the Webfooted Astronomer
News from the Seattle Astronomical Society
August 2009

Big eyes on the sky

by Ron Hobbs

Just in time for the season 400 years ago that Galileo began to point his new instrument toward the sky, *National Geographic* has published a delightfully informative short history and future of the telescope by Timothy Ferris. In particular, it provides an overview of the next generation of ground-based telescopes that have the prospect of transforming once again our understanding of the universe. I have spent much of my life anticipating the arrival of a new package of remote sensing devices at one or more of the worlds of the Solar System, an admittedly parochial view, but I am now finding myself anticipating these new instruments that will bring the universe closer to our doorstep.

The largest of the new instruments, the "biggest eye on the sky,"[1] will be the European Extremely Large Telescope (E-ELT). To be built by the European Southern Observatory, the intergovernmental agency that already operates three large telescopes in the Atacama Desert region of Chile, it will have a primary segmented mirror 42 meters in diameter. The secondary mirror is likely to be six meters across, comparable to some of the largest telescopes in operation today. Equipped with adaptive optics, it is expected to provide images with 15 times the resolution of Hubble. It will have the power to resolve the very first stars to form after the cosmological "dark ages" as well as some of the Earth-like planets the Kepler telescope is almost certain to discover in the habitable zones of nearby stars. To be built in either the Andes or the Canary Islands, the massive instrument is expected to begin observing in 2018. The E-ELT is a scaled-down version of the conceptualized 100 meter Overwhelmingly Large (OWL) Telescope, which you have to admit is the coolest name and acronym for a telescope.

Continued on page 3

NEXT MEETING

August 19 — 7:30 p.m.
University of Washington Physics/Astronomy Building, Room A-102

John Wisniewski: Imaging Circumstellar Disks: Exoplanet Diagnostics

The natal circumstellar disks of protostars, i.e. protoplanetary disks, are believed to serve as the birthplace of planets. Slightly older debris disks can serve as virtual signposts for the presence of exoplanets and can enable one to study the early dynamical evolution of exoplanetary systems. While technically challenging, spatially resolving protoplanetary and debris disks provides unique diagnostics of the birth and early evolution of exoplanets. In his talk, Wisniewski, a postdoctoral fellow in the Department of Astronomy at the UW, will review some of the high contrast imaging techniques which are used to image these disks.

SAS Calendar

August 14
Jupiter at opposition

August 17
Neptune at opposition

August 19 — 7:30 p.m.
Seattle Astronomical Society Meeting
Guest speaker: Dr. John Wisniewski. Details on page 1.

August 19 — 9 p.m.
UW Observatory — Public viewing night

August 20 — New Moon

August 20-23
Brooks Memorial Park star party. Details, page 6.

August 22 — 8 p.m.
Tiger Mountain Star Party (members only)

August 27 — First quarter Moon

August 27 — 6 p.m.
Conversation on SETI at Science Fiction Museum at EMP. Details, page 7.

August 29 — 7 p.m.
Seattle Astronomical Society Star Parties
- Green Lake, Seattle
- Paramount Park, Shoreline

September 2 — 9 p.m.
UW Observatory — Public viewing night

A full list of SAS events for the next 90 days is on the club Web site at:

SAS officers

President, Karl Schroeder
president@seattleastro.org

Board chair, Jon Bearscove
chair@seattleastro.org

VP Programs, Jerry Kuch
programs@seattleastro.org

VP Education, Mohammad Sarwat
education@seattleastro.org

VP Membership, Rod Ash
membership@seattleastro.org

VP Publicity, Judy Schroeder
publicity@seattleastro.org

Secretary, Connie Griffith
secretary@seattleastro.org

Treasurer, Maxine Nagel
treasurer@seattleastro.org

The Webfooted Astronomer is the monthly publication of the Seattle Astronomical Society (SAS). All opinions expressed herein are those of the contributors and not necessarily those of SAS. Advertising display rates: full page (7″ x 9.5″) $50; half page (7″ x 4.75″) $30; less than half page: $5 per page inch (1″ x 5″). Personal ads are published free to current paid members of the SAS. For all others, 10 cents per word, 50 word minimum charge. Submit article ideas to Editor, The Webfooted Astronomer, PO Box 31746, Seattle, WA 98103, or e-mail to editor@seattleastro.org.

Big eyes on the sky

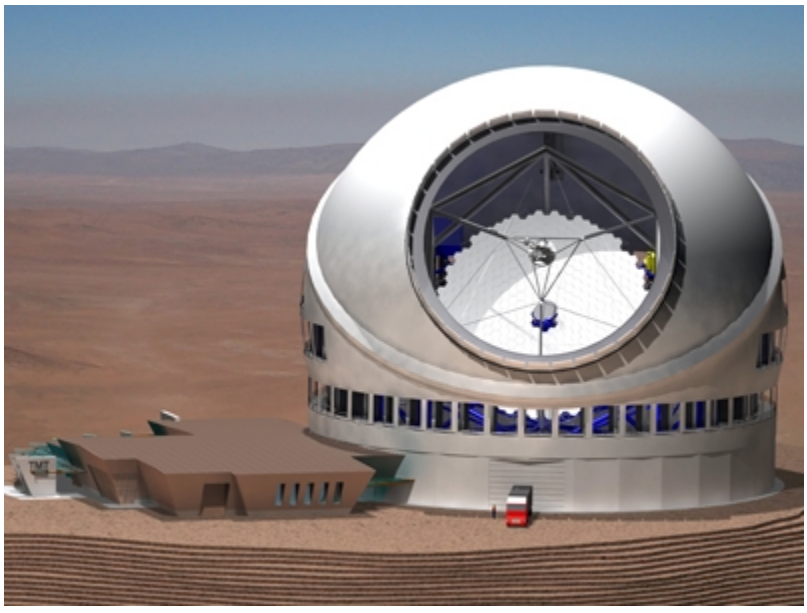
Continued from page 1

A couple of other behemoths are on the drawing table. The Thirty Meter Telescope, a collaborative effort of an association of Canadian universities, Cal Tech and the University of California, has just chosen Mauna Kea as its preferred site.[2] The instrument features a primary mirror that is, well the name says it all, composed of 492 individual segments. Farther south, a collaboration of U.S. and Australian organizations intends to build the Giant Magellan Telescope at Cerro Las Campanas in Chile. The GMT is a segmental telescope composed of seven 8.4-meter mirrors which will have the resolving power of a 24.5-meter mirror.[3] The website claims that it will "produce images 10 times sharper than the Hubble Space Telescope." The instrument is under construction with the first mirror being ground and polished.

All of these behemoths are projected to be completed late in the next decade. One of the interesting side effects of these big telescopes is that many today's largest telescopes will be freed up to do survey work, discovering new objects which the bigger telescopes can examine in greater detail.[4] As all of these and other new instruments work in concert, one can only imagine the insights we may gain about the formation and structure of the universe, the nature of dark matter and energy, as well as whether or not the Earth is alone in the galaxy. I find myself experiencing the same kind of eager anticipation I once felt before the Apollo expeditions to the Moon or the arrival of Voyager 2 at Neptune. ★

Ron Hobbs is the Public Programs Assistant for The Museum of Flight and a Solar System Ambassador for NASA's Jet Propulsion Laboratory.

1: http://www.eso.org/public/outreach/products/publ/handouts/pdf/e-elt-hr.pdf
2: http://www.tmt.org/news/site-selection.htm
3: http://www.gmto.org/tech_overview
4: Ferris, T. "Cosmic Vision." *National Geographic*. July 2009: 120-137



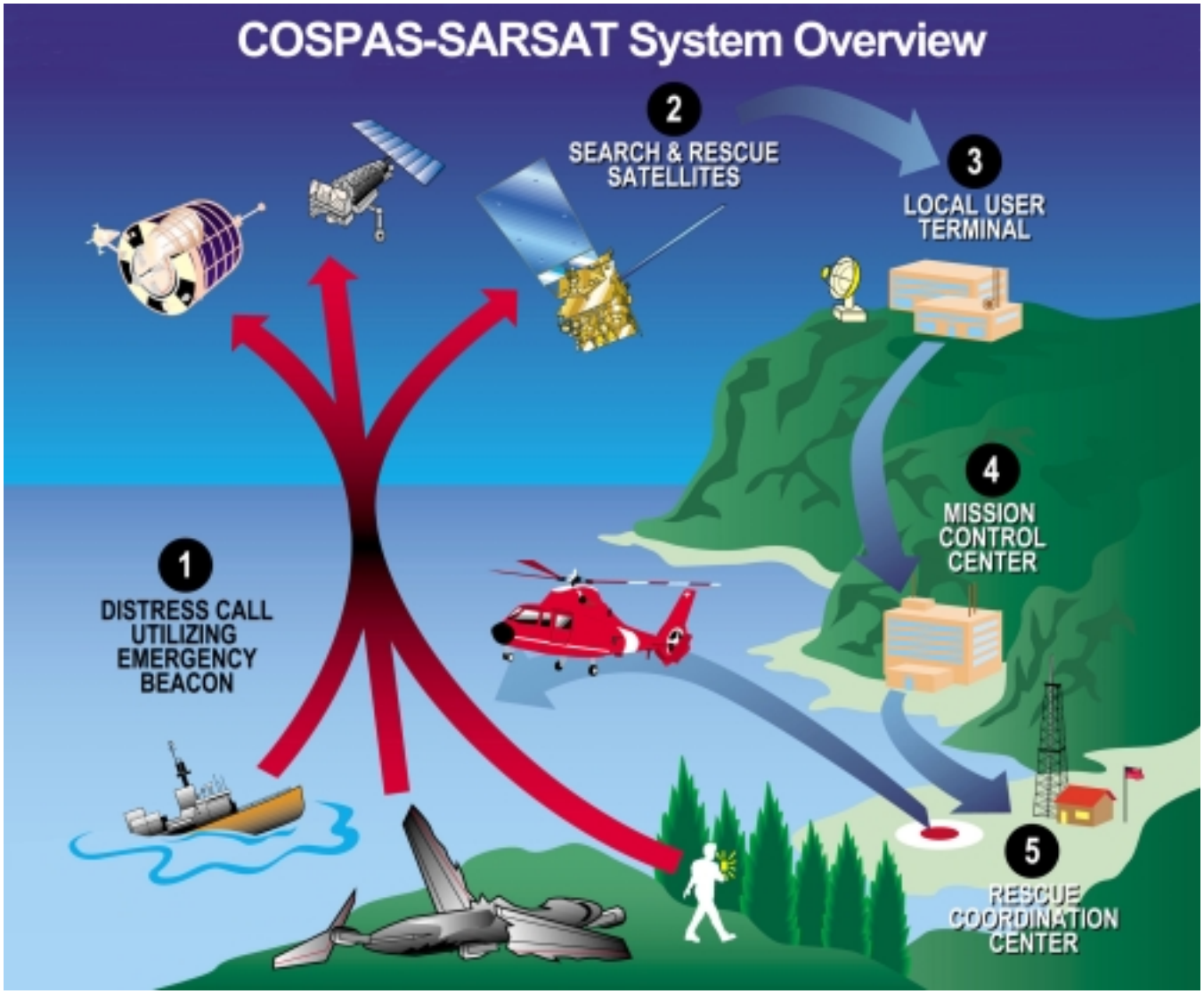
Drawing of the Thirty Meter observatory, image courtesy TMT Observatory Corporation. A gallery of images of the observatory can be viewed at http://www.tmt.org/gallery/index.html

Sarsat to the rescue

If a plane crashes in the woods and nobody hears it, does it make a sound?

Never mind contemplating this scenario as a philosophical riddle. This can be a real life or death question. And the answer most of the time is that, even if no people are nearby, something is indeed listening high above.

That something is a network of satellites orbiting about 450 miles overhead. The "sound" they hear isn't the crash itself, but a distress signal from a radio beacon carried by many modern ships, aircraft, and even individual people venturing into remote wildernesses.



NOAA's polar-orbiting and geostationary satellites, along with Russia's Cospas spacecraft, are part of the sophisticated, international Search and Rescue Satellite-Aided Tracking System.

Sarsat to the rescue

Continued from page 4

In the last 25 years, more than 25,000 lives have been saved using the satellite response system called Search and Rescue Satellite-aided Tracking (SARSAT). So what are these life-saving superhero satellites? They are mild-mannered weather satellites.

"These satellites do double duty," says Mickey Fitzmaurice, a National Oceanic and Atmospheric Administration (NOAA) systems engineer for SARSAT. "Their primary purpose is to gather continuous weather data, of course. But while they're up there, they might as well be listening for distress signals too."

In February, NASA launched the newest of these Polar-orbiting Operational Environmental Satellites (or POES) into orbit. This new satellite, called N-Prime at launch and now dubbed NOAA-19, prevents a gap in this satellite network as another, aging NOAA satellite reached the end of its operational life.

"The launch of N-Prime was a big deal for us," Fitzmaurice says. With N-Prime/NOAA-19 in place, there are now six satellites in this network. Amongst them, they pass over every place on Earth, on average, about once an hour.

To pinpoint the location of an injured explorer, a sinking ship, or a downed plane, POES use the same Doppler effect that causes a car horn to sound higher-pitched when the car is moving toward you than it sounds after it passes by.

In a similar way, POES "hear" a higher frequency when they're moving toward the source of the distress signal, and a lower frequency when they've already passed overhead. It takes only three distress-signal bursts — each about 50 seconds apart — to determine the source's location.

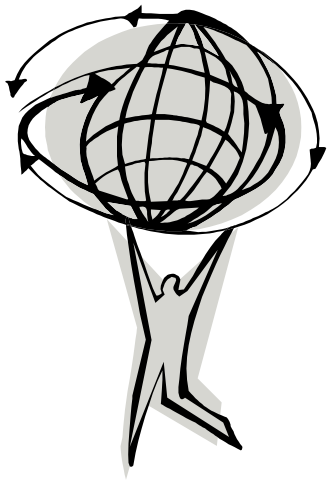
Complementing the POES are the Geostationary Operational Environmental Satellites (GOES), which, besides providing weather data, continuously monitor the Western Hemisphere for distress signals. Since their geostationary orbit leaves them motionless with respect to Earth below, there is no Doppler effect to pinpoint location. However, they do provide near instantaneous notification of distress signals.

In the future, the network will be expanded by putting receivers on new Global Positioning System (GPS) satellites, Fitzmaurice says. "We want to be able to locate you after just one burst." With GPS, GOES will also be able to provide the location of the transmitter.

Philosophers beware: SARSAT is making "silent crashes" a thing of the past.

Download a two-page summary of NOAA-19 at www.osd.noaa.gov/POES/NOAA-NP_Fact_Sheet.pdf. The Space Place gives kids a chance to rescue stranded skiers using their emergency rescue beacons. The Wild Weather Adventure game awaits them at spaceplace.nasa.gov/en/kids/goes/wwa. ★

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



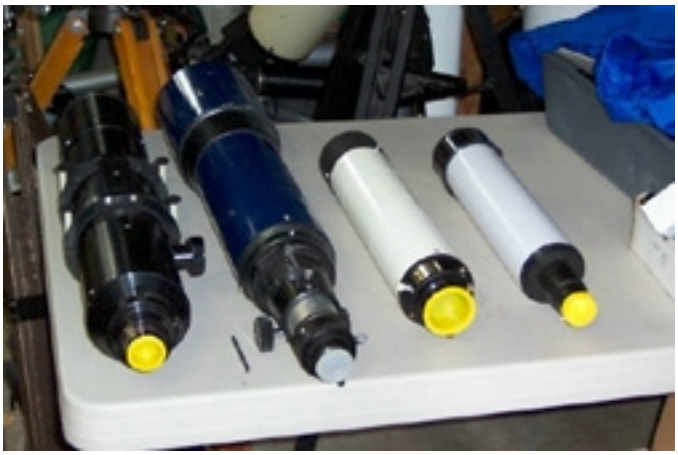
Club star party Aug. 20-24 at Brooks Memorial Park

The annual SAS star party at Brooks Memorial State Park will be held the weekend of August 20-24.

The park is 12 miles north of Goldendale on State Highway 97. The club party will be in the group campsite on the east side of the highway. Water and vault toilets are provided at the site. Showers, flush toilets, and a small store are located just inside the park to the west of the highway.

The event is informal, so there is no requirement to preregister. For more information, contact Karl Schroeder, KSchroe225@aol.com or 206-362-7605.

Scopes for sale



SAS will have four optical tubes for sale at the August 19 meeting. These are small/short tube scopes from the club library. They do not have mounts. Two would make excellent finders and the other two will work as grab-and-goes.

Seattle Astronomical Society Has Stars in Their Eyes

With literally hundreds of astronomy clubs across the United States alone, the fascinating hobby of stargazing continues to thrive and inspire young and old alike to explore the starry heavens. Such clubs provide an excellent resource for individuals to observe, learn about and discover astronomical wonders. Nowhere is this truth more evident than with the Seattle Astronomical Society. Recently, we caught up with long-time member Mike Langley, who agreed to share his insights regarding the club and astronomy in the Seattle area ...

When did the Seattle Astronomical Society get started and what is its purpose?

The Seattle Astronomical Society (SAS) has been in existence for over 60 years. One member can recall attending SAS meetings at Broadway High School in 1948 ... The SAS was founded with

Burley Packwood, Maxine Nagle and Michael Langley of the SAS.

What kind of public outreach activities is the SAS involved in?

We participate in a public outreach program at the Theodor Jacobsen Observatory on the University of Washington campus twice a month. The SAS recently raised funds for the purchase of 150 telescope kits for young astronomers, and UW student volunteers are conducting telescope building sessions for the kids. It has been a very successful program with each session filled to capacity. We are

Star Party is by far the most popular star party around. The event is held in late July or early August each year. The elevation is about 6300 feet and far enough away from Seattle to have dark skies. Everyone I know loves it.

What are some of the favorite Orion products used by SAS members?

One very popular Orion product is your Classic XT series Dobs. Many of my friends own one of these Dobs and I have owned an XT10 for many years. Even though I have recently purchased the XX12, I plan to keep [my XT10] forever. I have used the XT10 at more public star parties than I can count and I will continue to use it whenever I don't have much setup time. Astro-imaging is becoming very popular these days and Orion imaging products are showing up everywhere. Another Orion product I see a lot is your Premium ED Refractors.

The fall catalog (#098) for Orion Telescopes & Binoculars features a one-page profile of the Seattle Astronomical Society, on page 51. The profile includes the SAS logo, and a photo of memers Burley Packwood, Maxine Nagel, and Mike Langley. There's NO truth to the rumor that the profile was done because Langley owns every telescope ever manufactured by Orion! If you don't have a print copy of the catalog, you can see the profile, with even more photos, online at http://www.telescope.com/seattle.

CityClub to sponsor SETI conversation

Seattle CityClub is hosting a conversation later this month with two of the leading scholars on the search for extraterrestrial intelligence: The University of Washington's Dr. Don Brownlee, and Dr. Nancy Tarter of the SETI institute.

The event, "The Search for Extraterrestrial Life: Is Anything or Anybody Out There?", will be held Thursday, August 27 at the Science Fiction Museum at the EMP, 325 5th Ave North in Seattle. Registration begins at 6 p.m., a reception at 6:30, and the program at 7 p.m. Cost is $25, with pre-registration available on-line at http://www.seattlecityclub.org/civicrm/event/info?reset=1&id=21

Dr. Jill Tarter is one of the world's most prominent leaders in the field of SETI . A founding member of the institute's staff, Tarter received her bachelor of engineering physics degree with distinction from Cornell University and her master's degree and a Ph.D. in astronomy from the University of California, Berkeley. She served as project scientist for NASA's SETI program, the High Resolution Microwave Survey, and has conducted numerous observational programs at radio observatories worldwide. Since the termination of funding for NASA's SETI program in 1993, she has served in a leadership role to secure private funding to continue the exploratory science. Many people are now familiar with her work as portrayed by Jodie Foster in the movie *Contact*.

Dr. Donald Brownlee is familiar to SAS members though his occasional presentations to the club. Brownlee is professor of astronomy at the University of Washington, from which he received his doctorate in astronomy. His research interests include investigations, conducted at the University of Washington, the Lunar Science Institute, and the California Institute of Technology, of interplanetary dust, comets, meteorites, and the origin of the solar system. He also conducted research as a distinguished visiting professor at the Enrico Fermi Institute at the University of Chicago. Brownlee is principal investigator for the STARDUST Discovery mission that collected comet samples and returned them to Earth. He is co-author, with his UW colleague Dr. Peter Ward, of *Rare Earth: Why Complex Life is Uncommon in the Universe*.

The discussionwill be moderated by Keith Seinfeld, health and science reporter for KPLU radio. The event is sponsored by Experience Music Project and the Science Fiction Museum and Hall of Fame. Co-presenting organizations include Boeing Employees' Astronomical Society, Northwest Science Writers Association, Pacific Science Center, and Washington NASA Space Grant.

The Webfooted Astronomer
Seattle Astronomical Society
PO BOX *31746*
SEATTLE, WA 98103-1746

RETURN SERVICE REQUESTED

NEXT MEETING
August 19, 2009

John Wisniewski,
Imaging
Circumstellar disks

Details, page 1

Seattle Astronomical Society Membership

Join or renew on-line at http://www.seattleastro.org/membernew.shtml or mail this form and your check to the address below. For family memberships, please include the names of persons you want to appear in the membership directory. For renewals, please include magazine subscription customer number.

Name _____

Address _____

_____

Phone _____ E-mail _____

☐ New member ☐ Renewal ☐ SAS may publish info in membership directory

☐ Individual membership – $25	**$** _____
☐ Family membership – $25	**$** _____
☐ Full-time student membership – $10	**$** _____
☐ Receive paper copy of newsletter (free on-line) – $15	**$** _____
☐ Sky & Telescope magazine – $33	**$** _____
☐ Astronomy magazine – $34	**$** _____
☐ Donation (optional)	**$** _____
	TOTAL $: _____

Mail to: Seattle Astronomical Society, c/o Treasurer, PO Box 31746, Seattle WA 98103-1746