

# The Downsizing Checklist

## Seven Canopy Skills to Perfect Before Going Smaller for Performance

by **Bill von Novak**

**S**afety & Training Advisors spend a considerable amount of time telling people they shouldn't be loading their canopies so heavily. But 90 percent of the time, jumpers don't listen. Skydivers can have a bit of an ego, and many simply hear, "I think you're a crappy canopy pilot who can't handle a smaller wing." So they downsize anyway and break their legs, backs and pelvises with some regularity.

The dire-warning approach may not always be the most effective strategy, since jumpers often don't listen to people who tell them they're not as good as they think they are. Perhaps if jumpers have better tools to evaluate themselves, they'll make better decisions about canopy choices. It's one thing to have some boring S&TA guy give a jumper a lecture, it's quite another to try to perform a maneuver under canopy and fail. In that case, there's no one telling him that he's not flying the canopy well enough; it's obvious to him.

To that end, here is a list of canopy control skills everyone should have before downsizing. Some are survival skills (being able to flat-turn could save people every year), and some are canopy-familiarization skills (such as gentle front-riser approaches to teach how to judge altitude and speed at low altitudes). It's important that jumpers do these before they downsize, because some maneuvers are a little scary (turning at 50 feet? Yikes!), and the jumper should perform them on a larger canopy they're completely comfortable with.

When performing anything other than a standard landing approach, it is important for jumpers to separate their landings from others by either time (e.g., exiting on a separate pass) or distance (i.e., in an area specifically designated for such maneuvers and away from

those flying standard patterns). USPA recommends that all canopy pilots, particularly those new to the sport, receive professional canopy coaching prior to executing new maneuvers. This is not only the safest way to learn new tasks, but it will vastly improve your learning curve, as well. In addition, all new maneuvers should be attempted up high before attempting them near the ground, and an experienced instructor or canopy coach can help provide a visual reference by flying "base" (in other words, a set point by which you can gauge your altitude loss, etc., when performing maneuvers mid-air).

So, if you are considering downsizing, make sure you can perform the following skills under your current canopy:

### 1. Flat Turn 90 Degrees at 50 Feet

This is the most important of all the skills. The objective of this maneuver is to change your direction 90 degrees while losing as little altitude as possible, coming out of the maneuver at normal flying speed. "Coming out at normal flying speed" means you can instantly flare and get a normal landing. If you can do this at 50 feet and come out of the maneuver at five feet at a normal flying speed, you can flare and land well.

Every year people die because they decide they simply have to turn at 100 feet and know only one way to do it: pull down a toggle. Their parachutes dive and they hit the ground at 40 mph. To prevent this, not only do you have to know how to flat turn, you have to practice it enough so it becomes second nature. Then when you do need it, you won't have to think about it.

To practice this maneuver, start by toggle-turning the parachute



USPA recommends that all canopy pilots, particularly those new to the sport, receive professional canopy coaching prior to executing new maneuvers.

gently. Immediately follow that with some opposite toggle. The idea is that you want to flare just a little to counteract the canopy's desire to dive. Continue adding opposite toggle until you've stopped the turn. At this point, let both toggles all the way up. If you feel the parachute accelerate after you let up on the toggles (i.e., it feels like you are recovering from a flare), use less opposite toggle next time. If you feel like the parachute is diving as if you just did a toggle turn, use more opposite toggle next time. Basically, you want to start the turn with one toggle, stop it with the other one, and use just enough toggle to keep the wing from diving but not so much that you flare.

It should go without saying that you should practice this maneuver up high before you ever try it down low. If and when you do try it low, start at lesser angles (e.g., try a 15-degree turn first), make sure the pattern is clear, and make sure conditions are good (soft ground, gentle winds). Work up gradually to a full 90-degree turn.

Before considering downsizing, it is important to be able to perform at least some degree of flat turn when you're low; jumpers are horrible judges of exact altitudes when they're at 1,000 feet, and it's hard to tell if you've lost 50 feet or 200 in a turn. By trying it out low,

you'll get a better sense of what it can do for you, and you'll have the "sight picture" better set in your memory in case you have to use it for real one day.

A variation on the flat turn is to go to half brakes and then let one brake up. This gives you a flat turn, but by flaring first you use up some of the canopy's energy, so you can't turn as effectively. On the plus side, the turn happens more slowly. If you are about to hit a tree and feel that you can safely make a low turn, this variation might be the way to go, as it combines a turn and a flare, thus reducing your speed before impact. The USPA Integrated Student Program (ISP) currently teaches a version of this, so it might be a good way to make your first flat turns before transitioning to the less-braked variety.

