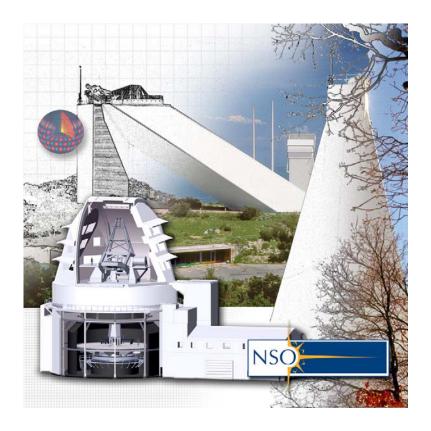
NATIONAL SOLAR OBSERVATORY



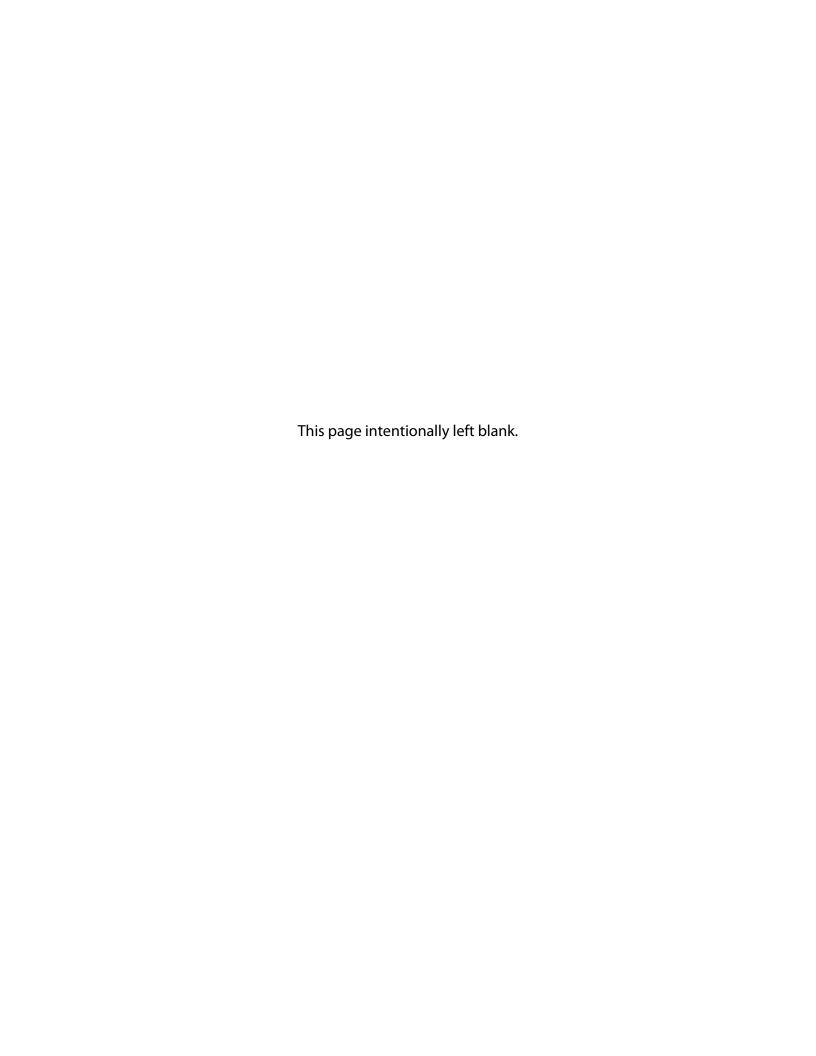
NSO Quarterly Report (1) FY 2007 October 1, 2006 – December 31, 2006

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

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







National Solar Observatory

Quarterly Report (1) FY 2007 October 1 – December 31, 2007

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

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 December 31, 2006. 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.

