

Baptism by Ramjet

How I survived my first test at the "rocket ranch."

Air & Space Magazine

Bill Dye



Josue Evilla

In 1977, I got a job at the Chemical Systems Division "rocket ranch," a subsidiary of United Technologies Corporation, just east of San Jose, California, fulfilling my dream to be a rocket test engineer. Two months in, during the development of the Advanced Strategic Air-Launched Missile for the Air Force, I experienced my first ramjet test. Solid- and liquid-fuel rockets contain both the fuel and the oxidizer for combustion; ramjets carry only fuel and use oxygen from compressed air as an oxidizer.

"Mark, T minus 60 seconds, auto sequence start," I said, hitting a switch on the test conductor console. Outside, huge valves on the ramjet opened and clouds of steam billowed from the ejector. The control room rumbled.

"Good steam pressure," a tech said.

"T minus 20 seconds."

The air temperature was stabilizing. The test facility was now simulating high-speed, high-altitude flight. Next: ramjet start.

"Three...two...one...ignition."

The roar and vibration in the control room escalated. Technicians and engineers continuously checked their gauges. I glanced at the magnetic tape reels recording the ramjet data. For 15 seconds everything went fine. Suddenly I heard a roar over my headset. On the TV monitor: FIRE. The ramjet casing had ruptured.

I hit the fuel shutdown switch and turned on a water deluge to douse the ramjet. Another unsuccessful test.

Art, a supervisor, came at me with scissors in hand. He swooped in, clipped off my necktie, and added it to the collection on the control room wall, each with date, test, and the tie owner's name. I had soloed as a ramjet test conductor!

One of the positions during ramjet tests was roof observer, the guy who kept an eye on the ramjet from the control room roof. To notify the test conductor of a disaster, like a ruptured ramjet casing, he would open his microphone. The blast of noise in the conductor's headset would be a hint that something was amiss—a blast of noise like the one I heard in the headset during my inaugural test.

I wanted to feel the experience, not view it on a monitor. For the next test I volunteered to be roof observer rather than test conductor.

"Are you sure you want to do this?" asked Dick, our expert roof observer (his real job was electrical tech supervisor).

"Sure!" I climbed the ladder to the flat tar-and-gravel roof, donned the headset, checked in with the test conductor, and stretched out near the raised edge. The ramjet was about 200 feet away. With binoculars I could see everything on the test stand clearly.

"T minus two minutes."

"Data recording?"

"Ready."

"Facility?"

"Ready."

"Roof observer?"

"Gotcha covered" (the traditional response).

"Three...two...one...mark. Auto sequence start, T minus 60 seconds."

That was the last thing I heard over the headset. The steam ejector erupted. Through the binoculars I saw Mach diamonds within the supersonic air screaming out of the diversion valve. I saw the valve rotate, slowing the air to subsonic speed before diverting it into the ramjet. A flashbulb went off; ignition. WHAM. A mammoth roar rocked me as a flame the size of North Dakota shot from the exhaust.

My glasses vibrated. My teeth chattered. My ears ached. The sound intensified. I could feel the incredible speed of the thing even though it was firmly mounted to the test stand.

Somehow I managed to keep an eye on the ramjet. Finally, after 400 seconds, it stopped. The test had been successful.

I was embossed on the edge of the roof-glasses crooked, headset dangling around my neck, binoculars in the gravel. Dick's face appeared at the top of the ladder. He looked over my remains, grinned, and said, "Wasn't that fun?"

My snipped tie resided on the control room wall, and a white dress shirt stained with roof tar was hanging in my closet. Now I was truly a rocket test guy.

Bill Dye has spent nearly 40 years in aerospace, much of that at Lockheed Martin. He published *Climbing Into My Dream: An Aerospace Engineer's Journey* via iUniverse in 2011.