

National Solar Observatory



NSO Quarterly Report FY 2003 January 1, 2003 – March 31, 2003

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

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

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Quarterly Report (2) FY 2003

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May 15, 2003

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This report consists of summary statistics and other data on NSO observing programs, telescope usage, personnel changes, and visiting scientists, and a safety report for the fiscal quarter ending March 31, 2003. Quarterly highlights of public and educational outreach activities are also described here. The appendix contains a comprehensive list of all 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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Observing Programs*

33 observing programs were carried out at NSO this quarter; two of these were thesis programs involving four graduate students. A comprehensive list of all 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 (US vs Foreign)			
3 Months Ending Mar-2003		Nbr	% Total
Programs (US)		30	91%
Programs (non-US)		1	3%
Thesis (US)		0	0%
Thesis (non-US)		2	6%
Total Number of Unique Science Projects*		33	100%

*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	23	6	29	85%	11
Graduate Students	0	4	4	12%	-
Undergraduate Students	1	0	1	3%	-
Other (Research Tech.)	0	0	0	0%	4
Total Users	24	10	34	100%	15

Institutions Represented by Visiting Users**					
	US	Non-US	Total	% Total	
Academic	5	2	7	47%	
Non-Academic	7	1	8	53%	
Total Academic & Non-Academic	12	3	15	100%	

**Note: Total number of institutions represented by users do not 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).

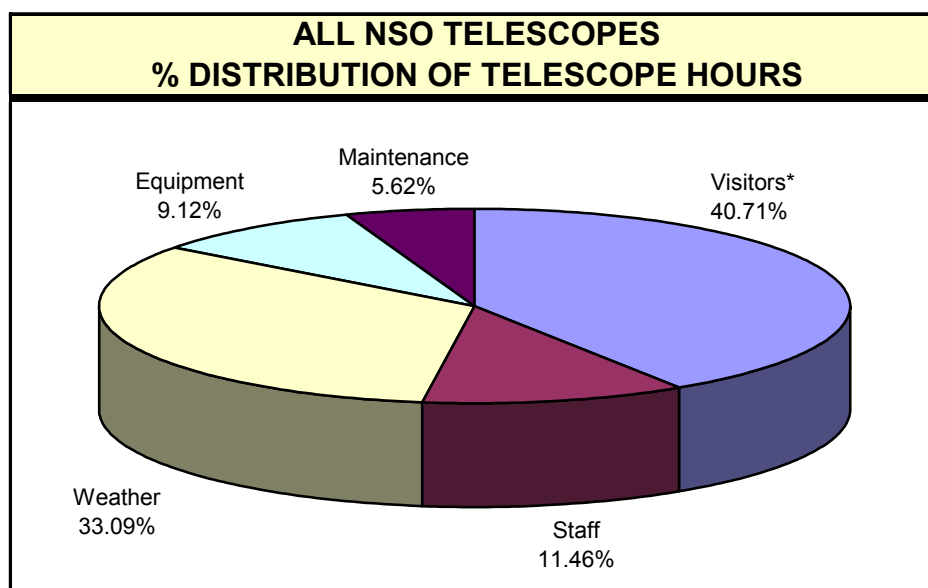
INSTITUTIONS REPRESENTED BY USERS	
Foreign Institutions (3)	
ETH-Zurich	
National Astronomical Observatory of Japan	
University of Tokyo	
US Institutions (11)	
American Institute of Physics	
College of William & Mary	
High Altitude Observatory, NCAR	
Jet Propulsion Laboratory	
NASA/Goddard Space Flight Center	
NASA/Langley	
New Jersey Institute of Technology	
South Carolina State University	
Southwest Research Institute, San Antonio	
University of Wisconsin, Madison	
University of Colorado	
US Air Force, Los Angeles AFB	
US Air Force/Philips Lab (USAF/PL/GSS)	

Number of Users by Nationality			
Japan	4	United States	39
Switzerland	6		

Telescope Usage and Performance Data

In the quarter ending 31 March 2003, 40.71% of total available telescope hours at NSO/Sacramento Peak and NSO/Kitt Peak went to the observing programs of visiting principal investigators as well as synoptic programs; 11.46% were devoted to the programs of NSO scientists. Scheduled maintenance (including instrument tests, engineering, and equipment changes accounted for 5.62% of total allotted telescope hours.

