NOVAC
THE NEWSLETTER OF
THE NORTHERN VIRGINIA
ASTRONOMY CLUB
SEPTEMBER 2014

Milky Way image taken at AHSP by Joanne Schulze.

Chasing Holes in Clouds at the Almost Heaven Star Party

by Glen Ward

The 2014 Almost Heaven Star Party was so fantastic that I wonder if the "almost" should be removed from the name of next year's event! Though the first two nights were cloudy and The Mountain Institute was engulfed by clouds, attendees had plenty to do with presentations, delicious food, and the companionship of other astronomers. By Sunday evening, things looked a little more promising, and many attendees were monitoring the radar and satellite images closely.

As night fell on the evening of Sunday, August 24, hopes were high that the clouds might blow out. But the sky was still overcast, and the fine mist and blowing wind was making many hesitant to uncover or even unpack telescopes. A look at the sky revealed at least two layers of cloud, which were moving in separate directions. It seemed like the clearing might not arrive.

Around 11pm, the first patches of clearing started to blow through. Things are much different under a dark sky. We couldn't see the clouds as big white patches—instead, the sky at such a dark location appears black when overcast. And, the very low

Continued on page 2

Almost Heaven Star Party 2014 *Continued from p. 1*

altitude and high speed of the bottom cloud layer meant that there was little warning when a hole in the clouds came along.

But what an incredible sight it was when a large hole passed over the observing field! The stars appeared as if in a portal into space, and the hole in the black clouds was rimmed with a puffy silver rim. In thirty years of observing, I have never seen the stars with such brilliance and purity. Capella and Vega seemed intense, and the Milky Way was brighter than I'd ever imagined it could be. The previously dark landscape lit up with starlight, and the scene was like something from a science fiction movie.... or a dream.

Almost as fast as it came, a hole would blow past and we would be back to clouds. Then another hole would come along, perhaps in a different part of the sky. It was apparent that the clouds were blocking light pollution, because the views on that night were fantastic even by Spruce Knob standards. It seemed to me that it was almost like a movie... Many comments were heard stating that the view was like being in space. It was surreal, and was one of the greatest experiences I have ever had in astronomy.

When dawn came, everything was coated with dew so thick it looked like there had been a flood. A neighboring astronomer helped me out with a large package of heat packs to strap to my objective cells. One of the great things about the Star Party was the camaraderie shown by the attendees. Numerous small acts of kindness were observed over the five days I was on the mountain.

The night of Monday, August 25 was the last official night of the party, and the weather cooperated much more. People were out walking around until well into the morning hours. One visitor

Continued on p.7

PHOTO CREDIT: JOANNE SCHULZE

PHOTO CREDIT: RICHARD GRAUEL

PHOTO CREDIT: JOHN MCDONNELL

PHOTO CREDIT: RICHARD GRAUEL

The *NOVAC Newsletter* is the official publication of the Northern Virginia Astronomy Club and is published quarterly. The NOVAC Newsletter is available to members of NOVAC as a regular membership benefit.

Membership

Membership in the Northern Virginia Astronomy Club is $35.00 per year and is open to anyone interested in astronomy or the sciences. Additional memberships at the same address are $10.00 per person. Membership in the Astronomical League is free with NOVAC membership and includes the *Reflector* magazine plus access to their Observing Awards.

Contact:
Kent Allingham
3510 Country Hill Drive
Fairfax, VA 22030
treasurer@novac.com

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, Chris Lee, at newsletters@novac.com.

The Moon and Apollo Missions: A Portable Planetarium Program at the Winkler Botanical Preserve

By Harold Geller and Jodie Smolik

In its second year of a collaborative effort, George Mason University of Fairfax, Virginia and the Winkler Botanical Preserve of Alexandria, Virginia have successfully implemented a portable planetarium program about the Moon with science camp students in the summer of 2014.