## 2. Flare Turn at Least 45 Degrees

A flare turn does two things: It gives you another tool in your arsenal to dodge last-minute obstacles and teaches you to fly your canopy all the way through to the landing. The number-one mistake jumpers with new high-performance canopies make is to reach out to break their fall while they're flaring; this, of course, turns the



# The Downsizing Checklist

Seven Canopy Skills to Perfect Before Going Smaller for Performance

canopy in the direction they are reaching. Most people decide that this is due to a side gust just as they're landing. It's amazing how even experienced jumpers will report this phenomenon when landing a new canopy, although it's happening 40 to 50 times in a row (and always in the same direction)! Learning to flare turn will help eliminate this problem.

To flare turn, start with a normal flare, then flare just slightly more with one toggle. The canopy will turn. Bring the other toggle down to match it, and the canopy will straighten out. It's a dynamic process; rather than putting the toggles at a certain position, you have to increase your pull on one toggle for a second, then catch up with the other before you finish the flare. If you feel a rise upward under your canopy, then don't flare as quickly. If you drop to the ground, bring both toggles down more aggressively when they are at different heights. One thing that helps is to think about where your canopy is (in relation to your body) rather than what it's doing. In other words, use the toggles to move the canopy off to one side for a moment, then use the toggles to put the canopy back over your head. You will need to know the stall point of your canopy, and make sure you don't pull the toggles down so far that the canopy stalls before you land. Smooth and gentle input will help you stay in control during these maneuvers.

This can be hard to practice with a large canopy. It is possible to pull off a 45-degree turn under even a large student canopy, but the flare is over so quickly that it's hard to notice. It gets much easier to achieve noticeable results on a canopy loaded around 1:1.

It's possible to pull off a nearly 180-degree turn at just above 50 feet if you combine a flare turn with a flat turn. However, knowing how to do flat and flare turns simultaneously doesn't mean you can always turn at 50 feet and get away with it. Oftentimes it's better to accept a downwind landing than to make a turn at a dangerously low altitude. But if you do absolutely have to turn low (say, you're on course for the electrified fence around the pit-bull farm) a flat/flare turn will let you either turn and land normally or at least minimize the damage caused by landing in a turn.

## 3. Land Crosswind and in No Wind

These are straightforward. No-wind landings are pretty easy; the only issue is that your perception of speed and altitude will be off. Since you seem to be moving more quickly over the ground when there's no wind (which you actually are), it can seem like a good idea to add just a little brake to slow yourself down before you land. Resist that urge! Keep that speed in your canopy; converting speed to lift is how you can achieve a full flare.

Crosswind landings can be a little trickier because of the strong tendency to reach out to break your fall. Your goal should be to keep your wing level with the ground throughout the landing flare. It requires careful attention, finesse and quick-but-subtle reactions to really land well in crosswind conditions—especially if the winds are stronger than five mph. Be ready to make a parachute landing fall in case the landing is not as smooth as you would like. If you want to get fancy (and traffic permits), try a flare turn into the wind after you start your flare on the crosswind landing—you can easily pull off a standup landing if you've turned enough before you put your feet down.


If these work well, you may want to try a downwind landing. The benefit is that it will prepare you to accept a downwind landing in the future; you won't be tempted to turn too low trying to avoid it. Choose an ideal day with low winds for this one. You should have a clear landing area that is slippery (wet grass is perfect). Prepare to PLF, and think about laying it down on your thighs as you land to start sliding. (The position you want to be in as you slide is very close to the baseball "sliding into home plate" position. If you get the side of your thigh and calf dirty, you're doing it right.) You can slide across grass at 30 mph without getting hurt, but planting your feet and cartwheeling at those speeds can be very dangerous.

## 4. Land Reliably within a 10-Meter Circle

Essentially, this is the requirement for getting a USPA PRO Rating. It is critical because your accuracy skills are what will keep you from having to turn low in the first place. It's very comforting to know that you can land in any 50-ish-foot clearing if you find yourself landing out; it's especially important as you progress to smaller canopies that need longer landing areas to land well. Your only option may be a section of road, and you may have to hit the beginning of the road spot-on to have enough room to slow down.

