PRIMEFOCUS
Tri-Valley Stargazers

June 2004

Meeting Info:

What
Community Data Access Lead, Large-aperture Synoptic Survey Telescope

Who
Dr. Kem Cook

When
June 18, 2004
Conversation at 7:00 p.m.
Lecture at 7:30 p.m.

Where
Unitarian Universalist Church in Livermore
1893 N. Vasco Road

Inside

June Meeting

Community Data Access Lead, Large-aperture Synoptic Survey Telescope

Dr. Kem Cook, Lawrence Livermore National Laboratory

(Introduction by Chuck Grant)

Last month we had Alex Filippenko as speaker. He spoke on his recent discoveries about cosmology which are among the most unexpected and revolutionary findings in astronomy and, indeed, in the entire history of science. There is little doubt in my mind that as confirming observations continue to accumulate, Alex will win a Nobel Prize for this work. That is a pretty tough act to follow. But we found another one at about the same revolutionary level for this month!

While results in cosmology are interesting, it does not have much day to day application to us as people, or to our activities as amateur astronomers. The subject discussed in this month's talk will, on the other hand, directly affect what and how serious amateur astronomers observe.

Our speaker this month, Dr. Kem Cook, works on a project which promises to make significant contributions to cosmology, improve our detection and cataloging of solar system objects (both near and far) by several orders of magnitude as well as revolutionize how serious amateur astronomers contribute to real science. His project is the Large-aperture Synoptic Survey Telescope (LSST). The telescope will have an amazing set of specifications and will be used for equally amazing observing programs. Some highlights are:

Modified three mirror Paul design, with monolithic 8.4 meter primary mirror, overall system is f/1.25 with a 10 meter focal length.

0.2 arc second resolution over a three+ degree wide field (2.3+ gigapixels)

10 second exposures go down to magnitude 24

The image can be read out in 2 seconds or less, and the telescope repositioned for the next exposure in 5 seconds

The entire sky (at that location and time of year) can be surveyed at full resolution in one wavelength to magnitude 24 in three days

All data is processed in real time, and is immediately available on the net to the entire world, not just project members

E-mail notifications of transient events detected such as: distant supernovae, gamma ray burst optical counterparts, micro-lensing, novae outbursts, extra-solar transits, etc. will be sent in less than 30 seconds after the observation

After transient objects are filtered out, all observations will contribute to continuously improving deep-survey of the entire sky, which will go below magnitude 27 in several wavelength bands within 2 years.

All observations will be archived, and available on-line, so anyone can look at any what was going on in any part of the sky at any time in the past (within the lifetime of the project) to within about three days.

News & Notes

Welcome

TVS welcomes our newest members—**Vijay Gadad** and **David Woolsey**.

2004 TVS Meeting Dates

Below are the TVS meeting dates for the next few months. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting. The *Prime Focus* deadline applies to that month's issue (e.g., the July 4th deadline is for the July issue).

Lecture Meeting	**Board Meeting**	***Prime Focus* Deadline**
June 18	June 21	June 6
July 16	July 19	July 4
Aug 20	Aug 23	Aug 8
Sept. 17	Sept. 20	Sept. 5

Money Matters

At the May Board meeting, Treasurer **Gary Steinhour** gave us the account balances (as of May 23, 2004) of TVS's accounts:

Checking	$1,077.47	
CD #1	$3,936.27	matures 08/17/04
CD #2	$2,429.22	matures 08/27/04
CD #3	$2,069.58	matures 07/16/04

TVS Is A Big Winner at TVS

Rick McWilliams wins the 2004 Clyde Tombaugh Award, which is presented by the RTMC each year for "Creative Innovation in Telescope Design". Rick invented digital setting circles and the company he owns and founded, Tangent Instruments in Palo Alto, manufactures the digital setting circles sold under the brand names: Celestron's AstroMaster, Lumicon's SkyVector, and JMI's NGC among others. (More trivia: another TVS member, Steve Gotlieb, corrected and verified, by visual observation, the NGC & IC database for Celestron's Advanced AstroMaster model.)