This year's new program was titled "The Moon & Apollo Missions." It was designed to help teach about the Moon and to honor the 45th anniversary of the Apollo 11 Mission. The 2013 planetarium program was titled "Constellations & Asterisms."

"The Moon & Apollo Missions" planetarium program was field tested in the spring of 2014 with 100 students from the Mount Vernon Elementary School of the Alexandria City Public School System. Fourth grade students were enrolled in an after school reading program for "at-risk students." These students spent a month reading books about the Moon and then participated

in a field trip to the Winkler Botanical Preserve where they were exposed to the Starlab Portable Planetarium System and the Moon. The lunar program was implemented during the 10 week summer session which took place from late June (due to make-up days required for an unusually high number of snow days) to more than 550 children during the summer months of June, July and August. The program integrated the Starlab planetarium, an interactive PowerPoint presentation, video presentations, and concluded with an outdoor hike that tested the students' knowledge as presented in

Continued on p. 5

Upcoming NOVAC Meetings

October 12
Speaker:
Shobita Satyapal
Supermassive Black Holes

November 9
Speaker:
Bob Murphy
The Moon in the Landscape

December 14
Topic &
Speaker TBA

Monthly meetings are normally held at 7 p.m. on the second Sunday of each month (except for the month of May, when the meeting is held on the first Sunday) in Room 163 of the Research Building on the campus of George Mason University. More info at www.NOVAC.com.

A Conversation With…
Jeff McFarlin

Club-member David Werth interviewed NOVAC Astrophotography Ace Jeff McFarlin

NOVAC: What was the genesis of your interest in astronomy?

Jeff: For a few years my Dad was a science/astronomy teacher at a local college when I was a kid. We lived in rural northeast CT, on about 100 acres of land, and nighttime was always pretty spectacular. I remember he took me to a local high-school observatory a couple times as well, as well as the obligatory binocular observing on lounge chairs from home. Although I'd always taken interest in science/math in general, my first 'real' scope was a Celestron 8" SCT (how many of us went that very path?). It became more serious and I'd say I caught the bug in late 2007 or so.

NOVAC: How did you parlay that into an interest in astrophotography?

Jeff: I don't recall specifically what drove me to buy my first camera, but I'd seen various imagery taken by astrophotographers and I thought I would take a stab at it. How hard could it be, right? Little did I realize what it really entailed, and how deeply you can get sucked into the hobby.

NOVAC: Do you have a background in photography apart from what you do in astronomy?

Jeff: None whatsoever. My wife is the photographer in the family. I've barely even used a DSLR!

NOVAC: Can you describe your current photographic rig for us?

Jeff: Paramount MX, QSI683wsg8, Astrodon narrowband and LRGB filters, Starlite Xpress Lodestar, Rob Miller Tri36M tripod, main scope is a Explore Scientific ES127CF. I also use an AT8RC, and an Orion ED80-T CF.

NOVAC: And what are your principal processing programs?

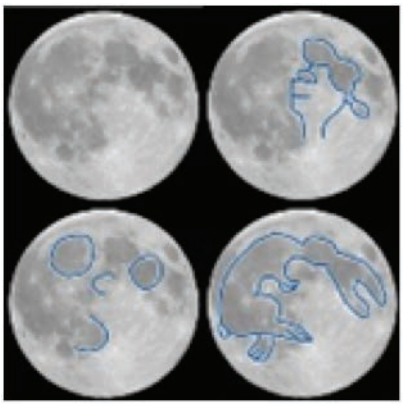
Jeff: I use Maxim DL for capture and pre-processing, Adobe Photoshop 5 CS, and a few plug-ins (HLVG, etc) for post-processing. I plan on moving full-time to PixInsight as soon as I get back into the hobby. I'm on hiatus right now due to my wife's work schedule.

NOVAC: What percentage of your time is spent taking the pictures and what part is spent in processing?

