

BRUTE FORCE

Disconnect

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Flying long-duration sorties in the B-1, or any airframe, presents numerous challenges to an aircrew – not a few of which are physiological in nature.

Last fall, as our squadron deployed to a Forward Operating Location (FOL) in support of Operation ENDURING FREEDOM (OEF), we all knew we'd be in for quite a shock in terms of flying hours. Normal OEF sorties ranged from 13 to 18 hours, quite a jump from the duration of 3 to 5 hours back home. We prepared the best we knew how for the marathon flying times and the multiple air refuelings required for each mission.

One sortie for my crew started uneventfully, but took a turn for the worse about 18 hours into the standard 24-hour duty day. It was clear

for a "breakaway" and the tanker began an ascent. I took the aircraft and maintained the contact position while attempting to disconnect the boom via our system. But again, the disconnect mechanism failed to expel the boom nozzle. As the tanker pitched up and vectored away from us, the boom reached its point of maximum extension and was extracted via a "brute force" disconnect.

Once clear of the boom, we descended to the bottom of the refueling block. We first noticed the obscured windscreen while scanning to find the tanker's position. I liken it to flying through a dense cloud, but as I said, it was a clear night. We quickly determined there would be no more attempted contacts that night unless the view through the fluid on the windscreen



outside and near midnight local time as we prepared for our final air refueling of the mission. We anticipated an onload of 60 – 80,000 pounds of fuel, requiring 10 to 15 minutes on the boom.

We were on the boom and receiving gas when our aircraft began to inch forward in the envelope. The tanker attempted an automatic disconnect, but the mechanism failed, and the boom remained latched. The boom operator called

dramatically improved. We also needed to determine what the fluid was.

Keep in mind there is no ambient lighting over the ocean so we couldn't tell the fluid's color, a big help to determining the leaking fluid. We noted our current fuel and the time as a preliminary data point for determining if the leaking fluid was fuel. Thus, the troubleshooting began. Discussion with the tanker crew confirmed their boom had

been damaged, and our hydraulic system, dedicated to the operation of the air refueling receptacle, was suspiciously low on pressure. We theorized the refueling port on our aircraft must also be damaged, and that the fluid on the windscreen was leaking hydraulic fluid rather than gas.

After 15 minutes, the windscreen began to clear, and once again, we could see the stars and the tanker's position well above us. Whew! Now all we needed to do was recover the jet and explain how we'd gotten into the predicament in the first place. Or so we thought.

About an hour from our intended destination, we detected a distinct fuel smell permeating the cabin, and began to suspect that the leaking fluid was fuel. To complicate matters, the aircraft primary oxygen system (MSOGS) stopped working shortly after we started to return to base, and as a crew, we elected to save our backup oxygen for the final portion of the flight or in case the fuel smell worsened. At this point, the smell was still tolerable.

During the period before we landed, the window repeatedly became obscured and then cleared each time after 10 to 15 minutes. Our plan was to set up for an instrument approach, coordinate with all the appropriate agencies, and then hold until the window cleared enough for the landing. Deteriorating weather to the south forced us to deviate, and during this time, we unsuccessfully attempted contact with the forward operating location on the high frequency and ultra high frequency radios. The best we could do was getting them to understand we had an emergency.

Forty-five minutes from the airfield, the window obscured again, but this time it never fully cleared. As we neared the airfield, the normal lights were not visible at all. In fact, it wasn't until we over flew the fully lit runway environment that we realized the magnitude of the torrent of fluid that streamed across the

windscreen. The cockpit side windows were equally useless, and even the Weapons Strike Officers couldn't see from their portholes. We truly had zero visibility.

We asked the tower controller to maximize the intensity of the runway lighting and then flew an instrument landing system to a planned missed approach. Doing so allowed maintenance and the supervisor of flying to get a closer look. Even at 165 knots and at night, both agencies saw a massive amount of fluid billowing from the top of the nose of the aircraft. Now they knew the nature of our problem.

We returned to the holding pattern, and we brainstormed some more. It was 3 a.m., almost 3 hours after the brute force disconnect, 21 hours into our crew duty day. We had 6 hours of fuel on board, and we'd been airborne for 13 hours. We were having great difficulty transmitting and receiving on our radios due to static, and all four crewmembers began to feel the effects of smelling fuel fumes for so long. Our first decision was to begin to use the backup oxygen. We weren't sure if we'd need to hold for another 10 minutes or 5 hours, but it was clear we needed a reprieve from inhaling fuel fumes. It would have been nice to have good radio contact with ground to get a duty pilot's advice, but on this night we were going it alone.

There is no emergency checklist for how to land a B-1 without visual references, and we sure dreaded the thought of potentially being the first crew to do so. We discussed an ejection plan and attempted to continue to query personnel outside the jet for advice. We tried many solutions to get the fuel to stop leaking, but our best bet came when we used the external system for removing ice on the windscreen. The heated blast of air cleared a small portion of the lower windscreen, just enough to be able to see something.

"We've got it!" I said and turned in the direction of the runway.

Within a minute, we got indications of an overheat condition on

both sides of the windscreen. Did we care that the window may potentially delaminate and distort? No, but we didn't want to lose our saving grace, so the plan was for the copilot to shut off the anti-ice system and then turn it back on at glideslope intercept.

The B-1 lands in a 7-degree angle of attack. This attitude places the nose quite high above the horizon. As we slowed from our holding speed to our approach speed, the jet began its characteristic rearward cant. At the briefed point, the copilot engaged the anti-icing system. This time, however, the cleared portion on the lower windscreen was 4 inches in height at best and slowly decreasing.

With the jet trimmed and the throttles set, we touched down on centerline, on glideslope just as the window, once again, completely obscured. With only the glow from the runway side markers in our side windows, we brought the jet to a halt 50 feet to the right of the centerline. Not bad for a near zero visibility landing. After some minor snafus during the emergency exit we got the jet safely shut down. The fuel spray out the top of the jet, however, took maintenance another hour to stop.

Lessons Learned

In retrospect, what nuggets can be extracted from this near mishap?

1. The physiological effects of long duration sorties are insidious and cumulative. Once you start taking out withdrawals from your sleep bank, your reaction time is slower. It's essential you recognize this fact and plan accordingly.

2. Did we troubleshoot in the best possible manner? Yes and no. We train to have the help of folks going ground-speed zero. That night, the radios were so garbled we couldn't even get across the nature of our emergency much less get a "hotel" conference going. However, we divided up responsibilities in the cock-



pit so that we could search the books to the maximum extent possible before making our decision to land.

3. "So there I was..." exchanges are beneficial, not simply ego talk. The decision to try the anti-icing system originated from a discussion with another pilot earlier in the deployment concerning what their crew did in an unrelated incident.

4. Maintenance can work miracles. They did such an outstanding job after we recovered that both the tanker and our bomber flew again within 24 hours.

5. Don't be afraid to switch runways, winds permitting, to get the best approach for the emergency. The ILS we flew was not to the active runway. The precision afforded by that approach far outweighed the few knots of gained tailwind.

6. And finally, the emergency isn't over for the crewmembers until the engines are shut down and you have safely egressed from the airplane. ✈️