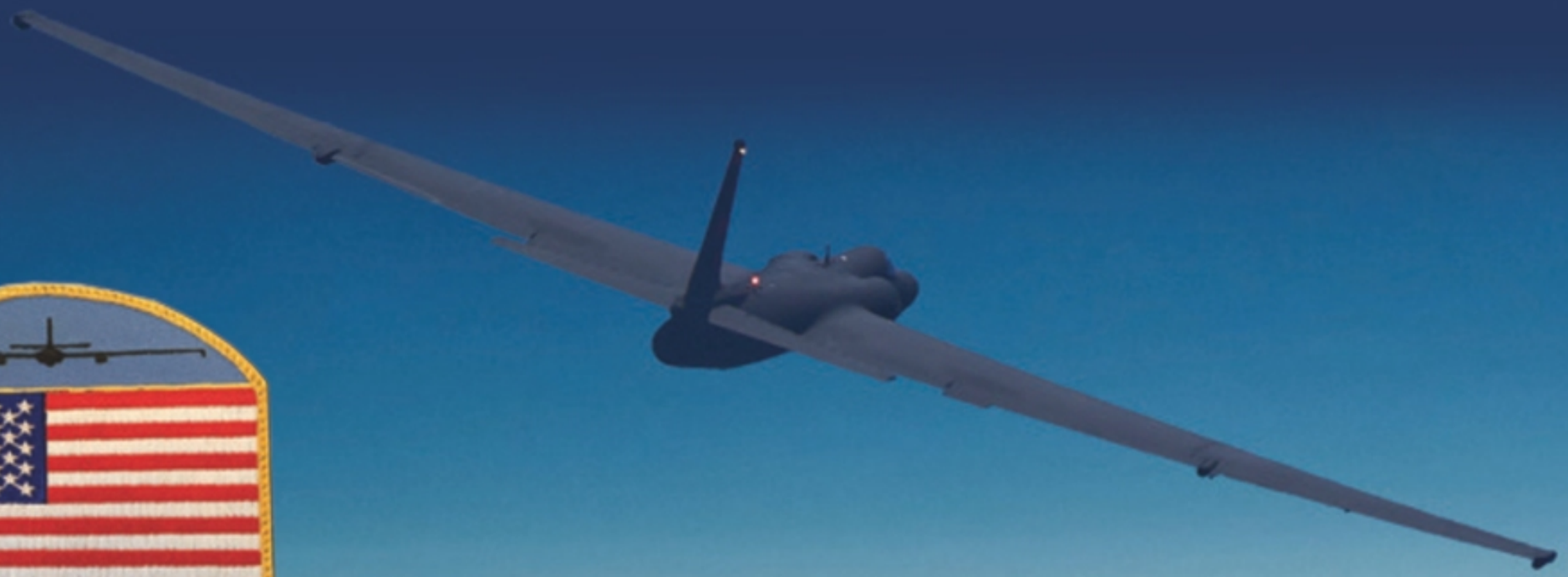


Maj. Dean Neeley is in the forward, lower cockpit of the Lockheed U-2ST, a two-place version of the U-2S, a high-altitude reconnaissance aircraft that the Air Force calls Dragon Lady. His voice on the intercom breaks the silence. "Do you know that you're the highest person in the world?" He explains that I am in the higher of the two cockpits and that there are no other U-2s airborne right now. "Astronauts don't count," he says. "They're out of this world."

We are above 70,000 feet and still climbing slowly. The sky at the horizon is hazy white but transitions to midnight blue at our zenith. It seems that if we were any higher, the sky would become black enough to see stars at noon. The Sierra Nevada Mountains of California look like a mere corrugation on the Earth and Lake Tahoe looks like a fishing hole. I'm mildly concerned about the bailout light on the instrument panel and pray that Neeley does not have reason to turn it on.

I cannot detect air noise; through my headset I only hear only my own breathing, the hum of avionics and, inexplicably, an occasional, shallow moan from the engine, as if it were gasping for air. Atmospheric pressure is only an inch of mercury, less than 4 percent of sea-level pressure. Air density and engine power are similarly low. The stratospheric wind is predictably light, from the southwest at 5 knots.

