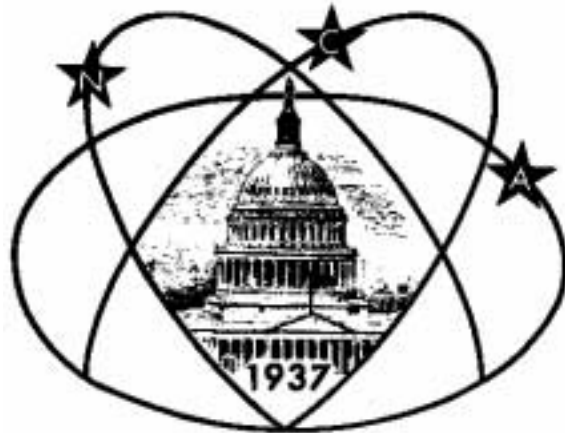


Star



Dust

National Capital Astronomers, Inc.

<http://capitlastronomers.org>

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President's Message and Info about the June Meeting! *Jay Miller*

Well, this is my last note to you. It's been an eventful four years beginning just before 9/11 and including two changes of venue. I would like to thank all who have helped NCA during my tenure. I'm not going to list names because I'd probably forget someone. I hope members who have yet to help out will consider doing so in the future, even if it's a one time thing. Right now we're having a serious problem recruiting people for president and vice-president. This is partly because of concerns about assistance. If no one steps

forward in the next couple of weeks, NCA may cease to exist after 67 years.

For June, we are going to repeat the members only star party we had last year. Dan Lewis has arranged for us to use the District of Columbia Radio Control Club-model airplane field in Germantown. Directions are elsewhere in this issue. Since we will be holding elections, come even if it's raining. They do have a covered area. I'm suggesting a 6:30 P.M. meeting time on June 4 because we should be able to

begin observing at 9 P.M. This will give us time to do a little picnicking, elect officers, talk astronomy, etc. If you don't have a telescope come anyway. If you have questions on using your telescope it's a perfect time to get assistance. I'll bring some of the Night Sky Network stuff and tell you all about it. So bring a table and chairs or a blanket, maybe a telescope, and enjoy. If I don't see you there, have a great summer and we'll see you in September (hopefully).

Jay H. Miller, President

The June NCA Meeting is a star party and elections in a new location! See the President's message above!!

Review of talk by Mr. Ian Jordan: "UMBRAS: The External Occultation Technique for Observing Exoplanets" *by Dr. Walter L. Faust*

Mr. Ian Jordan was the second speaker at the April 2 meeting of the National Capital Astronomers at the University of Maryland Astronomy Observatory. He described his work over the last 6 to 7 years, with a group of about a dozen collaborators (particularly citing his initial mentor Alfred B. Schultz) from several professional institutions: Computer Sciences Corporation, The Applied Physics Lab, The Westminster Astronomical Society, NASA God-

dard, UC Berkeley, and others.

Talk Outline

- Introduction: The what (what will be attempted) and the why.
- History: Presented in terms of one particular application, finding and observing terrestrial planets around nearby stars; the potential scope is broader.
- Umbras: A general discussion of occultation.

- Ground Demonstration: Work with the Westminster group.

Ground-based and HST surveys are starting to yield direct images of extrasolar planets, but those available are very far away from their suns, and/or very large.

The general objective is to distinguish a faint source next to a bright source. Dis-

(Continued on page 3)

NCA Events This Month

The Public is Welcome!

NCA Home Page: <http://capitalastronomers.org>

NCA Mirror- and Telescope-making Classes: Fridays, June 3, 10, 17, and 24 ; July 1, 8, 15, 22, 29; August 5, 12, 19, 26 6:30 to 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, June 11 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.

Upcoming NCA Meetings
2005: June 4

Observing with the NCA C-14

Mike McNeal

Day, Date and Time	Prime Objects
Sat., June 4, 9:00 P.M.	NCA Star Party
Sat., June 11, 9:00 P.M.	Rock Creek Park: <i>Exploring the Sky</i>
Sat., June 18, 9:30 P.M.	Alcor, Mizar
Sat., June 25, 9:30 P.M.	Alberio

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 menealmi@verizon.net to let him know you are coming.

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).

