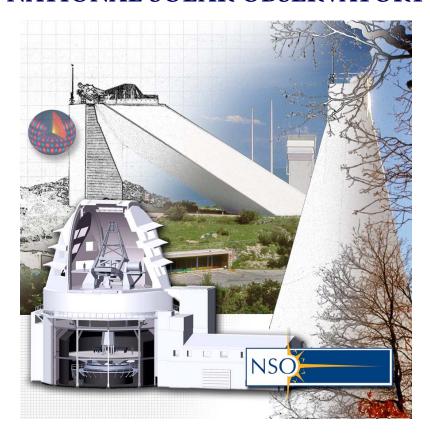
NATIONAL SOLAR OBSERVATORY



NSO Quarterly Report (3) FY 2006

April 1, 2006 – June 30, 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





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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, 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.

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I. Observing Programs*

22 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 Jun2006	Nbr	% Total			
Programs (US)	16	73%			
Programs (non-US)	3	14%			
Thesis (US)	3	14%			
Thesis (non-US)	0	0%			
Total Number of Unique Science Projects*	22	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	14	3	17	59%	9	
Graduate Students	6	0	6	21%	0	
Undergraduate Students	2	0	2	7%	0	
Other	4	0	4	14%	5	
Total Users	26	3	29	100%	14	

Institutions Represented by Visiting Users**						
US Non-US Total % Total						
Academic	13	2	15	83%		
Non-Academic	3	0	3	17%		
Total Academic & Non-Academic 16 2 18 100%						

^{**}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 (2)
University of Calgary
Utrecht University

US Institutions (16)
California State University, Northridge

EdinboroUniversity, PA

Framingham High School, MA

Manhasset High School, NY

New Jersey Institute of Technology

Chippewa Hills High School, Remus, MI

Stetson University, FL

South Mountain High School, Phoenix, AZ

University of Colorado, LASP

University of Hawaii

University of Maryland

University of Washington

University of Wisconsin, Madison

High Altitude Observatory, NCAR, Boulder

NASA Ames Research Center

NASA/Goddard Space Flight Center

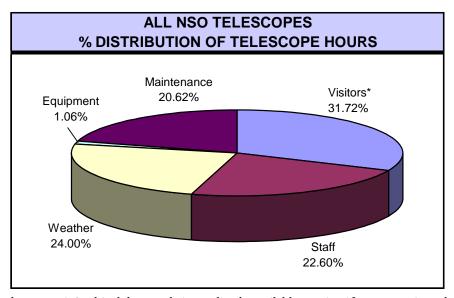
US Air Force/Philips Lab (USAF/PL/GSS)

Number of Users by Nationality					
Canada	2	United States	40		
Netherlands	1				

II. Telescope Usage and Performance Data

In the quarter ending June 30, 2006, 31.7% 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; 22.6% were devoted to the programs of NSO and NOAO scientists. Scheduled maintenance, including instrument tests, engineering, and equipment changes, accounted for 20.6% of total allotted telescope hours.

Total "downtime" (hours lost to weather and equipment problems) for NSO telescopes was 25.1%. 24.0% of these lost observing hours were due to bad weather, with 1.06% 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) April 1, 2006 - June 30, 2006							
Telescope	Hours	% Hours	Used By:	% Hours	s Lost To:	% Hrs. Lost To:	
Толоворо	Available	Visitors ^a	Staff	Weather	Equipment	Scheduled Maintenance	
Dunn Solar Telescope/SP	1,032.0	13.0%	17.3%	20.7%	0.0%	48.9%	
McMath-Pierce*	918.0	27.7%	40.8%	28.9%	2.6%	0.0%	
KP SOLIS Tower ^b	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	283.5	60.8%	0.0%	38.4%	0.7%	0.0%	
Hilltop Dome	216.0	0.0%	0.0%	0.0%	0.0%	0.0%	
All Telescopes 2,449.5 31.7% 22.6% 24.0% 1.1% 20.6%							

^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 Service User Demographics (NSO/SP)				
Demographic Group	Requests	Traffic		
U.S. Science (.gov, .edu, .mil)	14.6%	23.6%		
Other U.S. (.com, .net, misc.)	69.4%	56.3%		
Foreign	13.8%	17.9%		
Unresolved	2.2%	2.2%		

FTP Archive Statistics

There were 164,575 successful user requests, serving 7,039 distinct files to 5,341 distinct hosts. A total of 67.002 Gbytes were served, averaging 754.030 Mbytes per day.

