SO, YOU WANT TO

In the hands of a capable and knowledgeable pilot, even a simple airplane like this Cessna 120 can operate in the bush.

BE A BUSH PILOT?

HERE'S WHAT YOU NEED TO KNOW

Before you explore landing in the backcountry, consider these important safety precautions and expert recommendations for successful bush flying.

BY STEVE ELLS

Photograph by Daniel H. Bailey / Alamy StockPhoto

Contributor: Octavio Campos Salles / Alamy Stock Photo

A Cessna 175, landing on an unimproved airstrip in the Pantanal of Brazil.

A local Cessna 150 owner stopped me yesterday to tell me about his plan to convert his 1959 Cessna 150 into a bush plane by installing a Texas Taildragger kit, big tires, and a 150 hp engine. "It's going to be a mini [Cessna] 180," he said. I encouraged him.

After we parted, I thought to myself that it seems as if flying airport-to-airport for the proverbial $100 hamburger has been pushed aside in favor of exploring the backcountry in a personal airplane. It appears that everyone wants a "bush" plane these days.

The draw of unimproved airstrips

In 2003, a small group of Montana pilots formed the Recreational Aviation Foundation (RAF). This group realized the threat of recreational airstrip closure was of national concern. Over the last 17 years, the RAF has worked with local and regional governments to make sure bush airstrips are preserved for future flyers.

Facebook groups such as "Big Tire Pilots - STOL Pilots - Backcountry Pilots - Mountain Pilots" have posted hundreds of online videos about backcountry flying destinations and procedures.

Airplanes suitable for bush operations are available. But are you, as a pilot, capable of operating safely "out there?"

Self-testing for competency

Pilots who can't maintain speeds within a couple of knots and aren't comfortable flying close to the ground in unwelcoming terrain have a way to go before they're ready to tackle landing strips that require "on-the-edge" flying. On-the-edge flying means flying final at speeds as low as 1.1 Vso.

An inability to accomplish this level of flying may be due to rusty or not-yet-honed skills, but let's also remember that manufacturer's "book numbers" are gleaned using airplanes that are in top-notch shape with strong engines, being flown by professional pilots.

So, rule No. 1 is to do tests to determine what you and your airplane are capable of. Do these tests with the airplane loaded, because that's how you will be flying.

Here's the first test to see if you're ready for backcountry (bush) flying. Dig out the Pilot's Operating Handbook or Owner's Manual for your airplane. Look up the minimum distance required to do a short field takeoff. Add in all the variables—air temperature, surface, density altitude, runway slope—to come up with a "book" distance.

Then, imagine that your life depends on your ability to get off a remote airstrip in the book distance.

Fly a series of test flights in a forgiving environment to see if you can get off the ground in that distance. This is the first step in flying "scientifically"—gathering data appropriate to your airplane and your skill level.

If you can't manage that takeoff the first time you try, you're not alone. Perhaps you're just not yet ready. It's also very likely that you don't really know the numbers for your airplane.

Practice flying in less-than-perfect wind conditions. Feeling you're ready for an all-out bush flying adventure because you're comfortable at the home drome in calm wind isn't rational, nor does it predict real-world performance.

Reading for the fundamentals

A wannabe bush pilot is usually just a pilot without the experience and the set of skills needed for backcountry flying.

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One way to get one's mind around the bush pilot skill and knowledge set is by reading.

Two of the best reference books on bush flying in my collection are F.E. Potts' "Guide to Bush Flying" and Sparky Imeson's "Mountain Flying Bible and Flight Operations Handbook." Although I haven't read it, I've heard that "Mountain Flying" by Geeting and Woerner is also good.

Guide to Bush Flying

In 1971, Potts was one of a small group of Alaskan pilots to obtain an IFR air taxi certificate using single-engine aircraft. Potts ran FEPCO Aviation out of Spruce Point, Alaska. He retired in 1984 after 22 years and 17,000 hours. He never had an accident. He's gone now, but his words remain.

Fred Potts' book is subtitled "Concepts and Techniques for the Pro." It's out of print, although copies are offered for sale on Amazon—for outrageously high prices.

