

# *In Flight* USA

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## Testing the Limits: Experimental Test Pilot Bob Gilliland

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By ZQ TAYLOR

### Author's Note:

*The day I interviewed Bob Gilliland was 22 December 2006. That morning, his other telephone line was ringing incessantly with requests for the pilot's autograph and comments because it was the 42<sup>nd</sup> anniversary of the inaugural flight of SR-71, which Bob flew out of Palmdale, CA in 1964.*

Imagine the pressure, the thrill, the terror, and the breathless rush of quarterbacking during a seriously big game—as if lives and livelihood depended upon every move, every decision being made. This is how Robert Jordan Gilliland began to explain the life of an experimental test pilot. Gilliland enjoyed sports from an early age, especially highboard diving and football, which he believes helped foster his good piloting skills even before crouching into a cockpit for the first time years later.

### The Playing Fields and Thunder Chasing

“Athletics is good preparation for being a fighter pilot and a test pilot: competitiveness and a little danger are common both in sports and in the sky. It's reminiscent of the quote about the Battle of Waterloo being won on the playing fields of Eton,” says Gilliland, recalling the passage often attributed to Arthur Wellesley, the first Duke of Wellington, who fought Napoleon Bonaparte at Waterloo.

While Gilliland has probably spent more time at 80,000 feet than on the ground during his illustrious flying career, he was not originally predestined for an aviation profession. At age 17, he volunteered for the US Navy, trained for submarines during the tail end of World War II. Then he received an appointment to the US Naval Academy Class of 1949.



*Gilliland on the first flight of Lockheed SR-71A #950, which was originally designed for USAF Strategic Air Command, the operation in charge of America's bombers and missile-based arsenal after World War II. (Photo courtesy: Gilliland library.)*

One month before his graduation, Gilliland and other Annapolis officer cadets learned that the newly-minted US Air Force was looking to commission up to six percent of these graduates into its flight program. Under the promise of flying jets within a year, Gilliland gladly accepted a commission as a second lieutenant with the Air Force. (In the interim between the Air Forces' establishment in 1947 and the first Air Force Academy class in 1959, graduates of West Point and Annapolis could choose Air Force commissions if qualified.)<sup>1</sup>

After six months between Randolph and Williams Air Force Bases, Gilliland was literally and figuratively soaring. By the summer of 1950, he was assigned to the 86<sup>th</sup> Fighter Wing at Neubiberg Air Base in Germany, flying American Republic P-47 and F-47D Thunderbolts and American Republic F-84 Thunderjets, as part of the NATO Cold War build-up.

“NATO was then looking for volunteer F-84 aviators for the Korean air war. We signed forms stating that if we didn't get killed in Korea, we would extend our service back in the European Theater of Operations,” chuckles Gilliland. “I was flying with the 69<sup>th</sup> fighter squadron out of

K2 in Taegu, Korea, and those Thunderjets sure were good for dive bombing.”

Thunderjets were the Air Force’s primary strike aircraft during the Korean War, flying nearly 90,000 missions and destroying 60 percent of all ground targets.<sup>ii</sup> When Gilliland returned to Germany in 1953, his base had been moved to Ramstein. The now-seasoned combat pilot completed his tour of duty and eventually finished his military service at Eglin AFB, after testing and flying most of the Air Force inventory.



*Gilliland as a volunteer F-84 aviator with the 69th fighter squadron, K2 Air Base, Taegu, Korea during the Korean air war. (Photo courtesy: Gilliland library.)*

### **Testing Flight Envelopes at Skunk Works**

Next, Gilliland obtained a Master’s degree at the University of Tennessee and joined the Tennessee National Guard to continue flying. In 1961, while still in the reserves, he went to work as a company test pilot at Lockheed.

“I remember Tony LaVier giving me the ‘new-guy speech’ about all I’d have to do to become chief pilot someday is just stay alive,” says Gilliland. “I started out as a test pilot in the F-104, which killed a few guys, including one of my good friends Iven Kincheloe—we’d gotten our wings the same day at flight school. I enjoyed flying all the F-104s, but the engines were not so reliable, and they had downward ejection seats, plus the wings were only seven feet from root to tip, essentially making it a missile with a man in it.”

The Lockheed F-104 Starfighter was built in Clarence L. “Kelly” Johnson’s famous Skunk Works, the company’s advanced development arm. Oozing with talent for churning out exceptionally advanced aircraft such as the P-38, P-80 and the U-2 among others, only Johnson’s reputation could have allowed him to work with such independence, rather than by committee-laden design.

Gilliland was very content testing the F-104, a postwar, supersonic fighter designed to perform at Mach 2, even at combat altitudes over 60,000 feet. Significant in its fighter capabilities, F-104 was the first operational aircraft to sustain flight at Mach 2, making and breaking speed and altitude records. While more 2,580 Starfighters were produced, the high accident rate deterred the Air Force from purchasing more than 300.

