There's only one way to find out if a Minuteman missile works. Here's how they do it.

by Matthew Jaffe

Photographs by Chad Slattery

With the turn of a key at an underground launch facility, a Minuteman III begins a 4,800-mile test ride over the Pacific.
The July dawn arrives at California’s Vandenberg Air Force Base as little more than a rumor. A thick layer of ocean fog cloaks the sprawling base in gray silence. Red-tailed hawks perch drowsily on roadside electrical lines, and even the base’s ubiquitous gophers are slow to stir from their burrows.

It is a deceptive quiet. In buildings around the base, Air Force and civilian workers are busy preparing for the seven o’clock launch of a Minuteman III missile. Inside a former Titan missile bunker built into a stabilized dune, a room buzzes with banter and business as technicians monitor the Minuteman and its various systems. A few miles away sits the launch control center, which is filled with industrial green, 1990s-vintage computer equipment. There, missile combat crew members First Lieutenant Walter Jimenez, 24, and Captain Wilmer Jackson, 30, prepare for the high point of their young careers. Soon they will launch a real missile.

The launch is only a test, part of Air Force Space Command’s Follow-On Operational Test and Evaluation program. Even as cold war tensions ease, strategic weapons planners need to know how well the nation’s aging land-based missiles will perform. Designed for a life of 10 years, Minuteman missiles have stood on alert for more than 30, thanks to upgrades of their solid fuel and guidance systems. Further modernizations could extend the system’s role as a nuclear warhorse until 2025.

Montana’s bleak landscape is home to dozens of missile silos, which are frequently located on farmlands hundreds of miles away from their base. The remote sites mean long days for the security teams who escort the warheads (stored in the trailer above) while they’re in transit.

Practice runs like today’s (which is one of only three Minuteman test launches the Air Force conducts per year) help ensure that the missiles and their crews will be prepared in case of a real war. And, if necessary, both Jackson and Jimenez say they wouldn’t hesitate to turn the keys that launch the missiles. They’ve turned those keys hundreds of times during training sessions. Today it’s a bit more real.

Jackson and Jimenez have come to Vandenberg from Malmstrom Air Force Base in Montana, where they monitor the readiness of 10 nuclear missiles hidden among the plains and foothills surrounding the base. Part of the 341st Missile Wing, they are required to pull 24-hour shifts inside capsules buried up to 100 feet beneath the ground (see “Life in the Egg,” Oct./Nov. 1984), where they run through lengthy checks of each missile’s systems and troubleshoot emergencies, which can range from guidance system failures to security sensors set off when animals wander.
der across the ground above the silo. Crews often describe the job as "23 hours of boredom and one hour of sheer terror." Or as Jackson says, "I'm a baby sitter of missiles. One of them cries, I take care of it."

Unlike the whitewashed beauties on display at Vandenberg's entrance, the Minuteman III that Jackson and Jimenez will launch is a 60-foot, 75,000-pound, primer-green monster. The three-stage missile has become a no-nonsense Frankenstein of a weapon, patched with spares, upgraded parts, and cannibalized sections of other missiles. In the same way that an operational B-52 has essentially been rebuilt over the years, the typical Minuteman III is an accumulation of upgrades. The Air Force has replaced parts in the guidance system, while the third stage has an improved motor.

Unlike earlier generations of missiles, such as the liquid-fueled Titan and Atlas, the Minuteman III uses a solid propellant that combines fuel and oxidizer in a substance the consistency of creamy peanut butter. The advantage of using solid fuel is that it is much safer and easier to handle than liquid fuel.

Over time, however, the solid propellant can separate from the walls of the missile, or sag, preventing a smooth burn. Periodically, manufacturers clean out both the second and third stages and replace the propellant. After the Minuteman III has been randomly selected from a list of missiles on alert (the number of the chosen missile is literally drawn out of a hat), a two-day operation to get it started on its journey begins.

A helicopter ferries crew and equipment to the launch site, where removing the missile (viewed from the bottom of the 120-foot silo) is an eight-hour operation. Missile engineer Dale Enger (below) has worked on the Minuteman program since 1962, when Montana received its first generation of missiles.

For the journey from Montana to California, the Minuteman's three rocket stages ride aboard a C-141 transport. The on-site maintenance crew at the ranch house near the launch pad are there to replace parts and keep the rocket in top condition. The two-man crew drives to the site in a 5,000-square-foot truck and trailer, traveling along the Missouri River. They are housed in a 100-foot trailer on the far side of the river. The occasional business like the Byway Cafe, a restaurant that sells homemade sticky buns, offers such a break from the bleak landscape that it takes on an almost legendary stature.

The harshness of the land can make life difficult for the maintenance crews, who sometimes have to remove four feet of snow from a site just to begin work. "If it's 20 below with wind chill getting to minus 20s, they'll go ahead and cancel," says Senior Airman Michael A. Bentley. "It's not worth sending us out and risking somebody getting frostbite to do this job. It's not a life-and-death thing."

A day earlier, blowing snow and packed ice had forced the maintenance team to turn back and cancel the operation. Today's weather is better. The wind blows hard, but temperatures rise into the 30s. Under an azure sky, the snowakins white on distant purple mountains.

The silo site, designed to be inconspicuous, blends in with acres of farm-
the MCC, using a hand-held gadget called a missile electronic encryption device, which relays an identification number and information that only the maintenance and security chiefs would know. Once their identities have been authenticated, the FCC sends the security chief an encrypted combination to open the Aircrat, a round, 106-pound steel door that seals the silo's top. Likewise, the ECC sends the maintenance chief an encrypted combination for the silo's B-plug, a 14,500-pound steel device locked by large pins.