Potts wrote the following on the first page of his book: "This book contains methods and/or flying techniques that have worked successfully for the author (as well as for other professional bush pilots) for many years. However, for those without the required skill, experience, and judgment, these techniques (because they utilize the edges of an airplane's performance envelope, close to the stall; or require operation low to the ground) are very dangerous."

He advised that pilots wishing to learn the advanced techniques in the book take thorough instruction from a Certificated Flight Instructor qualified in bush techniques.

Potts' book is full of practical tips about operating a one-man air taxi in

Alaska. There are sections on Alaskan weather and seasons, the airplanes he used, and special operating techniques. And although it may seem like bush pilots are "seat of the pants" daredevils, Potts writes that, "The most effective way to fly an airplane in the bush is scientifically—by the numbers."

Mountain Flying Bible and Flight Operations Handbook

Sparky Imeson was in dental school when a ride in his father's Piper J-3 Cub convinced him to trade a future of drilling teeth for one of drilling holes in the sky. Imeson was awarded the Flight Instructor of the Year for the Northwest Region in 1974, 1979, and 1995. Imeson passed away, but like Potts, his experience and wisdom are still available to seekers.

Imeson's book is titled "Mountain Flying" for a reason. Early in his flying career, Imeson flew out of an FBO in Jackson, Wyoming. He writes, "This book is an attempt to collect the information necessary to operate the airplane in the mountains, safely, under various conditions of flight."

Imeson goes on, "Pilots with a desire to learn the advanced techniques, such as the curved-path takeoff or flying in narrow canyons, should do so only with the help of a knowledgeable and qualified mountain instructor."

Bush flying, and by extension, mountain flying, are quite different from everyday flying. Based on what these two experts write, bush flying skills can be learned; judgment on when and how to use those skills takes experience.