Directions to the June Meeting

Jay Miller

Here are the directions to the District of Columbia Radio Control Club field from their web site (<http://www.dc-rc.org/>):

Driving Directions

From Clopper Road (MD 117) North, left

on Schaeffer Road, which is the first left after MD route 118. The Walt Good field entrance is about 3.5 miles on the left (just after the one lane bridge). From MD Route 118 West from Interstate 270. Right at MD Route 117, Clopper Road and take the

the first left on to Schaeffer road. The entrance to the Walt Good Field is about 3.5 miles on the left.

Four Things to do in June, July, and August

Jay Miller

Get Deeply Impacted!

Go to the Deep Impact open house at the UMD Physics Lecture Hall for the impact which is scheduled to happen at 1:50 A.M. July 4. You have to first register at www.astro.umd.edu/deepimpact

Observatory Open House

Check on the University of Maryland Ob-

servatory, in College Park open house schedule at: www.astro.umd.edu/openhouse.

Shenandoah Astronomical Society Meeting

The Shenandoah Astronomical Society (home.worldnet.att.net/~shenastro) will have a meeting on Monday, June 6 in Mid-

dletown, VA where they will discuss making your own moving telescope platform.

Green Bank Star Quest

The 2nd annual Green Bank Star Quest will take place from July 6-10 at Green Bank Observatory's dark sky site. More info at: www.greenbankstarquest.org or www.caacwv.org.

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.

2005 Schedule

Date Time

6/11 9:00 P.M.
7/16 9:00 P.M.
8/27 8:30 P.M.
9/24 8:00 P.M.
10/8 7:30 P.M.
11/5 7:00 P.M.

Notes

The Big Dipper and the Summer Triangle 10-day-old Moon; Jupiter in the western sky
Pegasus and Andromeda rising; Hercules
Rock Creek Park Day; Andromeda Galaxy
Draconid meteor shower peak 10/8
Pleiades; possible Taurids meteor shower

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

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.

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

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

Thank you, Science Fair Judges!

We all appreciate the work of Bob Bolster, Steve Robinson, and Andrew W. Seacord, II, and Wayne Warren to do the 2005 science fair judging at the Fairfax County Regional Science and Engineering Fair,

the Prince George's Regional Science Fair, and the Montgomery Area Science Fair.

Without the time and effort put in by these NCA members, we would have no

science fair winners. So we want to say a big "Thank you" to the judges!

Review of talk by Ian Jordan, *continued*

(Continued from page 1)

playing a simulated bright:faint pair of intensity ratio 150:1, Mr. Jordan stated that observation of terrestrial planets would require $\sim 10^{10}$ greater contrast capability. He produced a plot of the number of as-yet observed extrasolar planets vs. their M/M_{sun} ; very few weigh less than the several times the Sun. Those which have been observed required a contrast capability $\sim 10^{-2}$ of that which would be needed to observe an Earth-equivalent object.

Mr. Jordan then played a movie strip in which Carl Sagan demonstrated observation by occultation to a classroom of children.

The Proposed Vehicle Design

The speaker then showed a square screen unrolled for operation, with solar cells on

the reverse face, and an ion-propulsion unit for placement at a position some tens of thousand kilometers from a telescope.

He showed an ion-propulsion unit tens of thousands of kilometers from a telescope.

Mr. Jordan then showed a graphical simulation of edge-discrimination which favorably compared a suitably occulted $\lambda/100$ mirror to an unocculted $\lambda/1000$ mirror (the latter extremely hard to make).

Following that, he displayed a comparison of the population of stars, which could be studied with this technique.

History of Occulters

Mr. Jordan showed a history of occulters from Danielson in 1962 to Lyon and Schultz in 2001. He showed design drawings of the following:

- The Woodcock: a 60 meter disk unfolding umbrella occulter.
- The BOSS: a variable transmission screen occulter, employing continuously graduated apodization for high nulling.
- The UMBRA: an unrolled square of multilayer mylar, aluminized and painted black.

