Loud Bangs Are Not a Good Thing

By Capt. Todd Kalish, USAF

It was a hot June day as I donned my pressure suit for a local, high-altitude sortie above California. As the life-support crew strapped me in the cockpit, I checked to see where all the switches were in this airplane. No two U-2s on the ramp are identical. They were built one at a time, and they all have their own personalities and quirks. Perhaps more importantly, they tend to make odd noises at inconvenient times. Even with almost 500 hours in the jet, I am still surprised by the noises.

Pressure suits are a unique environment. Wearing it is demanding, both physically and mentally, so many of the normal tasks a pilot does are delegated to others. When you're going on a high flight, another U-2 pilot will preflight the airplane and do the pre-start checklist. All the pilot has to do is turn on the boost pumps and start the engines. There is no hydraulic assist on any of the flight controls, so everything the pilot does is by muscle power. Add warm temperatures and a pressure suit to the equation, and you have a sweat-soaked, dehydrated pilot sitting in the cockpit at the hold short.

As the ground crew buttoned up the airplane, they took the cooling air off of the inertial navigation unit and closed all the hatches. Since every ounce of weight on the U-2 matters, there is no additional cooling unit on the airplane. The INU is very susceptible to overheating. Once the engine is started, the pilot has to help by selecting full-manual cold with the cockpit temperature and by keeping the power up for cooling. Even so, it is still a race against time before the unit overheats and shuts down. Since the day was quite hot, I did just as I was supposed to do and selected full-manual cold.

The U-2 takes a lot of manual effort just to move it on the ground. The tail wheel turns only six degrees, which equates to a 189-foot-turn radius with no wind. You have to take winds

and flight-control positions into account to successfully turn. I quickly taxied to the runway and ran my pre-takeoff checklist, while the ground crew did their last checks. Two important items in the checklist came into play. First, the checklist says to make sure your suit controller, which allows cooling air into the suit, is open only one notch. This does not allow for much air into the suit, but at full power, any more than that will inflate you like the Michelin Man, making control of the aircraft a problem. I checked the controller. The other important item is to make sure the temperature control is in auto to prevent the cockpit from filling with fog. Since I had selected full-manual cold for the taxi out, I reached over and gave the knob two clicks to auto. With everything set and a thumbs up from my mobile safety of flight, I ran her up and headed down the runway. I parked about 32 degrees nose high for the climb out.

Passing 1,000 feet, I heard the cockpit air surging. But hey, there were a lot of strange noises in this airplane. This one just groaned a bit. But as I continued to climb, I noticed it was getting intolerably hot. Having direct sunlight on you while in the pressure suit is like wearing two or three sets of MOPP gear and laying out in the sun. Even so, it shouldn't have been that hot. I glanced down at my cockpit temperature and saw it was pegged at 120 degrees, as high as the gauge would go. It turns out the two clicks I had turned the temperature knob had sent it from full cold, right past auto, to full hot. "Good job, knucklehead," I thought, as I reset it. Passing 10,000 feet, I finally adjusted my suit-cooling knob for more air into the suit. The cabin temperature still was pegged at 120 degrees. Sweat soaked the inside of my suit.

Photo-composite by Allan Amen

I set the autopilot, passing 40,000 feet. I took my hands off and made sure everything was OK before I reached down for my mission board. As I reached down, I heard a loud bang and saw the yoke jump forward and then back. The airplane now had my undivided attention again as I pickled off the autopilot and began to hand-fly the airplane once again.

Something had hit me, I thought, as I grabbed the controls. A bird? No, I was too high for that. Another airplane? No, I probably was too high for that as well. I decided to turn around and head for home. But before I started descending, I tried to figure out what the bang could have been. Maybe a hydraulic line had broken loose and had hit the side of the airplane. I glanced down at the hydraulic gauge, and it was pegged at 3,000 psi, right where it should have been. A minute or so had passed since I first heard the bang, and my pulse rate started to slow once again. My departure took me several miles south before turning me back to the north on my route, so I still was only 50 miles away from Beale AFB. Now that I had climbed through 48,000 feet, I had plenty of altitude to glide back if I needed to.

The damaged horizontal stabilizer.

I decided to see if the autopilot would reengage. This would free my hands to run checklists and to find the problem. The autopilot is temperamental—it uses a loud horn to signal its refusal of your offer to fly the airplane if anything is wrong with the system. I reached down and flipped the switch, and, to my amazement, the autopilot engaged without a peep. I thought that was odd. I was sure whatever had caused that bang would have made the autopilot quit working.

Maybe I had a loose panel under the airplane, and it was hung open. The U-2 has viewsight, which is like a reverse periscope, to see directly under the aircraft. You can move it up to see the bottom of the aircraft and the wings. Looking through the viewsight, I looked over every bit of the airplane but saw nothing unusual. I used the mirrors in and around the cockpit but saw nothing unusual there, either.

Several minutes had passed, and I had found nothing wrong with the airplane. I pickled off the autopilot again, made a couple of turns, and the airplane performed perfectly. “If I go back now,” I thought, “the ground crew will find nothing and write it off to another pilot who heard gremlins.”

This is the point where a hot, dehydrated pilot in a pressure suit starts making bad decisions. Even though I knew better, I started second-guessing myself. I thought, maybe I didn’t hear that loud of a bang. Maybe it was just one of those U-2 noises that caught me by surprise. The airplane is fine, it’s probably nothing. Besides, I’m going to turn south in a few minutes and be close to the base before I head away, so I’ll just wait and see what happens.

Fortunately for me, nothing did happen. The flight controls felt significantly lighter in pitch than I was used to as I hand-flew the airplane down from altitude. I once again dismissed this because I knew the airplane had just been modified with some light servos. I didn’t realize the pitch was supposed to be that light.

When I unstrapped and climbed down the ladder on to the ramp, the crew chief asked me if I’d had a bird strike. I told him no but suggested he show me why he was asking. When we went to the back of the airplane, I could see the left horizontal stab had delaminated over about two-thirds of the surface on the trailing edge. What was once a strong composite material now had the consistency of cardboard. It was a very impressive sight to see, especially considering I had flown several hours with it.

The two sections of the composite material

separated with enough force to tear rivets apart and rip the composite material itself. Only four bolts hold together the aft section of the U-2. Had that stab departed the airplane or started some violent flutter at altitude, I would have gotten to test the ejection seat for my ride home. I wouldn't have particularly cared for a 13-mile free fall.

There were many lessons learned on this flight. First, I thought myself almost impervious to hot-weather ops. I've generally never been bothered by hot-weather ops before. But spending an hour in a pressure suit in late June with temps in the 90s before takeoff will wear on anyone. Also, I have enough experience in this airplane to know a U-2 noise from something that isn't. I talked myself out of doing what I knew was right, which was to come home. From now on, I will pay more attention to keeping myself hydrated and cool before a flight and doing what I know is right.

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