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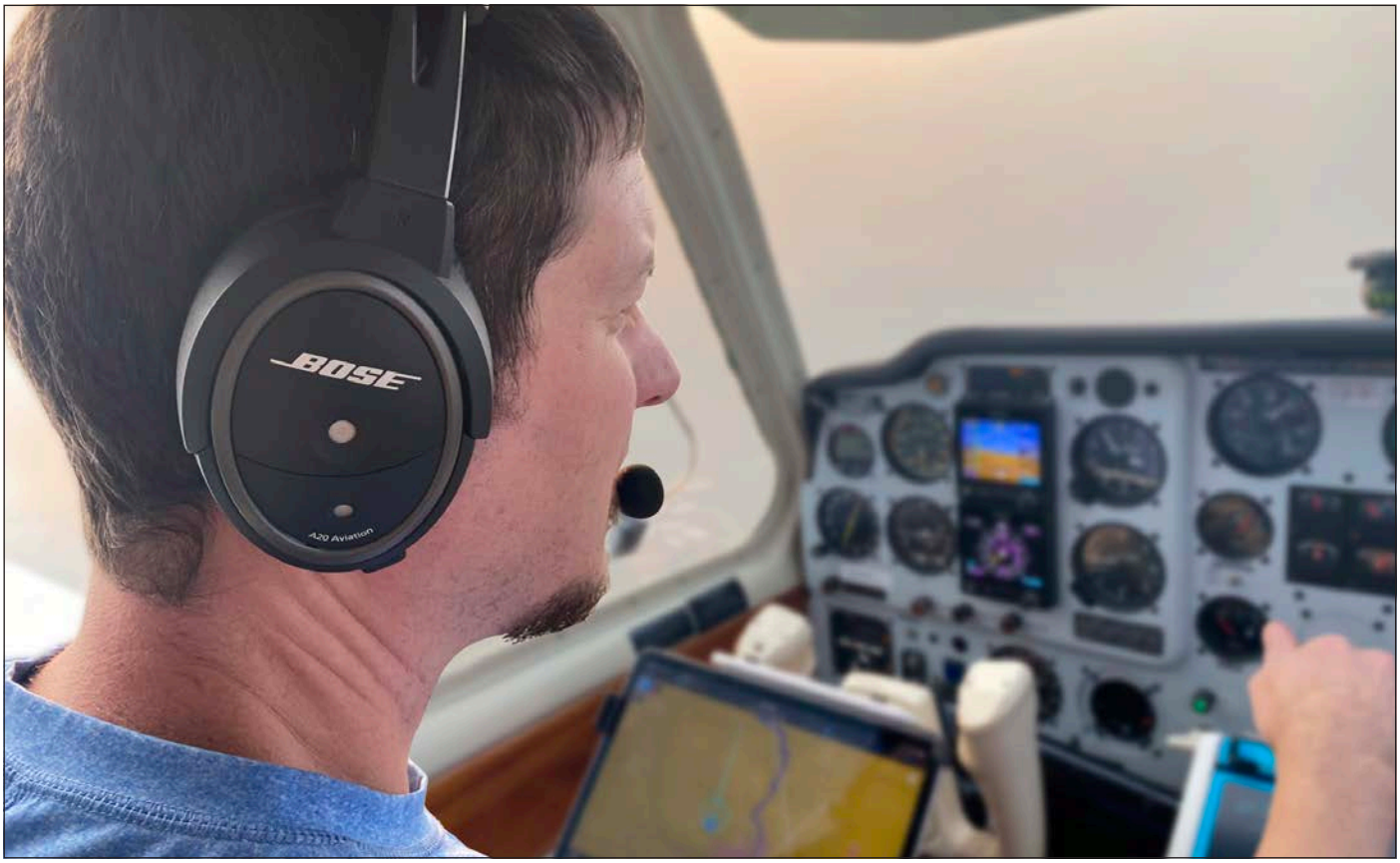
The following excerpt is from:

