

AURA CONTRACT No. C77006A
SMARTS 2 (MOU)
TO OPERATE SMALL TELESCOPES IN CHILE

THIS MEMORANDUM OF UNDERSTANDING (MOU) is between the Association of Universities for Research in Astronomy, Inc. (“AURA”), an Arizona non-profit corporation, and each of the SMARTS 2 member institutions, as further defined below (“Members”) (“AURA” and the “Members,” together, the “Parties”). It is effective as of January 9, 2006.

This project shall be known as The Small and Moderate Aperture Research Telescope System 2 (“SMARTS 2”) project. A consortium consisting of the Members and AURA, through AURA’s operating centers (National Optical Astronomy Observatory (“NOAO”) and Space Telescope Science Institute (“STScI”)), shall constitute the “SMARTS 2 Consortium.” NOAO operates the Cerro Tololo Inter-American Observatory (“CTIO”), which manages the small telescope site in Chile. The AURA Centers are subdivisions of AURA, each funded through U. S. Government agencies. The SMARTS 2 Consortium will operate the small telescopes at CTIO in Chile pursuant to the terms and conditions of this MOU.

I. Recitals

A. The NOAO 2002 Request for Proposals (RFP)

In 2002 NOAO invited proposals for operation of the 0.9-m, 1.3-m and 1.5-m telescopes (the “existing small telescopes”) at Cerro Tololo International Observatory in Chile. In its RFP, NOAO provided in part that responders should be

“prepared to assume the full responsibility --- technical, scientific, and financial --- for operations of these telescopes.” It advised, *“CTIO wishes to retain some access for its users to a CCD imaging capability similar to that presently offered at the 0.9-m telescope. In exchange for*

providing the three telescopes and associated instrumentation, CTIO would retain access to 25% of the total observing time, integrated over all three telescopes, with at least half of this time being for CCD imaging. This time will be allocated through normal NOAO observing proposals. In addition, Chilean astronomers are entitled to 10% of the observing time. Provision of the telescopes and current instrumentation would be the extent of NOAO's contribution. Continued operation and maintenance of all items will be the responsibility of the proposer. Proposers are also urged to plan for early replacement of the 0.9-m telescope control system.”

NOAO informed those responding to the RFP that it would consider the following factors in proposal evaluation:

- 1. Quality and significance of the proposed scientific programs*
- 2. Educational impact of the proposed use*
- 3. Plans for additional instrumentation for the telescopes*
- 4. Plans for public outreach*
- 5. Technical and financial resources available to ensure that the proposed program will be implemented successfully.*

The proposal submitted by the SMARTS Consortium (as originally constituted in 2002, “SMARTS 1”), together with an Operations Plan and Budget, was accepted, and the SMARTS Agreement to Operate Small Telescopes in Chile, AURA Contract No. C33003A, was entered into by AURA and the SMARTS 1, effective as of February 1, 2003. The SMARTS 1 consortium was charged with operating the existing small telescopes from February 1, 2003, through January 31, 2006.

This MOU represents the next phase in management of the small aperture telescopes at CTIO, which will be accomplished by a reconfigured, flexible SMARTS 2 Consortium. The RFP continues to establish basic terms of the SMARTS 2 project, as it did for SMARTS 1.

II. MOU.

A. The Work

The Members and AURA (the "SMARTS 2 Consortium" or the "Consortium") agree to operate the small telescopes at Cerro Tololo on the terms and conditions set forth in this MOU, as supplemented by their individual Membership Agreements, which shall be in the form attached as Appendix A.

B. Term of MOU

After the operating plan for semesters 2006A and 2006B has been approved, the Consortium shall operate the CTIO small telescopes for at least thirteen months under this MOU. Its operations shall begin in semester 2006A (as of Jan. 9, 2006), and continue through semester 2006B, which ends on Jan. 31, 2007. Its operations shall continue as long thereafter as the terms of this MOU are satisfied, up to a total of sixty-one months (through semester 10B, ending Jan. 31, 2011).

This arrangement is subject to periodic review by independent *ad hoc* committees that may be convened from time to time by the National Science Foundation ("NSF"). Any such committee will base its review on the criteria established in the 2002 RFP, described above in section I.A. In the event of an unfavorable review, the Consortium will continue to operate the telescopes at least through the end of the scheduling semester then in progress (or thereafter, as NSF and the Consortium may agree). The financial and windup responsibilities set forth in this MOU shall apply at the windup of the Consortium in 2011 or before, and shall survive termination of this MOU.

