Accelerated Freefall (AFF) Category B-H Training Aid

All training to be conducted by instructors of the:

Last Revised, 9/5/2022

This Book Belongs to:

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WARNING

IMPORTANT NOTICE AND DISCLAIMER

SPORT PARACHUTING, ALSO REFERRED TO AS SKYDIVING OR "*JUMPING OUT OF A PERFECTLY GOOD AIRPLANE*," IS A POTENTIALLY DANGEROUS AND HIGH-RISK ACTIVITY THAT MAY BE HAZARDOUS AND MAY CAUSE OR RESULT IN SERIOUS INJURY OR DEATH TO ITS PARTICIPANTS, EVEN WITH PROPERLY FUNCTIONING EQUIPMENT. WHENEVER A PERSON LEAVES THE GROUND, HE OR SHE RISKS INJURY AND EVEN DEATH. WHETHER TO ACCEPT OR REJECT THIS RISK AND ITS ACCOMPANYING CHALLENGE MUST BE A PERSONAL DECISION. EACH INDIVIDUAL PARTICIPANT, REGARDLESS OF EXPERIENCE, HAS FINAL RESPONSIBILITY FOR HIS OR HER OWN SAFETY. PARTICIPATION IS VOLUNTARY. YOU MUST WEIGH THE RISK AND THE REWARD. Even properly designed, built, assembled, packed, maintained, and used parachutes sometimes malfunction. The results of such malfunctions are sometimes serious injury or death. If you are not willing to accept the risks of sport parachuting, then you should reconsider your involvement in sport parachuting. **THE USPA AND START SKYDIVING LLC ARE NOT AND CANNOT BE HELD LIABLE FOR ANY JUMP OR TRAINING OPERATIONS THAT RESULT IN INJURY OR DEATH TO ANY PARTY.**

You must always read, follow, and comply with all warning labels, manuals, instructions, training, procedures, rules, laws, regulations, requirements, and recommendations put forth and enforced by the manufacturers of all of your equipment and aircraft, the drop zones and airports at which you are jumping (including Start Skydiving LLC and the Middletown Regional Airport), the United States Parachute Association (USPA), the Federal Aviation Administration (FAA), and all of the applicable governing authorities (city, county, state, province, and/or federal/national).

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Exercising proper precautions and procedures can enhance an individual's safety. This manual contains some of the knowledge and practices that, in the opinion of the USPA and Start Skydiving LLC, will promote the safe enjoyment of skydiving. **THIS MANUAL PROVIDES PROCEDURES TO ADDRESS MANY FORESEEABLE SITUATIONS, BUT EACH SITUATION IS DIFFERENT. DEVIATIONS FROM THESE RECOMMENDATIONS DOES NOT IMPLY NEGLIGENCE AND ARE NOT TO BE USED IN A COURT OF LAW TO DEMONSTRATE NEGLIGENCE. REGARDLESS OF ANY STATEMENTS MADE IN ANY PUBLICATIONS, THE USPA AND START SKYDIVING LLC HAVE NEITHER BEEN GIVEN NOR ASSUMED ANY DUTY TO ANYONE AND SHALL HAVE NEITHER LIABILITY NOR RESPONSIBILITY TO ANY PERSON OR ENTITY WITH RESPECT TO ANY LOSS OR DAMAGE CAUSED OR ALLEGEDLY CAUSED DIRECTLY OR INDIRECTLY BY THE INFORMATION CONTAINED IN THIS BOOK. THE USPA AND START SKYDIVING LLC HAVE NO OBLIGATION TO ANYONE CONCERNING HIS OR HER SKYDIVING ACTIVITIES.**

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Your skydiving instructor will be happy to explain any area of this book that is not clear to you.

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In Memory of

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&

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Freefall Priorities

1. Pull! Pull! Pull! Regardless of stability, no matter what, ALWAYS PULL!
2. Pull by the proper altitude. You must always know your altitude!
3. Pull by the proper altitude while stable.

Landing Priorities

1. Land with your wing level, flying in a straight line. No low turns below 300 feet!
2. Land in a clear and open area, avoiding obstacles.
3. Flare to at least half brakes and prepare to perform a parachute landing fall (PLF).

Other Good Advice

Be altitude aware. It will save your life.

If you are unsure about something, ask an instructor.

Do not get discouraged. Take it one jump at a time.

Plan the dive, dive the plan, and always have a backup plan.

Seek professional coaching when learning new skills whenever possible.

Do not push yourself beyond your current capabilities.

Set SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals.

Know when to say NO. Use good judgment to avoid dangerous situations outside of your comfort/skill level (i.e., jumping in high winds, borrowing equipment, large formation jumps, freeflying, CRW, high performance landings, wingsuiting, etc.…).

Be safe and have fun! ☺

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Mental Relaxation:

The Key to Body Flight

In the early Categories, like a magic mantra, you will hear repeatedly from your instructors: "Altitude, arch, legs, relax." Managing all four points at once is the key to controlled freefall.

After altitude awareness, relaxing is your key goal. It takes only a little push from the hips to get an effective arch, and you usually need to extend your legs only a little to get use of them in the wind. However, you need to relax your other muscles a lot.

So how can a brand-new skydiver relax in such an adrenaline-charged, exciting, and new environment?

Sports psychologists all recognize the value of staying loose and mentally relaxed for peak performance. Many describe ways to achieve a state of prepared relaxation. Each athlete learns to develop one technique and uses it to gain that state before and maintain it during every performance.

Almost all the techniques begin with slower, deeper, controlled breathing. Learn to breathe from deep in your lungs, using the muscles of your diaphragm. Practice breathing in slowly until your lungs are full and then emptying your lungs completely when you breathe out.

While you practice controlled breathing, you can use one of several suggested devices to relax your mind and your body:

- Imagine yourself in a familiar, comfortable place, trying to visualize every sensual experience that you can associate with it: sight, sound, odor, taste, and touch. Picture the colors of the background and the details, try to smell the air as it would be, imagine you hear the sounds, and feel the air on your face. Imagine you just took a sip of your favorite drink.

- Relax your body part-by-part, starting with your toes, then your ankles, calves, thighs, hips, abdomen, etc., spending five to ten seconds in each place while continuing your controlled breathing.

- Count up to ten with each breath and then backward to zero.

There are many other relaxation techniques you can borrow or develop, but choose one and practice it until you perfect it, even when you are not skydiving. That way, you can relax yourself quickly and effectively whenever the need arises—such as just before a skydive.

As you are getting ready to jump, you should continue controlling your breathing. Move slowly and deliberately in the aircraft as you approach the door and get into position, not only to help you maintain your relaxed, prepared state for the jump, but also for safety. Take another breath just before you actually launch from the aircraft and another to help you settle into freefall as soon as you let go. Make breathing part of every sequence, especially as you go through your "altitude, arch, legs, relax" sequence.

While skydiving is inherently a high-speed sport, you will notice that the best skydivers never do anything in a hurry.

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Category B

One Jump with Two Current USPA AFF Instructors

In Category B, you learn to be more comfortable in the skydiving environment. You perform leg awareness exercises to improve control and may even perform assisted turns (if time) in preparation for heading maintenance in Category C and controlled turns in Category D. Training in this category reviews and expands your understanding of the canopy landing pattern and the airport environment, with attention to avoiding aircraft on or approaching the runways. You help with pre-flight planning and the use of the written flight plan, including the opening point, the projected wind line, and the landing pattern. In addition, you learn to use the runway as a reference for direction and distance when observing the drop zone from the aircraft or under canopy. Your emergency review emphasizes topics from the first-jump course on parachute malfunctions. In Category B, you become more responsible for your equipment, particularly while moving around and inside the aircraft. Study topics introduce USPA Basic Safety Requirements for student jumps. To advance, you should monitor altitude and deploy at the correct altitude without prompting from any instructors.

Learning and Performance Objectives

- Adapting and relaxing in the skydiving environment
- Heading and altitude awareness
- Stable parachute deployment without prompting or assistance
- Planning and flying the landing pattern & flaring with assistance
- Written flight plan
- Airport orientation
- Protecting handles
- Equipment emergency review

Rules and Recommendations

Review the USPA Basic Safety Requirements (BSRs) on supervision and progression requirements for students.

1. General:
   a. All student-training programs must be conducted under the direction and oversight of an appropriately rated USPA Instructor until the student is issued a USPA A-License.
   b. A person conducting, training, or supervising student jumps must hold a USPA instructional rating according to the requirements that follow.
   c. On any student jump, the supervising instructor or both instructors if a two-instructor jump, must submit a completed incident report to USPA within 48 hours if any AAD was activated on the jump. No disciplinary action will result from this self-report.
   d. Each Instructor or Coach must ensure that all gear used on a student jump has received a complete gear check and is ready to jump before boarding the aircraft.
2. First-jump course:
   a. All first-jump non-method-specific training must be conducted by a USPA Instructor or a USPA Coach under the supervision of a USPA Instructor.
   b. All method-specific training must be conducted by a USPA Instructor rated in the method for which the student is being trained.
3. All students must receive sufficient training in the following areas to jump safely:
   a. Equipment
   b. Aircraft and exit procedures
   c. Freefall procedures
   d. Deployment procedures and parachute emergencies
   e. Canopy flight procedures
   f. Landing procedures and emergencies

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4. Harness-hold program advancement criteria:
   a. All students must jump with two USPA AFF rating holders until demonstrating the ability to deploy reliably in the belly-to-earth orientation at the correct altitude without assistance, except:
      (1) Students who have been trained in a wind tunnel may jump with one AFF rating holder after demonstrating the following in the wind tunnel:
         (a) basic stability (neutral body position)
         (b) heading control
         (c) controlled forward and backward motion
         (d) controlled turns
         (e) proper response to hand signals
         (f) simulated altimeter checks and time awareness
         (g) wave-offs
         (h) simulated main parachute activation
      (2) The wind tunnel training and tunnel flight sessions must be conducted by an AFF rating holder, or a tunnel instructor who is under the direct supervision of an AFF rating holder. All training must be documented.
   b. All students must jump with one USPA AFF rating holder, exit safely, maintain stability, and deploy at the planned altitude without assistance prior to attempting disorienting maneuvers.
   c. All students must jump under the direct supervision of an appropriately rated USPA instructor until demonstrating stability and heading control prior to and within five seconds after initiating two intentional disorienting maneuvers involving a back-to-earth presentation.

5. Student training for group freefall (Coach or AFF):
   a. Student freefall training for group freefall jumps must be conducted by either a USPA Coach or a D-license holder approved to make coach jumps by their S&TA, under the supervision of a USPA Instructor, and;
   b. The maximum group size allowed for any group skydive is four if that group includes any solo students cleared for self-supervision. The solo student must have successfully demonstrated the skills of ISP Category G. There must be at least one instructor, coach, or D-license holder (that has been approved by an S&TA) for each student involved.

6. No skydiver will simultaneously perform the duties of a USPA instructional rating holder and pilot-in-command of an aircraft in flight.

7. All student jumps, including tandems, must be completed between official sunrise and sunset.

Review the BSRs on wind limits for students (waiverable by a USPA S&TA)

1. **Maximum ground wind limits for all solo students (waiverable by a USPA Safety & Training Advisor) are 14 mph for ram-air reserve canopies and ten mph for round reserve canopies.**
2. There are no wind limitations for licensed skydivers. Licensed skydivers must exercise judgement.

Review the BSRs on minimum required deployment altitudes for students

1. Minimum container opening altitudes above the ground for skydivers are:
   a. Tandem jumps: 5,000 feet AGL
   b. All students and A-License holders: 3,000 feet AGL
   c. B-license holders: 2,500 feet AGL
   d. C and D-license holders: 2,500 feet AGL (waiverable to a minimum altitude of 2,000 feet AGL)

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BSRs on drop zone requirements for students and what are considered hazards

1. Areas used for skydiving should be unobstructed, with the following minimum radial distances to the nearest hazard:
   a. **Solo students and A-License holders: 330 feet**
   b. B- and C-license holders and all tandem skydives: 165 feet
   c. D-license holders: 40 feet
2. **Hazards are defined as telephone and power lines, towers, buildings, open bodies of water, highways, automobiles, and clusters of trees covering more than 32,292 square feet.**
3. Manned ground-to-air communications (e.g., radios, panels, smoke, lights, etc.…) are to be present on the drop zone during skydiving operations.

Equipment

1. Parachute deployment with opportunities for malfunctions explained (actually deploy it on the ground):
   a. Lost, missing, or unrecoverable main deployment handle
   b. Impossible main deployment handle extraction (hard pull)
   c. Pack closure (closing sequence, bridal routing, pin orientation, etc.)
   d. Pilot chute hesitation (burble)
   e. Pilot chute in tow
   f. Premature deployment (premature container opening)
   g. Pilot chute entangled with jumper or equipment (horseshoe)
   h. Bag lock
   i. Streamer
   j. Line over
   k. Tension knots
   l. Fabric or line failure sufficient to interfere with control and flare (broken lines or canopy damage)
   m. Slider hang up (stuck slider)
   n. Control line entanglement (stuck or locked toggle)
2. Review parachute retrieval after landing, including stowing the toggles and daisy-chaining the lines.

Spotting and Aircraft

1. Minimum, careful movement in the aircraft helps prevent premature activation.
2. Runway lengths and headings (use of a compass):
   a. The runway heading provides a reference for direction (north, south, east, and west).
   b. The runway length provides a reference for judging distance from the air (in tenths of a mile for GPS and Loran).
   (*Note: The Middletown Airport's runway is oriented 050°-230° (NE-SW) and is 6,100 feet in length.)*
3. Winds are described by their direction of origin, said as a compass heading (for example, "The winds are two-thirty," means the winds are blowing from the southwest).
4. Avoid runways and approaches, including getting clear of a runway after landing on or near one.
5. Crossing the runway:
   a. Avoid crossing the primary paved runway under canopy below 1,000'. Avoid the ends below 2,000'.
   b. Before crossing on foot, stop at least 200 feet away from the edge of the runway and carefully scan both ends of the runway for aircraft both on the ground and in the air multiple times.
   c. If you see an aircraft about to takeoff or land, kneel on the ground until it has cleared the runway.
   d. Once the runway appears to be clear of all traffic, quickly run straight across the runway.
   e. As you are crossing, continue to scan for aircraft that may be taking off or landing.
   f. If you see an aircraft about to takeoff or land before you are halfway across, turn around and run at least 200 feet back into the grass on the side where you were before you started crossing.
   g. If you see an aircraft about to takeoff or land after you are halfway across, immediately clear the runway by running forward until you are at least 200 feet into the grass on the other side.

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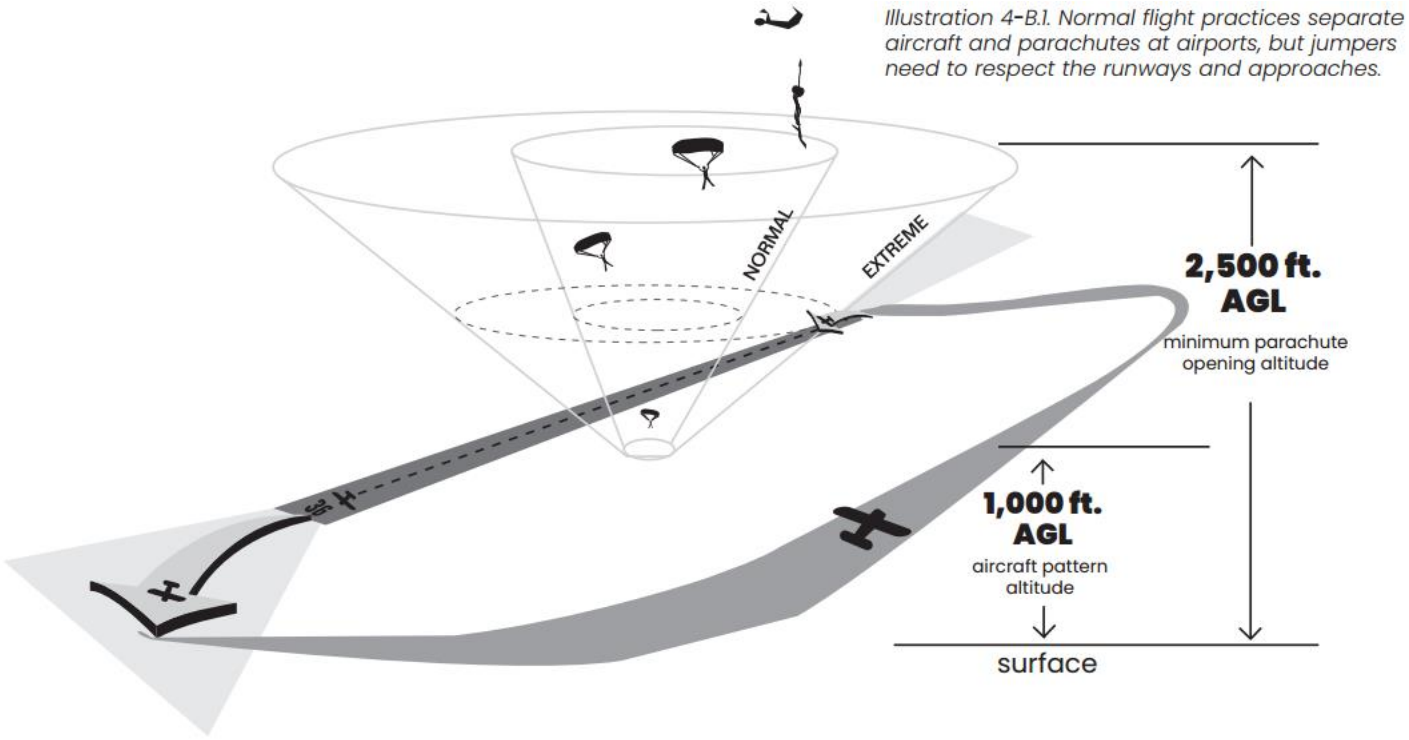
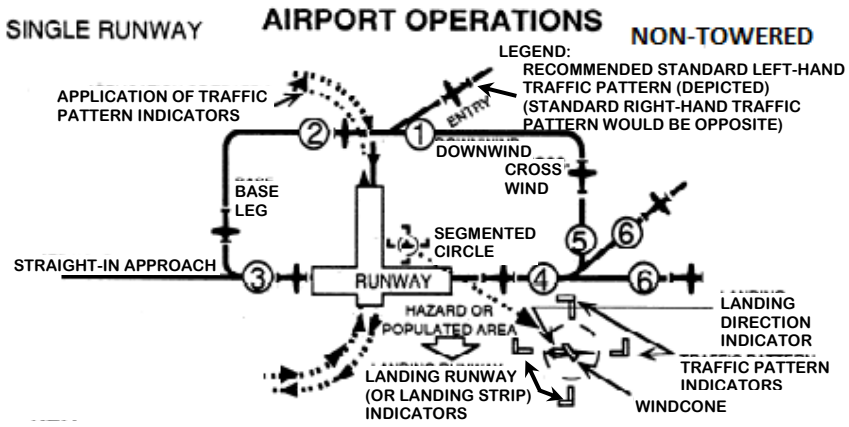
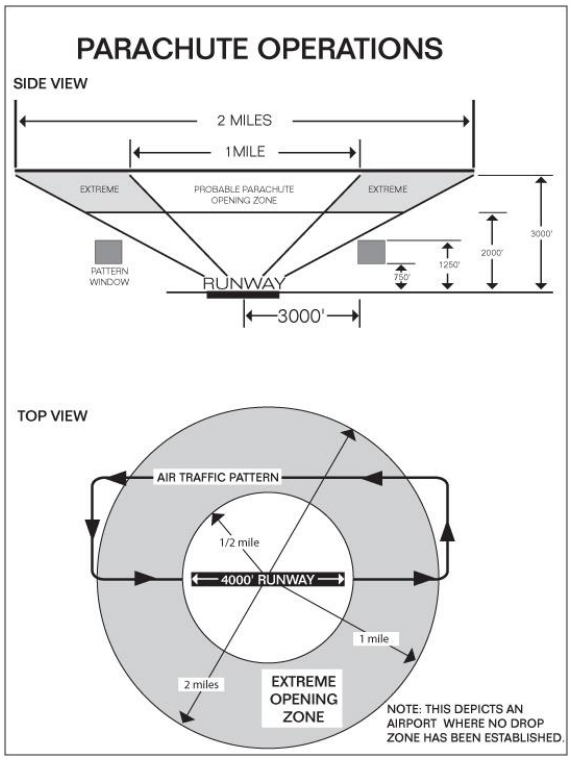
6. Discuss local aircraft traffic approach altitudes and landing patterns and their relationship to canopy approach and landing patterns. (Study Illustrations B.1, B.2, and B.3 below.)



Illustrations B.1, B.2, and B.3: Normal flight practices separate aircraft and parachutes at airports, but jumpers need to respect the runways and approaches.

Note: All diagrams depict a non-towered, single-runway airport where no drop zone has been established.





KEY

① Enter pattern in level flight, abeam the midpoint of the runway, at pattern altitude.

② Maintain pattern altitude until abeam approach end of the landing runway on downwind leg.

③ Complete turn to final at least 1/4 mile from the runway.

④ Continue straight ahead until beyond departure end of runway.

⑤ If remaining in the traffic pattern, commence turn to crosswind leg beyond the departure end of the runway, within 300 feet of pattern altitude.

⑥ If departing the traffic pattern, continue straight out, or exit with a 45° turn (to the left when in a left-hand traffic pattern; to the right when in a right-hand traffic pattern) beyond the departure end of the runway, after reaching pattern altitude.

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Exit and Freefall

1. Student-led exit: Review the exit setup from Category A. ("Right hand, right foot, left hand, left foot")
   a. Climb-out and exit procedures prepare you to meet the relative wind in a stable, belly-first freefall body position.
      (1) Move to climb out into position using practiced steps for efficient placement in the door.
      (2) The prelaunch position setup should place your belly into the relative wind as part of the launch from the plane.
   b. Count: Verify that the instructors are ready.
      (1) Call "Check in!" to the inside instructor, who responds with, "OK!" a smile, nod, & shake.
      (2) Call "Check out!" to the outside instructor, who responds with, "OK!" a smile, nod, & shake.
      (3) Look forward toward the propeller. Take a deep breath in & out to relax. Then begin a verbal & physical cadence of three ("UP, DOWN, ARCH!") to help the instructors leave simultaneously.
      (4) On "ARCH!" push off the plane horizontally, take a deep breath to relax, arch your back, push your hips forward, extend your legs out, look up, and watch the plane fly away.
      (5) After stepping off the plane, take another deep breath to relax and count aloud by thousands using: "PLANE-one-thousand, ARCH-two-thousand, LEGS-three-thousand, ARMS-four-thousand, BREATHE-five-thousand", and then do a Circle of Awareness (CoA) to check heading and altitude and establish communication with the instructors.
      (6) You must exit soon after climb-out to ensure that you open the parachute over the correct place on the ground.

2. Altitude awareness to recognize & act at the assigned pull altitude is the most important task in freefall.

3. Short Circles of Awareness (Short CoAs): "Altitude, arch, legs, relax" (spend one second on each task)
   a. Know your altitude.
   b. Check your arch (hips forward a little).
   c. Check your legs (most beginners need to extend their legs a little and point their toes).
   d. Relax.
      (1) Consciously breathe deeply in and out to release tension.
      (2) Use this technique just before and after releasing from the aircraft.
   e. Repeat to establish and maintain awareness, stability, and control.

4. Leg awareness: You practice leg awareness by extending legs while arms remain in a neutral position.
   a. Extending the legs from the neutral position adds more drag in the back, lifting your lower body.
   b. The off-level attitude causes you to slide forward on the deflected air.
   c. Hold the position for three seconds and return to neutral to cancel the effect.
   d. Finish all maneuvers 1,000 feet above wave-off altitude or 6,000 feet AGL, whichever comes first.

5. Maintaining a heading:
   a. First, relax into a comfortable, arched, symmetrical, strong, stable, neutral "box" body position.
   b. Find a point ahead on the horizon as a heading reference.
   c. If altitude permits (above 7,000 feet AGL), team turns are performed:

(Although not required, team turns, like relaxation, may aid a student in preventing turns on later jumps.)

      (1) Check the altitude. Look ahead toward the horizon and choose a fixed heading.
      (2) Your instructors will then attempt to turn you 45° to the right off of your original heading.
      (3) Counter this turn and go back to your original heading by dipping the left shoulder and twisting your upper body at the waist while keeping your arms fixed to deflect air to the right side.
      (4) Stop the turn by returning to a neutral body position once your body is pointing at the heading.
      (5) Check the altitude. Your instructors will turn you left if time permits (above 7,000 feet AGL).
      (6) If you forget to initiate the turn back, your instructors may help you initiate the turn for you.
   d. Finish all maneuvers 1,000 feet above wave-off altitude or 6,000 feet AGL, whichever comes first.

6. Deployment:
   a. Perform at least three consecutive unassisted practice pilot chute touches or continue to perform more until they are smooth and you are comfortable with locating the deployment handle in freefall
   b. Wave-off to signal deployment at 5,500 feet.
   c. Pull by 4,500 feet without prompting or assistance from any instructors.