Emergency Strategies

A Pilot-Friendly® Manual

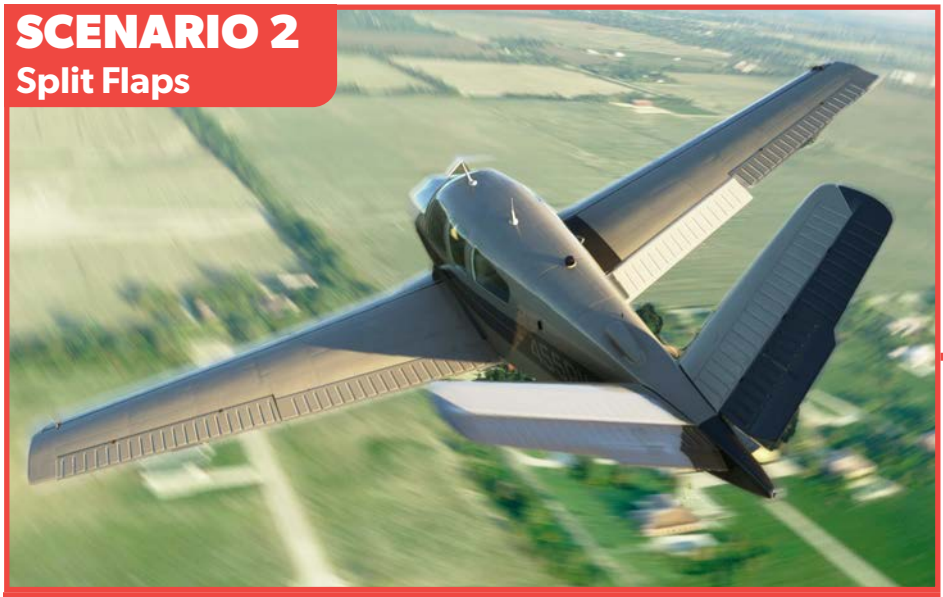


A simplified approach to handling emergencies in an airplane.

It's not W10. Landing on the 2500-foot runway might earn you legitimate bragging rights … or a trip to the hospital. Paine Field (KPAE) has a 9000-foot runway aligned into the south wind. That's a crucial bonus since your no-flare touchdown will be faster than normal.

Tell ATC you're going to KPAE and request vectors for a long straight-in final. That gives you time to ensure your approach is on target and minimizes the maneuvering needed with compromised controls. You can even tune the ILS for help achieving a stabilized approach. If at any point the approach is off target, smoothly power up in increments and try again. However, be cautious of go-arounds close to the ground. You'd rather botch a landing and hit hard than mess up a go-around and lose control. Expect an audience of firetrucks for your landing. No pressure, they're just backup. You've got this.

SCENARIO 2
Split Flaps



It's a gusty yet gorgeous spring morning and you're eager to fly your Bonanza now that it's back from annual. After shaking off the rust with airwork, you head back to Stearman Field (1K1) in Wichita, KS. You join a midfield crosswind for right traffic Runway 17. Winds 280 at 12 make it a direct right crosswind, but you live in Kansas. This is nothing you can't handle. You extend approach flaps—and experience a ***sharp left roll and right yaw****.*

A Take Control

Instinctive application of right aileron is sufficient to level the plane, as long as you continue to hold the controls about halfway deflected. You *have* control, and you don't need full deflections to maintain it. That buys you time to work on the problem and devise a plan.

A quick check reveals that only the right flap has extended. Mystery solved, but now what?

Don't Adjust Flaps in a Turn?

There's a debate about extending or retracting flaps while turning. The argument is that if flaps don't move in sync, a roll toward the low wing could quickly lead to a precarious (or inverted) bank angle. Plus, diagnosing the issue could be trickier when you're already banked.

It's probably not necessary to completely avoid adjusting flaps while turning. Just be prepared to counter any uncommanded roll and to promptly undo your last action, i.e., return the flaps back to their previous position. Thankfully, in most planes, the flaps are mechanically linked, making split flap occurrences extremely rare. Even better, there's a 50-50 chance that an asymmetric flap deployment will result in a roll toward level. And while fully split flap conditions might not be covered in airplane certification testing, the ailerons' extra leverage from their outboard position should grant enough authority to overpower the flaps.

Stuck (but matching) flaps are much more likely than split flaps. It's important to master landing with any amount of flap deployment, including none. Practice go-arounds with "stuck" flaps, too. Can your plane climb with full flaps? In most airplanes, under most conditions, at most airports, the answer is yes—but be prepared for a different pitch attitude. In a Cessna 150 with 40° of flaps on a sweltering day? Probably not. In that case, avoid the 40° setting.

