

HANGAR

BY PILOTS

FOR PILOTS

FLYING

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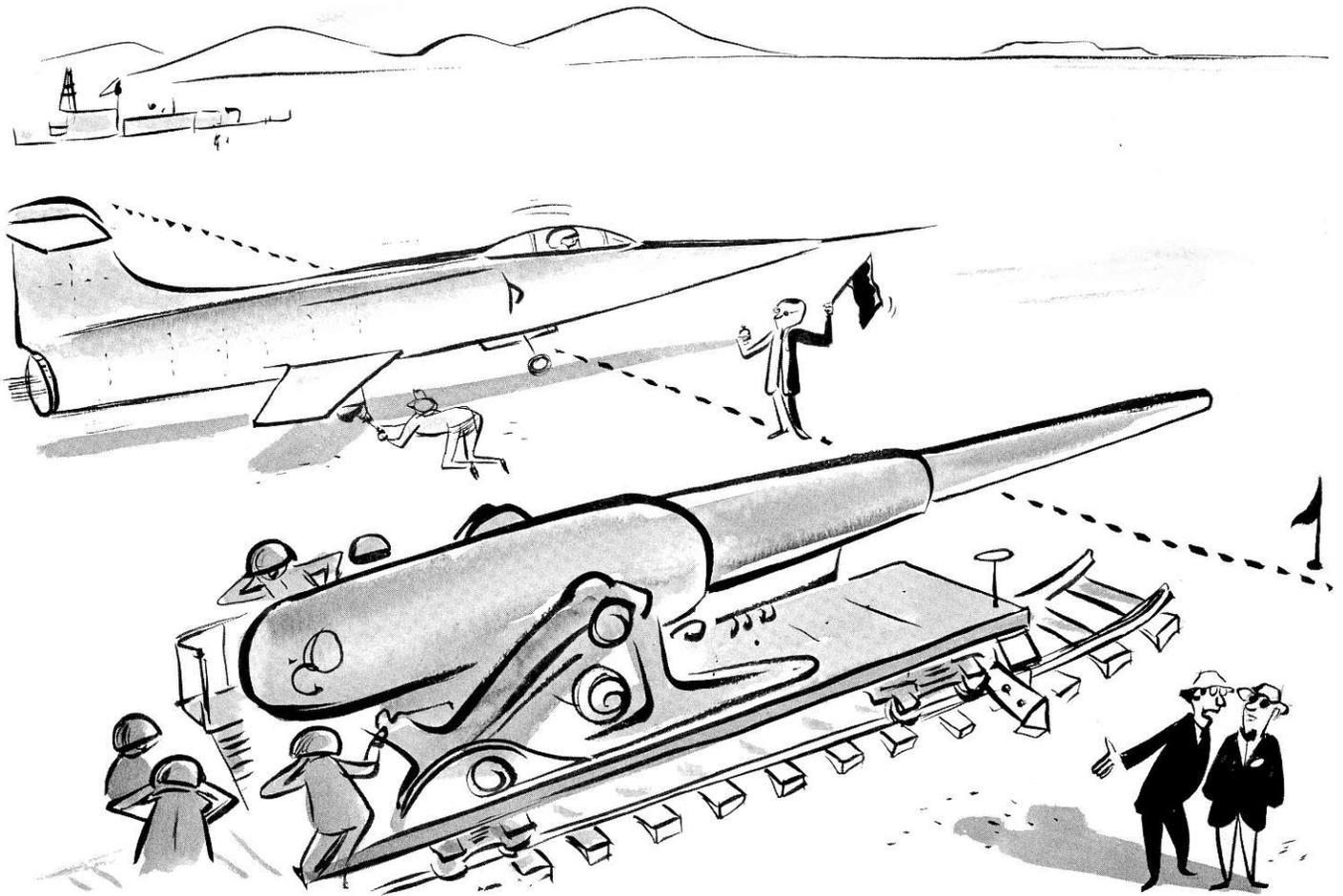
May, 1958



*The Story
Behind The
A-104 Speed
and
Altitude Records*

RECORD BUSTERS, INC. — Three-man team from Hamilton AFB express enthusiasm following altitude record run. From left, Capt. Walter W. Irwin (speed record: 1404 mph), Maj.