C. Title to Property; Export and Import.

1. Title to Newly-Acquired Equipment. Except for equipment currently in Chile, and except as noted in paragraph 3b (i), AURA and its subsidiaries and each Member, respectively, will retain title to any equipment that it purchases for Consortium operations, be responsible for its upkeep, and bear the risk of its loss or damage.
2. U.S. Export Law Compliance. In the performance of this MOU, any of the Parties may transfer, exchange, or develop data, information, software, hardware or other technology that may be subject to U.S. export control laws and regulations, including the International Traffic in Arms Regulations, 22 C.F.R. 120-130, and the Export Administration Act regulations, 15 C.F.R. 730-774. Each of the Parties individually will be responsible for obtaining export licenses or other export authority as may be required before exporting controlled data, information, software, hardware or other technology to foreign countries or providing access to foreign persons (as defined in 22 C.F.R. 120.16). Each of the Parties agrees to comply with any applicable United States laws and regulations in the export of such data, information, software, hardware, or other technology. No other Party will be responsible for any failure of another Party to comply with such laws or regulations.
3. Importing Equipment into Chile
 - a. Requesting AURA import of equipment. Upon the reasonable request of a Member, AURA shall import equipment into Chile for the Consortium's or the Member's use on the SMARTS 2 project. All foreign-manufactured (*i.e.*, not manufactured in Chile) equipment to be used in Chile will be imported into Chile by AURA. All costs associated with acquisition and import of equipment to Chile will be borne by the Party purchasing or supplying the equipment, including the costs associated with any export or import permits necessary for the equipment. Each of the Parties agrees to comply with any applicable Chilean import laws and regulations in the import into Chile of any such equipment. The Member desiring the importation into Chile of equipment and AURA shall cooperate in lawfully importing the desired equipment.
 - b. Management of equipment purchase and import. Any equipment purchased by a Party outside of Chile for use under this MOU in connection with the SMARTS project in Chile may be used under SMARTS 2 only if the following terms and conditions are satisfied and procedure used:
 - i. Either before or concurrently with the import into Chile, the purchasing Party will transfer legal title to the equipment to AURA. The purchasing Party will execute any documents ne-

cessary to transfer to AURA title to all property shipped to AURA in Chile. AURA will retain legal title while the equipment is in Chile. AURA shall maintain accurate records of the identity of the Purchaser of all equipment shipped to it under this MOU.

- ii. Any Party exporting property to Chile under this MOU will coordinate such shipments with the AURA Export Control Administrator (also known as "Manager, NOAO Procurement") including, as necessary, by presenting all necessary documents and information required to obtain export licenses from the United States Government. The AURA Export Control Administrator may be contacted as set forth on Appendix C.
- iii. Export licenses for all shipments to Chile under this MOU will be applied for and executed under the name of AURA and administered by the AURA Export Control Administrator.
- iv. The Parties agree to comply with U.S. government export laws and regulations and Chilean government import laws and regulations in shipping equipment to AURA in Chile.
- v. AURA assumes no responsibility for loss or damage to such equipment during shipment or while the equipment is in Chile.
- vi. AURA will dispose of such equipment in Chile as directed by the purchasing Party, at the expense of that Party.

D. Management and Memberships

1. A "Member" of the SMARTS 2 Consortium may be a research or academic institution; a specific department or division within such an institution, as represented by the institution; or individual research groups or researchers, whose membership in the Consortium has satisfied the conditions of this MOU and has been approved by the Management Council. Members must execute a Membership Agreement substantially in the form attached and compliant with section D.5, below, and setting forth any additional specific terms agreed to by the prospective Member and the Management Council.
 - a. Members who in any semester (as defined below) contribute \$25,000 or the equivalent (as determined by the Man-

agement Council and consistent with Section F, below) in any combination of cash, services, operations, telescopes, or instrumentation (the "Primary level"), will be considered Primary Members during the semester of their contribution at the Primary level. Primary Members are entitled to a seat on the SMARTS 2 Management Council, as defined below. A Primary Member is entitled to attend and vote in the Management Council when its Membership Agreement has been signed and its contribution made or (in the view of the Management Council) adequately committed. Membership in the Management Council terminates at the end of the last semester for which the Primary Member contributed at least the Primary level. AURA shall be represented through NOAO and STScI, which shall each be a Primary Member.

