



THE ROCKET RANCH GANG

*They're at home on the range, where
seldom is heard a discouraging word and
the ranch hands build rockets all day.*



by Ed Regis *Photographs by Cindy Charles*

At the bottom of a canyon in northern California, some enterprising space cowboys have been taming a new frontier: personal rocketry. To hell with an official presence in space. These gonzo incarnations of Robert Goddard have spent the last two decades designing, building, and launching hundreds of their own rockets—and we're not talking giant firecrackers or toy models. These are rockets that have to be lugged out to the Nevada desert for launch, rockets that have traveled upwards of 20 miles. Air traffic control has to vector aircraft away from the area to keep them discretely out of range of the one-, two-, and even three-stage launch vehicles.

The rockets are all built at a 320-acre parcel of land known as the Rocket Ranch. It's a private retreat for personal rocketry or the wages of a hobby

gone wild, depending on your perspective. Formerly used by the military as a practice bombing range, the property was put up for sale by the government in 1980 for \$150 per acre. "We jumped at the chance," recalls Chuck Piper, one of a cadre of ten or so folks looking for a home for their rocket club. All employed in the aerospace and electronics industries, these anti-bureaucratic, anti-academia space rangers have built what's probably the world's only private, non-commercial rocket design, manufacturing, and test center.

"It's the only place in the county zoned for recreational rocketry," says board chairman Kurt Bohan. As such, the place attracts a certain amount of unwanted attention. "We've seen military helicopters land on the hilltops, stay there and look around for a while, and then take off again," Piper says. And what must the Soviets think about

this remote site, which probably shows up on their satellite photographs?

To get to the Rocket Ranch you start at an intersection that's itself out in the middle of nowhere and drive west about 20 miles. You continue down a twisting mountain road until you emerge in open rangeland, where cattle and horses graze in sparse scrub. Eventually pine-studded mountains loom up on either side of the roadway, which parallels a dry stream bed.

Finally, you come to the gate. It's an ordinary chain-link gate but it's secured by a rack of no fewer than 10 padlocks. The Rocket Ranch is another mile or so beyond, down a small spur canyon.

When I arrive at the site, the membership is out in force. It's a picture-perfect, 102-degree day in the mountains, after all, so there they are, the all-stars of civil rocketry: Chuck Piper, a mechanical engineering graduate of the

University of California at Berkeley and currently senior ordnance engineer for Quantic Industries of San Carlos. There's smiling Kurt Bohan in his cowboy boots and straw hat, a guy who used to make satellite components for Ford Aerospace and now runs an engineering firm in Hayward. Here's Jerry and Sharon Durand, who operate their own electronics design company—Durand Interstellar—out of Los Gatos. And

"At night when all the lights are going and there's a high-humidity fog," Piper says, "well, it looks like a scene from *Close Encounters*."

"Except there's no music," adds Bohan.

"Yeah, we don't have an electronic organ," Piper says.

Off in the distance you can see tailings from an abandoned mine shaft. You can hear birds chirp and insects

have this grading permit, which costs \$150. And you have to tell them ahead of time how much dirt you're going to remove, and what possible impact on the local ecology it's going to have, and so forth."

That, however, was only the beginning. The creek running through the property made for another headache, especially since it's usually dry: "We had to show that none of the buildings, structures, grading, roads, or improvements that we were going to make on the property would be endangered by a hundred-year flood," Piper explains.

So they did that too, all on their own. "We had to submit a hydrological survey and do a water runoff study," he says. "It took almost three months to do that, and we couldn't do anything with the property until we had it finished. We had to go out and take all sorts of measurements... and anyway we finally prepared this 25-page report and submitted it to the county."

The county approved the report and the space crusaders pushed ahead... until the restroom crisis. Since the Rocket Ranch was zoned "agricultural/recreational," it had to have restrooms equipped with all the usual niceties, and the whole thing had to be handicapped-accessible.

No problem! They'd do that themselves too. They designed and constructed a spiffy restroom, complete with showers, handicapped facilities, and wheelchair ramp. To make things easy on themselves, they used a portable conveyor belt to transport the concrete blocks.