“Most pilots want to fly the latest, the fastest, the best. When I was flying the F-104, Kelly was designing the new Mach 3 stuff. He called me up to his office one day, telling me that LaVier liked me, the crews like me, and that he knew I enjoyed flying the 104,” recalls Gilliland. “But then Kelly leaned forward and said that he had something that goes faster than the 104, higher than the 104, and further than the 104. Kelly shoved back his chair and stood up, saying to me ‘Now, let’s go look at it.’ He knew it was exactly the thing I would go for.”

### **Soaring Between Wing and Space**

The Lockheed SR-71 Blackbird was the first stealth-design aircraft designed for strategic military reconnaissance. Evolving from the A-12 and YF-12 interceptor, the SR-71 flew so fast and so high that it had an advantage over surface-to-air missiles.

“It was the most advanced of the military aircraft. Nothing’s gone higher and faster than the SR-71 that is still considered an airplane. It would go so high, I could see the curvature of the earth,” remembers Gilliland.

From an altitude of 80,000+ feet, the SR-71 could survey about 100,000 square miles in an hour. This air jewel outshone every record for sustained speed, including an absolute world speed record of 2,193.1669 mph, and also for altitude including the US absolute record of sustaining at 85,068.997 feet. Perhaps an enlightening comparison is the flight time from New York to London: a commercial Concorde

flight could fly the route in just over three hours; the Boeing 747 averages six hours; the SR-71 flew it in less than 2 hours, at only Mach 2.68, well below its design envelope of Mach 3.2.<sup>iii</sup> To battle the extreme temperatures generated by the aircraft's speed, the airframe required 90 percent titanium alloy, the tires needed 100 percent nitrogen, and the engines needed special fuel, too. One fill-up of the JP-7 fuel enabled the SR-71 to travel about 3,000 nm.



*Lockheed SR-71 Blackbird was the first stealth-design aircraft designed for strategic military reconnaissance, designed with a wingspan of 55'7", speeds of Mach 3.2, and altitudes of 85,000+.* (Photo courtesy: Lockheed Martin.)

The inaugural flight of SR-71A was on December 22, 1964. The aircraft had been designed for USAF Strategic Air Command, the operation in charge of America's bombers and missile-based arsenal after World War II.

"I heard we had some big shots from D.C. and Omaha coming over for the first flight of the SR-71. I didn't know how we could even accomplish that first flight with so many parts still on the hangar floor," says Gilliland. "I told Kelly we should postpone this thing, but Kelly said 'Nope, if I postponed things every time somebody wanted me to, this thing would still be in the jigs.' So we proceeded. Kelly wanted to raise the gear on that first flight, which is not something we'd normally do. The cockpit was heavily instrumented and just to come around and land is a huge success for an inaugural flight. We agreed that if the gear didn't come down correctly, it would be a jump out."

It was not a jump out, but rather a huge success. The crew put extra fuel in SR-71 #950 just in case the gear did not function so that Gilliland could have time to work through it in the air. As it turned out, Gilliland had enough fuel to do two fly-bys after taking the aircraft to Mach 1.5 and 50,000 feet during an hour-long flight.



*Lockheed test pilot Gilliland suited up for the maiden flight of Lockheed SR-71A #950 on December 22, 1964, out of Palmdale, California.* (Photo courtesy: Gilliland library.)

Recognized for his outstanding aviation accomplishments that year, Gilliland was awarded the Iven C. Kincheloe Award, named for his old friend. Gilliland was the first pilot to achieve full envelope expansion of speed and altitude, and also the first pilot to fly the SR-71A, Sr-71B, and YF-12A #936 which was later modified as the SR-71C. He went on to log more flight time at Mach 3 than any pilot, and a total of 6,500 hours in numerous aircraft. About the time that Kelly Johnson retired from Lockheed Skunk Works in 1975, Gilliland also left the company. He continued as a Lockheed private contractor for many years. He remains passionate about the SR-71, its capabilities, its potential, and its significance.

"You know, the Mach 3 testing was conducted back then in the same veil of secrecy as the U-2 years prior. We couldn't tell anybody what we were doing, not even wives, and there were code names for everything. But those were the Cold War days and we were in it to survive," says Gilliland. "The SR-71 was an excellent reconnaissance vehicle that served seven US presidents. And I believe it was the little aircraft that helped us win the Cold War."

Thank goodness—and the breathless rush of quarterbacking seriously big games—that there are experimental test pilots like Bob Gilliland.

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[http://en.wikipedia.org/wiki/United\\_States\\_Air\\_Force\\_Academy#Establishment](http://en.wikipedia.org/wiki/United_States_Air_Force_Academy#Establishment)

<sup>ii</sup> [http://en.wikipedia.org/wiki/F-84\\_Thunderjet](http://en.wikipedia.org/wiki/F-84_Thunderjet)

<sup>iii</sup> <http://en.wikipedia.org/wiki/SR-71>