Table of Contents

I.	Observing Programs	1
II.	Telescope Usage and Performance Data	2
III.	User Statistics - Archives and Data Bases	3
IV.	Public and Educational Outreach Activities	5
V	. Safety Report	7
ΑP	PENDIX – Observing Programs	8

I. Observing Programs*

21 observing programs, three of which were thesis programs involving six graduate students, 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 (US vs Foreign)						
3 Months Ending Dec 2006	Nbr	% Total				
Programs (US)	17	81%				
Programs (non-US)	1	5%				
Thesis (US, involving 3 grad students)	2	10%				
Thesis (non-US, involving 3 grad students)	1	5%				
Total Number of Unique Science Projects*	21	100%				

^{*}Includes observing programs conducted by NSO/NOAO staff scientists.

Users of NSO Facilities by Category						
		Vis		NSO/NOAO Staff		
	US	Non-US	Total	% Total		
PhDs	7	6	13	59%	9	
Graduate Students	3	3	6	27%	0	
Undergraduate Students	0	0	0	0%	0	
Other	2	1	3	14%	5	
Total Users	12	10	22	100%	14	

Institutions Represented by Visiting Users**						
	US	Non-US	Total	% Total		
Academic	4	2	6	60%		
Non-Academic	3	1	4	40%		
Total Academic & Non-Academic	7	3	10	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).

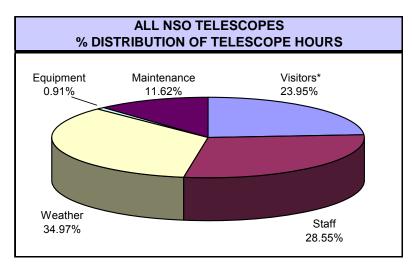
	INSTITUTIONS REPRESENTED BY USERS				
	Foreign Institutions (3)				
	Catania University, Catania Astrophysical				
	Observatory				
	INAF - Arcetri Astrophysical Observatory, Italy University of Rome "Tor Vergata", Italy				
	US Institutions (7)				
	New Jersey Institute of Technology/Big Bear				
	Solar Observatory				
	University of Maryland				
	Chippewa Hills High School, MI				
	Manhasset High School, NY				
	High Altitude Observatory, NCAR, Boulder				
	NASA Ames Research Center				
	US Air Force/Philips Lab (USAF/PL/GSS)				

Number of Users by Nationality				
Italy	10	United States	26	

II. Telescope Usage and Performance Data

In the quarter ending December 31, 2006, 24.0% 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; 28.6% were devoted to the programs of NSO and NOAO scientists. Scheduled maintenance, including instrument tests, engineering, and equipment changes, accounted for 11.6% of total allotted telescope hours.

Total "downtime" (hours lost to weather and equipment problems) for NSO telescopes was 35.9%. 35.0% of these lost observing hours were due to bad weather, with 0.9% lost to equipment problems.



^{*}Includes synoptic/archival data made immediately available to scientific community at large.

NSO TELESCOPES Percent Distribution of Telescope Hours (Scheduled vs. Downtime) October 1, 2006 - December 31, 2006						
		% Hours	Used By:	% Hours	s Lost To:	% Hrs. Lost To:
Telescope	Hours Available	Visitors ^a	Staff	Weather	Equipment	Scheduled Maintenance
Dunn Solar Telescope/SP	790.0	30.5%	3.8%	39.0%	0.9%	25.8%
McMath-Pierce*	662.0	0.0%	71.1%	27.8%	1.1%	0.0%
KP SOLIS Tower ^D	0.0	0.0%	0.0%	0.0%	0.0%	0.0%
FTS Lab ^c ∗	0.0	0.0%	0.0%	0.0%	0.0%	0.0%
Evans Facility	248.0	50.0%	0.0%	49.2%	0.8%	0.0%
Hilltop Dome	56.0	100.0%	0.0%	0.0%	0.0%	0.0%
All Telescopes	1,756.0	24.0%	28.6%	35.0%	0.9%	11.6%

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

^b Formerly the Kitt Peak Vacuum Telescope (KPVT), which was closed on 22 Sept 2003 to prepare for SOLIS.