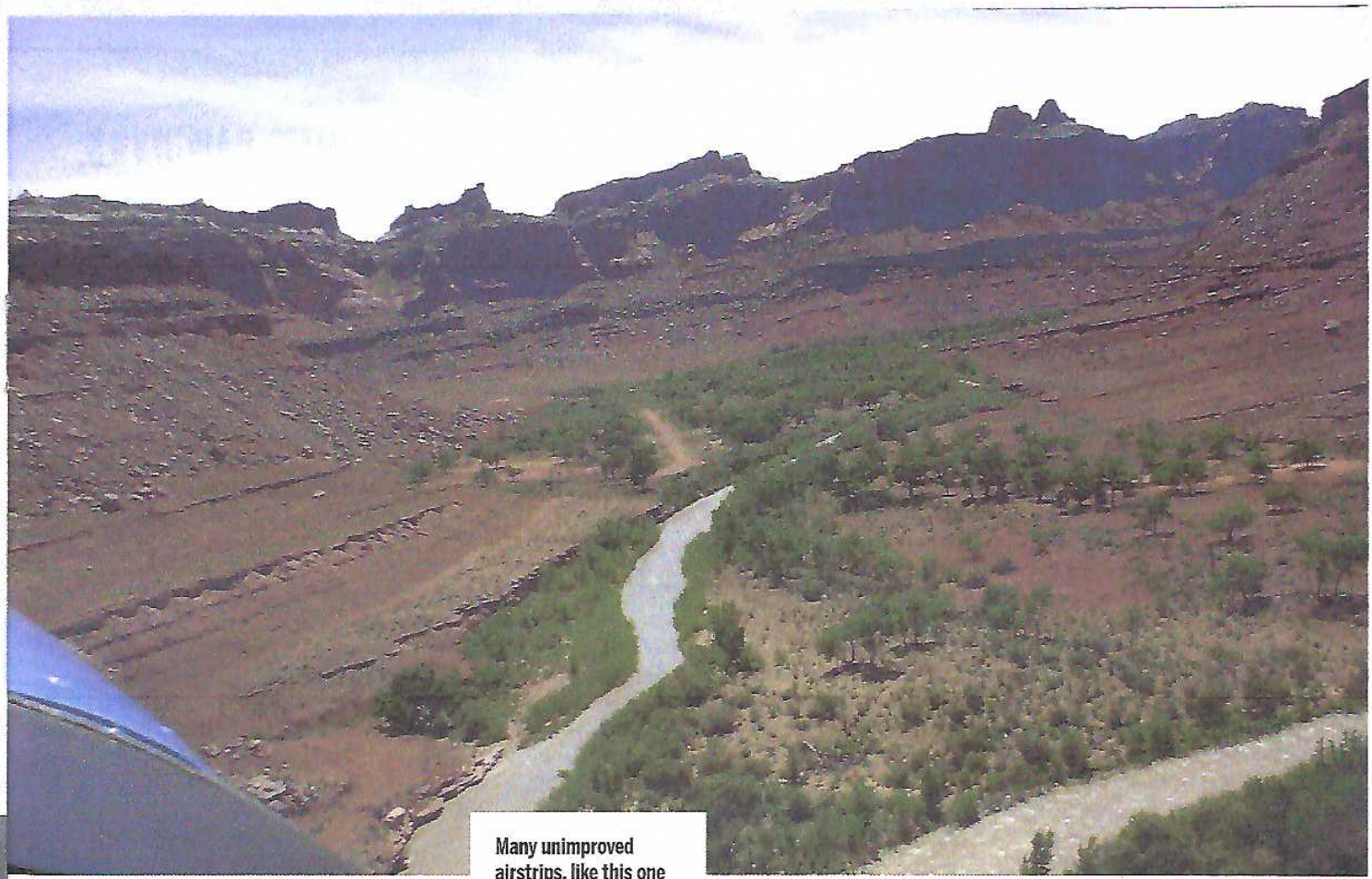
Canyon flying

Lori MacNichol teaches mountain flying at Mountain Canyon Flying in McCall, Idaho. MacNichol says she learned to fly because she wanted to be able to travel to backcountry Idaho to hook the big fish. She learned mountain and canyon flying in a Cessna 140. Almost any airplane can be flown in the backcountry provided the pilot factors in the (true) airplane performance and the dictates of weather (winds, air temperature, etc.).

MacNichol talks about a few of the

Alaska's Wood River Lodge depends on bush planes, like this Cessna 206, for delivery of people and goods.

Photo courtesy Accent Alaska.com / Alamy Stock Photo



Many unimproved airstrips, like this one in Utah, require precise airspeed control, as go-arounds are not possible.

most common pilot errors she sees in the first days of each class.

"Ninety percent of the people want to fly in the middle of the canyon," she said. "It's not flying close to the trees and the rocks that will kill you, it's not having enough room to turn around if you have to," she concluded.

Canyon flying tips are in Chapter 3 of Imeson's book. This chapter includes subjects such as: flying up canyons; beyond the point of no return; pass at the head of a canyon; flying up narrow canyons; subsidence and downdrafts in canyons.

There's also a section on course reversal procedures. Imeson writes, "the safest method to reverse course in a canyon is to trade speed in excess of best angle of climb for altitude by climbing as you make a 180-degree turn at the steepest bank angle you can comfortably make." What's the bank angle most pilots can comfortably make?

Let's remember that many pilots don't make a habit of practicing steep turns, especially turns with more than 45 or 50 degrees of bank. There's a good chance that most pilots have *never* done an extremely steep, 60-degree bank.

Maneuver speed and airspeed control

A speed Imeson calls "maneuver speed" is defined as the minimum speed to fly in a canyon when a turnaround is to be executed. This speed is approximately 15% greater than the stall speed adjusted for configuration. According to the Information Manual for the Cessna 172S, the stall speed in a 45-degree bank (flaps 10 degrees) is 50 kias. Add 15% (7.5) to arrive at 58 kias—Imeson's "maneuver speed."

Imeson also stressed that the scientific method was invaluable for safe bush flying. The following is Rule No. 3 in his Ten Commandments:

On a short runway, if 71% of the takeoff speed is obtained by the halfway point, the airplane will take off in the space remaining.

To use Rule No. 3, a pilot must know the takeoff speed of his airplane with its present loading, and the prevailing wind and density altitude. Multiply that by 0.71 for the 71% number. Then, he must pace off the runway length to put a visual sign such as a rock or a tree at the halfway point. If the 71% speed hasn't been clocked by the halfway point, abort the takeoff, and offload weight or wait for more favorable wind and weather conditions.

