

Flying Lockheed's F-104

—prelude to Avro CF-105?

Lockheed's F-104 is the fastest operational aircraft in the world today with a top speed in excess of 1300 mph—faster than the CF-105 is supposed to be. Many of the problems associated with flying the CF-105 will be similar to those of the F-104—the CF-105's safety margins must be as large.

By A. W. LeVier

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Some of you may have taken a look at this airplane and backed off a step. It is thin and it's sharp. You can cut yourself on any of the leading edge surfaces. This is the new look. It is not peculiar to Lockheed. Other people are working on similar airplanes. We just happen to be the first ones out the door. This kind of plane—thin and sharp—is the answer to the high mach numbers. And that's what we've got to have in our fighters these days.

In the old days a little bit of wing and a lot of engine usually added up to one thing—something that was hot as a pistol in performance but tricky to fly and hard to handle. That's where the F-104 will fool you. It's hot as a pistol, all right. But the aerodynamics business has come a long way. And the F-104, in my opinion, is easier to fly than the T-33 trainer.

Now, maybe you say, "Here's a test pilot who works for Lockheed talking big about his company's airplane."

Yeager Says

Well, some of you know Chuck Yeager; he was the first man outside Lockheed to fly the F-104. And he was sceptical. Chuck has flown in a lot of weird birds. Some haven't been so good from a pilot's viewpoint. I'm glad he was sceptical. He's one of the best judges I know. He hadn't been off the ground 60 seconds until he started talking on the radio. I never heard Chuck talk so much. And it was all praise.

Pete Everest and General Boyd both flew the plane. Both liked it. I value the judgment of these pilots.

These fellows—Yeager and Everest and General Boyd—yes, and me, too

—can talk this way about the F-104 because its hot performance doesn't come at the expense of safety. Let me tell you about some of its safety factors so you can make up your own minds.

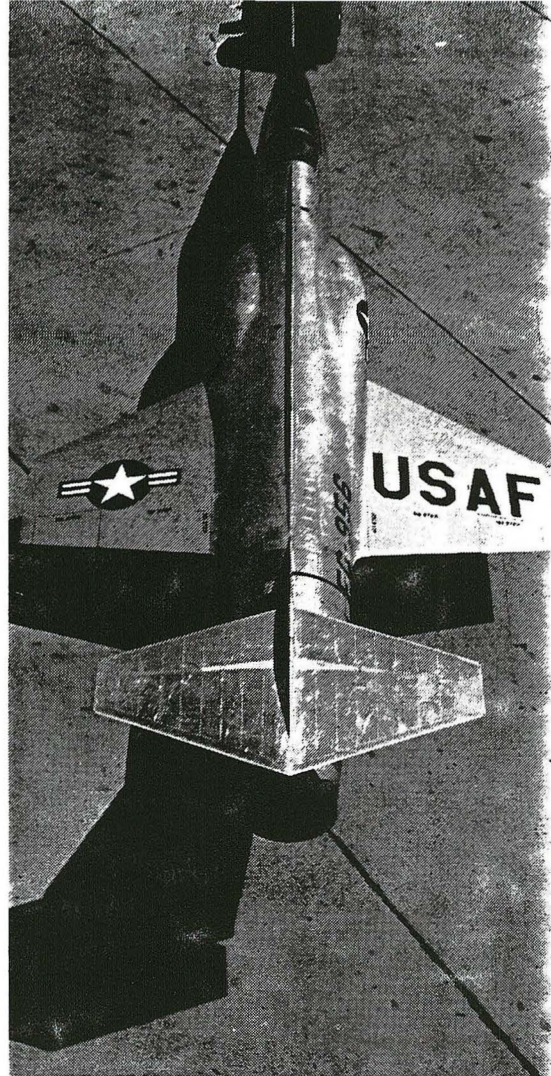
I guess I'd say, first off, that the peak performance our engineers designed into the 104 is one safety factor in itself. Because when you are a fighter pilot that's what you need—better performance than the other guy so you can be where he wants to be before he has a chance to get there. That's a real important item if we ever have to use this airplane in combat—and I'll have more to say about this later on.

Okay, you say. But every airplane has to land, too, and how does this one do when you head for home and come into the landing pattern. This plane flies at pattern speeds comparable to fighters of five years ago. That's right around 200 knots. The fact the wings are short doesn't mean that it comes in like a missile. The 104 is an airplane even if it looks like a missile.

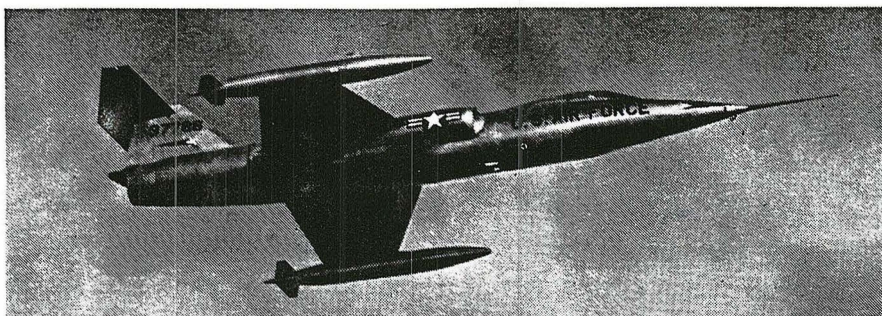
Touchdown speed is higher than old-type fighters—but by only about five per cent. And we are already whittling on that. She lands like a lady. You don't notice the speed.

