Crew Resource Management

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Driving a Classic

By LCdr. Rick Golbitz

When you drive a classic, you expect a few minor mechanical problems, but, hey, it's a classic, right?

It was business as usual, we had just kicked off our Caribbean detachment. The weather was hot, the mission was all too familiar, and our vintage-1970s, Lockheed P-3 Orion already had shot the No. 2 turbine in an impressive—even by P-3 standards—display of spewing oil and smoke. That was on our first mission and, as it turned out, our detachment's first three-engine landing. A talented team of maintainers replaced the bad turbine in minimal time, and we were able to reposition the aircraft the next day as scheduled. Following a five-hour transit, we put the plane to bed and prepared for our next mission.

Preflight was at oh-dark thirty. The country was new, but the weather, mission and aircraft were anything but. We left on time and made the 800-mile transit to our on-station point. After some fuel calculations, we decided to loiter the No. 1 engine to extend our on-station performance. We figured our bingo fuel based on a three engine, max-range transit at 10,000 feet, assuming a worst-case scenario of losing an engine and not being able to maintain pressurization. After the number-crunching, we set 23,000 pounds of fuel as bingo and settled into the mis-

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sion. We were at 500 feet, 250 knots max range, with one hour of on-station fuel remaining when the fun began.

"Chips light, No. 3," the flight engineer called.

Immediately, the PPC, flying in the left seat, initiated a climb. I scanned the engine instruments, looked for secondary indications of an impending engine failure, saw none, and told the FE to restart the No. 1 engine. With the No. 1 engine coming back to life, we turned our attention to the No. 3 engine. As we did, there was an audible overspeed sound, accompanied by a loss of indicated-shaft horsepower on No. 3. We initially thought the engine had decoupled, but none of the other instruments confirmed that as the problem. I looked at the No. 3 prop, saw it was dry, and, with no other indications of a propeller malfunction, I called for the No. 3 E-handle. Relieved that the propeller went to full feather, we completed the emergency-shutdown checklist on No. 3 and the initiation-to-completion of the No. 1 restart checklist in less than two minutes.

As we basked in the afterglow and complimented one another on our NATOPS and CRM knowledge, we realized something was wrong—too many annunciator lights were on. Besides all the normal lights, the No. 3 filter light was illuminated. In a harmony that would have made the Beach Boys proud, all five of us in the flight station said, "That's weird, why is that on?"

Our skipper (PPC), an instructor pilot with 4,000 hours in P-3s, was in the left seat. The CNARF-NATOPS-alternate-pilot evaluator, with 2,000 hours, sat in the right seat. The primary-pilot evaluator had 3,000 hours and looked over the skipper's shoulder while the CNARF NATOPS FE evaluator looked over the junior FE's shoulder. I felt confident there was little our vintage Orion could throw our way that we couldn't handle. That was before takeoff.

Now all five of us sat dumbfounded by one little light. Before we could determine why it was on, we had to handle what it meant to us. The light comes on when one or both low-pressure fuel filters on the engine become clogged and fuel bypasses the filters. This means the fuel from that engine's tank is contaminated and should not be used.

Our new problem became the 6,600 pounds of trapped fuel in the No. 3 tank. The fuel still was available but using it might adversely affect the other engines. Instead of the 27,000 pounds we thought we had, there were just over 20,000 pounds, nearly 3,000 pounds below our bingo

A photo-composite

fuel. Time to crunch our fuel numbers again and op-check our sweat pumps.

Pumps worked 4.0, but we still felt we were missing something. It wasn't until we tried to figure out what might have brought on the filter light that it became obvious. This plane is unlike the P-3s we normally fly because it is equipped with a survivability modification.

This mod includes flame-suppressant foam in the fuel tanks. The foam has been known to deteriorate and bring on the filter light.

Normally this is not a problem, except with the foam installed, you have five percent less fuel than what the fuel totalizer indicates. In our case, that was another 1,300 pounds of fuel we didn't have. With over 19,000 pounds of useable fuel, 4,000 below bingo and 800 miles from the nearest suitable alternate, the pucker factor became huge. We figured max-range airspeed and climbed to our best three-engine-cruise altitude.

Time to crunch more numbers, look at more charts, and start asking all the "what if" questions. What if we encounter bad weather? What if we are short on fuel? Will we use the fuel in tank three and, if so, when? And the biggest what-if of all: What if we lose another engine? Time for the flight engineers to work their chart magic and answer the $64,000 question, "Would we make home plate with our fuel remaining, on only two engines?"

Using our new worst-case scenario, we faced an 800-mile, two-engine transit, at 10,000 feet, and unable to maintain pressurization. The FEs determined it would take 12,000 pounds of fuel to get home. Doing some quick math, we would land with 7,500 pounds of useable fuel without having to use the 6,600 pounds of questionable fuel in tank No. 3. Not a lot of fuel for a P-3, but we wouldn't be swimming. I stopped my SV-2 mental inventory and noticed the collective stress level in the flight station had diminished significantly as we all reached the same conclusion.

We spent the next three hours monitoring engine performance, fine-tuning fuel logs, and watching the miles wind down on the GPS. We made an uneventful three-engine landing (No. 2 of 3 for those of you keeping score at home), acutely aware we dodged a lot of the "what ifs."

Two days later, following replacement of the No. 3 engine and several fuel-system components, the plane was readied for high-power-engine turns. Before starting the APU and as the flight engineer manually rotated the No. 2 propeller, he heard what he described as a "box of rocks" (an industry term), which aurally confirmed yet another problem. The No. 2 turbine was completely shot, again.

There was no indication of a pending turbine failure during flight, nor on postflight, most probably because of the APU noise. If we had lost the No. 2 turbine in flight, we would have been right in the middle of our new worst-case scenario. Following the replacement on the No. 2 engine, our "classic" Orion completed a post-maintenance check flight and returned to service.

We learned several lessons from this flight: some new, some not so new, but all equally important. First, strong NATOPS knowledge and timely execution of emergency procedures is essential when "it" starts to hit the fan. Each crew member knew their job and did it immediately. Second, always plan for your worst-case scenario, even if it keeps changing, and continuously revise your plan as necessary. Third, no matter how much experience you or your crew have, you still haven't seen it all. Do not let yourself become lax or over-confident. With over 15,000 hours of P-3 experience in the flight station, the mighty Orion still managed to throw us a curve ball. And finally, effective CRM is the difference between hitting that curve ball and striking out. In the P-3 community, we live and die by CRM. With a three-man flight crew and a 12-man tactical crew, it is the secret to our success.

Each member of our flight station, including the off-duty pilot and flight engineer, worked together, communicated and provided feedback, and operated freely within the CRM-friendly environment that pervades our community. We were able to handle an emergency and return one vintage P-3 and 14 aircrew to dry land.

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