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Emergency Procedure Review

1. **You must always practice your emergency procedures before your first jump of each day!**
2. Review pull priorities are in the following order of importance (top down):
   (1) Pull! Pull! Pull! **ALWAYS PULL, REGARDLESS OF ALTITUDE OR STABILIY!**
   (2) Pull at the correct altitude! Always deploy at the planned altitude, regardless of stability!
   (3) Pull at the correct altitude while stable.
3. Review and practice recognizing and responding to deployment handle problems for manual activation:
   a. Make only two additional attempts or use only two additional seconds, whichever one comes first, to correct the problem before initiating emergency procedures.
   b. The correct response to a lost, missing, or unrecoverable main deployment handle:
      (1) Use an open hand to sweep the bottom of the container for only one second and then sweep down the side of container to the bottom right-hand corner for only one more second.
      (2) If the main deployment handle cannot be located and deployed after these two additional tries or two additional seconds, whichever one comes first, deploy the reserve immediately.
      (3) If deploying the pilot chute results in another malfunction, cutaway and deploy the reserve.
   c. The correct response to a stuck or impossible main deployment handle extraction (hard pull):
      (1) Release the handle, but keep your hand on the handle. Rotate your hand with your palm facing down. Grab the handle again, ensuring you are only grabbing just the handle. Then place your right elbow against the side of the container for leverage and attempt to pull the handle again.
      (2) If the main deployment handle and main pilot chute cannot be deployed after two additional tries or two additional seconds, whichever one comes first, deploy the reserve immediately.
      (3) If deploying the pilot chute results in another malfunction, cutaway and deploy the reserve.
4. Horseshoe (part of the pilot-chute, bridle, lines, or canopy is caught or entangled on the jumper):
   a. Straighten up whatever it is caught on and try to shake it off using the wind to assist you.
   b. Only give no more than two tries or two seconds, whichever comes first.
   c. If the horseshoe malfunction cannot be cleared after two tries or two seconds, whichever comes first, or if doing so results in another malfunction, cutaway and deploy the reserve.
5. Review and practice the correct response to a pilot chute hesitation (burble) or pilot chute in tow:
   a. Twist at the waist and look over the right shoulder to modify the airflow while striking the right side of the container with the right elbow for only one second. Twist at the waist and look over the left shoulder while striking the left side of the container with the left elbow for only one second.
   b. If the container does not open after these two tries or two seconds, whichever comes first, or if doing so results in another malfunction, then cutaway and deploy the reserve immediately.
6. Review premature container opening in freefall for hand deployment:
   a. Attempt to locate the main deployment handle and deploy the pilot chute first.
   b. If the pilot chute cannot be located and deployed after two tries or two seconds, whichever comes first, or if deploying the pilot chute results in another malfunction, cutaway and deploy the reserve.
7. Review and practice common problems in the training harness in order of correction:
   a. The correct response to line twist(s):
      (1) Spread the risers and kick to untwist, leaving the toggles stowed until all twists are cleared.
      (2) If spinning, twist risers to untwist the lines and stabilize canopy. Then kick to untwist the risers.
      (3) If you cannot correct all line twists by 2,500 feet, cutaway and deploy the reserve.

b. The correct response to slider hang-up (stuck slider):
   (1) Pull both toggles down to the full flare position to slow the canopy and pump at the bottom of the control range between three-quarter brakes and full flare.
   (2) If unable to use the toggles, pump the rear risers smoothly between full flight and full flare.
   (3) The slider needs to be at least halfway down and pass a controllability check for a safe landing.
   (4) Repeat remedial procedures twice or until reaching the decide-and-act altitude of 2,500 feet, whichever one comes first.

c. The correct response to end cell closure(s):
   (1) Pull both toggles down to the full flare position and hold them there until the end cells open and then let them back up to full flight smoothly.
   (2) If unable to use the toggles, perform a full flare using both rear risers.
   (3) If no more than two cells are closed and they cannot be inflated, evaluate controllability and flare before reaching the decide-and-act altitude of 2,500 feet.
   (4) If steerable, land as planned and perform a parachute landing fall (PLF) upon landing.

d. If the canopy has opened normally but turns on its own, release both toggles to full flight by performing a full flare for five seconds. If still turning, perform one more flare for five seconds.

e. Evaluate controllability and flare before reaching the decide-and-act altitude of 2,500 feet for:
   (1) Broken steering line(s) or toggle(s): Use rear risers.
   (2) Broken suspension/stabilizer line(s) and/or canopy damage (such as rips or tears in the fabric)
   (3) Pilot chute entangled with the canopy or in the lines

8. Review and practice for recognizing and responding to total and partial high-speed malfunctions:

a. Total high-speed malfunction (unable to locate or extract the main deployment handle): Cannot activate or deploy your main parachute after two tries or two seconds, whichever one comes first.
   (1) **ARCH!** Return to the arch position.
   (2) **LOOK for, LOCATE, and LOCK** your eyes onto the reserve ripcord handle.
   (3) **HOOK** the reserve ripcord handle with your left hand and secure your grip with the right hand.
   (4) **PEEL, PULL, & STRIP** the reserve handle all the way out to activate the reserve deployment.
   (5) **ARCH!** Maintain the arch position as the reserve deploys.
   (6) **TWIST RIGHT and LEFT** for one second each while checking over each shoulder for reserve pilot chute deployment.
   (7) Perform these same emergency procedures for any type of malfunction below 1,000 feet.

b. Partial high-speed malfunction: The pilot chute and/or deployment bag has left the container, but the main canopy is either not deploying or is less than half inflated after two tries or two seconds, whichever one comes first.
   (1) **ALTITUDE!** Check your altitude to ensure you are still above 1,000 feet.
   (2) **ARCH!** Return to the arch position.
   (3) **LOOK for and LOCATE** the cutaway handle.
   (4) **GRAB** the cutaway handle with your right hand first and secure your grip with the left hand.
   (5) **LOOK for, LOCATE, and LOCK** your eyes onto the reserve ripcord handle.
   (6) **PEEL, PULL, & STRIP** the cutaway handle while keeping eyes locked onto the reserve handle.
   (7) **HOOK** the reserve ripcord handle with left hand immediately and secure grip with right hand.
   (8) **PEEL, PULL, & STRIP** the reserve handle all the way out to activate the reserve deployment.
   (9) **ARCH!** Maintain the arch position as the reserve deploys.
   (10) **TWIST RIGHT and LEFT** for one second each while checking over each shoulder for reserve pilot chute deployment.

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9. Review minimum cutaway altitude and reserve deployment without cutaway if necessary:
   a. You should decide if you are going to cutaway and take the appropriate actions by 2,500 feet.
   b. If below 1,000 feet without a functioning main canopy, deploy the reserve immediately!
   c. If in a canopy entanglement with another jumper below 1,000 feet and both of the canopies are uncontrollable and it appears that they cannot be separated in time for a safe landing, both of you should deploy your reserves immediately!
10. One canopy inflated and another deploying:
   a. If the reserve is inflated and the main is in a stage of deployment, disconnect the RSL and cutaway
   b. If the main canopy is fully inflated and the reserve is in a stage of deployment, shake the reserve risers to aid its deployment. Then be prepared to take action on the resulting configuration.
      (1) The two open canopies typically settle into one of three configurations: biplane, side-by-side, or down-plane.
      (2) Trying to force one configuration into a more manageable configuration is typically futile and can be dangerous.
11. Both parachutes deployed (two canopies out):
   a. Stable biplane:
      (1) Do NOT cutaway! Disconnect the reserve static line (RSL).
      (2) Leave all toggles stowed on both canopies. If a toggle releases itself during deployment or has already been unstowed, then only unstow the other toggle of that canopy and leave all other toggles stowed and fly that canopy in the half-brake position using minor, gentle toggle inputs.
      (3) Gently steer the front canopy by smoothly pulling on the rear risers of the front canopy only.
      (4) Only use as minimal input as necessary to maneuver the canopy for a safe landing.
      (5) Land both canopies without flaring. Perform a parachute landing fall (PLF) on landing.
   b. Stable side-by-side with directional control:
      (1) Do NOT cutaway! Disconnect the reserve static line (RSL).
      (2) Leave all toggles stowed on both canopies. If a toggle releases itself during deployment or has already been unstowed, then only unstow the other toggle of that canopy and leave all other toggles stowed and fly that canopy in the half-brake position using minor, gentle toggle inputs.
      (3) Gently steer the dominant canopy (larger and more directly overhead, typically the main) by smoothly pulling on the rear risers of the dominant canopy only.
      (4) Only use as minimal input as necessary to maneuver the canopy for a safe landing.
      (5) Land both canopies without flaring. Perform a parachute landing fall (PLF) on landing.
   c. Down-plane or pinwheel:
      (1) Disconnect the reserve static line (RSL) if altitude/time permits (above 1,000 feet).
      (2) Immediately cutaway the main canopy, regardless of altitude.
      (3) Steer the reserve to a normal landing & flare. Perform a parachute landing fall (PLF) on landing.
   d. Main-reserve entanglement:
      (1) Do NOT cutaway! Disconnect the reserve static line (RSL).
      (2) Do everything possible to attempt to clear the entanglement of the two canopies by pulling on the risers or toggles of the canopy with the highest chance of inflating.
      (3) Once one canopy is fully inflated, start trying to inflate the other canopy by pulling on the risers and/or toggles. If possible, retrieving the less-inflated canopy may help clear the canopies.
      (4) NEVER give up! Perform a parachute landing fall (PLF) on landing.

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12. Premature deployment in aircraft:
    a. You should attempt to contain and secure the open parachute, inform your instructor, close the door, and land with the plane.
    b. If your parachute goes out the door, you must follow it immediately before being extracted.

Canopy

1. Always look first in the direction of a turn under canopy before and during the turn.
2. Using a DZ photo or taking a walk in the field, you will preview with an instructor the expected opening point and prepare a written flight plan together.
3. Review the descent strategy:
    a. Determine position and altitude upon opening.
    b. Locate the target and establish a line to the pre-planned 1,000-foot pattern entry point.
    c. Divide the line logically in thousands of feet according to the remaining altitude (halfway down, halfway back). For example, if open at 4,000 feet:
        (1) Divide the line in thirds and fly over the first third of the line until 3,000 feet.
        (2) Fly over the second third of the line until 2,000 feet.
        (3) Alternatively, you can divide the line in half & remain over the first half of the line until 2,500 ft.
        (4) Fly over the remaining division of the line until reaching the instructor-assigned, pre-planned pattern entry point at 1,000 feet, as identified on the written flight plan.
    d. Fly the pre-planned pattern using downwind, base, and final approach legs, with specific checkpoints on the ground to fly over at specified altitudes.
4. Fly a straight-in final approach without S-turns (S-turns present a hazard to other traffic).
5. Flare at ten feet, based on experience in Category A.
   (Note: Flaring is covered in more detail in Categories C and F.)
6. Review the PLF and its value to protect parachutists against the shock a hard landing:
    a. Parachutists absorb the shock of a hard landing with a Parachute Landing Fall (PLF).
        (1) To prepare for a PLF, press your feet and knees tightly together with your knees slightly bent.
        (2) Flare the canopy completely with both hands together and into your groin to help prevent wrist and hand injuries.
        (3) Bring your chin down to your chest to help prevent neck injuries.
        (4) Point your toes slightly to allow the balls of your feet to make first contact with the ground.
        (5) Maintain the PLF position throughout the entire landing roll.
        (6) As soon as the balls of your feet (should be the first point of contact) touch the ground:
            (a) Lean into the direction of the landing to roll down one side of the body.
            (b) Lay over to the side of one calf.
            (c) Continue to roll to the thigh on the same side.
            (d) Continue rolling on to that hip (side of the butt).
            (e) Roll diagonally across your back to the opposite shoulder.
            (f) Allow your body to continue rolling and absorb the energy of the fall.
    b. The PLF position is also the proper way to prepare for a stand-up landing.
        (1) The PLF position keeps your weight balanced in the harness and helps avoid the tendency to reach for the ground.
        (2) If you touch down softly, you can step out of the PLF position and remain on your feet.

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Category B Quiz

(Must be passed before Category B jump.)

1. **Who must directly supervise your student training jumps?**
   a) USPA Instructor rated for your discipline
   b) The local Safety and Training Advisor
   c) Drop zone owner/operator

2. **What is your most important task when in freefall?**
   a) Correctly complete planned dive flow
   b) Altitude awareness to recognize and act at the assigned pull altitude
   c) Fall stable and on heading

3. **What are the maximum winds in which any student may jump?**
   a) 15 mph
   b) 10-15 mph, depending on conditions and individual student ability
   c) 10 mph for a round reserve canopy; 14 mph for a ram-air reserve, can be waivered by an S&TA

4. **How would you clear a pilot chute hesitation?**
   a) Pull harder.
   b) Wait for the AAD to fire.
   c) Change body position to modify the airflow over your back.

5. **In the event of a canopy problem, students should decide and act about executing emergency procedures by what altitude?**
   a) 2,000 feet
   b) 2,500 feet
   c) 1,800 feet

6. **How would you address the following routine opening problem: Twisted lines?**
   a) Before unstowing the toggles, spread risers, or twist the risers to transfer line twist to risers if twists are high on the lines, and kick in opposite direction while watching altitude to 2,500 feet; if all line twists are not fixed by 2,500 feet, cutaway and deploy the reserve.
   b) Cutaway and deploy the reserve.
   c) Pump rear risers or steering controls at the bottom of the stroke while watching altitude to 2,500’.

7. **How would you address the following routine opening problem: Slider stops halfway down?**
   a) Pull toggles to flare position and hold (or pull down on the rear risers and hold) and watch altitude. If stubborn, determine controllability with turn and flare by 2,500 feet.
   b) Pump rear risers or steering controls at the bottom of the stroke while watching altitude to 2,500’.
   c) Cutaway and deploy the reserve.

8. **How would you address the following routine opening problem: Closed end cells?**
   a) Make hard left and right turns in rapid succession to inflate each cell individually.
   b) Pump rear risers or steering controls at the bottom of the stroke while watching altitude to 2,500’.
   c) Pull toggles to flare position and hold (or pull down on the rear risers and hold) and watch altitude. If stubborn, determine controllability with turn and flare by 2,500 feet.

9. **How would you address the following routine opening problem: Broken lines or canopy damage?**
   a) Determine controllability and ability to flare by 2,500 feet.
   b) Cutaway and deploy the reserve.
   c) Pump rear risers or steering controls at the bottom of the stroke while watching altitude to 2,500’.

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10. How would you address the following routine opening problem: Good canopy that is turning?

a) Check to ensure both toggles are unstowed by performing two full flares and raising both toggles all the way back up to full flight; if still turning by 2,500 feet, cutaway and deploy the reserve.
b) Pump rear risers or steering controls at the bottom of the stroke while watching altitude to 2,500'.
c) Cutaway and deploy the reserve.

11. What is the appropriate action if below 1,000 feet without a landable parachute?

a) Cutaway and deploy the reserve.
b) Do not cutaway, immediately deploy the reserve parachute.
c) Wait for AAD to fire.

12. If the pilot chute goes over the front of the canopy after it has opened, how can you tell if it is a malfunction?

a) Determine controllability and ability to flare by 2,500 feet. If the canopy flares and turns correctly, it is probably safe to land.
b) If the pilot chute is fully inflated, it is a malfunction.
c) If the pilot chute is not fully inflated, it is a malfunction.

13. What is the correct response to an open container in freefall using a hand-deployed system?

a) No more than two tries or two seconds to locate and deploy the main pilot chute; if no success, cutaway and deploy the reserve.
b) Cutaway and deploy the reserve.
c) Determine controllability and ability to flare by 2,500 feet.

14. If the pilot chute extracts the deployment bag from the parachute container (backpack) but the deployment bag fails to release the parachute canopy for inflation, what is the correct response?

a) Determine controllability and ability to flare by 2,500 feet.
b) Do not cutaway, immediately deploy the reserve parachute.
c) No more than two tries or two seconds to pull on the risers vigorously; if no success, cutaway and deploy the reserve.

15. If part of the deployed parachute is caught on the jumper or the equipment (horseshoe), what is the correct response?

a) Do not cutaway, immediately deploy the reserve parachute.
b) Cutaway and deploy the reserve.
c) No more than two tries or two seconds to get it off and deployed; if no success, cutaway and deploy the reserve.

16. What are the three legs of the canopy landing pattern with relation to the wind direction?

a) Downwind (with the wind), base (across the wind but downwind of the target), final (with the wind)
b) Downwind (with the wind), base (across the wind but downwind of the target), final (into the wind)
c) Downwind (against the wind), base (across the wind but upwind of the target), final (into the wind)

17. Why is it undesirable to land at the end of a runway?

a) Approaching and departing aircraft
b) Turbulent winds
c) FAA regulations

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Category B Dive Flows

Minimum of One Jump with Two Current USPA AFF Instructors

Freefall Dive Flow

- Stable poised "praying" exit with a relaxed arch. (Must be stable within ten seconds of exit to pass.)
- Instructors release arm grips once stable and level.
- Perform the first full Circle of Awareness.
- Three consecutive practice touches without assistance, or more until comfortable.
- Perform the second full Circle of Awareness.
- Perform a short CoA ("Altitude, arch, legs, relax").
- Smoothly extend legs all the way & hold for three seconds or until 6,500 feet, whichever comes first.
- Smoothly return your legs to the ideal 45° position.
- Perform a short CoA ("Altitude, arch, legs, relax").
- Team turns, if altitude permits (above 7,000 feet). (L 45-90°, Short CoA, R 45-90°, Short CoA)
- Repeat as altitude permits. No new maneuvers below 7,000 ft. Stop final maneuver by 6,500 ft.
- Lock on at 6,000 feet (must be altitude aware).
- Begin wave-off at 5,500 feet.
- Deploy by 4,500 feet (must do so stable and without any instructor prompting or assistance to pass).

Canopy Dive Flow

- Check altitude within three seconds of deploying.
- Assess the canopy by asking, "Is it there? Is it square? Is it straight, stable, and steerable?"
- Correct any common canopy problems by 2,500'.
- Unstow the toggles from half brakes by pulling them down to your groin & letting them back up.
- Check altitude, air traffic, & position over ground.
- Perform a full flare and hold it for five seconds.
- Smoothly let the toggles all the way back up to return the canopy to full flight.
- Check altitude, air traffic, & position over ground.
- Look right and turn right at least 90°.
- Check altitude, air traffic, & position over ground.
- Look left and turn left at least 90°.
- Check altitude, air traffic, & position over ground.
- Perform a full flare and hold it for five seconds.
- Smoothly let the toggles all the way back up to return the canopy to full flight.
- Check altitude, air traffic, & position over ground.
- Find the landing area and the pattern entry point.
- Divide the flight path by thousands of feet.
- Steer over the correct portion of the flight path & continue to stay in the holding area until 1,000 ft.
- Look at the runway & determine compass heading.
- Identify all suspect areas of turbulence.
- Identify all power lines in the area during descent.
- Continue to scan for obstacles every 500 feet.
- Verify landing pattern and adjust as necessary.
- Look for obstacles around the landing area.
- Follow the pre-assigned pattern over the planned or alternate landing area.
- Scan for obstacles from base until landing.
- Prepare for a PLF once on final at 300 feet.
- Begin to flare quickly to half brakes at ten feet.
- Finish flaring to your groin just before the balls of your feet touch the ground.

Advancement Criteria

Freefall and Exit

- Stability within ten seconds of exiting the aircraft
- Maintain correct body position for stability throughout, including leg awareness and control
- Initiate deployment procedures within 500 feet of assigned altitude without prompts or assistance

Equipment

- Understanding routine canopy problems and the correct responses

Canopy

- Understanding and planning descent strategy from opening to pattern entry and pattern principles
- Steering with clearance procedures without prompting (self-evaluated)
- Assisted flare for a safe landing within 30 degrees of heading into the wind

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Category C

One Jump with Two USPA AFF Instructors and One Jump with One USPA AFF Instructor

By this time, you have had the opportunity to learn relaxed, controlled, and stable freefall by using the procedure, "altitude, arch, legs, relax." You will begin this category with two AFF Instructors, but you will need to jump with only one before being able to advance to Category D. You need to establish confidence and relaxed freefall control. A controlled freefall in Category C may include some random heading drift, which you learn to lessen by relaxing and focusing on the basics: altitude, arch, legs, and relax. The instructor shows you more about how to plan a canopy pattern for various wind speeds and directions to improve traffic flow and avoid conflicts with obstacles and other jumpers. You learn to predict, avoid, and react to turbulence induced by wind over obstacles and heated areas. You will learn ways to approach an off-field landing, and your instructor explains how off-field landings may affect neighbor relations. You will meet the FAA-rated parachute rigger, who packs and maintains the reserve parachute. He or she will familiarize you with the closed parachute system, and you will observe the pre-flight equipment check. Emergency review includes discussion on an inadvertently opened parachute in and around the aircraft, as well as how to avoid and respond to it. In addition, your instructor also provides more details on recognizing and avoiding landing obstacles, as well as how to approach off-field landings.

Learning and Performance Objectives

- Unassisted, solo, controlled, relaxed freefall with heading maintenance and hover control
- Solo deployment with wave-off
- Landing patterns for higher winds
- Downwind landings
- Wing loading
- Observe the pre-flight equipment check
- Accidental parachute opening in aircraft review
- Turbulence
- Landing off-airport
- Obstacle recognition and avoidance
- The FAA rigger
- Complete orientation of the parachute system with the main closed

Rules and Recommendations

Student gear Basic Safety Requirements (BSR) (SIM Section 2-1.M.2 through 5)

1. All students are to be equipped with the following equipment until they have obtained a USPA license:
   a. A rigid helmet (except tandem students)
   b. A piggyback harness and container system that includes a single-point riser release and an RSL
   c. A visually accessible altimeter (except tandem students)
   d. A functional AAD that meets the manufacturer's recommended service schedule
   e. A ram-air main canopy suitable for student use
   f. A steerable reserve canopy appropriate to the student's weight
   g. For freefall, a ripcord-activated, spring-loaded, pilot chute-equipped main parachute or a bottom-of-container (BOC) throw-out pilot chute
2. Students must receive additional ground instruction in emergency procedures and deployment-specific information before jumping any unfamiliar system.
3. For each harness-hold jump, each AFF rating holder supervising the jump must be equipped with a visually accessible altimeter.
4. All skydivers wearing a round main or reserve canopy and all solo students must wear flotation gear when the intended exit, opening, or landing point is within one mile of an open body of water (an open body of water is defined as one in which a skydiver could drown).

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FAA regulations for the training and certification of the FAA rigger (FAR 65)

1. To be eligible for a parachute rigger certificate, a person must:
   a. Be at least 18 years of age;
   b. Be able to read, write, speak, and understand the English language, or, in the case of a citizen of Puerto Rico, or a person who is employed outside of the United States by a U.S. air carrier, and who does not meet this requirement, be issued a certificate that is valid only in Puerto Rico or while he is employed outside of the United States by that air carrier, as the case may be; and
   c. Comply with the sections of FAR 65 that apply to the certificate and type rating he seeks.

2. Current or former military riggers are entitled to a senior parachute rigger certificate if he/she passes a written test on the regulations of FAR 65 and presents satisfactory documentary evidence that:
   a. He/she is a member or civilian employee of an Armed Force of the United States, is a civilian employee of a regular armed force of a foreign country, or has, within the 12 months before he applies, been honorably discharged or released from any status covered by this paragraph;
   b. He/she is serving, or has served within the 12 months before he/she applies, as a parachute rigger for such an Armed Force; and
   c. He/she has the experience required listed below for a senior parachute rigger certificate.

3. All other applicants for a senior parachute rigger certificate must meet the following requirements:
   a. Present evidence satisfactory to the Administrator that he/she has packed at least 20 parachutes of each type for which he/she seeks a rating, in accordance with the manufacturer's instructions and under the supervision of a certificated parachute rigger holding a rating for that type or a person holding an appropriate military rating.
   b. Pass a written test, with respect to parachutes in common use, on:
      (1) Their construction, packing, and maintenance;
      (2) The manufacturer's instructions;
      (3) The regulations of FAR 65; and
   c. Pass an oral and practical test showing his/her ability to pack and maintain at least one type of parachute in common use, appropriate to the type rating he/she seeks.

4. An applicant for a master parachute rigger certificate must meet the following requirements:
   a. Present evidence satisfactory to the Administrator that he/she has had at least three years of experience as a senior parachute rigger and has satisfactorily packed at least 100 parachutes of each of two types in common use, in accordance with the manufacturer's instructions:
      (1) While a certificated and appropriately rated senior parachute rigger; and/or
      (2) While under the supervision of a certificated and appropriately rated parachute rigger or a person holding appropriate military ratings.
      (3) An applicant may combine experience specified above to meet these requirements.
   b. If the applicant is not the holder of a senior parachute rigger certificate, pass a written test, with respect to parachutes in common use, on:
      (1) Their construction, packing, and maintenance;
      (2) The manufacturer's instructions; and
      (3) The regulations of FAR 65.
   c. Pass an oral and practical test showing his/her ability to pack and maintain two types of parachutes in common use, appropriate to the type ratings he/she seeks.

Study FAR 105.43.b.1 regarding periodic inspection and repacking of reserves

The reserve parachute must have been packed by a certificated parachute rigger within 180 days before the date of its use, if its canopy, shroud, and harness are composed exclusively of nylon, rayon, or similar synthetic fiber or material that is substantially resistant to damage from mold, mildew, and other fungi, and other rotting agents propagated in a moist environment.

