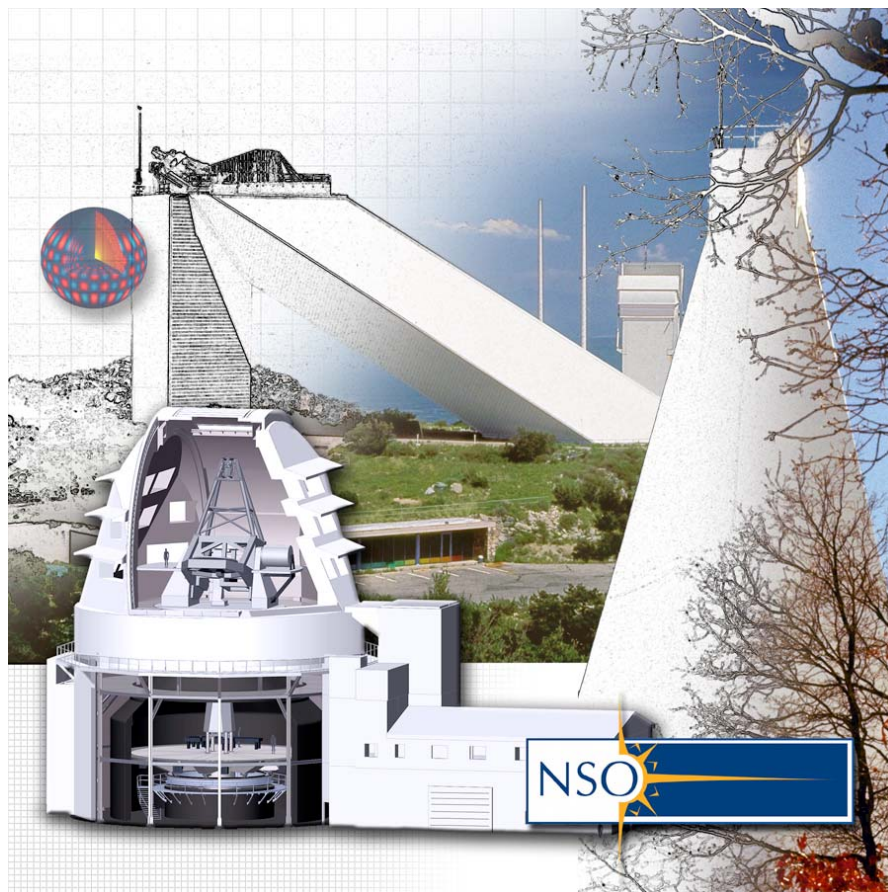


# NATIONAL SOLAR OBSERVATORY



## NSO Quarterly Report (3) FY 2005 April 1, 2005 – June 30, 2005

*Submitted to the National Science Foundation  
Under Cooperative Agreement No. AST-0132798  
Scientific Program Order No. 2*

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Also published on the NSO Web site: <http://www.nso.edu>



*NSO is operated by the Association of Universities for Research in Astronomy  
under cooperative agreement with the National Science Foundation*



# National Solar Observatory

## Quarterly Report (3) FY 2005

April 1 – June 30, 2005

*Submitted to the National Science Foundation under  
Scientific Program Order No. 2,  
Cooperative Agreement No. 0132798*

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This report consists of summary statistics and other data on NSO observing programs and telescope usage, and a safety report for the fiscal quarter ended June 30, 2005. Quarterly highlights of public and educational outreach activities are also described. The appendix contains a comprehensive list of principal investigators and collaborators, program titles, telescopes used, and observing hours associated with the quarter's observing programs.

Scientific highlights and current updates on NSO initiatives, new capabilities, instrumentation, and operational activities are published separately in the quarterly *NOAO-NSO Newsletter*.

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## I. Observing Programs\*

26 observing programs, three of which were thesis programs, were carried out at NSO this quarter. A comprehensive list of PI's, Co-I's, and collaborators, as well as program titles, telescopes used, and observing hours associated with the quarter's observing programs is attached as the Appendix.

| NSO Observing Programs by Type<br>(US vs Foreign) |           |             |
|---|-----------|-------------|
| 3 Months Ending Jun 2005                          |           | Nbr % Total |
| Programs (US)                                     | 21        | 81%         |
| Programs (non-US)                                 | 2         | 8%          |
| Thesis (US)                                       | 1         | 4%          |
| Thesis (non-US)                                   | 2         | 8%          |
| <b>Total Number of Unique Science Projects*</b>   | <b>26</b> | <b>100%</b> |

\*Includes observing programs conducted by NSO/NOAO staff scientists.

| Users of NSO Facilities by Category |           |          |           |             |                |
|-------------------------------------|-----------|----------|-----------|-------------|----------------|
|                                     | Visitors  |          |           |             | NSO/NOAO Staff |
|                                     | US        | Non-US   | Total     | % Total     |                |
| PhDs                                | 21        | 5        | 26        | 74%         | 10             |
| Graduate Students                   | 1         | 2        | 3         | 9%          | 0              |
| Undergraduate Students              | 0         | 0        | 0         | 0%          | 0              |
| Other                               | 5         | 1        | 6         | 17%         | 5              |
| <b>Total Users</b>                  | <b>27</b> | <b>8</b> | <b>35</b> | <b>100%</b> | <b>15</b>      |

| Institutions Represented by Visiting Users** |           |          |           |             |
|--|-----------|----------|-----------|-------------|
|  | US        | Non-US   | Total     | % Total     |
| Academic                                     | 10        | 2        | 12        | 67%         |
| Non-Academic                                 | 5         | 1        | 6         | 33%         |
| <b>Total Academic &amp; Non-Academic</b>     | <b>15</b> | <b>3</b> | <b>18</b> | <b>100%</b> |

\*\*The term "Non-Academic Institutions Represented by Users" include departments or divisions within an institution as separate entities (e.g., US Air Force and NASA are each counted as one institution even though several different sites/bases/centers are separately listed in the data base).