Neeley says that he has never experienced weather that could not be topped in a U-2, and I am reminded of the classic transmission made by John Glenn during Earth orbit in a Mercury space capsule: "Another thousand feet, and we'll be on top."

Although not required, we remain in contact with Oakland Center while in the Class E airspace that begins at Flight Level 600. The U-2's Mode C transponder can indicate no higher than FL 600. When other U-2s are in the area, pilots report their altitudes, and Air Traffic Control keeps them separated by 5,000 feet and 10 miles.

We are pressurized to 29,500 feet, but 100-percent oxygen supplied only to our faces lowers our physiological altitude to about 8,000 feet. A pressurization-system failure would cause our suits to instantly inflate to maintain a pressure altitude of 35,000 feet, and the flow of pure oxygen would provide a physiological altitude of 10,000 feet.

The forward and aft cockpits are configured almost identically, except that the forward instrument panel contains a down-looking periscope/driftmeter. This is used to precisely track over specific ground points during reconnaissance, something that otherwise would be impossible from high altitude. The forward cockpit also contains a small side-view mirror extending into the air stream in order to tell if the U-2 is generating a contrail when over hostile territory—which would immediately expose the aircraft during a secret mission.

Considering its 103-foot wingspan and subsequent roll dampening, the U-2 maneuvers surprisingly well at altitude; the controls are light and nicely harmonized. The U-2 is very much a stick-and-rudder airplane. It is unusual to discuss turbine fuel in gallons instead of pounds, but the 1950s-style fuel gauges in the U-2 indicate in gallons. Most of the other flight instruments seem equally antiquated.

Training at "The Ranch"

Preparation for my high flight began the day before at Beale Air Force Base (aka "The Ranch"), north of Sacramento, California. It is home to the 9th Reconnaissance Wing, which is responsible for worldwide U-2 operations based in America, Cyprus, Italy, Saudi Arabia and South Korea.

After passing a physical exam (whew!), I took a short, but intense, course in high-altitude physiology and use of a pressure suit. The suit, a 27-pound Model S1034 "pilot's protective assembly," is the same as the one used by astronauts during shuttle launch and re-entry.

TOP PHOTO BY ANATOLIY LUKICH / SHUTTERSTOCK.COM

HIGH FLIGHT

Flying the U-2 Dragon Lady

by BARRY SCHIFF

After being measured for my $150,000 spacesuit, I spent an hour in the egress trainer. It provided no comfort to learn that pulling the handle between my legs would activate the ejection seat at any altitude or airspeed. When the handle is pulled, the control wheels go fully forward, explosives dispose of the canopy, cables attached to spurs on your boots pull your feet aft, and you are rocketed into space. You could then free fall in your inflated pressure suit for 54,000 feet or more. I was told that "the parachute opens automatically at 16,500 feet, or you get a refund." To practice for such an event, I donned a harness and virtual-reality goggles to rehearse steering a parachute to landing.