^c Shut down this quarter for repairs/upgrade.

^{*}Totals include both day and night hours. (All others are day only.)

III. User Statistics - Archives/Data Bases

A. NSO/Sacramento Peak (NSO/SP)

Combined FTP & WWW Service Demographics (NSO/SP)					
Demographic Group	Requests	Traffic			
U.S. Science (.gov, .edu, .mil)	31.7%	33.8%			
Other U.S. (.com, .net, misc.)	57.5%	53.6%			
Foreign	10.8%	12.6%			
Unresolved	0.0%	0.0%			
Total	100.0%	100.0%			

FTP Archive Statistics

There were 270,988 successful user requests, serving 34,271 distinct files to 7,219 distinct hosts. A total of 74.688 Gbytes were served, averaging 831.352 Mbytes per day.

FTP User Demographics (NSO/SP)					
Demographic Group	Requests	Traffic			
U.S. Science (.gov, .edu, .mil)	38.9%	47.9%			
Other U.S. (.com, .net, misc.)	51.0%	41.5%			
Foreign	10.0%	10.6%			
Unresolved	0.1%	0.0%			
Total	100.0%	100.0%			

FTP Products (NSO/SP)					
Product	Requests	Traffic			
Realtime Images	3.1%	4.2%			
Corona Maps	82.7%	61.7%			
Staff Outgoing	0.3%	7.6%			
OSPAN Data Archive	13.4%	26.0%			
Other	0.5%	0.5%			
Total	100.0%	100.0%			

World Wide Web Statistics

There were 1,976,988 successful user requests, serving 40,385 distinct files to 82,084 distinct hosts. A total of 149.701 Gbytes were served, averaging 1.627 Gbytes per day.

WWW User Demographics (NSO/SP)				
Demographic Group	Requests	Traffic		
U.S. Science (.gov, .edu, .mil)	30.8%	26.7%		
Other U.S. (.com, .net, misc.)	58.3%	59.7%		
Foreign	10.9%	13.6%		
Unresolved	0.0%	0.0%		
Total	100.0%	100.0%		

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

WWW Products (NSO/SP)				
Product	Requests	Traffic		
Realtime Images and Movies				
(OSPAN, Other)	31.9%	35.0%		
Other Images	1.0%	1.3%		
Icon and Background Images	20.2%	1.8%		
Public Relations Pages	1.4%	0.3%		
Press Releases	4.5%	13.2%		
Telescope Home Pages	2.0%	0.6%		
OSPAN Project Pages	12.2%	1.5%		
SMEI Experiment & Data Pages	8.0%	17.8%		
Adaptive Optics Pages	0.4%	1.4%		
General Information	4.3%	4.6%		
Staff Pages	8.0%	21.7%		
Other	6.1%	0.8%		
Total	100.0%	100.0%		

FTP Upload Statistics - Sac Peak (cont.)

Most of the FTP upload activity is related to the USAF Solar Mass Ejection Imager (SMEI) experiment.

There were 5,869 successful user requests, uploading 118 distinct files from 4 distinct hosts. A total of 194.408 Gbytes were uploaded, averaging 2.115 Gbytes per day.

Incoming FTP User Demographics (NSO/SP)					
Demographic Group Requests Traff					
U.S. Science (.edu, .mil)	99.7%	99.5%			
Other U.S. (.com, .net, misc.)	0.3%	0.5%			
Total	100.0%	100.0%			

Incoming FTP Uploads (NSO/SP)					
Product Requests Traf					
SMEI Data	99.7%	99.5%			
Other	0.3%	0.5%			
Total	100.0%	100.0%			