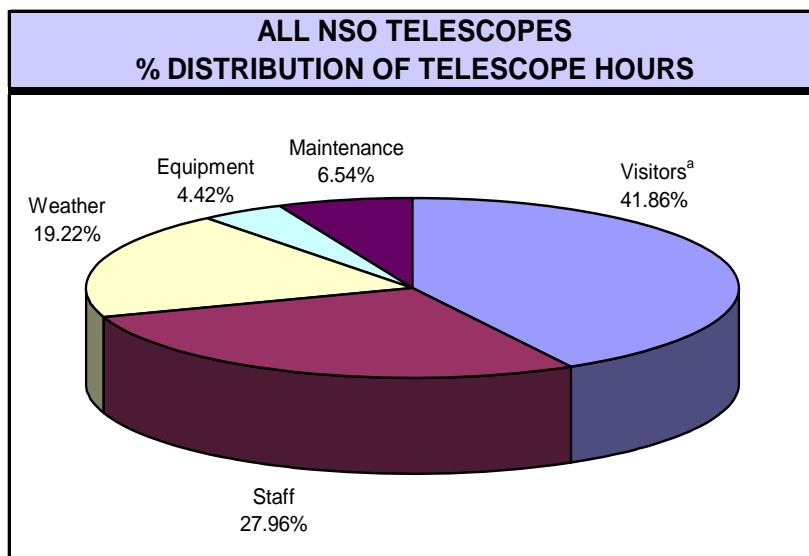
| Number of Users by Nationality |   |               |    |
|--------------------------------|---|---------------|----|
| Italy                          | 3 | Spain         | 4  |
| Mexico                         | 1 | United States | 42 |

| INSTITUTIONS REPRESENTED BY USERS                             |
|---|
| <b>Foreign Institutions (3)</b>                               |
| INAF - Arcetri Astrophysical Observatory                      |
| Instituto de Astrofisica de Canarias                          |
| Universidad de Monterrey, Mexico                              |
| <b>US Institutions (15)</b>                                   |
| Dickinson College   |
| Maria Carillo High School, Santa Rosa, CA                     |
| McEwen High School, McEwen, TN                                |
| Montgomery High School, Cunningham, TN                        |
| New Jersey Institute of Technology/Big Bear Solar Observatory |
| St. Pius X High School, Albuquerque                           |
| Stanford University   |
| University of Arizona   |
| University of Wisconsin, Madison                              |
| Windward Community College, HI                                |
| High Altitude Observatory, NCAR, Boulder                      |
| Lockheed Martin Solar & Astrophysics Lab                      |
| NASA/Goddard Space Flight Center (NASA/GSFC)                  |
| NASA/Langley Research Center                                  |
| Southwest Research Institute, San Antonio                     |
| US Air Force/Philips Lab (USAF/PL/GSS)                        |

## II. Telescope Usage and Performance Data

In the quarter ending June 30, 2005, 41.86% of total available telescope hours at NSO/Sacramento Peak and NSO/Kitt Peak went to the observing programs of visiting principal investigators and synoptic programs; 27.96% were devoted to the programs of NSO and NOAO scientists. Scheduled maintenance, including instrument tests, engineering, and equipment changes, accounted for 6.54% of total allotted telescope hours.

Total “downtime” (hours lost to weather and equipment problems) for NSO telescopes was 23.24%. Almost all of these lost observing hours were due to bad weather (19.22%), with 4.42% lost to equipment problems.



<sup>a</sup>Includes synoptic/archival data made immediately available to scientific community

| NSO TELESCOPES<br>Percent Distribution of Telescope Hours<br>(Scheduled vs. Downtime)<br>April - June 2005 |                 |                       |              |                  |             |                       |
|--|-----------------|-----------------------|--------------|------------------|-------------|-----------------------|
| Telescope  | Hours Available | % Hours Used By:      |              | % Hours Lost To: |             | % Hrs. Lost To:       |
|  |                 | Visitors <sup>a</sup> | Staff        | Weather          | Equipment   | Scheduled Maintenance |
| Dunn Solar Telescope/SP  | 1,032.0         | 43.8%                 | 11.9%        | 33.2%            | 4.0%        | 7.2%                  |
| McMath-Pierce*   | 1,042.0         | 15.9%                 | 64.4%        | 13.0%            | 6.7%        | 0.0%                  |
| KP SOLIS Tower <sup>b</sup>  | 0.0             | 0.0%                  | 0.0%         | 0.0%             | 0.0%        | 0.0%                  |
| FTS Lab*   | 636.0           | 75.5%                 | 5.7%         | 0.0%             | 0.0%        | 18.9%                 |
| Evans Facility   | 256.0           | 56.3%                 | 0.0%         | 35.9%            | 7.8%        | 0.0%                  |
| <b>All Telescopes</b>  | <b>2,966.0</b>  | <b>41.9%</b>          | <b>28.0%</b> | <b>19.2%</b>     | <b>4.4%</b> | <b>6.5%</b>           |

<sup>a</sup>Includes synoptic programs for which all data are made available immediately to the public and the scientific community at large.

