The Prevention of Gear-Up Landings

by Fred Furgang

Twenty years ago I was new to flying Bonanzas. I was trained by my flying club's CFI in our 1964 S35. My wife and I were flying the S35 from Miami to an airport in northern Florida. About half an hour out the alternator failed, so I conserved battery power for the landing. It was on short final that a pilot holding short of the runway announced on the radio: "Bonanza, your gear is up." I immediately lowered the gear and confirmed "down and locked," and landed uneventfully. As the saying goes, "Better lucky than smart." That anonymous pilot saved me a whole lot of grief!

Subsequent to that experience, I enrolled in several full weekend ground and air training sessions with the BPPP. I became a CFI myself and was asked to assist in the training of other Bonanza pilots. I was determined to formulate protocols for extending the landing gear that would decrease the probability that pilots would experience an inadvertent gear-up landing. According to ABS's Tom Turner, there is a gear-up Bonanza or Baron landing almost every week.

Training my primary students in Cessna Skyhawks and Piper Cherokees, I insisted that they perform a GUMPS checklist prior to every landing. In Skyhawks that included visually looking at the gear, as well as having me look at the gear from the right seat to verify that it was down and the tires intact. I loved those Beech Musketeers that had the mock gear handle installed.

Of course, in a Bonanza putting the gear down is more than an academic exercise. Since most training in the Bonanza starts with pattern work, I realized that this situation entails a great risk of a gear-up landing. ABS (and most other instructors in retractable gear airplanes) strongly advises against "touch and goes," which can easily result in a premature retraction of the gear. Always perform a full stop landing and taxi back unless you have a long enough runway to safely perform a "stop and go," and check that the aircraft is configured properly for the subsequent takeoff.

What are some of the potential distractions that can befall a pilot doing pattern work? The Bonanza will rapidly accelerate at level off, which may cause the distance between you, and the trainer ahead of you, to rapidly decrease. You may have to go from maximum engine power to a marked decrease in power to keep airspeed under control. You may notice some anomaly shortly after takeoff (e.g., the cabin door pops open). It can get very busy on the downwind with other aircraft entering the pattern, or instructions from ATC to extend or cut short the downwind leg.

If you normally lower the gear on the downwind abeam the numbers ("gear down to go down"), what do you do when you are told to extend your downwind and look for other inbound traffic before turning your base leg? You might get distracted on base leg by another aircraft reporting a long final. On final you may be concerned about the aircraft ahead of you clearing the runway in time for you to land. In other words, there are many possible sources of distraction that can, and frequently do, complicate pattern work and can provide just the interruption needed to result in a gear-up landing.

My solution to the question of where to put the gear down when staying in the pattern is simple: Put it down 50 feet prior to reaching pattern altitude. This provides several positive benefits. In a Bonanza you will usually reach pattern altitude on an extended upwind or crosswind leg. There are fewer possible distractions on these legs. Putting the gear down prior to reaching pattern altitude will prevent you from continuing to climb, as well as from rapidly accelerating on level off. The

power reduction required to maintain a safe pattern airspeed is less severe with the gear down. No matter what else distracts you on your way to the runway, your gear is already "down and locked." If for any reason the gear does not extend properly, you will have a much greater opportunity to recognize it and abort the landing.

When approaching an airport VFR from a distance away, why wait until you are in the pattern to drop the gear, with all the possible distractions mentioned above? My advice is to level off 500 feet above pattern a couple miles out. Then, when things look good to continue, lower the gear when leaving this altitude. Nothing else can distract you from lowering your gear.

What about instrument approaches? ABS/BPPP teach to drop the gear at the final approach fix (FAF) or glideslope intercept. This is perfect as the properly configured aircraft will now begin a descent of approximately 500 ft/min with no further change in configuration, power, or trim. Keep in mind that there are non-precision approaches that have no FAF, e.g., the VOR 5 to Naples, Florida (KAPF), where the VOR is on the field. The gear is lowered when you intercept the inbound course.

If you are on a descent to land with the gear still up, you may notice an abnormally high indicated airspeed, or lower than expected power setting. If you happen to be descending into a high headwind, your speed over the ground may look otherwise normal, until you experience a very short ground roll. This is why "flying by the numbers" is so critical: you know what performance to expect for any given power setting, configuration, and aircraft attitude.

To revisit the earlier described incident of my almost gear-up landing: What I should have done was to power up and abort the landing. Then, after consulting the POH, I could lower the gear on the remaining battery power, and after pulling the gear motor breaker, extend and crank the gear handle sufficiently to assure myself that the gear has indeed fully extended. It is important to understand that although the Bonanza's gear system has an uplock, it does not have a downlock. The gear remains extended on landing because the gear arms "over-extend." Like I said earlier, fortunately I was "better lucky than smart."

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