Star Dust

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September Speaker: Dr. George A. Doschek, "The Solar Atmosphere "

Submitted by Dr. Walter L. Faust

Dr. George A. Doschek will present the talk "The Solar Atmosphere " at the September 10 meeting of the National Capital Astronomers. Dr. Doschek has provided us with the following abstract of his talk.

Abstract

Our Sun has an atmosphere. In fact, the atmosphere extends from the Sun's surface, the photosphere, out to and far beyond the Earth's orbit in the form of the solar wind. The Sun's solar system "bubble" created by the solar wind extends out to distances on the order of 100 Astronomical Units! In this talk I will discuss new findings about the Sun's atmosphere including regions just above the photosphere, through the chromosphere and into the corona, obtained from space instruments flown on a number of recent and relatively recent solar missions. These missions include the Yohkoh satellite flown by the Japanese space agency, ISAS

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Presidential Welcome or What I Did Astronomical for My Summer Vacation

by Dr. Harold Williams

Welcome to an exciting year of NCA monthly meetings with lectures by special invited speakers at the University of Maryland Observatory on Metzerott Road with observing after the meeting if it is clear. Walter Faust, our new vice president and program chair, and a large program committee of NCA members have already gotten several exciting speakers already lined up. In the past the officers and trustees have met once a year during the summer; this year we have already had two meeting to handle NCA business: one on July 23 at our Treasurer Jeff Norman's place and an-

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Review of Talk by Dr. John C. Pearl: "Into Saturn's Realm: Results from the Cassini/Huygens Mission"

by Dr. David W. Dunham

Dr. John C. Pearl presented the talk "Into Saturn's Realm: Results from the Cassini/Huygens Mission" at the May 7 meeting of the National Capital Astronomers at the University of Maryland Astronomy Observatory. Dr. Pearl began by noting that he was immersed in the infrared observations being made by Cassini and had to step back to obtain an overview of all the results of the mission for this presentation. The mission has been so prolific that this job was daunting; he could give only a very high-level overview here and only discussed in some detail a few of the major results obtained so far. He started with an outline, which included mission objectives, mission de-

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Election Results

The annual election was held this year on June 4 at the District of Columbia Radio Control Club model airplane field in Germantown, Maryland. The Nominating Committee's slate of candidates were subsequently elected by unanimous acclamation. Those elected were:

President:	Harold Williams
Vice-president	Walter Faust
Secretary:	Nancy Grace Roman
Treasurer:	Jeffrey B. Norman
Trustee:	Benson Simon

Elliott Fein for the Nominating Committee.

NCA Events This Month

The Public is Welcome!

NCA Home Page: http://capitalastronomers.orgt

NCA Mirror- and Telescope-making Classes: Fridays, Sept. 2, 9, 16, 23, and 30 9:30 P.M. at the Chevy Chase Community Center, at the northeast corner of the intersection of McKinley Street and Connecticut Avenue, N.W. Contact instructor Guy Brandenburg at 202-635-1860 or email him at gfbrandenburg @yahoo.com.

Observing with NCA's 14-inch telescope: See schedule and information at right.

Exploring the Sky: Saturday, September 24 with NCA's 14-inch and other telescopes in Rock Creek Park, DC. See next page.

Open house talks and observing at the University of Maryland Observatory in College Park on the 5th and 20th of every month at 9 P.M. The talks are non-technical. There is telescope viewing afterward if the sky is clear.

Dinner with NCA members and speaker: Saturday, September 10 at 5:30 P.M., preceding the meeting, at the Garden Restaurant in the University of Maryland University College Inn and Conference Center. See map and directions on Page 6.

If you are planning to come to the dinner before the meeting, please tell Benson J. Simon, telephone: 301-776-6721, e-mail st88@ioip.com, so that we can make reservations for the right number of people.

Upcoming NCA Meetings
September 10, Oct. 1, Nov. 12, Dec. 10, Jan. 14, Feb. 11, Mar. 11, Apr. 8, May. 13, June 10.

Observing with the NCA C-14

Mike McNeal

Day, Date and Time	Prime Objects
Sat., Sept. 3, 9:00 P.M.	TBD
Sat., Sept. 17, 9:00 P.M.	TBD
Sat., Sept. 24, 8:00 P.M.	Rock Creek Park: *Exploring the Sky*

In Mike McNeal's backyard, 5410 Grove St, Chevy Chase, MD, (Friendship Heights Metro).

Please make reservations by 10 p.m. the Friday before.

Call Mike at 301-907-9449 or email him at mcnealmi@verizon.net to let him know you are coming.

