

The Observer



Caltech to Build Huge Radio Telescope Array in Nevada to Study Black Holes and Pulsars



The two technology demonstrator telescopes near Bishop earlier this year

On June 17, The California Institute of Technology announced that it will build the world's largest radio telescope array, to be known as the Deep Synoptic Array, to study some of the most exotic objects in the universe, including black holes, pulsars, and gamma ray bursters. The array will consist of 1,650 twenty-foot diameter radio telescopes in a remote area of Nevada's Great Basin. The project is being funded with a \$200 million grant from the Schmidt Sciences Foundation. According to the announcement, the array will be able to "see" objects in radio wavelengths ten times sharper and a hundred times faster than any radio telescope in operation today. A prototype technology demonstrator with two radio telescopes was set up near Bishop, California, earlier this year, and the results were considered very positive. If the permits are approved, construction could start by the end of this year, and the array could become operational in 2029.

Central Valley Astronomers-2026**President-Hubert Cecotti****1st Vice-president-Brian Bellis****2d Vice-president-Ryan Ledak****Secretary-Treasurer-Steve Harness****Star party coordinator-Brian Bellis****Historian/Observer editor-Larry****Parmeter****Director-Warren Maguire****Director-Fred Lusk****Director-Lynn Kleiwer****Director-Steve Brittan****Number of Exoplanets found as of June
2026-****Confirmed-6,298****How many more are out there-****Tens of thousands?****Millions?****Larry Parmeter is the editor of The Observer****He can be reached at 559-288-3456****Or lanpar362@gmail.com****The President's Message-**

Summer has arrived in the San Joaquin Valley, bringing long, warm evenings and some of the finest observing opportunities of the year. While the daytime heat may encourage us to stay indoors, the cool hours after sunset invite us to step outside and experience the remarkable beauty of California's night sky.

For members of the Central Valley Astronomers (CVA), summer is a season filled with possibilities. From our backyard observing sessions to trips into the Sierra Nevada, we have access to skies that can reveal wonders ranging from our neighboring planets to distant galaxies millions of light-years away. As darkness falls, look high overhead for the Summer Triangle, formed by the brilliant stars Vega, Deneb, and Altair. This familiar asterism serves as a gateway to one of the season's greatest spectacles: the Milky Way. Under Fresno's city lights, the Milky Way may be faint, but a short drive into the foothills or higher elevations of the Sierra transforms it into a breathtaking river of countless stars stretching across the sky. I encourage people to bring friends and family, with or without a telescope, and show the Milky Way: many people from the Central Valley haven't seen it as CVA members know it.

The constellations Scorpius and Sagittarius dominate the southern sky throughout the summer. Although they never climb especially high from our latitude, they point us toward the heart of our galaxy. This region is rich with open clusters, glowing nebulae, and dense star clouds. Objects such as the Lagoon Nebula (M8), the Trifid Nebula (M20), and the Swan Nebula (M17) are rewarding targets for binoculars and telescopes alike under dark skies, especially for astrophotographers. Large targets, such as the M8 region, are ideal for wide-field telescopes (e.g., SeeStar).

Summer also offers one of the finest globular clusters visible from the Northern Hemisphere; it is a good opportunity to do globular cluster marathons and search for faint globular clusters from the NGC catalog, or be more adventurous with Palomar globular clusters. The Great Hercules Cluster (M13) is never boring; it appears as a faint fuzzy patch through binoculars but resolves into hundreds of thousands of tightly packed stars in even modest telescopes. Different magnifications

can provide different experiences. Nearby, the Ring Nebula (M57) provides a fascinating glimpse of what may one day become the final chapter in our own Sun's story.

August brings one of astronomy's favorite annual events: the Perseid meteor shower. Away from city lights, we can often enjoy dozens of meteors per hour as Earth passes through debris left behind by Comet Swift-Tuttle. No telescope is required, just a reclining chair, a little patience, and a dark sky. Gas prices are going down, so it will become more affordable to drive to the mountains more often.