Once the A-circuit and the B-plug have been moved out of the way, crews can begin rolling back the massive steel and concrete launches enclosure doors. It inches back, disturbing the nests that field mice have built in the narrow gap underneath it. The mice scurry through the shallow snow, panicking at all the activity and the loss of the 110-square-foot roof over their heads. (Concerned about rodent-borne viruses, the maintenance technicians take care around the nests, although it's the occasional rattlesnake that they really worry about.)

To provide a sheltered work area, a modified semi-trailer is parked over the silo, where the conical top of the silo is now visible about 20 feet down. A distinct odor rises: eventually, it will work its way into the workers' clothes, it smells faintly organic, stale and musty, with a noticeable chemical spiciness.

While the work is complex and well-rehearsed, the tools are simple—mostly store-bought sets such as Craftsman and Snap-On. The downers, a three-person crew lowered into the silo, de-tach the missile's titanium-shrouded reentry system, which contains the warheads. Two doughnut-shaped work platforms circle the launch tube nested inside the silo, but because the downers need better access to the missile, they operate out of a work cage they have lowered alongside it. Cabinets with computers and environmental control equipment (old techs must be kept between 80 and 100 degrees Fahrenheit) surround the work platforms, a marked contrast to the tube's bare walls and occasional clusters of cable.

Hosted by a winch, the silvery reentry system rises toward the trailer, vibrating slightly as it climbs. Bentley and his partner, Senior Airman Dean Phelan, receive the assembly, which contains delicate guidance systems as well as three conical reentry vehicles. They operate out of a work cage they have lowered alongside it. Cabinets with computers and environmental control equipment (old techs must be kept between 80 and 100 degrees Fahrenheit) surround the work platforms, a marked contrast to the tube's bare walls and occasional clusters of cable.

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The Minuteman test launch requires weeks of preparation: technicians must assemble the reentry vehicles, which have been stripped of their warheads (left), and ready a telemetry package that will return information on the missile's flight (below).
foot-diameter metal ring packed with electronics that will transmit information about the Minuteman's performance to receivers along the California coast.

The other major addition is the de-estruck package. If the Minuteman stays off course, two mission flight control officers, Capt. Richard Boltz and Maj. Jeffery Hetrick, will send a radio signal that detonates explosives lining the missile. The missile's course is displayed on a monitor as a red line. If the missile deviates from the red line, Boltz and Hetrick have to decide its fate within four seconds: if they wait any longer, debris could fall beyond the safety zone. "Like any other operation where you're in a life-and-death situation, time slows down on you," says Hetrick. "It starts to compress."

The two men wear shoulder patches depicting a leering red creature grabbing a rocket, with the slogan "Track 'em or crack 'em." But it's a decision they don't relish. At Vandenberg in June 1985, a Minuteman turned in the wrong direction two seconds after launch, forcing launch control officers to destroy it. Unfortunately, the fiery debris set off a brushfire that burned 1,000 acres. "As soon as that vehicle comes out of the hole, you don't know whether it's going to go the right way or not," says Boltz. "Ninety-seven percent of the time they do, but it's the three percent that don't that you have to be ready for."

Out in the missile alert facility, which is located a few miles away from the building where Boltz and Hetrick are stationed, Jackson and Jimenez settle in for the countdown. Says Jimenez: "You're going through the same procedures in taking care of the missile, but (during a test) you always have the sense of relief in the back of your head that if something breaks down, it's a big deal, but it's not as life-threatening as if you had a nuclear weapon out there."
The facility is like a submarine: long, narrow, and fluorescent. About 20 minutes before launch, Jimenez struggles to change a console panel that was installed too tightly, while Jackson talks to the command post via a black cold war-vintage dial telephone. Three miles north in a seaside sib, the missile awaits the signal to launch.

At 6:35 a.m. the crew receives word from one of Struckman's support staff at the command post that the launch is on hold because of concerns about the strength of the telemetry signal. Holds the missile's rocket motors fire 30 seconds later. There's a quick burst of orange, then a brighter flash as the Minuteman III rises for a few seconds before being engulfed by a fog bank. Because of the distance, it takes about 15 seconds after the flash for the missile's roar to wash over the site.

Boltz and Hetrick won't be doing any cracking today. The big green monster has punctured the fog bank's ceiling and accelerated through the blue morning sky, pushing toward its peak speed of 15,000 mph. Stage separation goes smoothly, and five minutes after launch, the three disarmed warheads deploy well above the atmosphere (the exact altitude is classified). Then, glowing brightly from the heat of reentry, they continue arcing toward the South Pacific for another 25 minutes before finally splashing down 4,800 miles from Vandenberg.

Later, Jimenez and Jackson stop by the missile alert facility in between preparations for the long drive back to Malmstrom. Even as they accept congratulatory phone calls, the mission feels somewhat surreal. They're eager to see the launch video. "You're really not thinking it's going," says Jimenez. "You put your hand on the key, like you're trained, and turn it. Then it's like: Okay, what happened?"

After years spent on alert in underground launch centers, Walter Jimenez (foreground) and Wil Jackson get their first opportunity to launch a missile. All goes well for the Minuteman, as it bursts out of its sib at 7:14 a.m. and punches through a layer of fog blanketing the California coast.