B. NSO/Tucson (NSO/Tuc)

FTP User Demographics (NSO/Tuc)			
Demographic Group	%Total		
U.S. Science (.gov, .edu, .mil)	256	34.69%	
Other U.S. (.com, .net, misc.)	178	24.12%	
Foreign	208	28.18%	
Unresolved	96	13.01%	
Total Users	738	100%	

FTP Logins (NSO/Tuc)					
Demographic Group No. of Logins %Tota					
U.S. Science (.gov, .edu, .mil)	181	15.55%			
Other U.S. (.com, .net, misc.)	21	1.80%			
Foreign	662	56.87%			
Unresolved	300	25.77%			
Total Logins	1,164	100%			

FTP Products (NSO/Tuc)			
Demographic Group	%Total		
U.S. Science (.gov, .edu, .mil)	2,518,282	90.29%	
Other U.S. (.com, .net, misc.)	22,439	0.81%	
Foreign	123,847	4.44%	
Unresolved	124,562	4.47%	
Total Products	2,789,130	100%	

Gbytes of FTP & WWW Data Downloaded (NSO/Tuc)				
Demographic Group Gbytes %Tot				
U.S. Science (.gov, .edu, .mil)	57.32	9.6%		
Other U.S. (.com, .net, misc.)	1.96	0.3%		
Foreign	12.14	2.0%		
Unresolved	527.09	88.1%		
Total Gbytes	598.51	100%		

Product Distribution by Downloaded Files (NSO/Tuc)			
Product Type	No. of Files	%Total	
GONG (Magnetograms, spectra, time			
series, frequencies)	441,721	83.9%	
SOLIS/VSM	23,435	4.5%	
KPVT (magnetograms, synoptic maps,			
helium images)	13,213	2.5%	
FTS (Spectral atlases, general archive)	47,302	9.0%	
Evans/SP Spectroheliograms (Hα,			
Calcium K images)	23	0.00%	
Other	799	0.15%	
Total Downloaded Files	526,493	100.0%	

Product Distribution by Downloaded Gbytes (NSO/Tuc)			
Product Type	Gbytes	%Total	
GONG (Magnetograms, spectra, time			
series, frequencies)	488.60	81.7%	
SOLIS/VSM	16.55	2.8%	
KPVT (magnetograms, synoptic maps,			
helium images)	7.58	1.3%	
FTS (Spectral atlases, general archive)	77.53	13.0%	
Evans/SP Spectroheliograms (Hα,			
Calcium K images)	0.02	0.00%	
Other	7.99	1.34%	
Total Downloaded Files	598.26	100.0%	

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

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. Research Experiences for Undergraduates (REU), Research Experiences for Teachers (RET), and Other NSO Summer Research Assistantship (SRA) Programs

Recruitment and marketing plans were established for the 2007 REU/RET/SRA programs. These included NSO-RET advertising in "The Physics Teacher," published by the American Association for Physics Teachers, and electronic distribution via the National Astronomy and Arizona Physics Teachers List Serves. A plan was also implemented to recruit REU and SRA students more extensively through electronic means.

The inaugural NSO/GONG 2007 International Research Experience for (Graduate) Students (IRES) Program was also widely advertised. Sponsored by a grant from the NSF Office of International Science and Engineering (OISE), the eight-week, summer-2007 program will take place in Bangalore, India under the auspices of the Indian Institute of Astrophysics (IIA). The goal of the program is to expose potential researchers to an international setting at an early stage in their careers.

2. Other Educational Outreach

Matt Penn continues to mentor summer 2006 NSO/REU student Rachel MacDonald as her advisor for a University of Washington independent study course during the fall-2006/winter-2007 semester. Rachel's independent study is a continuation and expansion of her REU project on "Changes in Sunspot Umbral Intensity over Time."

In November, Aimee Norton visited the lower elementary classrooms at Khalsa Montessori Elementary School in Tucson, where she provided an opportunity for the children to view the solar transit of Mercury with a sunspotter telescope. A sunspot was present on the disk and the children were able to see and discuss a variety of topics related to the Sun, including sunspots, the solar cycle, the inner versus outer planets, eclipses, and telescopes.