One of CVA's greatest strengths is the opportunity to share these experiences with others. Whether you're attending a public star party at River Park or Millerton Lake, helping someone look through a telescope for the first time, or simply exchanging observing tips with fellow members, you're helping inspire curiosity about the universe. Every outreach event reminds us that astronomy is not only about discovering the cosmos, but it is also about building community here on Earth.

As always, I encourage everyone to join us at our monthly meetings and observation sessions using the Google sheet link available on Facebook. Whether you're a longtime CVA member or attending your first event, there is always something new to learn and someone eager to share the view through their telescope. Do not look only in your own telescope; go check what others have to offer.

The universe has been waiting for us to look up for billions of years. This summer, let's take every opportunity to do just that with the local community.

Clear skies,

Hubert Cecotti, CVA President

CVA Calendar for July and August

A reminder-no club meetings in July and August

July 11-Millerton Lake public starwatch

July 18-Club starwatch at Big Stump; starwatch weekend at Courtright

July 24-Public starwatch at Riverpark

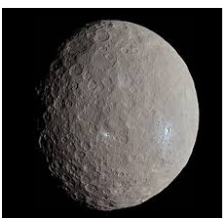
August 8-Public starwatch at Millerton Lake

August 15-Club starwatch at Big Stump; starwatch weekend at Courtright

August 21- Public starwatch at Riverpark

Upcoming-September 12-Club starwatch and Fall Star-B-Que at Big Stump; Dark Skies Festival the same weekend

Astronomy (Very) Short-



The first known asteroid, now classified as a dwarf planet, was found by Giuseppe Piazzi, a Catholic priest, at the Palermo Observatory in Sicily in 1801. He named it after Ceres, the Roman goddess of the harvest and the patron of Sicily. Today, the word cereal comes from her name.

Large Crowds at Millerton Lake for June Public Starwatch

Thanks to social media and publicity generated by the state park service, the June 6 public starwatch near the boat launch ramp on the west side of Millerton Lake attracted several hundred people, one of the largest turnouts at Millerton in many years. Fortunately, CVA showed up in force as well; an estimated 15 telescopes were on site to allow the crowds to view various celestial objects. Before dusk, there was some concern with the clouds in the area, but there were enough clear skies to delight and enthrall the many people present. The most popular objects shown were Jupiter, Alberio, Polaris, and M13. Hopefully similar crowds, but not the clouds, will appear for the next Millerton outing on July 11.



Spring Star-B-Que at Big Stump on May 16





Profiles in Astronomy

Alan Hale 1958-2026

Alan Hale, co-discoverer with Thomas Bopp of one of the brightest and most celebrated comets of recent years, died at his home in Cloudcroft, New Mexico, on June 6, 2026, at the age of 68. The cause of death was from apparent complications following an undisclosed surgical procedure. Right-Hale in 1997 with the telescope he used to find Comet Hale-Bopp

Hale was born in Tachikawa, Japan, where his father was a U.S. Air Force officer. A few months after his birth, his father was transferred to Alamogordo, New Mexico, where young Hale grew up and developed an interest in astronomy. After high school, he served in the Navy and eventually attended the U.S. Naval Academy, earning a degree in physics. After his Navy service, he worked for NASA for several years, then attended New Mexico State University, where he earned a doctorate in astronomy in 1992. In 1993, while working for the New Mexico Museum of Space History, he established and became president of the Southwest Institute for Space Research, which he later renamed the Earthrise Institute, whose mission he described as "to use astronomy, space, and other related endeavors as a tool for breaking down international and intercultural barriers and for bringing humanity together." As a result, Hale traveled to many different parts of the world giving talks on astronomy and encouraging people to take up the science and preserve dark sky spaces. Along the way, he gave himself a goal of seeing 500 comets in his lifetime, an endeavor that he started in his teens.

Hale's most famous comet came on the night of July 22, 1996; he was recording two other comets with a Meade 16" reflector telescope, when he noticed another one in Sagittarius which was not on any chart and has not been present a week earlier. He marked it and sent a telegram to Brian Mardson at the Central Bureau for Astronomical Telegrams at MIT, the official clearing house for all



transient objects. The same night, Thomas Bopp, an amateur astronomer in Stanfield, Arizona, also saw the object and sent a telegram as well. Within a day the object was identified as a comet, was named Hale-Bopp after its two discoverers, and eventually would become the brightest comet since Comet West in 1976.