TAKE CONTROL

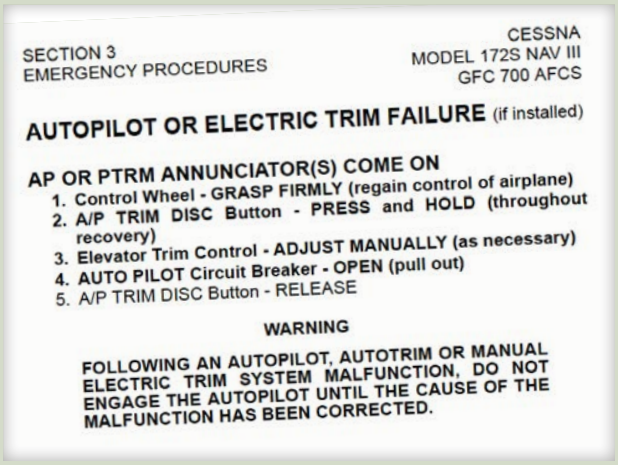
Runaway Trim

As you climb through 1000 feet, the nose gets heavy so you add nose-up trim with the electric switch on the yoke—but the need for back pressure keeps growing. If you were to let go of the yoke now, the plane would pitch down aggressively. That's when you realize that the trim indicator is far forward and still moving in that direction—it's a runaway trim.

This is one of the few emergency scenarios that require quick action. A serious upset can occur in just seconds. In the G1000 172S, it involves five steps. Firmly grasp the yoke—which you're likely already doing. Press and hold the autopilot trim disconnect button and keep it pressed throughout the recovery. Manually adjust the trim, if possible, to relieve your burning biceps. Finally, pull the autopilot circuit breaker and release the autopilot trim disconnect button.

Pushing or pulling on the yoke sufficiently might take two hands, especially in a heavier plane. There's no way to pull out a checklist in this situation. That makes it crucial to perform the actions quickly and from memory. Consider clearly labeling the trim and autopilot circuit breakers (or adding a collar to them so you can find them by feel) and practice reaching and touching them. Know the other ways to quickly disable electric trim. Turning off the master switch will do it if your brain goes blank.

If your autopilot and electrical trim are aftermarket additions, you'll find normal and emergency checklists in an Airplane Flight Manual Supplement. That includes mandatory preflight checks, which might catch issues in the first place.



SECTION 3
EMERGENCY PROCEDURES

CESSNA
MODEL 172S NAV III
GFC 700 AFCS

AUTOPILOT OR ELECTRIC TRIM FAILURE (if installed)

AP OR PTRM ANNUNCIATOR(S) COME ON

1. Control Wheel - GRASP FIRMLY (regain control of airplane)
2. A/P TRIM DISC Button - PRESS and HOLD (throughout recovery)
3. Elevator Trim Control - ADJUST MANUALLY (as necessary)
4. AUTO PILOT Circuit Breaker - OPEN (pull out)
5. A/P TRIM DISC Button - RELEASE

WARNING

FOLLOWING AN AUTOPILOT, AUTOTRIM OR MANUAL ELECTRIC TRIM SYSTEM MALFUNCTION, DO NOT ENGAGE THE AUTOPILOT UNTIL THE CAUSE OF THE MALFUNCTION HAS BEEN CORRECTED.

B Assess the Damage

There's another way to improve control, and it's a generally applicable golden rule for when things go awry: Undo the last thing you did. Retracting the flaps may clear the problem, and you'll just have to make a no-flap landing. Unfortunately for you, the right flap remains stuck—as happened in several real-life Bonanza cases.

The Bonanza's POH doesn't have a checklist for split flaps. Since you're not using the flaps anymore, pull the breaker when workload permits to ensure the motor doesn't run. Don't reset it if it already popped. Remember, you have a controllable airplane.