John Leibacher participated in a video conference with a French high-school class about the CoRoT (Convection, Rotation & planetary Transits) mission.

B. Public Outreach

1. Sunspot Visitor Center

Sunspot Astronomy & Visitor Center Summary of Visitors and Tours (3 Months Ending 12/31/06)			
Group/Program	No. of Visitors		
General Public Tours (Visits to Center and Self-Guided Tours)	2,511		
Guided Public Tours:	· · · · · · · · · · · · · · · · · · ·		
- School Groups K-12	120		
- Special Tours	125		
Total Visitors 2,756			

2. Other Public Outreach, Including Media and Public Information

In collaboration with NOAO Public and Educational Outreach (PAEO), NSO hosted a special group at Kitt Peak on 28 October for the purposes of raising funds for the "Sunnel," an outreach project that involves and series of paintings and exhibits to be placed in the McMath-Pierce tunnel leading to the main observing room. The theme is envisaged to be the structure of the Sun from the core to the corona as one walks down the tunnel, or "Sunnel," to the viewing area. In addition, the lobby area at the entrance would include a "heritage exhibit" dedicated to the memory of Keith Pierce. Mark Giampapa gave a presentation to a group led by Mr. David Heferle and Mr. Eric Ludvicksen of the United Financial Group in Tucson. Following the presentation, Mr. Heferle presented a check as a donation in support of the effort in memory of their former client, Keith Pierce. Several more donations were received after this event.

During this quarter, NSO solidified plans with the University of Arizona Lunar and Planetary Laboratory (LPL) to combine the NSO Brown Bag Lunch series with LPL's Space Science lunch meetings. The two series are now coordinated, with venues alternating each week between the NSO/NOAO main conference room and an LPL conference room. This is another step toward achieving a closer relationship with the UofA Space Sciences/LPL department.

In October, Dave Dooling gave an extended tour of Sunspot to members of the Antique Telescope Society, following their annual meeting in Texas. He also spoke to the South Central Mountain Resources Conservation and Development Council in Alto, New Mexico about NSO, the Sun, and the solar system model that's being developed at the Sunspot Astronomy and Visitor Center with scaled planet models placed at appropriate locations along the Sunspot Scenic Byway (NM 6563). Dooling also attended the New Mexico Science Teachers Association meeting in November, in Albuquerque, and gave a talk on educational aspects of the solar system model.

Frank Hill, as co-organizer of the 2006 Astronomical Data Analysis Software and Systems (ADASS) annual conference in Tucson, hosted a tour of the McMath-Pierce Solar Facility for ~50 meeting participants in October.

On November 21, NSO hosted a visit to Kitt Peak by Congresswoman-elect Gabrielle Giffords and family. NSO and NOAO/KP participants were Mark Giampapa, John Leibacher, Aimee Norton and Buell Jannuzi. The visit included dinner at the Kitt Peak, touring the McMath-Pierce, Mayall 4-m, and WIYN telescopes, and viewing selected objects at the Visitor Center telescope. During the visit, there were general discussions about Giffords' principal interests and planned focus for her work in Congress. She was particularly interested in learning about the economic impact of astronomy and the space sciences in Arizona.

Three press releases were issued this quarter: 1) The "NSO Response to the NSF Senior Review" (November 8, 2006, http://www.nso.edu/press/NSO Response Sr Review.html); 2) a description of the several NSO facilities and instruments that observed the Transit of Mercury in November (November 9, 2006: "NSO Observes the Mercury Transit of the Sun" http://www.nso.edu/press/merc_trans06/); and 3) "Telescope Spots Solar Tsunami" (December 7, 2006, http://www.nso.edu/press/tsunami/).

A profile of Aimee Norton and her association with NSO is featured in a Sally Ride Science publication titled "The Inside Story of the Sun," a 32-page booklet intended for middle schools as supplementary science materials for the 2008 school year.