Jeff: Since I'm a load-the-truck/drive/setup/image/tear-down/drive-home type of imager, the majority of my time is involved with actually acquiring the data. Maybe 10 or 15% is spent on the actual processing. That will soon change (see below). I rarely go back and re-process old data, although I do keep every bit of data I've ever acquired if I decide to in the future.

Continued on p. 6

A Portable Planetarium Program at the Winkler Botanical Preserve *Continued from p. 3*



The children first learn that from the very beginning of time, people around the world have gazed at the Moon and have seen different images on its surface

The planetarium program continues with a lesson on the phases of the Moon.

The children learn why we only see the near side of the Moon

the planetarium program. The Winkler Botanical Preserve invested in a customized Starlab cylinder to add to the planetarium system inventory. We describe now some of the details of the Moon planetarium program.

Prior to entering the inflatable dome, campers receive an introduction to the inflatable planetarium system and the educational partnership between George Mason University and the Winkler Botanical Preserve. Children enter the inflatable dome, in a darkened setting, in groups of approximately 25. All they see upon entering is the full Moon as projected by the planetarium projector cylinder.

A computer projector is then engaged to project a PowerPoint presentation on the dome. The children first learn that from the very beginning of time, people around the world have gazed at the Moon and have seen different images on its surface. Some have seen a man in the Moon, while others have depicted a woman in the Moon or even a rabbit.

The planetarium program continues with a lesson on the phases of the Moon. Students are exposed to different shapes that reminded them of different things to eat. The Crescent Moon is compared to a banana and a croissant! It is also pointed out that croissant is the French word for crescent. It is then noted that the quarter moon really looks like a half-moon and may remind us of a big slice of watermelon. The gibbous phase of the Moon is compared to an Oreo cookie that's been opened up so you can lick the icing in the middle. Sometimes we see a round Full Moon that looks like a hunk of cheese. What are all these shapes? The different shapes are called phases. The shapes we see are made by the Sun's light as it falls on the Moon. Using interactive animations, the children learn to identify all lunar phases and understand the difference between waxing and waning moons.

Moon geology and the difference between lunar and solar eclipses are also part of the lesson. In addition, the children learn why we only see the near side of the Moon. The Moon similarities and differences are also highlighted to the students.

Animals have helped to pave the way to space exploration The Starlab lesson concludes with the students learning about the Apollo Missions to the Moon.

Continued on p. 6

A Portable Planetarium Program at the Winkler Botanical Preserve *Continued from p. 5*

After learning some basic facts about the Moon, the lesson moves to the human exploration of the Moon. Students learn that between 1969 and 1972, only 12 men have walked on the surface of the Moon. However, it is pointed out that animals have helped to pave the way to space exploration. Before risking people, both the US and the Former Soviet Union placed animals into space. Many different species made the journey. Some did not survive because of equipment malfunctions, but most returned safely to Earth, demonstrating that humans could do so as well. During this part of the planetarium show, we play a game of "True or False? Animal Astronauts," with added information given about the dog Laika and the chimpanzee Ham.

The Starlab lesson concludes with the students learning about the Apollo Missions to the Moon. The students discover what the astronauts did on the Moon and what they left behind on the Moon. This includes a discussion of the human waste that was left upon the surface of the Moon, both hard and liquid forms.

After participating in the 45-minute planetarium program, students are escorted on a 30 minute outdoor hike on the trails of the Winkler Botanical Preserve. Along the trails there are a number of inquiry stations where students stop and are required to answer questions as a summative assessment of their knowledge about the Moon and the Apollo Missions. As a reward for correct answers students receive an open face Oreo cookie that is in the form of one of the lunar phases.

We feel that the Starlab planetarium program in association with an outdoor hike was a tremendous success. Students appear to be engaged and excited about what has been presented to them and the assessment cloaked in a game-show-like environment demonstrated retention of the facts and information learned during the planetarium program.