<sup>b</sup>The KPVT was closed on September 22, 2003 to prepare for SOLIS. The KPVT is now the Kitt Peak SOLIS Tower (KPST).

\*Totals include both day and night hours. (All others are day only.)

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### III. User Statistics – Archives/Data Bases

#### A. NSO/Sacramento Peak (NSO/SP)

| Combined Service Demographics (NSO/SP) |          |         |
|--|----------|---------|
| Demographic Group                      | Requests | Traffic |
| U.S. Science (.gov, .edu, .mil)        | 7.1%     | 19.4%   |
| Other U.S. (.com, .net, misc.)         | 72.7%    | 64.0%   |
| Foreign                                | 18.1%    | 15.2%   |
| Unresolved                             | 2.1%     | 1.5%    |

NOTE: Sac Peak statistics exclude the use of NSO archives and data bases from within the NSO/SP Local Area Network (LAN), from the NSO/Tucson LAN, and from NOAO as a whole.

#### **FTP Archive Statistics**

There were 203,960 successful user requests, serving 4,684 distinct files to 4,490 distinct hosts. A total of 49.078 Gbytes were served, averaging 552.689 Mbytes per day.

| FTP User Demographics (NSO/SP)  |          |         |
|---------------------------------|----------|---------|
| Demographic Group               | Requests | Traffic |
| U.S. Science (.gov, .edu, .mil) | 6.9%     | 29.9%   |
| Other U.S. (.com, .net, misc.)  | 80.5%    | 58.8%   |
| Foreign                         | 11.3%    | 10.2%   |
| Unresolved                      | 1.4%     | 1.1%    |

| FTP Products (NSO/SP) |          |         |
|-----------------------|----------|---------|
| Product               | Requests | Traffic |
| Realtime Images       | 2.5%     | 2.7%    |
| Corona Maps           | 97.1%    | 70.1%   |
| Staff Outgoing        | 0.3%     | 27.1%   |
| Other                 | 0.1%     | 0.1%    |

#### **World Wide Web Statistics**

There were 1,190,387 successful user requests, serving 12,048 distinct files to 92,721 distinct hosts. A total of 36.361 Gbytes were served, averaging 409.165 Mbytes per day.

| WWW User Demographics (NSO/SP)  |          |         |
|---------------------------------|----------|---------|
| Demographic Group               | Requests | Traffic |
| U.S. Science (.gov, .edu, .mil) | 7.1%     | 5.1%    |
| Other U.S. (.com, .net, misc.)  | 71.4%    | 71.0%   |
| Foreign                         | 19.2%    | 21.9%   |
| Unresolved                      | 2.2%     | 2.0%    |

| <b>WWW Products (NSO/SP)</b>                       |                 |                |
|--|-----------------|----------------|
| <b>Product</b>                                     | <b>Requests</b> | <b>Traffic</b> |
| Realtime Images and Movies ( <i>ISOON, Other</i> ) | 18.4%           | 21.2%          |
| Other Images                                       | 10.0%           | 33.5%          |
| General Icon and Background Images                 | 27.2%           | 6.9%           |
| Public Relations Pages                             | 12.5%           | 5.4%           |
| Press Releases                                     | 1.4%            | 4.3%           |
| Telescope Home Pages                               | 4.9%            | 2.5%           |
| ISOON  | 3.7%            | 3.6%           |
| Adaptive Optics Pages                              | 1.3%            | 5.3%           |
| General Information                                | 10.5%           | 8.4%           |
| Staff Pages  | 2.6%            | 5.7%           |
| Other  | 7.5%            | 3.2%           |

### **FTP Upload Statistics**

FTP uploads are using a significant amount of available bandwidth. Almost all of the FTP upload activity is related to the USAF Solar Mass Ejection Imager (SMEI) experiment.

There were 5,680 successful user requests uploading 113 distinct files from 5 distinct hosts. A total of 173.785 Gbytes were uploaded, averaging 1.910 Gbytes per day.