Total “downtime” (hours lost to weather and equipment problems) for NSO telescopes was 42.21%. Almost all of these lost observing hours were due to bad weather (33.09%), with only 9.12% lost to equipment problems.



NSO TELESCOPES Percent Distribution of Telescope Hours (Schedule vs. Downtime) January - March 2003						
Telescope	Hours Available	% Hours Used By:		% Hours Lost To:		% Hrs. Lost To: Scheduled Maintenance
		Visitors*	Staff	Weather	Equipment	
Dunn Solar Telescope/SP	774.0	21.2%	20.0%	25.6%	6.7%	26.5%
McMath-Pierce	1,522.0	41.6%	21.0%	31.4%	6.0%	0.0%
KP Vacuum	543.0	61.7%	0.0%	35.2%	3.1%	0.0%
FTS Lab	357.0	3.6%	0.0%	0.0%	76.2%	20.2%
Evans Facility	327.5	1.4%	29.9%	61.1%	6.7%	0.9%
Hilltop Dome	1,463.0	60.2%	0.0%	39.8%	0.0%	0.0%
All Telescopes	4,986.5	40.7%	11.5%	33.1%	9.1%	5.6%

*Includes synoptic programs for which all data are made available immediately to the public and scientific community at large.

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.

Sunspot Astronomy and Visitor Center

Sunspot Astronomy & Visitor Center Summary of Visitors and Tours (3 Months Ending 03/31/03)	
<i>Group/Program</i>	<i>No. of Visitors</i>
General Public Tours (Visits to Center and Self-Guided Tours)*	0
Guided Public Tours:	
- General Public	0
- School Groups K-12	150
- Special Tours	32
Total Visitors	182

*Note: Public tours were suspended as of 07 Sept 2002, at the end of summer season, and will resume in spring 2003.

Media and Public Information

- The redesigned, more informative and user-friendly Internet home page for the National Solar Observatory was completed and made publicly active in March.
- Two brochures for the public — one to attract tourists to NSO, and one to explain the Advanced Technology Solar Telescope — and bookmarks to direct people to Sunspot, were completed and are being distributed.

Public and Educational Outreach

- In January, three summer-2003 NSO/REU students presented poster papers at the American Astronomical Society (AAS) meeting in Seattle:
 - Adam Kraus on “A Prototype Data Reduction Pipeline for the GNAT System;”
 - Carol Thornton on “Comparison of Three Solar Magnetographs;” and
 - Adria Updike on “Calculation of Magnetic Helicity in a Force-Free Field.”
- Also at the January 2003 AAS-Seattle meeting – Jeff Sudol, collaborating with a group at Gettysburg College on Project CLEA (Contemporary Laboratory Experiences in Astronomy), presented a poster and software demonstration on the Solar Rotation Laboratory exercise portion of the project that involves 368 archived images of the Sun obtained by GONG during a period near solar maximum between January 1, 2002 and April 30, 2002.
- On January 30, Han Uitenbroek and Dave Dooling staffed an exhibit on NSO at the New Mexico Institute of Mining and Technology career fair in Socorro. The exhibit included a new poster that depicted scientific and engineering challenges in exploring the Sun.