Often enough, though, a vast quantity of sheer physical labor was simply unavoidable, as it was when the time came to put in the water, sanitation, and electrical power systems, all of which went underground.

"There's approximately 63 miles of wire buried in the ground here," Piper says, looking off down the valley. "You can't see it, but it's here."

"It took about eight months of weekends to dig all this and put everything in," says Bohan. "Tom Pavia and I did most of it. We did it by hand, with pick and shovel—in the rain many times."

"We ran into rocks," Pavia says. "Lots of rocks. *Huge* rocks! You had to take a pick and hammer and break them



Life on the ranch isn't all fun and games; the routine includes a fair bit of manual labor.

there behind the mirror shades is Ray Goodson, propulsion specialist at an aerospace firm in Sunnyvale and designer of the group's "nozzle-less" rocket motor (not literally nozzle-less, the thrust chamber is composed of solid fuel and burns away during launch).

And then there's the site itself, which is right out of *Dr. No*. The property runs from the canyon floor to the tops of the surrounding mountains and then some. Glancing upward you can see dirt roadways that zigzag up the red hills. The rim of the canyon is dotted with banks of sodium arc lights mounted on towers and aimed at the ranch below.

zing. A deep blue sky arches overhead, and you feel all at once that this place must really be a Secret Government Lab, that these people are CIA.

"Well, it would be nice if we were!" Bohan says when I tell him my impressions. "Because then we wouldn't have had to do all the work ourselves."

Indeed, these guys are the ultimate do-it-yourself space invaders. With the exception of some earth-moving work, which they contracted out, they did every last bit of the work themselves, while at the same time managing to comply with state and local building specifications.

"First there were the grading permits," Piper recalls. "We didn't know this when we bought the place, but in our county, in order to operate a bulldozer on your own property you need to

up. Just like we were prisoners."

"Yeah," Bohan says, "and our parents used to tell us that if we didn't get a good education we'd end up digging ditches!"

One of these ditches stretches some 900 feet up a steep hillside to a 2,500-gallon water tank. Underground pipes run from the tank down to a handful of fire hydrants located throughout the canyon at strategic points, one of which is the propellant mixing and casting building. This is the heart of the Rocket Ranch, where the solid fuel for the rockets is manufactured.

It's one of about a half-dozen steel-reinforced poured-concrete structures, which the rancheros put up themselves, of course, in most cases without needing to get building permits. "We made a number of our buildings just slightly smaller than the size for which you'd

legally need a permit," Bohan says. "That's why a lot of them are little boxes: 10 by 12 feet or so."

Everything else here had to meet code. "All the lights are class I and II explosion-proof lights," Piper says, "so that if there's any vapor or dust around it's not going to ignite. We have lightning suppressors, we have electromagnetic noise filters at the blockhouse to screen out stray signals from power sources. Even though we're an amateur organization, all our members are professionals and we've done everything we can to make this the safest possible facility."

It's hard to argue with that. The controlroom blockhouse is a fortress with 18-inch-thick reinforced walls. Its windows, salvaged from surplus tanks, can withstand a direct hit from a shell. The explosives magazine is another stronghold, the door alone weighing 1,400 pounds. "It's made out of quarter-inch armor plate," Piper says, "and it's got four inches of steel-reinforced concrete behind it."

Another one of these little concrete boxes stores electrical equipment: countless oscilloscopes, high-speed chart recorders, television monitors, cameras, computers—everything but radar. All of it's courtesy of member Ken Kitlas, who gets most of it cut-rate at electronics swap meets in the Bay Area. On the shelf is a nuclear detonation profiling scope, one of Kitlas' big-ticket purchases—\$25, marked down from 40.

The rest of the stuff was surplus from aerospace companies in the area. "Some of the prices were really incredible," Bohan says. "Those stadium floodlights up there," he says, squinting up, "they cost a couple of hundred bucks apiece when new. We got them from Lockheed for eight dollars each."