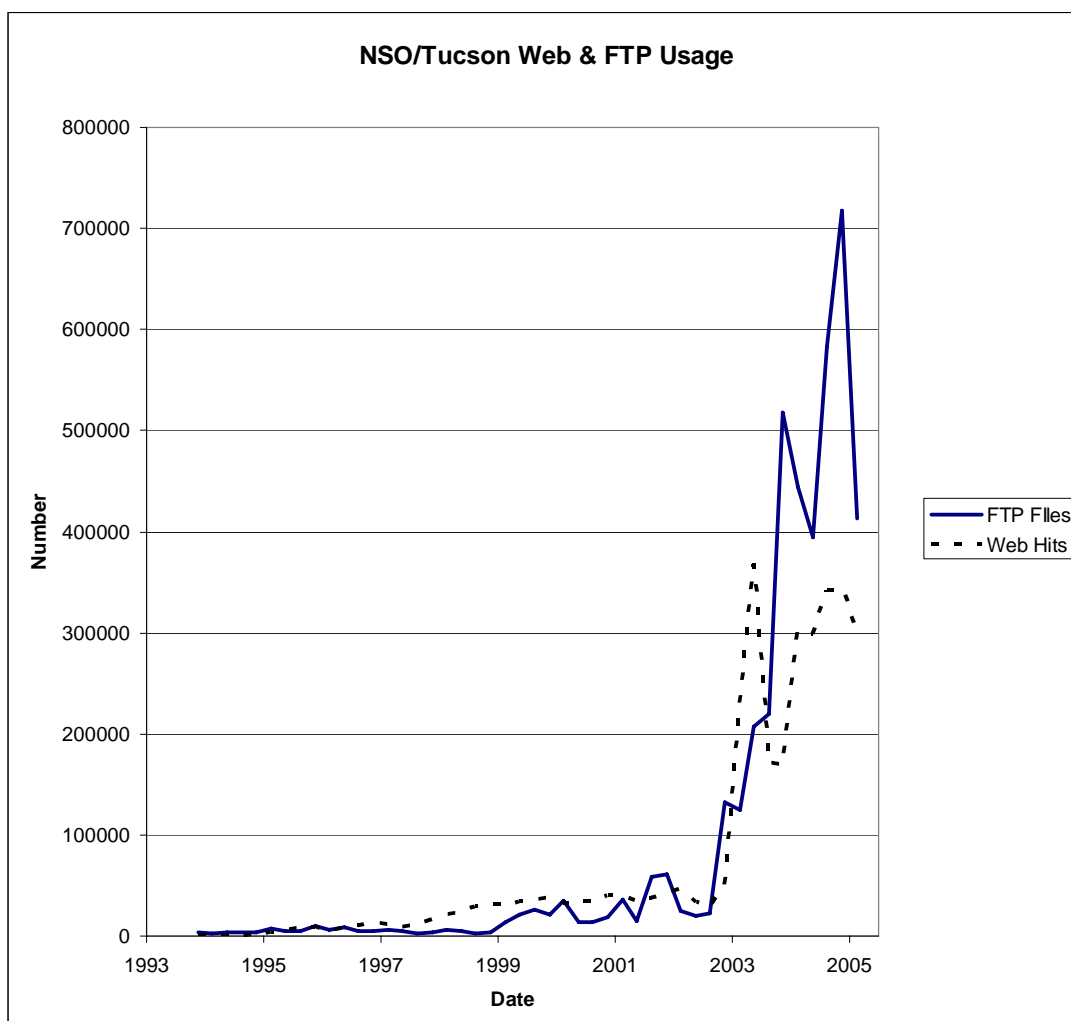
| <b>Incoming FTP User Demographics (NSO/SP)</b> |                 |                |
|--|-----------------|----------------|
| <b>Demographic Group</b>                       | <b>Requests</b> | <b>Traffic</b> |
| U.S. Science ( <i>.edu, .mil</i> )             | 99.9%           | 100.0%         |
| Other U.S. ( <i>.com, .net, misc.</i> )        | 0.0%            | 0.0%           |
| Foreign  | 0.1%            | 0.0%           |

| <b>Incoming FTP Uploads (NSO/SP)</b> |                 |                |
|--------------------------------------|-----------------|----------------|
| <b>Product</b>                       | <b>Requests</b> | <b>Traffic</b> |
| SMEI Data                            | 99.8%           | 100.0%         |
| Workshop Talks                       | 0.2%            | 0.0%           |

### **B. NSO/Tucson**

- Most recent complete quarter (01 April – 30 June 2005)
  1. 807 FTP users
  2. 82,666 FTP logins
  3. 413,203 files downloaded via anonymous FTP
  4. 299,926 Web page hits (not counting in-line images)
  5. 2,061,465 Web page hits including in-line images

- Distribution of downloaded data products by number of files for the most recent quarter:
  1. 5.2% KPVT (magnetograms, synoptic maps, helium images).
  2. 1.7% SOLIS (VSM magnetograms, synoptic maps, helium images)
  3. 0.5% FTS (spectral atlases, general archive).
  4. 0.1% Sac Peak spectroheliograms (H $\alpha$ , Calcium K images).
  5. 92.6% GONG (magnetograms, spectra, time series, frequencies).
- Demographics of FTP logins for most recent quarter:
  1. Science domains: 50.9%
  2. Public domains: 4.6%
  3. Foreign domains: 17.4%
  4. Unresolved: 27.1%



Note: All statistics are for NSO/Tucson archive usage by non-NSO and non-NOAO personnel. The numbers do not include NSO/Sunspot.



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## V. Public and Educational Outreach Activities

NSO public and educational outreach encompasses activities at the Sunspot Astronomy and Visitor Center, including the Visitor Center's retail operations, educational exhibits, and NSO/Sac Peak tours; tours of the NSO/Kitt Peak facilities; Web site outreach, including public information requests; scientific press and media relations; and staff involvement in programs to enhance science education in grades K-12, as well as higher education. Highlights for this quarter follow.