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 of the NOAO October - December 2006 Quarterly Report for additional details on risk management activities.

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

• NSO/Sac Peak had one OSHA recordable accident (knee injury) in 2006 and 3 non-recordable incidents (two slips on ice and one burn). These were recorded and posted on OSHA form 300A.

B. Safety and Health

- A Safety, Health and Environmental Action Plan was prepared for the NSO mirror-aluminizing project at the McMath-Pierce Solar Facility on Kitt Peak.
- At Sac Peak, S. Hegwer, T. Spence, R. Long, R. Hunter conducted an extensive safety review of an equipment lift repair project and developed a plan for safety. Additionally, it was determined that a better high-angle rescue plan should be designed and that has begun. W. Jones and the Fire Department will lead that effort.
- Risk management information related to hazardous materials transportation was provided by C. Gessner to J. Barr for a response to questions from the public review of the ATST Draft Environmental Impact Statement.

C. Fire Protection and Prevention

• Fire alarm systems were inspected at Kitt Peak in November.

D. Environmental

• The U. S. Forest Service approved the Sunspot sewage effluent distribution plan. Implementation is scheduled for completion in spring 2007, resulting in re-permitting of the sewage plant.

APPENDIX

National Solar Observatory 01 October - 31 December 2006

October - December 2006: During this period, 21 observing programs, 3 of which were thesis programs involving 6 graduate students, were carried out at NSO. 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, (REU) identifies Research Experiences for Undergraduates program participants, and (RET) identifies Research Experience for Teachers participants.

	or Undergraduates program participants, and (RET)	Nights	Days	Hours
10		0.0	4.0	23.0
Claude Plymate	National Solar Observatory			
McMath Engineering/M	aintenance			
McMP Main spectrogra	ph			
1858		0.0	15.0	156.0
William Livingston	National Solar Observatory			
Cycle Variability of the S	Solar Spectrum			
McMP Main spectrogram	ph			
2058n		8.0	0.0	68.0
Andrew Potter	National Solar Observatory			
Killen	University of Maryland			
Studies of Exospheric En	nission Lines in the Inner Solar System			
McMP Stellar spectrogr	aph			
2058		0.0	8.0	49.0
Andrew Potter	National Solar Observatory			
Killen	University of Maryland			
Studies of Exospheric En	mission Lines in the Inner Solar System			
McMP Stellar spectrogr	raph			
2127		0.0	14.6	68.0
Richard Altrock	USAF Research Laboratory			
Three-Line Coronal Pho	tometer			
Evans Facility Sac Peak				
2128		0.0	14.6	56.0
Simon Worden	NASA Ames Research Center			
Keil	National Solar Observatory			
Ca K Solar Rotation				

Evans Facility Sac Peak

		Nights	Days	Hours
2375		0.0	3.0	32.0
Constance Walker	National Optical Astronomy Observatory	0.0	3.0	32.0
DeWolf (TLRBSE)	Chippewa Hills High School, Remus, MI			
Guastella (TLRBSE)	Manhasset High School, Manhasset, NY			
Understanding the Morpho Sunspots	ology of Active Regions: Using Zeeman-Split IR Lines	to Determine Mag	netic Field Str	engths of
McMP Main spectrograph	1			
2454c		0.0	7.0	56.0
Steven Tomczyk	High Altitude Observatory, NCAR			
Coronal Multi-Channel Po	olarimeter (CoMp)			
Hilltop Dome Sac Peak				
2484		0.0	10.4	76.0
Kevin Reardon	INAF - Arcetri Astrophysical Observatory			
Casini	High Altitude Observatory, NCAR			
Cavallini	INAF - Arcetri Astrophysical Observatory			
Tomczyk	High Altitude Observatory, NCAR			
Spectropolarimetry of the	Choromosphere and Photosphere with the Interferome	etric Bidimensional	Spectrometer	(IBIS)
Dunn Solar Telescope/SP	Sac Peak			
2489		0.0	7.0	56.0
Douglas Gilliam	National Solar Observatory			
Bradford	National Solar Observatory			
Elrod	National Solar Observatory			
Dunn Solar Telescope Mai	intenance			
Dunn Solar Telescope/SP	Sac Peak			
2490		0.0	14.0	140.0
Douglas Gilliam	National Solar Observatory	3.0		110.0
Bradford	National Solar Observatory			
Elrod	National Solar Observatory			
Dunn Solar Telescope Tur	ret Maintenance			