This plane with the short wings operates on any runway that's considered adequate for a jet fighter. Now we all know the T-bird has been flown off 6,000-foot strips. The 104 will do

FIRST OF FASTEST — These two "on top" shots show vividly the clean, almost simple lines of the new Lockheed Starfighters. The unusual wings are thinner than on rocket research craft. In the photo on top special covers conceal engine air scoops on each side, just forward of the wing, for security reasons.



"Flying the F-104 is like giving a sub-machine gun to a soldier who has been used to a muzzleloader."



UNUSUAL CONFIGURATION — Sharp manoeuvrability at supersonic speeds was a prime consideration in design of the F-104. Straight, thin wings — almost knife-keen along the edge — are placed about two thirds of the way back on the fuselage, slanting downward. Horizontal stabilizer is placed high on the fin and moves as a single unit instead of having a separate elevator surface as on most planes.

the same. But we all know, too, that on a 6,000-foot strip you're cutting the odds pretty fine so we like considerably more runway if we can get it.

Pilot Safety

There are other things we've designed into the F-104 that are even more specifically for pilot safety. For instance, the control system. We have two completely separate and distinct hydraulic systems. And if we lose both hydraulic sources—say in the case of engine failure—we have a third emergency hydraulic pump and generator that doesn't depend on the engine. And you seldom need this. Even if the engine quits, it will windmill enough to run the pumps.

In the early days of testing the XF-104 prototype I lost my engine. I had lots of altitude so I headed for home at Muroc. I glided—glided, mind you—more than 50 nautical miles home for a landing. And my emergency hydraulic generator worked just fine. You might be surprised that this airplane glides. Actually, with everything up it is so clean that it glides pretty darned well. In fact, better than 10 to 1.

Our landing gear group has done a real job on the F-104. This gear falls free and locks in a few seconds. Considering that you have 15 to 20 seconds on the roundout, this means you don't have to lower the gear until you are over the runway and have it made. I think we all remember people who've had trouble with the old slow-extending gear.

Another thing on the 104 that you'll like from a safety standpoint is the engine. This plane accelerates like a piston-engined job. We've been waiting a long time for this. Taking a waveoff isn't going to be the chore that it used to be in early jets.

When you climb into the cockpit of this airplane of the future you're in for a treat. You've got a small, compact instrument panel with the gauges where you'd like to have them. It isn't perfect. I've yet to find two pilots who agree on where every gauge should go. But a lot of pilots have spent a long time in the seat of the mockup so that we'd have a panel that made sense and was simple. Simplicity is the essence of safety in my book. The fewer switches to throw, the fewer dials to look at, the fewer handles to move, all improve the pilot's chances of not making a mistake. We've done our best in this respect on the F-104.

For cockpit temperature you set the dial and forget it. Fuel management? Just like your automobile, unless you're carrying external fuel. Then you have one switch to throw. These little things add up.

No Ejection Pod

What about the time when the score adds up too high against you and you have to leave? We've put a lot of work into this feature on the F-104. We have a downward ejection seat that works like a charm. No chance to be thrown into a tail surface.

What happens if you're down near the ground and you think 50 ft. might make a difference? I've thought about that. Fifty feet doesn't make much difference, but if it should, I'd roll over on my back and eject up. (And if I didn't have control, I'd have left much, much earlier.)

Downward ejection is another feature of the new look in fighters. I think we'll see more downward ejection. It makes sense and more safety.

We're also working on an ejection seat that will protect the pilot at extreme speed. We don't believe in the pod.

Performance so good in the speed realm that we don't need deicers. The speed heats the surfaces so much that ice can't form.

As I said, performance like this is a wonderful safety feature. It can bring a pilot in and out so fast he doesn't get shot at for more than a few seconds. Every pilot likes this. The performance is there to overhaul and shoot down any fighter we know today. This is great. But with this performance comes responsibility. The pilot is going to have to use this performance with the respect and care it deserves. With these new airplanes you don't yo-yo around the sky.

In these days of fast jets if two oncoming airplanes get on a collision course at high speed they've just bought the farm. They can't see each other in time to turn off. With the F-104, unless the pilot is on his toes this can happen if a slower plane is going in the same direction!

Flying the F-104 is something like giving a submachine gun to a soldier who has been used to shooting a muzzleloader. The machinegun is just as safe—probably safer—but the man has to learn to treat the weapon with the respect and care it deserves. You handle it differently. You think ahead before you let go with it.

I personally think that F-104 pilots should be just F-104 pilots. Let them be specialists. Because if pilots are turned loose one day on the F-104 and the next day on something with inferior performance, it would be like driving a Ferrari one day and a Model A the next.

Truthfully, I think the F-104 is going to be one of the safest planes the Air Force has ever operated—as well as being the best.

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Low Rates

Pan American World Airways continues to pare tourist rates. Latest proposal, subject to CAB approval, is a low-fare class of travel said to run 20 per cent under present tourist fares on the airline's Puerto Rico route. The new rate Toronto to Puerto Rico will be \$76.50 one way and \$150.60 round trip, compared with the old tourist fare of \$93.50 one way, \$180.60 return. This latter will now be designated cabin class.