### A. Educational Outreach

#### 1. *Summer Research Assistantship (SRA) Programs including Research Experiences for Undergraduates (REU) and Research Experiences for Teachers (RET)*

During this quarter, a combination of 22 students and teachers participated in summer research opportunities at locations in both Tucson and Sunspot for 2005. There were 8 REU students, 4 RET teachers, and 12 graduate SRA's, of which 3 were PhD candidates doing ATST-related theses, 4 were sponsored by staff grant funds, 2 were Air Force Space Scholars, , and 1 was from the High Altitude Observatory.

#### 2. *Other Educational Outreach*

Alexei Pevtsov continued to teach a graduate course on "Observational Astrophysics" (PHYS580) at Montana State University in Bozeman. Four lectures were presented during this quarter. Dr. Pevtsov also served as a "guest expert" for an online forum as part of a high school advanced placement chemistry course ([www.mrsmales.com/forum](http://www.mrsmales.com/forum)) ; he answered astronomy questions posted by high school students.

Frank Hill and Carl Henney presented invited lectures at a three-day Solar Physics Workshop for middle school science teachers in June sponsored by the University of Arizona Lunar and Planetary Laboratory's Science and Mathematics Education Center. The workshop focused on providing an introduction to the underlying physics of the Sun, on the production of the aurora, and on making connections between solar activity and weather and climate on Earth. Workshop activities included an NSO-hosted tour, led by Bill Livingston, of the McMath-Pierce Solar Telescope facility.

NSO co-hosted a week-long observing run in June at the McMath-Pierce Solar Telescope as part of the NOAO TLRBSE summer program. Frank Hill and Claude Plymate worked with NOAO's Connie Walker, three high-school teachers, and one community college science instructor on magnetic active region mapping using a 1.5-micron magnetograph. Frank Hill implemented a software package to allow the teachers to reduce and analyze McMath-Pierce IR spectra. The teachers were also provided with copies of the NSO designed RASL/DASL (Research in Active Solar Longitudes/Data and Activities for Solar Learning) software and workbooks as part of the TLRBSE program activities.

As a Project ASTRO astronomer partner, Roberta Toussaint worked with students at Robison Elementary School in Tucson in April and May. During this quarter the NSO Sac Peak staff started working on plans for hosting the 2005 Project ASTRO Workshop for teachers and students on 09-10 September 2005.



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## B. Public Outreach

### 1. Sunspot Visitor Center

| <b>Sunspot Astronomy &amp; Visitor Center<br/>Summary of Visitors and Tours<br/>(3 Months Ending 06/30/05)</b> |                        |
|--|------------------------|
| <i>Group/Program</i>   | <i>No. of Visitors</i> |
| General Public Tours<br>(Visits to Center and<br>Self-Guided Tours)  | 2,800                  |
| Guided Public Tours:   |                        |
| - School Groups K-12   | 152                    |
| - Special Tours  | 165                    |
| <b>Total Visitors</b>  | <b>3,117</b>           |

A new 6 × 8-foot graphic was developed for the new backlit display box at the Visitor Center. A new Visitor Center tourism brochure was also finalized and printed, and Visitor Center ads were prepared for placement in local newspapers.

### 2. Other Public Outreach

On 21 April Dave Radzanowski of the White House Office of Management and Budget visited NOAO and NSO and was given a tour of the nighttime and solar facilities at Kitt Peak. NSO Deputy Director Mark Giampapa met with Radzanowski and briefed him on the Advanced Technology Solar Telescope Project and other NSO programs.

K.S. Balasubramaniam and John Leibacher represented NSO at the 11<sup>th</sup> annual Coalition for National Science Funding Science@Work exhibition at Capitol Hill on 21 June, at which members of Congress and their staff were briefed on the work of NSF-funded centers.

K.S. Balasubramaniam gave a tour of the NSO facilities at Sunspot to Ms. Rebecca Rizzuit, a staffer of New Mexico Senator Jeff Bingaman.

Alexei Pevtsov gave public lectures on “The History of Space Exploration in Postage Stamps” to members of the Montana Astronomical Society at the Museum of the Rockies in Bozeman, Montana on 29 April, and to the Alamogordo Astronomy Club on 17 June.

As part of a Tucson Amateur Astronomy Association activity, Claude Plymate and Teresa Bippert-Plymate hosted a star party with an 8-inch Meade telescope for students, parents and teachers at Vesey Elementary School on 07 April.

Ramona Elrod manned the NSO booth at the National Science Teachers Association conference in Dallas, Texas on 10 March – 03 April. She also represented NSO at an NRAO-hosted meeting of the Southwest Consortium of Observatories for Public Education (SCOPE) in Socorro, New Mexico on 15 April.

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Jackie Diehl represented NSO during Astronomy Day activities held at the New Mexico Museum of Space History, in conjunction with the Alamogordo Astronomy Club on 30 April. She also presented an evening campfire program for the Lincoln National Forest on 04 June.

The second issue of the *ATST Quarterly Newsletter* was published in May

## **V. Risk Management and Safety Report**

Risk Management services at NSO/Kitt Peak and Tucson are shared with NOAO. See also the "Tucson and Kitt Peak Site Safety Report" section (page 6) of the NOAO April-June 2005 Quarterly Report ([http://www.noao.edu/dir/q\\_rep/q3-05.pdf](http://www.noao.edu/dir/q_rep/q3-05.pdf)) for more comprehensive information on risk management activities.