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- Jackie Diehl participated in the new telescope users' workshop with the Alamogordo Astronomy Club in mid-January.
 - In February, more than 300 invitations to visit Sunspot were prepared and mailed to New Mexico and El Paso, Texas schools. The invitations comprised a description of NSO and its educational activities, and a map.
 - Jackie Diehl co-chaired the Alamogordo High School science fair that was held on February 10. Richard Radick, Joel Mozer and Dave Dooling were judges at the fair.
 - Mark Giampapa was a judge for the annual science fair at Fruchthendler Elementary School in Tucson on February 24. The winners at each grade level along with the second place projects went on to the Southern Arizona Science and Engineering Fair (SARSEF) competition at the Tucson Convention Center.
 - On February 27, K. S. Balasubramaniam presented a talk about the Advanced Technology Solar Telescope at the New Mexico Institute of Mining and Technology.
 - In February, nine undergraduate students (6 REU-funded and 3 grant-supported) and three graduate (SRA) students were selected from among 74 applicants to participate in the NSO summer 2003 Research Experiences for Undergraduates and Summer Research Assistant programs. Four high-school teachers (two at each site) were selected for the Summer 2003 Research Experiences for Teachers (RET) program.
 - On March 1st, 300 flyers about the Researching Active Solar Longitudes (RASL) Project were distributed at the 37th Annual High School Physics Teachers Day at Occidental College in Los Angeles. The RASL Project is a high-school level educational/research module (developed within the Research Experience for Teachers (RET) and Research-Based Science Education (RBSE) programs) that improves computer and analytical skills and contributes new scientific results to solar astronomy and physics. The RASL Project is being advertised nationwide in an effort to recruit teachers to participate in the project.
 - On March 18, Roberta Toussaint served as a specialty judge and a grand awards judge at the Southern Arizona Science and Engineering Fair (SARSEF) at the Tucson Convention Center.
 - Claude Plymate presented two talks to the Tucson Amateur Astronomy Associate (TAAA), one on March 7 on "Adaptive Optics at the McMath-Pierce Solar Telescope," and another on April 4 on "Two-Dimensional Imaging of the 4.67-micron CO Emission above the Solar Limb." Claude and Teresa Bippert-Plymate also helped the TAAA host a public star party on April 6 at the Saguaro National Park West.
 - Matt Penn has been working with University of Arizona undergraduate students Ali Schmidt and Jill Gerke on ATST-related projects. Ali's project, "Physical Models of ATST Sky Brightness Monitor (SBM) Variation," is for her Astronomy 499 independent study class. Jill is working with Dr. Penn on analyzing ATST SBM data. A co-authored paper has been drafted and is scheduled for submission to *Solar Physics* in June.
 - On March 20, Caroline Barban worked with students and teachers at Sewell Elementary School in Tucson as part of Project ASTRO.
 - Jackie Diehl and summer 2002 NSO/RET teachers Joey Rogers and Demetria Fenzi-Richardson staffed a new NSO exhibit at the National Science Teacher's Association national convention in Philadelphia, March 26-31. More than 1,000 teachers received literature on the Advanced Technology Solar Telescope, NSO, and NSO educational activities.
 - NSO Director Steve Keil gave a public lecture on the Advanced Technology Solar Telescope at Utah State University as well as a seminar about the National Solar Observatory while at Utah State University on January 6-9. He also gave a talk on solar physics and NSO capabilities to a science class at New Mexico State University in February.

User Statistics – Archives/Data Bases

NSO/Sacramento Peak

Combined User Demographics (NSO/SP)		
Demographic Group	Requests	Traffic
U.S. Science (.gov, .edu, .mil)	8.6%	8.6%
Other U.S. (.com, .net, misc.)	67.1%	68.2%
Foreign	21.4%	16.6%
Unresolved	3.0%	6.6%

NOTE: Historical use trends can be found at <http://www.nso.edu/WEB-REPORTS/trends.html>.

FTP Archive Statistics:

There were 138,124 successful user requests serving 1,757 distinct files to 8,076 distinct hosts. A total of 22.184 Gbytes were served, averaging 252.476 Mbytes per day.

FTP User Demographics (NSO/SP)		
Demographic Group	Requests	Traffic
U.S. Science (.gov, .edu, .mil)	4.9%	8.4%
Other U.S. (.com, .net, misc.)	74.6%	71.5%
Foreign	19.6%	11.6%
Unresolved	0.9%	8.5%

FTP Products (NSO/SP)		
Demographic Group	Requests	Traffic
Realtime Flare Patrol Images	54.3%	57.2%
Flare Patrol Movie Archive	0.0%	0.0%
SMEI ⁺	0.2%	5.3%
Corona Maps	40.6%	10.2%
Sunspot Numbers	1.2%	0.2%
NASA Orbital Debris Observatory	0.0%	0.0%
Staff Outgoing	2.9%	22.7%
Other	0.8%	4.4%

⁺SOLAR Mass Ejection Imager, a USAF satellite instrument. Data management for this instrument is conducted by the USAF group at NSO/SP.

World Wide Web Statistics:

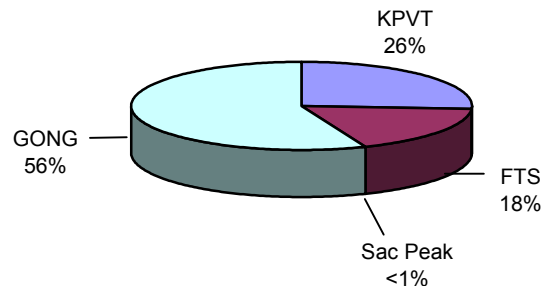
There were 757,900 successful user requests serving 16,571 distinct files to 46,522 distinct hosts. A total of 12.413 Gbytes were served, averaging 141.237 Mbytes per day.