September Speaker: Dr. George A. Doschek

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(now JAXA), the TRACE mission flown by NASA, and the SOHO spacecraft with instrumentation provided by both NASA and the European space agency (ESA). The instruments on these spacecraft are high resolution X-ray, extreme-ultraviolet, and ultraviolet telescopes and spectrometers that have given us an unprecedented look at the Sun's atmosphere, and the myriad of fascinating phenomena that occur in it, such as solar flares, coronal mass ejections, eruptive prominences, and coronal holes. I will also briefly discuss new upcoming solar missions and what we hope to learn from them.

Curriculum Vita
Dr. George A. Doschek, Branch Head, Solar Terrestrial Relationships Branch, Space Science Division, Naval Research Laboratory

Background: George Doschek has been Branch Head of the Solar-Terrestrial Relationships Branch in the Space Science Division at the Naval Research Laboratory (NRL) since 1979. Between 1970 and 1979 he was a Research Astrophysicist at NRL, and between 1968 and 1970 he was an E.O. Hulburt Fellow at NRL. He is a member of the American Astronomical Society and the Solar Physics Division of that society, as well as a member of several other societies. He is a Fellow of the Optical Society of America. He was the 1986-1988 Chairperson of the Solar Physics Division, and he is a recipient of NRL's highest award for scientific achievement, the E.O. Hulburt Award. He is an author on 278 research papers, most of which are in refereed journals. George Doschek's research areas are solar physics, atomic physics, and solar physics space instrumentation. He has analyzed data from many astrophysical space missions and has been a key player in the design and construction of new solar space experiments.

Education:
1963 - B.S. (Physics, Magna Cum Laude) University of Pittsburgh
1968 - Ph.D. (Physics) University of Pittsburgh

Awards, Honors:
Honorary Woodrow Wilson Fellow - 1963
Fellow, Optical Society of America
NRL Publications Awards - 1972, 1978, 1979, 1980, 1984, 1993
NRL E.O. Hulburt Science and Engineering Award - 1994

Professional Societies:
American Astronomical Society (Solar Physics Division)
Optical Society of America
American Geophysical Union
International Astronomical Union
Sigma Xi

Publications, Experiments:
278 papers in scientific journals, proceedings, 74 invited talks, 122 contributed (oral and poster) papers.
NRL PI, Bragg Crystal Spectrometer (BCS), *Yohkoh*; PI to NASA, Extreme-ultraviolet Imaging Spectrometer (EIS), *Solar-B*

Committees, Working Groups:
Chairperson, Solar physics Division of AAS (1986-1988)
Vice Chairperson, Solar Physics Division of AAS (1985-86, 1988-89)
Committee member, Solar Physics Division of AAS (1983-84, 1989-90)
Facility Scientist, Science Working Group for the NASA Orbiting Solar Laboratory (OSL)
Member, NAS Committee for Solar and Space Physics (June 1985-June 1987)
Member, NASA Management and Operations Working Group for Solar and Helio-

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Exploring the Sky
by Joe Morris

Exploring the Sky is an informal program that for nearly fifty years has offered monthly opportunities for anyone in the Washington area to see the stars and planets through telescopes from a location within the District of Columbia.

Sessions are held in Rock Creek Park once each month on a Saturday night from April through November, starting shortly after sunset. We meet in the field just south of the intersection of Military and Glover Roads NW, near the Nature Center. A parking lot is located immediately next to the field.

2005 Schedule

Date	Time	Notes
9/24	8:00 P.M.	Rock Creek Park Day; Andromeda Galaxy
10/8	7:30 P.M.	Draconid meteor shower peak 10/8
11/5	7:00 P.M.	Pleiades; possible Taurids meteor shower

Beginners (including children) and experienced stargazers are all welcome—and it's free!

A presentation of the National Park Service and National Capital Astronomers.

Questions? Call the Nature Center at (202) 895-6070 or check the Internet sites: http://www.nps.gov/rocr/planetarium http://www.capitalastronomers.org

Results from the Cassini/Huygens Mission

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sign, magnetosphere, icy satellites, rings, Saturn, Titan, and a summary, which included planned future observations.

Mission Objectives: There are five main scientific objectives of Cassini. The first is the magnetosphere, including its dynamics, configuration and current systems; particle composition (sources and sinks); and interaction with the solar wind, rings, and satellites, especially Titan. The second is Saturn, including properties of its atmosphere and ionosphere, and the planet's origin and evolution. Next is the rings, their structure, dynamics, and composition, and interaction with the satellites. Fourth is Titan, especially the properties and composition of its atmosphere and surface. The fifth objective involves the icy satellites, the results for three of which are given, with objectives including surface characteristics and geological processes, internal structure, and interactions with the magnetosphere. Dr. Pearl concluded this part with a figure showing the 18 satellites known in the early 1990's, including a view showing the relative locations of the satellites and rings, and the closest approach points of previous space missions that have visited Saturn.