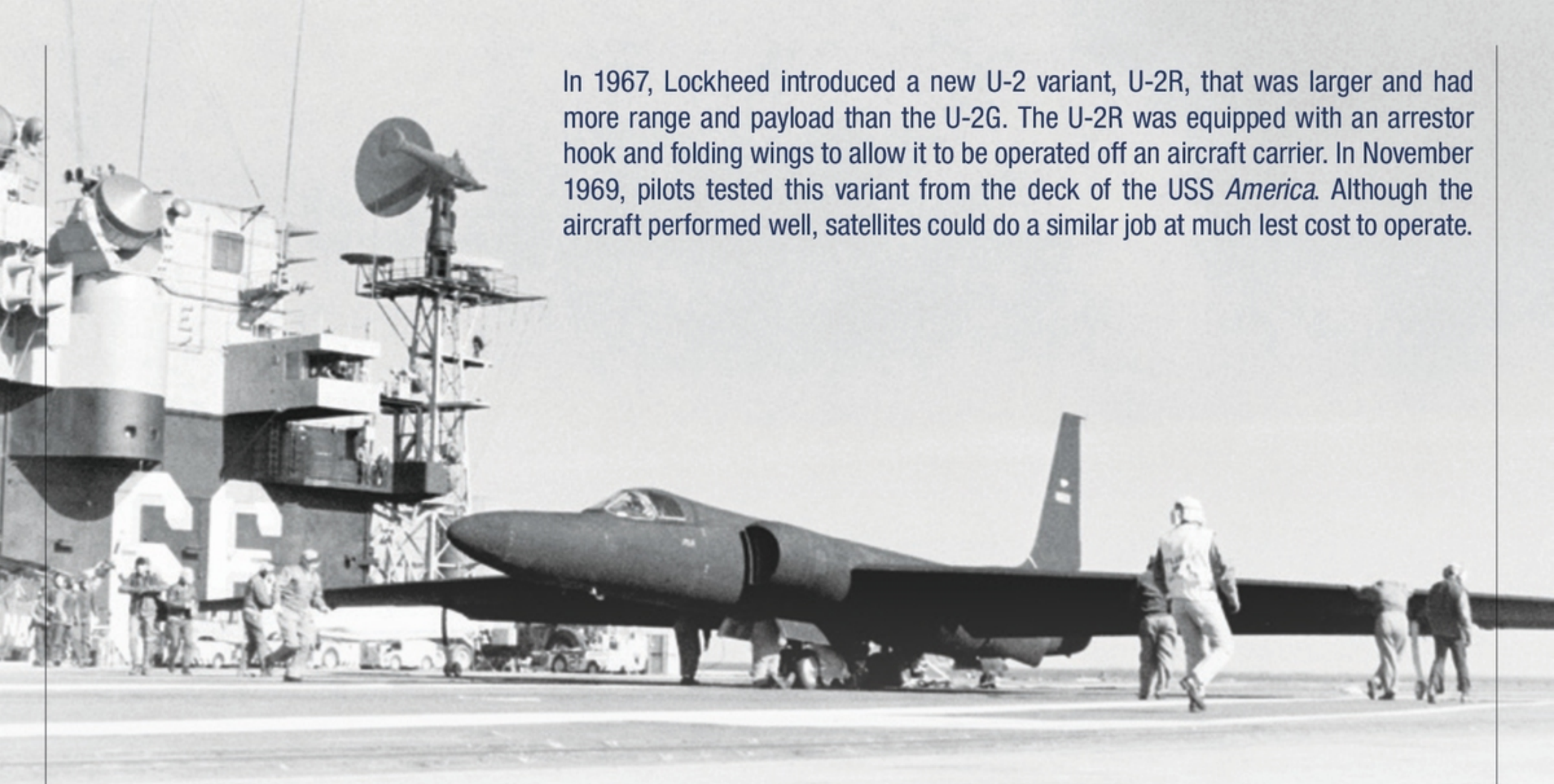
After lunch, a crew assisted me into a pressure suit in preparation to visit the altitude chamber, where I became reacquainted with the effects of hypoxia and was subjected to a sudden decompression that elevated the chamber to 73,000 feet. The pressure suit inflated as advertised. I could see a beaker of water in the chamber that boiled furiously to demonstrate what would happen to my blood if I were exposed without protection to ambient pressure above 63,000 feet.

The next morning, after a thorough preflight briefing, Neeley and I were assisted into our pressure suits, performed a leak check and settled into a pair of reclining lounge chairs for an hour of breathing pure oxygen. This displaces nitrogen in the blood to prevent decompression sickness (the bends) that could occur during ascent.

We were in the aircraft an hour later. Preflight checks completed and engine started, we taxied to Beale's 12,000-foot-long runway. The single main landing gear is not steerable, differential braking is unavailable, and the dual tailwheels move only 6 degrees in each direction, so it takes a lot of concrete to maneuver on the ground. Turn radius is 189 feet, and I had to lead with full rudder in anticipation of all turns.

We taxied into position and came to a halt so that personnel could remove the safety pins from the outrigger wheels (called pogos) that prevent one wing tip or the other from scraping

PHOTOS © MIKE FIZER AOPA



In 1967, Lockheed introduced a new U-2 variant, U-2R, that was larger and had more range and payload than the U-2G. The U-2R was equipped with an arrestor hook and folding wings to allow it to be operated off an aircraft carrier. In November 1969, pilots tested this variant from the deck of the USS *America*. Although the aircraft performed well, satellites could do a similar job at much lest cost to operate.

the ground. Lt. Col. Greg "Spanky" Barber, another U-2 pilot, circled the aircraft in a mobile command vehicle to give the aircraft a final exterior check.