WWW User Demographics (NSO/SP)		
Demographic Group	Requests	Traffic
U.S. Science (.gov, .edu, .mil)	9.3%	9.0%
Other U.S. (.com, .net, misc.)	65.7%	62.3%
Foreign	21.7%	25.5%
Unresolved	3.3%	3.3%

WWW Products (NSO/SP)		
Demographic Group	Requests	Traffic
Realtime Images	5.2%	8.0%
Other Images	8.6%	26.7%
General Icon and Background Images	26.0%	12.5%
Public Relations Pages	23.4%	15.3%
Press Releases	0.6%	1.9%
Telescope Home Pages	7.8%	6.4%
ISOON	1.9%	0.7%
Adaptive Optics Pages	0.9%	3.8%
General Information	11.2%	7.7%
Staff Pages	1.1%	7.6%
Other	13.3%	9.4%

NSO/Tucson

- Most recent complete quarter (01 January – 31 March 2003)
 1. 1,294 FTP users
 2. 24,957 FTP logins
 3. 131,909 files downloaded via anonymous FTP
 4. 49,589 web page hits (not counting in-line images)
 5. 705,206 web page hits including in-line images
- Distribution of downloaded data products by number of files for most recent complete quarter:
 1. 26% KPVT (magnetograms, synoptic maps, helium images).
 2. 18% FTS (spectral atlases, general archive).
 3. <1% Sac Peak spectroheliograms (H α , Calcium K images).
 4. 56% GONG (magnetograms, spectra, time series, frequencies).
- Digital Library access was used for 15% of file downloads.



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

Safety Report

OSHA Recordable Occupational Injuries and Illnesses

- During this quarter, no recordable injuries occurred at Sacramento Peak. However, two reportable incidents occurred at NOAO/NSO Kitt Peak and NOAO/NSO Tucson:
 - NOAO/NSO Tucson experienced an OSHA recordable injury in the instrument shop on March 25, 2003. An employee was walking between a sheet metal storage rack and an instrument box near the garage door. The employee fell and suffered lacerations to the chin and right arm. An accident investigation concluded a number of corrective actions that are in progress. Additionally, several other items were addressed including the creation of a new workers compensation form and ordering biohazard cleanup kits.
 - NOAO/NSO Kitt Peak experienced a minor vehicle accident involving two Kitt Peak employees. No one was injured and an internal accident report was filed.

Safety and Health

- As an annual requirement, the OSHA 300A log was completed, signed by the director and posted throughout the Tucson, Kitt Peak, and Sacramento Peak facilities.
- The NOAO/NSO Contingency Plan was approved on 02 January 2003 by the NOAO/NSO management committee. New documents were added to the plan including a listing of password protected employee contact information, Kitt Peak GPS coordinates and property information. CD-RW's have been copied and distributed to key management. Additionally, there is now an off site backup strategy for monthly engineering data and drawings for NOAO and NSO.
- NSO prepared a preliminary disaster response plan with an assessment of NSO's vulnerabilities and possible mitigating actions for the Observatory.

Other risk management activities completed in the second quarter:

- Preliminary discussions at NSO/Tucson for the SOLIS instrument lift plan.
- Nine Tucson (including NSO) employees completed the American Red Cross First Aid and CPR course on March 31.
- Risk Management services at NSO/Kitt Peak and Tucson are shared with NOAO. See also "Tucson and Kitt Peak Safety Report" section of NOAO January-March 2003 Quarterly Report for additional details on risk management activities.

Personnel Changes and Visiting Scientists

Hired			
<i>Date</i>	<i>Name</i>	<i>Position</i>	<i>Site/Project</i>
01/01/03	John A. Eddy	(Visiting) Scientist	NSO/T
01/22/03	Jill R. Gerke	Data Aide	NSO/T
03/05/03	Lora L. Haynie	Administrative Assistant	NSO/T
Completed Employment			
01/14/03	Thierry Corbard	Jr. Scientist	NSO/T
01/17/03	James Pintar	GONG Data Systems Manager	NSO/T
01/31/03	Michael Eydenberg	Research Assistant	NSO/SP
02/07/03	Norma Aguilar	Administrative Assistant	NSO/T
Changed Status			
None			
Visiting Scientists (one month or longer)			
01/16/03	Alessandro Cacciani, University La Sapienza, Italy		NSO/SP

APPENDIX
National Solar Observatory
01 January - 31 March 2003

January - March 2003: During this period, 33 observing programs (2 of which were thesis programs involving 4 graduate students) were carried out at the National Solar Observatory. Graduate and undergraduate students are indicated by a (T) for thesis students, (G) for non-thesis graduate students, (UT) for undergraduate thesis students; and (U) for undergraduate students.