C Test Controllability

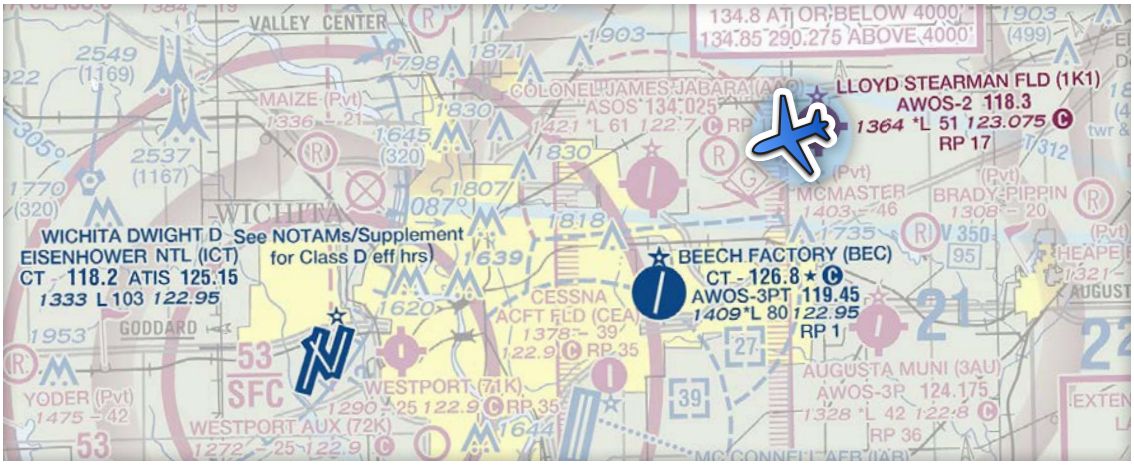
Does the plane feel relatively normal, requiring just a bit of aileron and rudder to compensate? Can you stay ahead of the airplane without getting so distracted that you'll forget the landing gear or become a traffic conflict? If so, seize the easy out and land. You're already in the pattern.

However, if there's *any* doubt, remember that you have a controllable airplane that's not going to get worse with time. Take a breath, exit the pattern, and get yourself accustomed to the new normal.

Your controllability testing should determine whether you still have adequate control authority at low speed and low power for landing. Generally, split flap situations become more manageable at low power, since flaps "feel" more propwash than ailerons. However, every situation is different.

You might consider a simulated go-around, but it's risky for the same reason that low power may help. Add power gradually and anticipate increased control pressure as you add propwash over the stuck flap.

TIP Do an extra-thorough preflight inspection after any maintenance work. Treat the first flight as a test flight and leave passengers behind. Mechanics make mistakes sometimes.



why add the stress of a busy Class C to the mix? Plus, it's a safe bet that someone at KBEC, of all places, can fix your problem ... once you land.

Today, you'll face a strong crosswind no matter where you go. That's not necessarily a bad thing. The stuck right flap has essentially the same effect as holding left aileron and right rudder—just the control inputs you'd need in a left crosswind. Choose a runway with a left crosswind. Use emergency authority to get Tower approval, if needed. Follow your standard procedures, lower the landing gear, and land.

D Devise a Plan

You could return to 1K1, but consider alternatives. A long, wide runway would be best. One with a control tower could help you concentrate on landing by offloading the distraction of other traffic. Beech Factory (KBEC) is right next door and fits the bill nicely. Wichita International (KICT) is another option, but

PREP AND PRACTICE

Total Yoke Failure

You accelerate down the runway and pull back to rotate. For a moment nothing happens, then the nose gradually rises and the airplane lifts off. You apply a bit of forward pressure, and left aileron to fix a slight drift, but again, nothing. That's when you notice that the USB cable on your flight sim's yoke is disconnected.

Oh, did we mention this was a sim?

You could just plug it back in, but why not seize the opportunity to practice dealing with failed flight controls? You still have rudder, trim, and throttle. That's enough to do the job. Is it a realistic failure mode? Perhaps not, but the core of flight control failure scenarios lies in the nonintuitive and unpredictable nature of the new control paradigm. In this situation, you'll have to overcome and retrain your well-honed pilot instincts through controllability testing, then devise a plan to land safely. That's realistic.

X-Plane can simulate a wide range of control failures, including fully jammed controls, broken "up" or "down" cables, trim runaways, busted throttle cables, and much more. Have a "friend" sabotage your plane with one of these failures to occur randomly or at a specific airspeed or altitude.