U-2 DRAGONLADY

Click on Icon to view a short movie clip describing a typical U-2 Mission

U-2 Mission by Lt. Col. Charles Wilson

Thanks and credit goes to John Stone for publishing Lt. Col. Charles Wilson's detailed account of what is involved in conducting a U-2 mission.

The U-2 was originally designed as a high altitude reconnaissance platform to penetrate the airspace of the Soviet Union in the mid-1950s. Most of the U-2 fleet today was made in the mid-late 1980s. The U-2 was built to operate at altitudes above 70,000 feet. This caused the aircraft to be made with long wings (today's U2 has about a 104' wing span) and configured with a bicycle (tandem) type landing gear. Aerodynamically it is a fairly "clean" aircraft-it likes to fly. It does fly very well, as long as it is in the "envelope" it was designed for. That is, flown within the speed parameters and G limits.

Compared to other aircraft, the U-2 is perhaps the most difficult for a pilot to fly. With its long wing and bicycle landing gear, it is especially difficult to land (as I said before it likes to fly). The pilot needs to stall the aircraft from about two feet, to get it on the ground. But more on that later.

A typical high altitude flight is pretty involved. The day prior to one of these flights, two pilots are identified, a primary and a backup. The backup pilot is also called a mobile officer. The mobile officer has two primary functions. He is a safety observer/mission monitor and becomes the mission pilot in the event the primary pilot has become sick. The mission is thoroughly planned.

Both pilots go into crew rest 12 hours prior to the launch. They also watch their diets. On the day of the flight, the pilot and mobile officer show two hours and fifteen

minutes prior to launch. They receive a weather brief and an intelligence brief. They take the time to eat a high protein meal. This is particularly important. A high protein meal (steak & eggs) provides the pilot with the necessary energy to sustain him through a nine hour flight without gastrointestinal discomfort. Following the meal, the primary pilot receives a physical exam. During this exam, the pilot's pulse rate, blood pressure, body temperature, ears, nose and throat are scrutinized to ensure that he is ready to endure the high altitude flight environment that can exceed nine hours in duration. The previous night's sleep and any meals are also reviewed. Then our primary pilot is integrated into a full pressure suit much like an astronaut wears.

Why a pressure suit? A pressure suit is needed as a redundant system. The hazardous physiological regime of high altitude flight dictates this. Also, with a cabin altitude of U-2 about 30,000 feet, the pilot must prebreathe 100% oxygen for 60 minutes prior to takeoff to avoid getting the bends. The pressure suit would be needed if the pilot were exposed to the atmosphere from a rapid decompression or having to eject from the aircraft. Two reasons for this are Boyle's law and Armstrong's line.

Boyle's law is that a given quantify of gas varies proportionately with the amount of pressure exerted upon it. We humans are used to 14.7 pounds of pressure per square inch (psi) at sea level. We are at the bottom of an ocean of air. This air has weight. The pounds psi at altitude is less than a half-pound. Armstrong's line says that at 63,000 feet pressure altitude, conventional liquids boil at 98 degrees Fahrenheit. If the pilot were exposed to the environment at70,000 feet, the gases in his body would rapidly expand causing a disastrous burst. Not to mention what a "boiling" body temp of 98.6 would cause. Yes, it would ruin his whole day. Obviously this is not conducive to a successful mission. In the meantime, the mobile officer is performing a preflight inspection of the aircraft. He sets up the cockpit and checks all the systems i.e. electrics, hydraulics, navigation, avionics. Also, he will walk around the entire aircraft inspecting the aircraft's structure. It is crucial for another qualified pilot to perform these tasks for the mission pilot because the bulkiness of the pressure suit limits the pilot's mobility, reduces his manual dexterity and can cause rapid heat buildup if he were to move around too much. When this is done, the pilot is integrated into the cockpit.

Just as it took a team of specialists to integrate the pilot into the suit, the same team integrates him into the aircraft. They connect the many belts, straps, hoses, cables and communication lines to the pilot. Once he is strapped in he will run appropriate checklists and start the aircraft. It is now ready to taxi.

Taxing the U-2 is challenging. Turning into the wind, the turn radius is about 189 feet. Turning away from the wind, the turn radius can exceed 300 feet. The pilot must judge turns carefully or get stuck and need the aircraft to be repositioned by the ground crews. No easy task either. Typical fighter aircraft have turn radii as small as 20-50 feet.