Like Bopp, Hale became internationally famous for his co-discovery. He traveled and lectured widely, hosted a radio program on astronomy, and wrote and published many articles on comets and astronomy in general. However, his health declined, and over the last few years, he rarely left his home in Cloudcroft. An asteroid, 4151 Alanhale, is named for him.

What's New In Space

ESA's Franklin Rover Will Finally Go to Mars-Hopefully

On April 16, NASA announced that it will officially support and provide logistics for the European Space Agency's long delayed Rosalind Franklin Rover to Mars. Along with the announcement, NASA also said that the rover will be launched via a Space-X rocket in late 2028, the next "window" for Mars launches.

The Franklin Rover, named after the English chemist and DNA pioneer Rosalind Franklin, has had a long and convoluted history. First proposed in 2001, it went through several years of revisions and modifications before being paired up with NASA as part of NASA's MAX-C Mars rover, to be launched jointly aboard Atlas rockets in 2014.

However, the MAX-C program was cancelled in 2011(it would eventually be revived and become the Perseverance Rover, which was launched in 2020). ESA then secured an agreement with Roscosmos in 2016 to launch the rover

aboard a Soyuz spacecraft in exchange for several Russian-built experiments aboard it. It was scheduled to be launched from the Baikonur Space Center in 2020, which was then postponed to 2022. However, Russia's invasion of the Ukraine in 2022 caused ESA to terminate the agreement, and it went looking for another launch partner. In 2024, it signed an agreement with Thales-Alenia, a French-based space consortium, to build and complete the project. At the same time, It went back to NASA, which agreed to find a launch vehicle for the mission. On April 16, NASA announced the Space-X Falcon Heavy as the launch vehicle. The launch will take place at the Kennedy Space Center.

The Franklin Rover's main experiment will be a drill which will dig as far as two meters(almost seven feet) down into the Martian soil to look for evidence of water and other life-supporting conditions. As of this writing, the landing site has been narrowed to six areas within 30 degrees of the Martian equator. A final site will be chosen within a year.



Vast Space to Host two French Missions in 2027

Vast Space Technologies and CNES, the French Space Agency, announced on June 2 that Vast will host two orbital missions in 2027 involving French astronauts. The first will be with veteran astronaut Thomas Pesquet commanding a four-person Crew Dragon mission for a two week stay aboard the International Space Station in the spring of 2027. It will be Pesquet's third visit to ISS, and the first time a non-American has commanded a crew to the space station. The second mission will involve space rookie Arnaud Prost; he will be part of the first crew to stay aboard Vast's Haven-1 space station, the first private commercial space station, which will be launched atop a Space-X Falcon Heavy rocket no later than April 2027. The ISS mission still has to be approved by the

International Space Station consortium, consisting of NASA, Roscosmos, the European Space Agency, the Japanese Space Agency, and the Canadian Space Agency.



Vast and the British Space Agency also signed an agreement for the BSA to participate in its space activities, including the Haven-1 mission. This means that John McFall may be a crew member on the Haven-1 mission. If he is selected, McFall will be the first person with a major physical disability to go into space. At age 19, he was seriously injured in a motorcycle accident, leading to one of his legs being amputated. He went on, however, to become a world-class para-athlete, winning

a bronze medal at the 2008 Para-Olympic Games in Beijing, as well as attending medical school and becoming a research physician. McFall has already qualified to be a member of The European Space Agency's astronaut corps. The agreement means that the BSA can start soliciting sponsorships to finance McFall's seat aboard the Crew Dragon that will take him to Haven-1. Indications are that he will soon begin training with NASA and Space-X for a future space flight, either to ISS or Haven-1.