Howard C. "Scrappy" Johnson (altitude record: 91,249 ft.), and Capt. James Low, standby. All are members of the 83rd Fighter-Interceptor Squadron stationed near San Francisco.



“It’s the only thing we could find to pace him on his speed run!”

The Speed, Altitude Records Story

By now, you, and an appreciable portion of the earth’s population, know that the F-104 Starfighter set two new world’s records within the last fortnight. Altitude: 91,249 feet. Speed: 1404 mph.

And probably many of you that drive Iron Darts and Bentwings and others said:

“Aha! They finally turned the Silver Sliver loose against the records. Wondered when they’d do it.”

But most of you who make the aeronautical field your business know that a record is something like an iceberg—only a little of it shows above the surface. Hidden from the public view

is the story of how the record came to be and how it was done.

We thought you’d like a little of the inside story. Let’s take a look at the two records in chronological order:

ALTITUDE

Two points highlight the altitude attempt:

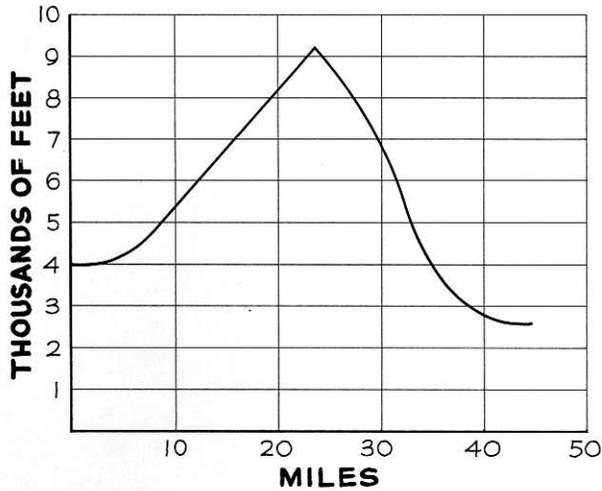
1) The Air Force and Lockheed obtained the altitude record by indirectly helping the Navy set its earlier 76,828 foot mark in a special Grumman F11F-1F Tiger.

2) The record came to be because an IBM 704 clattered its electronic brain cells together and told flight test: “You’ve got to fly lower to go higher.”

Back in January, when the F-104 first went operational at Hamilton AFB, Lockheed submit-

HANGAR FLYING
Wayne Pryor, Editor
Dept. 68-10, U-32, A-1
Lockheed Aircraft Corp., Burbank, Calif.

WORLD'S ALTITUDE RECORD FLIGHT



ted a proposal to the Pentagon for the F-104 to do a little record-breaking. Among the records we thought the airplane could take were the speed, altitude, time to climb, cross-country one-way and round-trip, and a few others.

At that time the Pentagon declined, preferring to let the airplane stay operational a few months before any attempts were made. But while making up these proposals, Richard Heppe, manager of our aerodynamics department in preliminary design, and some other people found a king-sized joker in the Federation Aeronautique Internationale rules.

Spelled Out Rules

FAI, the international record governing body, spelled out in its rules for altitude attempts that any record would be recorded only on the basis of a sealed barograph (fancy recording altimeter) in the airplane.

Altitude records are made today in jets by the "snap-up" or zoom technique. The airplane hustles along on the level to its best mach number, then converts this high velocity into a zoom to maximum altitude.

Because of the lag in a recording altimeter at high altitude—since the airplane is at the peak such a short time—our aerodynamics people estimated this might cost as much as 5000 feet worth of record altitude. We told this story to the U. S. National Aeronautical Association, a member of the FAI.

NAA moved fast and managed to get discussion of a new altitude-measuring system on the

FAI annual meeting agenda in Los Angeles this spring. But the margin was close—just eight hours from agenda closing time.

Thus, when the Navy went for its record, an FAI-approved triangular photo-theodolite system was used to accurately record the maximum height of the zoom to nearly 77,000 feet.