		Nights	Days	Hours
8		0.0	6.0	7.0
Michael Dulick	National Solar Observatory			
 <i>FTS Beamsplitter Changes</i>				
McMP FTS Lab				
1222		0.0	9.0	0.0
Curtis Rinsland	NASA Langley Research Center			
 <i>Monitoring of Long-Term Trends in the Concentrations of Atmospheric Gases from McMath FTS Solar Spectra</i>				
McPE FTS/Mc-P				
1661		0.0	5.0	0.0
Linda Brown	Jet Propulsion Laboratory			
Devi	College of William and Mary			
 <i>Laboratory Infrared Spectroscopy</i>				
McMP FTS Lab				
1854		0.0	3.0	30.0
William Livingston	National Solar Observatory			
 <i>Line Asymmetry Changes in the Solar Irradiance Spectrum</i>				
McMP FTS/Mc-P				
1858		0.0	8.0	28.0
William Livingston	National Solar Observatory			
 <i>Cycle Variability of the Solar Spectrum</i>				
McMP Main spectrograph				

		Nights	Days	Hours
2030		17.0	0.0	376.5
Ronald Oliverson	NASA/Goddard Space Flight Center			
Morgenthaler	NASA Goddard Space Flight Center			
Hilton	NASA/Goddard Space Flight Center			
Mierkiewicz	University of Wisconsin-Madison, Dept. of Atmospheric & Oceanic			
Baldeosingh (U)	South Carolina State University			
<i>Observations of [OI] 6300 Emission from Io</i>				
McMP Stellar spectrograph				
2058		0.0	7.0	36.0
Andrew Potter	National Solar Observatory			
Killen	Southwest Research Institute			
Morgan	Southwest Research Institute			
<i>Studies of Exospheric Emission Lines in the Inner Solar System</i>				
McMP Stellar spectrograph				
2058n		7.0	0.0	70.0
Andrew Potter	National Solar Observatory			
Killen	Southwest Research Institute			
Morgan	Southwest Research Institute			
<i>Studies of Exospheric Emission Lines in the Inner Solar System</i>				
McMP Stellar spectrograph				
2066b		0.0	12.0	86.0
Jan Stenflo	ETH- Zürich			
Gandorfer	Max Planck Institute for Aeronomy			
Gisler	ETH-Zurich Institut fur Astronomie			
Schmid	ETH- Zürich			
Keller	National Solar Observatory			
<i>Coherence Effects in Spectral Lines Near the Solar Limb</i>				
McMP Main spectrograph				
2066b		12.0	0.0	89.0
Jan Stenflo	ETH- Zürich			
Feller (T)	ETH-Zurich Institut fur Astronomie			
Joos (T)	ETH-Zurich Institut fur Astronomie			
<i>Coherence Effects in Spectral Lines Near the Solar Limb</i>				
McMP Main spectrograph				

		Nights	Days	Hours
2127		0.0	16.1	28.0
Richard Altrock	USAF Research Laboratory			
<i>Three-Line Coronal Photometer</i>				
Evans Facility Sac Peak				
2128		0.0	11.2	37.0
Simon Worden	USAF			
Keil	National Solar Observatory			
<i>Ca K Solar Rotation</i>				
Evans Facility Sac Peak				
2141		0.0	20.0	0.0
Steve Hegwer	National Solar Observatory			
Gilliam	National Solar Observatory			
<i>Telescope Maintenance</i>				
Dunn Solar Sac Peak				
2149		0.0	90.0	424.0
Archives	National Solar Observatory			
<i>Flare Patrol: Daily/Community</i>				
Hilltop Dome Sac Peak				
2150		0.0	90.0	424.0
Archives	National Solar Observatory			
<i>White Light Patrol: Daily/Community</i>				
Hilltop Dome Sac Peak				
2151		0.0	8.0	32.0
Archives	National Solar Observatory			
<i>Sunspot Drawing: Daily/Community</i>				
Hilltop Dome Sac Peak				