Mission Design: This began with a display of the 74 orbits that Cassini is expected to complete during the mission, with both Saturn equatorial and polar views in a rotating frame with fixed horizontal Sun-Saturn line. It shows the comprehensive coverage, obtained by multiple flybys of the satellites, that the mission will achieve to study both the satellites out to Iapetus and the magnetosphere. The inclination of Cassini's orbit to Saturn's equator starts at low values, mostly 20° or less, but ends with high inclinations, up to 78°. As remarkable as the Saturn orbits are, getting to Saturn was equally challenging, with Cassini launched on Oct. 6, 1997 and not arriving at Saturn until July 1, 2004. Gravity assists were needed from swingbys of the Earth, Jupiter, and two of Venus, as well as a large deep space maneuver, to reach Saturn, as shown on an ecliptic-plane view of the clever trajectory.

Magnetosphere: A complex figure showed Saturn's magnetosphere, including the bow shock region that serves as its interface with the supersonic solar wind. It is rather similar to diagrams of the magnetosphere of the Earth, including polar cusps that allow solar wind particles to impinge on the atmosphere in the polar regions, causing aurorae. However, Saturn's magnetosphere in addition has satellites and rings imbedded in its equatorial plane that may be the source for its extensive oxygen component. Just after Cassini's hour-long orbit insertion burn, the spacecraft passed closer to the rings, 16,000 km, than it will ever be again. During that time, it observed strong signatures from water group ions blasted from ring particles by charged particles in the inner magnetosphere. Cassini also imaged interactions of the magnetosphere with Titan.

Icy Satellites: As Cassini approached Saturn before orbit insertion, it flew by the distant irregular-shaped 16-km satellite Phoebe, obtaining spectacular images of its cratered surface and measured the temperature and the composition (iron, water, and carbon dioxide, and some organics) from its infrared spectrum across the surface.

The next target icy body was Iapetus, the satellite that is much darker in one hemi-

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September Speaker: Dr. George A. Doschek

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spheric Physics (1984-1986)
Member, MAX'91 Science Study Working Group (Feb. 1985-Feb. 1986)
Leader, Chromospheric Explosions Team, NASA Solar Maximum Mission Workshop (1983-1984)
Member, NRC Committee of line Spectra of the Elements - Atomic Spectroscopy (1978-1980)
Chairperson and Organizer of the *Eighth International Colloquium on Ultraviolet and X-ray Spectroscopy of Astrophysical and Laboratory Plasmas*, IAU Colloquium No. 86, 27-29 August, 1984, proc. published by NRL.
Member, Solar Panel of the Astronomy and Astrophysics Survey Committee (1989-1991)
Member, UV/Optical from Space Panel of the Astronomy and Astrophysics Survey Committee (1989-1991)
Member, NASA Space Physics Subcommittee (1991-1994)
Member, EUVE User's Committee (1994-1996)
Member, Solar-B Science Definition Team (1996-March 1998)
Member, Solar-B Science Working Group (2003-present)

Other National Capital Area Meetings, etc.

Montgomery College's Planetarium
Fenton St. in Takoma Park, MD. Planetarium programs for September 2005:
Saturday, September 17 at 7:00 P.M. "Ancient Sky Watchers of Guatemala, Mexico, Belize, El Salvador, and Honduras, the Maya." Before 900 A.D., the Maya had a better solar year determination (tracking of the winter solstice) than the Europeans did in 1582 A.D. How did they do this? URL: http://montgomerycollege.edu/Departments/planet/MayanAstronomy.html

Thursday, September 22 at 7:00 P.M. "When the Sky Falls" the autumnal equinox is at 6:23 P.M. URL: http://www.montgomerycollege.edu/Departments/planet/planet/skyfall.htm

Northern Virginia Astronomy Club
Sunday, September 11 at 7 P.M. Shuttle Astronaut Joe Edwards speaking of his experiences as an astronaut at NASA and pilot of STS-89. Location: George Mason University in Enterprise Hall, Room 80. Via I-66 from Washington: Take exit 60 at Route 123 South, Chain Bridge Road. Follow Route 123 through the City of Fairfax, and turn left at University Drive. Take your first right at Occoquan River Lane. Turn left at the stop sign onto Patriot Circle. Parking is available in the lower section of Parking Lot B. Additional details available at http://www.novac.com/meetings/

Sunday, October 1 at 3 P.M. NOVAC's Annual Star Gaze. Speakers: John Dobson and Richard Berry.

John Dobson is the co-founder of the Sidewalk Astronomers and the inventor of one of the most popular and affordable telescope mounts; he will speak on and be available to discuss observational astronomy.