At this time, Lockheed production test pilots were barreling over the top at 75,000 to 80,000 feet in radar tests on the F-104—altitude measured by radar from Edwards Air Force Base. Lockheed renewed its pleas to the Pentagon for a chance at the altitude record at least.

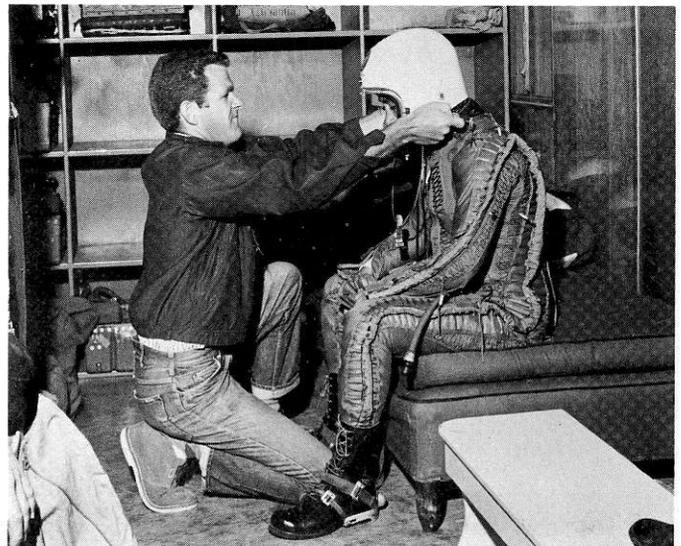
The Pentagon said it would consider the subject.

In the meantime, engineering test pilots began to check just how high we could get in a snap-up with the F-104. Jake Holliman and Bill Park put on their "moon suits" and began making zoom runs. Results were discouraging.

Started at Mach 2

Starting at 55,000 feet, with a speed exceeding mach two, the zooms were only slightly higher than production test's climbs—80 to 82,000 feet. The pilots were convinced the airplane would do better than that—but what was wrong with the technique?

Aerodynamics engineers fed our IBM electronic brain a batch of figures to chew on, then asked it, "how do we go higher?" The IBM pondered awhile, then spoke:



Pete Peterson, Lockheed flight equipment man, helps Maj. Johnson with helmet of "moon suit."

“Go lower. Build up your maximum acceleration at 45,000 feet, then zoom. Lower altitude gives more time to rotate the airplane to proper climb angle and still have high velocity to convert into altitude.”

Jake Holliman, engineering test pilot supervisor, looked doubtfully at the instructions from the Keepers of The Brain, but decided to give it a try. Result:

More than 87,000 feet on the first run.

“Can Exceed 90,000”

Lockheed sped the word back to the Pentagon: “Believe we can exceed 90,000 feet with the F-104.”

In the meantime, Bill Park proved it. Whipping up into a zoom from 45,000, he hurtled over the top at 90,900 feet. And the Pentagon’s reply came in the form of three officers from the crack 83rd FIS at Hamilton who walked into engineering flight test’s office at Palmdale two days later:

“We’re here to do a little record breaking.”

Maj. Howard C. “Scrappy” Johnson, Capt. Walter W. Irwin, and Capt. James Low had received orders to go to Lockheed and try the F-104 against the altitude record. If all went well, maybe they’d get a chance at the speed record.

Senior Officer Elected

Scrappy Johnson, operations officer of the 83rd, was an old hand—4600 hours and 1800 hours in jets—but less than 50 hours in the newly-arrived F-104. As senior officer, he was elected to make the attempt.

He made six practice flights—all record-breakers from the old 77,000 foot mark, but the French had just announced a non-recorded flight of more than 80,000 feet. If they went official, they might do quite a bit better. He’d have to work to make sure his mark was high enough to really give the next guy something to shoot for.

And some altitude-hungry individuals attempted to brain-wash him with sly suggestions like:

“You know Scrappy, if you were told to hold it all the way to a stall, you might get three or four thousand feet more—just hold her back all the way til she stops...”



Jake Holliman, Bill Park, and Maj. Johnson, the three highest-flying jet pilots in the world, confer before attempt on world’s altitude record.

