

Carpe Noctem: Seize the Night

ASTRONOMER TERRY GRAGE TRAVELS THE UNIVERSE FROM HIS BACKYARD

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Looking at Terry Grage's modest home, you'd never guess there was an astronomical observatory in the backyard. Walking into his backyard, you still wouldn't. There's just a narrow swath of lawn, a few plants and a meandering path that leads to a 12-by-20-foot aluminum shed.

But open the door to that shed and you'd find yourself in another world. This is Mind's Eye Observatory, which is what Grage has dubbed his high-tech lair. Inside it are computers, video monitors, star maps and posters, astronomy books, tools, cables, cameras, gauges, storage cases, and the centerpiece of the operation: a red-barreled 8-inch electronic telescope. Stowed nearby are two more telescopes, a 6-inch and a 12-inch.

"This is where I come to decompress," Grage says. He flips on a set of red lights and some otherworldly electronic music starts playing. The computer powers up and an array of seven video monitors comes to life.



Terry Grage views images from his telescope via video monitors inside his backyard shed, also known as Mind's Eye Observatory.





Grage captured this photo of the moon on the first night of using his current observatory in January of 2019.



The only hint that an astronomical observatory is lurking in Terry Grage's backyard is this sign on the outside of an aluminum shed.

"Galaxies really appeal to me," he says. "When you look at a galaxy that's millions of light-years away, and you start to figure out the distance ... well, you can't really. And then you start figuring out the time, and that thing you're looking at isn't even there anymore."

Take the Whirlpool Galaxy, for example, also known as Messier 51. It's 31 million light-years from earth, which means that when Grage looks at it through his telescope, he's seeing what that spiral-shaped cluster of stars looked like 31 million years ago! "I'm looking back in time," he says.

Grage has no formal training in astronomy, and for most of his life he held no more than an idle curiosity about the night sky. That all changed in 1994, when Comet Shoemaker-Levy 9 collided with Jupiter.

It was a dramatic event, something that had never been seen in the solar system before. Chunks of the comet, some measuring nearly a mile in diameter, struck Jupiter at well over 100,000 mph. Huge fireballs resulted, throwing plumes of debris 1,200-1,900 miles above the surface and leaving dark scars on the planet for months.

"I was working as a mechanic for an airline in Virginia, on the night shift," Grage says. "Another fellow and I always had an interest in astronomy, but we had never pursued it." The comet's collision, and the resulting coverage in the press, changed that. "We bought a couple of little telescopes," Grage says, "and went out on the snow." He adds with a laugh, "I remember it took me an hour just to find Saturn."

Grage's telescopic dabbling might well have ended there, but "aperture fever" had struck. He found himself wanting a bigger and better telescope and decided to build one himself: a 6-inch Dobsonian.

That style of telescope is named for John Dobson, and as Grage explains, "It's basically just a tube on a turret. It has an old-fashioned peephole, and you use a finder that puts crosshairs on a site." That's what he recommends for beginners, rather than buying a "spindly tripod thing – what we call the Christmas telescope. You don't have to spend a ton of money to do astronomy," he explains. "For \$300, you can get a nice Dobsonian telescope."

In 2000, Grage upped the ante again, building himself a 12-inch Dobsonian that could be synched up with a computer to automatically track moving objects. He would stow it in the garage, bringing it out on clear nights to use in his yard or to take to his favorite viewing spot about an hour and a half west of Vero Beach.

"I used to have a van with foot lockers in it," he says. "And I'd haul all that gear to the Kissimmee Prairie Preserve, which is a hot spot for astronomers now. It's a fantastic place. It's so quiet out there, nothing but a few animals and a few people."

As dusk approaches, Graze rolls out his trolley, goes inside to eat some dinner while his telescope acclimates, then returns at night to explore the sky.





Clockwise from upper left: M27 Dumbbell Nebula, Comet Neowise in 2020, M104 Sombrero Galaxy and Barnard 33 Horsehead Nebula in Orion

When you're driving there, you feel like you're driving off the face of the earth."

Kissimmee Prairie Preserve State Park was established by the state of Florida in 1997. In years past, the 54,000 acres of grasslands were used for grazing by free-roaming cattle and as a training area by the military before and during World War II, among other purposes.

According to the Florida Department of Environmental Protection: "Only nine percent of the original Florida dry prairie ecosystem remains intact, and Kissimmee Prairie Preserve State Park protects the largest tract of these fragile lands, which are home to 48 listed native species."

"A few friends and I used to have a club called the Indian River Astronomical Society," Grage says. "It doesn't exist anymore, but back then, every new moon, we would go out to Kissimmee Prairie." That's because less moonlight allows for better night sky viewing. "We did that before the park

was a known thing for astronomers. And we tried to keep it quiet, because it was such a great place for us – there's so little light pollution."

