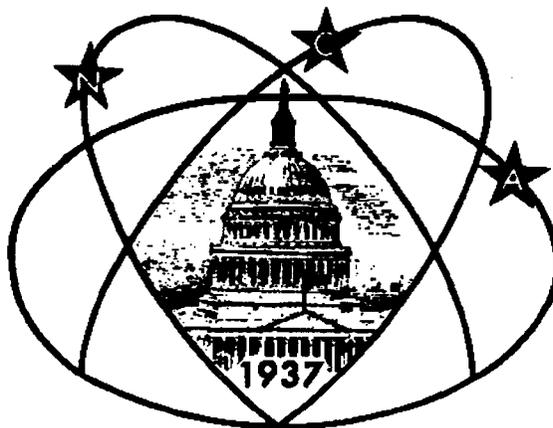


Star



Dust

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## David Crawford to Discuss Recent Progress with Light Pollution and the Development of a Global Network of Automated Telescopes

*By Wayne H. Warren Jr.*

The next meeting of the National Capital Astronomers will be held on January 8, 1994 at 7:30 PM in the Bunim Room of the Clinical Center (Building 10, floor 9) at the National Institutes of Health. At this meeting, we are pleased to have Dr. David L. Crawford of the National Optical Astronomy Observatories and President of the International Dark Sky Association (IDA) to describe recent developments in the battle against light pollution and his efforts to establish a global network of automated telescopes (the GNAT project).

The IDA is a tax-exempt, nonprofit organization incorporated (in the state of Arizona and Tucson-based) in 1988 and dedicated to the preservation of the night sky and to the reduction of energy waste by unnecessary lighting. Its membership includes amateur and professional astronomers, lighting engineers and companies, and others interested in dark skies and/or in quality nighttime lighting and energy savings. The IDA presently has almost 1300 members from 49 states and DC, and 53 countries other than the USA. Anyone who has visited Tucson and other areas in Arizona in recent years realizes what a difference the enactment of light ordinances can make in the control of light pollution. The sky glow from Tucson has actually decreased over the last 5 years, even though the city has grown substantially. IDA produces a number of useful items that

illustrate the issues and educate others about the problems of inefficient lighting. These include information bulletins, slide sets, posters such as "The Earth at Night" and "North America at Night", and other miscellaneous publications. As voluntary President of the IDA, Dr. Crawford dedicates much of his personal time to lighting issues and has been instrumental toward convincing officials and local governments to enact light control legislation.

Dr. Crawford has more recently become involved in a project to create a global network of automatic telescopes for making photometric (and eventually spectroscopic) observations robotically. Many of us are familiar with the significant accomplishments of Genet, Boyd, and their collaborators in the development of robotic telescopes, but many may not know that Dr. Crawford has been a consultant to the Fairborn Observatory since almost the beginning of this work. He has also been closely associated with large telescope projects since he was the Associate Director of Kitt Peak National Observatory in the early 1970s, at which time the 4-meter telescopes of KPNO and Cerro Tololo Inter-American Observatory (CTIO) were being built. In fact, he acted as Project Manager for AURA during the period 1963-1973 while the 4-meter telescopes were being designed and constructed.

*See CRAWFORD, Page 2*

## January Calendar

*The Public is Welcome!*

**Tuesdays, January 4, 11, 18, and 25, 7:30 PM** - Telescope making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 202/362-8872.

**Fridays, January 7, 14, 21, and 28, at 7:30 PM** - Telescope making classes at American University, McKinley Hall Basement. Information: Jerry Schnall, 202/362-8872.

**Fridays, January 7, 14, and 21, 8:30 PM** - Open nights with NCA's Celestron-14 telescope with Bob Bolster, 6007 Ridgeview Drive, south of Alexandria off Franconia Road between Telegraph Road and Rose Hill Drive. Call Bob for details 703/960-9126.

**Saturday, January 8, 1994, 5:30 PM** - Dinner with the speaker at the O'Donnell's Restaurant (8301

Wisconsin Avenue) before the monthly meeting. Reservations are for 5:30PM sharp.

**Saturday, January 8, 1994, 7:30PM** - Dr. David L. Crawford will speak on "The International Dark-Sky Association and the Global Network of Automatic Telescopes Project." Meeting will be held in the Bunim Room at the National Institutes of Health. For directions, refer to map and description on back page.