“Nope—I’m going to fly it over the top. I won’t need to stall it.”

So on the morning of May 7, 1958, at 9:39 a.m., Scrappy Johnson tucked up his wheels and started the run that was to make him the highest-flying jet pilot in the world.

He lit the afterburner on the way to the Pacific coast, between Ventura and Santa Barbara, then turned around and started back. This flight path gave an optimum fuel load at start of climb.

“Turning in,” he said.

Started Acceleration

Near Mt. Los Pinos, he went to full uniform burning and started his acceleration. The F-104 pulled a long white contrail against the clear blue sky. At 9:58 he reported again:

“Mach number 2.1, starting climb.”

The scheme was this: He would accelerate to mach 1.7 at 35,000, then angle up to 40,000, meanwhile building speed to mach 2.1. At 40,000 he would tip up some more, still holding 2.1 to get a climb attitude (rate of climb at this point, about 20,000 fpm). When he hit 45,000,

he would rotate at about 2.5 Gs to a 35 degree angle and set up an initial rate of climb around 80,000 feet per minute to 65,000 feet.

This was the point where the pilots are separated from the flyers. Johnson had to hold the airplane just a shade under one G all the way over the top to keep the plane from stalling. No instruments would help him. It was all in the seat of his pants and the feel of the stick—and many years experience in the driver's seat of an airplane.

Johnson kept easing the stick back. He had handicaps. As the outside pressure went down, and the sky turned deep purple, his pressure suit began to inflate, exerting an octopus-like squeeze all over his body. The suit squeezes achingly tight at 90,000 feet. And still he held that fine gentle pressure on the stick—then the nose went down through the horizon and he was over the top just slightly subsonic—about 80 to 100 knots indicated. True speed: 623 mph. Peak altitude: 91,249 feet.



Maj. Scrapy Johnson
(91,249 ft.)

SPEED

And then it was Capt. Walter W. Irwin's turn. With the altitude record in the bank, the Air Force thought a new world's speed record would make a fine thing to announce to the nation for Armed Forces Day — May 17.

That was a Saturday. NAA equipment for clocking the run would be set up and ready by Thursday. Capt. Irwin would have Thursday and maybe Friday morning to capture the record. The squeeze was on.

Lockheed really wanted the speed record. More than three years ago, March 25, 1955, Ray Goudey, engineering test pilot, had flown the XF-104 at mach 1.79 — 1150 mph. And this was with the Wright J65 that even with afterburner only gave a little more than 10,000 pounds thrust.

More than two years ago, April 27, 1955, the late Joe Ozier became the first man to double the speed of sound (1320 mph) in the F-104A. And with the vastly increased power of the J79 with afterburner the plane leaped out to that speed. Speeds above that were a question of how near the thermal barrier a pilot could squeeze the plane.

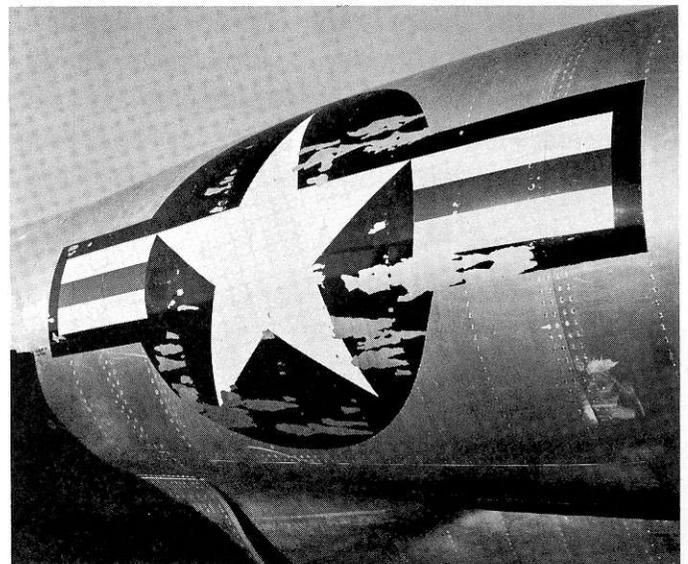
Rarely, in peacetime, has an officer flown under greater pressure than Capt. Irwin. Men with eagles and stars on their shoulders passed the word down to Capt. Irwin that they'd "sure like to see a good number for Armed Forces Day."