Ground Tests

These employ a principle of scaling, that D be proportional to the square root of z, where D is the diameter of the occulter and

(Continued on page 6)

Mid-Atlantic Occultations and Expeditions

by David Dunham

Asteroidal Occultations

Date	Day	EDT	Star	Mag	Asteroid	dmag	sin.	Location
Jun 17	Fri	23:44	2UC17338978	11.3	Baptistina	2.8	27	DE, MD, wPA
Jun 27	Mon	3:01	SAO 109378	9.3	Mars	0.0	236	e. USA
Jun 27	Mon	3:25	SAO 140606	8.2	Francette	7.6	113	sOH, WV, sPA-low
Jul 10	Sun	5:51	SAO 213005	9.2	Sylvania	3.4	84	w. NC-low, dawn
Jul 12	Tue	4:22	SAO 127194	8.1	Kallisto	4.4	142	nPA, nNJ, NYC
Jul 13	Wed	2:39	TYC06130689	10.9	Misa	4.3	46	w&nVA, MD, DC, NJ
Jul 24	Sun	5:36	SAO 146999	8.7	Armenia	5.2	122	cen. Tenn.
Jul 27	Wed	22:02	TYC56250739	11.7	Amaryllis	3.0	168	wPA, WV, wVA, wNC

Grazing Occultations through Early Sept., 2005

DATE	Day	EDT	Star	Mag	% alt	CA	Location
Jun 10	Fri	21:11	SAO 80288	8.6	15+	28 16N	Hvr dGrace, MD; Dover, DE Sun-7d
Jul 2	Sat	4:41	SAO 75923	8.0	16-	22 15N	Amaranth&Lewi sburg, PA; Sun-11d
Jul 18	Mon	1:07	Antares	1.1	84+	11 3N	Fayetteville & Coinjock, NC
Aug 13	Sat	22:20	SAO 184032	7.8	60+	15 3N	nWV, nSomerset & Harrisburg, PA
Aug 22	Mon	2:43	SAO 109126	7.2	91-	51 20N	Bryantown, MD
Aug 26	Fri	4:09	ZC 567	6.8	53-	57 15N	Myersv., MD; York&Allentown, PA
Aug 28	Sun	2:44	SAO 77267	8.3	34-	22 13N	Winchstr, VA; Myrsv., MD; York, PA
Aug 29	Mon	5:29	X90047	10.4	24-	43 13N	Alxandria, VA; Bowi e&Crofton, MD

Total Lunar Occultations

DATE	Day	EDT	Ph Star	Mag	% alt	CA	Sp.	Notes
Jun 10	Fri	21:21	R SAO 80288	8.6	15+	27 ON	K5	Sun -9; graze, ne MD
Jun 13	Mon	0:25	D 37 Leonis	5.4	32+	3 23S	M1	ZC 1504; Az. 285 deg.
Jun 17	Fri	21:08	D ZC 2002	6.8	79+	37 45S	K0	Sun alt. -6 deg.
Jun 18	Sat	1:13	D ZC 2017	6.4	80+	14 58S	K1	Az. 237 deg.
Jun 19	Sun	23:56	D ZC 2269	5.4	94+	26 89S	B5	Maybe close double
Jun 20	Mon	2:32	D V913 Sco	5.4	95+	11 87N	B5	ZC 2286; Az. 225 deg.
Jun 25	Sat	1:53	R 33 Cap	5.4	86-	21 83N	K0	ZC 3130
Jul 2	Sat	3:45	R 63 Arietis	5.3	16-	12 87N	K3	ZC487; Az. 73; 2*mg8, sp". 5
Jul 2	Sat	4:28	R ZC 492	6.1	15-	20 67S	A1	
Jul 10	Sun	22:08	D SAO 99272	7.5	18+	12 42S	K2	Azimuth 274 deg.
Jul 16	Sat	22:04	D RS Librae	7.0?	75+	26 24S	M	X39434; min. mag. 13
Jul 21	Thu	3:28	D omega Sgr	4.7	100+	17 69N	G3	ZC 2910; term. dist. 5"
Jul 21	Thu	3:47	R omega Sgr	4.7	100+	15 38N	G3	WA 333; term. dist. 2.1"
Jul 21	Thu	4:27	D 60 Sgr	4.8	100+	10 54S	G8	ZC2914; term. d. 3"; dble.
Jul 25	Mon	5:53	R 24 Psc	5.9	79-	45 77S	G9	ZC 3514; close=dbl; Sun-3
Jul 30	Sat	4:56	R 36 Tauri	5.5	28-	41 85N	G0	Close double, sep. ". 04?
Aug 1	Mon	3:33	R SAO 77604	7.0	12-	9 72S	K0	Azimuth 62 deg.
Aug 1	Mon	3:54	R SAO 77619	7.1	12-	13 51S	F2	Azimuth 65 deg.
Aug 1	Mon	5:04	R 136 Tauri	4.6	12-	25 45S	A0	ZC 890; Sun-12; double?
Aug 2	Tue	4:09	R ZC 1035	6.7	7-	6 58N	K3	Az. 59; close double?
Aug 11	Thu	20:22	D ET Vir	4.9	38+	25 8S	M1	ZC 2029; Sun alt. -4
Aug 15	Mon	20:48	D W Sgr	4.7	81+	21 9S	G0	ZC 2609; Sun-9; double?
Aug 18	Thu	21:22	D 33 Cap	5.4	99+	14 54S	K0	ZC3130; Az. 133; term. 11"
Aug 24	Wed	3:47	R ZC 299	6.0	73-	60 22S	M2	
Aug 24	Wed	22:52	R ZC 402	6.4	65-	3 82N	K2	Azimuth 69 deg.
Aug 25	Thu	0:52	R 40 Arietis	5.8	64-	25 84N	K1	ZC 415; Close double?
Aug 26	Fri	1:26	R SAO 76088	7.4	54-	24 74N	F2	Moon in outer Pleiades