This is not to say that building the Rocket Ranch has been cheap. Treasurer Al Kraft estimates that the members have collectively laid out some \$200,000 over the past 10 years in furtherance of their obsession. The money arrives in the form of \$65 monthly dues,

Al Kraft and Tom Pavia rehearse pouring propellant into a funnel to produce a rocket motor.



occasional special assessments, and contributions. Rumor has it that one year Piper put \$10,000 of his own money into the Rocket Ranch. There have been costs in connubial harmony too, with other rumors abounding of "space widows"—spouses left in the lurch as members go off to build rockets all weekend.

As to the point and purpose of it all, everyone has his own opinion. One no-

ity has to leave the planet eventually," says Bohan. "Statistically, something will go wrong in the atmosphere no matter how much we try to avoid it. But if there's enough humanity outside, then things still go on. Going into space is a matter of survival in the long run."

True as all of that might be, none of it goes to the heart of what really motivates these folks. What's really behind the Rocket Ranch, the truth be told, is

when it's launched," adds Jerry Durand.

In fact, 1991 is a launch year, and the ranchers will soon be building their rocket motors again. They start from scratch, using chemicals such as ammonium perchlorate, potassium perchlorate, and potassium nitrate. They place these and other herbs and spices into metal bowls and stir with stainless steel helical blades, not unlike making a cake batter. Then they pour the mixture into a vacuum casting bell—an aluminum cylinder with a plexiglass lid—which in turn is placed inside a concrete-walled enclosure. The casting bell has a funnel on top, and as the rocketeers dump the mixed propellant into the funnel, they can observe what's going on through the plexiglass lid. Eventually, all of this mixing and stirring will be done by remote control from the blockhouse, with closed-circuit TV.

"Why?" I ask. "Is this *dangerous*?"

"About as dangerous as driving out here," Piper says, not too reassuringly.

At any rate, the propellant casting is then left to harden, a process that takes a couple of days. Later, the result—a solid-fuel rocket motor, which now has the look and feel of an extremely large pencil eraser—is moved over to the stripping pad and trimming station, where it's finished off. Finally, the surface is covered with a chemical inhibitor to keep it from accidentally igniting, and the finished unit is placed in the explosives magazine for storage until it's ready for launch.

When launch time rolls around—traditionally it's scheduled for three-day weekends like Memorial Day and Labor Day—the members abandon the ranch for an even more remote site. Rocket motors, housings, and other parts are crated, packed into cars and trucks, and driven east on a 400-mile trek. This drive has occasionally made for some problems, like the time the transmission burned out on the main rocket transport vehicle, which is in fact a two-ton flatbed truck belonging to Piper. Fortunately Piper is also a regular Mr. Screwdriver, and he was prepared for the emergency.

"I bought a transmission a couple of weeks earlier because the old one was making weird noises," he remembers. "But I didn't have time to change it beforehand, so just as we were going out the driveway I said to myself: *Well,*



Ken Kittas' eye for bargains helps him round up second-hand electronics for use at the Rocket Ranch.

tion is that all this is done for educational purposes. "We want to have students get involved in this," says George James. "We'll have them build payloads for us—videocams that can go to 25,000 or 30,000 feet."

Another version is that the Rocket Ranch exists to pioneer new launch technologies. "This stuff is true high-tech," Piper says. "What we're doing is basically a low-cost version of what United Technologies can do. We've got vacuum systems, inert-gas systems, and so on. We're always trying out something new."

A third view is that they want to spearhead a grassroots human migration wave out into the cosmos. "Human-

the sheer joy of Rocketry—nothing less than the exhilaration of invading the universe with their own personal space hardware. What else could induce the ranchers to spend weekends, holidays, and vacations digging ditches in the rain? What else could account for all the money they pour into it? What else could explain the space widows?

"Job satisfaction in the aerospace industry isn't what it used to be," Piper explains. "If you went in to your boss and said, 'I'd like to build a 15-foot rocket that can go 20 miles for less than \$5,000,' he'd just laugh. He'd rather put you to work on some small part of a big thing that costs a million bucks. You're just a small cog in a large wheel these days, and most people don't really get much satisfaction from that. But out here we can pretty much build what we want, when we want."