### **Celestial Navigation Course**

**Beginning Monday, January 31, 1994, 7:30 - 9:30 PM**, a ten week course (12 classes) in celestial navigation fundamentals, including use of sextant and the hand calculator will be offered in Bethesda, MD. The instructor, NCA member, George Lear, is a USCG licensed master with offshore sailing experience as coach with the USNA Sailing Squadron, a professional engineer, and former college math instructor. Call George for details: 301/986-0314.

### **Smithsonian Sky Watchers' Report**

Non-technical information recording on astronomical events, objects, and phenomena in the Washington, D.C. region's sky. Updated weekly.

202/357-2000

### **Sky & Telescope's "Skyline"**

Moderately technical information recording on latest in space technology, astronomy, and related sciences. Updated weekly, or sooner if necessary.

617/497-4168

### **CRAWFORD, From Page 1**

Dr. David L. Crawford was educated at the University of Chicago, where he earned a Ph.D. under the guidance of Professor Bengt Strömberg, an astronomer/astrophysicist of world renown who made significant contributions in both theoretical and observational astronomy. And Dr. Crawford has made significant contributions himself in the areas of stellar photometry, galactic structure, the study of open star clusters, and in astronomical instrumentation. Following graduate school, he was an assistant professor of astronomy at Vanderbilt University for two years (1958-1960), after which he joined KPNO, where he has been a staff astronomer ever since. In the mid sixties, he designed and developed a standard system for H-beta narrow-band photometry, for which he and Jeannette Mander published the standard-star data still in use today. Later, Dr. Crawford and Jeannette Barnes (née

Mander) made thousands of photoelectric observations in the four-color (uvby) photometric system to define the some 300 or so standard stars for that system. Important for me personally was that Dr. Crawford supervised my own dissertation work involving a four-color and H-beta study of the Orion OB 1 stellar association surrounding the famous Orion Nebula.

Come and join Dr. Crawford and other NCA members to learn about the latest developments in the control of light pollution and in the construction of low-cost automated telescopes. As an associate member of IDA, NCA supports IDA objectives and its members have been actively involved in local lighting issues in the Washington area, which, as we all know, can really use some light control.

# GEOSTATIONARY SATELLITE GRAZES ORION NEBULA THIS MONTH

*By Leith Holloway*

The communication satellite IS5F13 (Intelsat Series 5, No. 13) passes about one-half degree south of the center of the Orion Nebula each night this month at convenient times and at a near full phase. This satellite is 23,000 miles up in space and appears about 11th magnitude. I have seen it twice this year (with the NCA's Celestron-14 at Bob Bolster's observatory and with the 12-inch reflector of the NASA Astronomy Club in Greenbelt with Jeff Guerber's help). Under darker skies it could probably be observed with smaller apertures.

With clock drive off this satellite appears stationary as the background stars drift slowly westward by it. One gets the illusion that the satellite is moving eastward, but it never leaves the field as long as the telescope is not moved. In the Washington metropolitan area IS5F13 will pass close to 2.8-magnitude iota Orionis (5h 35m, 5.9°S) at 11:10 p.m. EST on Dec. 1, 1993 and at 10:51 p.m. EST on Dec. 6th. Notice that the satellite passes the vicinity of the nebula about 4 minutes earlier each night.

On the 11th, 16th and 21st the satellite is nearest iota ORI at 10:31, 10:12 and 9:52 p.m. EST respectively. Times on intervening dates can be determined by subtracting multiples of four minutes from the times of earlier dates. I would appreciate getting star fixes on the satellite to check the accuracy of my prediction program. Times in UT to the nearest second and observing site coordinates to the nearest arcminute are accurate enough for my purposes. Good luck with your observing!

Leith Holloway

Telephone: (301) 564-6061

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## NASA's Astronomical Data Center (ADC) and National Space Science Data Center (NSSDC) Archives and Computer Resources

*by Wayne H. Warren Jr.*

The December 4, 1993 NCA meeting was held in the Lippsett Amphitheater of the National Institutes of Health. At this meeting, NCA members and guests were treated to a description and online demonstration of the data and information resources of the NSSDC and ADC located at NASA's Goddard Space Flight Center by NCA member Dr. Nancy G. Roman.

