

# NOVAC

THE NEWSLETTER OF THE NORTHERN VIRGINIA ASTRONOMY CLUB

NO. 113 • VOL. 25 • JULY/AUGUST 2004

## Deep Space Network 2-for-1 sale

By Patrick L. Barry

Call it a “buy one, get one free” sale for astronomers: Build a network of radio dishes for communicating with solar-system probes, get a world-class radio telescope with a resolution nearly as good as a telescope the size of Earth!

That’s the incidental bonus that NASA’s Deep Space Network (DSN) offers the astronomy community. Designed to maintain contact with distant spacecraft in spite of the Earth’s rotation, the large, widely spaced dishes of the DSN are ideal for performing a form of radio astronomy called “very long baseline interferometry” (VLBI).

VLBI produces very high resolution images of the cosmos by combining the output from two or more telescopes. The result is like having a giant “virtual” telescope as large as the distance between the real dishes! Since bigger telescopes can produce higher resolution images than smaller ones, astronomers need to use dishes that are as far apart as possible.

That need dovetails nicely with the DSN’s design. To maintain continuous contact with deep space missions, the DSN has tracking stations placed in California, Spain, and Australia. These locations are roughly equally spaced around

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### MESSAGE FROM THE PRESIDENT

## Cyclical patterns mark return of familiar friends

I’ve been thinking of cycles. Not wheeled ones, but ones that wheel. Those grand, natural cycles of events that arc across our lifetimes, helping to bound and define and glorify our days. Those waypoints along the path of the universe that readily mark something easily and fondly remembered. And the last two months can boast of some wonderful cyclic phenomenon: comets looping in for a rare visit, the Venus Transit, the summer solstice. The NOVAC Picnic. Perhaps you were fortunate enough to experience some of these with the weird churring of the cicadas as background music.



NOVAC President  
Rob McKinney

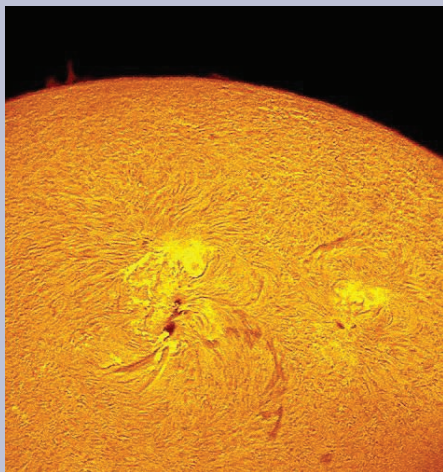
The NOVAC Picnic, while not exactly a natural phenomenon, was nevertheless a grand event. Thanks to Ed Witkowski and the many, many helpers who made it so fun and enjoyable!

Now it’s summer and the splendor of fireflies competing with the summer Milky Way await. I’m sure many of us have travel plans during vacation season. Are you taking a scope with you? Travel scopes seem to be a hot topic lately, so if you’ve ventured afield (particularly by airline) with a telescope, please share your experiences on the e-mail digest or by writing a review for our website.

My favorite “travel scope” has to be binoculars. I may be stretching the definition of “scope” to include binocs, but you have to admit they can’t be beat for portability and

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### ASTROPHOTO CORNER: THE SUN



Club member Greg Piepol took this image of the Sun on July 20, 2004 at 1600 UT. Visible in the center of the image is the eruption of Active Region 0652 and a Class M flare.

#### Specs:

- Solar rotation 2018, west is up
- 0.2Å solar spectrum H $\alpha$  filter
- Astro-Physics AP155 EDT refractor @f/50, 85mm aperture
- Baader Cool ERF, Solar Sentinel tilter
- 3.3 MP Olympus C-3040 digital camera
- 1/30 second shutter, afocal, hand held
- Processed with Image Plus and Adobe Photoshop CS.

# NOVAC

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## Deep Space Network, from page 1

the Earth, (separated by 120 degrees of longitude) that way at least one dish can always communicate with a probe regardless of Earth's rotation. That also means, though, that the straight-line distance between any two of the stations is roughly 85 percent of Earth's diameter, or about 6,700 miles. That's almost as far apart as land-based telescopes can be.