- b. Members who contribute at less than the Primary level will be Secondary Members. Secondary Members will not be entitled to a seat on the SMARTS 2 Management Council. Secondary Members must be sponsored by a Primary Member. Primary Members who sponsor Secondary Members will not have increased voting rights by virtue of their sponsorship.
- c. As of October 1, 2007, the beginning of SMARTS2 Year 3, individual investigators may become members at the Investigator level. The agreements for individual investigators do not require institutional signatures.

- 2. SMARTS 2 will be governed by a Management Council, comprised of one representative from each of the Primary Members. The Management Council shall have oversight responsibility for this MOU (including the related Member Agreements) and the overall operations of the SMARTS 2 Consortium project. To carry out this responsibility, it shall:
 - a. Meet annually at a place and time designated by the Principal Scientist (as defined below), to evaluate operations over the previous year and approve an operations plan for the following year. Each Primary Member will pay its own costs related to attending meetings of the Management Council. Primary Members who cannot attend the annual meeting may attend by teleconference.
 - b. Hold teleconferences as and when necessary, as determined by the Principal Scientist or any three Primary Members, to examine specific issues.
 - c. Act by a majority vote of those Primary Members present in person or by proxy in a meeting of a quorum. A quorum shall be a majority of the Primary Members. Major disputes among the Primary Members regarding the operation of

the SMARTS project will be resolved by the Management Council on the basis of one vote per Consortium Member, with NOAO having the deciding vote in case of ties.

- d. Review and approve or reject the proposed addition of any new Members of the Consortium.
- e. Appoint a Principal Scientist, and review and approve the Principal Scientist's choice of a SMARTS Financial Officer.
- f. Should wind-down become necessary, or any Consortium Member wish to cease membership or be in breach of this MOU, address orderly wind-down, withdrawal, membership termination, or other appropriate action, in consultation with the Principal Scientist.
- g. Take other actions appropriate and necessary to the overall management of the Consortium.

3. The Principal Scientist shall:

- a. Have overall responsibility for the project.
- b. Supervise day-day running of the project from his or her home institution, traveling when necessary to ensure smooth operations.
- c. Direct the SMARTS off-site team in its scheduling of telescope time, in accordance with the shares allocated by the Management Council.
- d. Resolve any issues pertaining to operations on Cerro Tololo, turning in the first instance to the Director of CTIO, or his/her designate.
- e. Supervise the preparation of reports and plans for consideration by the Management Council, and for calling Management Council meetings.
- f. Convene the Management Council when issues arise that require consideration by the Consortium.
- g. Coordinate regularly with the NOAO Office of Public Affairs & Educational Outreach on the timely release of potentially newsworthy scientific results and imagery from SMARTS telescopes, and on mutually beneficial educational outreach activities, including the NOAO TLRBSE program.
- h. Designate and supervise a SMARTS Financial Officer.
- i. Sign documents on behalf of the Consortium to bind the Consortium and its Primary Members, when consistent with Management Council action or otherwise with the duties of the Principal Scientist.

4. The SMARTS 2 Financial Officer shall:

- a. Report to the Principal Scientist, and manage all financial aspects of the SMARTS Consortium.

- b. Receive and monitor the Members' timely payment of contributions to the Consortium.
 - c. Serve as interface between Consortium Members and NOAO. NOAO shall serve as interface with AURA Observatory Support Services ("AOSS").
 - d. Prepare annual financial reports on Consortium operations for the consideration of the Management Council.
 - f. Provide an ongoing record of the financial status of the Consortium for use by the Management Council and the Principal Scientist upon request by either.
 - g. Arrange for the employment of any necessary offsite SMARTS consortium personnel, as approved by the Principal Scientist and Management Council.
 - h. Be compensated as determined by the Management Council, in consultation with the Principal Scientist.
5. Members will join SMARTS by signing a Membership Agreement that includes the terms of the form attached as Appendix A. A Membership Agreement shall be effective for one or more semesters (as defined below). The Membership Agreement will obligate the Member to abide by the requirements of this MOU and any of its amendments duly enacted by a majority of consortium members (including Primary and Secondary Members.) It will describe the contribution to be provided by the Member to the Consortium and establish a payment schedule or other timing constraints, if appropriate. It will set forth the proportion of SMARTS telescope time and the anticipated number of observing nights to which this contribution will entitle the Member. The Membership Agreement may also specify fractions of the available time and anticipated total observing nights for specific combinations of telescopes, instruments, and observing modes. Membership Agreements will be signed on behalf of the Consortium by the SMARTS Principal Scientist and the NOAO Director (for AURA), by an official of the Member who is authorized to allocate the resources provided by the Member and to bind the Member, and by a scientist who will act as the Member's representative on or liaison to the SMARTS Management Council. Membership Agreements for Secondary Members must also be signed by the Management Council representative of the sponsoring Primary Member.