Looking at a light pollution map of the entire East Coast of the United States, there are only three expansive areas that are isolated enough to provide premium "dark sky" viewing. One is in Georgia: Stephen C. Foster State Park in the Okefenokee Swamp. The other two are in Florida: Kissimmee Prairie Preserve State Park and Big Cypress National Preserve in the southern part of the state.

As the rangers at Kissimmee Prairie became more familiar with what Grage and his fellow club members were doing, they became interested themselves, even buying their own telescope. "We got them to make it a dark sky area," Grage says. "They came in and changed the lightbulbs on the bathhouses and everything else to red." Exposure to white light ruins the eye's ability to see things in a dark sky.



Clockwise: Saturn in 2006, open cluster M37 in the constellation Auriga, M51 Whirlpool Galaxy, globular cluster M3 in the constellation Canes Venatici

“There was an old horse paddock there, just a little square,” Grage says. “And we said, ‘Why don’t you make that into something for us? We’ll be out in the prairie and have a view you wouldn’t believe.’ They went even further than that,” he says. “They put in campsites, so astronomers could set up and camp. And they ran power to the site, which is a huge thing for us, so we had power to run all our gear.”

“They ended up really running with it,” Grage says. “If you look up Kissimmee Prairie Preserve now, you’ll see they have a huge section about astronomers. Birders like it too.”

In January 2016, the park was recognized as Florida’s first “Dark Sky Park” by the International Dark Sky Association. “It’s become very popular,” ranger Chris Camargo says. “And because there are only five astronomy sites, they fill up very quickly. We encourage people to use the other two campgrounds for naked-eye viewing or for using binoculars.” And, he adds, “The park is currently developing a 24-hour

astronomy viewing area near the entrance to the park.”

While Kissimmee Prairie remains a special place for Grage – he even proposed to his wife there in 2011 – these days he does all his viewing from his backyard. He built his first observatory there in 2009, a geodesic dome made of two-by-fours and covered with a tightly fitting tarp. Grage’s interest in that soon waned, though, as he became involved in other things – such as his new wife, Cheryl; two new stepchildren, Jack and Ashley; and learning how to play the classical guitar. Oh, and he also had a full-time job at Bay Street Pharmacy in Sebastian.

Mind’s Eye Observatory, his second and current set-up, came about in 2019, after his father passed away from a two-year bout with pancreatic cancer. Grage inherited his father’s shed, which was a fully outfitted woodshop. At first, he thought, “Great, now I have a man cave.” But then the astronomy bug bit again, and he started thinking about how

to convert the shed into an observatory.

“If you Google ‘amateur observatory,’ you’ll see every ridiculous thing anybody’s ever come up with,” he says. Pre-fabricated domes are one option. So is installing a sliding or hinged roof. Then there are the more humorous solutions, such as the “Observalavatory” – an outhouse-like structure that can be rolled aside to reveal an outdoor telescope.

Grage’s solution is ingenious, and as far as he knows, unique. Instead of opening up the roof of his shed, which would have exposed him to Florida’s heat and mosquitoes, he

