

U-2 Emergency

By Capt Steve Rodriguez, Beale AFB, Calif.

Flying above 70,000 feet in a two-seat U-2 Dragon Lady, the crew had less than 10 minutes before a complete electrical systems failure ...

An emergency never before encountered in the aircraft. So began the ordeal of Maj Mike Means and Capt Steve Rodriguez in September 2001. Ultimately, the flight would test their mettle as pilots and earn them the 12th Air Force Aircrew of Distinction Award for Fiscal Year 2002. As pilots, the majority of our training consists of learning how to deal with emergency situations. Each aircraft type in the inventory has a "bible," if you will, of the specific procedures to be applied in the event of an emergency. Yet we realize that we may be presented with scenarios, which are either considered "impossible" or for which there exists no specific guidance. At that point, a pilot has little to rely on except for his or her previous experience in the airframe and good judgment.

I had the distinct pleasure of being presented with just this type of scenario while flying above 70,000 feet on a U-2 training sortie. I was about 3.5 hours into my second two-seat high-altitude training flight. My instructor pilot (IP) Maj Mike Means and I had completed the dead reckoning and the photo flightline por-

tions of the flight and everything was going smoothly. Proceeding direct to Beale AFB, we started our practice alternate gear extension checklist.

At this point the Multiple Display Indicator (MDI), the digital display that displays altitude, airspeed, free air temperature, and rate of climb, started the countdown cycle, which normally occurs upon the initial application of power to the aircraft. About the same time, I realized that the TACAN bearing pointer, which had been pointing to Beale off the nose of the aircraft, was now in the 2 o'clock position. Since I had not made a heading change, I asked my IP if he was seeing the same indications. He was, and we concluded that the TACAN was probably malfunctioning. At this time my MDI failed completely, his started to fail, and I noticed that the fuel flow indicator began to fluctuate wildly. By now, the hair on the back of my neck started to stand up and I began to try to remember everything I could about the U-2 electrical system. We discussed declaring an emergency with ATC, but decided to hold off until we were sure we had one. Then the radio crackled and died. I reached down and dialed 7600, the radio-out code, into the transponder.

Photo by Maj Jeff Olesen





A U-2 prepares to depart in support of a mission.

We realized we were facing an imminent total electrical failure and quickly worked together as a crew to configure the aircraft for landing. My instructor attempted to extend the speedbrakes and the spoilers, but this proved futile because the switches to actuate the components are DC electrically powered. I put the gear handle down, but the electrically powered indicators were unable to tell me the status of the gear. I then pulled the alternate gear extension handle to give the gear every chance to lock into place. Looking through the viewsight (a periscope which can be turned to look at the bottom of the aircraft), the gear appeared to be down.

My IP would be hand flying the descent from altitude without benefit of trim. On standby instruments alone, he would have to avoid stalling or overspeeding the aircraft. This is tricky since the U-2 is dynamically unstable, and the difference between stall and overspeed (and aircraft break-up) is only 15 knots at altitude. He would then need to fly a no-flap landing and stop the aircraft with an emergency braking system that has occasionally failed in the past. To complicate matters more, the pres-

sure suit makes every movement difficult, and without benefit of speedbrakes or spoilers it would take nearly 90 minutes to make the descent.

In the plus column, however, the weather was clear and a million. From our perch at altitude we could view the entire Sacramento Valley where, just to the east of the Sutter Buttes, was Beale's 12,000-foot runway. With the aircraft properly configured, we both agreed on the fuel quantity on board, which was important since our fuel counter had died and our no-flap approach would need to be flown only 2 knots above stall speed. We also agreed that I would turn off the battery switch, turning it back on once established on final. Reaching for the switch, I heard my instructor's voice over the intercom becoming weak and scratchy. I flipped off the switch, hoping it would provide some power upon landing.

While I read over the descent checklists and accomplished what I could, my IP flew the spiraling descent over the field. I continued reviewing the emergency checklists and diagrams for the electrical system, hoping for some bit of information that would restore electrical

power. But I knew that any hope of regaining electrical power was lost when the standby attitude indicator rolled over and died. Our battery, the source of our backup DC power, was depleted.

In back, my instructor computed the landing distance for our fuel weight and configuration, without brakes. Due to the very low drag produced by the Dragon Lady in a no-flap configuration, this computed distance actually exceeded Beale's 12,000-foot runway length. Our only option was to make the landing and hope that the braking system would work on touchdown. As we descended lower, I could see the emergency response personnel waiting for us. We came up initial and rocked our wings, flying the electrical failure pattern. I flipped the battery switch on. As I had expected, nothing happened.

The U-2 produces so little drag when in a no-flap configuration, it is necessary to fly a shallow glidepath (approximately 1.5 degrees) to be able to descend to the runway with near-idle power. Approaching the threshold, we reached our computed threshold speed of 81 knots. Adjusting pitch and power to stay on the proper glidepath, we felt the aircraft

approach the tickle of the stall buffet. My IP carefully decreased the angle of attack to keep the aircraft flying and crossed the threshold at the desired altitude of 5 feet. After flaring the aircraft into the stall 2 feet above the runway, the aircraft touched down tail wheel first, as desired, and he shut down the engine to reduce our landing distance. The brakes worked as advertised and we came to a safe stop 8,000 feet down the runway.

So what caused our little adventure? It actually all started on the ground. As we were being strapped into the cockpit, all power went dead on the jet. Thinking someone had bumped the external power switch to "OFF," I moved it to "NORMAL" to get power on the aircraft and prevent our Instrument Navigation System (INS)

from losing its alignment. Not wanting to lose the alignment if we touched the switch again, we elected to leave the switch in "NORM" and start the aircraft on battery power. Unbeknownst to us, what had actually happened was that a bus control circuit breaker in the belly of the aircraft had popped. This forced most of the aircraft systems to be powered by the backup source, the battery. Since the battery has a limited life, it is only meant to afford the aircraft a recovery capability in the event of an electrical failure. It is certainly not meant to power an aircraft through a 4.5 hour training sortie. So when the battery gave up the ghost, it looked like to us that we had a total electrical failure situation. Lockheed considered this type of incident to be

virtually impossible and no guidance existed in the Dash-1. As a result of our experience, Lockheed added procedures for handling power loss on the ground.

So what did I learn from this sortie? First, when you find yourself in a situation that's not in the book, you have to rely on training, past experiences, and your survival instincts. Second, my belief that systems knowledge is crucial was reinforced. Third, not all of the emergencies we encounter comply with Dash-1 guidance. Fourth, I believe it's important to share the experience with other aviators so they can gain from our experience. Finally, our last line of defense in situations like this is our experience and sound judgment. ▶



We realized we were facing an imminent total electrical failure and quickly worked together as a crew to safely recover the aircraft.