E. SMARTS 2 Finances and Operating Plan

1. SMARTS will operate on a semester basis, and SMARTS semesters will coincide with NOAO scheduling semesters (Feb-July and August-January) unless otherwise determined by the Management Council. The approved operating plan and membership of the Consortium will not change during any given semester, but may change between semesters.
2. Prior to the start of each semester, the Principal Scientist and Financial Officer will prepare an operating plan. Operating plans may include more than one semester. Operating plans will include a financial projection for the semester(s), and a description of the telescopes, instruments and observing modes that will be supported during the semester. The operating plan will also describe the format, due date(s) and submission procedures for observing programs and other information required to carry out SMARTS observations. A Member's failure to provide observing programs and associated information in the designated format by the designated time and in the designated manner may result in loss or reduction of observing time, at discretion of the Principal Scientist or other individual designated by the Management Council. The operating plan will also specify a date by which observing time will be officially allocated by the Principal Scientist, and the principles by which such allocation will be carried out. Each operating plan must be reviewed and approved by the Management Council. All participating Members must have signed a membership agreement applicable to the semester prior to Management Council approval of an operating plan for that semester. For subsequent semesters, the operating plan must be approved no later than 6 months prior to the start of the semester.
3. For each semester, AURA will provide the Consortium a schedule of costs for all mountaintop activities to the Principal Scientist, Financial Officer, and Management Council. Starting with semester 2007A, this schedule must be provided no later than eight (8) months prior to the start of the semester. Upon request, AURA will also provide a justification for the costs set by its schedule. Costs scheduled for telescope share, employee salaries and benefits, and mountaintop meals and accommodations will be denominated in U.S. dollars, based upon an anticipated exchange rate between Chilean pesos and U.S. dollars determined by AURA and specified in the cost schedule, and will be binding through the duration of the semester, unless the Management Council approves a renegotiated operating plan as described in part 3(a), below. AURA will concurrently provide its best estimate for other costs, which may vary subsequently depending on local costs and exchange rates. Metered costs such as engineering support, electricity, water, and

liquid nitrogen will be given in appropriate units.

4. Once the Management Council has approved an operating plan for a semester, the operating plan and associated Membership Agreements for that semester will be renegotiated only if one or more of the following circumstances applies, as reasonably determined by the Management Council:
 - a. The actual exchange rate between the Chilean peso and the US dollar deviates from the rate anticipated in the AURA cost schedule by more than 10% for a continuous period of more than two consecutive calendar months;
 - b. Prior to the allocation of telescope time for the semester, the Principal Scientist determines that technical problems prevent the telescopes, instruments or operating modes set out in the operating plan from being supported; or
 - c. The non-fixed costs estimated by AURA increase by more than the financial contingency provided in the operating plan.

5. Once telescope time has been allocated, all Members are liable for the contributions specified in their Membership Agreements, even if technical problems encountered thereafter prevent the telescopes, instruments or operating modes set out in the operating plan from being supported. If, after telescope time has been allocated, any individual Member sustains a loss of observing capability in a semester due to technical problems (not including bad weather) that exceeds either (i) the equivalent of 15 nights of observing time, or (ii) 1/3 of the time allocated to that Member, the Management Council may authorize the Principal Scientist to reallocate observing time according to the following principles:
 - a. Fractional shares of overall observing time, and of time on specific instruments, telescopes and observing modes should be kept as close as possible to those specified by the operating plan and Membership agreements, even if the total number of nights is reduced.
 - b. Disruption of travel plans already set in place should be kept to a minimum.
 - c. Any financial savings realized by ceasing operations of some observing capability will be refunded to Members in proportion to the number of nights of observing time lost by that Member.

