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Aw, Chute!

Making the Pull-Parachute Decision

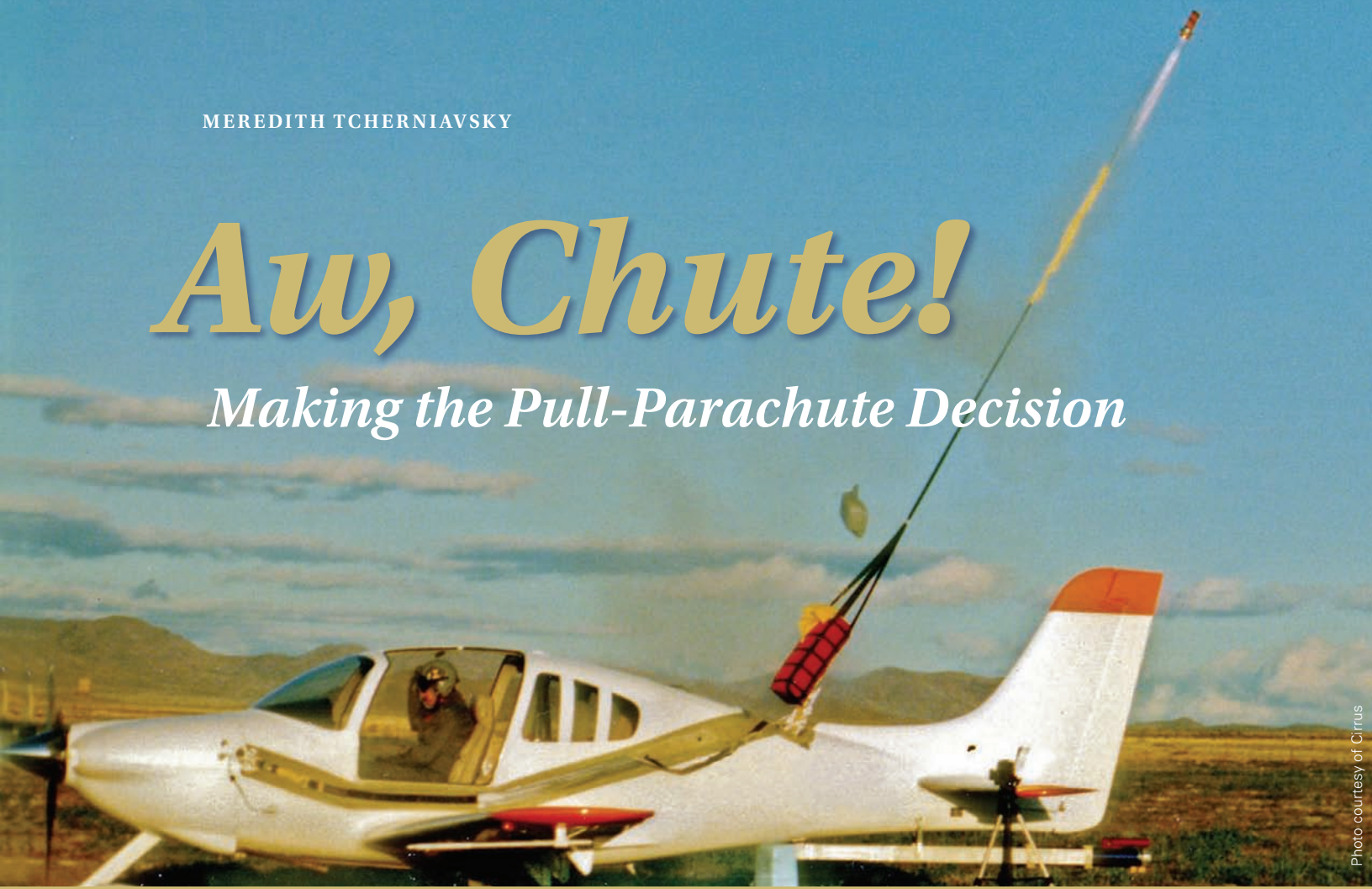


Photo courtesy of Cirrus

Every pilot since the inception of powered flight more than a century ago has learned—and some learned the hard way—that if your single engine quits, you have no choice but to fly the airplane all the way to the ground. But, what if your airplane is equipped with an airframe parachute system that would greatly increase chances of survival for all onboard in the event of a catastrophic engine failure? Would you still attempt a forced landing and hope that your power-off short-field technique is up to the task?

For pilots who own or fly airplanes outfitted with an airframe parachute, the opportunity is there to deploy the parachute and allow the airplane to make a safe and steady descent toward the ground. However, pilots may struggle with the chute-pull decision, having learned through many hours of flight training that the instinctual response to an engine failure in a single-engine airplane is to trim for best glide speed and set up for a power-off approach to whatever suitable surface lies below.

This is why it is crucial to establish some criteria before you ever leave the ground for making the pull-or-land decision. The NTSB's accident

data over the last 20 years suggests that off-airport landings have serious—and sometimes fatal—consequences. Recent data suggests, however, that deploying an airframe parachute, if one is available, increases the odds of survival, especially in situations where the pilot loses control of the airplane due to physical incapacitation or structural failure.

It's crucial to develop your own pull-or-land criteria before you leave the ground.

How an Airplane Packs a Parachute

While parachutes for light GA airplanes are proliferating, I have the greatest familiarity with those installed in Cirrus airplanes and will use this particular make and model as the basis for discussion in this article.