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Equipment

1. The automatic activation device (AAD):
   a. Activates the main or reserve parachute.
   b. Is worn only as a backup.

   (Note: Detailed AAD operation is explained in Category D.)
2. Observe the instructor performing the pre-flight equipment check using the checklist below:
   a. Top to bottom, (back):
      (1) Reserve packing data card and seal (especially on an unfamiliar or rental rig)
      (2) AAD turned on and/or calibrated and set to correct mode
      (3) RSL connector routed properly
      (4) Reserve ripcord cable movement (gently tug the reserve ripcord cable toward the pin and look for smooth cable movement at the other end by the reserve handle)
      (5) Reserve pin(s) seated in place at the ¾ position and straight and smooth (not bent or nicked)
      (6) Reserve closing loop tight, in good condition (not frayed), and have no visible wear
      (7) Reserve flap closed securely
      (8) Main activation cable or pin seated in place at the ¾ position and free of nicks, kinks, and burrs
      (9) Main closing loop tight, in good condition (not frayed), and worn no more than ten percent
      (10) Main pilot chute bridle routing (routed correctly and unobstructed from pin to pilot chute pouch) or ripcord cable movement
      (11) Main flap closed and secure and main activation handle in place
   b. Top to bottom, (front):
      (1) Risers stowed under the riser covers properly and riser covers closed and secure
      (2) Overview of operation of the Booth 3-Ring Release System: pulling the cable releases the rings
      (Note: Pre-flight details for the Booth 3-Ring Release System are covered in Category D. Disassembly and maintenance of the Booth 3-Ring Release System is explained in Category H.)
      (3) RSL connected and routed properly. Overview of the RSL's basic function: to back up the jumper in pulling the reserve following a cutaway.
      (Note: Comprehensive RSL operation is explained in Category E.)
      (4) Chest strap and hardware intact and not routed through the metal reserve D-ring handle
      (5) Cutaway handle seated properly in position and securely mated to the harness and no more than ½ inch of yellow cutaway cable visible between the cutaway handle and the cable housing
      (6) Reserve handle secured in position in its pocket and metal swab on end of the ripcord secure
      (7) Leg straps and hardware operational and correctly threaded and not twisted

Spotting and Aircraft

1. The landing pattern is square on a calm day, with each leg based on the canopy's projected glide distance from 300 feet of altitude (see Illustration C.1 on the next page).
   a. Each jumper must know his or her own canopy's glide distance from 300 feet in no wind to plan a pattern.
   b. The instructor estimates the 300-foot no-wind glide distance for beginning students (~600 feet).
2. The planned final approach must be shortened from the known zero-wind square pattern as the wind increases; for example, cut the final approach approximately in half for ten mph.
3. The base leg also shortens as the wind increases; for example, also cut the base leg approximately in half for a ten-mph wind.
4. Plan the 1,000-foot pattern entry point farther upwind as winds increase; for example, double the length of the downwind leg used for calm conditions, ending at the new projected 600-foot point for ten-mph winds.

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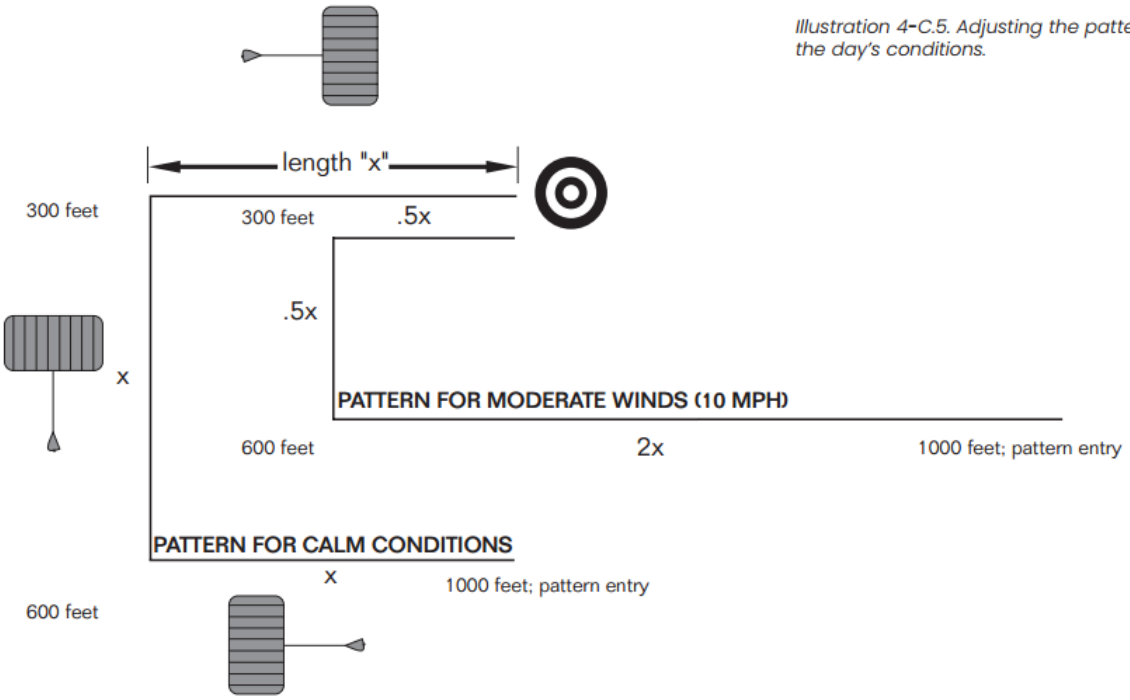

Illustration 4-C.5. Adjusting the pattern for the day's conditions.

Illustration C.1 - Adjusting the pattern for the day's conditions

Exit and Freefall

1. Review of smooth climb-out and exit (minimal assistance):
   a. Exact hand and foot placement (Verbalize: "right hand, right foot, left hand, left foot")
   b. Smooth launch to reduce momentum
   c. Correct presentation of hips and chest to the relative wind
   d. Legs out slightly more than neutral for a few seconds to add control
2. Single-instructor exit (second dive flow in Category C):
   a. Revise the climb-out procedure for one instructor.
   b. Prepare for slightly different results after launch with one instructor (typically more vertical and might turn).
3. Review of stability recovery and maintenance:
   a. Review short Circles of Awareness (Check altitude, arch, legs, relax, and correct turn if needed):
      (1) Know the altitude by reading the altimeter or counting from exit (depending on exit altitude).
      (2) Arch at the hips to improve belly-to-wind stability.
      (3) Check your leg position and adjust as needed (probably extend them out to 45 degrees).
      (4) Relax by taking a breath and letting go of unwanted body tension.
      (5) Recognize heading changes and actively correct as jump continues.
   b. **A.I.R.:** Provided you are **A**ltitude aware, **I**n control, and **R**elaxed (A.I.R.), you may continue alone in freefall & deploy at the assigned altitude. Perform a short Circle of Awareness, spending one second on each task: check altitude, arch, extend legs out to 45°, relax & breathe, correct heading.
   c. **Five-Second Rule:** If you are in freefall and above the assigned deployment altitude but cannot achieve A.I.R. within five seconds or by the assigned deployment altitude, whichever comes first, deploy your main canopy immediately, regardless of stability. (Review the three pull priorities.)
   d. **Roll-Out-of-Bed (ROB) Technique:** If you are above your assigned deployment altitude and falling in a back-to-earth orientation, roll to one side to recover to a stable, belly-to-earth body position. Check altitude, arch, look towards the ground to the right, bring the right arm in across your chest and extend your left arm straight out at 90° to your torso. As your body rolls to the right and you are facing the ground, return both arms back to the 90° freefall position. Check altitude.

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4. Alternate freefall altitude references:
   a. Judge altitude by keeping track of time (~10 sec. for first 1,000' & ~5.5 sec. per 1,000' thereafter)
   b. Look at the ground during the climb to altitude and cross check against the altimeter.
   c. Observe the cloud bases on the ride to altitude to use later as an altitude reference.
   d. Look at the ground after initiating deployment and while waiting for inflation; check what you observed against the altimeter after opening.

Emergency Procedure Review

1. Open parachute in aircraft:
   a. Extreme care is required when leaning back against anything in aircraft.
      (1) Be mindful of the size of the parachute equipment when climbing into and moving about the aircraft.
      (2) Minimum, careful movement in the aircraft and during climb-out and exit helps prevent premature activation.
   b. Importance of a pre-jump equipment check before leaving the aircraft.
   c. Importance of careful movement near or outside the door, especially with an AAD.
      (1) Use caution when wearing an AAD, especially near an open aircraft door and during climb-out.
   d. If a parachute opens in the plane:
      (1) If door is closed, secure the open parachute, inform an instructor, and land with the plane.
      (2) If the door is open, contain the open parachute, close the door, and land with the plane.
      (3) If the parachute goes out the door, so must the jumper.

2. Review of the three pull priorities in the following order of importance (top down):
   (1) Pull! Pull! Pull! **ALWAYS PULL, REGARDLESS OF ALTITUDE OR STABILIY!**
   (2) Pull at the correct altitude! Always deploy at the planned altitude, regardless of stability!
   (3) Pull at the correct altitude while stable.

3. If an off-DZ landing is unavoidable:
   a. Look for an open, clear, accessible field.
   b. Decide on an alternate landing area by 2,000 feet.
   c. Fly a predictable landing pattern.
   d. Transpose the planned landing pattern from the intended field onto the alternate field.
   e. Land well clear of turbulence and obstacles.
   f. Prepare for a hard landing (PLF) in any unfamiliar landing area.
   g. Be considerate of the property and be polite to its owner when leaving the landing area:
      (1) Cross only at gates or reinforced areas.
      (2) Leave all gates as they are found.
      (3) Do not disturb cattle.
      (4) Walk parallel to (between) any rows of crops until reaching the end of the field.
      (5) Notify the owner of any damaged property and repair or replace it (USPA will cover the costs).

4. Review of landing priorities:
   (1) Land with the wing level & flying in a straight line, at least for the last 10 secs of canopy flight.
   (2) Land in a large wide-open area at least 330 feet clear of any obstacles.
   (3) Flare to at least the half-brake position and prepare to perform a parachute landing fall (PLF).

5. Collapse an inflated canopy on landing by pulling in one toggle and running toward it.

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Canopy

1. Wing loading and canopy size:

   a. The wing loading ratio is the jumper's exit weight (geared up) divided by the square footage of the canopy.

   b. The manufacturer publishes wing loading or load recommendations for each model of canopy:
      (1) In the canopy owner's manual
      (2) On the manufacturer's website
         (a) Performance Designs (PD) recommends the following maximum exit weights for students on the following Navigator canopy sizes:
            1. 200 square feet: 130 pounds manufacturer recommended maximum student exit weight
            2. 220 square feet: 154 pounds manufacturer recommended maximum student exit weight
            3. 240 square feet: 180 pounds manufacturer recommended maximum student exit weight
            4. 260 square feet: 254 pounds manufacturer recommended maximum student exit weight
            5. 280 square feet: 270 pounds manufacturer recommended maximum student exit weight
            6. 300 square feet: 290 pounds manufacturer recommended maximum student exit weight

   c. Canopy performance changes with wing loading:
      (1) With a heavier wing loading, expect:
         (a) Faster forward speed
         (b) Faster descent rate
         (c) Quicker turns
         (d) Steeper and longer dive from a turn
         (e) More violent malfunctions
         (f) More skill to flare correctly
      (2) With a lighter wing loading, expect:
         (a) Less drive against a strong wind
         (b) Slower turns
         (c) More forgiveness of landing errors
         (d) Less predictable in turbulence

   d. Use the examples below to calculate your own wing loading for the canopy you are about to jump (one of the Category C advancement criteria) (see Illustration C.2 below):

WING LOADING EXAMPLES	
A jumper's exit weight (pounds)	**215**
divided by canopy size (sq. ft.)	**/280**
equals his/her wing loading:	**=0.77:1**
A jumper's exit weight (pounds)	**215**
divided by canopy size (sq. ft.)	**/195**
equals his/her wing loading:	**=1.1:1**

Illustration C.2 - Examples of how to calculate wing loading

   e. Canopies may appear easier to land with more weight, to a point:
      (1) A good landing in ideal conditions does not mean a smaller canopy is safe to jump in all conditions.
      (2) A more highly loaded canopy will stall at a higher airspeed.

   f. With the same wing loading, a smaller canopy of the same model will exhibit more lively performance characteristics:
      (1) Faster turns and turn response
      (2) Quicker dynamic stall response

2. Converting forward speed to lift:
   a. Flaring the canopy quickly to half brakes causes the canopy to slow down abruptly.
   b. Your momentum causes you to swing forward briefly, raising the front of the canopy and flattening the glide.
   c. Continue to flare, braking the canopy more and holding the high nose angle to maintain your lift while reducing the forward speed.
   d. Time your flare so your feet touch the ground before you begin to swing back under the canopy (dynamic stall) or begin to fly backwards (full stall) (see Illustration C.3 below).

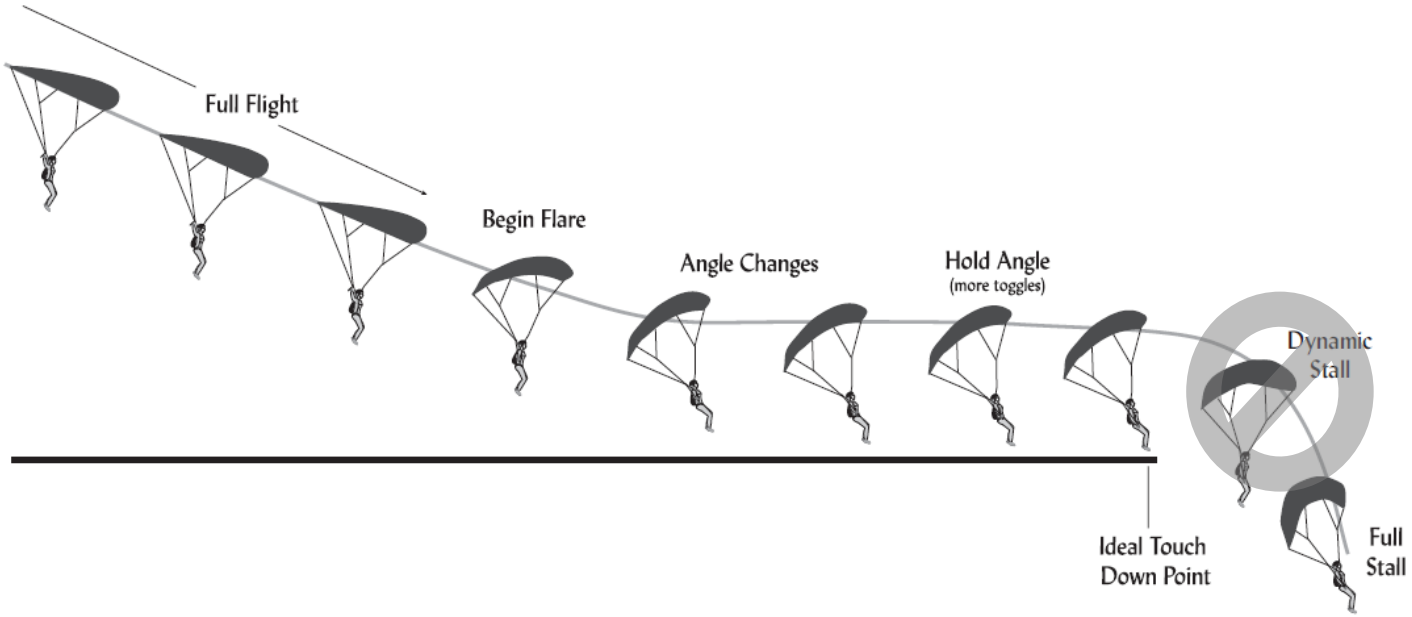
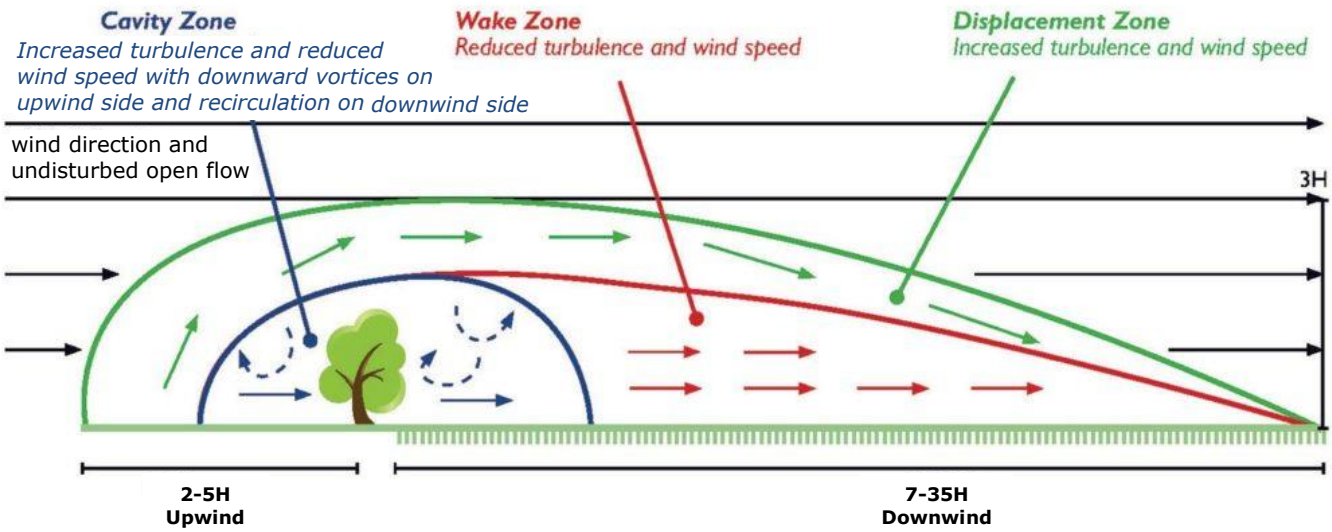


Illustration C.3 - When flared perfectly, the canopy lets the jumper down just prior to the stall.

3. Turbulence sometimes occurs in the landing area:
   a. Anticipate turbulence up to 5 times the height of an obstacle on the upwind side, up to 35 times its height on the downwind side, and up to 3 times its height vertically in these areas (see illustration).



Turbulence occurs downwind of an obstacle at up to 35 times its height, depending on the wind's strength.

b. The effects and likelihood of turbulence increase with wind speed.
   (1) A general rule of thumb is to multiply the current wind speed in miles per hour by the height of the obstacle in feet to estimate the horizontal distance in feet within which turbulence can be expected on the downwind side of the obstacle. To estimate the vertical height in feet at which turbulence can begin to be expected, multiply the obstacle's height in feet by three.
   (2) For example, a 10-mph wind can create turbulence on the downwind side of a 100-foot tree within at least 1,000 feet horizontally and 300 feet vertically, being worse closer to the obstacle.

c. Turbulence often occurs:
   (1) Near runways (wake and thermal turbulence)
   (2) Alongside roads (wake and thermal turbulence)
   (3) Where two areas of different colors or textures meet (thermal turbulence)
   (4) Behind other canopies (wake turbulence)
   (5) Over irregular terrain (mechanical turbulence)
   (6) Downwind of the propeller wash of a taxiing aircraft (wake turbulence) (see Illustration C.5)

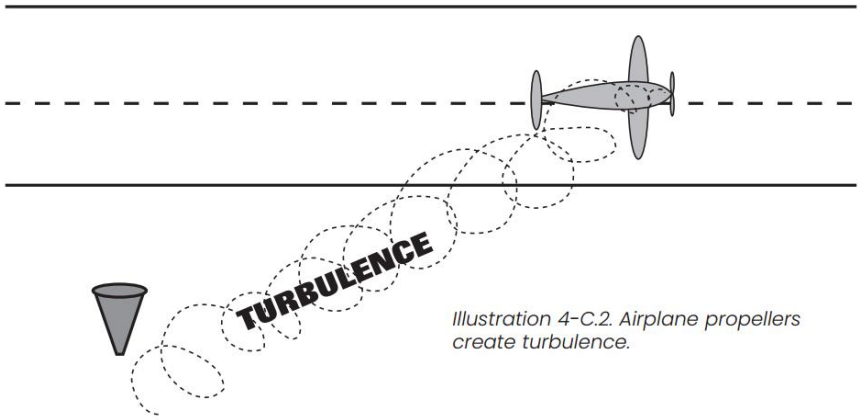


Illustration C.5 - Airplane propellers create turbulence.

4. When flying in turbulence:
   a. Maintain the desired heading using smooth but effective toggle input.
   b. Fly full speed or as directed in canopy owner's manual.
   c. Prepare for a hard parachute landing fall (PLF).

5. Recognition of a clear field:
   a. Power lines run along roads and between buildings, as well as randomly in open fields.
   b. A row of vegetation often hides a fence.
   c. Rocks, hills, and other terrain irregularities often remain invisible until just prior to touchdown.
   d. Inspect an unfamiliar landing area more closely at every 500-foot interval during descent and continuously below 500 feet.

6. Downwind landings are better than low turns:
   a. On calm days, unexpected wind shifts sometimes require jumpers to land with a light wind, instead of against it.
   b. On windy days, jumpers sometimes fly downwind too long and run out of time to complete a turn into the wind, also requiring them to land with the wind.
   c. When faced with deciding between a low turn and a downwind landing, the downwind landing is the correct decision.
   d. The effects of a downwind landing are potentially greater. When making a downwind landing:
      (1) Prepare for a PLF at 300 feet. Flare normally at the normal altitude, regardless of ground speed.
      (2) Make contact with the ground using the balls of your feet first. Instead of performing a PLF, lean back and slide onto on the side of your calf, thigh, and then butt while maintaining a tight PLF body position (like a feet-first slide in baseball/soccer). Keep hands together in your groin.
      (3) Tripping when trying to run out a high-speed landing or attempting to roll during a high speed PLF can result in serious neck injury or death.

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7. Planning a landing pattern (intended landing area or alternate) for smooth flow and separation of traffic (see Illustration C.6 below):
   a. Jumpers on left-hand (left-turning) approaches should land on the left side of the landing area; jumpers on right-hand approaches should land on the right side of the landing area to prevent conflicts.
   b. The turn from base leg to final is the most hazardous because of opposite approaching traffic.
   c. Look and avoid.

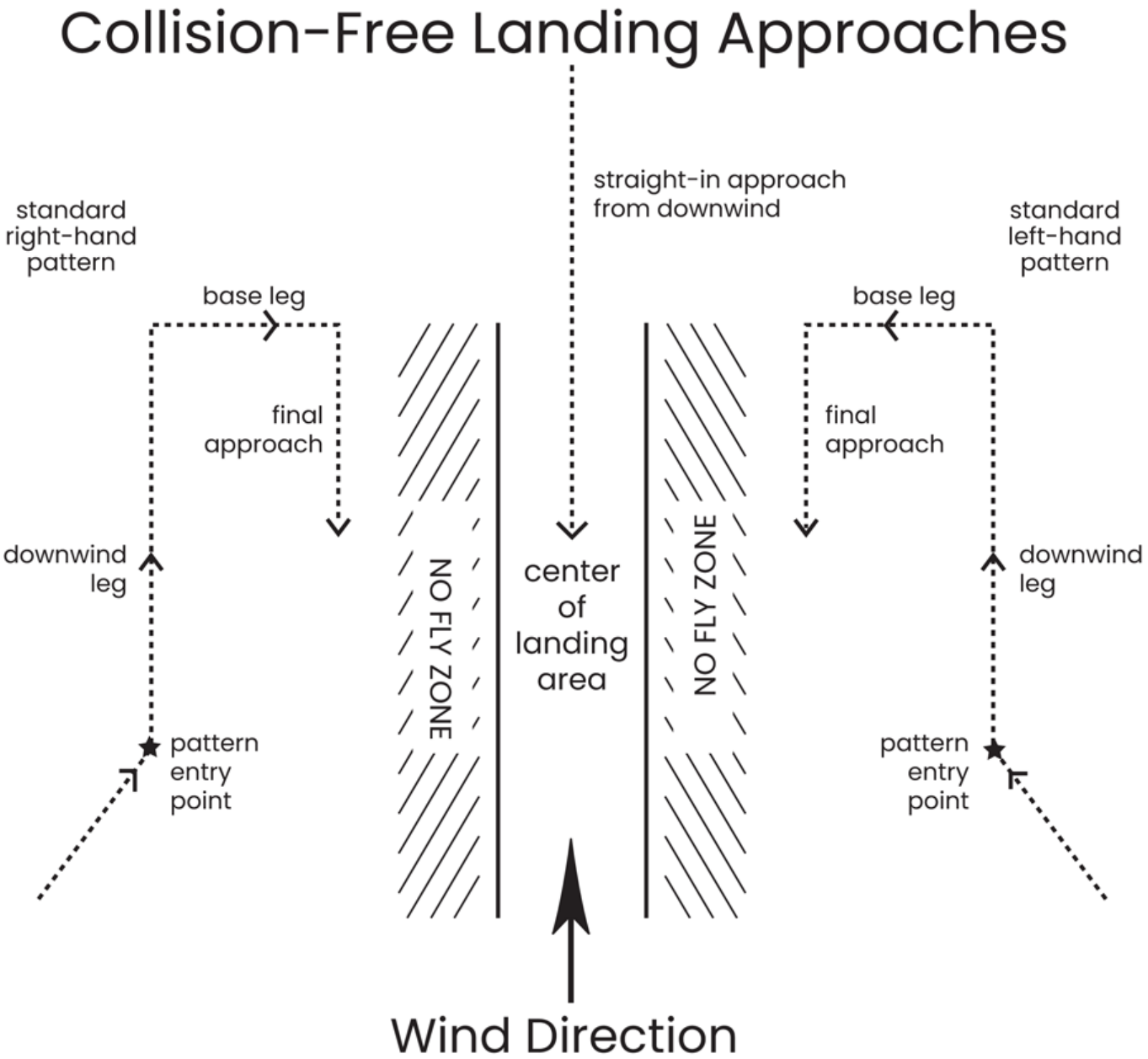

Illustration C.6 - Jumpers flying a right-hand pattern should land on the right side of the field; jumpers flying a left-hand pattern should land on the left side of the field.