FTP User Demographics (NSO/SP)				
Demographic Group	Requests	Traffic		
U.S. Science (.gov, .edu, .mil)	16.2%	42.8%		
Other U.S. (.com, .net, misc.)	66.6%	33.8%		
Foreign	14.0%	23.2%		
Unresolved	3.2%	0.2%		

FTP Products (NSO/SP)					
Product	Requests	Traffic			
Realtime Images	2.6%	1.8%			
Corona Maps	95.1%	45.9%			
Staff Outgoing	1.6%	51.9%			
Other	0.7%	0.4%			

World Wide Web Statistics

There were 1,261,079 successful user requests, serving 38,545 distinct files to 33,981 distinct hosts. A total of 64.647 Gbytes were served, averaging 727.463 Mbytes per day.

WWW User Demographics (NSO/SP)				
Demographic Group	Requests	Traffic		
U.S. Science (.gov, .edu, .mil)	14.4%	3.7%		
Other U.S. (.com, .net, misc.)	69.8%	79.5%		
Foreign	13.8%	12.5%		
Unresolved	2.1%	4.3%		

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 & Movies (OSPAN, Other)	31.4%	54.2%		
Other Images	0.4%	0.1%		
General Icon and Background Images	18.8%	2.2%		
Public Relations Pages	1.6%	0.5%		
Press Releases	2.6%	6.4%		
Telescope Home Pages	5.2%	1.1%		
OSPAN Project Images	7.3%	1.1%		
SMEI Experiment & Data Pages	8.0%	6.7%		
Adaptive Optics Pages	0.7%	0.7%		
General Information	12.4%	19.9%		
Staff Pages	4.6%	5.2%		
Other	7.0%	1.9%		

FTP Upload Statistics - Sac Peak (cont.)

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

There were 5,975 successful user requests uploading 111 distinct files from 6 distinct hosts. A total of 111.523 Gbytes were uploaded, averaging 1.226 Gbytes per day.

Incoming FTP User Demographics (NSO/SP)				
Demographic Group	Traffic			
U.S. Science (.edu, .mil)	99.8%	100.0%		
Other U.S. (.com, .net, misc.)	0.1%	0.0%		
Foreign	0.1%	0.0%		

Incoming FTP Uploads (NSO/SP)					
Product Requests Traffic					
SMEI Data	99.8%	100.0%			
Workshop Talks	0.0%	0.0%			
Other Uploads	0.0%	0.0%			

B. NSO/Tucson

FTP User Demographics (NSO/Tuc)					
Demographic Group No. of Users %Tota					
U.S. Science (.gov, .edu, .mil)	104	30.14%			
U.S. Public (.com, .net, misc.)	82	23.77%			
Foreign	106	30.72%			
Unresolved	53	15.36%			
Total Users	345	100%			

FTP Logins (NSO/Tuc)			
Demographic Group	No. of Logins	%Total	
U.S. Science (.gov, .edu, .mil)	45	17.93%	
U.S. Public (.com, .net, misc.)	9	3.59%	
Foreign	166	66.14%	
Unresolved	31	12.35%	
Total Logins	251	100%	

FTP Products (NSO/Tuc)				
Demographic Group	No. of Products	%Total		
U.S. Science (.gov, .edu, .mil)	427,573	91.75%		
U.S. Public (.com, .net, misc.)	5,681	1.22%		
Foreign	3,149	0.68%		
Unresolved	29,597	6.35%		
Total Products	466,000	100%		

Gbytes of FTP & WWW Data Downloaded (NSO/Tuc)			
Demographic Group	Gbytes	%Total	
U.S. Science (.gov, .edu, .mil)	345.61	91.3%	
U.S. Public (.com, .net, misc.)	0.89	0.2%	
Foreign	1.77	0.5%	
Unresolved	30.31	8.0%	
Total Gbytes	378.58	100%	

Product Distribution by Downloaded Files (NSO/Tuc)			
Product Type	No. of Files	%Total	
GONG (Magnetograms, spectra, time			
series, frequencies)	429,836	92.2%	
SOLIS/VSM	8,558	1.8%	
KPVT (magnetograms, synoptic maps,			
helium images)	2,918	0.6%	
FTS (Spectral atlases, general archive)	24,620	5.3%	
Evans/SP Spectroheliograms (Hα,			
Calcium K images)	26	0.01%	
Other	42	0.01%	
Total Downloaded Files	466,000	100.0%	

Product Distribution by Downloaded Gbytes (NSO/Tuc)			
Product Type	Gbytes	%Total	
GONG (Magnetograms, spectra, time			
series, frequencies)	349.09	92.2%	
SOLIS/VSM	4.27	1.1%	
KPVT (magnetograms, synoptic maps,			
helium images)	1.39	0.4%	
FTS (Spectral atlases, general archive)	23.79	6.3%	
Evans/SP Spectroheliograms (Hα,			
Calcium K images)	0.04	0.01%	
Total Downloaded Files	378.58	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. Summer Research Assistantship (SRA) Programs, including Research Experiences for Undergraduates (REU) and Research Experiences for Teachers (RET)

During this quarter, a combination of 15 students and teachers participated in summer research opportunities at the NSO's Sunspot and Tucson sites for 2006. There were seven REU students, four RET teachers, one undergraduate SRA, and three graduate SRAs, two of which are PhD candidates doing ATSTrelated theses.