Faced Demanding Job

He had few hours in the airplane — yet he was up against one of the most demanding piloting jobs in the flying business. A speed record run (see chart) at F-104 speeds requires piloting accuracy bordering on the limits of human ability. Capt. Irwin had to fly a hairline course in three dimensions.

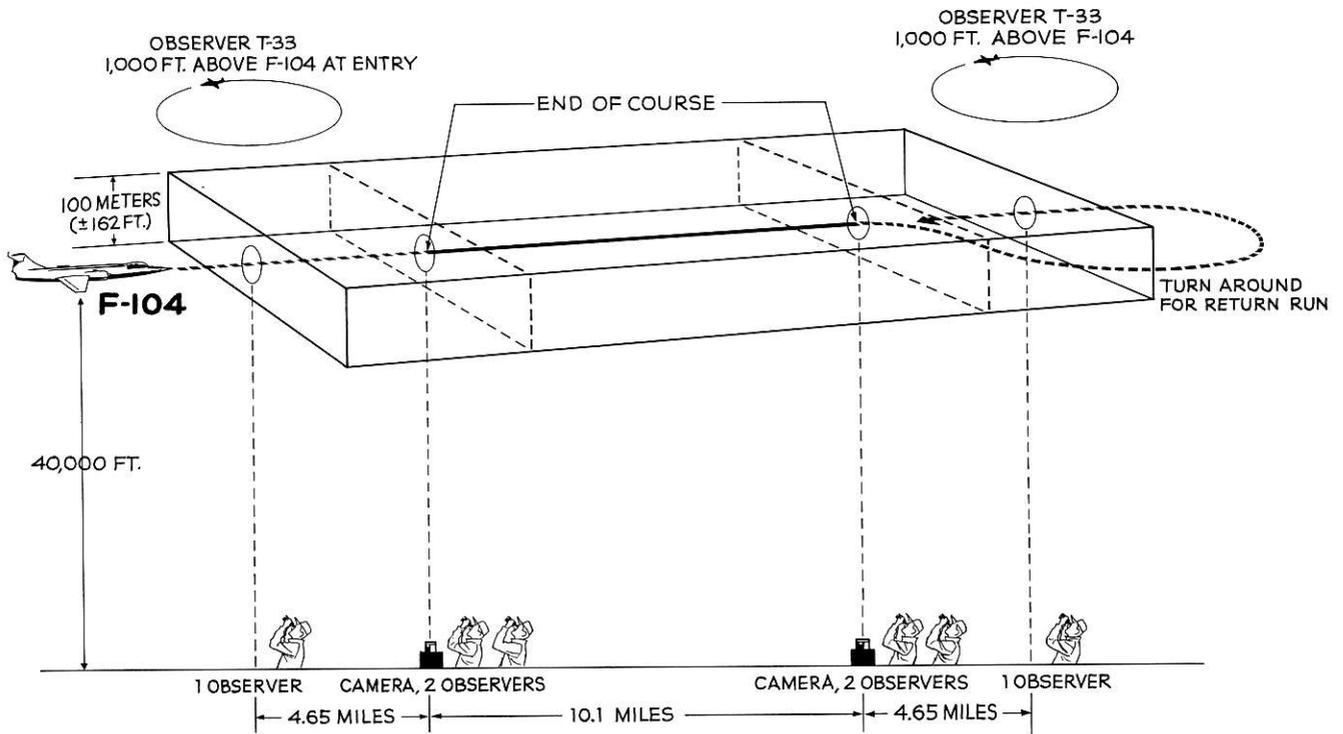
But Irwin had no time to make a hundred practice runs to get the course down cold and insure an absolutely optimum performance. He was working against the clock. On Tuesday and Wednesday he managed half a dozen runs to get the feel of the course.