Dr. Roman began her presentation by describing the purpose and history of the NSSDC, which was established in 1967 to acquire, archive, and disseminate data from NASA space missions so that they would be available for scientific studies beyond those of the principal investigators who originally took the data. In addition to data from U. S. space missions, the NSSDC has archived and disseminates data from a wide variety of foreign missions, plus ground-based data that may be of use to support future space missions. In the early 1970s, following the establishment of a stellar data center in Strasbourg, France under the auspices of the International Astronomical Union, Dr. Jaylee M. Mead of Goddard's Laboratory for Optical Astronomy, began an effort to collect astronomical catalogs in machine-readable form and to distribute them informally when requested. This project started as a loose collaboration with the Strasbourg center and was funded directly from

NASA Headquarters by Dr. Roman's division. The ADC was formally organized in 1977 when Dr. James I. Vette, then Director of the NSSDC, agreed to establish the ADC within his organization. Shortly thereafter (January 1978), a cooperative agreement was negotiated between NASA and the Centre de Données Stellaires (CDS, as it was then known) to exchange data and to coordinate their efforts to

*See ROMAN, Page 4*

### OBSERVER'S HANDBOOK

*By Jeff Norman*

Copies of the "Observer's Handbook" for 1994, published by the Royal Astronomical Society of Canada, will be on sale at the January 8, 1994 NCA monthly meeting and at all subsequent meetings until they are sold out. The price is \$12. Please bring a check for \$12 made out to "National Capital Astronomers" rather than cash. If you would like a copy and cannot attend the meeting, please call Jeff Norman evenings or weekends at (202) 966-0739 to make other arrangements.

### *ROMAN, From Page 1*

reduce redundancy and to provide wider data availability to the scientific community. Since that time, a worldwide network of astronomical data centers has been established with members in Argentina, China (PR), France, Germany, Japan, Russia, and the USA.

Although the ADC archive consists primarily of ground-based astronomical catalogs, some space-based data are included as well when these are in the form of catalogs compiled from particular space missions (catalogs from the Infrared Astronomical Satellite, the International Ultraviolet Explorer, and the Small Astronomy Satellite series are examples). The ADC holdings, which are grouped according to general data type (positional, photometric, spectroscopic, crossidentification of objects, combined data, miscellaneous, nonstellar, and radio) currently number more than 700 catalogs and other data sets. Historically, these catalogs were distributed by request on magnetic tape and a Status Report giving information on all catalogs was published regularly in the *Astronomical Data Center Bulletin*, a periodic publication of the ADC that was begun in 1980 to disseminate information about ongoing projects and archive content to the scientific community. More recently, the ADC has moved toward the newer technologies of compact disk and network distribution, the *Bulletin* being replaced by a quarterly ADC *Electronic News* that provides updates to the list of data available. In 1991, the ADC produced a CDROM containing 114 of its most frequently requested catalogs. The only major catalogs available at the time and not included on the CDROM were the series of *Durchmusterungen* (Bonner, Córdoba, Cape Photographic), which were omitted because of their large sizes. (These catalogs, containing some 1.5 million entries for 1.2 million stars, had been computerized over a period of 15 years as one of the cooperative data center efforts mentioned earlier.) However, the *Durchmusterung* catalogs and a cross index of double stars have recently been published in book form as NASA Reference Publications 1297-1300, 1302 and are available from the NSSDC for \$150. For all ten volumes (but note that NSSDC publications and data products are available at no cost to NASA affiliated and supported researchers). Several thousand copies of the ADC CDROM have been distributed to date and it is still available (in standard ISO 9660 format) from the NSSDC for a cost of approximately \$25 (see address below).

Dr. Roman then went on to demonstrate the NSSDC NODIS (NSSDC Online Data and Information Service) system for obtaining information and requesting data. This system provides a menu-driven interface and can be used by direct dial-in or TCP/IP Internet connection to the NSSDC computer system. It is available free of charge to anyone who can access the system. The following procedure allows access to the GSFC Local Area Network (LAN) or to the NSSDC computer directly:

1. Dial 286-9000 (area code 301 from nonlocal, 286-9500 for even parity; 2400 baud); or dial 286-4000 (4500 for even parity; 9600 baud).
2. At ENTER NUMBER prompt, enter "ncf" to connect to a terminal server (omit quotation marks).
3. At NTDS1> prompt, enter "c NSSDCA".
4. At "login" prompt, enter "NODIS" (no password required).
5. The system will then ask for personal identification and check to see if the user is already entered in the NSSDC database. If not, the user is asked to key in information that will

be entered into the database for future reference. Information about terminal type and interface will then be requested.