2. Project ASTRO

In May, Project ASTRO partner Kerri Donaldson-Hanna gave a presentation on the Hawaiian Island volcanoes to three fifth-grade classes at Ventana Vista Elementary School in Tucson. She also held Solar System and Astronomy discussion sessions with the same groups of fifth-graders.

4. Teacher Leaders in Research Based Science Education (TLRBSE)

NSO co-hosted a week-long observing run in June at the McMath-Pierce Solar Telescope as part of the NOAO TLRBSE 2006 summer workshop. Frank Hill and Claude Plymate worked with NOAO's Connie Walker, and three high school teachers on magnetic active region mapping using the 1.5-micron magnetograph. The Tucson TLRBSE workshop, involving 16 teachers, included talks covering the different research projects and exploring issues related to mentoring and leadership. NSO's Aimee Norton was one of the panel members for the June 15 panel discussion on "The Nature of Research." 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 workshop activities.

5. Other Educational Outreach

More than 30 students and faculty attended the first in a series of five weeklong Summer Solar Physics Schools held by the NSO and the University of Arizona's Lunar and Planetary Laboratory (LPL). The school was held June 11-16 at NSO/Sacramento Peak and was designed for advanced undergraduate and beginning graduate students interested in the physics of the Sun and possible careers in solar physics, space physics, or related fields. Lectures were given on solar energetic particles by Joe Giacalone (University of Arizona-LPL), helioseismology by Rachel Howe and Rudi Komm (NSO), solar magnetohydrodynamics by Randy Jokipii (University of Arizona-LPL), the solar interior by Gordon Petrie (NSO), radiative transfer by Han Uitenbroek (NSO), photospheric and chromospheric fields by K. S. Balasubramaniam (NSO), and solarterrestrial history by Tom Bogdan, director of the Space Environment Center in Boulder, Colorado.

On April 7, K. S. Balasubramaniam hosted a group of 14 physics graduate students from the University of New Mexico, Albuquerque. The students were provided with an opportunity to discuss problems and approaches to solutions in several areas of solar physics, followed by a comprehensive tour of the Sacramento Peak telescope facilities.

During April and May, Mark Giampapa made three separate presentations to kindergarteners, first graders, and third graders at Fruchthendler Elementary School in Tucson on dimensions and measurements entitled "World Record," and on "The Universe."

B. Public Outreach

1. Sunspot Visitor Center

Sunspot Astronomy & Visitor Center Summary of Visitors and Tours (3 Months Ending 06/30/06)			
Group/Program	No. of Visitors		
General Public Tours (Visits to Center and Self-Guided Tours)	4,592		
Guided Public Tours:			
- School Groups K-12	149		
- Special Tours	344		
Total Visitors 5,085			

2. Other Public Outreach, Including Media and Public Information, and External Coordination

Work began this quarter on the solar system scale model (1:250 million) planned for Sunspot. An 18-foot diameter pale yellow circle representing the Sun was painted on the patio outside the Visitor Center. Silhouettes of the planets will be added shortly. A $6'\times6'$ poster with photographs of the planets to scale have also been added inside the Visitor Center, and road signs representing the inner planets have been ordered for posting at correct locations along Solar Physics Drive. Classroom exercises are also being developed.

Dave Dooling represented NSO for Astronomy Day at the Las Cruces Museum of Natural History in April.

In April, K. S. Balasubramaniam participated in the filming for television of a documentary on the Sun by Oleg Maltsev of the University of New Mexico Department of Media Arts. Filming was also done in April at Kitt Peak by a crew from South Korea which included an interview at the McMath-Pierce telescope with Matt Penn.

On June 25-30, NSO scientific staff and 2005 REU student Douglas Mason attended the annual Solar Physics Division meeting of the American Astronomical Society in Durham, New Hampshire. Mason presented a poster on "Flares, Magnetic Fields, and Subsurface Vorticity: A Survey of GONG and MDI Data," for which he is first author on a paper that is being published in the 10 July 2006 issue of the *Astrophysical Journal*.