8. When to attempt a stand-up landing (all must be met, otherwise perform a Parachute Landing Fall):
   a. When you are in control of all of the variables (i.e., you flew the planned pattern and landed into the wind onto the planned target with a level wing and a fully functioning main parachute).
   b. After a good full flare at the appropriate altitude.
   c. Only if you touch down softly and you are confident that you can comfortably remain on your feet.

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Category C Quiz

(Must be passed before Category C-1 jump.)

1. **In flat and stable freefall at terminal velocity, how long does it take an average jumper to fall 1,000 feet?**
   a) 4.5 seconds
   b) 5.5 seconds
   c) 6.5 seconds

2. **What is the correct procedure for recovering from instability to the belly-to-earth position?**
   a) Be more aggressive in your body position.
   b) Altitude, arch, legs, relax.
   c) De-arch, relax.

3. **Which is better, to pull at the planned altitude or to fall lower to get stable before pulling?**
   a) Always be stable before pulling.
   b) Pull above the planned altitude if you know you will not be stable.
   c) Pull at the planned altitude, regardless of stability.

4. **What is the purpose of the wave-off before deployment?**
   a) To signal other jumpers
   b) To get stable before pulling
   c) To relax in preparation for deployment

5. **What is the purpose of the parachute landing fall (PLF), & why is it important for skydivers?**
   a) It allows skydivers to land in any location safely.
   b) It protects against hard landings, and all skydivers have hard landings.
   c) It helps protect your gear.

6. **What part of the landing pattern is most dangerous to skydivers?**
   a) The intersection of the base and final approach legs
   b) The last 20 feet of the landing leg
   c) Entry into the downwind leg

7. **How do higher wind speeds affect the planned landing pattern as compared to the pattern plan for a calm day?**
   a) Lengthens the final approach, shortens the base leg, lengthens the downwind leg, and places the planned pattern entry point farther upwind.
   b) Shortens the final approach, shortens the base leg, lengthens the downwind leg, and places the planned pattern entry point farther upwind.
   c) Shortens the final approach, lengthens the base leg, lengthens the downwind leg, and places the planned pattern entry point farther downwind.

8. **In moderately strong winds, how far downwind of an obstacle might you find turbulence?**
   a) 1-5 times the height of the obstacle.
   b) 5-10 times the height of the obstacle.
   c) 7-35 times the height of the obstacle.

9. **What is the best procedure to use when flying your canopy in turbulent conditions?**
   a) Fly your canopy at half-brakes (or as directed by the owner's manual).
   b) Keep the canopy flying in a straight line at full flight (or as directed by the owner's manual).
   c) Fly in a zigzag pattern at full flight (or as directed by the owner's manual).

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10. Why is it important to protect your parachute system operation handles when in and around the aircraft?
a) Keeps them in place and prevents accidental or premature deployment.
b) Protects them from corrosive aircraft exhaust.
c) Reinforces muscle memory of handle locations.

11. What is the equipment pre-flight strategy to use before putting on your gear?
a) Metal parts first, fabric second, plastic third
b) Top to bottom, back to front
c) Manifest check, instructor check, pilot check

12. How does the three-ring main canopy release system disconnect the main parachute from the harness?
a) Cuts the risers
b) Pulls the cables to release the cloth loop
c) Pulls the cables to release the reserve closing-pin

13. How do you know if a reserve parachute has been packed by an FAA rigger within the last 180 days?
a) Rigger's packing seal on the reserve ripcord
b) Information found on the reserve packing data card
c) Drop zone administrative records

14. How do you know the reserve container has not been opened since the FAA rigger last closed it?
a) Rigger's packing seal on the reserve ripcord
b) Information found on the reserve packing data card
c) Drop zone administrative records

15. If the surface winds are blowing from west to east, which direction will you face to fly the downwind leg of the landing pattern (instructor's illustration)?
a) West
b) East
c) North

16. How is wing loading calculated?
a) Divide the exit weight by the square footage
b) Divide the square footage by the exit weight
c) Divide the jumper's weight by the square footage

17. Which canopy size (same model design) will exhibit quicker control response?
a) 210-square feet with a 210-pound jumper (geared up)
b) 190-square feet with a 190-pound jumper (geared up)
c) 170 square feet with a 170-pound jumper (geared up)

18. When is it OK to attempt a stand-up landing?
a) When the winds are between 5-10 mph
b) When the jumper has control of all variables and has executed a good flare at the appropriate altitude and touches down softly and is confident that he or she can comfortably remain standing
c) When the parachute is open, square, steerable, and able to be landed

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Category C Dive Flows

Two Jumps with Two USPA AFF Instructors on C-1 and One USPA AFF Instructor on C-2

C-1 Freefall Dive Flow

- Stable poised "praying" exit with a relaxed arch & 2 gripped instructors (must be stable w/in 5 secs).
- Instructors release arm grips once level.
- Perform the first full Circle of Awareness.
- Three smooth practice touches without assistance.
- Perform the second full Circle of Awareness.
- Perform two toe taps if needed.
- Instructors release all grips as situation allows. (Must earn release with stability in order to pass.)
- Do a short Circle of Awareness every five seconds. (Altitude, Arch, Legs, Relax, Correct Turn if needed)
- Instructors make sure of student control by 6,000' and regrip through deployment only if needed.
- Lock on at 6,000 feet. (Must be altitude aware.)
- Wave-off at 5,500 feet. (Must do so to pass.)
- Deploy by 5,000 feet. (Must do so stable & without any instructor assistance or prompting to pass).

C-2 Freefall Dive Flow

- Stable poised "praying" exit with a relaxed arch & 1 gripped instructor (must be stable w/in 5 secs).
- Instructor releases arm grip once level.
- Perform the first full Circle of Awareness.
- Three smooth practice touches without assistance.
- Perform the second full Circle of Awareness.
- Perform two toe taps if needed.
- Instructor releases all grips as situation allows. (Must earn release with stability in order to pass.)
- Do a short Circle of Awareness every five seconds. (Altitude, Arch, Legs, Relax, Correct Turn if needed)
- Instructor makes sure of student control by 6,000' and regrips through deployment only if needed. (Student must be stable without assistance to pass.)
- Lock on at 6,000 feet. (Must be altitude aware.)
- Wave-off at 5,500 feet. (Must do so to pass.)
- Deploy by 5,000 feet. (Must do so stable & without any instructor contact or prompting to pass.)

Category C Canopy Dive Flow

(Same canopy dive flow for both Category C jumps.)

- Check altitude within three seconds of deploying.
- Assess the canopy by asking, "Is it there? Is it square? Is it straight, stable, and steerable?"
- Correct any common canopy problems by 2,500'.
- Unstow the toggles from half brakes by pulling them down to your groin & letting them back up.
- Check altitude, air traffic, & position over ground.
- Perform a full flare and hold it for five seconds.
- Smoothly let toggles all the way back up to return the canopy to full flight.
- Check altitude, air traffic, & position over ground.
- Look right and turn right at least 90°.
- Check altitude, air traffic, & position over ground.
- Look left and turn left at least 90°.
- Check altitude, air traffic, & position over ground.
- Perform a full flare and hold it for five seconds.
- Smoothly let toggles all the way back up to return the canopy to full flight.
- Check altitude, air traffic, & position over ground.
- Find the landing area and the pattern entry point.
- Divide the flight path by thousands of feet.
- Steer over the correct portion of the flight path & continue to stay in the holding area until 1,000 ft.
- Look at the runway & determine compass heading
- Identify suspect areas of turbulence.
- Identify all power lines in the area during descent.
- Continue to scan for obstacles every 500 feet.
- Verify the landing pattern & adjust as necessary.
- Look for obstacles around the landing area.
- Follow the pre-assigned pattern over the planned or alternate landing area.
- Scan for obstacles from base until landing.
- Prepare for a PLF once on final at 300 feet.
- Begin to flare quickly to half brakes at ten feet.
- Finish the flare to your groin just before the balls of your feet touch the ground.

Advancement Criteria

Exit and Freefall

- Demonstrate the ability to freefall safely with one current USPA AFF Instructor
- Control within five seconds of exit
- Maintain a stable and relaxed freefall
- Ability to dampen turns and heading drift using "altitude, arch, legs, relax, correct turn"
- Wave-off and pull at the assigned altitude
- Stable deployment without prompting or contact

Canopy

- Fly a recognizable pattern with minimal assistance
- Flare with minimal assistance

Spotting and Aircraft

- Understanding of how to plan and adjust the landing pattern for wind speed and direction

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Visualization: Mind over Body

Did you know that done properly, visualizing what you are about to do can be as effective as practicing it for real? Studies show that the only part of an athlete's performance that visualization will not help is gaining the strength necessary to perform the task.

Exercise is hard and skydiving is expensive, but visualization is cheap and easy. To begin, go where you can relax and where distractions will not affect you. (Potential distractions may be all around, but you can train your mind to tune them out.) Breathe rhythmically and slowly and recall or imagine a pleasant experience or moment where you are calm and very comfortable.

Then imagine your upcoming performance exactly as you want it to occur. Start from the beginning, which includes moving to the door of the aircraft and imagine your actions through to the end. You should even visualize your descent under canopy.

Visualize every detail: where you will place your hands and feet in the door, the cold air rushing in, the noise of the plane, the clean smell of the air, the feel of the aircraft metal on your hands, and everything you can associate with the upcoming experience.

Imagine how you will move every part of your body during the count and exit and how you will feel as you fly away from the plane. Think of where you will position your hands, feet, head, and torso, particularly as you explore techniques for maneuvering in freefall. Visualize every move, including looking at the ground, checking your altimeter, and seeing your instructors.

Some athletes visualize the upcoming performance from their point of view, while others visualize as if they were watching themselves on TV from above or alongside.

Visualize in slow motion or real time, but no faster. See your performance as one continuous flowing action, rather than as snapshots. As you visualize your actions, associate the motions by feigning the small movements with your hands or your legs with each action ("twitch") as you mentally rehearse the performance.

Leave yourself a few minutes to take in the sights and sounds on the way to altitude, but keep your performance first on your mind. The jumpers who succeed best all practice their routines on the climb to altitude, so you should not feel out of place. Just look around at the others doing the same thing!

At this stage of your training, your performance requires as much of your attention as any skydiver training for competition. Use these same visualization tips that help top athletes in skydiving and other sports to help you improve your performance and increase your overall satisfaction from each jump.

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Category D

Minimum of Two Jumps with One Current USPA AFF Instructor

By now, you have learned to safely control freefall by keeping track of your altitude, focusing on a neutral body position-especially your hips and legs and relaxing. In Category D, you will learn to control heading by modifying the neutral position using your upper body to deflect air. You will need to demonstrate relatively effortless control of 90°, 180°, and 360° freefall turns before moving on to aerobatics, introduced in Category E. Under canopy, you will explore rear riser control, which opens new safety options and adds fun to the canopy ride. Before advancing, you should demonstrate the ability to return to the drop zone and steer a planned, recognizable landing pattern without assistance. To progress to Category E, you should also be able to flare and land with minimal assistance by now. You should be able to stand up on landing by the end of this category. In Category C, you observed your instructor prepare and inspect your gear for the jump. Now, it is your turn. In Category D, you will begin studying skydiving equipment in earnest to become responsible for your own pre-flight equipment checks. You will review the owner's manual for the automatic activation device and learn how to operate one. The USPA Instructor introduces some of the elements of spotting, which means choosing the correct exit point and guiding the pilot to it. You will observe jump-run operations from the door. Study assignments include the FAA requirements for cloud clearance and visibility, which you will need to memorize.

Learning and Performance Objectives

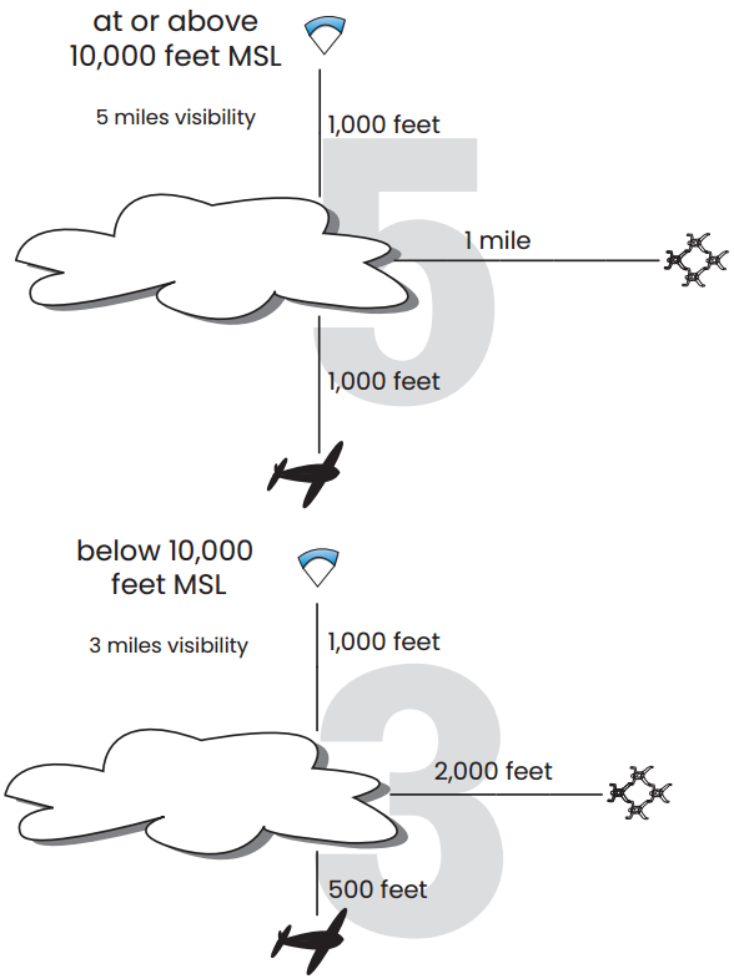
- Stable, solo, unassisted, poised exit
- Freefall turns and heading control
- Freefall speeds and times (review)
- Recognize and observe the airport and the spot and look below for aircraft from the aircraft door during jump run
- Rear riser control with and without brakes
- Building landing review
- Read the AAD owner's manual and operate the AAD
- Assisted pre-flight equipment check
- Introduction to three-ring release operation
- Memorize FAA cloud clearance and visibility requirements

Rules and Recommendations

Cloud clearance and visibility requirements for skydivers (FAR 105.17)

1. The pilot and jumper are jointly responsible for complying with the flight visibility and cloud clearance requirements of FAR Section 105.17. Aircraft flight under visual flight rules (VFR) conditions and persons making parachute jumps require minimum clearance from clouds and minimum visibility depending upon the altitude at which the activity is taking place:
   a. For activities that are at or above 10,000 feet MSL, the required minimum distance from clouds is 1,000 feet under, 1,000 feet over, and one mile horizontally from clouds. Flight visibility must be at least five miles.
   b. For activities that are at more than 1,200 feet above the surface but less than 10,000 feet MSL, the required minimum distance from clouds is 500 feet under, 1,000 feet over, and 2,000 feet horizontally from clouds. Flight visibility must be at least three miles.
2. No person may conduct a parachute operation, and no pilot in command of an aircraft may allow a parachute operation to be conducted from that aircraft:
   a. Into or through a cloud, or
   b. When the flight visibility or the distance from any cloud is less than that prescribed above.

3. Read and memorize the cloud clearance and visibility table and illustration below:



ALTITUDE	FLIGHT VISIBILITY (STATUTE MILES)	DISTANCE FROM CLOUDS
(1) 1,200 feet or less above the surface regardless of the MSL altitude	3	500 feet below 1,000 feet above 2,000 feet horizontal
(2) More than 1,200 feet above the surface but less than 10,000 feet MSL	3	500 feet below 1,000 feet above 2,000 feet horizontal
(3) More than 1,200 feet above the surface and at or above 10,000 feet MSL	5	1,000 feet below 1,000 feet above 1 mile horizontal

Illustration D.1 - Jumpers must observe the FAA requirements for visibility and clearance from clouds (FAR 105.17) to avoid other aircraft flying over the drop zone.

USPA requires that all student jump operations be completed prior to sunset

All student jumps, including tandems, must be completed between official sunrise & sunset. (BSR 2-1.F.9)

Equipment

1. An Introduction of the Booth 3-Ring Release System:
   a. A brief history of the Booth 3-Ring Release System:
      (1) The Booth 3-Ring Release System was invented by the Relative Workshop and United Parachute Technologies founder Bill Booth in 1976. It was the first practical release system that allowed skydivers to reliably jettison their malfunctioning main canopies in one motion by simply pulling a single handle. In use for years with excellent results, it is one of the foremost safety advances in skydiving equipment to date.
      (2) The Booth 3-Ring Release System is not only easier to operate than previous canopy release systems, but it is also more reliable and far less expensive. Failures of a properly built, assembled, maintained, and used Booth 3-Ring Release System are virtually unknown.
      (3) Once the main is jettisoned, the only things left on the harness are two smooth rings that cannot snag a deploying reserve. Some other release systems can – and have – interfered with the deploying reserve. The Booth 3-Ring Release System is now the industry standard.

b. Getting to know and understand how the Booth 3-Ring Release System works:

(1) Knowing how the Booth 3-Ring Release System works will help you to assemble and inspect it properly. This section was written with the student and his or her instructor in mind.
(2) Begin by peeling the release handle (more commonly referred to as a cutaway or breakaway handle) from the hook and loop fastener on the harness. Peeling upward and then down, rather than pulling straight down, makes it easier to separate the handle from the webbing.
(3) Look behind the risers near the harness and observe the movement of the yellow cable as you pull the cutaway handle. When the yellow cable clears the white loop, the Booth 3-Ring Release System is disengaged.
(4) Now gently and slowly pull one of the risers off the harness. As you pull, you'll notice that the white loop gets pulled through the grommet by the action of the smallest ring.
(5) While opening shock may exceed 1,000 pounds, the yellow cable never sees a force in excess of about ten pounds. This is due to the mechanics of the Booth 3-Ring Release System. Each ring forms a lever with a ten-to-one mechanical advantage as it passes through the other. A force of 1,000 pounds on the large harness ring exerts a force of only ten pounds on the white loop. (Opening shock usually totals about 1,000 pounds or 500 pounds on each riser.)
(6) Because of the mechanical advantage provided by the 3-Ring design, only a force of approximately one pound on the top ring keeps the release together. That's why it's important to keep foreign matter, such as bits of dirt, grass, sticks, and other debris out of the 3-Ring assembly. A small stick or object in the white loop could prevent a riser from releasing.
(7) Because of the tremendous mechanical advantage of the system, it is also important to understand the properties of the nylon components of the system.
(8) When nylon stays in the same position for a long time, it begins to conform to that position, especially if dirty. This is sometimes referred to as taking a "set". If the Booth 3-Ring Release System stays assembled for too long, the nylon can become so stiff that the low drag from a malfunction (such as a streamer) may not pull the riser off the ring and release the system.
(9) The Booth 3-Ring Release System must be disassembled, flexed, and inspected every week or every 25 jumps, whichever comes first. *(Note: The disassembly, maintenance, and reassembly of the Booth 3-Ring Release System are covered in detail in Category H.)*

2. Automatic activation device operation:

a. The instructor or a rigger explains the basics of how to operate the AAD.
b. Every jumper should read and understand the information contained in the AAD owner's manual.
c. An AAD initiates the reserve deployment sequence at a pre-set altitude (also sometimes used on the main parachute system).
d. An AAD is encouraged for all licensed jumpers.
e. The use of an AAD for activation of the reserve parachute, coupled with proper training in its use, has been shown to significantly increase the chances of surviving a malfunction or loss of altitude awareness.
f. The AAD is used to back up the jumper's deployment and emergency procedures, but no jumper should ever rely on one.
g. The FAA requires that if an AAD is installed, it must be maintained in accordance with the manufacturer's instructions (FAR 105.43.c).
h. An AAD may complicate certain situations, particularly if the jumper deploys the main parachute low enough for the AAD to activate.
i. Understanding and reviewing of the emergency procedures for Two Canopies Out is essential.

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3. Pre-flight equipment checks:

(Note: Your instructor should guide you through a complete pre-flight equipment check using a checklist.)

a. Before each jump, check your equipment from top to bottom, back to front, before putting it on.
   (1) Top to bottom, (back):
      (a) Reserve packing data card and seal (especially on an unfamiliar or rental rig)
      (b) AAD turned on and/or calibrated and set to correct mode
      (c) RSL connector routed properly
      (d) Reserve ripcord cable movement (gently tug the reserve ripcord cable toward the pin and look for smooth cable movement at the other end by the reserve handle)
      (e) Reserve pin(s) seated in place at the ¾ position & straight and smooth (not bent or nicked)
      (f) Reserve closing loop tight, in good condition (not frayed), and have no visible wear
      (g) Reserve flap closed securely
      (h) Main activation cable or pin seated in place at the ¾ position & free of nicks, kinks, & burrs
      (i) Main closing loop tight, in good condition (not frayed), and worn no more than ten percent
      (j) Main pilot chute bridle routing (routed correctly and unobstructed from pin to pilot chute pouch) or ripcord cable movement
      (k) Main flap closed and secure and main activation handle in place
   (2) Top to bottom, (front) from your left to your right as you are facing the parachute system:
      (a) Risers properly stowed under the riser covers and riser covers closed and secure
      (b) Check for perfect condition and proper routing and assembly of the 3-Ring release system:
         1. Each metal ring passes through only one other metal ring.
         2. The white retaining/locking loop passes through only the topmost, smallest metal ring.
         3. The white retaining/locking loop passes through the metal riser grommet and the metal release/cutaway cable housing terminal end fitting without twisting.
         4. Nothing except only the yellow cutaway cable passes through the white locking loop.
         5. The white retaining/locking loop is undamaged.
         6. The yellow cutaway cable is free of nicks, kinks, and burrs (especially on the end).
      (c) RSL connection, routing, and basic function to back up the jumper in pulling the reserve following a cutaway *(Note: Comprehensive RSL operation is explained in Category E.)*
      (d) Chest strap and hardware intact and not routed through the metal reserve D-ring handle
      (e) Cutaway handle seated properly in position & securely mated to the harness & no more than ½ inch of yellow cutaway cable is visible between the cutaway handle and the cable housing
      (f) Reserve handle secured in position in its pocket and metal swab on end of cable is not loose
      (g) Leg straps and hardware operational and correctly threaded and not twisted
b. With the help of another jumper, get a complete gear check with all your gear on before boarding.
c. Get your equipment checked once again before exiting the aircraft:
   (1) "Check of threes" (jumper self-check)
      (a) Three-ring assembly (and reserve static line)
      (b) Three points of harness attachment for correct routing, assembly, and adjustment
      (c) Three operation handles—main activation, cutaway, and reserve (touch them in this order)
   (2) Pin check back of system (by another jumper) top to bottom:
      (a) Reserve pin(s) seated in place and straight (and AAD on, calibrated, & set to correct mode)
      (b) Reserve ripcord cable movement
      (c) Main pin seated in place at the ¾ position and main pilot chute bridle correctly routed
      (d) Main activation handle in place
   (3) Personal equipment check ("SHAGG"):
      (a) **S**hoes: tied, no hooks
      (b) **H**elmet: fit and adjustment
      (c) **A**ltimeter: set for zero
      (d) **G**oggles: tight and clean
      (e) **G**loves: lightweight and proper size (only if below 40° at jump altitude for solo students)

4. Jumpsuit or clothes:
   a. Access to handles: shirt tails, jackets, and sweatshirts tucked in and pockets zipped closed
   b. Protection on landing
   c. Provide correct fall rate

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Aircraft and Spotting

1. Instructor-assisted planning with the landing pattern for the day's conditions.
2. Overview of aircraft spotting and jump-run procedures (what "spotting" means):
   (Note: It is recommended that an experienced jump pilot explain spotting procedures in Category E.)
   a. Determining the best opening point:
      (1) Calculations from wind forecasts
      (2) Observation and discussion of previous jumpers' canopy descents
   b. Pre-flight briefing with the pilot to discuss the correct jump run and exit points
   c. Guiding the pilot on jump run
   d. Verifying that the area below is clear of clouds and other aircraft before jumping
3. During jump run, observe spotting procedures and demonstrate the technique for looking straight down from the aircraft:
   a. Sight from the horizon looking forward
   b. Sight from the horizon looking abreast
   c. The junction of the two perpendicular lines from horizon marks the point straight below aircraft.
4. You must get your head completely outside the aircraft to look effectively for other aircraft and clouds.

Exit and Freefall

1. Stable poised "praying" exit without assistance:
   a. Use the same climb-out, setup, launch, and flyaway procedure as on previous poised exits.
   b. Prepare for slightly different results without an instructor gripping the harness on exit.
   c. Exit without assistance and establish control within five seconds before advancing from Category D.
2. Review of stability recovery and maintenance, short CoA: "altitude, arch, legs, relax, correct heading"
   a. Review short Circles of Awareness ("Check altitude, arch, legs, relax, and correct turn if needed"):
      (1) Know the altitude by reading the altimeter or counting from exit (depending on exit altitude).
      (2) Arch at the hips to improve belly-to-wind stability.
      (3) Check your leg position and adjust as needed (probably extend them out to 45 degrees).
      (4) Relax by taking a breath and letting go of unwanted body tension.
      (5) Recognize heading changes and actively correct as jump continues.
   b. **A.I.R.:** Provided you are **A**ltitude aware, **I**n control, and **R**elaxed (A.I.R.), you may continue alone in freefall & deploy at the assigned altitude. Perform a short Circle of Awareness, spending one second on each task: check altitude, arch, extend legs out to 45°, relax & breathe, correct heading.
   c. **Five-Second Rule:** If you are in freefall and above the assigned deployment altitude but cannot achieve A.I.R. within five seconds or by the assigned deployment altitude, whichever comes first, deploy your main canopy immediately, regardless of stability. (Review the three pull priorities.)
   d. **Roll-Out-of-Bed (ROB) Technique:** If you are above your assigned deployment altitude and falling in a back-to-earth orientation, roll to one side to recover to a stable, belly-to-earth body position. Check altitude, arch, look towards the ground to the right, bring the right arm in across your chest and extend your left arm straight out at 90° to your torso. As your body rolls to the right and you are facing the ground, return both arms back to the 90° freefall position. Check altitude.
3. Alternate freefall altitude references:
   a. Judge altitude by keeping track of time (~10 sec. for first 1,000' & ~5.5 sec. per 1,000' thereafter)
   b. Look at the ground during the climb to altitude and cross check against the altimeter.
   c. Observe the cloud bases on the ride to altitude to use later as an altitude reference.
   d. Look at the ground after initiating deployment and while waiting for inflation; check what you observed against the altimeter after opening.