For users who have network access, the system is available via TCP/IP (Internet) by issuing a telnet command to [nssdca.gsfc.nasa.gov](http://nssdca.gsfc.nasa.gov) and from NSI/DECNET by "set host NSSDCA" followed by steps 4 and 5 above.

The NODIS system provides a menu to access to the various areas of information present. To use the ADC online system, select astrophysics (item 2) and Astronomical Data Center Catalogs (item 1). The ADC Online System allows access to the ADC archives by catalog number (if known), short title (including author), or by key word(s). Information available for individual catalogs includes computer parameters such as record length (logical) and number of records for each catalog file, plus brief descriptions and literature references if they are available. It is also possible to request data for staging and direct access via TCP/IP ftp data transfer, in which case the requester is notified by electronic mail when the data are ready for transfer. It is not yet possible to transfer data using KERMIT, but this is being discussed and may be available in the near future. (Note: KERMIT data transfer is very slow relative to ftp and it is not advisable to use it for large volumes of data, especially via telephone lines that might break a connection after a couple of hours of transfer time.) Data can also be obtained on diskettes (for small catalogs) and on various standard magnetic tape media, in which case they are sent by regular mail.

Other options available in NODIS include the NSSDC Master Directory that provides information about where to obtain data, even if they are not archived at the NSSDC, a list of CDROMs available for distribution, an online version of the NSSDC Newsletter, and several additional selections. The main menu provides options for Multi-Disciplinary, Astrophysics, Space Physics, Planetary Sciences, Earth Sciences, and Life Sciences/Microgravity information.

Dr. Roman proceeded to demonstrate the use of a few other menu options and the system was seen to be very easy to use and comprehend. She then asked for a volunteer to try the system and Harold Williams made several queries for demonstration purposes. The system performed very well via the dial-up modem connection and should be valuable for NCA members who can access it from their home or business computers and terminals.

For offline access to the NSSDC through its Coordinated Request and User Support Office (CRUSO) to obtain information and request data, users can write to CRUSO, National Space Science Data Center, Code 633, NASA Goddard Space Flight Center, Greenbelt, MD 20771 (telephone 301286-6695; electronic address [request@nssdca.gsfc.nasa.gov](mailto:request@nssdca.gsfc.nasa.gov)).

Dr. Roman's clear description and very successful online demonstration of NSSDC and ADC services showed how easily all of us can now access and use facilities previously available only to persons directly affiliated with the agencies involved. Thus, even as amateur astronomers working essentially from home, we now have access to and can use professional level systems and quality data at the cost of no more than a telephone call.

The NCA wishes to thank Dr. Roman for a very exciting presentation, member Jay Miller for volunteering the use of his personal notebook computer and for arranging the use of the Lippsett Amphitheater, and NIH for providing projection equipment and an audio-visual person to assist with the demonstration hardware.

# National Capital Astronomers, Inc.

is a non-profit, public-service corporation for advancement of the astronomical sciences and is the astronomy affiliate of the Washington Academy of Sciences. For information, call NCA: (301) 320-3621.

## SERVICES AND ACTIVITIES:

**A Forum** for dissemination of the status and results of current work by scientists at the horizons of their fields is provided through the monthly NCA Meeting. (See monthly *Stardust* for time and location.) All interested persons are welcome; there is no charge.

**Expeditions** frequently go to many parts of the world to acquire observational data from occultations and eclipses which contribute significantly to refinement of orbital parameters, the coordinate system, navigation tables and timekeeping. Other results of this work under continuing study include the discovery of apparent satellites of some asteroids, discovery of apparent small variations in the solar radius, and profiles of asteroids.

**Discussion Groups** provide opportunities for participants to exchange information, ideas, and questions on preselected topics, moderated by a member or guest expert.

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

**The NCA Public Information Service** answers many astronomy-related questions, provides predictions of the

paths and times of eclipses and occultations, schedules of expeditions and resulting data, assistance in developing programs, and locating references.

**Astronomical Telescope & Binocular - Public Seminar**, for Selection, Use, and Care, held annually in November, offers the public guidance for those contemplating the acquisition of a first telescope, and dispels the many common misconceptions which often leads to disappointment.