George Mason University and the Winkler Botanical Preserve hope to continue with this fruitful collaboration and build upon our past two tears' experiences by developing a new planetarium program for the summer of 2015, possibly one that focuses on the dwarf planet Pluto, as the New Horizons mission should be flying by Pluto during the period of the summer camp program.

It is our desire not only to ignite the children's imagination about astronomy, but also to engage and integrate astronomy as presented in the Virginia Standards of Learning (SOLs) into our planetarium programs so that students' standardized test scores may improve, along with the students' desire for learning. ✶

A Conversation With…Jeff McFarlin *Continued from p. 4*

NOVAC: Do you still observe without imaging or with your time constraints is it all photography all the time?

Jeff: If I believe the night will be especially clear I'll bring an 8" SCT and Celestron SE mount to do visual observations with. Once the imaging rig is setup and running I don't have to touch it, unless performing a manual meridian-flip. However, that's the only time I do visual observing as my home location is horrible for it.

NOVAC: How did you come to join NOVAC and what aspect of the club appeals to you the most?

Jeff: I found NOVAC on the web, and joined right away. Before I was a member I'd never met another local astrophotographer. Since I've joined I keep pretty close contact with more than a few. It's very helpful to compare notes, techniques learned, etc.

NOVAC: Are you participating in the new NOVAC astrophotography SIG?

Jeff: My free time is too limited at the moment, but I very much would like to.

NOVAC: What is on your bucket list for astrophotography? What haven't you done or photographed that you would like to some day?

Jeff: I have many, many objects I would like to capture that I haven't, and some that I want to re-capture. For example, I have access to a C11HD, and I'm planning on pointing that towards some galaxies to shoot in LRGB.

NOVAC: You mentioned being on hiatus from astrophotography. Tell us about that and what you think the future holds.

Jeff: My wife is a personal trainer, and mostly works evenings, and since we have 2 small children, it's not really possible to leave the house to go take pretty pictures. However, for the past 7 months I've been working with another club member on a 'special project' that will, if all goes as planned, allow both of us to simultaneously remotely image in very dark sky at will. We bought 20 acres in WV and our observatory goes up in November, so psyched about that! I will post to the general mailing list once this project officially gets off the ground! ✶

Almost Heaven Star Party 2014 *Continued from p. 2*

from Bulgaria, a Geography teacher, was especially interesting and the two of us managed to identify Phoenix and Grus, a pair of southern constellations we had never seen before. We also observed many of the famous objects and I was sorry when he departed into the night.

About 2:30am, I was startled by a noise and a young fellow dressed in black and without a flashlight was seen to come out of the darkness. We talked for a few minutes and soon he was using my 4 in. refractor by himself. As he had never used a telescope before, he was amazed by what he was seeing, and he spent about 90 minutes pointing the scope around the sky and exploring on his own. It was a great experience to watch him discover some objects like the Double Cluster and M42 for the first time, and I felt pretty certain by the time he left that he would be looking for a telescope of his own soon.

I finished watching Orion and Gemini rise, followed by Jupiter and Venus, and then it was day. I felt terrible that I would have to leave "almost" heaven and return to the real world. But I can honestly say that the 2014 Almost Heaven Star Party was a great event. The location and the people involved came together perfectly and made this Star Party a great success. I look forward to next year's Party! ✶

PHOTO CREDIT: PHIL WHERRY

PHOTO CREDIT: PHIL WHERRY

PHOTO CREDIT: PHIL WHERRY

PHOTO CREDIT: PHIL WHERRY

PHOTO CREDIT: JOANNE SCHULZE

PHOTO CREDIT: PHIL WHERRY

PHOTO CREDIT: JOANNE SCHULZE

M72 • NASA.gov

Blast from the past—*This article originally appeared in the July/August 2004 issue of the NOVAC Newsletter.*

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 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) and the DSN website at deepspace.jpl.nasa.gov/dsn. For details of the Cassini Saturn orbit insertion, see www.jpl. nasa.gov/basics/soi. Kids can check out The Space Place at spaceplace.nasa.gov/en/kids/ dsn_fact1.shtml to learn about the amazing ability of the DSN antennas to detect the tiniest spacecraft signals.