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4. Initiating freefall turns:
   a. First, establish a strong, comfortable, arched, relaxed, symmetrical, neutral "box" body position prior to initiating a turn (important).
   b. Find a point ahead on the horizon as a primary heading reference.
   c. Turn your head and look under your elbow in the direction you wish to turn.
   d. Initiate a turn by changing the level of your upper arms to deflect air to one side; the forearms should follow. You should now be looking over the elbow that you have lowered.
      (1) For example, if performing a 90-degree left-hand turn, maintain a neutral "box" body position, look under your left elbow, and select a new heading 90° from your current primary heading.
      (2) Start by dropping your left shoulder and left forearm while simultaneously lifting the right shoulder and left forearm to tilt your entire upper body. Maintain your arms at 90° angles.
      (3) Once halfway, coast by returning your entire body to the neutral "box" body position.
      (4) If too much momentum was generated or you begin to coast too late, counter the excess drift to stop on heading, or at least near it, by smoothly, but hard enough, dropping the right shoulder and right forearm while lifting the left shoulder and left forearm to deflect air the other way until the drift completely stops. Then return to the neutral "box" body position.
   e. Assist the turn's effectiveness by evenly extending both legs slightly past 45 degrees to counter the effects of tension in the upper body.
   f. Any deviation from the neutral position (as when initiating a turn) demands more effort to maintain the rest of the body in neutral.
   g. Maintain positive leg pressure and a strong arch for a smooth turn.
   h. Stop small turns (90° or less) by returning to the neutral body position at the halfway point.
   i. Stop larger turns (180 and 360 degrees) using the "Start-Coast-Stop" (SCS) principle.
      (1) Look in the planned direction. Start the turn using the turn position for the first half of the turn.
      (2) Return to neutral (to coast) when the target heading comes into view.
      (3) Counter the turn if necessary to stop on heading.
   j. To regain lost control: "altitude, arch, legs, relax (neutral position), pick a new heading to maintain"
   k. Stop all maneuvers at 5,000 feet and maintain a stable arch on heading with positive leg pressure through wave-off and deployment.

5. Calculating freefall time according to exit altitude based on average terminal velocity of 120 mph:
   a. Ten seconds for the first 1,000 feet
   b. 5.5 seconds for each additional 1,000 feet (round down to five seconds for an added safety margin)
   c. Example: jump from 5,500 feet with a planned deployment altitude of 3,500 feet
      (1) Allow ten seconds from 5,500 to 4,500 feet
      (2) Add five seconds from 4,500 to 3,500 feet
      (3) Plan a total of 15 seconds for freefall

Emergency Procedure Review

1. Review in a training harness for quicker recognition & decision-making ability for a good/bad canopy:
   a. Ask the three questions: Is it there (are at least five cells inflated)? Is it square (are at least seven cells inflated)? Is it flying straight and stable (with no more than ¼ brake input) and is it steerable?
   b. The main canopy must answer "yes" to all three questions by no lower than 2,500 feet in order to land. If it is not controllable by 2,500 feet, you must perform your emergency procedures.

2. Review the three pull priorities in the following order of importance (top down):
   (1) Pull! Pull! Pull! **ALWAYS PULL, REGARDLESS OF ALTITUDE OR STABILIY!**
   (2) Pull at the correct altitude! Always deploy at the planned altitude, regardless of stability!
   (3) Pull at the correct altitude while stable.

3. Review and practice recognizing and responding to deployment handle problems for manual activation:
   a. Make only two additional attempts or use only two additional seconds, whichever one comes first, to correct the problem before initiating emergency procedures.
   b. The correct response to a lost, missing, or unrecoverable main deployment handle:
      (1) Use an open hand to sweep the bottom of the container for only one second and then sweep down the side of container to the bottom right-hand corner for only one more second.
      (2) If the main deployment handle cannot be located and deployed after these two additional tries or two additional seconds, whichever one comes first, deploy the reserve immediately.
      (3) If deploying the pilot chute results in another malfunction, cutaway and deploy the reserve.
   c. The correct response to a stuck or impossible main deployment handle extraction (hard pull):
      (1) Release the handle, but keep your hand on the handle. Rotate your hand with your palm facing down. Grab the handle again, ensuring you are only grabbing just the handle. Then place your right elbow against the side of the container for leverage and attempt to pull the handle again.
      (2) If the main deployment handle and main pilot chute cannot be deployed after two additional tries or two additional seconds, whichever one comes first, deploy the reserve immediately.
      (3) If deploying the pilot chute results in another malfunction, cutaway and deploy the reserve.
4. Horseshoe (part of the pilot-chute, bridle, lines, or canopy is caught or entangled on the jumper):
   a. Straighten up whatever it is caught on and try to shake it off using the wind to assist you.
   b. Only give no more than two tries or two seconds, whichever comes first.
   c. If the horseshoe malfunction cannot be cleared after two tries or two seconds, whichever comes first, or if doing so results in another malfunction, cutaway and deploy the reserve.
5. Review and practice the correct response to a pilot chute hesitation (burble) or pilot chute in tow:
   a. Twist at the waist and look over the right shoulder to modify the airflow while striking the right side of the container with the right elbow for only one second. Twist at the waist and look over the left shoulder while striking the left side of the container with the left elbow for only one second.
   b. If the container does not open after these two tries or two seconds, whichever comes first, or if doing so results in another malfunction, then cutaway and deploy the reserve immediately.
6. Review premature container opening in freefall for hand deployment:
   a. Attempt to locate the main deployment handle and deploy the pilot chute first.
   b. If the pilot chute cannot be located and deployed after two tries or two seconds, whichever comes first, or if deploying the pilot chute results in another malfunction, cutaway and deploy the reserve.
7. Review and practice common problems in the training harness in order of correction:
   a. The correct response to line twist(s):
      (1) Spread the risers and kick to untwist, leaving the toggles stowed until all twists are cleared.
      (2) If spinning, twist risers to untwist the lines and stabilize canopy. Then kick to untwist the risers.
      (3) If you cannot correct all line twists by 2,500 feet, cutaway and deploy the reserve.
   b. The correct response to slider hang-up (stuck slider):
      (1) Pull both toggles down to the full flare position to slow the canopy and pump at the bottom of the control range between three-quarter brakes and full flare.
      (2) If unable to use the toggles, pump the rear risers smoothly between full flight and full flare.
      (3) The slider needs to be at least halfway down and pass a control check for a safe landing.
      (4) Repeat remedial procedures twice or until reaching the decide-and-act altitude of 2,500 feet, whichever one comes first.

c. The correct response to end cell closure(s):
   (1) Pull both toggles down to the full flare position and hold them there until the end cells open and then let them back up to full flight smoothly.
   (2) If unable to use the toggles, perform a full flare using both rear risers.
   (3) If no more than two cells are closed and they cannot be inflated, evaluate controllability and flare by performing a control check before reaching the decide-and-act altitude of 2,500 feet.
   (4) If steerable, land as planned and perform a parachute landing fall (PLF) upon landing.

d. If the canopy has opened normally but turns on its own, release both toggles to full flight by performing a full flare for five seconds. If still turning, perform one more flare for five seconds.

e. Evaluate controllability and flare before reaching the decide-and-act altitude of 2,500 feet for:
   (1) Broken steering line(s) or toggle(s): Use rear risers.
   (2) Broken suspension or stabilizer line(s)
   (3) Pilot chute entangled with the canopy or in the lines
   (4) Canopy damage, such as rips or tears in the fabric

8. Review and practice for recognizing and responding to total and partial high-speed malfunctions:

   a. Total high-speed malfunction (unable to locate or extract the main deployment handle): Cannot activate or deploy your main parachute after two tries or two seconds, whichever one comes first.
      (1) **ARCH!** Return to the arch position.
      (2) **LOOK for, LOCATE, and LOCK** your eyes onto the reserve ripcord handle.
      (3) **HOOK** the reserve ripcord handle with your left hand and secure your grip with the right hand.
      (4) **PEEL, PULL, & STRIP** the reserve handle all the way out to activate the reserve deployment.
      (5) **ARCH!** Maintain the arch position as the reserve deploys.
      (6) **TWIST RIGHT and LEFT** for one second each while checking over each shoulder for reserve pilot chute deployment.
      (7) Perform these same emergency procedures for any type of malfunction below 1,000 feet.

   b. Partial high-speed malfunction: The pilot chute and/or deployment bag has left the container, but the main canopy is either not deploying or is less than half inflated after two tries or two seconds, whichever one comes first.
      (1) **ALTITUDE!** Check your altitude to ensure you are still above 1,000 feet.
      (2) **ARCH!** Return to the arch position.
      (3) **LOOK for and LOCATE** the cutaway handle.
      (4) **GRAB** the cutaway handle with your right hand first and secure your grip with the left hand.
      (5) **LOOK for, LOCATE, and LOCK** your eyes onto the reserve ripcord handle.
      (6) **PEEL, PULL, & STRIP** the cutaway handle while keeping eyes locked onto the reserve handle.
      (7) **HOOK** the reserve ripcord handle with left hand immediately and secure grip with right hand.
      (8) **PEEL, PULL, & STRIP** the reserve handle all the way out to activate the reserve deployment.
      (9) **ARCH!** Maintain the arch position as the reserve deploys.
      (10) **TWIST RIGHT and LEFT** for one second each while checking over each shoulder for reserve pilot chute deployment.

9. Review minimum cutaway altitude and reserve deployment without cutaway if necessary:

   a. You should decide if you are going to cutaway and take the appropriate actions by 2,500 feet.
   b. If below 1,000 feet without a functioning main canopy, just deploy the reserve immediately!
   c. If in a canopy entanglement with another jumper below 1,000 feet and both of the canopies are uncontrollable and it appears that they cannot be separated in time for a safe landing, both of you should deploy your reserves immediately!

10. One canopy inflated and another deploying:
    a. If the reserve is inflated and the main is in a stage of deployment, disconnect the RSL and cutaway.
    b. If the main canopy is fully inflated and the reserve is in a stage of deployment, shake the reserve risers to aid its deployment. Then be prepared to take action on the resulting configuration.
        (1) The two open canopies typically settle into one of three configurations: biplane, side-by-side, or down-plane.
        (2) Trying to force one configuration into a more manageable configuration is typically futile and can be dangerous.
11. Both parachutes deployed (two canopies out):
    a. Stable biplane:
        (1) Do NOT cutaway! Disconnect the reserve static line (RSL).
        (2) Leave all toggles stowed on both canopies. If a toggle releases itself during deployment or has already been unstowed, then only unstow the other toggle of that canopy and leave all other toggles stowed and fly that canopy in the half-brake position using minor, gentle toggle inputs.
        (3) Gently steer the front canopy by smoothly pulling on the rear risers of the front canopy only.
        (4) Use minimal input to steer the front canopy only as necessary to maneuver for a safe landing.
        (5) Land both canopies without flaring. Perform a parachute landing fall (PLF) on landing.
    b. Stable side-by-side with directional control:
        (1) Do NOT cutaway! Disconnect the reserve static line (RSL).
        (2) Leave all toggles stowed on both canopies. If a toggle releases itself during deployment or has already been unstowed, then only unstow the other toggle of that canopy and leave all other toggles stowed and fly that canopy in the half-brake position using minor, gentle toggle inputs.
        (3) Gently steer the dominant canopy (larger and more directly overhead, typically the main) by smoothly pulling on the rear risers of the dominant canopy only.
        (4) Use minimal control input to steer the canopy only as necessary to maneuver for a safe landing.
        (5) Land both canopies without flaring. Perform a parachute landing fall (PLF) on landing.
    c. Down-plane or pinwheel:
        (1) Disconnect the reserve static line (RSL) if altitude/time permits (if above 1,000 feet).
        (2) Immediately cutaway the main canopy, regardless of altitude.
        (3) Steer the reserve to a normal landing & flare. Perform a parachute landing fall (PLF) on landing.
    d. Main-reserve entanglement:
        (1) Do NOT cutaway! Disconnect the RSL if altitude/time permits.
        (2) Do everything possible to attempt to clear the entanglement of the two canopies by pulling on the risers and/or toggles of the canopy with the highest chance of inflating.
        (3) Once one canopy is fully inflated, start trying to inflate the other canopy by pulling on the risers and/or toggles.
        (4) If possible, retrieving the less-inflated canopy may help clear the canopies.
        (5) NEVER give up!
        (6) Perform a hard parachute landing fall (PLF) on landing.
12. Procedures for testing a questionable canopy above your decision-and-action altitude:
    a. Make two tries to clear the problem with toggles or rear risers if altitude permits (above 2,500 ft.).
    b. The canopy must fly straight, turn, and flare reliably to be able to land safely.
    c. Decide to cutaway or land the canopy by 2,500 feet and act.

13. Procedures for landing on a building:
    a. Plan your landing approach to be well clear of objects. Fly far enough from objects that another jumper or your own misjudgment does not force you into a building or other hazardous object.
    b. Focus on clear, open landing areas and steer the parachute to a clear area.
    c. Make any low-altitude avoidance turns from braked flight to avoid an equally dangerous dive following a turn from full flight.
    d. If a building is unavoidable, press feet and knees together and prepare for a PLF to absorb impact.
    e. If possible, disconnect the reserve static line (RSL) before landing on a building.
    f. At ten feet above the first point of contact with the building, flare to at least half brakes.
    g. Strike the building feet first, whether landing on top or into the side of the building.
    h. After landing on top of a building in windy conditions:
        (1) Disconnect the reserve static line (if possible).
        (2) Cutaway the main parachute canopy to avoid being pulled off roof.
        (3) If landing with a reserve, retrieve and contain the canopy until removing the harness.
    i. Wait for competent help and assistance.

Canopy

(You must discuss this section with a current USPA AFF Instructor.)

1. Rear riser steering:
    a. Steer using the rear risers with the brakes still set to change heading quickly after opening:
        (1) With the brakes set, the canopy has less forward momentum to overcome for a turn.
        (2) The rear risers operate more than the entire back quarter of canopy.
    b. Using risers to steer in case of a malfunctioned toggle:
        (1) Release both brakes.
        (2) You need to conserve enough strength to complete all turns with rear risers until landing and still be able to flare.
        (3) Especially on a smaller canopy, you should practice rear riser flares many times above 1,000 feet on a routine jump before committing to a rear riser landing (important).
        (4) Your plan to land or cutaway in the event of a malfunctioned toggle should be made before you ever encounter the problem.
        (5) One locked brake with the other released may necessitate a cutaway; decide and act by 2,500 feet.
    c. Practice all riser maneuvers above 1,000 feet and focus on the canopy pattern and traffic from 1,000 feet down.
    d. Before making any turns, look in the direction of the turn to prevent collisions and entanglements.
2. With minimal assistance, land within 165 feet of the target.

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Category D Quiz

(Must be passed before Category D-1 jump.)

1. **For planned deployment initiation at 3,500 feet, approximately how long should an average-sized jumper fall after exiting at 5,500 feet?**
   a) 10 seconds
   b) 15 seconds
   c) 20 seconds

2. **What is the most appropriate response to loss of heading control in freefall?**
   a) Altitude, arch, legs, relax.
   b) Correct by turning in opposite direction.
   c) De-arch.

3. **What is the best way to avoid a canopy collision when turning?**
   a) Announce in a loud, clear voice your upcoming turns and/or maneuvers.
   b) Always fly a right-hand pattern.
   c) Look first in the direction of the turn.

4. **What is the quickest and safest way to change heading immediately after opening?**
   a) Aggressively use toggle inputs to turn.
   b) Rear riser turn with the brakes still set.
   c) Front riser turn with the brakes still set.

5. **How would you steer a parachute that has a broken brake line?**
   a) Immediately cutaway and pull the reserve.
   b) Use the rear risers to steer with the brakes still set.
   c) If familiar with rear riser flares on that canopy, release both brakes and use the rear risers to steer

6. **How would you prepare to land a canopy using the rear risers to flare?**
   a) Practice with rear riser flares at altitude with that canopy during a routine jump.
   b) Prepare to PLF.
   c) Set the brakes first and then land using rear risers.

7. **What is the procedure for landing on a building?**
   a) Cutaway 5-10 feet above the building surface, prepare to PLF.
   b) Disconnect the RSL (if time), contact the building feet first, PLF, cutaway after landing on top of a building, wait for competent help.
   c) Steer away from building so that you land on solid ground.

8. **What is the purpose of the automatic activation device?**
   a) To back up the jumper's emergency procedures
   b) To deploy the main canopy if the jumper is unable
   c) To give the jumper more useable freefall time

9. **What is the "check of threes"?**
   a) Check with manifest to confirm your load number; check with your instructor to go over the dive flow; check with the pilot to confirm load.
   b) Check three-ring release system for correct assembly & RSL; 3 points of harness attachment for correct routing, assembly, & adjustment; 3 operation handles: main activation, cutaway, reserve
   c) Altitude, arch, legs.

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10. What must the spotter do to determine what is directly underneath the aircraft while on jump run?

a) Maintain communication with flight control.
b) Check GPS spot.
c) Place head completely outside the aircraft and look straight down.

11. How far horizontally must jumpers be from any cloud below 10,000 feet MSL?

a) 2,000 feet
b) 3,000 feet
c) one mile

12. How far horizontally must jumpers be from any cloud at 10,000 feet MSL and above?

a) 2,000 feet
b) 3,000 feet
c) one mile

13. What are the minimum visibility requirements below 10,000 feet MSL?

a) one mile
b) three miles
c) five miles

14. What are the minimum visibility requirements at and above 10,000 feet MSL?

a) one mile
b) three miles
c) five miles

15. Who is responsible for a jumper observing cloud clearance requirements?

a) Jumper and pilot
b) Each jumper
c) Safety and Training Advisor

16. According to the BSRs, what is the latest a student may jump?

a) 9:00 PM (2100)
b) All student jumps must be completed by sunset.
c) All student jumps must be completed by thirty minutes after sunset.

17. What is the technique for determining the point straight below the aircraft during jump run?

a) Determine two lines from the horizon, one ahead and one abreast, and find the intersection of those two lines.
b) Look straight down and focus on the point that does not move.
c) Determine two lines from the horizon, one ahead and one parallel, and find the intersection of those two lines.

18. What must the jumper look for below before exiting the aircraft?

a) Previous groups of skydivers
b) Clouds and other aircraft
c) Both a and b

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Category D Dive Flows

Minimum of Two Jumps with One Current USPA AFF Instructor

D-1 Freefall Dive Flow

- Observe the instructor spotting from the door.
- Stable, poised "praying" exit with a relaxed arch & one instructor gripped (must be stable w/in 5 secs)
- Perform one full Circle of Awareness.
- One smooth practice touch without assistance.
- The instructor releases grips and flies to the front.
- Perform a short Circle of Awareness:

"Altitude, Arch, Legs, Relax, Correct Turn if needed"

- Find a reference point on the horizon (a heading) and determine the position of the instructor.
- Ask permission to turn if above 6,000' (head nod).
- Wait for instructor's permission (a head nod back).
- Start a left turn, coast, & stop at 90° (within 20°).
- Altitude, Arch, Legs, Relax, Correct Turn if needed
- With instructor's permission each time, perform alternating left and right 90° turns while doing a short CoA in between each maneuver (within 20°)
- Initiate no new turns below 6,000'. (Shake head.)
- Finish your final turn by no lower than 5,000 feet.
- Lock on at 5,500 feet (must be altitude aware).
- Wave-off at 5,000 feet (must do so to pass).
- Deploy by 4,500' (must be solo & stable to pass).

D-2 Freefall Dive Flow

- Observe the instructor spotting from the door.
- Solo, poised "praying" exit with a relaxed arch.

(Must be stable within five seconds of exit to pass.)

- Perform one full Circle of Awareness.
- One smooth practice touch without assistance.
- Instructor flies to the front.
- Perform a short Circle of Awareness:

"Altitude, Arch, Legs, Relax, Correct Turn if needed"

- Find a reference point on the horizon (a heading) and determine the position of the instructor.
- Ask permission to turn if above 6,000' (head nod).
- Wait for instructor's permission (a head nod back).
- Start a left turn, coast, & stop at 180° (within 45°).
- Altitude, Arch, Legs, Relax, Correct Turn if needed
- If above 6,000', turn right 180° back to 1st heading
- With instructor's permission each time, perform alternating left and right 360° turns (within 45°) while doing a short CoA between each maneuver.
- Initiate no new turns below 6,000'. (Shake head.)
- Finish your final turn by no lower than 5,000 feet.
- Lock on at 5,500 feet (must be altitude aware).
- Wave-off at 5,000 feet (must do so to pass).
- Deploy by 4,500' (must be solo & stable to pass).

D-1 Canopy Dive Flow

- Check altitude, air traffic, & position over ground.
- Correct common canopy problems (line twists, slider, end cells) using rear risers with brakes set.
- Look right and turn right 90° using rear risers.
- Check altitude, air traffic, & position over ground.
- Look left and turn left 90° using rear risers.
- Check altitude, air traffic, & position over ground.
- Release brakes, conduct controllability check, and fly to the holding area. (Keep toggles in hands.)
- Look right and turn right 90° using rear risers.
- Check altitude, air traffic, & position over ground.
- Look left and turn left 90° using rear risers.
- Check altitude, air traffic, & position over ground.
- Look right and turn right 180° using rear risers.
- Check altitude, air traffic, & position over ground.
- Look left and turn left 180° using rear risers.
- Check altitude, air traffic, & position over ground.
- Practice rear riser flares. (Keep toggles in hands.)
- Return to normal toggle controls by 2,000 feet.
- Verify landing pattern and adjust as necessary.
- Continue to stay in holding area until 1,000 feet.
- Follow the pre-planned landing pattern over the planned landing area or alternate.
- Prepare to PLF at 300' & begin flare at 10' to land.

D-2 Canopy Dive Flow

- Check altitude, air traffic, & position over ground.
- Correct common canopy problems (line twists, slider, end cells) using rear risers with brakes set.
- Look right and turn right 90° using rear risers.
- Check altitude, air traffic, & position over ground.
- Look left and turn left 90° using rear risers.
- Check altitude, air traffic, & position over ground.
- Release brakes, conduct controllability check, and fly to the holding area. (Keep toggles in hands.)
- Look right and turn right 360° using rear risers.
- Check altitude, air traffic, & position over ground.
- Look left and turn left 360° using rear risers.
- Check altitude, air traffic, & position over ground.
- Practice rear riser flares. (Keep toggles in hands.)
- Return to normal toggle controls by 2,000 feet.
- Verify landing pattern and adjust as necessary.
- Continue to stay in holding area until 1,000 feet.
- Follow the pre-planned landing pattern over the planned or alternate landing area.
- Prepare to PLF at 300' & begin flare at 10' to land.

Note: Your hands should go to the rear risers after opening on every jump for collision avoidance. You can flare your parachute to land with the rear risers in situations where your toggle(s) are rendered useless.

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Advancement Criteria

Spotting and Aircraft

- Recognize and observe the airport and the spot and look below for aircraft from the aircraft door during jump run

Equipment

- Read AAD owner's manual and operate the AAD

Exit and Freefall

- Stability within five seconds after an unassisted poised exit
- At least two right and two left 90° turns, stopping within 20°
- At least one right and one left 180° & one right and one left 360° turns, stopping within 45°

Canopy

- At least one right and one left 90° rear riser turn with brakes still set before controllability check
- At least one right and one left 90° rear riser turn with the brakes released after controllability check and while in the holding area and above 2,000 feet
- At least one right and one left 180° rear riser turn and one right and one left 360° rear riser turn with the brakes released after a controllability check and while in the holding area and above 2,000 feet
- Cumulative of at least two rear riser flares with brakes released after a controllability check and while in the holding area and above 2,000 feet
- Fly the planned landing pattern without assistance
- Flare and safely stand-up a landing within 165 feet of the target with minimal assistance

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Learning How to Spot, One Jump at a Time

Before earning a USPA A-License, you are expected to learn to spot in routine conditions. "Spotting" simply means choosing the opening point and guiding the pilot to the correct position over the ground for exit. You can calculate the spot from a winds-aloft report. FAA Flight Service provides these reports, which you can get from the pilot. Start Skydiving posts these reports outside of manifest daily.

When you are in the door before exit, spotting starts with determining exactly what is straight down and how the plane is moving across the ground. A good spotter's training never ends.

Here are some tips for beginners:

1. **Be familiar with the DZ and surrounding area,** including the correct exit and opening points for the day's conditions. Your USPA Instructor will simply tell you at first and then show you how to figure it for yourself later.

2. **Look out of the aircraft,** obviously done best with the door open and your head all the way outside. Small aircraft give you more opportunities to practice spotting. In larger aircraft, your instructor will arrange some door time. First, just get comfortable looking out. Put your head all the way out into the wind stream.