**Working Groups** support areas such as computer science and software, photographic materials and techniques, instrumentation, and others.

**Telescope-Making Classes** teach the student to grind and polish, by hand, the precise optical surface that becomes the heart of a fine astronomical telescope.

**NCA Travel** offers occasional tours, local and world-wide, to observatories, laboratories, and other points of interest. NCA sponsored tours for comet Halley to many parts of the southern hemisphere.

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

**Public Programs** are offered jointly with the National Park Service, the Smithsonian Institution, the U.S. Naval Observatory, and others.

## PLEASE ENROLL ME IN NATIONAL CAPITAL ASTRONOMERS MEMBERSHIP

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**Note:** If you already subscribe to *Sky & Telescope*, please attach a recent mailing label. You may renew this subscription through NCA for \$22 when it expires.

Make check payable to National Capital Astronomers, Inc., and send with this form to:

Leith Holloway 10500 Rockville Pike Apt. M-10, Rockville, MD 20852.

The following information is optional. Please indicate briefly any special interests, skills, vocation, education, experience, or other qualifications which you might contribute to NCA.

Thank you, and welcome!

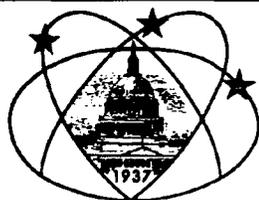
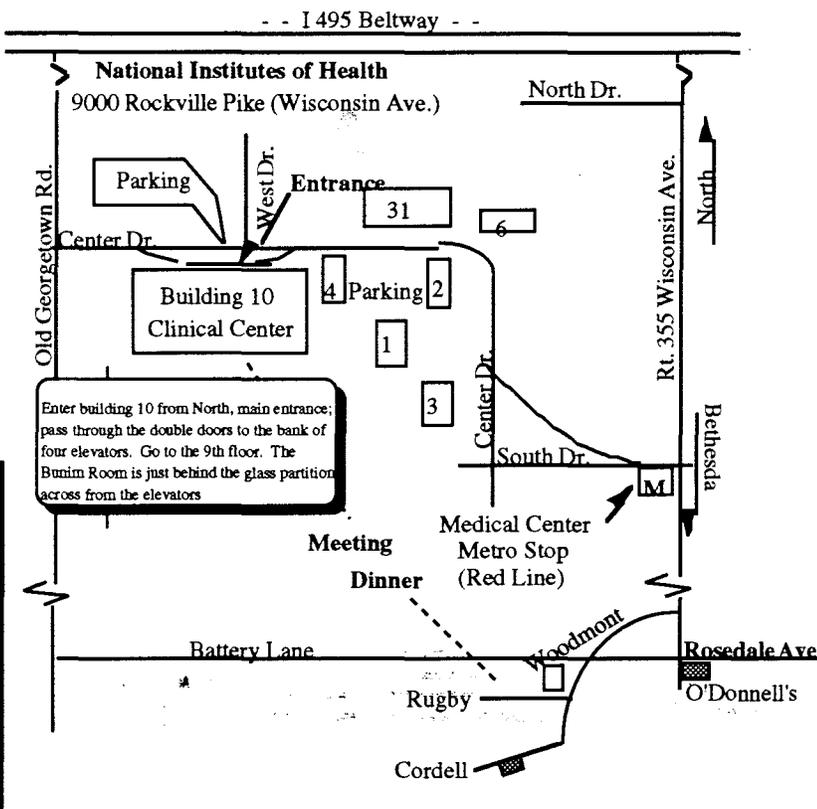
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# Getting to the NCA Monthly Meeting

•Subway Riders - From Medical Center Metro Stop: Walk down the hill, pass the bus stops and turn right at the anchor (onto Center Drive). Continue uphill to building 10, the largest building on campus. Also, the J2 bus line connects the Bethesda (7:16 PM) and NIH (7:23 PM) Metro stops with Building 10 (7:25 PM).

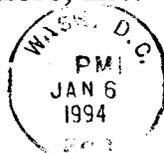
•To O'Donnell's Restaurant: Take Wisconsin Avenue toward Bethesda and proceed to Rosedale Avenue (opposite Battery Lane). The restaurant is on the corner of Rosedale and Wisconsin (8301 Wisconsin Avenue). Parking is available behind the restaurant. Seats are not guaranteed after 5:30.

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