"We often collaborate with other VLBI groups around the world, combining our dishes with theirs to produce even better images," says Michael J. Klein, manager of the DSN Science Office at NASA's Jet Propulsion Laboratory. "Since our 70-meter dish in Canberra, Australia, is the largest dish in the southern hemisphere, adding that dish in particular makes a huge difference in the quality of a VLBI observation."

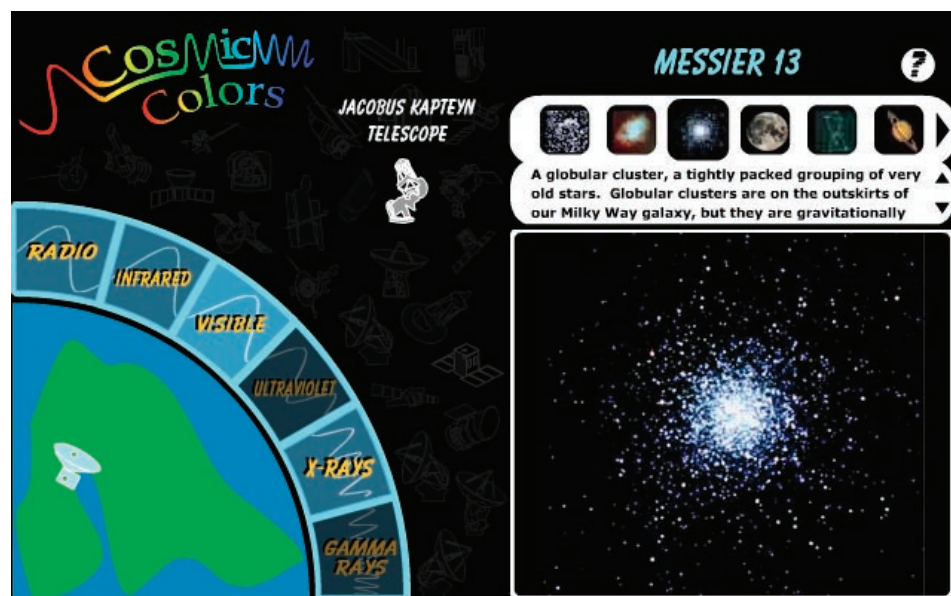
Even though only about 1 percent of the DSN's schedule is typically spared from

probe-tracking duty and scheduled for radio astronomy, it manages to make some important contributions to radio astronomy. For example, the DSN is currently helping image the expanding remnant of supernova 1987A, and Dr. Lincoln Greenhill of the Smithsonian Astrophysical Observatory is using the DSN dishes to explore a new way to measure the distances and velocities of galaxies.

And all this comes as a "bonus" from the dishes of the DSN.

To introduce kids to multi-wavelength astronomy, NASA's website for kids, The Space Place, has just added the interactive demo, "Cosmic Colors," at <http://spaceplace.nasa.gov/en/kids/cosmic/>

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration. \**



"Cosmic Colors" game from the NASA kids website.

## President, from page 1

utility! And there's something about looking at the stars with both eyes that's special.

So summer is here. The cycles of the weather patterns are favoring us so far with drier air and clearer skies. Grab your "travel scope". Head outside, far or near. Lift your gaze from the fireflies and hit "Play" on that cicada recording. And enjoy the grand, starry wheeling of the heavens above. \*