F. SMARTS 2 Contributions and Shares

1. Each Consortium Member shall contribute telescopes, instrumentation, cash, and scientific oversight and management as set forth in the applicable Membership Agreement and reflected in the Operating Plan. Any Member that fails timely to make its complete contribution may be subject to adverse action by the Management Council, including by reduction in facility use or termination of its Consortium Membership. An example of a schedule of contributions for semesters 20XX A and B is provided as Appendix B to this MOU.
2. The Management Council shall allocate telescope time among Consortium Members in every semester of operation according to the principles established in the approved operating plan for that semester. The operating plan will specify the relative value of time with the various telescopes and instrument modes.
3. In accordance with the terms of the AURA operating agreement with the Government of Chile, ten (10) % of all time available on SMARTS telescopes in Chile is to be provided to Chilean astronomers. If Chilean astronomers do not use their full ten (10) % in a given semester, the extra time will be allocated to Members in proportion to their shares of SMARTS during that semester. Chilean proposals will be submitted through NOAO's proposal process, and will be prioritized by the Chile National Time Assignment Committee ("CNTAC"). NOAO will coordinate with CNTAC so that Chilean proposals will be prepared appropriately respecting any special operating conditions and restrictions applied by the Members for its users in general. Upon request, the SMARTS Principal Scientist will provide a copy of approved current and future operating plans to the CNTAC.
4. The operating plan may authorize the Principal Scientist to allocate time of up to five (5) % of the total time available or seven (7) nights per semester per telescope (whichever is less) at his/her discretion. Any such time not used will be allocated to Members proportionately to their shares of SMARTS during that semester.
5. All shares of SMARTS established in this MOU, or in SMARTS operating plans, or in SMARTS Membership Agreements, will refer to and be based on net time - that is, the time remaining after the Chilean time and any discretionary time under paragraphs 3 and 4, above, has been set aside.
6. Member contributions to SMARTS may come in one of three forms, described below. The precise allocation of shares within the guidelines specified below will be set out in the operating plans and Membership Agreements.

- a. Telescopes. Members may contribute telescopes, which includes the telescope itself and a working Telescope Control System (“TCS”). Any expenditures by SMARTS for major new equipment and/or software required to bring the telescope into working order will be deducted from the share of observing time allocated to the contribution of the telescope. Routine telescope maintenance of telescopes will be considered part of the operating expenses for the project, and will not be subject to such a deduction. The overall share of SMARTS designated for contributions of telescopes (assuming no deductions for major equipment or software purchases) will be no more than 30%, and no less than 20%.
 - b. Instrumentation. Members may contribute instrumentation for the telescopes, which may include documentation and training for operators and observers, as well as non-routine maintenance, upkeep and repairs of the instrument(s). Any funding required from SMARTS to bring the instrument into working order will be deducted from the share of observing time allocated to the contribution of the instrument. The overall share of SMARTS allocated for contributions of instruments (assuming no deductions for major equipment or other upgrades) will be no more than 30%, and no less than 20%.
 - c. Operations. Members may contribute toward the operations costs of SMARTS, which may include mountaintop expenses, employee salaries, routine maintenance of telescopes and instruments, scientific, technical and financial management, and any other costs incurred by the Consortium. Contributions may be either in cash, or in kind, as provided in the Membership Agreements and Operating Plans. Major upgrades and repairs of telescopes or instruments, and salaries and travel expenses of instrument or telescope scientists and engineers, are considered part of the telescope or instrument contributions. The overall share of SMARTS allocated for contributions toward the operating costs will be no more than 60%, and no less than 40%.
7. The Parties recognize that the 1.5-m, 1.3-m and 0.9-m buildings and telescopes, complete with control systems, acquisition/guider boxes, and guider assemblies and any CTIO instruments (“Existing Telescopes”), were funded by NSF. The U. S. Government therefore has an equitable ownership interest in the Existing Telescopes. The U. S. Government does not insure its property against casualty loss

and, under its agreement with the NSF, AURA does not insure the Existing Telescopes. In the event of casualty loss of one or more of the Existing Telescopes, or any portion thereof, AURA will not be required to repair, replace or render such telescope or portion thereof operable except as AURA shall determine in its sole discretion, unless such repair or replacement is fully funded by the NSF.