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 January - March 2006 Quarterly Report for additional details on risk management activities.

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

NSO had no injuries reported this quarter.

B. Safety and Health

- CFO's Olando Gary and Chuck Gessner helped the GONG technicians with electrical wiring and
 grounding code compliance for the two shelter structures that were built at the Tucson GONG farm.
 The spare shelter has been modified, and GONG technicians modified the Learmonth shelter after it
 arrived in Australia.
- All GONG shelters were fitted with new portable first aid kits. Each kit has an inventory checklist that
 will be used by the technicians during visits. Members of the GONG staff have been charged with
 determining the types of local medical services that are available, the local procedures for obtaining those
 services, and documenting the information.
- NSO-FTS staff were consulted on the proper methods for handling and disposing of unwanted chemicals
 and proper procedures for the application of floor painting.
- A Risk Management Report was presented to the Management Committee on June 28. Topics included a
 decrease in OSHA reportable events, NOAO-NSO Contingency Planning, ATST Hazardous Materials
 Management Plan and other risk management activities.

C. Environmental

 A draft Hazardous Material Management Program for ATST was prepared at the request of Jeff Barr (NOAO/NSO) and Charlie Fein (KC Environmental, Inc., Maui), to provide more detail for the Environmental Impact Statement on what procedures ATST expects to implement on this issue.

D. Insurance

• During the quarter, advisement was provided for property insurance for STScI, liability related to a visiting astronomers at Kitt Peak, liability insurance for an NSO and NCAR jointly owned camera, travel insurance coverage for Gemini and STScI NOAO private car liability, workers compensation questions at STScI, employer's liability coverage for STScI, D and O coverage, LSST insurance premiums, LSST certificates of insurance and others. Most of these topics will be included in the Insurance Frequently Asked Questions document that will be made available in the future. To date, there are twenty-six case scenarios.

APPENDIX

National Solar Observatory 01 April - 30 June 2006

April - June 2006: During this period, 22 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) identified Research Experiences for Undergraduates program participants, and (RET) identifies Research Experience for Teachers participants.

		Nights	Days	Hours
1858		0.0	8.0	174.0
William Livingston	National Solar Observatory			
Cycle Variability of the	Solar Spectrum			
McMP Main spectrogra	aph			
2127		0.0	14.4	72.0
Richard Altrock	USAF Research Laboratory			
Three-Line Coronal Pho	otometer			
Evans Facility Sac Peal	X			
2128		0.0	13.4	66.0
Simon Worden	NASA Ames Research Center			
Keil	National Solar Observatory			
Ca K Solar Rotation				
Evans Facility Sac Peak	K			
2193		0.0	5.6	34.5
Richard Altrock	USAF Research Laboratory			
Elrod	National Solar Observatory			
Calibration of Coronal I	Photometer			
Evans Facility Sac Peal	, c			
2245n		5.0	0.0	8.0
Christoph Keller	Universiteit Utrecht, Sterrekundig Instituut			
Ren	Big Bear Solar Observatory, NJIT			
Plymate	National Solar Observatory			
ATST Key Technology I	Developments			
McMP Main spectrogra	nph			
2245		5.0	0.0	38.0
Christoph Keller	Universiteit Utrecht, Sterrekundig Instituut			
Ren	Big Bear Solar Observatory, NJIT			
Plymate	National Solar Observatory			
ATST Key Technology I	Developments			

McMP Main spectrograph

-		Nights	Days	Hours
2367		0.0	8.0	54.0
Andrew Potter	National Solar Observatory	0.0	0.0	34.0
Plymate	National Solar Observatory			
Killen	University of Maryland			
Bradley (T)	University of Colorado, LASP			
	etary Observations at the McMath-Pierce Telescope			
McMP Main spectrograp	bh			
2367n		0.0	8.0	30.0
Andrew Potter	National Solar Observatory			
Plymate	National Solar Observatory			
Killen	University of Maryland			
Bradley (T)	University of Colorado, LASP			
Adaptive Optics for Plane	etary Observations at the McMath-Pierce Telescope			
McMP Main spectrograp	bh			
2375		0.0	5.0	41.0
Constance Walker	National Optical Astronomy Observatory			
DeWolf (TLRBSE)	Chippewa Hills High School, Remus, MI			
Guastella (TLRBSE)	Manhasset High School, Manhasset, NY			
Johnson (TLRBSE)	South Mountain High School, Phoenix, AZ			
Hill	National Solar Observatory			
Understanding the Morph Sunspots	hology of Active Regions: Using Zeeman-Split IR Lines	to Determine Mag	netic Field Str	engths of
McMP Main spectrograp	bh			
2439		0.0	5.0	29.0
James LoPresto	Edinboro University of Pennsylvania			
Plymate	National Solar Observatory			
Polar Solar Vortex				
McMP FTS/Mc-P				
2440		0.0	10.0	40.0
T. Alan Clark	University of Calgary	224		
Bergman	University of Calgary			
Infrared Metal and Mole	cular Line Studies of Active and Quiet Sun			