### **A. OSHA Recordable Occupational Injuries, Illnesses, and Other Incidents**

- NSO had no injuries reported this quarter.

### **B. Safety and Health**

- New safety signs for the Tucson GONG site were installed.
- A Risk Management overview was presented to the Management Committee on 22 June. The Committee was informed of the following: there were no OSHA recordable injuries reported to date for this fiscal year; our experience with a few property damage instances and vandalisms during this quarter; insurance annual review; the status of the safety manual rewrite; preparations for the Kitt Peak summer shutdown; and inspection at NSO's Sac Peak.
- Risk management considerations were reviewed in the 23 June ATST enclosure review meeting. Topics of discussion included access, ladder ways, fire protection, chemical containment and others.

**APPENDIX**  
**National Solar Observatory**  
**01 April - 30 June 2005**

**April - June 2005:** During this period, 26 observing programs, three of which were thesis programs, were carried out at the National Solar Observatory. Graduate and undergraduate students are indicated by (T) for thesis students, (G) for non-thesis graduate students, (UT) for undergraduate thesis students, and (U) for undergraduate students. (TLRBSE) identifies middle and high school teachers who are Teacher Leaders in Research Based Science Education program participants, and (RET) identifies Research Experience for Teachers program participants.

|  |                                     | <b>Nights</b> | <b>Days</b> | <b>Hours</b> |
|--|-------------------------------------|---------------|-------------|--------------|
| <b>8</b>   |                                     | <b>0.0</b>    | <b>15.0</b> | <b>120.0</b> |
| Michael Dulick   | National Solar Observatory          |               |             |              |
| <br><i>FTS Beamsplitter Changes; System Maintenance</i>  |                                     |               |             |              |
| McMP   | FTS Lab                             |               |             |              |
| <b>1222</b>  |                                     | <b>0.0</b>    | <b>9.0</b>  | <b>108.0</b> |
| Curtis Rinsland  | NASA Langley Research Center        |               |             |              |
| <br><i>Monitoring of Long-Term Trends in the Concentrations of Atmospheric Gases from McMath FTS Solar Spectra</i> |                                     |               |             |              |
| McPE   | FTS/Mc-P                            |               |             |              |
| <b>1854</b>  |                                     | <b>0.0</b>    | <b>3.0</b>  | <b>104.0</b> |
| William Livingston   | National Solar Observatory          |               |             |              |
| Renshaw (RET)  | St. Pius X High School, Albuquerque |               |             |              |
| <br><i>Line Asymmetry Changes in the Solar Irradiance Spectrum</i>   |                                     |               |             |              |
| McMP   | FTS/Mc-P                            |               |             |              |
| <b>1858</b>  |                                     | <b>0.0</b>    | <b>8.0</b>  | <b>178.0</b> |
| William Livingston   | National Solar Observatory          |               |             |              |
| <br><i>Cycle Variability of the Solar Spectrum</i>   |                                     |               |             |              |
| McMP   | Main spectrograph                   |               |             |              |
| <b>1882</b>  |                                     | <b>0.0</b>    | <b>3.0</b>  | <b>36.0</b>  |
| James Lawler   | University of Wisconsin             |               |             |              |
| <br><i>Atomic Transition Probabilities for Rare Earth Elements</i>   |                                     |               |             |              |
| FTS Lab  |                                     |               |             |              |
| <b>2127</b>  |                                     | <b>0.0</b>    | <b>15.1</b> | <b>76.0</b>  |
| Richard Altrock  | USAF Research Laboratory            |               |             |              |
| <br><i>Three-Line Coronal Photometer</i>   |                                     |               |             |              |
| Evans Facility   | Sac Peak                            |               |             |              |

|  |                                  | Nights      | Days        | Hours        |
|--|----------------------------------|-------------|-------------|--------------|
| <b>2128</b>  |                                  | <b>0.0</b>  | <b>15.1</b> | <b>68.0</b>  |
| Simon Worden   | University of Arizona            |             |             |              |
| Keil   | National Solar Observatory       |             |             |              |
| <i>Ca K Solar Rotation</i>   |                                  |             |             |              |
| Evans Facility   | Sac Peak                         |             |             |              |
| <b>2245</b>  |                                  | <b>0.0</b>  | <b>10.0</b> | <b>89.0</b>  |
| Christoph Keller   | National Solar Observatory       |             |             |              |
| Ren  | Big Bear Solar Observatory, NJIT |             |             |              |
| Plymate  | National Solar Observatory       |             |             |              |
| <i>ATST Key Technology Developments</i>  |                                  |             |             |              |
| McMP   | Main spectrograph                |             |             |              |
| <b>2245n</b>   |                                  | <b>10.0</b> | <b>0.0</b>  | <b>29.0</b>  |
| Christoph Keller   | National Solar Observatory       |             |             |              |
| Ren  | Big Bear Solar Observatory, NJIT |             |             |              |
| Plymate  | National Solar Observatory       |             |             |              |
| <i>ATST Key Technology Developments</i>  |                                  |             |             |              |
| McMP   | Main spectrograph                |             |             |              |
| <b>2282</b>  |                                  | <b>0.0</b>  | <b>12.0</b> | <b>13.0</b>  |
| Donald Jennings  | NASA/Goddard Space Flight Center |             |             |              |
| McCabe   | NASA Goddard Space Flight Center |             |             |              |
| Sada   | Universidad de Monterrey         |             |             |              |
| Boyle  | Dickinson College                |             |             |              |
| <i>Zeeman Splitting in OH at 12 Microns</i>                                      |                                  |             |             |              |
| McMP   | Main spectrograph                |             |             |              |
| <b>2367</b>  |                                  | <b>0.0</b>  | <b>14.0</b> | <b>216.0</b> |
| Andrew Potter  | National Solar Observatory       |             |             |              |
| Plymate  | National Solar Observatory       |             |             |              |
| Killen   | University of Maryland           |             |             |              |
| <i>Adaptive Optics for Planetary Observations at the McMath-Pierce Telescope</i> |                                  |             |             |              |
| McMP   | Main spectrograph                |             |             |              |