I knew that the U-2 is overpowered at sea level. It has to be for its engine, normally aspirated like every other turbine engine, to have enough power remaining to climb above 70,000 feet. Also, we weighed only 24,000 pounds (maximum allowable is 41,000 pounds) and were departing into a brisk headwind. Such knowledge did not prepare me for what followed.

The throttle was fully advanced and would remain that way until the beginning of descent. The 17,000 pounds of thrust made it feel as though I had been shot from a cannon. Within two to three seconds and 400 feet of takeoff roll, the wings flexed, the pogos fell away, and we entered a nose-up attitude of almost 45 degrees at a best-angle-of-climb airspeed of 100 knots. Initial climb rate was 9,000 fpm. We passed through 30,000 feet five minutes after liftoff and climb rate steadily decreased until above 70,000 feet, when further climb occurred only as the result of fuel burn.

The U-2 provides high-altitude, all-weather surveillance and reconnaissance, day or night, delivering critical imagery and signals intelligence to decision makers throughout all phases of conflict. The intelligence gathered can be transmitted in near real time anywhere in the world via air-to-ground or air-to-satellite data links, rapidly providing critical information to combatant commanders.

The aircraft has the following sensor packages: electro-optical infrared camera, optical bar camera, advanced synthetic aperture radar, signals intelligence and network-centric communication.

