



The Last Zoom Mission

As recounted by Col (Ret) Hank Hoffman (Class of 1963)

Aerospace Research Pilot School (ARPS) began in 1961 at Edwards AFB, Calif., and closed in 1973 when the outer space component was moved to NASA. The F-104 arrived at Edwards in 1962. ARPS and the F-104 are inescapably linked, since that school lasted only as long as the F-104 could be maintained. A Zoom mission was described as one where lots of kinetic energy was traded for altitude.

ARPS called for three F-104As to be reclaimed from storage at the boneyard at Davis-Monthan AFB, Ariz. They were modified with a Rocketdyne LR121-NA-1 rocket motor and redesignated NF-104As. The installed J79 engine generated 15,000 pounds of thrust in afterburner and burned JP-4. The LR-121 produced 6,000 pounds of thrust and burned a combination of JP-4 and 90% hydrogen peroxide. Rocket motor burn time was on the order of 90 seconds. It also had three axis reaction controls to control the aircraft in space.

Remember that the F-104 only weighs about 20,000 pounds full of fuel, so its thrust to weight ratio was exceptionally impressive.

The NF-104A went to 120,800 feet on Dec. 6, 1963. Major Bob Smith was the pilot, and he started his Zoom from 37,000 feet and Mach 2.4. This aircraft, number 56-0760, now sits on a pole in front of Test Pilot School.

Of the other two, one was severely damaged by an explosion in the rocket motor and discontinued in service.

The other was flown by ARPS commander Colonel Chuck Yeager on an unauthorized flight on Dec. 10, 1963. He got into a spin at 101,500 feet and rode that spin down to 8,500 feet where he bailed out. At that time, if you flew to 125,000 feet, you qualified for astronaut wings. Students did not fly the NF-104 until 1968 due to the danger. The cause of the accident was attributed to gyroscopic effects of the engine shutting down.

There was also a student fatality and aircraft loss apparently caused by a glove that became disconnected from his pressure suit. This convinced the ARPS staff that the mission was possibly too dangerous for students, and consequently the Zoom

program was cut back to entry at Mach 2 and 30,000 feet. At those upper altitudes without a pressure suit, your blood will boil in less than two seconds. It is horrible to contemplate.

I was in the last class of ARPS, class 73A. Because of a very bad cold, I was the last one to fly this final Zoom mission on Nov. 30, 1973.

I got into my pressure suit for two hours of pre-breathing oxygen and then mounted my already preflighted F-104C. I took off and headed east, joined by my safety chase, another classmate and an IP in an F-104D. We did a mil power climb to 45,000 feet, turned around toward Edwards, called to activate the supersonic corridor, turned on the ground data, lit the afterburner and descended to 30,000 feet to more swiftly go through the high drag area from Mach 1 to about Mach 1.5. There, the aircraft really wanted to run!

At Mach 2, I pointed the aircraft up to 60 degrees for the climb. I have to say there is no thrill on earth quite like lighting the burner and pointing the nose up! Those who are not military fliers must only imagine the thrill of truly defying gravity in that wild ride!

At 65,000 feet I finally came out of burner and rode the bird over the top, just above 75,000 feet in a parabolic, zero G maneuver. There you can clearly see a bright blue band of atmosphere about the planet, and the curvature of the earth. All is dark above, no stars, because of the bright reflection off the desert far below. Only about a thousand people have seen this live since the beginning of time.

When I pulled the throttle to idle, I found I was minimum fuel, but the base is in clear sight and I won't touch the throttle again until I shut it off back in the chocks. Gravity is firmly back in charge as I cross the runway at 25,000 feet and my safety chase rejoins. There it's full speed brakes, maneuvering flaps, and a 300 knot 270 degree turn to final. Since max gear speed is 205 knots, I am well into the flare down to about 50 feet before I can put the landing gear down.

The whole flight took only about 20 minutes, sometimes it takes longer to describe it. In the chocks, the launch crew opened a bottle of champagne, and so I had a drink or two before returning to class. I was unaware of the historic nature of this flight; I was just trying to graduate. There was no class 73B, because the school had to put the F-4 into the place of the F-104 in the curriculum. A few days later, I got to fly one of our F-104Ds to the boneyard. It marked the end of an era.

Students had only flown the Zoom profile from 1968 to 1973 and so I was very fortunate to have been one of only about 200 men to take this truly amazing ride!