

DEALING WITH *In-Flight* *Emergencies*

by Bill Frank



It is indeed fortunate that the vast majority of pilots will fly their entire lives without ever encountering a major in-flight emergency. In my 30-plus years of flying, I have experienced one partial power failure (cracked intake manifold), one impending engine failure (lost oil pressure), one total electrical failure (field wire broke off alternator), one electrical fire (a lot of smoke, very little fire), and a dual Garmin 430 failure (in IMC within 30 minutes of each other). Each incident ended safely, but I can honestly say that in each case not all of my actions were entirely correct. When things start going south in a hurry, time may indeed seem to slow down, but clarity of thought often goes right out the window.

In the Air Force, each major emergency checklist starts with bold face items that have to be committed to memory. With enough frequent regurgitation of these memory items, pilots reach a point where they can be reliably recalled under the stress of an actual emergency. Most of us, myself included, rarely find the time to review, let alone regurgitate emergency checklists, leaving us unsure of what will happen when the “you-know-what” really hits the fan.

The Big Three

Most people are either groupers or splitters; I tend to be a grouper. There are three major emergency conditions that you need to be prepared to deal with in your aircraft. It can be argued that all emergencies are major, but many allow time to reference a checklist (e.g., alternator failure, over-voltage situation, etc.) or require activation of CAPS (structural failure/overload, midair collision, etc.). The three that don't fit these categories and are therefore worth examining in further detail are partial power loss/engine failure, engine fire, and electrical fire. In each instance, appropriate and timely action is required to reach a safe conclusion to the emergency. It is difficult to memorize three separate checklists and then recall them correctly in the heat of the moment.

As you know I'm a grouper, so I've come up with a way that I can recall one simple checklist that will cover all three of these emergencies. Before getting started, I want to make it clear that all emergencies, big and small, begin with maintaining aircraft control. We all know or read of accidents that have occurred not because of the

emergency at hand, but because no one was minding the ship while the emergency was being dealt with. Please remember that all actions must be backed up by the checklist once the emergency is under control.

The logic behind this simplified memory checklist is to group the necessary actions into three categories: **Air**, **Fuel** and **Ignition**. That's it. Memorize those three and you are well on your way. Where does the logic come from? To create combustion – a good thing when contained within the engine, a bad thing anywhere else – you need those three items. Let's see how it's applied to each emergency.

① Partial Power Loss or Engine Failure:

As an instructor when I simulate an engine failure, most students' attention (hopefully after maintaining aircraft control and establishing best glide speed) moves to the fuel system – mixture rich, switching tanks and activating the boost pump. At that point, dealing with the engine failure or partial power loss is often deemed complete and the student is now concentrating on proceeding to the nearest airport, a forced landing or CAPS activation. The magnetos

and alternate air, often sources of engine failure or partial power loss, are forgotten.

A better approach is to apply the three memory items. Each can be accomplished quickly, in any order. As an added bonus, Cirrus aircraft have the items in each of these categories physically grouped together.

- **Air** – Pull alternate air on.
- **Fuel** – Look at the fuel grouping and work with mixture, tank selection and boost pump; it's all right there.
- **Ignition** – Check magnetos left, right and both.

That's it. Attention to these three areas will cover most common causes of non-catastrophic power-plant failure. Now you can concentrate on heading to the airport, attempting an engine restart, and completing the checklist.

② Electrical Fire:

- **Air** – Direct your attention to the vents and environmental system. Close them off. The smoke may accumulate temporarily, but the key is to stop the air from circulating so that you're not fanning a small flame into a big one.



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- **Ignition** – Eliminate all sources of electricity including battery and alternators. Depending on your flight conditions, you may want to leave battery 2 on, to power the flight instruments in order to maintain aircraft control.
- **Fuel** – What's burning is wire coatings, insulation, plastic, etc. You can't eliminate these things, but it should jog your memory to activate the fire extinguisher. Note that because of the metal panel covers underneath the instrument console, you are going to have to position the fire extinguisher to aim around the edges and allow the Halon to seek anything that's burning.

Now begin your emergency descent.

3 Engine Fire:

- **Air** – In this case, air is our friend and we will use it to try and blow out the fire during the emergency descent. Slipping to divert smoke and flames away from the pilot will often aid in control of the aircraft, though this will be very disconcerting for any passengers.
- **Fuel** – The fuel selector goes to the off position. Remember how to get it there. Pull the mixture to idle cut-off. Turn the boost pump off as it may continue to squirt fuel remaining in the lines onto the hot engine.
- **Ignition** – Turn magnetos off. If the propeller is still turning and the magneto switch is in both, left or right positions, a spark will be going to the cylinders, continuing to ignite any remaining fuel. Leave the electronics on (battery, alternator, and avionics). You don't want to create a second emergency.

In the case of any fire (electric or engine), do not attempt to glide to the nearest airport, unless one is immediately available. Initiate an emergency descent and get the aircraft on the ground terminating at a lower attitude either with a forced landing or CAPS activation. Remember, that even under CAPS, a pretty good rate of descent (~1,300 fpm) can be maintained, so activating after slowing from the emergency descent is probably a quicker way to getting on the ground than trying to set up for a forced landing.

Three Simple Words

The object here has been to deal with three major emergencies by committing to memory these three simple items: **Air**, **Fuel** and **Ignition**. They will focus your attention to each of the areas that need to be dealt with in handling these emergency situations. This may not work for everyone, but by remembering these three words you won't forget any of the important steps in resolving these emergencies.

Fly safe, maintain aircraft control and always back up your actions with a checklist. **COPA**

About the author: *Bill Frank owns Turbo Cirrus N787WF (#2178). He has over 3,400 hours total time, 1,600-plus of those hours in Cirrus aircraft. He has COMM/INST, CFII, MEI and CSIP ratings and can be contacted at Aeromax Flight Services, (715) 482-3773.*

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