NASA names Artemis III Crew

On June 9, NASA announced the crew for the Artemis III mission, which will test one and possibly two lunar landers in Earth orbit in 2027. Commanding the two week-long flight will be Randall Bresnik, a two-time space veteran and former military test pilot. The pilot will be Luca Parmitano, also a veteran test pilot with the Italian Air Force and a two-time astronaut with the European Space Agency(what it sounds like is that, for a mission which will be highly demanding and technical, NASA wanted two experienced test pilots to be in charge of it). One mission specialist is Frank Rubio, a physician who holds the record for the longest American stay in space, 370 consecutive days aboard ISS. The other mission specialist is Andre Douglass, a rookie astronaut who holds a Ph.D. in engineering. Artemis III's backup is Bob Hines, another veteran test pilot who has already made one flight to ISS, and will be trained to step into any of the Artemis III seats if one of the primary crew has to be replaced(it appears more and more that the backup for one Artemis crew will be made a member of the prime crew for the next mission; Douglass was the backup for the Artemis II crew; so don't be surprised if Hines is on the Artemis IV mission). When the Artemis III announcement was made, there was some controversy over the fact that a woman was not on the crew. Nasa chief administrator Jerod Isaacman said the next day that several women are currently training for future Artemis missions, and it appears likely that at least one and maybe two women and another ESA astronaut will be on the Artemis IV crew.



More Bad News for Blue Origin



On May 28, a Blue Origin New Glenn heavy lift rocket exploded on its launch pad at Cape Canaveral while undergoing a "hot fire" test prior to launch, destroying the rocket and damaging the pad. Both Blue Origin and NASA termed it "an anomaly," and immediately began an investigation into the cause. This is another setback for Blue Origin; Both Space-X and Blue Origin are behind schedule in their lunar

lander programs, which is causing NASA some concern in its effort to land astronauts on the moon by 2028. Space-X (mostly) successfully launched and test-flew its newest version of Starship(V3) on May 22, but must still show refueling, orbital maneuvering, and lunar lander capabilities before NASA will accept it.



Galaxy in the Eyepiece

NGC 3780

The cup in the Big Dipper holds a number of galaxies; one of the lesser-known ones is NGC 3780. This is a spiral galaxy, designated SAc, about 98,000 light years in diameter, slightly smaller than our Milky Way, 19 million light years away according to the latest measurements, and having an apparent magnitude of 12.1. It is considered the largest of a group of galaxies known as LGG 247, and was first observed by William Herschel in 1789.

NGC 3780 is classified as a LINER, for Low-ionization nuclear emission line region, galaxy, due to the weak ion emission lines in its spectrograph charts. It also has a very active nucleus, leading many scientists to believe a giant black hole is at its center. Three supernovas have been observed in it in recent years: SN1978H, SN1992bt, and SN2024btj.

Star Stories

Muphrid

Muphrid has the unfortunate distinction of being close to Arcturus in Bootes and thus being pretty much overshadowed by it. It is the third brightest star in that constellation and is given the Bayer designation of Eta Bootes. It is now known to be one part of a double star system as well as a spectroscopic binary. It is classified as a G0 star, has an apparent magnitude of 2.68 and an absolute magnitude of 2.41, and, according to the latest measurements, is 37 light years from Earth. It is 1.7 times the size of our Sun.



Muphrid is now believed to have a binary companion, about which little is known. The main star, Muphrid, is designated as Aa, while the smaller star is Ab; the best research shows it to be a red dwarf with a designation of M7. It also has a double companion about two arc minutes away, which is known as DB+19 2726.

Scientists believe that Muphrid is beginning to evolve from a main sequence star, and, being very similar, is providing a model for what will eventually happen to our Sun. It will turn into a red giant, then probably become a planetary nebula sometime far in the future.

Like many other stars, the name Muphrid comes from Arabic; it was originally *Mufrid al Ramih* which means “The single one of the lancer,” probably referring to the spear or staff that Bootes, the herdsman, carried. The Arabs also called it Saak. In Chinese it was *You Nae Di yi*,

“the first star of the conductor.”

Another in a continuing series on lesser-known, but still important, astronomical observatories around the world

The Crawford Observatory

The Crawford Observatory is located in Cork, Ireland, on the campus of the University College, Cork. It was established in 1878, after a donation from William Crawford, the owner of a brewing company. In the late 19th and up to the mid-20th centuries. It was one of the country's premier scientific facilities, its showpiece being a 13" Thomas Grubb refractor telescope. For many years, the observatory was regularly used by professors and students at the College. However, as the city of Cork grew, light pollution reduced viewing, the telescopes became outdated, and by the early 1950s, the observatory was effectively closed from disuse and disrepair. An attempt to repair and reopen the telescope buildings in the 1970s met with failure.