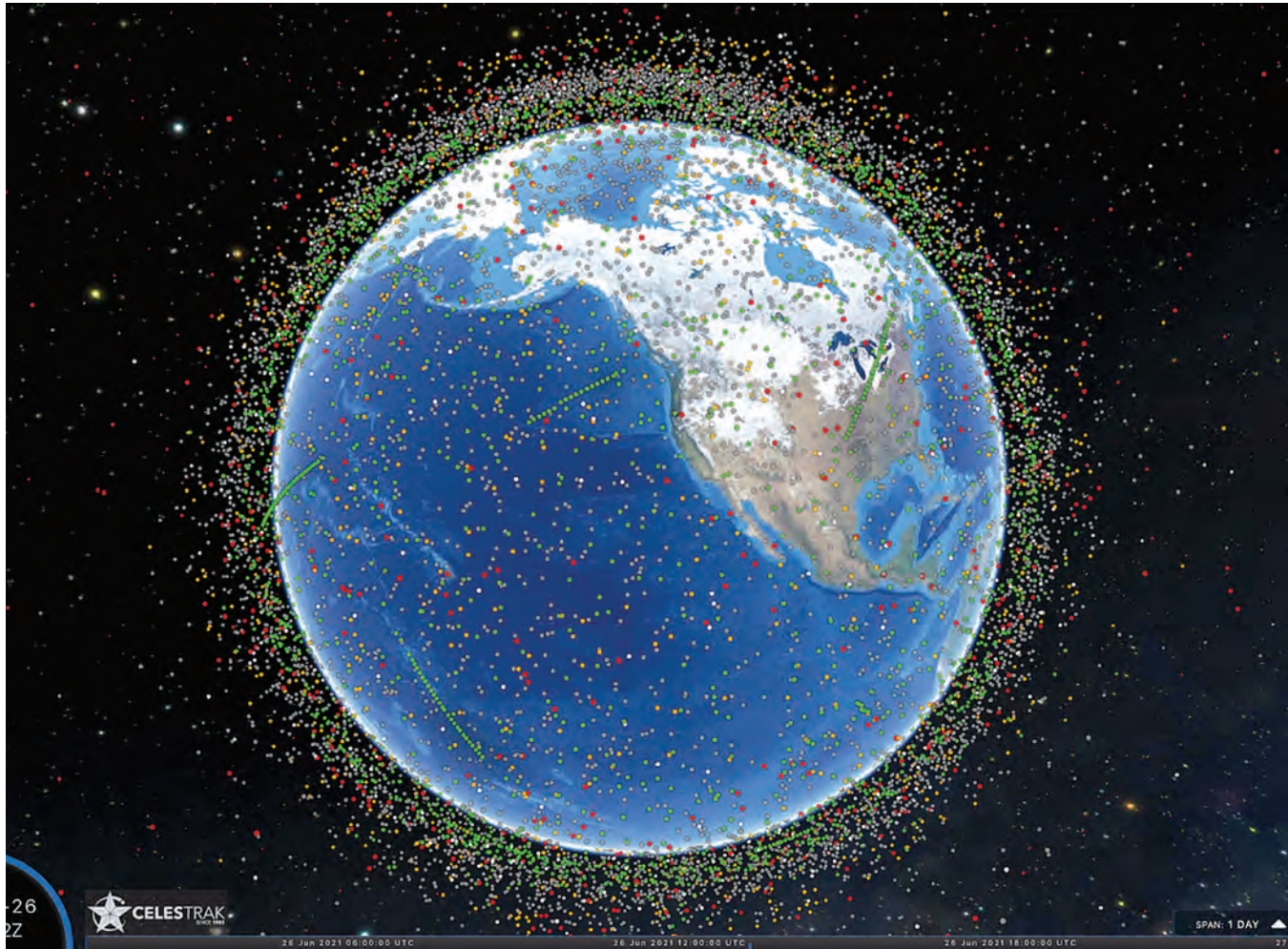
installed a set of trolley tracks just outside the shed’s roll-up door. “I wheel the telescope out, shut the door, and I’m in here in my chair with my computers and all my screens.”

What makes an arrangement like that even possible is a fairly recent approach to viewing the heavens – video astronomy or, as some prefer to call it, electronically assisted astronomy. “It’s a huge thing for amateurs now,” he says. “It’s really why I’m doing what I do.”

Grage has a camera attached to his telescope, which is linked by cables to his computer. That allows him to view

As the sun sets, Grage switches to red lights outside his observatory, which helps his eyes adapt to viewing the nighttime sky.





Celestrak.com is a free website that displays a real-time visualization of all the satellites orbiting earth. The lines are groups of SpaceX satellites.

everything remotely. Even better, frame-integration technology gives him the ability to stack pictures – that is, it takes multiple photographs of the same object and combines them into a single image.

“It’s like opening a camera shutter and leaving it open,” Grage explains. “The difference is, you can eliminate the bad frames. When you stack images like that, you can see much deeper.” That’s despite having more light pollution at his home than at Kissimmee Prairie.

A bad frame might be caused by a hiccup in the tracking or a passing cloud. Man-made satellites are another increasing problem these days, in effect photobombing astronomers’ observations and photographs. According to several monitoring databases, there are approximately 7,000 satellites currently orbiting earth, roughly half of them active and half of them inactive. And the numbers keep escalating. SpaceX, for example, has launched more than 1,500 satellites in the last two years, for use in its internet constellation, Starlink.

“There’s a huge international uproar about this now,” Grage says. “A lot of amateurs are upset. Professionals are

even more upset; they’ve got a million-dollar telescope, and they’re looking at all this junk.”

Despite that, Grage is still able to see and save some remarkable images. “My images aren’t processed very much,” he explains. “It’s kind of like I’m standing out at Kissimmee Preserve, looking up at the galaxy.” By contrast, there’s a subset of video astronomers who take highly processed shots with specialized equipment. “They’ll take an object and spend months on it, using different filters and collecting hours and hours of data,” Grage says. “And they’ll go back and spend months processing it. Their pictures are absolutely crazy.”

But that’s not what Grage does, or even attempts to do. His is a more exploratory journey, marveling at what he finds along the way. “I call my pictures ‘now and later,’ because I’m observing them live, and I just save the pictures to share,” he says. “I did some crude stuff years ago with guys back in the club, but what I’m doing now just blows me away sometimes, compared with what I was doing back then. I’ve never discovered anything. But I’ve discovered stuff I never knew of, which makes it feel like I’ve discovered something.” 🌟