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

This article was provided by the Jet Propulsion Laboratory, California Insti- tute of Technology, under a contract with the National Aeronautics and Space Administration. ✶

Help Wanted—NOVAC Star Gaze by David Werth

On Saturday September 27th, NOVAC will be hosting our 32nd annual fall Star Gaze. This big public event is held in conjunction with other astronomy events being held all around the country that day.

The location is C. M. Crockett Park and runs from 3 PM to 11 PM for the public. NOVAC members are able to stay as late as they wish to observe.

Big events require a lot of help to pull off so I am looking for volunteers to contribute some time that day. What we need are folks to do an hour shift at the front entrance and the NOVAC club tent.

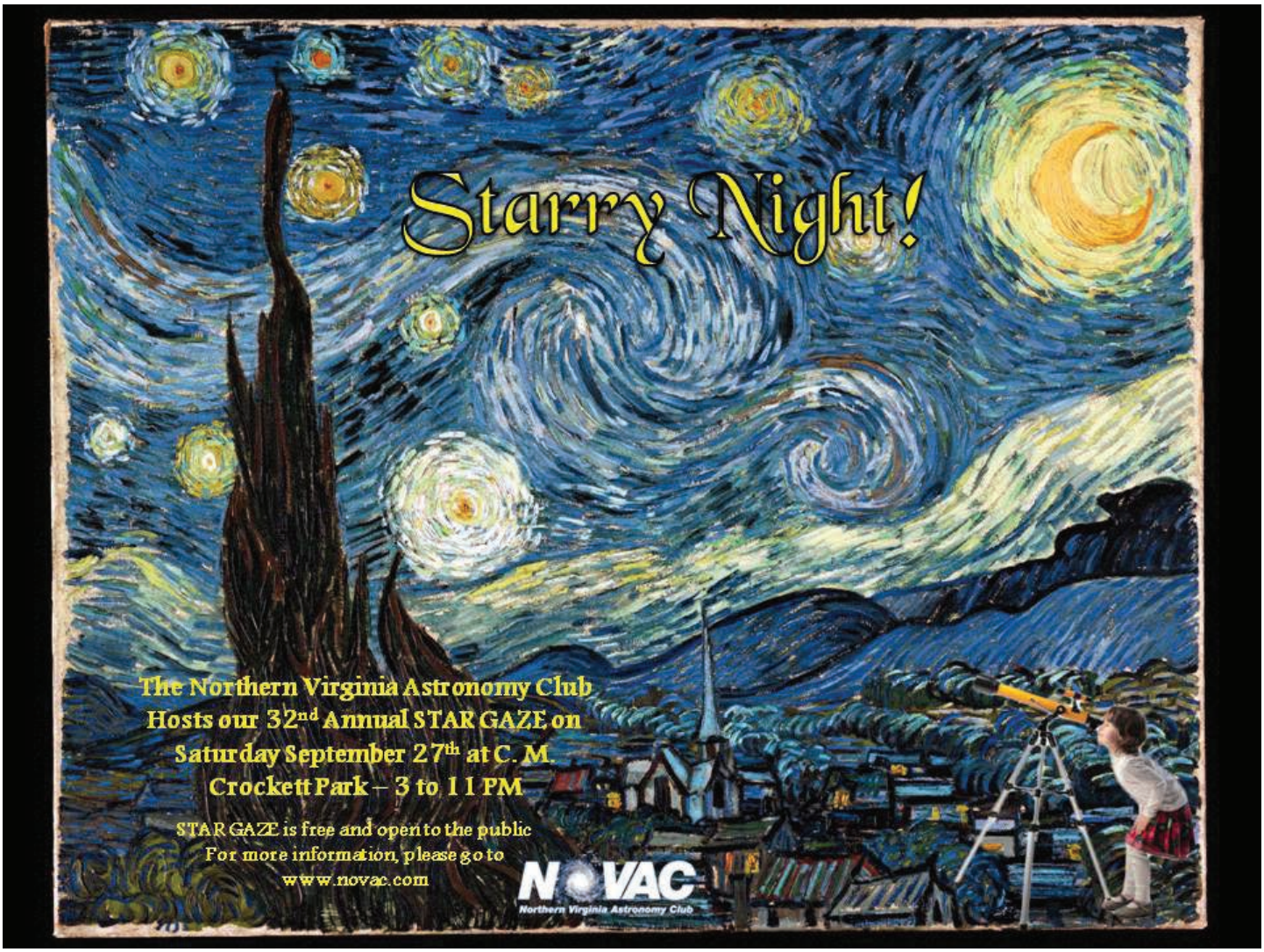
Also needed are folks to do safe solar solar viewing from 3 PM to about 6:30 PM. Help in the food tent and folding chairs and packing up after the last presentation is always welcome.