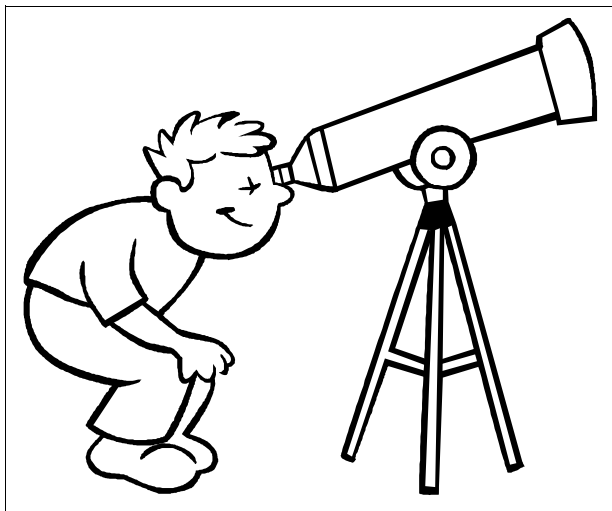
(Continued on page 5)

Mid-Atlantic Occultations and Expeditions

(Continued from page 4)

DATE	Day	EDT	Ph	Star	Mag	%	alt	CA	Sp.	Notes
Aug 26	Fri	3: 21	R	SAO 76156	6.9	53-	46	88N	A0	2nd* mg10 sep3. 6", PA335
Aug 26	Fri	4: 56	R	ZC 556	5.4	52-	64	84S	B8	spectroscopic binary
Aug 26	Fri	5: 27	D	ZC 567	6.8	52-	69	-2N	A0	Triple; see grazes
Aug 26	Fri	5: 51	R	ZC 567	6.8	52-	72	31N	A0	Sun-8; X33507 R 9s before
Aug 26	Fri	5: 55	R	ZC 564	6.2	52-	72	69N	B8	Sun alt. -7 deg.
Aug 26	Fri	6: 12	D	ZC 570	7.0	52-	74	6N	A2	Sun -4; VA graze
Aug 26	Fri	6: 22	R	ZC 570	7.0	52-	74	20N	A2	Sun alt. -2 deg.
Aug 27	Sat	1: 53	R	ZC 698	7.5	43-	21	57S	K2	
Aug 28	Sun	3: 41	R	ZC 840	6.3	33-	33	63S	K0	Maybe close double
Aug 28	Sun	4: 05	R	SAO 77314	8.2	33-	37	69N	B8	Moon in Milky Way
Aug 29	Mon	2: 25	R	SAO 78410	7.7	25-	10	16S	K1	Not shown many fainter
Aug 29	Mon	4: 39	R	SAO 78480	7.5	24-	34	90S	K5	Close double?
Aug 29	Mon	5: 10	R	SAO 78496	7.5	24-	40	71S	K0	
Aug 29	Mon	6: 01	R	49 Auri gae	5.3	24-	49	71S	A0	ZC 1008; Sun alt. -7
Aug 29	Mon	6: 05	R	SAO 78530	7.8	24-	50	48N	B9	Close double?
Aug 31	Wed	5: 06	R	SAO 80089	7.2	10-	18	37S	G5	
Sep 8	Thu	20: 41	D	ZC 2115	7.2	25+	9	40N	A6	Azi muth 235 deg.
Sep 9	Fri	20: 01	D	SAO 183713	7.4	34+	18	75N	A5	Sun alt. -8 deg.
Sep 10	Sat	21: 14	D	ZC 2397	6.5	45+	13	46S	K1	Azi muth 217 deg.
Sep 10	Sat	22: 32	D	ZC 2405	6.6	45+	3	38N	A2	Azi muth 231 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



Support the IDA

The deadline for the September Star Dust is August 15. 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.