All airplanes manufactured by Cirrus are delivered with what is known as the Cirrus Airframe Parachute System, or CAPS. The parachute system's design and operation is fairly simple. A harness embedded in the aircraft's skin is attached to the fuselage and connected to a parachute located



Photo by Tom Hoffmann

inside the empennage. The parachute is extracted by a small rocket activated by pulling a handle inside the cockpit. In a few seconds the parachute opens. And, consistent with following the Pilot's Operating Handbook (POH) Emergency Procedures for CAPS Deployment, all forward velocity is gone, and the aircraft begins to descend under the canopy in a slightly nose-low attitude.

It's Not About Saving the Airplane!

Once the system is deployed, the aircraft occupants are essentially along for the ride. The flight controls will not have any effect and the aircraft will float in the direction of the prevailing wind. Altitude loss during deployment of the chute depends on a variety of factors. Although altitude losses of fewer than 400 feet have been demonstrated from level flight deployments, FAA aerospace engineer Wess Rouse notes, "Certain conditions may

require considerably more altitude for the parachute to fully open, as covered in the Cirrus POH." Under canopy,

the aircraft descent rate will stabilize, and according to the POH, "impact in a fully stabilized deployment is equivalent to a drop from approximately 13 feet."

Interestingly, the POH for both the Cirrus SR20 and SR22 instructs pilots to establish best glide speed and maneuver for a forced landing if all attempts to restart the engine fail. Of CAPS, the Airplane and Systems Description section says: "The system is intended to save the lives of the occupants, but will most likely destroy the aircraft and may, in adverse circumstances, cause serious injury or death to the occupants."

Accordingly, it is important to carefully read the CAPS descriptions in Section 3, Emergency Procedures, and in Section 10, Safety, and consider

when and how you would use the system. The emergency section states, "The Cirrus Airframe Parachute System (CAPS) should be activated in the event of a life-threatening emergency where CAPS deployment is determined to be safer than continued flight and landing."

You Are Still Pilot in Command

The fact that Cirrus leaves the CAPS deployment decision up to the pilot is consistent with the pilot in command's authority and responsibility outlined in Title 14 Code of Federal Regulations (14 CFR) part 91. However, the independent, not-for-profit Cirrus Owners and Pilots Association (COPA, of which the author is a member) takes a much stronger stance on the system's use. As COPA founder and president Rick Beach has stated at COPA safety seminars, "Way too many accident reports show that the pilot had the opportunity, the altitude, and the airspeed, but died without activating the parachute that has saved 70 lives in similar circumstances."

The pilot of a Cirrus SR22 that crashed approximately 2.5 miles west-northwest of Strom Field Airport in Morton, Wash., on March 19, 2010, may have wished he had done just that. According to the preliminary NTSB report, the private pilot was killed and the passenger sustained serious injuries after the pilot attempted to land the airplane following an engine failure in VFR conditions. According to a preliminary briefing by the NTSB, the pilot of another aircraft reported hearing a mayday call from the accident aircraft indicating that the Cirrus was "dead stuck and did not think he would make the airport."

The passenger of the accident airplane told the NTSB that the pilot suddenly placed his hands on the controls, told her the engine had lost power, and that they were going to land at a nearby airport. He entered a steep right turn toward the airport. The passenger could not recall hearing anything unusual. The passenger also indicated the pilot had discussed the CAPS with her prior to the trip and showed her how to activate it in the event of an emergency. The passenger reported that the pilot did not attempt to activate the CAPS.

After impacting trees, the airplane came to rest in a rural residential area on soft terrain used for gardening. Multiple fence posts and rails were dislodged and found at the main wreckage site. The wings and forward fuselage area sustained significant impact damage. All control surfaces remained attached. There was no fire.

You must have a clear understanding of the system's limitations as well as its benefits.

Might the pilot have lived and his passenger spared serious injury if he had deployed the CAPS? It's impossible to know for sure, but another recent Cirrus engine failure ended successfully after the pilot chose to use the CAPS.

According to the NTSB's preliminary information, "the airplane was in level cruise flight at 11,000 feet when the engine lost power. The pilot tried to glide to the nearest airport, McCurtain County Regional. When he realized he would be unable to extend the glide, he deployed the ballistic parachute." The parachute opened properly "and ground impact caused substantial damage to the landing gear and wing."

Personal Minimums for Parachute Pull

What can we learn from these and other accidents? As with any aircraft, you need to know the system cold. If you fly an airplane that's equipped with a parachute system, that means having a clear understanding of its limitations as well as its benefits. For instance, remember that the parachute cannot help you if you experience an engine failure at an altitude too low for it to deploy, e.g., engine failure upon takeoff. For that reason, you should

continue to practice simulated engine-out landings under safe conditions.

Think as well about the nature of the terrain you expect to traverse. Even with a parachute, a forced landing in rugged terrain or water will present challenges you need to consider and, as appropriate, mitigate. A pilot operating a parachute-equipped aircraft also needs to think a little differently about the implications of engine failure over a congested area. Though all pilots who lose engine power have somewhat limited options, remember that your ability to actively steer the aircraft, that is, direct it away from populated areas, disappears when you are under canopy.

There are no hard and fast textbook answers to these questions; on the contrary, much depends on the specific circumstances. Still, you will always be better off if your flight preparations have included a healthy dose of "what if" thinking and planning. ✈️

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An example of an airframe parachute system installed in a Flight Design light-sport aircraft. Systems like these are available as factory options or standard equipment, or via supplemental type certificate on a growing number of aircraft.



WARNING - Pilot is responsible for ensuring that any baggage has been properly secured before take-off. Displaced items can adversely affect the center of gravity or block the controls.