3. **Identify the DZ,** the climb-out point, and the exit point from the open door of the aircraft. Point them out to your instructor or coach.

4. **Look straight down,** using horizon reference points. Avoid using the aircraft as a reference. On jump run, the plane is often climbing, banking, skidding, or crabbing.

5. **Determine the track of the aircraft.** Once you can identify two points straight below the plane on jump run, you know the actual path of the aircraft across the ground. If you see that it will take you too far to the left or right, suggest a correction to the one supervising your jump, who will relay your corrections to the pilot.

6. **Allow enough time (distance)** for your climb-out and setup to separate you from other jumpers. Learn when to climb-out.

Soon, you will give directions to the pilot under supervision. After a while, your USPA Instructor or Coach will not interfere unless your spotting appears unsafe.

Your spotting training will require several jumps, and the staff will log your progress. Spot as often as you can during your training as a student so you will feel confident later when you are on your own.

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Category E

Minimum of Two Jumps with One USPA AFF Instructor and One Self-Supervised Jump

This is the last category that distinguishes between students of different disciplines. Once you have demonstrated the ability to regain stability and control within five seconds after initiating a disorienting maneuver, a USPA AFF Instructor may clear you to jump without instructor supervision in freefall. At that point, any USPA Instructor may perform gripped exits with you, as well.

From Category E on, a USPA Instructor makes sure you are properly trained and supervised on each jump. In Category E, you practice unpoised (door) exits and aerobatics to increase your confidence, awareness, and control in freefall. By now, you should be jumping from the highest altitude available at your drop zone. Under canopy, you will practice for softer landings by looking for the "sweet spot" in the flare stroke that provides the best lift for that canopy. The goal is to flare your canopy to fly as flat as possible until you begin to touch down. The USPA Instructor will also remind you of your responsibility (and every jumper's responsibility) to observe and avoid other canopies.

By the end of Category D, you should have been able to land within 165 feet of the target with minimal assistance. In Category E, you should be able to do it on your own. Part of the emergency procedure review includes a detailed discussion on preventing premature openings in freefall and more detailed procedures for two open canopies. A rigger or USPA Instructor will introduce you to the open parachute system to identify its key components, along with the FAA's rules for packing parachutes. Supervised packing begins in Category F.

You will discuss weight, balance, airspeed, jump run procedures, and aircraft emergency procedures, usually with a jump pilot. A jump pilot or USPA Instructor also shows you how to read a winds-aloft report. From that information, you will learn to calculate the best opening point over the ground. In Categories E through H, you are expected to select and prepare your equipment for jumping (with the supervising USPA Instructor's advice), including obtaining all recommended pre-jump equipment checks. You are also learning to spot, where to sit in the aircraft, and to allow enough distance between the jumpers exiting before you. You should know the surface winds and plan the appropriate landing pattern.

In order to be cleared to student self-supervision by a USPA Instructor, you must have obtained the following skills and knowledge:

1. Demonstrated the ability to regain stability and control in freefall within five seconds after initiating a disorienting maneuver.
2. Demonstrated sufficient canopy control skills to land safely in all expected conditions.
3. Demonstrated the knowledge needed to select and inspect gear before use.
4. Shown knowledge of spotting needed to make reasonable judgment about suggested exit points.
5. Shown knowledge of both normal and emergency aircraft procedures for all aircraft types in common use for skydiving.

Learning and Performance Objectives

- Door (unpoised) exit
- Recovering stability and awareness
- Freefall aerobatics
- Unsupervised freefall
- Canopy stalls
- The canopy's "sweet spot"
- Two canopies deployed (review)
- High wind landings
- Reserve static line (RSL) comprehensive
- Rectangular versus elliptical canopies
- Complete open parachute orientation
- Component identification
- Unassisted pre-flight equipment check
- Parachute packing and supervision
- Wind limits for students
- Aircraft orientation briefing, including:
  - airspeed and weight and balance
- Independent aircraft emergency procedures
- Intro to winds aloft, spot selection, selecting the opening point, and actively assisting with jump run

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Rules and Recommendations

Review and discuss the USPA BSR 2-1.H on wind restrictions for students:

1. **Students are limited to 14 mph (ten mph for round reserves).**

2. **A USPA Safety and Training Advisor may file a waiver for students to jump in higher winds.**

3. There are no wind limitations for licensed skydivers. Licensed jumpers must exercise judgment.

Note: Start Skydiving is waivered to 16 MPH for ram-air canopies.

Read BSR 2-1.N and FAR 91.211.a.3 regarding oxygen requirements for jumps:

No person may operate a civil aircraft of U.S. registry at cabin pressure altitudes above:

1. 12,500 feet (MSL) up to and including 14,000 feet (MSL) unless the pilots and required minimum flight crew are provided with and use supplemental oxygen for that part of the flight at those altitudes that is of more than 30 minutes duration;

2. 14,000 feet (MSL) unless the pilots and required minimum flight crew are provided with and use supplemental oxygen during the entire flight time at those altitudes; and

3. **15,000 feet (MSL) unless the operator provides each occupant of the aircraft with supplemental oxygen.**

Review and discuss (preferably with an FAA rigger) the rules for the periodic inspection and repacking of the main and reserve parachute system published by the FAA in FAR Part 105.43.a and FAR Part 105.43.b:

No person may conduct a parachute operation using a single-harness, dual-parachute system, and no pilot in command of an aircraft may allow any person to conduct a parachute operation from that aircraft using a single-harness, dual-parachute system, unless that system has at least one main parachute, one approved reserve parachute, and one approved single person harness and container that are packed as follows:

1. **The main parachute must have been packed within 180 days before the date of its use by a certificated parachute rigger, a non-certificated person under the direct supervision of a certificated parachute rigger, or the person making the next jump with that parachute.**

2. **The reserve parachute must have been packed by a certificated parachute rigger:**

    a. **Within 180 days before the date of its use, if its canopy, shroud, and harness are composed exclusively of nylon, rayon, or similar synthetic fiber or material that is substantially resistant to damage from mold, mildew, and other fungi, and other rotting agents propagated in a moist environment or**

    b. **Within 60 days before the date of its use, if it is composed of any amount of silk, pongee, or other natural fiber, or material not specified above.**

3. If installed, the automatic activation device must be maintained in accordance with manufacturer instructions for that automatic activation device.

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Open Parachute Orientation

Attend the Category E Open Parachute Orientation (below) to prepare for packing lessons.

An FAA rigger or a USPA AFF Instructor will introduce you to the parachute system when it is unpacked.

You will learn the common points of parachute wear and maintenance requirements during Category G.

Assembly and maintenance of the three-ring release is covered in Category H.

1. Packing is a function of identifying and organizing the parachute.
2. Identify:
    a. Pilot chute, bridle, and collapsing system
    b. Deployment bag or another device
    c. Pilot chute attachment
    d. Top skin and discuss the different characteristics of F-111 (0-3 cfm) and zero-P fabric.
    e. Packing tabs
    f. Bottom skin
    g. Leading edge (nose)
    h. Trailing edge (tail)
    i. Center of tail (warning label or tab)
    j. Stabilizers
    k. Manufacturer's label (to identify end cell)
    l. Slider stops
    m. Loaded and unloaded ribs
    n. Cross-ports
    o. A, B, C, D, and brake lines
    p. Line cascades, including brake lines
    q. Slider and slider grommets
    r. Connector links and link protectors
    s. Risers and brake system

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Equipment

1. Typical characteristics of elliptical canopies, compared to rectangular canopies of the same size and material:
   a. Flatter glide for same airspeed
   b. Faster turns
   c. Greater loss of altitude in a turn
   d. May continue to dive after stopping control input following a turn
   e. Slower, less predictable opening (some models)
   f. Shorter toggle stroke for flare (some models)
   g. Quicker, more abrupt stall (some models)
2. The stall speed of any wing increases with higher wing loading:
   a. More suspended weight
   b. Sudden maneuvers, such as flaring hard after a dive
3. Read and discuss USPA recommendations on the use and limitations of the reserve static line, or RSL:
   a. A reserve static line attaches to a main canopy riser to extract the reserve ripcord pin immediately and automatically after separation of the main risers from the harness.
   b. An RSL is recommended for all experienced jumpers.
      (1) The RSL backs up the jumper by extracting the reserve ripcord pin after a cutaway.
      (2) The RSL:
         (a) must be routed and attached correctly to function
         (b) when misrouted, can complicate or prevent a cutaway
      (3) RSLs can complicate certain emergency procedures:
         (a) cutaway following a dual deployment
         (b) cutting away from an entanglement after a collision
         (c) unstable cutaway, although statistics show that chances are better from an unstable reserve deployment than delaying after a cutaway
         (d) unstable cutaway with a helmet camera or other protruding device
         (e) cutaway with a surfboard (although an RSL may have prevented two fatal skysurfing accidents)
         (f) cutaway on top of a building or on the ground in high winds
         (g) cutaway after landing in water
         (h) broken riser on the RSL side (results in reserve deployment); prevention:
            1. inspecting and replacing worn risers
            2. packing for soft openings (tight line stows; see manufacturer's instructions)
            3. stable deployment at slow speeds
      (4) If temporarily disconnecting an RSL, care must be taken so it does not interfere with the operation of the parachute system, consult a rigger.
   c. When using a reserve static line device, the skydiver must not depend on the static line device and must manually pull the reserve ripcord immediately after the cutaway.
   d. An RSL may not be desirable when attempting linked canopy formations.
   e. Unless the manufacturer's instructions state otherwise, a connector device between the left and right main risers should not be used.

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Aircraft Briefing

Attend the following aircraft briefing presented by an experienced jump pilot or AFF instructor for Category E students outlined below that covers the interaction between the jumpers, the aircraft, and the pilots.

1. Sufficient airspeed is necessary for flight; without it, the aircraft wing stalls.
2. Weight
   a. Aircraft weight limits are specified in the aircraft owner's manual and other documentation and, by law, may not be exceeded.
   b. Weight includes:
      (1) Fuel
      (2) Occupants
      (3) Skydiving equipment
      (4) Other (jump seats, oxygen systems, etc.)
   c. The weight must be calculated for each load.
3. Weight distribution (center of gravity)
   a. The load in an aircraft must be distributed within center of gravity limits to fly.
   b. Limits are published in the owner's manual and other documentation.
   c. The pilot must calculate and monitor weight distribution for each flight.
   d. Jumpers moving around the aircraft can place the load out of limits.
      (1) In aircraft with a door in the rear, some jumpers must remain forward as groups congregate near the door.
      (2) Large groups planning to exit together should inform the pilot.
4. Seatbelts must be worn when the aircraft is moving below 1,000', including taxi, takeoff, & landing, to:
   a. Prevent injuries in an emergency
   b. Maintain the load within the center-of-gravity limits
5. Jumpers outside the aircraft:
   a. Can block air flow to the control surfaces
   b. Add drag that makes it harder to maintain the necessary airspeed
   c. When floaters (outside the aircraft) are out, jumpers must exit quickly to reduce the effect of drag.
6. Apply the concept of weight, balance, and drag to aircraft at the DZ.
7. Review all possible aircraft emergency procedures with a current USPA AFF Instructor. All students should take direction from his or her instructor(s) who will help prepare you for one of four actions:
   a. In an aircraft emergency below 1,500 feet, everyone must prepare to land with the aircraft:
      (1) The door must be closed and everyone must have his or her helmet and seatbelt fastened on.
      (2) Assume the proper crash position and brace yourself for impact by bringing your knees to your chest and clasping your hands behind your head to reinforce your neck.
      (3) After the aircraft has come to a complete stop, immediately, yet orderly, locate the nearest exit and get out of the aircraft if you are able, making sure to exit away from the propeller(s).
      (4) Do not touch anything as you exit the aircraft.
      (5) Walk at least 100 feet away from the aircraft.
      (6) Never go back to the aircraft for any reason.
      (7) Go get help if you are able.
   b. In an aircraft emergency at or above 1,500 feet, but below 3,500 feet:
      (1) Exit solo, giving at least three seconds between exits, count to three, and deploy your reserve.
   c. In an aircraft emergency at or above 3,500 feet, but below 6,000 feet:
      (1) Exit solo, giving at least three seconds between exits, count to three, and deploy your main.
   d. In an aircraft emergency at or above 6,000 feet:
      (1) Perform a routine exit with or without instructor assistance and deploy your main as planned.
   e. After an emergency exit and once under an open canopy:
      (1) Look for the instructor's parachute and follow it to a clear and open landing area.
      (2) If you cannot find an instructor, follow any other experienced jumper or select any clear area.
8. Discuss all of the different sections of FAR 91 provided in Section 9-1 of the Skydiver's Information Manual with an experienced jump pilot; only the sections pertinent to skydiving are included there.

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Spotting

(An experienced jump pilot or a current USPA AFF Instructor must cover this section with you.)

1. How to read a winds-aloft report
2. True versus magnetic heading
3. Jump-run procedures
4. Spotting corrections
   a. Manual (hand signals, shoulder taps)
   b. Electronic (spotting buttons and lights)
   c. Verbal
5. The effect of winds during canopy descent:
   a. A canopy descends at approximately 1,000 feet per minute.
   b. Divide the opening altitude by 1,000 feet to determine time of descent, e.g., 3,000 feet = three minutes of descent.
   c. Estimate in miles per minute the amount of drift during descent, as in Table E.1:

MPH	Miles per Minute	Drift from 3,000 feet
60	1 mile per minute	3 miles
30	½ mile per minute	1.5 miles
20	1/3 mile per minute	1 mile
15	¼ mile per minute	¾ mile
10	1/6 mile per minute	½ mile
5	1/12 mile per minute	¼ mile

Table E.1 – Convert miles per hour to miles per minute and multiply times three minutes (approximately 1,000 feet of descent per minute) to estimate drift under canopy from 3,000 feet based on wind speed.

6. Calculate the drift under canopy from 3,000 feet, based on the average of the known winds and a canopy descent rate of 1,000 feet per minute, to choose the correct opening point. Example below:

Winds (forecast and observed):

Altitude	Heading	Speed (mph)
3,000’ AGL	280	20
Surface	260	10
Average	270	15

Use Table E.1 above to estimate the canopy's drift during a 3-minute descent in winds averaging 15 mph:

Drift:

Open	Time	Distance	Heading
3,000’ AGL	3 minutes (x ¼)	¾ mi	from 270°

Average the wind direction and velocity to estimate drift after opening at 3,000 feet above the ground.

   a. Canopy descent time from 3,000 feet (at 1,000 feet per minute): three minutes
   b. Total (uncontrolled) drift at ¼ mile per minute: ¾ mile
   c. Ideal opening point: ¾ mile due west

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Alternate Method for Calculating Freefall and Canopy Drift

Example for Calculating Freefall Drift:

Altitudes	Heading	Speed (in mph)
3,000 feet	250°	15 mph
6,000 feet	260°	18 mph
9,000 feet	270°	20 mph
12,000 feet	290°	25 mph
Average	*270°*	*19.5 mph*

To simplify the process, convert mph to mile per minute (mpm) (assuming a one-minute freefall)

$$\frac{19.5 \text{ mph}}{60 \text{ min}} = 1/3 \text{ mile per minute (mpm)}$$

Freefall drift is equal to 1/3 mile at 270°.

Example for Calculating Canopy Drift:

Altitudes	Heading	Speed (in mph)
Surface	180°	12 mph
3,000 feet	200°	18 mph
Average	*190°*	*15 mph*

$$\frac{15 \text{ mph}}{60 \text{ min}} = \text{¼ mile of uncontrolled drift per minute under canopy}$$

Assume 4,000 feet opening altitude (i.e., four minutes under canopy):

¼ mile of uncontrolled drift per minute x four minutes under canopy = one mile @ 190°

7. Observe and ask jumpers on a previous load about the wind conditions and spot.

8. Jumper procedures during jump run

   a. The pilot determines when the door may be opened (red light will illuminate) and may prefer to operate the door.

   b. Look below to:

      (1) Check for clouds

      (2) Check for aircraft

      (3) Verify the jump run is correct

   c. When the pilot gives the OK to jump (green light near door will illuminate), verify that the aircraft is the desired distance from the drop zone and begin exit procedures.

9. Be sure to establish communications for spotting corrections with the pilot prior to flight.

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Exit and Freefall

1. You should attempt a stable door (unpoised) exit:
   a. Position for the best launch (for left side exits: face cockpit with left foot forward & right foot back).
   b. Present the front of your hips to the relative wind.
   c. Exit in a neutral "box" body position with your legs slightly extended past 45° (better stability).
   d. Maintain your arch as the relative wind changes from ahead to below after exit.
2. Recovering from exit and freefall instability:
   a. Review short Circles of Awareness ("Check altitude, arch, legs, relax, and correct turn if needed"):
      (1) Know the altitude by reading the altimeter or counting from exit (depending on exit altitude).
      (2) Arch at the hips to improve belly-to-wind stability.
      (3) Check your leg position and adjust as needed (probably extend them out to 45 degrees).
      (4) Relax by taking a breath and letting go of unwanted body tension.
      (5) Recognize heading changes and actively correct as jump continues.
   b. **A.I.R.:** Provided you are **A**ltitude aware, **I**n control, and **R**elaxed (A.I.R.), you may continue alone in freefall & deploy at the assigned altitude. Perform a short Circle of Awareness, spending one second on each task: check altitude, arch, extend legs out to 45°, relax & breathe, correct heading.
   c. **Five-Second Rule:** If you are in freefall and above the assigned deployment altitude but cannot achieve A.I.R. within five seconds or by the assigned deployment altitude, whichever comes first, deploy your main canopy immediately, regardless of stability. (Review the three pull priorities.)
   d. **Roll-Out-of-Bed (ROB) Technique:** If you are above your assigned deployment altitude and falling in a back-to-earth orientation, roll to one side to recover to a stable, belly-to-earth body position.
      (1) Check altitude.
      (2) Arch.
      (3) Look over your right shoulder towards the ground to the right.
      (4) Bring your right arm in across your chest.
      (5) Extend your left arm straight out at 90° to your torso.
      (6) As your body rolls to the right and you are facing the ground, return both arms back to 90°.
      (7) Check altitude.
3. Barrel rolls, back loops, and front loops (instructor's preferred technique):
   a. The skills of performing a barrel roll, a back loop, and a front loop are FUN to perform and are the first "recreational" moves to learn. These introduce the two remaining axes of rotation:
      (1) Lateral (loops where the axis is through the hips) and
      (2) Longitudinal (rolls where the axis is through the body from the top of the head to the feet).
   b. All three of these moves require you use your full range of motion (physical literacy) and make decisions about your altitude and attitude in the air.

c. Try barrel rolls first, because they have a natural built-in recovery component from back-to-earth.

d. A barrel roll is achieved by applying drag on one side of the axis of rotation. This is accomplished by moving the arms from one side to the other. The steps to complete a barrel roll are:

(1) SET UP in the strong, relaxed, comfortable, arched, symmetrical, neutral "box" body position (important).

(2) INITIATE by first extending the legs straight out, knees locked, toes pointed, and flattening the torso. It should feel as if you were lying face down on the floor.
(a) Bring left arm in across the chest, as if you are going to punch the opposite shoulder.
(b) At the same time, forcefully push down on the air with the extended right arm, just as you would if pushing yourself over while lying on the floor.
(c) As you have rotated to 180°, allow your extended right arm that is pushing the air to naturally wrap into your body.

(3) RECOVER at 270° - 300° by extending the left arm spread back into a relaxed arch. Once it is extended, reestablish the curve in the torso by arching at the hips and extending the right arm.

(4) Two things commonly occur during this type of roll:
(a) Because the legs are extended in order to provide an elongated body position for executing the roll, there is a tendency to fall slightly "head down." This is completely natural.
(b) This roll has a tendency to go off heading. The major player in this is not extending the legs fully prior to initiation. The slightest bend will cause the roll to go off heading. Keep both of your legs completely straight with your knees locked and toes pointed.

(5) This particular type of roll may be referred to as a "King Kong" roll or "Flip Flop" because of the arm action. This technique relies on the asymmetrical drag to cause the roll as a result you must do the arm motions with lots of speed do to a clean roll. Sometimes this roll is taught as a passive movement: that is, by extending one arm and contracting the other, the wind should push (roll) you over. However, a dynamic roll will produce better results; the more you push down on the air with the extended arm, the faster the roll.

(6) A different kind of roll is the French roll. On this type of roll, you straighten the torso and throw your arms above your head with a twisting action. It has the benefit of better heading control.
(a) Unlike the traditional barrel roll, this maneuver does not create as much forward movement or head-down tilt. Learning to roll is a good way to introduce yourself to back flying, and to return to your belly from inverted flight. It is frequently used as a transition for back-to-belly freefly compulsory moves in competition.
(b) When straightening your legs and pointing your toes, pretend to grab an imaginary ball on the horizon in a scooping motion, or, think of scooping ice cream. You should be able to pick a heading and maintain sight during the entire 360° roll. While reaching for the imaginary ball, twist your shoulders in the direction you want to roll. For example, if you want to roll to the right, scoop the bottom of the imaginary ball with your right hand. Your left hand grabs the top of the imaginary ball. The faster you reach for the imaginary ball, the faster you will roll, because French rolls are all about momentum.
(c) As a twist to the twist, you can also initiate the roll using the feet instead of the arms.
(d) Some people perform a roll during tracking to check the sky around them. However, this practice is greatly discouraged as you actually lose sight of your direction and heading if you are scanning, and, because it is disorienting, it is just not worth the risk. It is better to track fast and far and look around you in a forward orientation than waste time performing a maneuver.

e. The skydiving "back loop" is similar to a "backward somersault" or a "backflip" used in many sports (i.e., gymnastics). The key steps to follow for a basic back loop are:

(1) SET UP in the strong, comfortable, relaxed, symmetrical, arched, neutral "box" body position (important).

(2) INITIATE the loop by breaking the arch at your waist and aggressively bringing your knees up to your chest (impulse); think of trying to touch each knee into a shoulder; avoid contacting your face. Tuck your knees against your chest until your torso passes through vertical.
   (a) Bringing your knees up quickly will help your body to follow through the loop. Think of hitting each shoulder with your knees, which creates the momentum. The faster you drive your knees to your chest, the faster you will rotate.
   (b) At the same time as tucking the knees, de-arch your elbows down through the shoulders and roll the shoulders down and cup the sternum and stretch both of your arms forward out in front and push down slightly to create floating of the upper body to assist in speeding up the loop initiation. This will result in a much faster loop.
   (c) Keep the arms forward in their neutral "box" position (90-degrees at the shoulders and elbows). As the knees come to the chest, the arms will naturally sweep back along the sides of the body as it rotates. Keep them along the side of the body throughout the rotation.
   (d) To provide more stability, for beginners, you may place your arms wide out to the side to provide a wider stance and hence more stability. However, out front is correct.
   (e) Keep the head looking forward toward the horizon. When the knees come to the chest, the head should naturally tuck into the chest. This is correct. Let it happen.
   (f) Note: while often misstated, it is incorrect to "throw" the head back during any loop. Avoid doing this at any time. This will throw off your center of balance, and actually counters the rotational momentum that you are trying to generate with your legs. Keep the head looking forward and allow it to roll into the chest.
   (g) The result of these quick and coordinated actions is that you will rotate or roll backwards.
   (h) The faster you transition from arch to tuck and tuck to arch, the cleaner the loop will be.
   (i) A good drill for rotating faster is to do a back roll on a trampoline. Perform a back drop onto the shoulders & then very quickly pull your feet/knees over your head so that you flip backward and onto your feet. The idea is that, when you do a back tuck, you should be pulling your feet up over your head to rotate, not dropping your head and shoulders.

(3) COAST with your knees and chin tucked in against your chest until you are at least 270° through the loop, at which point you will see the ground come into view straight below with the sky above the horizon and feel the wind starting to hit your chest. This is when you recover.

(4) RECOVER the rotation once the ground comes into view straight below with the sky above the horizon, at least 270° through the loop, by fully extending both legs straight out and arch.
   (a) Stretch your legs straight back out to a fully extended position to grab as much air as possible to counter the rotation as you come around to the horizontal position.
   (b) Keep the arms tucked into the side of the body and out of the wind until the rotation has ceased. Use only the legs to counter the rotation.
   (c) Once the rotation has stopped, then place the arms back into the relaxed, neutral position. The momentum from bringing the knees to the chest should be enough impulse to complete the loop. If your torso pitches up past the horizon, that means you had lots of momentum for the loop, and either (a) opened a moment too late, or (b) placed your arms out too prematurely, causing them to catch air and lift the front of the body. As a refinement, you may need to sweep the arms to the sides during the coast or initiate with less impulse.

f. A front loop is similar to a forward somersault. The steps to complete a front loop are:

(1) SET UP in a relaxed, arched, neutral "box" body position (important).

(2) INITIATE by bending aggressively forward at the waist to drop the upper body straight down toward the ground or farther. At the same time, fully extend both of your legs out evenly and sweep your arms back to the sides. Fully extending both legs will result in a faster rotation.

(a) The most common mistake when executing a front tuck is to throw the head down toward the ground. Instead, be sure to force the upper body downward toward the legs, initiating at the waist, maintaining a neutral head position with your head back and chin up.

(b) As the body begins to rotate and the wind hits the back, tuck the knees in to the chest to remove them from the wind as the rotation continues. You can grab onto the knees if this helps. Bring the legs in tight to help with the rotation. This conserves momentum and the result is accelerated rotation.

(3) COAST in the tucked position until the body passes the upright position (270° around). It is accepted practice to grasp the knees to hold the tuck tight.