At 6 a.m. he was wheels off for his first run Thursday. On the run he received radar headings and corrections into the course. During



Paint was ripped off Capt. Irwin's plane by blistering 1400 mph speed during record run.

WORLD'S RECORD SPEED RUN MEASURING SYSTEM



the 10.1 mile speed course proper he received only position reports from radar—no headings or corrections.

His job was to get the Starfighter squared away, trimmed out, and on an even heading well before he got into the "trap." Any attempt at heading change or trim was almost impossible in the "trap" because of the narrow altitude tolerance. He had 100 meters—that is, plus or minus 162 feet—altitude variation allowable.

Steady Hand Needed

A blink of an eyelid, the slightest tremor in his hand, would flick him out of that precise slot at 1400 mph.

Capt. Irwin's course and altitude difficulty was compounded by a third factor:

He was nudging the F-104 against the glowing maw of the thermal barrier. As air slammed into the airplane's ducts it slowed and gave off heat. If he allowed the plane to go too fast his compressor inlet temperature would go too high and

melt down the engine. This meant he had to throttle the afterburner during the run.

He must hold this spiderweb-thickness track in the sky—yet keep on the throttle all the time to avoid going "over temp."

His first run wasn't up to snuff—he joggled off the altitude. He changed planes.

Misses "Good Number"

His second run was fair—but the "good number" wasn't there.

As a good pilot does under pressure, Capt. Irwin began to "settle in" on his job. On his third time out the run was a thing of beauty—like a white chalkline in the sky. Speed: more than 1500 mph. Then Dame Fortune turned a cold eye on the enterprise.

Coming out of the run, still in afterburner, he was to perform a "teardrop turn" and reenter the course. Flight test had computed that it required less fuel to make the complete course in full A/B than to throttle down after passing through, then re-accelerate.

These turns at mach 2 spoke eloquently of the stability of the F-104. The turns could not go higher than 1640 feet above the run altitude and were made at three Gs. T-33s with NAA observers monitored the turn and course entry.

In the turn after the 1500 mph downwind run, a wire broke in the afterburner nozzle control mechanism. Capt. Irwin had to land and that scrubbed the run. This was noon and a high cloud strata began to move across the course. There could be no more runs today. Friday morning would have to be it.

Sleep Comes Easy

Capt. Irwin had no trouble sleeping that night. He was exhausted.

At 6:47 Friday morning Capt. Irwin lifted off. At 7:05 he landed. The speed looked like 1435 average. Then came the word from the course; The ground cameras had failed. The run was disqualified. And just to add to the joy, a mechanic found that this plane had blown a gear case oil seal. It couldn't run again.

This one hurt. The plane had a late series engine in it with a higher allowable temperature inlet rating. It could be allowed to go faster than airplanes with an early series engine. Capt. Irwin was now under the gun.

He Must Hack It

He must make his run good this time out — and he must hack the number with an early series engine with a lower temperature rating. If the cameras were fixed.

At 7:50 Edwards reported the cameras ready and waiting. At 7:58 Capt. Irwin was airborne and headed out. Then Dame Fortune made her last pitch.

Orbiting over the course to watch the entry and exit were three T-birds flown by Capt. Richard O. Collins and Capt. George M. Winn from Oxnard AFB and Capt. Harry Ramsay from Norton AFB. They carried NAA observers in the back seat.

Capt. Winn's T-bird blew a canopy section when a camera bumped it, slightly injuring the NAA observer. It had to come back. But that's why there were three. The stand-by T-bird moved

in and Capt. Irwin made his downwind run. Speed: 1465.41.

He wrenched around, trimmed out, and took up his 180-degree heading with radar vectoring him onto the course. He held steady while inching back the throttle to keep temperature down. Speed: 1342.97 mph. A 60-70 knot wind was blowing at altitude. Average speed: 1404.19 mph.

A general said: "I'll buy that," and off they trooped to press conference.