Richard Berry, another very well-known astronomer, author, and publisher, will talk about our place in the Milky Way galaxy, and how visual observation reveals some of its major structures. Location: C.M. Crockett Park. Crockett Park is about 20 miles south of Manassas at 10066 Rogues Road (Rt. 602) Midland, Va, 22728. From Washington D.C./ Northern Virginia, go west on I-66 to exit 44 (234 South bypass around Manassas). Take 234 bypass approximately 3 miles to Rt. 28 West. Stay on Route 28 for about 13.7 miles through Nokesville, Catlett, and Calverton. Turn right on Rt. 643 (Meetze Rd.) towards Warrenton (Mayhugh's country store is on the corner) Go about a mile up Rt. 643 to the park entrance road (Rogues Rd.) on the left. Look for a small sign directing you to C.M. Crockett Park. Once on the park entrance road, go one-half mile to the park gate. For more information: http://www.novac.com/gaze/

Presidential Welcome

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other on August 9 at our Secretary Dr. Nancy Grace Roman's place. We have decided to meet monthly for a while and we shall meet again on Monday, September 12 in the planetarium of Montgomery College at 7:30 P.M. All NCA members are welcome to join us. We will be working on changes to the NCA constitution and bylaws. A copy of the current constitution and bylaws will be accessible on the web page http://capitalastronomers.org, soon; I am writing this on August 17. It was generally felt by the officers and trustees that we need to change our structure some and add some officers like a president-elect and vice president-elect, so people will have a year to get used to the office and be more likely to say yes. It has also been further suggested that we have an assistant treasurer and an assistant secretary to help Jeff and Nancy Grace and to train them to possibly take over eventually. We have had a very hard time for a few years getting people to agree to become vice president/ program chair and president and our organization would most likely collapse if anything should happen to our singularly good treasurer or secretary. NCA was founded in 1937 and many things in our society have changed since then; I personally would like to enable NCA to survive to 2037 when NCA can celebrate our one hundredth anniversary. I will be 87 years old in 2037 and I would like to be a regular member, if alive, and not the web master or a recycled officer. We must make some changes now so we can make additional changes in that far off date 2037 to survive as an organization.

For the last year or two, NCA members have checked out a number of observing sights in places darker than the University of Maryland observatory. We have found a number of them and they are not all in West Virginia. Check the web site for a list of them with directions and maps.

Now for what I did astronomically for my summer vacation: June 2-5, NOVAC, Northern Virginia Astronomy Club, AHSP, Almost Heaven Star Party, at TMI, The Mountain Institute, near Spruce Knob, West Virginia, camping in a tent with my wife. I talked about astrolabes and collected fossils during the daylight, and finally saw stars the last night I was there. (No light domes, and stars to magnitude 7.5 naked eye. This is the best real sky I have ever seen.) July 2-4, Gatewood Group camping near Spruce Knob with two Montgomery College Science Club students using a NOVAC free pass, which any NCA member can get for free, not just me; July 6-10 Greenbank Starquest II alone in a dorm room at NRAO, National Radio Astronomy Observatory in Greenbank, W.Va., two small light domes from Marlton and Snow Shoe. Fellow NCA member Jeff Guerber was there, too, in a tent; by that time, I had learned to be a dew fighter and had dew heaters on all optical surfaces; July 30-August 4 at TMI alone, remarkably clear skies every night, but loss of transparency the last night only, and I finally figured out how to use enough dew heaters to keep even the Telrad finder clear of dew. August 11-13 at TMI with my wife Barbara and the Persieds meteor shower. As a flat-lander born and raised in Florida, I have finally gotten used to mountain roads and can even drive Route 33 at night in West Virginia, which is a little crazy. While W.Va. still has two absolutely dark regions, they are more than five hours away from us. Of course, W.V. is so mountainous that they are about that far away from my new friend, Melisia Thorner, from Hurricane, W.Va. as they are from me. A few mountainous miles can take a long time to drive, but they have thinned out the misuse of outdoor lights in a few regions. It certainly isn't government regulation in W.Va. that enforces good lighting, where the only permit in Pocahontas County is a privy permit.

Results from the Cassini/Huygens Mission

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sphere than the other. Most surprising was a mountain chain about 2000 km long (possibly longer since its full extent could not be imaged) and about 20 km high virtually coincident with Iapetus' equator. Also curious is a very large impact basin, and many craters with bright walls facing toward the bright hemisphere.

Close-up images and measurements were made of Enceladus during a flyby on February 15th. This satellite reflects about 90% of the light falling on it, the highest albedo of any body in the Solar System. Enceladus' location at the heart of the E-ring indicates that it may be the source for that ring. The close-up flyby images showed an active surface with few craters in some areas and lots of grooves, reminiscent of Europa's surface. Measurements showed that Enceladus has a tenuous atmosphere from impacts with magnetospheric particles, and probably a magnetic field of its own. [Observations of the flyby in July have shown that the atmosphere probably emanates from warm "tiger stripe" features near the south pole].