(4) RECOVER at 270° around by first unfolding the upper body back into an arch and extending the arms to counter the rotation. This will catch the air and stop the rotation. After the rotation has stopped, then extend the legs back out into the neutral "box" position (45° or slightly farther).

g. Any two successive disorienting maneuvers with recovery and reorientation within five seconds qualify you for self-supervision in freefall (the same one may be used twice).

h. Demonstrate full control by completing all three maneuvers within 60° of the initial heading.

4. Rolls, loops, and other freeflying maneuvers result in faster and erratic fall rates; check altitude often.

Read and discuss USPA recommendations on altimeters in SIM Section 5-3.J

Visual altimeters, especially when chest-mounted, may be unreliable during inverted positions.

Some examples of altimeter types and locations include:

1. Visual altimeter worn on the wrist:
   a. Easy to read in a variety of freefall positions
   b. Wrist is usually unaffected by burbles
   c. Difficult to read while tracking
2. Visual altimeter worn on the chest or main lift web:
   a. Reference for others in a group, particularly when belly flying
   b. Readable during tracking
   c. Subject to error and erratic readings while back-to-earth
3. Audible altimeter, typically worn against the ear:
   a. Audible altimeters provide a good reference to key altitudes near the end of the planned freefall
   b. Extreme background noise of freefall and a jumper's attention to another event can render audible altimeters ineffective.
   c. Students should use audible altimeters only after demonstrating a satisfactory level of altitude awareness.

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Emergency Procedure Review

1. Preventive measures for two open canopies:
   a. Deploy the main parachute at the correct altitude to avoid AAD activation.
   b. Initiate malfunction procedures high enough to cutaway safely and avoid AAD activation.
   c. Maintain and correctly operate hand-deployed pilot chutes, especially collapsible pilot chutes.
   d. Protect your equipment before exit to prevent pins or handles being knocked loose.
   e. Some AADs, particularly those used for student jumping, will activate under a fully open parachute when controlled too aggressively at lower altitudes.
2. Various scenarios can result in having both parachutes deploy with one of the following outcomes.
3. Review detailed procedures for two canopies out as they pertain to experienced jumpers found below.
   a. One canopy inflated and another deploying:
      (1) If the reserve is inflated & the main is in a stage of deployment, disconnect the RSL & cutaway.
      (2) If the main canopy is fully inflated & the reserve is in a stage of deployment, shake the reserve risers to aid its deployment. Then be prepared to take action on the resulting configuration.
         (a) The two open canopies typically settle into one of three configurations: biplane, side-by-side, or down-plane.
         (b) Trying to force one configuration into a more manageable configuration is typically futile and can be dangerous.
   b. Stable biplane:
      (1) Do NOT cutaway! Disconnect the reserve static line (RSL).
      (2) Leave all toggles stowed on both canopies. If a toggle releases itself during deployment or has already been unstowed, then only unstow the other toggle of that canopy and leave all other toggles stowed and fly that canopy in the half-brake position instead of using the rear risers.
      (3) Gently steer the front canopy by smoothly pulling on the rear risers of the front canopy only.
      (4) Use minimal input to steer the front canopy only as necessary to maneuver for a safe landing.
      (5) Land both canopies without flaring. Perform a parachute landing fall (PLF) on landing.
   c. Stable side-by-side with directional control:
      (1) Do NOT cutaway! Disconnect the reserve static line (RSL).
      (2) Leave all toggles stowed on both canopies. If a toggle releases itself during deployment or has already been unstowed, then only unstow the other toggle of that canopy and leave all other toggles stowed and fly that canopy in the half-brake position instead of using the rear risers.
      (3) Gently steer the dominant canopy (larger and more directly overhead, typically the main) by smoothly pulling on the rear risers of the dominant canopy only.
      (4) Use minimal control input to steer the canopy only as necessary to maneuver for a safe landing.
      (5) Land both canopies without flaring. Perform a parachute landing fall (PLF) on landing.
   d. Down-plane or pinwheel:
      (1) Disconnect the reserve static line (RSL) if altitude/time permits (if above 1,000 feet).
      (2) Immediately cutaway the main canopy, regardless of altitude.
      (3) Steer the reserve to a normal landing & flare. Perform a parachute landing fall (PLF) on landing.
   e. Main-reserve entanglement:
      (1) Do NOT cutaway!
      (2) Do everything possible to attempt to clear the entanglement of the two canopies by pulling on the risers and/or toggles of the canopy with the highest chance of inflating.
      (3) Once one canopy is fully inflated, start trying to inflate the other canopy by pulling on the risers and/or toggles. If possible, retrieving the less-inflated canopy may help clear the canopies.
      (4) NEVER give up! Perform a parachute landing fall (PLF) on landing.
4. Procedures for high-wind landings:
   a. Choose a point to the side or well downwind of any obstacle that may generate turbulence.
   b. Land using a PLF and pull one toggle in as quickly as possible until the canopy collapses and run towards the canopy. As you run to it, try to step on the bridle and use it to pull the canopy to you.
   c. After landing, disconnect the Reserve Static Line (RSL) as a precaution in case a cutaway becomes necessary to prevent being dragged. Cutaway if necessary to prevent being dragged.

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Canopy

1. Types of stalls:
   a. An aerodynamic stall is a stable, steady-state stall, or sink, with decreased glide and increased rate of descent:
      (1) Associated with older designs and specialized accuracy canopies
      (2) May not be achievable with newer, flatter-gliding canopies, which often fly flatter almost until a full stall
   b. A dynamic stall occurs at the end of a flare when the jumper begins to swing/rock back under the canopy, the canopy begins to nose forward (the nose lowers), and the canopy begins a slight dive:
      (1) Associated with a sharp dive
      (2) May signal a full stall
   c. A full stall occurs when the trailing edge (tail) is pulled and held below the leading edge (nose) and the canopy begins to fly backwards:
      (1) Collapses the canopy
      (2) May result in unrecoverable line twist in smaller, more highly loaded wings stalled with the toggles (a rear riser stall may be more controllable)
      (3) May be contrary to the manufacturer's recommendations
      (4) May result in entanglement with the jumper if released too abruptly
      (5) May result in injury if done too low
2. Raise the controls smoothly and evenly after any stall to avoid diving and partial collapse.
3. Proper flare technique:
   a. Keep your feet and knees together to maintain heading during the landing flare (level harness).
   b. Flare to full arm extension (elbows locked) with your hands in front of your groin and your chin down to provide visual feedback for level control and to brace your neck for a hard PLF.
4. Discovering the best landing flare ("sweet spot") for the canopy being jumped (nine practice flares):
   a. From full glide, flare to a mid-point in the toggle range:
      (1) Approximately the bottom of the rib cage
      (2) At a medium rate of flare
   b. Feel the amount and duration of lift before the stall.
   c. Return gently to full flight for at least ten seconds.
   d. Repeat to the same depth:
      (1) Once at a faster rate
      (2) Once at a slower rate
   e. Compare the strength and duration of the lift before the stall.
   f. Flare at three different speeds to a point deeper in the toggle stroke, approximately at the hips.
   g. Flare at three different speeds to a higher point in the toggle stroke, approximately the shoulders.
   h. Compare the flares to determine the stroke rate and depth that produces the maximum combined strength and duration of lift for that canopy.
5. Best flare height above the ground:
   a. Use the best flare procedure (discovered during the nine practice flares) upon landing, beginning one body height (approximately five to six feet) above ground.
   b. Flare to minimum descent (or flat) and hold that toggle position when the glide begins to flatten.
   c. Smoothly continue the toggle stroke to maintain the flat glide.
   d. If the canopy begins to stall and drops several feet, begin the flare that much lower next time.
   e. If you do not achieve the flattest glide before landing, begin to flare slightly higher next time.
   f. If you flare too high, never return your canopy to full flight. Raise your hands to waist height & PLF.
6. Review of traffic avoidance procedures:
   a. Watch for other traffic, especially upon entering the landing pattern.
   b. The most dangerous point of the pattern occurs when two jumpers on opposite base-leg approaches turn to final approach.
   c. The lower canopy has the right of way, but a jumper should not fly to assert right of way over it.
   d. It takes two people to have a collision, but only one to avoid it.

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Category E Quiz

(Must be passed before Category E-1 jump.)

1. **What happens to a jumper's fall rate when performing rolls, loops, or freeflying maneuvers?**
   a) Increases
   b) Decreases
   c) Stays the same

2. **What happens to a visual altimeter when it is in the jumper's burble?**
   a) Reads unreliably
   b) Nothing
   c) Reads high

3. **What is the best way to recover from a canopy stall to full glide?**
   a) Quickly counteract with toggle input.
   b) Pull legs up into a tight ball.
   c) Smoothly raise the controls.

4. **Describe an aerodynamic stall as it applies to a ram-air canopy;**
   a) Sudden state of increased glide and increased rate of descent
   b) Stable state of decreased glide and increased rate of descent
   c) Stable state of increased glide and decreased rate of descent

5. **When does a dynamic stall occur?**
   a) When the front risers are pulled down quickly
   b) At the end of a flare when the jumper begins to rock back under the canopy
   c) At the beginning of a flare

6. **What happens after a dynamic stall if the tail is held lower than the nose?**
   a) Recovery
   b) Continued dynamic stall
   c) Full stall

7. **What is the best way to determine a canopy's optimum flare speed and depth for landing?**
   a) Practice different rates of flare entry at different depths of flare.
   b) Divide exit weight by the canopy's square footage.
   c) Contact the manufacturer.

8. **Describe your procedure for landing in high winds:**
   a) Stay well downwind of any obstacle, face into the wind early, disconnect the RSL, land with a PLF, pull one toggle down completely, and after landing, cutaway if necessary.
   b) Do not attempt a stand-up landing; PLF
   c) Enter the downwind leg at ¾ brakes and smoothly continue to full brakes.

9. **How many A-lines does a nine-cell canopy have?**
   a) Nine
   b) Ten
   c) Eleven

10. **To what part of the canopy do the steering lines (brake lines) connect?**
    a) Nose or leading edge
    b) End cells
    c) Tail or trailing edge

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11. What lines go through the rear slider grommets?
a) A, B, and C
b) C, D, and brakes
c) A, C, and D

12. Where does the main pilot chute bridle attach to the canopy?
a) Rear center
b) Top center
c) Front center

13. Who may pack a main parachute?
a) FAA rigger, person jumping the parachute, person under rigger's supervision
b) Drop zone certified packer, FAA rigger
c) Anyone

14. How often do the main and reserve parachute need to be packed?
a) Every 120 days
b) Every 180 days
c) Every 90 days

15. Who is in command of the aircraft?
a) FAA
b) TSA
c) Pilot

16. What are two purposes for wearing seatbelts in an aircraft?
a) To conform to federal regulations and protection in a crash
b) To prevent items from getting loose and maintain the correct balance
c) To maintain the correct balance and protection in a crash

17. Who is responsible for determining if the aircraft is in condition for safe flight?
a) The aircraft owner
b) The pilot
c) FAA

18. Above what altitude MSL is the pilot of an unpressurized aircraft required to breathe supplemental oxygen?
a) 14,000 feet
b) 15,000 feet
c) 18,000 feet

19. Above what altitude MSL are all occupants of an unpressurized aircraft required to be provided with supplemental oxygen?
a) 14,000 feet
b) 15,000 feet
c) 18,000 feet

20. In an aircraft with the exit door near the back, what must jumpers do to maintain the balance during exit procedures?
a) Remain forward until it is time for their group to exit.
b) Follow the pilot's instructions on each jump.
c) Remain as close to the pilot as possible.

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21. What is the biggest danger to a jumper when flying the canopy pattern?
a) Other canopies
b) Turbulent wind
c) Canopy malfunction

22. What is the best way to avoid a canopy collision?
a) See and remain clear of other jumpers.
b) Spiral quickly so that you are the first jumper landing.
c) Stay in brakes so that you are the last jumper landing.

23. How does the RSL work?
a) Activates a small explosion that cuts the reserve closing-loop
b) Prevents main canopy from being cutaway
c) Forms a separable link between the main riser and reserve ripcord so that cutting away the main activates the reserve, if the RSL is hooked up

24. What would happen if the main riser attached to the RSL breaks?
a) The reserve deploys into the main.
b) The reserve deploys with the main still attached by the other riser.
c) The main remains attached, creating a two-out situation.

25. What is the best way to prevent risers from breaking?
a) Inspection and maintenance; correct packing, tight line stowage, and stable deployment.
b) Replace risers every year.
c) Remind your rigger to inspect at every reserve inspection and repack.

26. What is one way to prevent a dual deployment?
a) Initiate malfunction procedures high enough to cutaway safely and avoid AAD activation.
b) Deploy the main parachute at or above the AAD activation altitude.
c) De-activate AAD under canopy above AAD activation altitude.

27. What is generally the best action to take in the following two-canopy bout scenario: Biplane?
a) Release the RSL (if time permits) and cutaway (regardless of your altitude).
b) If stable with directional control, release the RSL, leave the toggles stowed on both canopies, steer the dominant canopy gently using the rear risers of that canopy only; no flare on landing and PLF.
c) Release the RSL and leave the toggles stowed on both canopies and steer the front canopy gently using the rear risers of that canopy only; no flare on landing and PLF.

28. What is generally the best action to take in the following two-canopy-out scenario: Side-by-side?
a) Release the RSL (if time permits) and cutaway (regardless of your altitude).
b) If stable with directional control, release RSL & leave toggles stowed on both canopies and steer the dominant canopy gently using the rear risers of that canopy only; no flare on landing and PLF.
c) Release the RSL and leave the toggles stowed on both canopies and steer the front canopy gently using the rear risers of that canopy only; no flare on landing and PLF.

29. What is generally the best action to take in the following two-canopy-out scenario: Down-plane?
a) Release the RSL (if time) and cutaway (regardless of your altitude).
b) If stable with directional control, leave the toggles stowed on both canopies and steer the dominant canopy gently using the rear risers of that canopy only; no flare on landing and PLF.
c) Leave the toggles stowed on both canopies and steer the front canopy gently using the rear risers of that canopy only; no flare on landing and PLF.

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Category E Dive Flows

One USPA AFF Instructor on E1 & E2. Self-Supervised Solo on E-3 w/Instructor on Plane.

E-1 Freefall Dive Flow

- Assist instructor with spotting.
- Stable, solo door (unpoised) exit without grips.

(Must be stable within five seconds of exit to pass.)

- Find a reference point on the horizon (a heading).
- Determine the position of the instructor.
- Perform a full Circle of Awareness.
- Ask permission to perform maneuvers (head nod).
- Wait for instructor's permission (a head nod back).
- Perform a L barrel roll (must be w/in 60° to pass).
- Perform a short Circle of Awareness.

(Altitude, Arch, Legs, Relax, Correct Turn if needed)

- Ask permission to perform maneuvers (head nod).
- Wait for instructor's permission (a head nod back).
- Perform a R barrel roll (must be w/in 60° to pass).
- Perform a short CoA in between each barrel roll.
- With instructor's permission each time, continue to perform barrel rolls (within 60°) until 6,000 ft.
- Initiate no new maneuvers below 6,000 feet.
- Shake head, "No more maneuvers!" at 6,000 feet.
- Complete final maneuver by 5,000 feet, no lower.
- Lock on at 5,000 feet. (Must be altitude aware.)
- Wave-off at 4,500 feet. (Must do so to pass.)
- Deploy by 4,000' (stable & w/o assistance to pass).

E-2 Freefall Dive Flow

- Assist instructor with spotting.
- Stable, solo door (unpoised) exit without grips.

(Must be stable within five seconds of exit to pass.)

- Find a reference point on the horizon (a heading).
- Determine the position of the instructor.
- Perform a full Circle of Awareness.
- Ask permission to perform maneuvers (head nod).
- Wait for instructor's permission (a head nod back).
- Perform a back loop (must be w/in 60° to pass).
- Perform a short Circle of Awareness.

(Altitude, Arch, Legs, Relax, Correct Turn if needed)

- Ask permission to perform maneuvers (head nod).
- Wait for instructor's permission (a head nod back).
- Perform a front loop (must be w/in 60° to pass).
- Perform a short CoA in between each maneuver.
- With instructor's permission each time, continue to perform the required aerobatics to meet the standards (within 60°) to pass until 6,000 feet.
- Initiate no new maneuvers below 6,000 feet.
- Shake head, "No more maneuvers!" at 6,000 feet.
- Complete final maneuver by 5,000 feet, no lower.
- Lock on at 5,000 feet. (Must be altitude aware.)
- Wave-off at 4,500 feet. (Must do so to pass.)
- Deploy by 4,000' (stable & w/o assistance to pass).

E-3 Freefall Dive Flow

- Assist instructor with spotting.
- Perform a stable, solo, poised ("praying") exit.
- Practice falling stable and performing turns with precision while maintaining correct body position and altitude awareness throughout the skydive.
- **Aerobatics and tracking are NOT permitted!**
- Stop all maneuvers by 6,000'! Lock on at 5,000'!
- Wave-off at 4,500'! **Deploy by 4,000', no lower!**

Category E Canopy Dive Flow

(Same dive flow for all three Category E jumps.)

- Check altitude, air traffic, & position over ground.
- Correct any common canopy problems.
- Release brakes, conduct a canopy controllability check, and move to the holding area.
- Check altitude, air traffic, & position over ground.
- Flare to bottom of ribs at a medium speed & hold.
- Recover to full flight for ten seconds.
- Check altitude, air traffic, & position over ground.
- Flare to bottom of ribs at a quicker speed and hold
- Recover to full flight for ten seconds.
- Check altitude, air traffic, & position over ground.
- Flare to bottom of ribs at a slower speed and hold.
- Recover to full flight for ten seconds.
- Check altitude, air traffic, & position over ground.
- Flare to hips at a medium speed and hold.
- Recover to full flight for ten seconds.
- Check altitude, air traffic, & position over ground.
- Flare to hips at a quicker speed and hold.
- Recover to full flight for ten seconds.
- Check altitude, air traffic, & position over ground.
- Flare to hips at a slower speed and hold.
- Recover to full flight for ten seconds.
- Check altitude, air traffic, & position over ground.
- Flare to shoulders at a medium speed and hold.
- Recover to full flight for ten seconds.
- Check altitude, air traffic, & position over ground.
- Flare to shoulders at a quicker speed and hold.
- Recover to full flight for ten seconds.
- Check altitude, air traffic, & position over ground.
- Flare to shoulders at a slower speed and hold.
- Recover to full flight for ten seconds.
- Check altitude, air traffic, & position over ground.
- Complete all maneuvers above 1,000 feet.
- Evaluate the most effective flare according to the strongest and most sustainable lift ("sweet spot").
- Initiate best flare at head height above ground.
- Continue to flare to maintain a flat glide to land.
- Evaluate flare height according to landing results.

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Advancement Criteria

Equipment

- Complete open parachute system orientation
- RSL orientation

Spotting and Aircraft

- Correct calculation of the opening point given simple wind conditions
- Active participation with spotting procedures on jump run

Exit and Freefall

- Cumulative of two successive disorienting maneuvers with stability and altitude awareness recovered within five seconds
- Cumulative of one left barrel roll, one right barrel roll, one back loop, and one front loop (all within 60° of the original heading and recovering stability and altitude awareness within five seconds)
- One self-supervised freefall

Canopy

- Unassisted landing within 165 feet of target

Note: Once these requirements have been met and you have received the endorsement of a USPA AFF Instructor, your training may be supervised by any current USPA Coach or Instructor. You may then self-supervise in freefall, but remain under USPA Instructor supervision. A USPA Coach or Instructor should accompany you in the aircraft to verify the correct spot, clearance from clouds and aircraft, exit separation, and your position in the aircraft exit order.

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Categories F-H: Group Skydiving Skills

Skydiving is a sport for individualists who like to do things together. In the first portion of the USPA Integrated Student Program, Categories A-E, you focused on the skills required to survive independent freefall: stability control, deployment at the correct altitude, landing in a clear area, and using the equipment.

The remaining three categories, F-H, prepare you for more advanced freefall control. More importantly, you get ready for skydiving in groups: in freefall and under canopy.

Your education continues in canopy flight, equipment, and aircraft skills essential for safety. Soon, you will graduate and become independent of supervision. Detailed review also continues on the emergency procedures introduced in the first-jump course.

With the direct assistance of other qualified staff members, such as the USPA Coach, the USPA Instructor continues to supervise your training and monitor your progress during all remaining student jumps until you obtain your USPA A-License.

The freefall portions of Categories F through H address group flying techniques and skills. Under the supervision of a USPA Instructor, a USPA Coach may train you for the freefall skills in these last three categories and accompany you in freefall.

After completing all training and jumps at the end of Category H, you may sign up for a USPA A-License check dive with a USPA Instructor.

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Category F

Minimum of Two Tracking Jumps with One Current USPA Coach and Two Clear-and-Pulls

Tracking is a basic group skydiving skill that enables jumpers to gain sufficient freefall separation for a safe opening. It is such an important skill that the freefall training in this category is devoted entirely to tracking techniques. To begin, while supervising yourself in freefall, practice the basics of the delta position, the first step toward a flat track. The USPA Coach will evaluate and refine your tracking skills as part of the jumps in Categories G and H. Tracking evaluation is part of the A-License check dive with the USPA Instructor. Flying the canopy slowly and performing flat, altitude-conserving turns is an important skill that can help you out of a difficult landing approach in a tight area. You will also learn more about how to handle aircraft emergency exit procedures independently. Emergency review includes power line recognition, avoidance, and landing procedures. During this category, you will also make a practice clear-and-pull from 5,500 feet, followed by a clear-and-pull jump from 3,500 feet, as required for the A-License. By now, you are ready to learn how to pack and should begin working with a packing instructor. The staff continues to build your understanding of aircraft procedures on jump run with emphasis on separation between groups exiting on the same pass. You also learn the specific procedures for coordinating with the pilot or jumpmaster in the event of an aircraft emergency.

Learning and Performance Objectives

- Introduction to tracking
- Two clear-and-pulls
- Braked turns, approaches, and landings
- Extending the glide to achieve maximum glide
- Power-line landing review
- Packing with assistance
- Checking others' equipment
- Recurrency procedures following inactivity
- Calculating the exit point from winds aloft
- Separating groups during exit

Rules and Recommendations

Study USPA BSRs applicable to USPA A-License holders

1. Compliance with Federal regulations (BSR 2-1.B):
   a. No skydive may be made in violation of Federal Aviation Administration regulations.
   b. FAA regulations include the use of restraint systems (seatbelts) in the aircraft by all skydivers during movement on the surface (taxiing), takeoff, and landing. (FAR 91.107)
2. Medical requirements (BSR 2-1.C):
   a. All persons engaging in skydiving must:
   (1) Carry a valid Class 1, 2, or 3 Federal Aviation Administration Medical Certificate; or
   (2) Carry a certificate of physical fitness for skydiving from a registered physician; or
   (3) Have completed the USPA recommended medical statement in the DZ liability release waiver.
   b. Any skydiver acting as parachutist in command on a tandem jump must possess a current FAA Third-Class Medical Certificate or equivalent medical certificate acceptable to USPA, or, if residing outside the United States or its territories or possessions, a current Aviation Medical Certificate recognized by the Civil Aviation Authority of the residence country.
3. Age requirements (BSR 2-1.D):
   a. For skydives made within the U.S. and its territories and possessions, skydivers are to be at least 18 years of age.
   b. For skydives made outside the U.S. and its territories and possessions, the minimum age is specified by the country's (or its national air sport control's) requirements. Such skydivers who are under 16 years of age will not be issued a USPA license.

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4. Membership (BSR 2-1.E):
   a. USPA membership is required of any skydiver cleared for self-supervision at a USPA Group Member DZ, except for non-resident foreign nationals that are a member of their own national aeroclub.

5. Alcohol and Drugs (BSR 2-1.F):
   a. No person may make a parachute jump, or attempt to make a jump, if that person is or appears to be under the influence of either;
      (1) alcohol.
      (2) any drug that affects that person's faculties in any way contrary to safety.
   b. No person may make a parachute jump, or attempt to make a jump, within 8 hours after the consumption of any alcoholic beverage.

6. Maximum ground winds (BSR 2-1.H.2):
   a. For all solo students:
      (1) 14 mph for ram-air reserves (Start Skydiving is waivered to 16 mph for ram-air canopies).
      (2) 10 mph for round reserves.
   b. For licensed skydivers are unlimited.

7. Minimum container opening altitudes above the ground for skydivers are (BSR 2-1.I.2):
   a. Tandem jumps—4,500 feet AGL
   b. All students and A-License holders—3,000 feet AGL
   c. B-License holders—2,500 feet AGL
   d. C- and D-License holders—2,500 feet AGL (waiverable to a minimum altitude of 2,000 feet AGL)

8. Drop zone requirements (BSR 2-1.J.1.a, BSR 2-1.J.2, and BSR 2-1.J.3):
   a. Areas used for skydiving should be unobstructed, with the following minimum radial distances to the nearest hazard:
      (1)Solo students and A-License holders: 330 feet
      (2) B- and C-License holders: 165 feet
      (3) D-License holders: 40 feet
   b. Hazards are defined as telephone and power lines, towers, buildings, open bodies of water, highways, automobiles, and clusters of trees covering more than 32,292 sq. ft.
   c. Manned ground-to-air communications (e.g., radios, panels, smoke, lights) are to be present on the drop zone during skydiving operations.

9. Parachute equipment (BSR 2-1.M.5):
   a. FAA regulations (FAR 105.19) require that when performing night jumps, each skydiver must display a light that is visible for at least three statute miles from the time the jumper is under an open parachute until landing.
   b. All skydivers wearing a round main or reserve canopy and all solo students must wear flotation gear when the intended exit, opening, or landing point is within one mile of an open body of water (this is defined as one in which a skydiver could drown).