I could also use help from someone with a van or SUV Saturday morning to help me haul things form the NOVAC storage site in Burke to and from Crockett Park. I only have a sedan with limited space and there is a fair amount of equipment needed at Star Gaze.

At Astronomy Day, our big Spring event, we had about 90 or so telescopes and binocular rigs set up on the field. If the weather behaves we could see 400 to 600 members of the public so I am hoping for a big turnout from the club.

If you want to put in a hour helping out, please contact David Werth–36dwerth@comcast.net.

For more info about the Star Gaze visit www.novac.com/wp/outreach/stargaze/.



"To observe, and to help others observe"

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

Access to dark sky observing sites

NOVAC maintains agreements that provide club members with year-round access to observing sites away from city lights. **www.novac.com/wp/observing/**

Monthly meetings

Monthly meetings are normally held at 7 p.m. on the second Sunday of each month [except in May when the meeting is held the first Sunday] in Room 163 of the Research Building on the campus of George Mason University. Each meeting features a lecture on an interesting topic by a local expert. See the meeting web page or future newsletters for a schedule of speakers. **www.novac.com/wp/outreach/meetings/**

Quarterly 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, amateur telescope making (ATM) projects, and more.
www.novac.com/wp/members/newsletter/

High-quality telescopes to borrow

NOVAC members may borrow one of the club's several loaner telescopes at no charge. Members may choose from among three 6 in. reflectors, two 10 in. f/6 reflectors, an 8 in. SCT, and a hydrogen-alpha solar scope. Binoculars are also available for loan.
www.novac.com/wp/members/loaner-scope/

Club website

Up to date information about club events and activities is maintained on the club website at **www.novac.com**.

Large club library

NOVAC maintains a well stocked library from which members may borrow by contacting John Deriso (**librarian@novac.com**). A full list of titles is available on the club website.
www.novac.com/wp/members/library

Private email listserv

Members keep up with current club information by subscribing to the NOVAC email list, without fear of flame wars or spam emails.

Public outreach opportunities

Several times each year volunteers from NOVAC present astronomy programs to schools, churches, Scout troops and other public groups. Contact **outreach@novac.com** or fill out the outreach form on the NOVAC website to request a program or help in supporting an event. **www.novac.com/wp/outreach/outreach-form/**

Membership in the Astronomical League

Through NOVAC's membership in the Astronomical League (AL), NOVAC members gain access to the AL's newsletter, services and observing programs.
www.astroleague.org

Discounts on astronomy magazines

Subscriptions to *Sky & Telescope* and *Astronomy* magazines are offered to club members at a considerable discount.
Contact Kent Allingham: **membership@novac.com**

Mentor Program

Young or old, new or experienced, this program is for everybody. If you would like to meet with a mentor, think you would like to be a mentor, or have any questions about the program, contact: **mentor@novac.com**.

See your Membership Guide for more details about member benefits.
http://www.novac.com/wp/members/