The Rings and Small Satellites: Dr. Pearl started with the outer E-Ring whose particle size distribution was measured by Cassini, showing that the particles were larger near Enceladus. They were found to be composed of water ice, which is expected considering Enceladus' high reflectance.

An image of Prometheus, which shepherds the F-Ring, showed its interaction with the ring. Images showed dozens of gravity waves in the rings, which are now known to be only a few tens of meters thick.

Cassini found a 5-km satellite, Polydeuces, near the stable triangular libration point in Dione's orbit, while earlier observations had found a 30-km satellite, Helene, at the other triangular libration point.

Saturn: A chart showed the rotation period of Saturn's atmosphere as a function of latitude based on observations from the Voyager flybys, and later observations by HST and Cassini. Curiously, the rotation rate has changed by six minutes since Voyager's measurements, for unknown reasons. These are based on the rotation rate of decametric radiation thought to originate relatively deep in the planet; by contrast, the decametric rotation rate of Jupiter has been constant. There's no way the planet's angular momentum can change by that amount, so the change may be due to changes in differential rotation of narrow bands and the decametric radiation is probably coming from a localized source in one of these bands. The variations in rotation rate with latitude amount to almost half an hour due to winds with different speeds at different latitudes. A large change took place in the equatorial rotation rate from Voyager's flyby to recent observations. An image of swirls and spots in Saturn's atmosphere was shown, but they are not as pronounced and harder to image than those of Jupiter

.**Titan:** The last part of the presentation concentrated on Titan, the largest satellite in Saturn's system (a little larger than Mercury) and the only satellite with a massive atmosphere, the pressure being 1.6 times that of Earth's at the surface. The atmosphere is mainly nitrogen, but it is shrouded with a photochemical haze with occasional clouds. There may be lakes of liquid methane or ethane on the surface. There are 35 flybys of Titan planned by Cassini, not only because its large mass is efficient for changing the orbit but also to make detailed scientific measurements. This intriguing body was the target of the European Space Agency's Huygens probe that rode with Cassini to Saturn, and was released to drop into Titan's atmosphere and parachute to the surface. An infrared spectrum of Titan's atmosphere shows a rich mixture of organic compounds, including methane, propane, ethyl-acetylene, hydrogen cyanide, and others. Other measurements during the close Titan flybys show wave structures in the atmosphere and winds up to 160 m/sec. Like Venus, Titan is a slow rotator with much faster winds. Albedo features on Titan were imaged in the infrared at 1 micron during the flybys. The largest bright feature is called Xanadu; it has peculiar radar properties. Detailed synthetic aperture radar (SAR) measurements have been made over narrow swaths of Titan during each flyby; one flyby planned in August should cover the area where the Huygens probe landed. Craters and strange "cat scratch" features are revealed in the SAR images. The SAR data are hard to interpret. As more of the surface is imaged by SAR with future flybys, the puzzle may be solved. The radar in its altimetry mode has shown only subdued topography on Titan with variations of at most a few hundred meters. In the infrared, no sun glints have been observed, indicating a lack of a very smooth surface at those wavelengths.

Spectacular panoramas from the descending Huygens probe were shown. A "shoreline" is evident with a dendritic pattern "inland." The probe drifted east as it descended until the last few hundred meters, when the winds shifted, sending it westward. Images taken from the surface show many rounded rocks that are probably composed of water ice. The surface looks like most areas of Mars where probes have landed and transmitted images, but of course the surface of Titan is much different, much colder with much higher pressure. Ethane and carbon dioxide, as well as methane, abundances increased after landing, apparently due to the warm spacecraft heating the surface (about 93° K before the landing) and releasing these compounds into the nearby atmosphere.

Future Highlights: Planned observations include high-latitude measurements of Saturn's magnetosphere, including the aurora; solar and radio occultations by Saturn, Titan, and the rings; more Titan flybys, including many more SAR swaths; and close encounters with Enceladus, Tethys, Dione, Rhea, Hyperion, and Iapetus, including solar eclipses of most of them as Saturn's autumnal equinox is approached. Cassini's satellite tour design is flexible, able to respond to equipment problems and scientific discoveries. A flaw found in the Huygens probe relay system showed that it would not work for the originally planned autumn 2004 descent, so the whole satellite tour was altered, with the Titan probe's descent in January this year, which allowed the probe to be tracked with large antennas on the Earth. The July flyby distance from Enceladus was lowered to search for that satellite's magnetic field after the discovery of its tenuous atmosphere. The September orbit will be altered to decrease the effects of the E-ring particle environment, found to be a little more dangerous than expected.