Regarding airspeed control, MacNichol says that many new students in her basic Mountain and Canyon Flying Fundamentals courses don't know how to fly a steep stabilized approach, nor do they know how to control their airspeed to the degree required. "Pilots have to be able to hold airspeed within 2 knots to meet our class completion standards," said MacNichol. *(Mountain Flying Seminars lists 12 courses through June 2020; individual instruction is also available. See link in Resources. —Ed.)*

Here's why that's important. Touching down at a speed

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that's 10% higher than normal will increase the landing distance required by 21%.

MacNichol says that many pilots in her classes are also hampered by their inability to be patient and to stay flexible. Mountain Canyon Flying instructors teach their students to "shop" an off-airport landing site before making the decision that it's safe to land. Shopping isn't always followed by landing.

Students are taught to always maintain an "I don't have to land" mindset. Plan each flight with enough fuel, daylight, etc. to safely return to the takeoff point or another safe landing spot. Imeson writes that this shopping trip must include observations about wind direction, runway slope, approach path, runway surface, and an estimate of runway length.

MacNichol said there's one more skill that seems to be lacking in the majority of the Mountain Canyon Flying students. It's an inability to move their chosen land point. In other words, adjust the touchdown spot in the last seconds before touching down.

An Alaska flight instructor's perspective

Dean Eicholz is an ex-Navy Grumman A-6 Intruder pilot who taught flying in Soldotna, Alaska, for over 30 years. His opinions are based on thousands of Alaska flight instruction hours. He is a retired Designated Pilot Examiner (DPE).

Eicholz says pilots that choose to go into strips that require "on-the-edge" flying must be able to execute perfectly every time. "Nine out of 10 isn't good enough; flying into some of these unimproved strips is like landing on an aircraft carrier," said Eicholz.

He often challenged pilots during examinations to make a soft-field takeoff in the distance spelled out in the POH. The lesson is that the 500- to 700-foot figure in the book is a very short distance—and that a realistic distance for the average nonprofessional pilot is book distance times two, or even three, especially if the strip is rough, sloped, and/or the winds are blustery.

Eicholz says pilots should ask themselves the following question: "If I don't really have a mission, why attempt to fly into an airstrip that puts everything I have at risk?"

Judgment and skill

Pilots wanting to learn the skills required to operate out of off-airport sites will increase the chances of enjoying the experience and enhancing safety by getting instruction, assembling a book of personal and airplane performance numbers, and learning how to do steep stabilized approaches to short and soft-field landings.

There's more to being safe than just skillfully flying the airplane. Gathering a working knowledge about local weather patterns, wind behavior in canyons and mountains, grasping the importance of topographical features such as river drainages (lower ground), and staying physically healthy all play a part in successful bush flying.

After the airplane is tuned and in tip-top shape, schedule a session with a good flight instructor to get up to speed before setting out, especially when other demands have cut back on recent stick time. Get comfortable with these new flying skills by first using them at strips with generous margins. Develop the diligent "scientific" approach to back-country flying that has been proven to be the safest approach.

Lastly, always carry survival gear. Always tell someone where you're going and when you plan to return. Install a 406 MHz ELT and register it. If that's not yet in the budget, at least carry a PLB.

Fred Potts wrote, "... in my humble opinion flying in Alaska is no more dangerous than down in the 'lower 48.' All it requires is a bit of judgment and common sense."

If you want to fly safely "out there," prepare well, prepare "scientifically," and then enjoy the wonder and fun that is only available to small airplane flyers flying into the wild.

STEVE ELLS has been an A&P/IA for 45 years. He is a commercial pilot with instrument and multi-engine ratings and loves utility and bush-style airplanes and operations. Ells was a tech rep and editor for Cessna Pilots Association and associate editor for AOPA Pilot. He owns Ells Aviation (EllsAviation.com) and lives in Templeton, California. Send questions and comments to editor@cessnaflyer.org.

RESOURCES

FRED POTTS' WEB OUTPOST
fepco.com/Bush_Flying.html

MCCALL MOUNTAIN CANYON FLYING SEMINARS
mountaincanyonflying.com

RECREATIONAL AVIATION FOUNDATION (RAF)
theraf.org