McMP Main spectrograph

		Nights	Days	Hours
2441		0.0	10.0	76.0
Matthew Penn	National Solar Observatory			
MacDonald (REU)	University of Washington			
NSO Array Camera (NAC	') Engineering			
McMP Main spectrograph	h			
2454a		0.0	15.0	120.0
Daniel Seeley (RET)	Framingham High School, MA			
Schad (REU)	University of Notre Dame			
Keil	National Solar Observatory			
Tomczyk	High Altitude Observatory, NCAR			
Coronal Multi-Channel P				
Hilltop Dome Sac Peak	•			
2454b		0.0	7.0	56.0
Peter Nelson	High Altitude Observatory, NCAR	0.0	7.0	30.0
Elmore	High Altitude Observatory, NCAR			
Tomczyk	High Altitude Observatory, NCAR			
Coronal Multi-Channel P Hilltop Dome Sac Peak	ourimeter (Comp)			
·				
2454c		0.0	5.0	40.0
Brandon Marsell (U)	Stetson University			
Tomczyk	High Altitude Observatory, NCAR			
Coronal Multi-Channel P	olarimeter (CoMp)			
Hilltop Dome Sac Peak				
2472n		8.5	0.0	69.5
Ronald Oliversen	NASA/Goddard Space Flight Center			
Roesler	University of Wisconsin			
Kidder (T)	University of Washington, Dept of Earth & Spa	ce Sciences		
Kokorowski (T)	University of Washington, Dept of Earth & Spa	ce Sciences		
Schnackenberg (T)	University of Washington, Dept of Earth & Spa	ce Sciences		
High Spectral Resolution	Fabry-Perot Observations of Comet Schwassmann-	Wachmann 3		
McMP Main spectrograp	h			
2472n		8.5	0.0	69.5
Ronald Oliversen	NASA/Goddard Space Flight Center			
Harris	University of Washington, Seattle			
Morgenthaler	University of Washington, Seattle			
	Fabry-Perot Observations of Comet Schwassmann-			

McMP Main spectrograph

		Nights	Days	Hours
2489	V : 16.1 O	0.0	17.5	175.0
Steve Hegwer	National Solar Observatory			
Gregory	National Solar Observatory			
Long	National Solar Observatory			
Dunn Solar Telescope Main				
Dunn Solar Telescope/SP S	Sac Peak			
2489a		0.0	10.0	12.0
Steve Hegwer	National Solar Observatory			
Gregory	National Solar Observatory			
Long	National Solar Observatory			
Dunn Solar Telescope Elev	ator Doors Maintenance			
Dunn Solar Telescope/SP S	Sac Peak			
2490		0.0	18.5	222.0
Steve Hegwer	National Solar Observatory	-		
Gregory	National Solar Observatory			
Long	National Solar Observatory			
Dunn Solar Telescope Turr	ret Maintenance			
Dunn Solar Telescope/SP S				
2491	N. J. Comp. C. T. J. J.	0.0	12.0	66.0
Carsten Denker	New Jersey Institute of Technology			
Deng (T) Verdoni (T)	New Jersey Institute of Technology New Jersey Institute of Technology			
Tritschler	National Solar Observatory			
Precursors and Origins of (
Dunn Solar Telescope/SP S				
2492		0.0	7.3	65.0
Han Uitenbroek	National Solar Observatory			
Tritschler	National Solar Observatory			
Characterizing and Testing	the CN-Band Lyot Filter			
Dunn Solar Telescope/SP S	Sac Peak			
2493		0.0	12.0	85.0
Haosheng Lin	University of Hawaii, IFA			
DST Facility IR Spectropol	arimeter Engineering			

Dunn Solar Telescope/SP Sac Peak

		Nights	Days	Hours
				_
2494		0.0	13.8	85.0
Alexandra Tritschler	National Solar Observatory			
Uitenbroek	National Solar Observatory			
Rimmele	National Solar Observatory			
The Center-to-Limb Vario	ation of Magnetic Elements			

Dunn Solar Telescope/SP Sac Peak