|  |   | Nights     | Days       | Hours       |
|--|---|------------|------------|-------------|
| <b>2375a</b>   |   | <b>0.0</b> | <b>5.0</b> | <b>35.0</b> |
| Constance Walker   | National Optical Astronomy Observatory    |            |            |             |
| Brown (TLRBSE)   | Montgomery High School, Cunningham, TN    |            |            |             |
| Brown (TLRBSE)   | McEwen High School, McEwen, TN            |            |            |             |
| Salkovics (TLRBSE)   | Maria Carillo High School, Santa Rosa, CA |            |            |             |
| Ciotti (TLRBSE)  | Windward Community College, Hawaii        |            |            |             |
| <i>Understanding the Morphology of Active Regions: Using Zeeman-Split IR Lines to Determine Magnetic Field Strengths of Sunspots</i> |   |            |            |             |
| McMP   | Main spectrograph                         |            |            |             |
| <b>2433</b>  |   | <b>0.0</b> | <b>0.5</b> | <b>5.0</b>  |
| Thomas Rimmele   | National Solar Observatory                |            |            |             |
| Sankarasubramanian   | National Solar Observatory                |            |            |             |
| <i>High-Resolution Studies of Pores Using the Diffraction-Limited Spectro-Polarimeter (DLSP)</i>                                     |   |            |            |             |
| Dunn Solar Telescope/SP  | Sac Peak                                  |            |            |             |
| <b>2442</b>  |   | <b>0.0</b> | <b>6.5</b> | <b>65.0</b> |
| Tony Spence  | National Solar Observatory                |            |            |             |
| Fletcher   | National Solar Observatory                |            |            |             |
| Dunbar   | National Solar Observatory                |            |            |             |
| Jones  | National Solar Observatory                |            |            |             |
| <i>Dunn Telescope Maintenance</i>  |   |            |            |             |
| Dunn Solar Telescope/SP  | Sac Peak                                  |            |            |             |
| <b>2443</b>  |   | <b>0.0</b> | <b>6.5</b> | <b>47.0</b> |
| Richard Wachter  | Stanford University                       |            |            |             |
| Tomczyk  | High Altitude Observatory, NCAR           |            |            |             |
| Uitenbroek   | National Solar Observatory                |            |            |             |
| Rajaguru   | Stanford University                       |            |            |             |
| <i>Influence of Magnetic Fields on the Doppler Measurements of Oscillations</i>  |   |            |            |             |
| Dunn Solar Telescope/SP  | Sac Peak                                  |            |            |             |
| <b>2444</b>  |   | <b>0.0</b> | <b>7.0</b> | <b>47.0</b> |
| Thomas Rimmele   | National Solar Observatory                |            |            |             |
| Sankarasubramanian   | National Solar Observatory                |            |            |             |
| <i>Network Magnetic Field Observations Using the Diffraction-Limited Spectro-Polarimeter (DLSP)</i>                                  |   |            |            |             |
| Dunn Solar Telescope/SP  | Sac Peak                                  |            |            |             |