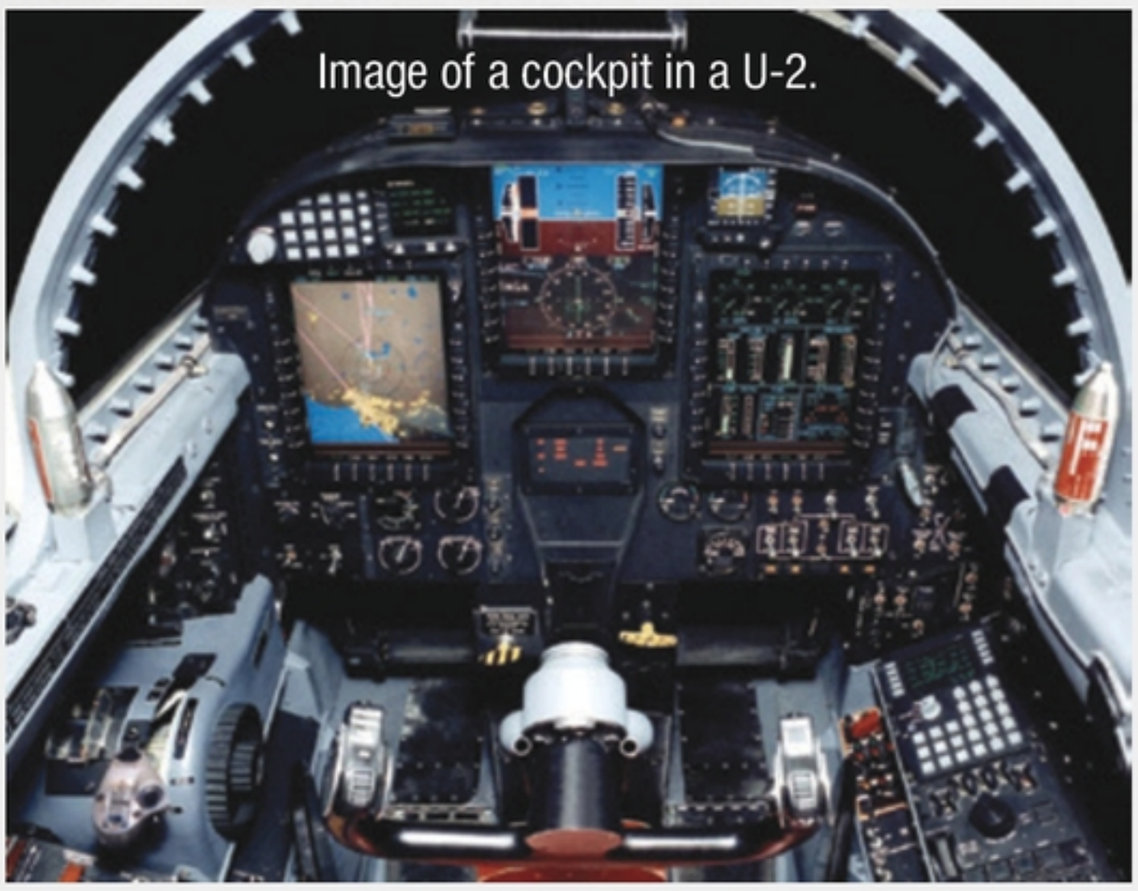


Image of a cockpit in a U-2.

COCKPIT PHOTO BY USAF

On Final Approach

Dragon Lady is still drifting toward the upper limits of the atmosphere at 100 to 200 fpm until it is time to descend. Descent begins by retarding the throttle to idle and lowering the landing gear. We raise the spoilers, deploy the speed brakes (one on each side of the aft fuselage), and engage the gust alleviation system. This raises both ailerons 7.5 degrees above their normal neutral point and deflects the wing flaps 6.5 degrees upward. This helps to unload the wings and protect the airframe during possible turbulence in the lower atmosphere.

Gust protection is needed because the Dragon Lady cannot withstand heavy gust and maneuvering loads. Strength would have required a heavier structure, and the U-2's designer, Clarence "Kelly" Johnson, shaved as much weight

as possible—which is why there are only two landing gear legs instead of three. Every pound saved resulted in a 10-foot increase in ceiling.

With everything possible hanging and extended, the U-2 shows little desire to go down. It will take 40 minutes to descend to traffic pattern altitude, but we needed only half that time climbing to altitude.

During this normal descent, the U-2 covers 37 nm for each 10,000 of altitude lost. When clean and at the best glide speed of 109 knots, it has a glide ratio of 28:1. It is difficult to imagine ever being beyond glide range of a suitable airport, except when over large bodies of water or hostile territory.

Because there is only one fuel quantity gauge, and it only shows the total remaining, it is difficult to know whether fuel is distributed evenly, which is important when landing a U-2. A low-altitude stall is performed to determine which is the heavier wing, and some fuel is then transferred from it to the other.

We are on final approach with flaps at 35 degrees in a slightly nose-down attitude. The U-2 is flown with a heavy hand when slow, being careful not to overcontrol. Speed over the threshold is only 1.1 VSO (75 knots), very close to stall. More speed would result in excessive floating.

I peripherally see Barber accelerating the 140-mph, stock Chevrolet Camaro along the runway as he joins in tight formation with our landing aircraft. I hear him on the radio calling out our height (standard practice for all U-2 landings). The U-2 must be close to normal touchdown attitude at a height of 1 foot before the control wheel is brought firmly aft to stall the wings and plant the tailwheels on the concrete. The feet remain active on the pedals, during which time it is necessary to work diligently to keep the wings level. A roll spoiler on each wing lends a helping hand when its respective aileron is raised more than 13 degrees.

The aircraft comes to rest, a wing tip falls to the ground, and crewmen appear to reattach the pogos for taxiing. Landing a U-2 is notoriously challenging. It can be like dancing with a lady or wrestling a dragon, depending on wind and runway conditions.

The U-2 was first flown by Tony Levier in August 1955, at Groom Lake, Nevada (Area 51). The aircraft was then called Article 341, as an attempt by the CIA to disguise the secret nature of its project. Current U-2s are 40 percent larger and more powerful than the one in which Francis Gary Powers was downed by a missile over the Soviet Union on May 1, 1960.

The Soviets referred to the U-2 as the "Black Lady of Espionage" because of its spy missions and mystique. The age of its design, however, contradicts the sophistication of the sensing technology carried within. During the U.S. involvement in Kosovo, for example, U-2s gathered and forwarded data via satellite to Intelligence at Beale AFB for instant analysis. The results were sent to battle commanders, who decided whether attack aircraft should be sent to the target. In one case, U-2 sensors detected enemy aircraft parked on a dirt road and camouflaged by thick, overhanging trees. Only a few minutes elapsed between detection and destruction.