During this activity, our mobile officer follows along in a high-performance chase car. The mobile, who is in radio contact with the pilot, is in the role of safety observer, monitoring the aircraft as it moves. Out on the runway, the ground crews remove the

safety pins from the pogos. The pogos are outrigger gear that allow the aircraft to taxi without dragging a wing. The mobile officer gives the aircraft a "last chance" check, making sure everything looks normal.

Once cleared for takeoff, the pilot moves up the throttle to maximum thrust. As soon as the wings start generating lift, the pogos drop onto the runway. With an initial climb rate that exceeds 15,000 ft/min, a U-2 takeoff is an impressive sight. The climb rate varies depending on a few things like gross weight, temperature and pressure altitude. That climb rate tapers off, around 25,000 feet. Shortly afterwards, the ground crews recover the pogos and stow them in a truck until the aircraft lands. The pogos will be put back in place after the aircraft lands. The pilot then flies his U-2 to above 70,000 feet and accomplishes his assigned reconnaissance mission.

At 70,000 feet you are twice as high as the airliners fly. You begin to see the curvature of the earth and the sky begins to blacken as the outerlimits of the atmosphere are reached. If our pilot wasn't so busy on an operational mission, it would be easy for him to get a lonely feeling up there at 70,000 feet hundreds or even thousands of miles away from home base. After the reconnaissance portion of the mission is accomplished, our pilot heads for home and prepares to descend. He runs the appropriate checklists. Even with the landing gear down and speed brakes out, the descent takes about 45 minutes. As I said before, the aircraft likes to fly. During the descent, our mobile officer has reviewed the weather and positioned himself in the chase car at the threshold (or beginning) of the runway. Monitoring the mission frequency the whole time. He is there to help the pilot with any unusual difficulty that may be encountered. Our pilot now finds the runway with his navigation instruments, visually acquires it, and crosses the runway threshold at about 10 feet.

Despite being exposed to serious threats and a hazardous physiological environment, our pilot is about to engage in the most challenging part of the mission-landing the U-2. The U-2 is without a doubt, the most difficult aircraft in the inventory to land. With its bicycle landing gear, long wingspan and its "desire" to keep flying (even with idle power), the pilot has his hands full putting it on the ground. The mobile officer also has a big role to play here.

Keep in mind our pilot has been in a hazardous physiological environment for over nine hours. Not much to eat, no chance for a break, unable to get up and walk around. He is dehydrated, fatigued, and has a skewed depth perception from the high altitude.

Still, our pilot brings the aircraft to cross the runway threshold at 10 feet precisely on centerline. The mobile chases the aircraft down the runway, making altitude calls at about every two feet. Deviations are also called out. To successfully land this aircraft, the pilot must achieve a full stall at two feet above the runway. I don't mean killing the engine. By stalling I mean to cause the aircraft's wings to stop generating lift. Our pilot does this through exact airspeed control. No easy task considering the condition he is in along with the bulkiness of the pressure suit. As it slows, the tail wheel lowers to the runway and when the U-2 reaches a stall, the main wheel touches down. The maneuver looks graceful to onlookers, but tends to feel violent inside the cockpit as the pilot feels the stall, touches down and struggles to keep the wings level.

But, it is not over yet. The pilot still has to "fly" the wings until the aircraft can stop. Remember, the pogos fell out upon takeoff so as long as the airplane is rolling and the wings are producing some lift, the pilot must fly the wings to keep them off the runway. Finally, as the aircraft begins to stop, the pilot will gently put one wing on the ground. Each wing has a titanium skidplate so that they are not damaged during this phase. The ground crews now reinstall the pogos so that the pilot can taxi back. The mobile is monitoring the whole event. After parking, our team of specialists assist the pilot in getting out of the cockpit. The pilot is tired and stiff from this long day, but still, it is not over. After getting out of the pressure suit, the pilot attends the maintenance debrief where equipment problems are discussed. Intelligence debrief when required. Finally, the pilot attends an operations debrief. Following a flight like this, a U-2 pilot cannot fly for 48 hours with the first 24 hours being mandatory off. This is to allow his body to recuperate from a most physically demanding mission.