Rick and his wife were fixtures at Hidden Hill Observatory for many years. They could be heard rattling off NGC numbers in quick succession as their 18 inch dobs moved through the dark so fast I thought the Teflon bearings in their scopes might melt.

Rick is the second TVS member to win the Clyde Tombaugh award, Jack Marling won in 1999. Rick joins with such distinguished company as a partial list of previous winners shows: Clyde Tombaugh, John Dobson, Tom Johnson (Celestron), Richard Berry, Steve Kufeld (Telrad), and Al Nagler

Jane Houston Jones wins the 2004 G. Bruce Blair Award, which is presented by the Western Amateur Astronomers (TVS is a member of WAA) each year for "achievement for amateur astronomy". Jane was introduced to astronomy by John Dobson. She went through organizing John Dobson's telescope making workshops, organizing the San Francisco Sidewalk Astronomer's famous outreach program, serving as the President of the Astronomical Association of Northern California (AANC, of which TVS is a member) for five years, and many other activities, to her current dream position as Senior Outreach Specialist for the Cassini Program at NASA's Jet Propulsion Laboratory in Pasadena. Jane joined TVS during the time she was President of AANC.

Jane is the second TVS member to win the G. Bruce Blair award, Don Machholz won in 1995. Jane joins very distinguished company including Albert Ingalls, Walter Scott Houston, Clyde Tombaugh, Leslie Peltier, John Dobson, Paul Zurakowski, David Levy, Ed Krupp, Richard Berry, and Patrick Moore, just to name a few.

Mike Rushford opened the RTMC's show-and-tell with some of the spectacular ground based solar movies we saw at a TVS meeting last year.

Dave Rodrigues lead two educational sessions. The first was "A magical tour of the universe" in which magic is used to help express scientific ideas. The second was "What's up? A tour of the night sky" with objects pointed out with a dazzling 20 milliwatt green laser supplied by Howie Glatter. The crowd responded quite well to Dave, despite my heckling.

Ron Bissinger arrived in a very cool convertible PT-Cruiser (turbocharged too).

Maggie Halberg was considering the purchase of one of the new Coronado Instruments eyepieces (specially designed for solar viewing) when procrastination saved the day. Maggie won a complete set of those eyepieces plus barlow and case in the Saturday night door prize drawing. **Bobbie**, a frequent TVS meeting attendee, easily won the people's choice award for cutest dog at the conference.

Dave Rodrigues also won a door prize—a bag of rocks. (Actually, a gift certificate for some nice fossils.)

Newsletter header image: M20/The Trifid Nebula/NGC 6514

This new image from the Hubble Space Telescope offers a close-up view of the center of the Trifid Nebula, near the intersection of the dust bands, where a group of recently formed, massive, bright stars is easily visible. M20 lies within our own Milky Way Galaxy about 9,000 light-years from Earth, in the constellation Sagittarius.

Image Credit: NASA, ESA, and The Hubble Heritage Team (AURA/STScI). Acknowledgment: F. Yusef-Zadeh (Northwestern Univ.)

Chuck Grant found a good deal on some Meade 90mm alt-az refractors and picked up nine complete telescopes which were donated to TVS to be given away to interested children. The give-away program was kicked off by the first of these telescopes being donated as a door prize to the RTMC beginner's corner workshop, where it was awarded to a lucky child attendee. The door prize also included a 2004 free membership in TVS.

TVS was one of the donors to the RTMC sponsorship program. The donations to this program funded the attendance of several groups of children to RTMC including some scout troupes. The TVS name and logo appeared on the program and the RTMC web site in recognition of our donation. There was also a little ceremony in front of the crowd where we were presented a certificate of thanks.

This year TVS set up a booth at RTMC for the first time. We had some membership information on display, but mostly it was just a place for TVSers to hang. The space was free as long as we weren't selling anything, so why not? Several people inquired about the Hidden Hill Observatory.

Our booth was not quite as well attended as the Meade booth, where they gave away free hats, free sodas, free cookies, and supplied free wireless internet connectivity for most of the campground.

