

## SR-71 Fun Facts

**SR-71As** 29 operational aircraft built, 11 lost. Trainers built- 2 SR-71Bs, 1 lost & 1 SR-71C

**Historical:** 54,000 flying hours; 17,000 sorties; 3500 ops missions; 11,000 ops hours; 26,000 refuelings.

**1<sup>st</sup> Flight 22 Dec 1964, 1st Combat Flight March 1968, & Operational Flights end Oct 1989**

**Speed Runs: NY to London 1 hr 56 minutes, London to LA 3 hrs 48 minutes**

**Aircraft 972 arrives Dulles Airport after Speed runs (LA to Dulles 64 min) on 6 Mar 1990**

**Structure** - 93% titanium – Russian Titanium source **America's** first stealthy A/C & last designed with Slide rule

**Speed** - Top speed 3.3 mach, 2,200+ Miles/hour, 36 miles/min or 3200feet/sec Faster than a standard 30.06 hunting rifle bullet when fired. Normal turn took about 75nm+ radius

**Why black?** Protect mostly titanium surfaces & best heat radiating color to help remove heat from the aircraft during flight by radiating heat into the extremely cold upper air- (-55°C/-80F). Reduced surface temperature by up to 50F at 3.2 mach.

**Glass Windows** - Laminated Quartz glass about 1.0 inches thick

**Average temp** At cruise, about 600°F (causes the aircraft to grow 3-4 inches length & 1-2 width during cruise). Aircraft Surface Temp range from cool 450 F to hot engine area 1200 F. Pilot pie windows 620 F

**J58 bleed bypass turbojet engines** 34,000 lbs thrust in afterburner at sea level; afterburners lit coming off tanker to initiate climb and acceleration; stay on continuously for cruise until descent 1-1/2+ hours later. 6 engine bypass tubes create significant Ram Thrust at higher machs. 83% ram effect at 3.2 Mach.

**Engine Chemical Ignition System** TEB (triethylborane), a pyrophoric (burns on contact with air) with burn temp up to 3000°F.

**CORE Engine temperature** – 2000F Afterburner area 3200-3400F

**Fuel** - JP-7 kerosene base with additives; tanks inerted with nitrogen to prevent auto detonation

**Engine oil:** 70-550°F normal temp range; consistency at 60°F honey, 40°F Jell-O, 32°F solid. Preheat engine to 70°F before start.

**Tires** - BF Goodrich, aluminum powder impregnated to reject airframe heat; 415 psi filled with nitrogen; 22 ply rating; 3 ply tread.

**Flight duration** - Most training and ops flights 2.5-4.5 hours (required one or two in-flight refuelings)

**Aerial refueling** - Aircraft carries up to 80,000 lbs of fuel (12,400+ gallons). Refueling normally lasted about 12-15 minutes with 70,000-80,000 lbs of fuel transferred. Normally flown around 25,000 ft with KC-135Q tanker starting at about 325 knots; as fuel transferred from tanker; it would accelerate to 350 knots IAS (its airspeed limit). Max distance between refuelings about 2800 nm (3200 statute miles).

**Pressure suits** - Derived from Gemini designs used through mid 70s. Late 70s replacement 1030 pressure suits would later serve as the initial Space Shuttle pressure suits for Shuttle test flights – Cost \$250,000

**Two Man Crew** (1) Pilot in front with normal flight controls and functions, (2) Reconnaissance Systems Officer in back had no flight controls; ran astronavigation system, all camera systems, and the aircraft systems checklist; controlled the electronic defensive systems; and did many of the radio calls.

**View at Altitude** - At 80,000 + ft you can see the curvature of the Earth about 350+ miles in all directions. The sky is a deep blue-black, as 97% of the atmosphere, which gives the blue color, is below.

**Engine start** - Normally 30 minutes prior to takeoff; enough time to do all ground checks and taxi to end of runway for one final check before taking the runway.

**Performance points** - Most take-offs at 40,000 lb fuel load.

- From brake release and afterburner light, about a 4,500 ft takeoff roll in about 20 seconds.
- Liftoff at 210 knots (about 240 mph) with Rapid climb passed through 20,000 ft in about 2 minutes.
- After dropping off the tanker and afterburner ignition it took about 17 minutes to climb to 75,000 ft+ and Mach 3. This took about 360 nautical miles distance and consumed 1/3 of your fuel.
- Level off normally around 75,000+ ft to a cruise-climb condition that, as fuel burned off, would climb up around 82-85,000 ft before starting down depending on the outside temp & number of turns.
- Descent and deceleration from 80,000+ ft to 25,000ft took about 10 minutes and 220 nm.
- Landing approach speed was 175 knots plus (200 mph) with landing at 150-155 knots (170mph). With the large orange drag chute the aircraft would stop in about 5000 ft. If the drag chute did not work it was a 10,000 ft landing roll out to slow and stop the aircraft.
- Film and recorders would be down loaded for processing after engine shutdown

**Buz Carpenter, Smithsonian Udvar Hazy Center Docent and former SR-71 Instructor Pilot**