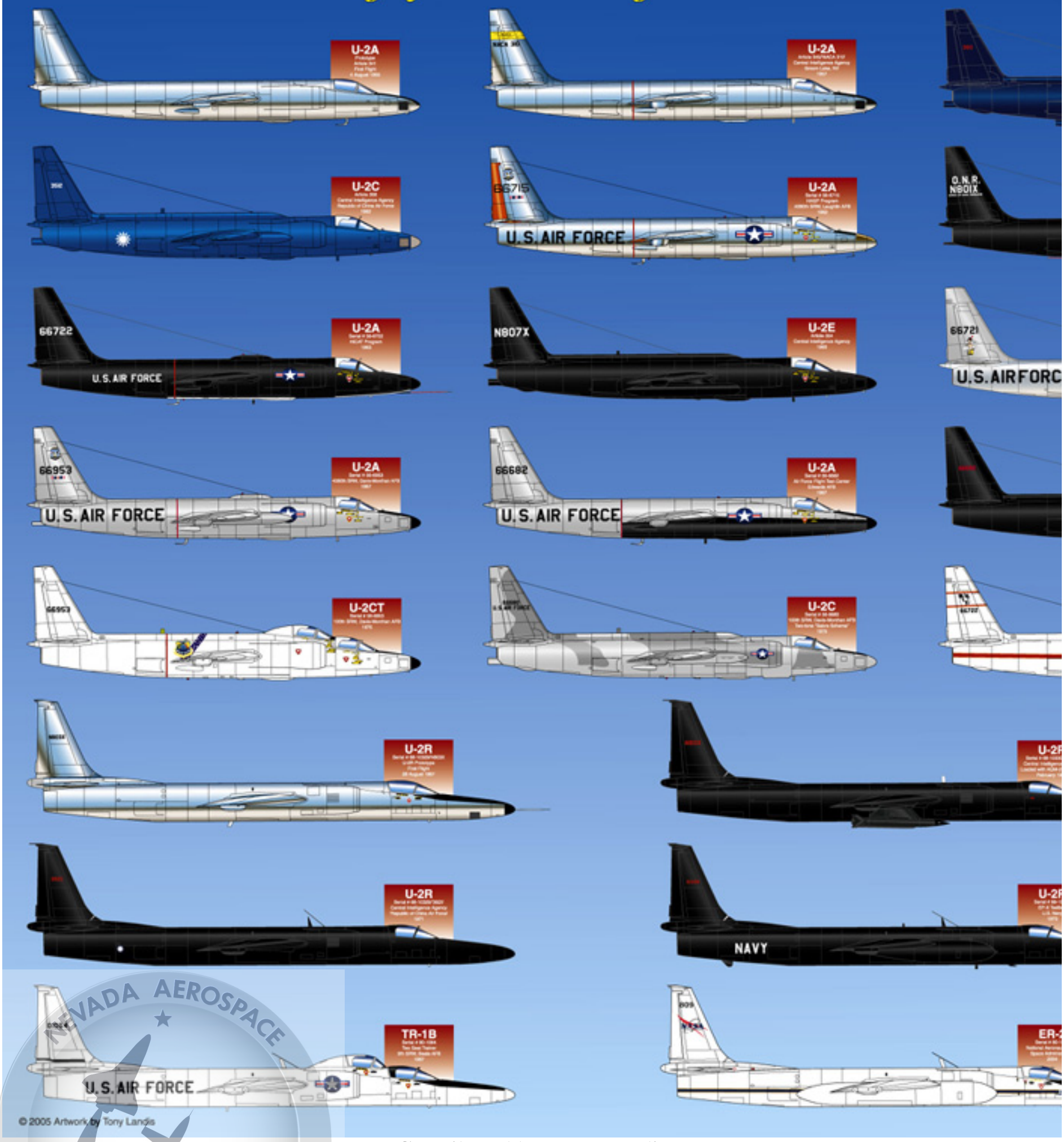
Who are these pilots? Well, they are a very tough breed. We recruit only the best pilots. They must have 1500 hours of flying time. 900 first pilot/instructor time. They generally have experience in one-two and sometimes three aircraft. They need outstanding records and a wing commander recommendation. With all this, they might get an interview.

The interview lasts two weeks. We bring prospective pilots out to Beale AFB, CA for a physical and three inflight evaluations in the U-2. Bear in mind, they haven't flown this type aircraft before. They must be able to land it three ways. No-flap, no-voice and normally. If they can do that, they might make it. Additionally, these prospective pilots are interviewed by the wing commander, his squadron commanders, and ops officers. Colonel Wilson reports that the last summer he was at Beale (1994), 17 pilots interviewed with eight of them making it.

The Heyser & Anderson Flights over Cuba

Former U-2 pilots gathered in Anacortes in 1994
L-R: William H. McMurray, Louis C. Garvin, Philip O. Robertson, Bob Matye, Louis C. Setter, John H. Meierdierck, Arthur Lien

Fifty Years Of The Lockheed U



Contributed by Tony Landis