The subject of canopy accuracy is too long to do justice to here, but the top three hints are: 1) If you're not sure if you're going to make it over a wire or tree, look at what it's doing with respect to the background. If more background is appearing from beneath the wire or tree, you're probably going to make it. 2) As you look at the ground, most points will seem to move away from a central point. Some will rise, some will fall, some will appear to move out to the side. If you look long enough, you'll find one point that's not moving; that's where you're going to land if the winds don't change (which they most likely won't). 3) Going into brakes usually makes you land short when flying into the wind but can extend your glide in no wind. Front risers almost always make you land shorter.





When performing anything other than a standard landing approach, it is important for jumpers to separate their landings from others by either time or distance.

### **5. Initiate a High-Performance Landing with Double-Front-Riser Input, and Make a Front Riser Turn to Landing**

Landing with front risers is only a requirement for jumpers who wish to begin learning speed-induced landings. Jumpers should progress to front-riser landings under the supervision of a trained canopy coach. Once a jumper is familiar with using his front risers to make a turn to final approach for landing, the technique offers several advantages over toggle turns.

With proper training, front-riser high-performance landings (particularly double-front-riser landings) are a lot safer than toggle-turn high-performance landings. Up to a point, if you turn too low or become worried about the landing, just release your grip on the risers and you're back to normal flight. However, if you are too low, you will still not be able to stop the rapid descent before you hit the ground, and the penalty for mistakes can be pretty high. The injuries could be severe or even fatal. If you decide to learn to use your front risers for landing, practice a lot up high before you initiate any of the maneuvers for an actual landing. In order to get used to the added speed and different sight pictures you will experience with speed-induced landings, start with straight-in approaches using double front risers before you progress to turning with one front riser.

Remember to always keep a hold on your toggles, even when using your front risers for input.

For double-front-riser landings, set up for a normal landing, but aim for a point a little farther away than you normally do. At 100 feet or so, pull down both front risers. Your canopy will drop and accelerate. At some point above the ground (60 feet or so, depending on your canopy), let up on the front risers. Your canopy will begin to recover. It is critical that you learn the recovery arc of your canopy and how to manage the speed and descent rate for every landing that involves speed-inducing techniques such as front-riser input. It is better to err on the high side when starting this maneuver by letting up on the front risers before landing. Once you are getting it right, the recovery arc should allow the canopy to plane out just a few feet above the ground and fly parallel with the ground before you add toggle input to finish the landing. Start your flare normally. You may need to use less toggle pressure than normal, since the canopy is now going more quickly than normal and the same amount of toggle input gives you more lift. You will also plane out farther, since you have more speed you have to bleed off before you come to a stop. Practice this maneuver above 1,000 feet until you are smoothly transitioning between front risers to toggles. A digital altimeter can help you see how much altitude you are using during each maneuver.



# The Downsizing Checklist

Seven Canopy Skills to Perfect Before Going Smaller for Performance

For front-riser turns to landing, first try front-riser turns above 1,000 feet and get used to how your canopy recovers. Then start by coming in 10 degrees off the wind line and making a gentle front-riser turn to line up into the wind at approximately 100 feet. The canopy will dive and accelerate, so be prepared to instantly drop the front riser and flare if you have to.

Also be prepared to steer during your flare, since the canopy may not have stopped turning completely before your flare begins. Done correctly, you'll start your flare with more forward speed, giving you a longer plane-out. However, if you had to abort your turn and start flaring early to keep from hitting the ground, your turn was initiated too low, and you are now in a potentially dangerous situation. Experienced canopy pilots can pull off this maneuver and create impressive carving turns while landing. But none of them started out with such a maneuver, and it takes a great deal of practice to get to this point.

Make sure your flares are smooth when you perform this maneuver! A smooth flare generates more lift for a longer period of time than stabbing the brakes. However, don't start your flare at 30 feet—starting the flare that high will slow the canopy down, negating the effects of the front-riser approach. If you do find yourself stabbing the brakes to prevent hitting the ground, move up the altitude at which you start your front-riser turns.