Known TVSers (past or present) in attendance at RTMC this year: Rick McWilliams, Jane Houston Jones, Alan Gorski, Mike Rushford, Carter Roberts, Gene Cross, Ron Bissinger, Maggie Halberg and Bobbie, Chuck Grant, Dave Rodrigues, Paul Swenson (now with Celestron).

Calendar of Events

June 26, 8:30 p.m.
What: *The New Horizons Pluto-Kuiper Belt Mission*
Who: Dr. Jeff Moore
Where: Mountain Theater, Mt. Tam
Cost: Free (donations are greatly appreciated)

The New Horizons mission is planned to launch January 2006 and will visit Pluto and Charon, then head out to the Kuiper Belt to collect more data. For more info, including directions, visit www.mttam.net.

July 20-24
What: *AstroCon 2004*
Who: ASP, AANC, ALPO, AAVSO
Where: Doubletree Hotel, Berkeley
Cost: Varies

The conference starts on July 20th with a reception and a talk by Gibor Basri. Most of the daytime events revolve around astronomical paper presentations. Highlights include optional events such as a star party at the Chabot Space & Science Center, lunch with David Levy, the ASP Awards Banquet featuring Dr. Geoff Marcy, and the closing banquet on board the USS Hornet, with former astronaut Alan Bean as the speaker.

If you sign up before June 15th, full conference registration is $80; after June 15th it's $95. One-day registration can be purchased for $25 prior to June 15th, $30 after.

Conference registration is required for all events except the ASP Awards Banquet and the Gray Line tours.

For more info, visit the AstroCon web site: www.astrocon2004.org.

Astro Events

Jupiter Transits

Our Jupiter observing season is coming to an end. Below is the remainder of the transit times for various Jupiter related objects. The abbreviations are fairly straight forward: G=Ganymede, C=Callisto, I=Io, E=Europa, GRS=Great Red Spot, and if you see a 's' next to one of the moons, it means its shadow (e.g., Cs=Callisto's shadow); na means Jupiter is below the horizon or it is daylight at that time.

June

Sun 6	GRS	12:30a	na	na
	GRS	na	10:15p	12:15a
Tue 8	Es	na	10:35p	12:16a
	GRS	9:50p	11:50p	na
Fri 11	GRS	na	9:20p	11:20p
Sun 13	I	na	9:25p	10:35p
	GRS	9:15p	11:00p	na
	Is	9:33p	10:28p	11:47p
Mon 14	Gs	na	10:10p	12:10a
Tue 15	E	9:36p	11:00p	12:27a
	GRS	11:00p	na	na
Fri 18	GRS	na	10:10p	12:00a
Sun 20	GRS	10:05p	11:45p	na
	I	10:18p	11:20p	na
	Is	11:28p	na	na
Mon 21	G	na	9:30p	11:24p

Comet Updates

Have you tried looking for either Comet NEAT or Comet LINEAR? As recent as June 5th, Comet NEAT was still visible through binoculars. Comet LINEAR is low in the Southern horizon.

NEAT C/2001 Q4

Date	Mag.	Constel.	Rise	Transits	Sets
June 12	4.15	U. Maj	6:43a	5:45p	4:59a
June 19	4.68	U. Maj	cir'polar	5:29p	cir'polar
June 26	5.16	U. Maj	cir'polar	5:29p	cir'polar

LINEAR C/2002 T7

Date	Mag.	Constel.	Rise	Transits	Sets
June 12	4.8	Sextans	11:59a	5:33p	11:07p
June 19	5.73	Sextans	11:42a	5:19p	10:56p
June 26	6.46	Sextans	11:23a	5:01p	10:40p
July 3	7.17	Sextans	11:00p	4:30p	10:18p

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First Light: Beginners' Astronomy

by Richard Campbell

Unexpected Delights

Little do we know—unexpected delights await the new stargazer. You would think we had seen it all. What with the Hubble Space Telescope photography, the news flashes about the sky, the growing body of spectacular astronomy books...and that thing, what was it?...the World Wide... whatie?

Still, your eyes will be surprised when you look through *your* telescope.