Dunn Solar Telescope/SP Sac Peak

		Nights	Days	Hours
2491a		0.0	9.0	18.0
Carsten Denker	New Jersey Institute of Technology	0.0	7.0	10.0
Deng (T)	New Jersey Institute of Technology			
Verdoni (T)	New Jersey Institute of Technology			
Tritschler	National Solar Observatory			
	Coronal Mass Ejections (Part II)			
Dunn Solar Telescope/SP				
2494a		0.0	8.0	0.0
Alexandra Tritschler	National Solar Observatory			
Uitenbroek	National Solar Observatory			
Gullixson	National Solar Observatory			
The Center-to-Limb Variation	tion of Active Region Faculae and Magnetic Elements			
Dunn Solar Telescope/SP	Sac Peak			
2498		0.0	15.0	102.0
Aimee Norton	National Solar Observatory			
MHD Wave Speeds As a F	unction of Umbral Field Strengths			
McMP Main spectrograph	1			
2400		0.0	4.0	22.0
2499 Andrew Potter	National Solar Observatory	0.0	4.0	22.0
Killen	University of Maryland			
Observation of Mercury Tr	ransit			
McMP Main spectrograph	1			
2500		0.0	5.0	19.0
Matthew Penn	National Solar Observatory			
NSO Array Camera (NAC)) Engineering			
McMP Main spectrograph	1			
2509		0.0	8.0	23.0
Francesca Zuccarello (F)	Catania Astrophysical Observatory, Catania University	0.0	0.0	23.0
Guglielmino (T)	Catania Astrophysical Observatory, Catania University			
Spadaro (1)	Catania Astrophysical Observatory, Catania University			
Romano	Catania Astrophysical Observatory, Catania University			
Statistical Study of Quiet S				
Dunn Solar Telescope/SP	Sac Peak			

		Nights	Days	Hours
				^
2510		0.0	14.4	77.0
Kevin Reardon	INAF - Arcetri Astrophysical Observatory			
Potter	National Solar Observatory			
Killen	University of Maryland			
Knight (T)	University of Maryland			
Cavallini	INAF - Arcetri Astrophysical Observatory			
Observation & Spatial Scale	Characterization from the Transit of Mercury			
Dunn Solar Telescope/SP S	ac Peak			
2511		0.0	9.0	26.0
Hector Socas-Navarro	High Altitude Observatory, UCAR			
Norton	National Solar Observatory			
Statistical Study of Quiet Su	n Magnetic Fields			
Dunn Solar Telescope/SP S	ac Peak			
2512		0.0	8.0	27.0
Dario Del Moro (T)	University of Rome "Tor Vergata"			
Berrilli	University of Rome "Tor Vergata"			
Janssen	INAF - Osservatorio Astrofisico di Arcetri			
Reardon	INAF - Arcetri Astrophysical Observatory			
Giordano (T)	University of Rome "Tor Vergata"			
Interplay between Convectiv	e Motion and the Magnetic Field in the Quiet Sun			
Dunn Solar Telescope/SP S	ac Peak			
2513		0.0	8.0	24.0
Krishna Balasubramaniam	National Solar Observatory	0.0		25
Keil	National Solar Observatory			
Gullixson	National Solar Observatory			

Alfen Waves & Oscillations--Near-Real-Time Testing of the DLSP Data Pipeline

Dunn Solar Telescope/SP Sac Peak