However, in the late 1990s, the College received a substantial grant from the Irish government, and with that, made a full-scale effort to renovate the observatory. The buildings were remodeled and the telescopes were dismantled, completely refurbished, and reassembled to their previous operational conditions. The Observatory was reopened in 2006; the telescopes are once again used by professors and students at the College, as well as by the public for regular outreach events.

Beside the 13" refractor, the observatory has three other telescopes: an 8" Thomas Grubb refractor piggybacked with the 13," a 5" transit telescope and a 4" siderostatic telescope (a telescope where a flat mirror turns and reflects the celestial image into a fixed telescope. This type of telescope was popular during the late 1880s and early 1900s. Today, this design is best seen in the McMath Solar Telescope at Kitt Peak; the telescope itself is stationary while a mirror at the top of it follows the Sun and shines its light into the tube. This variation on the siderostatic telescope is called a heliostatic telescope. The next issue of *The Observer* will feature an article about siderostatic and heliostatic telescopes).

Some Great Astrophotos by Dave Morrow



The Garlic Head Nebula, LBN-576, in the Constellation Cassiopeia. According to Dave's notes, "This was a total of 32 hours integration time over a 6-8 week period from my Bortle 7 front yard."



Comet C/2025 R3 taken with a Smart Pro Telescope for approximately 30 minutes



NGC 4565, the Needle Galaxy, in the constellation Coma Bernices. It is a mag 10.4 object approximately 50 million light years from

Some More Great Astrophotos by Hubert Cecotti



The Draco Triplet -also known as NGC 5981, NGC 5982, and NGC 5985



M 8, commonly known as the Lagoon Nebula, and **M 20, the Trifid Nebula**



NGC 7000, also known as Caldwell 20, the North American Nebula in Cygnus

All of these images were taken with a SeeStar telescope

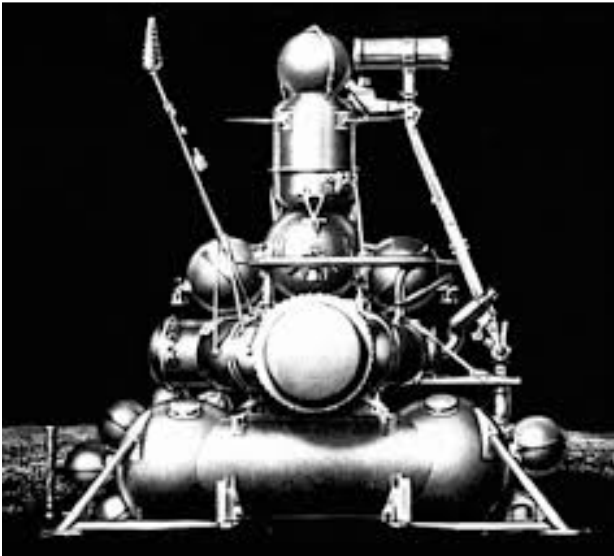
Space Age Archeology

Luna 15

With the advent of Artemis II and a return to the moon in the next few years, interest in the original Apollo moon missions has grown. Part of that history, though, and especially with Apollo 11, was the Luna 15 mission. As the number 15 implies, it was not the first of the Soviet Luna missions, nor was it the last, but in many ways it was the most consequential, and symbolized the entire Russian moon effort. This is its story, and it begins with a brief history of the entire Luna program.

The Russian effort to send spacecraft to the Moon began as early as 1956, even before Sputnik was launched. OBK-1, the space design bureau headed by Sergei Korelev, designed and built a spacecraft known only as Luna E-1 no. 1, its launch in September 1958, was a failure, as was Luna E-1 no. 2 a month later. The first successful Luna was Luna 1, which flew by the moon in January 1959. Luna 2 crashed onto the moon in September 1959, and Luna 3 transmitted images from the far side of the moon in October 1959. Of the flyby and “hard landing” Lunas, only three were successful out of over ten. The next several Lunas were designed to soft-land on the moon. At least thirteen were launched from 1963 to 1967, and only two were successful, the first being Luna 9 in February 1966. The next Luna series consisted of orbiters. Of eight that were launched between 1966 and 1974, six were successful.