If the spacecraft continues to perform as planned, an extended mission beyond the June 30, 2008 nominal mission is possible. Cassini might be kept operating for another two years. Saturn's magnetospheric response to the changing solar wind during most of a solar sunspot cycle might be

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Cassini/Huygens Mission

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measured. Surface changes on Titan might be observed to estimate seasonal atmospheric dynamics. Enceladus might be monitored to look for signs of internal activity. The strange ring "spokes" might be studied, along with temperature changes with changing solar illumination. Saturn's atmospheric dynamics can be studied in more detail. With a long-enough mission, high-resolution mapping of the icy satellites could be completed. Stereoscopic coverage of much of Titan with SAR observations could be most interesting.

Dr. Pearl concluded his talk with a summary of the many results from the mission to date, only 20% of which had been completed. The tape ran out while he was giving this summary, so unfortunately I have no information about the questions that were asked at the end. New amazing pictures and other results continue to be obtained by Cassini, including strange terrain imaged during a recent close flyby of the "death-star" moon Mimas. The latest images, as well as archives of the past ones, and other results of the mission can be found at http://saturn.jpl.nasa.gov/home/index.cfm .

The deadline for the October Star Dust is September 14. Please send your material to Elliott Fein by that date to ensure inclusion. Send submissions to Elliott Fein at elliott.fein@erols.com.

Articles submitted may be edited to fit the space available.

Do You Want to Get *Star Dust* Electronically?

Any member wishing to receive *Star Dust*, the newsletter of the National Capital Astronomers, via e-mail as a PDF file attachment, instead of hardcopy via U.S. Mail, should contact Nancy Grace Roman, the NCA Secretary, at nancy.roman6@verizon.net or 301-656-6092 (home).

NCA TREASURER'S REPORT

Jeffrey Norman

July 1, 2004 to June 30, 2005

INCOME	
Dues	$ 5914.49
Gifts	1224.00
Interest	147.40
Telescope-making Classes	135.00
Total Income	$ 7420.89
EXPENSES	
Dues (AL – 720.00 + IDA – 100.00)	$ 820.00
Miscellaneous	7.61
Secretary	385.99
Sky & Telescope Subscriptions	2806.74
Speakers' Dinners	389.47
Star Dust	2403.67
Total Expenses	$ 6813.48
Balance - July 1, 2004	$ 11563.26
Excess Income over Expenses	607.41
Balance - June 30, 2005	$ 12170.67

Total number of paying members joining or renewing from 7-1-03 to 6-30-04	135 *
Total number of paying members joining or renewing from 7-1-04 to 6-30-05	123 *
Decrease in Membership (8.9%)	12

MEMBERSHIP REVIEW

Total Paying Memberships as of 6-30 of Each Fiscal Year

1992 - 223	1995 - 201	1998 – 169	2001 - 162	2004 - 135
1993 - 184	1996 - 179	1999 - 173	2002 - 154	2005 - 123
1994 - 163	1997 - 194	2000 - 174	2003 - 146	

- This does not include life members or science fair winners, because they receive free memberships.

NCA BUDGET - FISCAL 2006

Income	
Dues	5900
Gifts	1200
Interest	100
Telescope-making Classes	100
Total Income	7300
Expenses	
Dues (AL - 700 + IDA - 100)	800
Miscellaneous (includes cost of NCA banner)	100
Secretary	400
Sky & Telescope subscriptions	2800
Speakers Dinners	400
Star Dust	2400
Total Expenses	6900
Surplus	400

Mid-Atlantic Occultations and Expeditions

by David Dunham

Asteroidal Occultations

Date	Day	EDT	Star	Mag	Asteroid	dmag	dur. s	Ap. in.	Location
Sep 8	Thu	5:41	PPM 95755	8.9	Kirkwood	7.1	2	2	*s. Georgia
Sep 9	Fri	4:40	2UC43747063	11.3	Irmgard	4.9	5	7	*Cape Hatteras
Sep 23	Fri	0:19	TYC46950141	11.1	Siegena	0.7	14	7	IN,KY,eTN,wGA
Sep 24	Sat	4:39	2UC45624260	11.5	Westphalia	4.2	4	8	OH,eKY,wNC,GA
Sep 24	Sat	20:06	2UC26286964	11.3	Asterope	2.0	6	8	s.S.Car.,e.GA
Sep 25	Sun	3:21	2UC43092069	11.4	Juewa	1.9	6	8	Ohio,nwPA,nwNY
Sep 28	Wed	21:41	TYC62190862	11.0	Aspasia	1.7	6	6	KY,WV,VA,MD,DC
Sep 30	Fri	3:52	2UC36757351	11.1	Ida	3.1	3	7	seMI,sOnt.