		Nights	Days	Hours
2193		0.0	11.2	37.5
Richard Altrock	USAF Research Laboratory			
Elrod	National Solar Observatory			
<i>Calibration of Coronal Photometer</i>				
Evans Facility Sac Peak				
2219		0.0	3.0	0.0
Donald Lubowich	American Institute of Physics			
<i>The Solar Boron Abundance</i>				
McMP FTS/Mc-P				
2245		0.0	18.0	92.0
Christoph Keller	National Solar Observatory			
<i>ATST Key Technology Developments</i>				
McMP Main spectrograph				
2290		0.0	7.0	23.0
Harrison Jones	NASA/Goddard Space Flight Center			
Penn	National Solar Observatory			
Malanushenko	National Solar Observatory			
<i>Flare Polarimetry Using He I 1083 nm</i>				
KPVT				
2292		0.0	2.0	16.0
Claude Plymate	National Solar Observatory			
<i>Infrared Spectral Imaging at the McMath-Pierce Telescope</i>				
McMP Main spectrograph				
2293n		9.0	0.0	47.0
Andrew Potter	National Solar Observatory			
<i>NEO Astrometry with the McMath-Pierce East Auxiliary Telescope</i>				
McPE Stellar spectrograph				

		Nights	Days	Hours
2303		0.0	6.0	16.0
Archives				
Malanushenko	National Solar Observatory			
<i>TRACE Observations</i>				
KPVT	Spectromagnetograph			
2320		0.0	5.0	50.0
Thomas Ayres	University of Colorado, CASA			
<i>Pushing the Resolution Envelope in the Thermal IR</i>				
McMP	Main spectrograph			
2336		0.0	6.0	40.0
Jacques Beckers	National Solar Observatory			
Rimmele	National Solar Observatory			
<i>Development of Solar SCIDAR</i>				
Dunn Solar	Sac Peak			
2336a		0.0	5.0	31.0
Jacques Beckers	National Solar Observatory			
Rimmele	National Solar Observatory			
<i>Development of Solar SCIDAR</i>				
McMP	Main spectrograph			
2337		0.0	5.0	6.0
Linda Brown	Jet Propulsion Laboratory			
Steyert	NASA Goddard Space Flight Center			
Butler	Jet Propulsion Laboratory			
<i>Laboratory Spectroscopy of Hot Methane</i>				
McMP	FTS Lab			
2342		0.0	21.0	77.0
Arturo Lopez Ariste	High Altitude Observatory, NCAR			
Tomczyk	High Altitude Observatory, NCAR			
Casini	High Altitude Observatory, NCAR			
Balasubramaniam	National Solar Observatory			
Pevtsov	National Solar Observatory			
<i>Vector Magnetic Fields in Prominences</i>				
Dunn Solar	Sac Peak			

		Nights	Days	Hours
2355		0.0	10.5	36.0
Maud Langlois	New Jersey Institute of Technology			
Rimmele	National Solar Observatory			
Moretto	National Solar Observatory			
<i>Evaluation of the Anisoplanatism and Feasibility of Solar MCAO</i>				
Dunn Solar	Sac Peak			
2356		0.0	10.0	53.0
Krishna Balasubramaniam	National Solar Observatory			
Pevtsov	National Solar Observatory			
<i>Rotational Motions in Spicules</i>				
Dunn Solar	Sac Peak			
2357		0.0	11.0	57.0
Yukio Katsukawa (T)	University of Tokyo, National Astronomical Observatory			
Shimizu	University of Tokyo, NAO			
Kubo (T)	University of Tokyo, NAO			
Tsuneta	National Astronomical Observatory of Japan			
<i>Magnetic Field Evolution around Leading Sunspots</i>				
Dunn Solar	Sac Peak			
2358		0.0	11.5	56.0
Bruce Lites	High Altitude Observatory			
Norton	High Altitude Observatory, UCAR			
Socas-Navarro	High Altitude Observatory, NCAR			
<i>Deep Internetwork Magnetograms at High Resolution</i>				
Dunn Solar	Sac Peak			
3790		0.0	90.0	296.0
Archives	National Solar Observatory			
<i>Vacuum Telescope Synoptic Program: Daily/Community</i>				
KPVT	Spectromagnetograph			