The U-2 outlived predictions of its demise and survived its heir apparent, the SR-71 Blackbird. The current fleet of 37 aircraft are budgeted to operate for another 20 years, but this could be affected by the progress of unmanned aircraft.

After returning to Earth (physically and emotionally), I am escorted to the Heritage Room, where 20 U-2 pilots join to share in the spirited celebration of my high flight. The walls of this watering hole are full of fascinating U-2 history memorabilia, including several plaques that proudly list those who have soloed the Dragon Lady. This group of 670 pilots forms an elite and close-knit cadre of aviators.

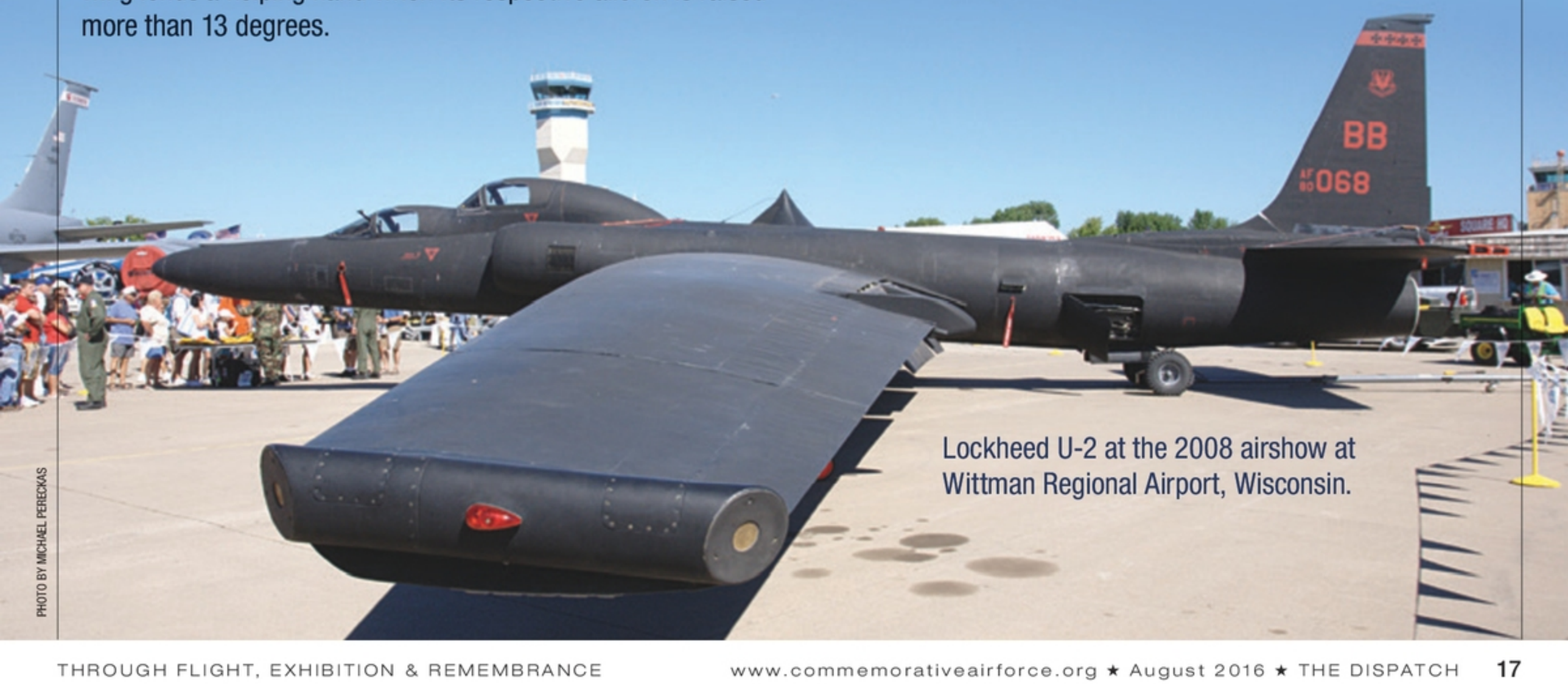


PHOTO BY MICHAEL PERECKAS

Lockheed U-2 at the 2008 airshow at Wittman Regional Airport, Wisconsin.