Grazing Occultations

DATE	Day	EDT	Star	Mag	% alt	CA	Location
Sep 22	Thu	2:36	ZC 493	6.9	79- 59	14N	Hazelton, WV & Somerset, PA
Sep 25	Sun	1:09	SAO 78043	9.0	50- 68	11N	Charlotte,NC; Carson&Toano,VA
Sep 26	Mon	5:31	SAO 79180	8.1	40- 58	6N	Hampton, VA;Winston-Salem, NC
Sep 29	Thu	4:41	SAO 98725	9.0	15- 16	6N	Hampton, VA;Winston-Salem, NC
Sep 29	Thu	6:47	SAO 98751	8.3	14- 38	1N	BlackWaterFalls,WV Sun -5
Sep 30	Fri	5:09	SAO 99149	7.1	8- 11	5N	s. Nags Head, NC

Total Lunar Occultations

DATE	Day	EDT	Ph	Star	Mag	%	alt	CA	Sp.	Notes
Sep 8	Thu	20:41	D	ZC 2115	7.2	25+	9	40N	A6	Azimuth 235 deg.
Sep 9	Fri	20:01	D	SAO 183713	7.4	34+	18	75N	A5	Sun alt. -8 deg.
Sep 9	Fri	20:41	D	SAO 183725	8.1	34+	13	51N	K5	Azimuth 223 deg.
Sep 9	Fri	21:22	D	ZC 2248	7.6	34+	7	66N	A2	Azimuth 230 deg.
Sep 10	Sat	21:14	D	ZC 2397	6.5	45+	13	46S	K1	Azimuth 217 deg.
Sep 10	Sat	22:32	D	ZC 2405	6.6	45+	3	38N	A2	Azimuth 231 deg.
Sep 11	Sun	20:23	D	SAO 185632	8.1	56+	20	52S	F2	
Sep 13	Tue	19:59	D	SAO 188639	7.7	77+	21	81N	B9	Sun alt. -9 deg.
Sep 13	Tue	22:55	D	SAO 188724	7.7	78+	22	20N	F5	equal pair,".1, PA 45
Sep 15	Thu	21:15	D	ZC 3214	6.8	94+	26	35S	A0	/SAO 164829 & ZC 3228
Sep 16	Fri	0:47	D	29 Aquarii	6.5	94+	31	48S	A0	mag2*=6.8 3.8", PA 246
Sep 21	Wed	1:00	R	ZC 363	7.2	87-	50	52N	F0	/2nd * = X65442
Sep 22	Thu	0:36	R	tau Ari	5.3	79-	38	44S	B5	mag2*=8.1 1.", PA 228
Sep 22	Thu	2:54	R	ZC 493	6.9	78-	64	41N	A0	
Sep 22	Thu	4:12	R	SAO 75929	8.0	78-	73	58S	K7	/2nd * X 5643
Sep 23	Fri	4:37	R	chi Tauri	5.4	69-	74	81S	B9	mag2*=8.4 20",PA 25deg.
Sep 23	Fri	6:16	R	ZC 655	7.9	68-	73	64S	F5	
Sep 24	Sat	5:52	R	ZC 797	6.4	58-	78	66N	B9	spec. binary; Sun -13
Sep 27	Tue	3:03	R	SAO 79859	8.5	30-	19	49N	F0	
Sep 27	Tue	3:22	R	omega Cnc	5.9	30-	23	59S	G8	ZC 1206
Sep 27	Tue	6:04	R	SAO 79936	8.1	30-	53	50N	K5	Sun alt. -12 deg.
Sep 28	Wed	5:02	R	ZC 1330	7.8	22-	55	79N	G5	
Sep 29	Thu	5:55	R	SAO 98726	8.6	14-	30	60S	B9	
Sep 29	Thu	6:26	R	SAO 98737	8.4	14-	36	56S	G5	Sun alt. -8 deg.

David Dunham, e-mail dunham@starpower.net, more info. http://iota.jhuapl.edu
Phone home 301-474-4722; office 240-228-5609; car 301-526-5590

Getting to the NCA Monthly Meeting and the Dinner Before the Meeting

Jeff Guerber

NCA meetings are now held at 7:30 p.m. at the University of Maryland Observatory, in College Park on Metzerott Rd. between University Blvd. (MD-193) and Adelphi Rd. To get there from the Capital Beltway (I-495), either take US Rt. 1 south about a mile, turning right onto MD-193 West, then at the first light turn right onto Metzerott; or, take New Hampshire Ave. (MD-650) south, turn left at the second light onto Adelphi Rd., two more lights, turn left onto Metzerott, and proceed about a mile to the observatory. The observatory is on the south side of Metzerott Rd., directly opposite the UM System Administration building; you can park there if the observatory lot is full, but be careful crossing Metzerott Rd.