After the Luna orbiters, the Russian Luna program divided into two goals. One part of it worked on soft-landing rovers to wander across the Moon’s surface, while the other focused on soil sample return spacecraft. The rover program, called Lunokhod, showed two successes out of three launches in 1969, 1970, and 1973. The second part, the soil sample return missions, began in 1970, and this is where Luna 15 comes in. By the late 1960s, the competition between the U.S. and the Soviet Union to land men on the moon was heating up. Recovering from the Apollo 1 tragedy in 1967, the U.S. was preparing to land men on the Moon by the end of 1969. The Soviets never explicitly said they were going to land men on the moon by 1970, but everything they were doing pointed to that. They had developed a huge heavy-lift rocket, the N-1; were working on a lunar version of the manned Soyuz spacecraft; and were also working on a lunar lander, which was similar to the



American Lunar Module. They expected to have all the lunar components ready for a landing attempt by late 1969 or early 1970. They did not believe that the U.S. would be able to send men to the moon until at least late 1970 or 1971. It came as a shock, then, when NASA was able to send Apollo 8 around the Moon in December 1968, test the lunar lander in Earth orbit in February 1969, and then in lunar orbit in May 1969. When it was announced that Apollo 11 would be a lunar landing mission in July 1969, the Soviet political hierarchy demanded that OBK-1 launch a major moon mission ahead of Apollo 11. This was the infamous secret launch of the N-1 on June 30, 1969, which ended when several engines failed and the rocket crashed back onto the launch pad. For years afterwards, it was rumored that the launch was part of a dual mission

which would carry up to three cosmonauts to the Moon, either to orbit or to actually land. It is now known that the N-1's payload was an unmanned Zond (a variation of the Soyuz) whose mission was to photograph lunar landing sites for a manned mission. With the failure of the N-1-Zond, The Soviet Union's hopes to beat the Americans to the moon were ended.

However, there was one more drama to be played out. Within a few days of the N-1 failure, Soviet political leaders again demanded that OBK-1 launch a moon-bound spacecraft just before Apollo 11, anything that would distract the world from the Americans' achievement. OBK-1 would have to come up with a space-worthy craft, prepare and test it, prepare the rocket as well, and launch it within two and a half weeks. All it had at the time was a static ground test prototype of the proposed soil sample return spacecraft, which was never designed to go into space. Nevertheless, the OBK-1 leadership decided that if they could not put a man on the moon before the Americans, they would try to be the first to return lunar soil samples. So, the engineers and technicians worked 24 hours a day to prepare the test craft for an actual lunar mission; years later, many of them said they were amazed that it worked as well as it did. In the meantime, another crew worked overtime to assemble and test the rocket that would carry it. It was launched on July 13, and those involved said they breathed sighs of relief that it even got out of Earth's atmosphere. The craft, which the Soviets never named but Western observers designated Luna 15, went into lunar orbit shortly after Apollo 11 was launched on July 16. The Soviets said almost nothing about it other than it would not interfere with Apollo 11's mission. All the time, though, OBK-1's mission controllers were trying to land it on the Moon's surface; over three days, they changed its orbit several times in attempts to position it for a landing. But the rushed and makeshift nature of the mission could not make up for the ambitious flight objective, and on July 20, shortly after Armstrong and Aldrin landed on the Moon, OBK-1 lost control of it and it crashed onto the surface of Mare Crisium. Some who were in the control room at the time said years later that there was a sense of resignation, while others, more optimistic, felt the failure would lead to more successful missions in the future. The official Soviet press report said the mission was a complete success and the spacecraft had achieved all its objectives, although it never said what these were. Almost no one in the West believed that, and not until after the fall of the Soviet Union in the 1990s were the people involved in the mission allowed to talk about it and the facts came out. Today, it is mostly a footnote in the history of the Apollo moon landings.