8. For any telescope or instrument supplied by a Party other than AURA, the supplying Party shall determine whether or not to insure such property, and the risk of loss of or damage to the telescope of instrument shall be borne entirely by the supplying party. No supplying Party shall have any obligation to replace any such equipment in the event of destruction or loss.

G. Liability for Personal Injury and Property Damage

1. The Parties shall, at all times, exercise due care for safety. No Party shall make any claim against any other Party (or its guests, agents, employees, officers or directors), for property damage, personal injury or death arising out of any injury, death or damage arising from the activities conducted pursuant to this MOU; including such events that may occur as a result of negligence. Each of the Parties shall, to the extent permitted under the laws governing such Party, indemnify and hold harmless the other Party from and against any such claim made by any of the indemnifying Party's employees, agents, or affiliates.
2. Each of the Parties shall obtain insurance or self-insure for Liability, Casualty and other risks consistent with its own institutional insurance program. Each of the other Parties shall be endorsed as an additional insured as regards operations under this MOU in the insurance policies of the Party, or in the self-insurance program of the Party. Each party that maintains a self-insurance program certifies that all applicable regulatory requirements for such self-insurance program have been met.
3. Notwithstanding any other provision of this MOU, none of the Parties hereto shall be deemed to be engaged in a partnership, joint venture, or any other combined enterprise with any of the other Parties under the laws of any state or nation. Each Party shall be solely responsible for its obligations under this MOU.

H. Amendments

This MOU may be amended only at the end of a semester, upon majority vote of all Consortium Members, both Primary and Secondary, and thereafter by a writing signed by an authorized representative of each Party. Prior to becoming effective as to that Member, any such Amendment may be subject to approval by regulatory authorities having jurisdiction over the signatory party. The addition of Consortium Members and recalculation of shares and related obligations shall not be treated as an amendment to this MOU if approved by the Management Council as set forth in this MOU.

I. Incorporation of Membership Agreements; Priority of Documents; Survival

This MOU shall incorporate and include any and all Membership Agreements that have been executed and are effective for any given semester. Each Member shall execute the applicable individual Membership Agreement which shall incorporate all the terms of this MOU into its own. In the event of any conflict, the terms of this MOU shall prevail. The effectiveness of this MOU as to any Member shall be conditioned upon the execution of sufficient individual Membership Agreements in any given semester, as determined by the Management Council. Each Member shall be a third party beneficiary of all other Membership Agreements, and each Member agrees that other Members shall be entitled to rely on and enforce, through the Consortium, the promises and covenants made its Membership Agreement. If the SMARTS 2 Consortium should be terminated by action of the Management Council, those of this MOU's and the Membership Agreements' terms and conditions necessary for the orderly windup of operations shall survive and remain in effect until windup and resolution is complete.

J. Compliance with laws

Each Party agrees to comply with applicable Chilean and United States laws and regulations in its performance of this MOU. All shipments to CTIO shall be made in accordance with the provisions of the Agreement between AURA and the Government of Chile. Copies of the Agreement between AURA and the Government of Chile shall be

available to any Party upon written request to AURA.

K. Notices

All notices under this MOU shall be given in writing, by overnight mail, by confirmed facsimile, at the addresses set forth in the Membership Agreements or as may later be changed by a party by written notice given to AURA, the Principal Scientist, and all Consortium Members. Notices may also be given by email with confirmation of receipt, at the email addresses set forth in the Membership Agreements.

L. Counterparts

This MOU may be executed in any one or more identical counterparts, each of which shall be deemed to be an original instrument, but all of which together shall constitute but one instrument.

N. Choice of Law

Any action brought to enforce this MOU must be brought in a court of competent jurisdiction located in the United States of America.

SMARTS 2 Appendices

Appendix A Form of SMARTS 2 Membership Agreement
Appendix B Example of a Consortium Contribution Report
Appendix C Contact Information for AURA Export Control Administrator

Adopted by the SMARTS management council.

Amended by the SMARTS management council February 1, 2008

(to take effect as of October 1, 2007).

Amended by the SMARTS management council September 30, 2008.