Take Venus. Most people know that it's our "sister planet," very hot and closer to the sun. But few know that it shows sharp *crescent phases* each year. It will progress, just like the moon, from full to gibbous, half to crescent, crescent to new. Who knew? Not me! Not until I orbited the sun 30 times! Venus is super-easy to find—just point your scope at the brightest *star-like point* in the night sky and you're there. Since Venus orbits closer to the sun than Earth, you will always see it near the sun, in the morning or evening.

How about satellites? Who would have thought that when you attach a cheap video eyepiece to your telescope, point it at the moon, and wait a while, a satellite will *whoosh in front of the moon's disc* appearing as a whizzing point of light? Dozens of Tri-Valley Stargazers saw this happen live, last year at a club meeting. You can see it too, if you get a simple webcam and portable TV, or view through your telescope eyepiece long enough. This sort of transit observing is gaining momentum lately, since during the upcoming Venus transit, the International Space Station will pass in front of the Sun *4 times,* viewable from different places on Earth.

Most people know the Moon is visible during the day. But *stars* besides the Sun? Nahhhhh. You can't be serious! Actually it *is* possible for the *brightest* stars. If your setting circles are calibrated properly, and you point to a bright star's coordinates, you can see it with a wide-field eyepiece as a tiny pin-prick of light ("Go-To" scopes work too). It takes practice to observe this way, since your eye may have trouble focusing on infinity. When you finally see the star, though, it's quite thrilling. We normally imagine space as infinite black. But a clear daytime sky *is* infinite space, just with a little scattered blue light in the way.

Surprise!

The Moon is easily seen during the day. What other astronomical objects can you see during the day?

Astronomical Insights

by David Feindel

This month's column was going to reveal the answer to one of the burning astronomical equipment questions of our time. The experiments were going to be done during my first foray of the year to the Del Valle site. But a combination of publication deadlines, soft seeing, and being seduced by skies dark enough to see all 7 stars in Ursa Minor (dimmest one is Eta UMi at mag 4.95) combined to do me in. Next month. Promise.

First up was taking a look at the comets. Both are still visible, but they are heading back out and fading in both magnitude and interest. NEAT is still the brighter of the two, being higher in the sky and therefore darker. The nucleus of both comets were visible, but not any structure or tail. The seeing wasn't very good, making it impossible to split Castor, about 20 degrees above the horizon as darkness fell. Polaris was swimming, 37 degrees up, as was Arcturus, 60 degrees up. Jupiter's NEB and SEB were visible, but showing no real detail. Mars was in the trees; Saturn was below the horizon. At this point, even I could tell it was going to be a "soft target" evening. So it was off to catch the Beehive (M44), which looked its usual spectacular self at 50x and a 1.3 degree FOV. (We are talking SCTs here; 1.3 is as good as it gets.) With Hercules nearly overhead, it seemed a good time to take a look at some globular eye candy. M13, M92, M5, and M3 all showed some structure, but had unresolved centers. M13 is unresolvable in my 8" anyways, but on good nights, you can convince yourself that you can separate the stars in the core a bit in the others.

I wanted to take a look at Markarian's Chain, the string of 14 galaxies anchored by M84 and M86 straddling the Virgo/Coma Berenices border. In the scope, M84 and M86 were easily recognized as face-on galaxies, but without any visible structure. Another highlight, "The Eyes" (aka NGC 4435 and 4438) were much less impressive. The two small galaxies were clearly visible, but didn't stand out. The other members of the chain (NGC 4413, 4425, 4387, 4388, 4402, 4458, 4461, 4473, 4477, and 4479) were all present, but faint.

The last stop of the night before the moon's scheduled arrival was the Double-Double. At this point, Lyra was around 80 degrees above the horizon. But seeing was still soft; 143x gave the best view, just splitting the pairs. Any more power, and the image deteriorated. As the moon rose over the ridge to the East, we packed up and pronounced the night a success.

Comet C/2001 Q4 NEAT taken through a 106mm Takahashi refractor using a Canon 10D digital camera set at ISO 1600; 3-one minute exposures stacked and processed using Photoshop. Tracking was done on the nucleus of the comet which is why stars are trailed.
Photo by: Ron Bissinger

What's Up *by Debbie Dyke*

All times Pacific Daylight Time unless otherwise noted.

June

9 Wed **Last Quarter Moon** 1:02 p.m.
For the next two mornings, Vesta is close to the Moon.

10 Thur Uranus stationary 5:00 p.m.

11 Fri **Pluto at opposition** 5:00 a.m.

13 Sun 1944 JPL was formed, originally called Air Corps Jet Propulsion Research Project.

16 Wed 1963 Valentina Tereshkova becomes the first woman in orbit.

17 Thurs Moon at apogee (252,076 mi/406,575 km) 9:00 a.m.
New Moon 1:27 p.m.

18 Fri **Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.
Mercury in superior conjunction 2:00 p.m.
1983 Sally Ride becomes the first U.S. woman in space, 20 years after USSR sent Valentina up for a spin.

19 Sat Mars 5° E of the Moon at twilight.

20 Sun Father's Day
Tri-Valley Stargazers discussion meeting. 2:00 p.m. at the Round Table Pizza on 1024 E. Stanley Blvd., Livermore. Discuss astro stuff with your fellow members.
In the early evening look for Saturn, Mars, the crescent Moon, and Jupiter to form a line.

21 Mon **Summer Solstice** 5:57 p.m.
Tri-Valley Stargazers Board meeting. 7:00 p.m. at the Round Table Pizza in Livermore.
Sun goes into Gemini.

22 Tues 1675 Royal Greenwich Observatory founded.
1978 James Christy discovers Pluto's satellite Charon.

23 Wed Jupiter less than 3° below the Moon in the evening.

25 Fri **First Quarter Moon** 12:08 p.m.
1178 Five British monks observe an impact on the crescent Moon. Theory has it that the resulting crater is the one we know as Giordano Bruno.

26 Sat 1730 Charles Messier born.

29 Tues The Moon is just 2° from Antares in the evening.

30 Wed 1905 Einstein submits his new theory of special relativity.
1908 An asteroid breaks up and explodes over Siberia near Tunguska with the force of a hydrogen bomb. Ka-boom.

July

1 Thurs Moon at perigee (221,617 mi/357,448 km) 4:00 p.m. Large tides expected.

2 Fri **Full Moon** 4:09 a.m.

4 Sun **Independence Day**.
1054 Chinese astronomers observe the Crab Nebula supernova.
1997 Mars Pathfinder lands on Mars.
1868 Henrietta Swan Leavitt born. Henrietta discovered over 2,400 variable stars and the relationship between period and luminosity in Cepheid variables.

5 Mon Earth at aphelion (94,299,086 mi/152,095,300 km) 4:00 a.m.

7 Wed Japanese Star Festival (Tanabata).

8 Thurs Saturn in conjunction with the Sun 10:00 a.m.

NASA's Space Place

Far-out Ideas

by Patrick L. Barry

Ever had a great idea for a new spacecraft propulsion system, or for a new kind of Mars rover? Have you ever wondered how such "dinner napkin sketches" evolve into real hardware flying real missions out in the cold blackness of space?

The road to reality for each idea is a unique story, but NASA has defined some common steps and stages that all fledgling space technologies must go through as they're nursed from infancy to ignition and liftoff.

Suppose, for example, that you've thought of a new way to shield astronauts from harmful radiation during long space missions. In the first stage, you would simply "flesh out" the idea: Write it down, check the physics, and do some quick experiments to test your assumptions.

If the idea still looks good, the next step is to build a "proof of concept." This is the "science fair project" stage, where you put together a nifty demonstration on a low budget-just to show that the idea can work.

For your radiation-shielding idea, for example, you might show how a Geiger counter inside a miniature mock-up doesn't start clicking when some radioactive cobalt-60 is held nearby. The shielding really works!

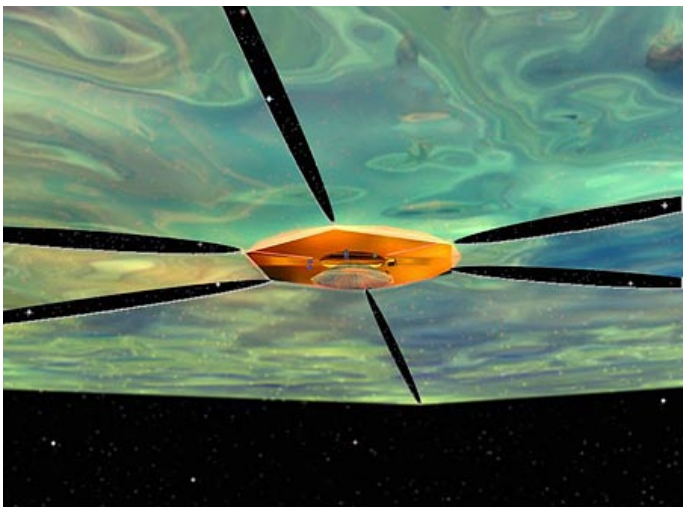
Once that hurdle is cleared, development shifts into a higher gear. In this stage, explains Dr. Christopher Stevens of JPL, the challenge isn't just making it work, but making it work in space.

"Some conditions of space flight cannot be adequately simulated here on Earth," Stevens says. Cobalt-60 doesn't truly mimic the diverse mixture of radiation in space, for example, and the true microgravity of orbit is needed to test some technologies, such as the delicate unfolding of a vast, gossamer solar sail. Other technologies, such as artificial intelligence control systems, must be flight tested just because they're so radically new that mission commanders won't trust them based solely on lab tests.

Stevens is the manager of NASA's New Millennium Program (NMP), which does this sort of testing: Sending things to space and seeing if they work. In recent years the NMP has tested ion engines and autonomous navigation on the Deep Space 1 spacecraft, a new "hyperspectral" imager on the Earth Observing 1 satellite, and dozens of other "high risk" technologies.

Thanks to the NMP, lots of dinner napkin sketches have become real, and they're heading for space. You can learn more at the NMP web site, nmp.nasa.gov.

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



This is just one idea of how a solar sail could be used to power an interstellar probe. A solar sail is one possible type of new technology that NASA's New Millennium Program would test in space before it would be risked on a scientific mission.

Astro Events *continued*

Galaxy NGC3627 / M66. This is one of the famous galaxies in Leo the Lion. It can be observed with even the smallest telescope and more aperture shows successively more detail. The image was made with a 13" f4 newtonian telescope and a Starlight MX716 CCD Camera. Multiple images through colored filters (red, green and blue) were used to compose a color image. The raw images form the CCD camera are all black and white. A luminance image was also mixed into the color image to provide extra detail. The exposure times were stretched over two nights in May 2004. Exposures for the luminance was 57 x 1 min and for the RGB frames 9 x 2 min. Processing was done in AstroArt 3.0.
Photo by Gert Gottschalk

Tri-Valley Stargazers
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PRIMEFOCUS

Tri-Valley Stargazers Membership Application

Member agrees to hold Tri-Valley Stargazers, and any cooperating organizations or landowners, harmless from all claims of liability for any injury or loss sustained at a TVS function.

Name _____ Phone _____ e-mail _____

Address _____

Do not release my: _____ address, _____ phone, or _____ e-mail information to other TVS members.

Membership category: _____ $5 Student.
_____ $25 Basic. You will receive e-mail notification when the PDF version of *Prime Focus* is available for download off the TVS web site.
_____ $30 Regular. You will receive a paper version of *Prime Focus* in the mail.
_____ $32.95 One year subscription to *Sky & Telescope* magazine.
_____ $29 One year subscription to *Astronomy* magazine.
_____ $55 Two year subscription to *Astronomy* magazine.
_____ $20 Hidden Hill Observatory (H2O) refundable key deposit (key property of TVS).
$_____ Tax deductible contribution to Tri-Valley Stargazers.

$_____ TOTAL – Return to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551

Membership information: Term is one calendar year, January through December. Student members must be less than 18 years old or still in high school.