"And you actually get to be there



maybe I ought to take this extra transmission along, just in case. And as we were coming down over the pass outside of Truckee, all of a sudden it started making just the most godawful grinding, grunting, growling noises you ever heard. Smoke started coming out from underneath the truck . . . and anyway, between the grinder, the acetylene torch, and the generator set that we had with us, plus the floor jack that I had, plus sledgehammers, we pounded the old one off and put in the new one."

Finally, they arrived many hours later at the launch site, which is a dry lake bed in Nevada's Smoke Creek Desert, about a hundred miles north of Reno. The place is surreal.

"Terrible conditions out there in the desert," one of the launchers says. "It's not a good environment to build things. Lack of power, lack of sanitation, lack of everything."

"It's like being on the moon," says another member. "Only you don't have to bring oxygen."

"It's like being on Mars," says another.

Actually, it's like being in the most out-of-the-way place in Nevada, which is bad enough. A flat hardpan desert crisscrossed by ruts and tire tracks, the site is completely surrounded by low mountain ranges off in the distance. The members show up here in their Suzuki Samurais, Ford Broncos, and assorted other four-wheel-drive vehicles. They pitch tents, unfold sleeping bags, and drag out Coleman stoves. Once they have climbed into white coveralls and donned hardhats, they assume identities as range safety officer, communications chief, or some other elder—all of them wearing color-coded badges just like NASA's.

"In the old days," Bohan says, "it was a lot more informal. During those years a few people made their own fireworks and would set them off between launches. There was this one fellow I remember, a really heavy-set guy, he was apparently looking into the fireworks box using a flare to see what was in there when some sparks dropped in

It's do-it-yourself time as Chuck Piper adjusts the stadium lights that extend the workday.





Intergalactic headquarters and the test site share the bottom of this rocky canyon with the ranch's blockhouses, bathroom, cargo container, shop area, and utility yard. But to reach the canyon you must first pass through the front gate (below), well secured with padlocks.



from the flare, and he made a hasty retreat just as the box was going off."

The granddaddy rocket to date has been Piper's own 22-foot-long, three-stage masterpiece. Launched in 1976, it went up like a dream. The first stage burned for one and a half seconds, developed 7,000 pounds of thrust, and took the rocket to 1,500 feet. It coasted for a second or two as the first stage cut out, then the next stage fired and separated from the booster.

The second stage burned for eight-tenths of a second and developed 4,700 pounds, which took the rocket to 5,000 feet. By that time it was already out of sight except for a curling trail of white smoke.

Then the third stage cut in. A small engine with only 400 pounds of thrust, it burned for a full 15 seconds and climbed up to where the sky's a deep purple. The rocket eventually reached an altitude of 120,000 feet.

Before long another rocket will stand alone on the launch stand, shimmering



The gang's all here: Standing (from left) are Sharon Durand, Jerry Durand, Tom Pavia, Chuck Piper, and Al Kraft. In front: Doug Royce, Kurt Bohan, and Ken Kitlas. Before long they'll be back at their launch site in the Nevada desert (below).

COURTESY ROCKET RANCH



slightly in the desert heat. On a good day as many as 10 rockets might be sent up. After the final launch, at sundown, it will be time once again for "The Last Dead-Dog Campfire Party." It's a traditional ritual, although not as raucous as it sounds. How rowdy can a bunch of engineer types get after firing rockets into the blue all day?

If the post-launch blowout doesn't exactly live up to its billing, it's partly because these rocket ranchers are already thinking about next time. Their latest goal is an altitude of 100 to 300 miles—or higher. "Our board of directors," Bohan says, "has officially and unani-

mously voted to develop minimal orbital technology."

Minimal orbital technology. In other words, these guys have it in their minds to lob something into Earth orbit. What that something *is* really doesn't matter—payloads have never been their strong suit—just so long as it circles Earth for a little while. Their own personal Sputnik.

An improbable enterprise to be sure—there's the guidance problem to be solved, for one thing—but nothing this crew can't handle. They're already talking about *methods*, about this technique they have in mind for spin-stabilizing the craft, when I ask if they have a timetable for all this.

"You mean like 'by the end of the century?'"

Everyone laughs. But then they all agree. Why not? That's *ten years away*, after all! *Plenty of time!*

"Yeah, up to orbit for sure," they say. "By the end of the century." ➔