## Spruce Knob schedule

### 2004 dates (tentative)

August 13-14	2 nights
September 11-18	8 nights
October 14-16	3 nights

# Waiting for Cassini's "safe arrival" call

by Diane K. Fisher

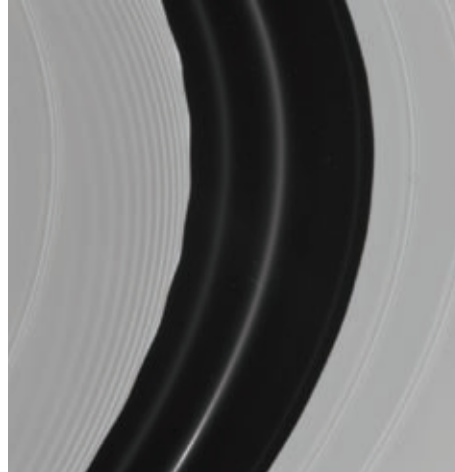
The evening of June 30, 2004, was nail-biting time at Cassini Mission Control. After a seven-year journey that included gravity assist flybys of Venus, Earth, and Jupiter, Cassini had finally arrived at Saturn. A 96-minute burn of its main engine would slow it down enough to be captured into orbit by Saturn's powerful gravitational field. Too short a burn and Cassini would keep going toward the outer reaches of the solar system. Too long a burn and the orbit would be too close and fuel reserves exhausted.

According to Dave Doody, a Cassini Mission Controller at the Jet Propulsion Laboratory (JPL) in Pasadena, California, there was a good chance the Earth-bound Cassini crew would have to wait hours to learn whether or not the burn was successful. Of the three spacecraft-tracking Deep Space Network (DSN) complexes around the globe, the complex in Canberra, Australia, was in line to receive Cassini's signal shortly after the beginning of the burn. However, winds of up to 90 kilometers per hour had been forecast. In such winds, the DSN's huge dish antennas must be locked into position pointed straight up and cannot be used to track a tiny spacecraft a billion miles away as Earth turns on its axis. "The winds never came," notes Doody.

The DSN complex at Goldstone, California, was tracking the carrier signal from Cassini's low-gain antenna (LGA) when the telltale Doppler shift in the LGA signal was seen, indicating the sudden deceleration of the spacecraft from the successful ignition of the main engine. Soon thereafter, however, Goldstone rotated out of range and Canberra took the watch.

After completion of the burn, Cassini was programmed to make a 20-second "call home" using its high-gain antenna (HGA). Although this HGA signal would contain detailed data on the health of the spacecraft, mission controllers would consider it a bonus if any of that data were actually captured. Mostly, they just wanted to see the increase in signal strength to show the HGA was pointed toward Earth and be able to determine the spacecraft's speed from the Doppler data. If possible, they also wanted to try to lock onto the signal with DSN's closed-loop receiver, a necessary step for extracting engineering data.

Normally it takes around one minute to establish a lock on the HGA signal once a DSN station rotates into range. Having only 20 second's worth of signal to work with, the



NASA/JPL/Space Science Institute

Right after entering Saturn orbit, Cassini sent this image of the part of the Encke Gap in Saturn's rings.

DSN not only established a lock within just a few seconds, but extracted a considerable

amount of telemetry during the remaining seconds.

"The DSN people bent over backwards to get a lock on that telemetry signal. And they weren't just depending on the technology. They really know how to get flawless performance out of it. They were awesome," remarks Doody.

Find out more about the DSN from JPL's popular training document for mission controllers, Basics of Space Flight ([www.jpl.nasa.gov/basics](http://www.jpl.nasa.gov/basics)) and the DSN website at [deepspace.jpl.nasa.gov/dsn](http://deepspace.jpl.nasa.gov/dsn). For details of the Cassini Saturn orbit insertion, see [www.jpl.nasa.gov/basics/soi](http://www.jpl.nasa.gov/basics/soi). Kids can check out The Space Place at [spaceplace.nasa.gov/en/kids/dsn\\_fact1.shtml](http://spaceplace.nasa.gov/en/kids/dsn_fact1.shtml) to learn about the amazing ability of the DSN antennas to detect the tiniest spacecraft signals.

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration. \**

## Sky Meadows public observing nights

### 2004 schedule

Date	Comments
Aug 14, Saturday	2 days before new moon.
Sept 18, Saturday	4 days after new moon.
Oct 9, Saturday	3 days after last quarter moon.
Oct 28, Thursday	Lunar eclipse! Program starts at sunset. Umbral phase starts 9:14 pm; total eclipse 10:23–11:45 pm; ends 12:53 am Friday
Nov. 13, Saturday	1 day after new moon.

Saturday observing time is sunset–11 pm.

**Sky Meadows State Park, near Paris, Virginia**—Join Sean O'Brien, staff astronomer of the Albert Einstein Planetarium, and other local amateur astronomers, for public telescopic observing under dark, star-filled skies, away from city lights. The evening begins with a short night sky orientation at dusk, followed by telescopic observing of various astronomical objects.

*Sky Meadows State Park is west of Washington, D.C. on US Route 17 North, 1 mile south of US Route 50, or 7 miles north of Interstate 66, Exit 23. The park contact phone number is (540) 592-3556. There is a \$4 parking fee per car. Please cover flashlights with a red filter or a brown paper bag. Dress warmly. In case of clouds or rain, an amateur astronomer will lead a short alternate program.*

This isn't an official NOVAC event, but NOVACians are the preponderance of telescope volunteers. Telescope volunteers get in free, and can observe until 1:00 am.

# Meeting notes

## Board of Trustees Meeting

Tuesday, May 4, 2004

\* **Pedro Martinez** reported club dues for the **International Dark-Sky Association (IDA)** membership needs to be paid soon to remain current. There was some discussion of **Rob McKinney's** e-mail recommendation that NOVAC increase its level of membership from Sponsor Level to Supporter Level to fulfill an objective to fight light pollution recommended at the Board's off-site in March. A motion was made, seconded and carried to increase NOVAC's annual dues to the International Dark-Sky Association to \$500.

\* **Phil Wherry** indicated that the club now has 851 members from 649 households, including 18 new members. He is reworking the membership and renewal forms. **Renewal responses** indicated appreciation for the newsletter and website, as well as the nice group dynamics within the club. One DC-based member indicated feeling a little isolated from club activity. Members from outside the area continue to join, likely in order to gain access to Spruce Knob for dark-sky observing.

## General Meeting

Sunday, May 9, 2004

\* **Greg Piepol** indicated he would cover the June transit of Venus for the **Sky Tour**, focusing primarily on the timing and other details of the event and not on the whole history of Venus transits. Questions arose whether or not **Pete Johnson** would do an Observer's Challenge at the June meeting. **Ed Seward** indicated there was nothing new to report on speakers for upcoming General Meetings. Greg Piepol reported the new ISP for the **club website** is very responsive and no real problems exist at present other than a few AOL members having problems getting access to the site.

\* **Alan Figgatt** reported on the current status of loaner telescopes. He said,

except for **Jim Richberg** (temporary basis), there has been no response to a call for a volunteer custodian for the **Powers-16 telescope**. It was noted that this telescope is not suited to being a loaner telescope and needs to be handled by members who know how to collimate it, for example. Various suggestions were made for using this telescope, including that the mirror be reconfigured to make it a more manageable telescope to use. **Will**

## ANNOUNCEMENTS

■ Our deepest sympathy to Jonathan Bein on the passing of this son Alex. A donation was made to Children's Hospital in memory of Alex Bein.

■ NOVAC increased its level of support to the International Dark-Sky Association (IDA) from Sponsor to Supporter Level.

■ Annual dues are now \$30.

**Stewart** offered to be the new custodian for the club's **10-inch Meade SCT**. **Ed Karch's** offer to put handles on it and make a new case for it was appreciated. It was suggested that he proceed with the handles, while purchasing a new case might prove to be easier than making one. Alan Figgatt also mentioned that some **telescope custodians** do not seem to be very accessible, and this may lead to less frequent use of these telescopes. It was suggested that being able to reserve loaner telescopes on the website might increase usage.

\* **Bob Traube** reported on outreach requests, including at the **Blue Ridge Environmental Stewardship Center** and a Falls Church-based group helping people with emotional problems.

\* There was discussion of the possibility of the **Astronomical League** developing a new system for club dues.

\* **Bob Hand** noted extensive discussion last year of developing a **volunteer award program** in order to encourage club members to become more active, and **Bob Traube's** development of a process for recognizing volunteer efforts. He suggested that the Board begin to look at implementing the process sometime in the near future, since 2004 is almost half over. It was agreed to look at this further at the next meeting.

## Board of Trustees Meeting

Thursday, June 10, 2004

\* **Ed Witkowski**, organizing the **annual club picnic**, reported that 31 people have indicated their intention to be there. Going through supplies, help was sought in providing drinks and condiments. The question of entrance fees will be clarified with the park authorities.

\* An upcoming meeting of the **Mid-Atlantic region of the Astronomical League (MERAL)** was taking place, but no club representative could make it. The possibility of having the MERAL Vice-Chair come and talk about the group and the possibility of sharing observing sites was discussed.

\* **Pedro Martinez** reported that he received the dues notice from the **Astronomical League**, which should amount to approximately \$3,360. He will prepare the check. **Rob McKinney** noted that he and Pedro had reviewed the CD situation but decided to wait until the Fall before recommending any action.

\* **Phil Wherry** indicated that the club now has 874 members from 670 households, including two new supporting members and two new patrons. **Renewal responses** indicated that one person found Sunday General Meetings difficult to attend; another recommended trying to sell used gear within the club (which it was noted is already done via the list server). Appreciation for the **newsletter** was expressed. Phil also reported on some changes he is making in processing

membership records. **Rob McKinney** noted a member's suggestion that the club obtain a **post office box**, but it was decided that doing so would create a logistical nightmare. Support was given to allowing **Sky Publishing** to have limited access to club membership records to verify *Sky and Telescope* magazine renewals. Allowing members to renew directly at club rates would spare the club Treasurer a lot of work. It was suggested that NOVAC seek to have reciprocity arrangements allowing access to observing sites of other clubs.

## General Meeting June 13, 2004

- \* **Alan Figgatt** suggested focusing on deep-sky objects in a summer constellation might be timely. **Ed Seward** reported that **Brent Archinal** would give an overview of the **Mars rovers** and the next meeting. In July, a panel of experts will be subjected to questions. No speaker had so far been scheduled for August.
- \* **Alan Figgatt** reported that the Society continued to wait for approval of its roll-off roof observatory building from the Fairfax County Park Authority.
- \* **Laquetta Karch** said that she received one Astronomical League certificate to present to a club member at the next general Meeting. It was decided not to sponsor a **Venus Transit Certificate** program for the League, although the club might want to create a web-generated certificate for club members who observed the event.
- \* **Bob Parks** reported that Fairfax County was reviewing the club's application to use **Chapel Road Park** as an observing site.
- \* **Bob Traube** and **Donna Blosser** reported on outreach requests, including at the **Blue Ridge Environmental Stewardship Center**, which had to be canceled again. Given the lack of luck with this event, **Bob Stewart** suggested scheduled a monthly event at Blue Ridge. There were no other outreach requests at the moment.

- \* **Bob Traube** circulated the process for selecting a volunteer for recognition, including a schedule for decision-making. He recommended keeping this on the agenda.
- \* The Board recalled the sad news of the passing of **Alex Bein**, son of **Jonathan Bein**, both of who were active club observers. A motion was made, seconded and passed to donate \$100 to **Children's Hospital**, in lieu of flowers, in memory of Alex Bein.
- \* **Bob Parks** reported that **Mike Mills** received an estimate of \$10,000 to re-

figure the **Powers Mirror**, which was viewed as too much to approve. He said the Robotic telescope project was proceeding, and the telescope would be moved to **Pete Johnson's** house soon. There was some additional discussion on what to do with the Powers-16 telescope.

- \* Note was made of the enormous amount of work **Bob Stewart** does in maintaining **observing sites** with his equipment. A motion was made, seconded and approved to reimburse Bob Stewart up to \$200 for the cost of observing site maintenance.

# New members

James Anderson  
 Rob Barnes  
 Glenda Barrett  
 David Bartlett  
 Sam Cantey  
 Scott Carlin  
 Ian Carmack  
 Charles Carriker  
 Steven L. Clark  
 Jeff Cook  
 Ray & Diane Cultrera  
 Jose Delgado  
 Robert D'Imperio  
 W. Bernard Drum  
 PJ Dunn  
 David Eastin  
 Joe Foreman  
 Kevin P. Gallagher  
 Moises Gomez  
 Lee Ann Hennig  
 Jeffrey Holbrook  
 Duane Keye  
 David & Viranand Kyger  
 Charles Lawson & Bonnie Vanaman  
 Chris Liljenstolpe

Roy Mayfield  
 Paul McDaniel  
 Dave Minerath  
 Ralph Mitchell  
 Michael and Quinn Monette  
 Arthur Mullis  
 Jonathon Neil  
 Robert O'Mara  
 Yoichiro Otsuka  
 Timothy Perry  
 Bob Sachs  
 Joel Scalzo  
 Eric & John Schmalz  
 Melvin Shaffer  
 Charles Skinner  
 Jason Spilis  
 John Turner  
 Samir Unadkat  
 James Weimer  
 Greg Weiner  
 Gordon Weynand  
 & Toral Patel-Weynand  
 Frank and Sue Whorton  
 Michael Williams

## Monthly Observing Sessions

### 2004 Schedule

August 14	Spruce Knob	
September 11	Crockett Park	NOVAC Star Gaze
October 16	Mason Neck SP	
November 13	Observatory Park	
December 11	Camp Highroad	



# “To observe, and to help others observe”

NOVAC is a non-profit, all-volunteer organization chartered to advance amateur astronomy in Northern Virginia. Members benefit from:

## **Access to dark sky observing sites:**

NOVAC maintains agreements that provide club members with year-round access to observing sites away from city lights

## **Monthly meetings**

Monthly meetings are held at 7 p.m. on the second Sunday of each month in Room 80 of the Enterprise Building on the campus of George Mason University. Each meeting features a lecture on an interesting topic by a local expert. See the web page or future newsletters for a schedule of speakers.

## **Bimonthly newsletter**

The NOVAC newsletter provides information specifically for NOVAC members, as well as general interest articles on such topics as observing reports, equipment reviews, upcoming events, ATM projects, and more.

## **High-quality telescopes to borrow**

NOVAC members may borrow one of the clubs several “loaner” telescopes at no charge. Members may choose from among three 6” reflectors, two 10” f/6 reflectors, an 8” SCT, and a hydrogen-alpha solar scope. Binoculars are also available for loan.

## **Club website**

Up to date information about club events and activities is maintained on the club website at [www.novac.com](http://www.novac.com).

## **Large club library**

NOVAC maintains a well stocked library that members may borrow from by contacting John Deriso ([seaotter@bellatlantic.net](mailto:seaotter@bellatlantic.net)). A full list of titles is available from the club website.

## **Private e-mail list-serve**

Members keep up with current club information by subscribing to the NOVAC e-mail list, without fear of flame wars or spam e-mails.

## **Public outreach opportunities**

Several times each year, volunteers from NOVAC present astronomy programs to schools, churches, Scout troops, and other public groups.

## **Membership in the Astronomical League**

Through NOVAC’s membership in the Astronomical League, NOVAC members gain access to the AL’s newsletter, services, and observing programs.

## **Discounts on astronomy magazines and books**

Subscriptions to *Sky & Telescope* and *Astronomy* magazines are offered to club members at a considerable discount. Also, astronomy books purchased through the club are eligible for a 10–25% discount.

**See your *Membership Guide* for more details.**



**The NOVAC Newsletter is the official publication of the Northern Virginia Astronomy Club and is published six times per year.** The NOVAC Newsletter is sent to members of NOVAC as a regular membership benefit.

## **Membership**

Membership in the Northern Virginia Astronomy Club is \$25.00 per year and is open to anyone interested in astronomy or the sciences. Additional memberships at the same address without additional copies of the newsletter are \$5.00 per person. Contact:

Phil Wherry  
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Vienna, VA 22181-6158  
703-242-2618  
703-242-1167 fax  
[psw@wherry.com](mailto:psw@wherry.com)

## **Change of address**

All notices of change of address should be sent to Phil Wherry. Please include both old and new addresses.

## **Advertising**

NOVAC does not knowingly accept advertising for products of inferior quality nor does it accept responsibility for the quality of advertised products.

## **Submissions to the newsletter**

NOVAC members are invited to submit articles for publication in the NOVAC Newsletter. The editor reserves the right to edit all materials submitted. Send article submissions to the Editor, Dave Yustein, at [david.yustein@aero.org](mailto:david.yustein@aero.org).

**The deadline for submissions is two weeks in advance of publication: Friday, August 6 for the September/October 2004 newsletter.**

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