At 5:30 p.m., before the meeting, please join us for dinner at the Garden Restaurant in the UMD University College Inn and Conference Center, 3501 University Blvd. East at Adelphi Rd. From the Beltway, either take New Hampshire Ave. south, turn left onto Adelphi, and at the third light (passing Metzerott) turn left onto University then immediately right into the garage; or, take US-1 south, turn right onto University Blvd. west, and take it to the intersection with Adelphi Rd. Park either in the garage (costs), or in Lot 1 nearby (free). To get to the Observatory, exit to the right onto University Blvd. (MD-193) east, and at the second light turn left onto Metzerott Rd.

Getting to the NCA Meeting
Star=Observatory R=Restaurant P=Parking

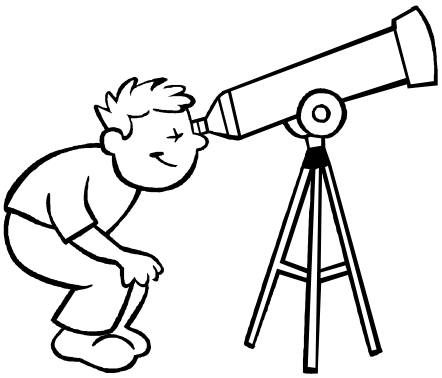
Observing after the Meeting

Elizabeth Warner

Following the meeting, members and guests are welcome to tour through the Observatory. Weather permitting, several of the telescopes will also be set up for viewing.

Are You Coming to Dinner?

If you are planning to come to the dinner before the meeting, please tell Benson J. Simon, telephone: 301-776-6721, e-mail st88@ioip.com, so that we can make reservations for the right number of people.



Do You Need a Ride?

Please contact Jay Miller, 240-401-8693, if you need a ride from the metro to dinner or to the meeting at the observatory. (Please try to let him know in advance by email at rigel1@starpower.net.)

Support the IDA

Join the International Dark-Sky Association

3225 N. First Avenue Tucson, AZ 85719-2103

www.darksky.org

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SERVING SCIENCE & SOCIETY SINCE 1937

NCA is a nonprofit, membership-supported, volunteer-run, public-service corporation dedicated to advancing astronomy, space technology, and related sciences through information, participation, and inspiration, via research, lectures, presentations, publications, expeditions, tours, public interpretation, and education. NCA is the astronomy affiliate of the Washington Academy of Sciences. NCA is an IRS Section 501(c)(3) tax-deductible organization. All are welcome to join NCA.

SERVICES & ACTIVITIES:

Monthly Meetings feature presentations of current work by researchers at the horizons of their fields. All are welcome; there is no charge. *See* monthly *Star Dust* for time and location.

NCA Volunteers serve in a number of capacities. Many members serve as teachers, clinicians, and science fair judges. Some members observe total or graze occultations of stars occulted by the Moon or asteroids.

Publications received by members include the monthly newsletter of NCA, *Star Dust*, and an optional discount subscription to *Sky & Telescope* magazine.

Consumer Clinics: Some members serve as clinicians and provide advice for the selection, use, and care of binoculars and telescopes and their accessories. One such clinic is the semiannual event held at the Smithsonian Institution National Air and Space Museum.

Fighting Light Pollution: NCA is concerned about light pollution and is interested in the technology for reducing or eliminating it. To that purpose, NCA is an Organization Member of the International Dark Sky Association (IDA). Some NCA members are also individual members of IDA.

Classes: Some NCA members are available for educational programs for schools and other organizations. The instruction settings include star parties, classroom instruction, and school-teacher training programs that provide techniques for teaching astronomy. NCA sponsors a telescope-making class, which is described in the *Star Dust* "Calendar of Monthly Events."

Tours: On several occasions, NCA has sponsored tours of astronomical interest, mainly to observatories (such as the National Radio Astronomy Observatory) and to the solar eclipses of 1998 and 1999.

Discounts are available to members on many publications, products, and services, including *Sky & Telescope* magazine.

Public Sky Viewing Programs are offered jointly with the National Park Service, and others. Contact: Joe Morris, joemorris@erols.com or (703) 620-0996.

Members-Only Viewing Programs periodically, at a dark-sky site.

NCA Juniors Program fosters children's and young adults' interest in astronomy, space technology, and related sciences through discounted memberships, mentoring from dedicated members, and NCA's annual Science Fair Awards.

Fine Quality Telescope, 14-inch aperture, see "Calendar of Monthly Events."

Yes, I'd like to join NATIONAL CAPITAL ASTRONOMERS!

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FIRST CLASS
DATED MATERIAL

The September NCA Meeting is on the 2nd Saturday of September!

Inside this issue: