. Gemini South and SOAR would then be the only US-accessible facilities with AO in the Southern Hemisphere. Another desirable instrument in the SOAR initial instrument complement is an IR multi-object spectrograph; discussions on how best to procure such an instrument are underway. An interim spectrograph will either be an upgrade of CTIO-IRS or OSIRIS. The latter could also provide an IR imaging capability close to first light, which might otherwise be lacking.

Gemini, of course, has an active instrumentation program for the Gemini South telescope. In addition to the instruments in the accompanying table, Gemini plans to install NICI (Near-IR Coronagraphic Imager) in 2004 and a Multi-Conjugate Adaptive Optics (MCAO) system in 2004–2005. Their program is presently under review and likely to change. For instance, Gemini now proposes to go straight to MCAO on Gemini South rather than Hokupa'a South as an interim AO facility. Consequently, the instrument complement for Gemini South is being reevaluated.

CTIO will continue to have a strong instrumentation program, both to support present instruments and to provide future instruments. We hope to be able to expand the program so that we can participate in providing instrumentation for the US 6–10 m telescopes. Instruments may also be procured by partnerships with universities or built by NOAO–Tucson.

The accompanying table depicts our instrumentation plan for the CTIO telescopes through 2003. For reference, we also include the Gemini South instrumentation plan. Details will almost certainly

change, and we are interested in specific suggestions. The Blanco instruments mentioned that may be unfamiliar to most readers are IFU and ISPI. IFU is an Integral Field Unit feed that is permanently mounted to the Hydra bench spectrograph. First engineering tests are scheduled for November 2000; project manager is Tom Ingerson. ISPI is a 2K all-transmission IR imager with 2K HgCdTe array, mounted permanently at the $f/8$ RC focus to give a 10×10 arcmin field with 0.3 arcsec pixels; project manager is Ron Probst. See the CTIO Web site at <http://www.ctio.noao.edu> for updated information.

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CURTIS SCHMIDT TELESCOPE CLOSURE

Alistair Walker and Pat Seitzer

CTIO and the University of Michigan regret to inform you that the Curtis Schmidt telescope on Cerro Tololo will be available to general users only through the end of the 2001A semester. For the 2001B semester, it will be used by University of Michigan astronomers only, and at the end of that semester it will be closed. The global situation regarding the facilities available at CTIO is discussed in the accompanying article, "CTIO Telescope and Instrument Combinations—The Future."

The Schmidt telescope with SITe 2K CCD covering 1.5 deg^2 has proven to be a powerful combination for many programs and is a facility still unique in the Southern Hemisphere. Parties interested in the future of the Curtis Schmidt should contact Pat Seitzer at the Department of Astronomy, University of Michigan (seitzer@astro.lsa.umich.edu).

CTIO, SOAR, and Gemini South Instrumentation 2000–2003

Telescope	2000B	2001A	2001B	2002A	2002B	2003A	2003B	Comments
Gemini South								
T-ReCS			x	x	x	x	x	Deliver Q2 2001
Phoenix			x	x	x	x	x	Share with SOAR
HROS						x?	x?	Deliver Q3 2002?
GMOS					x	x	x	Deliver Q4 2001
Flamingos I			x (June-Nov)		x		x	Share with KPNO
GNIRS						x	x	Deliver Q3 2002
Flamingos II							?	
Abu	x	x						Commissioning only
SOAR								
Optical Imager					x:	x	x	Commissioning instrument
IR Imager						x?	x?	Not yet funded
Goodman Sp.					x:	x:	x	
IFU Sp.					x:	x:	x	
CTIO IRS						x:	x	Or Osiris
Phoenix						x:	x	Share with Gemini
Blanco								
Mosaic II	x	x	x	x	x	x	x	These four instruments can all be mounted simultaneously.
Hydra	x	x	x	x	x	x	x	
ISPI				x	x	x	x	
IFU			x	x	x	x	x	
RC Spec	x	x	x:	x:	x:			Replaced by GMOS, Goodman Sp., IFU
Echelle	x	x	x:					
IRS	x:	x:	x:					One of these two instruments will likely go to SOAR
Osiris	x	x	x	?	?			
VISITOR								Only in campaign mode?
1.5-m								
CFCCD	x	x	x	x				Retire or severely blocked Retire if no Andicam option
CSCCD	x	x	x	x				
Osiris/Cirim	x	x	x	?				Retire
ASCAP	x	x	x					Retire
BME	x							Retire
Andicam					x?	x	x	Dual IR and CCD imager
1.0-m								
Andicam	x	x	x					Present YALO agreement ends after 2001B.
0.9-m								
CFCCD	x	x	x	?				Close or operate with partners.
Schmidt								
NFCCD	x	x						Close after 2001A.

x: designates restricted scheduling

1.5-m BME Spectrograph to be Retired

The 1.5-m telescope Bench-Mounted Echelle (BME) spectrograph will be retired at the end of the present semester, 2000B. The BME was built by Tom Ingerson in 1995, with scientific support provided by Nick Suntzeff. With a 200-mm fiber and slit, resolutions in the range 15000-60000 could be

achieved with SiTe 2K CCD. Total system efficiencies of typically 0.5–1.5% restrict the use of the BME to bright stars. In recent semesters, demand for the BME has been very low. Therefore, we have reluctantly decided to cease offering this instrument after the end of the present semester.

NEW ARRIVALS

Malcolm Smith

AURA Observatory personnel have seen many new faces around the “Recinto” recently, and more new staff members will be joining us shortly. All of us in Chile welcome these new members of AURA-O.

Now that Gemini is ramping up to its final stages before entering operational mode, several new International Gemini South employees have arrived or will be arriving, as follows:

Pedro Prado (from Argentina), System Support Associate, started work in April.

Claudia Winge (Brazil), Gemini Fellow, May 5.

Eric Hansen (US), Systems Engineering Manager, June 1.

Gelys Trancho (Spain), System Support Associate, July 1.

Marie Claire Hainaut-Rouelle (Belgium), System Support Associate, July 1.

Michael Ledlow (US), Gemini Fellow, July 6.

Bryan Miller (US), Assistant Astronomer, July 17.

Jeff Cox, (US), System Support Associate, August 1.

Tom Hayward (US), Associate Scientist, will arrive on September 18.

Phil Puxley (UK), Associate Director of Gemini–Cerro Pachón, January 1, 2001.

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SOAR project employees will also start arriving early next year; the first arrival is expected to be Oliver Wiecha.

CTIO is also going to be welcoming several new scientific staff members. One of them, Don Hoard, has been at CTIO since 1998; he will become a Postdoctoral Research Associate on August 1. Don will continue in his role of Research Experiences for Undergraduates Site Director. His areas of scientific interest are cataclysmic variables and other interacting binary stars, accretion disks, mass inflows and outflows, planetary nebulae, pre-main sequence binary stars, and globular cluster systems.

Both Tom Hayward (mentioned above) and James De Buizer, who will take up a Postdoctoral Research Associate position, will arrive on September 18 while we are all celebrating the Chilean national holidays. Jim is currently a NASA Space Grant Fellow at the Infrared Astrophysics Group in the Department of Astronomy at the University of Florida. He has been working with Charlie Telesco's team and has visited CTIO three times since 1998. His main scientific interests are massive star formation, circumstellar disks, and infrared instrumentation.

On November 1, Hugo Schwarz and Nicole van der Bliek arrive to take up positions of Associate Astronomer and Assistant Scientist, respectively.

Hugo is from the Netherlands and is well known to most of the CTIO staff, as he worked at La Silla from 1986 to 1995. From La Silla, Hugo went to the Nordic Optical Telescope at La Palma, where he was Astronomer in Charge of the 2.6-m telescope. Hugo's main interests are the late stages of stellar evolution, with emphasis on (proto)PNe, symbiotic stars, and AGB stars, especially mass loss in carbon stars. Nicole van der Bliek is also from the Netherlands. She comes to us from the IR group at the Stockholm Observatory where she is on a Postdoctoral ESA fellowship (having obtained her Ph.D. at Leiden). Nicole is familiar with Chile as she was on a student fellowship at La Silla between 1993 and 1995. She is currently participating in a follow-up program for the ISOCAM survey of nearby star formation regions with G. Olofsson and L. Nordh and their group from Stockholm Observatory. Her main research interests lie in the field of star formation, IR astronomy in general, and IR instrumentation.

Andrei Tokovinin, CTIO's new Associate Astronomer, is scheduled to arrive in February 2001. Andrei, from Moscow, USSR, is currently working with the Adaptive Optics Group at ESO, Garching, carrying out theoretical studies of multi-conjugate adaptive optics concepts. Andrei's main interests are astronomical instruments, astrophysics of binary and multiple stars, and atmospheric propagation.

How to Contact CTIO

<i>The Web</i>	<i>http://www.noao.edu/ctio</i>
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Undergraduates Wanted for the 2001 CTIO REU Program!

Donald W. Hoard

The year 2000 saw another successful National Science Foundation-funded Research Experiences for Undergraduates (REU) program at CTIO. Two students presented posters at the June 2000 AAS meeting in Rochester, and the other two will attend the January 2001 AAS meeting in San Diego. We're looking forward to another outstanding program for 2001 when we anticipate offering four undergraduate Research Assistant positions for a ten-week program starting in January 2001. Donald W. Hoard is the CTIO REU Site Director.

CTIO hosts the only NSF-funded REU program that takes place during the US academic year, which is the Chilean summer (January through March). This schedule provides an alternative for students who can take advantage of a quarter or semester away from their home campuses, and who are interested in participating in an overseas program. The CTIO REU program offers students the unique opportunity to gain observational experience studying objects in the rich Southern Hemisphere sky (e.g., the Magellanic Clouds, the Galactic Center), while also providing them with a chance to work alongside Chilean astronomy and engineering students who come to CTIO to participate in the "Prácticas de Investigación en Astronomía" (PIA) program of summer engineering internships.

The application deadline for the 2001 CTIO REU program is 2 October 2000. The program is open to US citizens or permanent residents who will be enrolled as full-time undergraduate students through January 2001. Please check the CTIO REU Web page (<http://www.ctio.noao.edu/REU/reu.html>) for application materials and the latest news about our 2001 program, as well as for more information about the

CTIO REU program, projects, and participants from previous years.

Please direct inquiries to ctioreu@noao.edu.



2000 CTIO REU student Melanie Blackburn (West Virginia) observes with the CTIO Curtis Schmidt telescope during two nights of orientation on the mountaintop.