Join the International Dark-Sky Association

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*The June NCA Meeting
is a star party and
elections in a new
location! See the
President's message on
Page 1.*

Review of talk by Ian Jordan, *continued*

(Continued from page 3)

z is occulter-mirror separation.

Specifically, Mr. Jordan's group pursued a "North Star Occulter Test", exploiting the near-stationarity of Polaris. The objectives were to:

- Characterize the square occulter's diffraction pattern.
- Validate their proposed focal-plane alignment technique.
- Demonstrate utility of their technique in detection of a faint companion.
- Demonstrate the feasibility of scaled ground testing.

He said that astronomy and photometry of multiple field sources in numerous sequential images is required.

Mr. Jordan discussed initially, as a representative case of scaling, $D = 4$ meters, $z = 20,000$ km to $D = 9$ mm, $z = 100$ meters. Thus the experiment could be pursued with "common hardware." Actually, they employed a 101 mm refractor masked to 11 mm or to 24 mm. Square occulters were used, 1" and 2" on an edge, these centered within a 12" diameter light shield about 6' long.

The apparatus was depicted in a number of photographs.

A green laser was used for alignment and

for targeting of Polaris. Alignment of the light shield was accomplished using a back-reflection of the laser co-mounted with the telescope. A green beam was shown, photographed at Polaris, humorously ascribed to the "Polarians" "returning" the beam. Due care was given to avoid aircraft.

There was no provision for tracking Polaris; rather, the star was allowed to drift past, near the axis of alignment. Three-second movie strips show the star's light

Mr. Jordan's group pursued a "North Star Occulter Test", exploiting the near-stationarity of Polaris.

attenuated by 99 ¾ %. An attractive feature of the square occulter is apparent, in that diffraction is restricted to four spikes, one

emanating perpendicularly from the center of each edge of the square. As the star is occulted, the four spikes afford a clear indication of its location.

Closing the technical discussion, Mr. Jordan briefly discussed the various mechanisms of acceleration of the two-unit system in the vicinity of the L2 point: gravitational components, solar light pressure, and the solar wind. His understanding was that thousands of seconds of drift of the target star could be accommodated. An audience member suggested that a laser beam be used as a reference line for feedback control.

Next questions centered upon the difficulties of maintaining station for the two units, given the saddle-shaped cusp of the gravitational potential near L2. These afford a minimum tangentially to Earth's orbit; but along the extended Sun-Earth axis there is a shallow maximum within a narrow canyon.

Mr. Jordan, in response to a question about the potential for funding of an actual orbiting occulter-telescope pair, replied that his objective has been to "demonstrate that the technique could not work": i.e., to exclude, if possible, this technique from the realm of consideration. His position evidently is that this has not as yet been demonstrated.

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Editor: Elliott Fein, Co-editor: Adele Fein, Editorial Advisor: Nancy Byrd. Consultant: Jeffrey Norman
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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. Most of these NCA members are also members of the International Occultation Timing Association (IOTA).

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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All members receive Star Dust, the monthly newsletter announcing NCA activities. As an added optional benefit to extend your knowledge of astronomy you may also choose Sky and Telescope magazine at the discounted rate of \$33.

Student Membership: \$15with *Sky and Telescope*....\$48

Standard Individual or Family Membership: \$27with *Sky and Telescope*....\$60

You are welcome to make contributions in any amount in addition to the dues shown above.

Contribution amount: _____

Please mail this form with your check payable to National Capital Astronomers, to:

Mr. Jeffrey Norman, NCA Treasurer; 5410 Connecticut Avenue, NW #717; Washington, D.C. 20015



National Capital Astronomers, Inc.

If undeliverable, return to
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**FIRST CLASS
DATED MATERIAL**

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