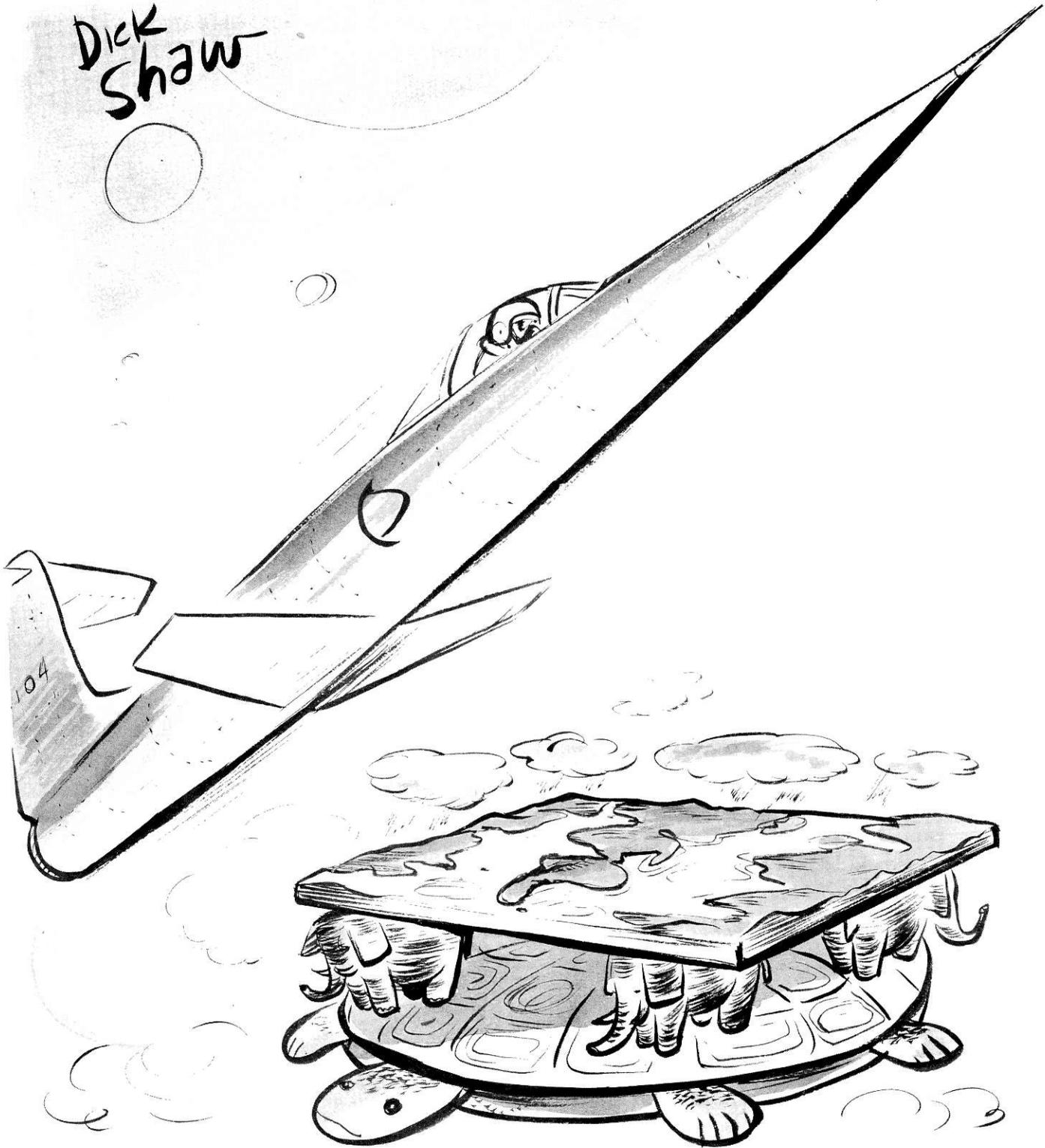
**Capt. Walt Irwin
(1404 mph)**

And that's part of the story of how the F-104 became the first plane in the history of aviation to take both the world's speed and altitude records. Nice hangar flying with you. Be back next issue with some dope on the F-104B, an airplane identical to the F-104A in maximum performance — except it carries two people and offers the best view from the back seat in the history of jet instruction.



F-104B — View from rear seat.

Dick
Shaw



“If you think my high altitude is news, just listen to this!”