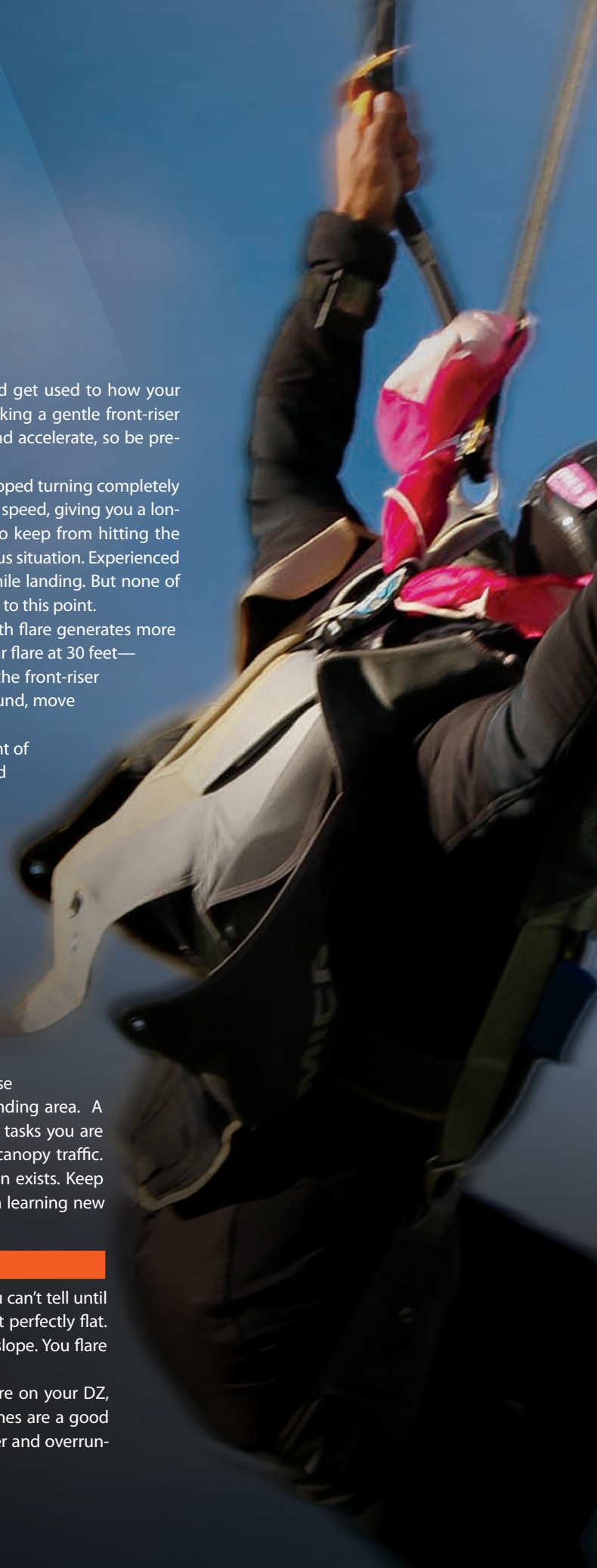
Probably the most critical skill you will get from this exercise is the development of your "sight picture." Below 200 feet, your altimeter is pretty useless (and you should be looking at traffic and the landing area, anyway). Eventually you'll develop a sense of what "picture" you should see just before you start your riser turn. The picture will vary with wind, landing area, etc. If you arrive at the point where you would normally start your front-riser turn and the picture's not right, abort it and land normally.

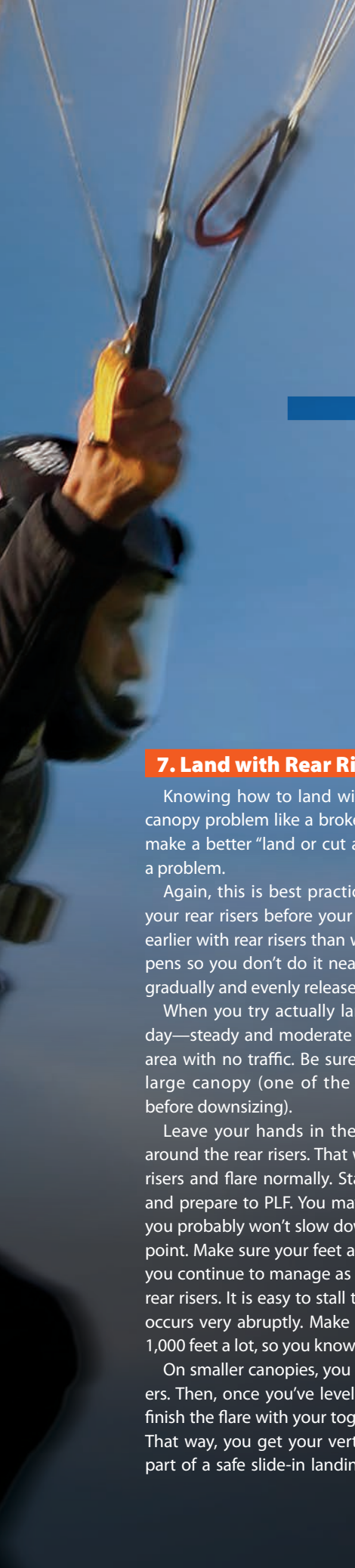
Once you have your sight picture down and are doing front-riser turns that transition to gradual flares, start increasing the angle of your turn. Once you get to 90 degrees, you're going to be gaining a lot of speed, so be sure to adjust your sight picture to compensate. As always, bail out by dropping your grip on the front risers if you feel like there's anything wrong. Once you drop the risers, level the wing with your toggles and prepare to flare. At worst, you'll have to land cross-wind, but that's a skill you should have at this point anyway. When learning these maneuvers, it's a good idea to get out on a low pass to ensure a traffic-free landing area. A separate, low pass with no other canopies in the air allows you to focus on the tasks you are learning, without having to constantly check airspace and worry about other canopy traffic. Even if you are in the air with just one other canopy, the potential for a collision exists. Keep yourself safe, and insist on making a completely separate pass for yourself when learning new canopy skills.