|  |                                      | Nights     | Days       | Hours       |
|--|--------------------------------------|------------|------------|-------------|
| <b>2445</b>  |                                      | <b>0.0</b> | <b>9.0</b> | <b>41.0</b> |
| Bruce Lites  | High Altitude Observatory, UCAR      |            |            |             |
| Socas-Navarro  | High Altitude Observatory, UCAR      |            |            |             |
| Sankarasubramanian   | National Solar Observatory           |            |            |             |
| <i>Quiet Sun Magnetic Fields at High Angular Resolution (DLSP)</i>   |                                      |            |            |             |
| Dunn Solar Telescope/SP Sac Peak   |                                      |            |            |             |
| <b>2446</b>  |                                      | <b>0.0</b> | <b>7.0</b> | <b>38.5</b> |
| David Elmore   | High Altitude Observatory, NCAR      |            |            |             |
| Socas-Navarro  | High Altitude Observatory, UCAR      |            |            |             |
| Borrero  | High Altitude Observatory, UCAR      |            |            |             |
| <i>Enhanced Advanced Stokes Polarimeter</i>  |                                      |            |            |             |
| Dunn Solar Telescope/SP Sac Peak   |                                      |            |            |             |
| <b>2447</b>  |                                      | <b>0.0</b> | <b>7.0</b> | <b>38.5</b> |
| Marian Martinez Gonzalez (T)   | Instituto de Astrofisica de Canarias |            |            |             |
| Socas-Navarro  | High Altitude Observatory, UCAR      |            |            |             |
| Borrero  | High Altitude Observatory, UCAR      |            |            |             |
| Dominguez Cerdana  | Instituto de Astrofisica de Canarias |            |            |             |
| <i>Enhanced Advanced Stokes Polarimeter: Simultaneous Visible &amp; Infrared Observations of photospheric Quiet Sun Fields</i> |                                      |            |            |             |
| Dunn Solar Telescope/SP Sac Peak   |                                      |            |            |             |
| <b>2448</b>  |                                      | <b>0.0</b> | <b>9.0</b> | <b>77.0</b> |
| Krishna Balasubramaniam  | National Solar Observatory           |            |            |             |
| Elmore   | High Altitude Observatory, NCAR      |            |            |             |
| Socas-Navarro  | High Altitude Observatory, UCAR      |            |            |             |
| Bogdan   | High Altitude Observatory            |            |            |             |
| Lites  | High Altitude Observatory, UCAR      |            |            |             |
| <i>A Study of Variations of Magnetized Waves in Sunspots</i>   |                                      |            |            |             |
| Dunn Solar Telescope/SP Sac Peak   |                                      |            |            |             |
| <b>2449</b>  |                                      | <b>0.0</b> | <b>7.0</b> | <b>38.5</b> |
| Rebecca Centeno (T)  | Instituto de Astrofisica de Canarias |            |            |             |
| Socas-Navarro  | High Altitude Observatory, UCAR      |            |            |             |
| Elmore   | High Altitude Observatory, NCAR      |            |            |             |
| Collados Vera  | Instituto de Astrofisica de Canarias |            |            |             |
| <i>Enhanced Advanced Stokes Polarimeter: Chromospheric Waves and Dynamics in Sunspots and Active Regions</i>                   |                                      |            |            |             |
| Dunn Solar Telescope/SP Sac Peak   |                                      |            |            |             |

|                    |                                 | Nights     | Days       | Hours       |
|--------------------|---------------------------------|------------|------------|-------------|
| <b>2450</b>        |                                 | <b>0.0</b> | <b>7.0</b> | <b>38.5</b> |
| Anna Pietarila (T) | High Altitude Observatory, UCAR |            |            |             |
| Socas-Navarro      | High Altitude Observatory, UCAR |            |            |             |
| Elmore             | High Altitude Observatory, NCAR |            |            |             |

*Enhanced Advanced Stokes Polarimeter: Wave and Dynamics in the Quiet Solar Chromosphere*

Dunn Solar Telescope/SP Sac Peak

|               |  |            |            |              |
|---------------|--|------------|------------|--------------|
| <b>2451</b>   |  | <b>0.0</b> | <b>9.0</b> | <b>100.0</b> |
| Kevin Reardon | INAF - Arcetri Astrophysical Observatory |            |            |              |
| Casini        | High Altitude Observatory, NCAR          |            |            |              |
| Cavallini     | INAF - Arcetri Astrophysical Observatory |            |            |              |
| Tomczyk       | High Altitude Observatory, NCAR          |            |            |              |

*Spectro-polarimetry of the Chromosphere and Photosphere with the Interferometric Bidimensional Spectrometer (IBIS)*

Dunn Solar Telescope/SP Sac Peak

|               |  |            |            |             |
|---------------|--|------------|------------|-------------|
| <b>2452</b>   |  | <b>0.0</b> | <b>7.0</b> | <b>42.0</b> |
| Katja Janssen | INAF - Osservatorio Astrofisico di Arcetri |            |            |             |
| Reardon       | INAF - Arcetri Astrophysical Observatory   |            |            |             |

*Speckle Reconstruction Techniques Using the Interferometric BI-dimensional Spectrometer (IBIS)*

Dunn Solar Telescope/SP Sac Peak

|                |   |            |            |             |
|----------------|---|------------|------------|-------------|
| <b>2453</b>    |   | <b>0.0</b> | <b>8.5</b> | <b>61.0</b> |
| Mandy Hagenaar | Lockheed Martin Solar & Astrophysics Laboratories |            |            |             |
| Uitenbroek     | National Solar Observatory                        |            |            |             |

*Moat Flows and Moving Magnetic Features around Sunspots*

Dunn Solar Telescope/SP Sac Peak

|               |                                 |            |            |             |
|---------------|---------------------------------|------------|------------|-------------|
| <b>2454</b>   |                                 | <b>0.0</b> | <b>5.0</b> | <b>42.5</b> |
| Phillip Judge | High Altitude Observatory, NCAR |            |            |             |
| Casini        | High Altitude Observatory, NCAR |            |            |             |
| Burkepile     | High Altitude Observatory, NCAR |            |            |             |
| Tomczyk       | High Altitude Observatory, NCAR |            |            |             |

*Coronal Multi-Channel Polarimeter (CoMp)*

Dunn Solar Telescope/SP Sac Peak