## 6. Land on a Slight Upslope or Downslope

Often, landing areas away from the DZ aren't perfectly flat, and sometimes you can't tell until you're at 20 feet. To prepare for this, find a place on your landing zone that's not perfectly flat. Scope it out, and plan on landing there. There's no magic trick for landing on a slope. You flare more aggressively to land going uphill, less aggressively to land going downhill.

Obviously not all DZs have slopes. If you don't have a good slope somewhere on your DZ, you may have to put this one off until you're at a DZ that does have one. Beaches are a good place to practice this, since they have fairly predictable slopes down to the water and overrunning your landing just means you get wet.





It makes a lot more sense to learn these skills on a larger canopy before you start jumping a smaller canopy that will scare or hurt you if you're unprepared.

## 7. Land with Rear Risers

Knowing how to land with rear risers can help you deal with a canopy problem like a broken or stuck brake line and can help you make a better “land or cut away” decision when you do have such a problem.


Again, this is best practiced up high. See how far you can pull your rear risers before your canopy starts to stall. It will stall much earlier with rear risers than with toggles; memorize where that happens so you don't do it near the ground. If your canopy does stall, gradually and evenly release your rear risers to return to full flight.

When you try actually landing with rear risers, choose an ideal day—steady and moderate winds, soft ground and a clear landing area with no traffic. Be sure to try this for the first time on a fairly large canopy (one of the reasons you should do these things before downsizing).

Leave your hands in the toggles and wrap your whole hands around the rear risers. That way, if things go awry you can drop the risers and flare normally. Start your flare at a normal flare altitude, and prepare to PLF. You may get the sort of lift you're used to, but you probably won't slow down as much before you're near that stall point. Make sure your feet are on the ground (sliding, preferably) as you continue to manage as much of the speed as possible with the rear risers. It is easy to stall the canopy with rear risers, and the stall occurs very abruptly. Make sure you practice this maneuver above 1,000 feet a lot, so you know where the stall point is.

On smaller canopies, you may want to start the flare with rear risers. Then, once you've leveled the canopy out, drop the risers and finish the flare with your toggles (which are still around your hands). That way, you get your vertical speed to zero, which is the critical part of a safe slide-in landing, and you will still be able to stop the

canopy without hitting the ground going too quickly. (This is also a technique used by swoopers to extend their swoops, by the way.)

This list does not include all the skills you need to fly a canopy safely; it is simply a checklist of skills you should have before downsizing. These are skills you should learn before you downsize, although some (like the flare turn) can be difficult to practice on lightly loaded canopies. On higher-performance canopies at 1:1 loadings and higher, skills like the flare turn become both possible and necessary to practice so you can hone your skills while under a canopy that tolerates minor mistakes. It makes a lot more sense to learn these skills on a larger canopy before you start jumping a smaller canopy that will scare or hurt you if you're unprepared. If you can't perform some of these skills yet, get professional canopy coaching until you can. Once you can do them all, only then should you consider a smaller canopy. And someday, when someone cuts you off under that small canopy, you'll have the training to react properly. Then, even if you haven't completely adapted to the smaller canopy yet, the correct reaction will most likely save your life. 

### About the Author

*Bill von Novak, D-16479, made his first jump in 1991. Since then he's worked as an organizer, an S&TA and a chief instructor and has taught students via static-line, tandem and AFF methods. He has been on three big-way formation skydiving world records and currently works as a videographer at Skydive Perris in California. He lives with his wife, Amy, in San Diego.*