10. Special altitude equipment and supplementary oxygen (BSR 2-1.N):
    a. Supplementary oxygen available on the aircraft is mandatory on skydives made from higher than 15,000 feet MSL.

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Study USPA recommendations on training following periods of inactivity

1. **Students**
   a. **Students who have not jumped within the preceding 30 days should make at least one jump under the direct supervision of an appropriately rated USPA Instructor.**

2. Licensed skydivers
   a. Skydivers returning after a long period of inactivity encounter greater risk that requires special consideration to manage properly.
   b. Care should be taken to regain or develop the knowledge, skills, and awareness needed to perform the tasks planned for the jump satisfactorily.
   c. Jumps aimed at sharpening survival skills should precede jumps with other goals.

3. Changes in procedures
   a. If deployment or emergency procedures are changed at any time, the skydiver should be thoroughly trained and practice under supervision in a harness simulator until proficient.
   b. Ground training should be followed by a solo jump which includes several practice sequences and deployment at a higher-than-normal altitude.
   c. The jumper should repeat ground practice at short intervals, such as before each weekend's jump activities, and continue to deploy at a higher-than-normal altitude until thoroughly familiar with the new procedures.

4. Long lay-offs
   a. Jumpers should receive refresher training appropriate for their skydiving history and time since their last skydive.
      (1) Jumpers who were very experienced and current but became inactive for a year or more should undergo thorough training upon returning to the sport.
      (2) Skydivers who historically jump infrequently should review training after layoffs of even less than a year.
   b. Skydiving equipment, techniques, and procedures change frequently.
      (1) During recurrency training following long periods of inactivity, jumpers may be introduced to new and unfamiliar equipment and techniques.
      (2) Procedures change to accommodate developments in equipment, aircraft, flying styles, FAA rules, and local drop zone requirements.
   c. Returning skydivers require thorough practical training in the following subject areas:
      (1) aircraft procedures
      (2) equipment
      (3) exit and freefall procedures
      (4) canopy control and landings
      (5) emergency procedures
   d. USPA A-License holders who have not made a freefall skydive within:
      (1) 60 days: should make at least one jump under the supervision of a currently rated USPA instructional rating holder until demonstrating altitude awareness, freefall control on all axes, tracking, and canopy skills sufficient for safely jumping in groups
      (2) 90 days: should make at least one jump beginning in Category D with a USPA AFF Instructor or in Category B with a USPA IAD Static-Line, or Tandem Instructor before proceeding to unsupervised freefall
   e. USPA B-License holders who have not made a freefall skydive within the preceding 90 days:
      (1) should make at least one jump under the supervision of a USPA instructional rating holder until demonstrating the ability to exercise the privileges of that license safely.
   f. USPA C & D-License holders who have not made a freefall skydive within the preceding six months:
      (1) should make at least one jump under the supervision of a USPA instructional rating holder until demonstrating the ability to exercise the privileges of that license safely.

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Equipment

1. Pack at least one parachute with the assistance of a knowledgeable packer.
2. Discuss the most important points of packing:
   (Note: An FAA rigger is your best resource for this discussion.)
   a. Lines straight and in place in the center of the completed pack job
   b. Slider up (orientation closest to the canopy)
   c. Tight line stows to prevent premature line deployment
3. Perform a pre-jump equipment check on another jumper who is in full gear:
   a. The "three checks of threes" in the front:
      (1) Three-ring assembly (and reserve static line)
      (2) Three points of harness attachment for snap assembly, correct routing, adjustment, & no twists
      (3) Three operation handles: main activation, cutaway, and reserve (check them in this order)
   b. Pin check back of system, top to bottom:
      (1) Automatic activation device on, calibrated, and set to correct mode
      (2) Reserve pin seated at the ¾ position and straight
      (3) Reserve ripcord cable movement
      (4) Main pin seated at the ¾ position
      (5) Main ripcord cable movement or correct pilot chute bridle routing
      (6) If the pilot chute is collapsible, check the indicator window for color on the kill-line
      (7) Main activation handle in place
   c. Check personal equipment ("SHAGG"):
      (1) **S**hoes: tied, no hooks
      (2) **H**elmet: fit and adjustment
      (3) **A**ltimeter: set for zero
      (4) **G**oggles: tight and clean
      (5) **G**loves: lightweight and proper size (only if below 40° at exit altitude for solo students)

Spotting and Aircraft

1. Acting without a rated USPA instructor during routine jump operations and aircraft emergencies:
   a. The person spotting the load usually serves as the jumpmaster.
   b. In larger aircraft, the jumpmaster should establish an exclusive chain of communication with pilot.
      (1) A communication assistant should be able to communicate directly with the pilot and the jumpmaster simultaneously.
      (2) Other jumpers should not get involved in communication among the pilot, communications assistant, and the jumpmaster.
2. Review of low-altitude exit procedures:
   a. The jumpmaster must determine if jumpers are over a safe landing area and communicate this information to the pilot.
   b. Establish firm altitudes at which certain aircraft emergency decisions would be made (DZ policy):
      (1) Altitude below which all jumpers will land with the aircraft (below 1,500 feet)
      (2) Altitude below which all jumpers will jump using their reserves (1,500 feet to 3,500 feet)
      (3) Altitude below which all jumpers will jump and immediately use their mains (3500 ft to 5500 ft)
   c. Jumpers must maintain correct weight distribution in the aircraft, especially during emergency exits

3. The effect of the winds-aloft on the exit point:
   a. Subtract the speed of the headwind on jump run (if flown into the wind) from the airspeed of the aircraft to determine the ground speed.
   b. Jumpers are first thrown forward on exit (approximately 0.2 miles in calm winds, less with headwind) from residual aircraft speed and then fall straight down or blow toward the target.
   c. The winds-aloft will cause freefalling jumpers to drift according to the wind's strength and direction.
   d. Winds generally diminish at lower altitudes.
   e. Average the speed and the direction of the winds from exit altitude to 3,000 feet AGL to estimate freefall drift. See the example in Table F.1 below for a sea-level drop zone:

Altitude	Heading	Speed (mph)
3,000 feet	250	07
6,000 feet	260	14
9,000 feet	270	16
12,000 feet	290	23
Average	270	15

(Note: 15 mph = ¼ mile per minute)

Table F.1 – Averaging the winds-aloft. Note: Averaging the force and direction of the winds-aloft works sufficiently in common jump conditions. A vector analysis provides results that are more accurate.

(1) If flying jump run upwind, use the average heading of 270 degrees.
(2) Aircraft forward throw is approximately 1/8-1/4 mile upwind in the light-to-moderate headwind.
(3) Jumpers fall for one minute, drifting at 1/4 mile per minute for 1/4 mile of drift downwind.
(4) Since the forward throw and the freefall drift approximately cancel each other, the ideal exit point is almost straight over the ideal opening point in this example.

4. Group separation on jump run:
   a. Slower-falling jumpers and groups are exposed to upper headwinds longer and are blown farther downwind than faster-falling jumpers and groups.
      (1) Slower-falling groups should exit before faster-falling groups if jump run is flown into the wind.
      (2) On days with strong upper headwinds, allow more time between groups on the same pass to get sufficient horizontal separation over the ground.
         (a) Provide at least 1,000 feet of ground separation between individuals jumping solo.
         (b) Provide at least 1,500 feet of ground separation between small groups, adding more as size of the groups increase.
      (3) Once the parachute has opened, delay flying up or down the line of flight until:
         (a) Any slower-falling group that exited before has opened their parachutes and turned toward the landing area.
         (b) The group exiting after has completed their freefall and opened.
   b. Flying jump run across the upper winds (crosswind) helps achieve separation between groups.
   c. Whether flying one or more aircraft, each pass should allow enough time for jumpers on a previous pass to descend to a safe altitude before dropping jumpers from the next pass.

5. Perform all duties on jump run with minimum assistance, including:
   a. Operating the door (if the pilot allows)
   b. Monitoring progress during jump run
   c. Directing the pilot to the correct spot
   d. Choosing the correct exit point

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Exit and Freefall

1. Tracking
   a. The goal of a tracking maneuver is to gain as much horizontal separation from the center of a formation of skydivers as possible, while losing as little altitude as possible.
   b. Priorities
      (1) Heading: directional control should be the first priority, along with altitude awareness (counting aloud by thousands)
         (a) directional control: legs should extend and stay wide for steering and more stability
         (b) dipping a shoulder in the desired direction is a common method used for heading control.
      (2) pitch: working to flatten the track and conserve altitude is the next priority
      (3) distance/speed: refining the track for maximum distance and speed is the final priority
      (4) stopping the track: extending arms forward and down, and dropping knees slightly to slow the track before main canopy deployment.
   c. You should continue to refine the tracking position on every jump, working towards a narrower body position and de-arched torso for maximum speed and minimum loss of altitude.

2. Initiating a track:
   a. First, complete any turns and return to a strong, relaxed, stable, neutral "box" position (important)
   b. Then locate a fixed point on the horizon (a heading) and lock onto it before you begin to track.
   c. Smoothly extend both legs fully with your knees locked and toes pointed to initiate forward motion.
   d. Press your shins down on the relative wind.
   e. Keep your knees the same width apart as the initial neutral "box" position at shoulder-width apart.
   f. Control in the delta and track positions:
      (1) Dip one shoulder slightly in the direction of the turn to make heading corrections.
      (2) Make only small corrections.
   g. Slowly extend your torso by stretching your shoulders toward your ears and flatten your arch.
   h. Fully extend your arms and sweep them out to the side 90° to your torso and spine with your arms and hands on level with your hips (or slightly below) and the palms of your hands facing down.

3. Refining the track:
   a. Once establishing a heading in a positive forward dive, fully extend both legs with your knees locked and toes pointed.
   b. Extend and flatten your torso and stiffen your body slowly into a slight reverse arch position.
   c. De-arch your lower back and roll your pelvis down into your thighs (hamstrings) (like sucking your belly button to your spine).
   d. Roll your shoulders toward your ears and push them down and forward slightly and cup the sternum, while keeping your arms and hands on level with your hips (or slightly below).
   e. Continually adjust your body position to meet the relative wind effectively.

4. Tracking practice procedure:
   a. Experienced jumpers often allow only five to ten seconds to obtain adequate separation.
   b. Practice entering and refining an on-heading track for five seconds, reversing direction, and repeating.

5. Tracking jump safety:
   a. Fly exactly perpendicular to the jump run to avoid others up and down the line of flight.
   b. Always plan tracking dives with other groups in mind.
   c. Learn to control a track on heading first, and then develop techniques for pitch and speed.

6. Clear and pull:
   a. A clear and pull is used for emergency exits and pre-planned low-altitude jumps.
   b. Use a familiar, stable, poised exit technique.
   c. Present your hips to the relative wind and execute normal pull procedures (without wave-off) to deploy within five seconds of exit.
   d. Expect the parachute to open in relation to the relative wind, not overhead as usual.
   e. The sequence consists of a clear and pull from two altitudes:
      (1) first from 5,500 feet
      (2) once successful, from 3,500 feet

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Canopy

1. Braked turns:
   a. Performed correctly, braked turns provide the quickest heading change with the least altitude lost.
   b. A braked turn may be the best choice when a quick heading change is needed at a low altitude:
      (1) When suddenly encountering another jumper under canopy or someone in the landing area
      (2) When suddenly recognizing an obstacle
      (3) When returning from a long spot and misjudging the final turn (frequently committed error)
      (4) When too low to recover from a full-flight turn
   c. Practice braked turns:
      (1) From the slowest speed at which the canopy will fly, raise one toggle slightly to initiate a heading change in the opposite direction.
      (2) Try to change heading as quickly as possible without banking or stalling.

2. Using brakes to attain the maximum glide and minimum descent:
   a. Different canopies exhibit different flight characteristics with brake or rear riser input.
      (1) On lower-glide designs, the minimum descent may begin nearer the half-braked position.
      (2) On higher-glide designs, the minimum descent may be nearer the three-quarter braked position or just prior to a full stall (reverse flight).
      (3) Some canopies achieve minimum descent using the rear risers instead of the toggles.
   b. Minimum sustainable descent (float):
      (1) Allows the jumper to remain above other jumpers on descent
      (2) Allows the canopy to cover a greater distance
   c. Anticipate loss of the tailwind nearer the ground and keep an alternate landing area in mind between your position and the target.

3. Recognizing and adjusting for minimum descent and maximum glide ("accuracy trick"):
   a. Look ahead to the point on the ground that appears not to rise or sink in your field of vision:
      (1) Everything before that point appears to fall.
      (2) Everything beyond it appears to rise.
      (3) That point is the projected landing point on the canopy's current glide slope.
   b. Pull the toggles down slightly to see if the stationary point moves farther away:
      (1) If so, the glide slope has flattened.
      (2) The canopy will cover more distance.
   c. Repeat until the point begins to move closer, then return to the maximum glide position that you have just determined.

4. When flying downwind in maximum glide:
   a. As the winds decrease at lower altitudes, your glide slope will degrade.
   b. The actual landing area will be closer than you initially anticipated.

5. Increasing the glide when flying against the wind:
   a. In lighter winds, may improve distance.
   b. In stronger winds, may slow the canopy too much and reduce its upwind range.

6. Braked pattern and landing approach:
   a. Fly one entire landing pattern in at least half brakes, to determine the effect on glide path.
   b. Plan for a change in glide slope:
      (1) A lower-glide design may require a smaller pattern when flown in brakes.
      (2) A higher-glide design may require a much bigger (broader) pattern when flown in brakes; anticipate a longer final approach by extending it to avoid overshooting the target.
   c. Fly final approach in quarter to half brakes.
   d. Flare carefully from the braked position:
      (1) Practice high to avoid a stall.
      (2) To get the best flare, may require a shorter, quicker stroke initiated lower to the ground.
      (3) The stall may occur more abruptly. Plan for a PLF.
   e. A smaller canopy may descend too quickly in deep brakes for a safe braked landing.

7. Accumulate two unassisted landings within 80 feet of the planned target.

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Emergency Procedure Review

1. Recognizing and avoiding power lines:

   a. Power lines present a serious hazard to all aviators; know where they are near your DZ.
      (1) Expect power lines to appear typically along roads, between buildings, in and along straight-line paths through wooded areas and in the forest, and randomly in open fields, as well as other random places.
      (2) They may be invisible, except for their poles.

   b. Identify power lines in the landing area as early as possible and steer to avoid them.
      (1) Scan every 500 feet of descent into an unfamiliar landing area.
      (2) Continually scan below 500 feet.

2. Review and practice emergency procedures for a powerline landing in a training harness:

   a. Power lines can be extremely dangerous: if there is no other alternative, landing in or on trees, water, or a small obstacle may be preferable to landing in power lines.

   b. A steep dive following sharp turns from full flight close to the ground can be equally dangerous, so it is important to identify power lines and wires near your landing area and continue steering to avoid them while enough altitude remains to do so safely, avoiding sharp turns near the ground.
      (1) If a low-altitude avoidance turn is necessary to avoid power lines:
         (a) Prepare for a hard landing (PLF) with your feet and knees tightly together.
         (b) Only make the minimum, flat, braked turn necessary to avoid the lines.
         (c) Attempt to land parallel to the power lines and wires when possible.
         (d) Execute a braked landing and flare.

   c. Emergency procedures for landing in a power line if a power line landing is unavoidable:
      (1) Drop any ripcords or other objects.
      (2) Pull both toggles to the halfway position to bring the canopy to slow flight.
      (3) Protect your face by covering it with your forearms.
      (4) Prepare for a hard landing (PLF) with your feet and knees tightly together.
      (5) Turn your head to one side away from wires with chin down to protect your chin.
      (6) Try to avoid touching any power lines or wires if possible.
         (a) Do not touch more than one power line or wire at a time.
      (7) If suspended in the wires:
         (a) Stay still and keep your helmet on.
         (b) Prepare to drop the rest of the way to the ground at any moment (stay in a PLF position).
         (c) Wait for competent, knowledgeable help from drop zone staff and power company personnel for help in getting down.
         (d) The parachute's nylon can conduct electricity at higher voltages, so the power needs to be off before making contact with anyone or anything on the ground.
         (e) Verify and confirm only with the power company that the electrical power is turned off and will stay off until recovery operations are complete.
      (8) If the computer controlling the power distribution senses a fault in the line, computer-controlled resets may attempt to turn the power back on without warning.

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Category F Quiz

(Must be passed before Category F-1 jump.)

1. **What is the best way to change direction of canopy flight while conserving the most altitude?**
   a) Braked turns.
   b) Rear riser turns.
   c) Front riser turns.

2. **What happens if a canopy is controlled too deeply in brakes?**
   a) It dives.
   b) It bucks.
   c) It stalls.

3. **Describe the difference between flaring from half brakes and full glide?**
   a) Flaring from half brakes requires a quicker stroke, the stroke is shorter, and stalls occur sooner.
   b) Flaring from half brakes requires a slower stroke, the stroke is shorter, and stalls occur sooner.
   c) Flaring from half brakes requires a slower stroke, the stroke is longer, and stalls occur sooner.

4. **How does the half-braked position affect the canopy's flight?**
   a) Speeds descent, changes glide
   b) Slows descent, changes glide
   c) Slows descent

5. **What is a glide path?**
   a) The direction the parachute travels horizontally across the ground.
   b) The angle at which the parachute descends towards its projected landing point.
   c) The pattern that is ultimately flown when landing.

6. **How do you determine your glide path?**
   a) Look straight down between your feet to see which direction you are traveling.
   b) Look straight out at the horizon to determine if you are flying level.
   c) Look ahead to find the point on the ground that appears not to rise or sink.

7. **How does wind affect the glide path of your canopy?**
   a) The glide path will degrade (become steeper) as the wind speed decreases when flying with the wind.
   b) The glide path will degrade (become steeper) as the wind speed increases when flying into the wind.
   c) Both a) and b)

8. **How is heading corrected during a track?**
   a) Dip leg in direction of the turn.
   b) Turn head slightly towards direction of the turn.
   c) Dip one shoulder slightly in the direction of the turn.

9. **When making tracking jumps from large plane, why is it important to track perpendicular to the jump run?**
   a) To stay clear of FAA controlled airspace
   b) To avoid other groups ahead and behind
   c) To avoid plane on its descent

10. What is the ground speed of a jump aircraft with an airspeed of 90 mph when flying against a 50-mph headwind on jump run?

a) 40 mph
b) 140 mph
c) 90 mph

11. How can jumpers assure adequate separation between groups exiting the aircraft?

a) Count slowly to five.
b) Gauge separation according to position over the ground.
c) Gauge separation according to GPS instruments.

12. What are the three most important aspects of packing the main canopy?

a) Stow brakes, lines straight and in place in the center, nose rolled tightly.
b) Lines straight and in place in the center, slider up, tail rolled tightly.
c) Lines straight and in place in the center, slider up, tight line stows.

13. How can you tell if the RSL is routed correctly?

a) Clear path from snap shackle to guide ring.
b) Buckle is fully closed.
c) Red tab is visible.

14. What is the make and model of your main canopy?

a) Aerodyne Solo
b) Icarus Student Canopies
c) PD Navigator

15. What is the make and model of your harness and container?

a) UPT Vector SE
b) Javelin Student Odyssey
c) Rigging Innovations Telesis 3.0

16. What is the make and model of the automatic activation device (AAD) in the student parachute systems at Start Skydiving?

a) Cypres 2
b) Vigil II
c) Mars m2

17. What is the minimum pull altitude allowed for student skydivers and A-License holders?

a) 3,000 feet
b) 2,500 feet
c) 2,000 feet

18. What are the maximum winds allowed for student skydivers using square parachutes?

a) 10 mph
b) 14 mph
c) 18 mph

19. If a jumper falls for one minute through upper winds averaging 30 mph from the west: How far will the jumper drift?

a) ½ mile
b) ¼ mile
c) ¾ mile

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20. (Continued from Question #19.) In which direction will the jumper drift?
a) West
b) East
c) North-Northeast

21. What is the procedure for landing in power lines?
a) Make any maneuvers necessary to avoid landing in power lines.
b) Avoid the area early during the descent, minimum braked turn necessary to avoid lines, land parallel to the wires, braked landing, prepare for PLF, try to touch only one line at a time, wait for help and confirmation that the power has been turned off and will remain off until recovery operations are complete.
c) Get as big as possible, disconnect RSL (if time), cutaway, prepare to PLF.

22. In the event of an aircraft emergency with no students or instructors aboard, who should coordinate procedures between the pilot and the other jumpers on the load?
a) The person closest to the pilot
b) The most senior jumper
c) Jumpmaster or spotter

23. **At Start Skydiving, what is the lowest altitude the pilot would likely ask jumpers to leave the plane during a routine engine-out emergency?**
a) 1,500 feet AGL
b) 2,500 feet AGL
c) 3,500 feet AGL

24. **In an aircraft emergency, what is the lowest exit altitude that an A-License holder should deploy the main parachute before choosing the reserve instead?**
a) 1,500 feet AGL
b) 2,500 feet AGL
c) 3,500 feet AGL

25. How many jumps are required for the USPA A-License?
a) 20
b) 25
c) 30

26. What does a USPA A-License permit a skydiver to do?
a) Compete in USPA competitions and events.
b) Jump without supervision and pack anyone's main parachute.
c) Jump without supervision, pack his or her main parachute, and engage in basic group jumps.

27. What should an A-Licensed jumper do to regain currency after ten weeks of inactivity?
a) Make at least one jump beginning in Category D with a USPA AFF Instructor or in Category B with a USPA IAD Static-Line, or Tandem Instructor before proceeding to unsupervised freefall.
b) Make at least one jump under the supervision of a USPA instructional rating holder.
c) Go through the first jump course and repeat all necessary ISP categories.

28. What should an A-Licensed jumper do to regain currency after four months of inactivity?
a) Make at least one jump beginning in Category D with a USPA AFF Instructor or in Category B with a USPA IAD Static-Line, or Tandem Instructor before proceeding to unsupervised freefall.
b) Make at least one jump under the supervision of a USPA instructional rating holder.
c) Go through the first jump course and repeat all necessary ISP categories.

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Category F Dive Flows

Minimum of Two Tracking Jumps with One Current USPA Coach and Two Clear-and-Pulls

F-1 & F-2 Freefall Dive Flows

(Same dive flow for both Category F tracking jumps.)

- Perform all spotting procedures with minimal assistance. Coach observes spot to ensure safety.
- Solo, poised ("praying") exit with a relaxed arch. (Must be stable within 5 seconds of exit to pass.)
- Perform one smooth PPCT w/in 5 seconds of exit.
- Altitude, arch, legs, relax, correct turn if needed.
- Coach flies out in front facing the line of flight.
- Turn to face 90° from the line of flight.
- Altitude, arch, legs, relax, correct turn if needed.
- Track for 5 secs w/in 30° using start, coast, stop.
- Altitude, arch, legs, relax, correct turn if needed.
- Turn 180°, remaining perpendicular to jump run.
- Altitude, arch, legs, relax, correct turn if needed.
- Track for 5 secs w/in 30° using start, coast, stop.
- Altitude, arch, legs, relax, correct turn if needed.
- Repeat tracking sequences until 6,000 feet.
- Shake head, "No more maneuvers!" at 6,000 feet.
- Stop final track by no lower than 5,000 feet.
- Lock on at 5,000 feet. (Must be altitude aware.)
- Wave-off at 4,500 feet. (Must do so to pass.)
- Deploy by 4,000' (must do so while stable to pass).

F-3 & F-4: Clear-and-Pulls

(Same dive flow for both Cat-F clear-and-pull jumps)

- Category F-3 is a clear-and-pull from 5,500 feet.
- Category F-4 is a clear-and-pull from 3,500 feet.
- Perform all spotting procedures with minimal assistance. Coach observes spot to ensure safety.
- Stable, solo, poised ("praying") exit position.
- Initiate deployment within five seconds without waving off (must do so while stable to pass).

Category F Canopy Dive Flow

(Same canopy dive flow for all four Cat-F jumps.)

- Check altitude, air traffic, & position over ground.
- Correct any common canopy problems.
- Release brakes, conduct a canopy controllability check, and move to the holding area.
- Check altitude, air traffic, & position over ground.
- Discovery of the stall point while above 2,500 feet.
- Discovery of the flattest glide slope and the lowest descent rate using the accuracy trick.
- Practice flaring from ½ brakes and from ¾ brakes.
- Practice 180° left and right turns while flying in ¾ brakes. Check altitude, air traffic, and position over ground before and after each maneuver.
- Always look in the direction of the turn before and during each turn to ensure clear airspace.
- Find landing area and pattern entry point.
- Divide flight path by thousands of feet.
- Look at runway and determine compass heading.
- Identify suspect areas of turbulence.
- Identify all power lines in the area during descent.
- Continue to scan for obstacles every 500 feet.
- Verify landing pattern and adjust as necessary.
- Steer over the correct portion of the flight path & continue to stay in the holding area until 1,000 ft.
- Follow the pre-assigned pattern in half-brakes over the planned or alternate landing area.
- Scan for obstacles from base until landing.
- Prepare to PLF once on final at 300 feet.
- Continue flying at half-brakes until time to flare.
- Flare for landing from half-brakes & perform a PLF (shorter, quicker stroke initiated lower to ground).
- Coach measures the student's landing distance from a planned target.

Advancement Criteria

Aircraft and Spotting

- Spot the aircraft, including all procedures, with minimum assistance

Exit and Freefall

- Cumulative of three tracking sequences: track for five seconds within 30° of the planned heading, turn 180°, and track back for five seconds
- One stable clear-and-pull from 5,500 feet (must deploy within 5 secs of exit while stable)
- One stable clear-and-pull from 3,500 feet (must deploy within 5 secs of exit while stable)

Canopy

- Cumulative of two left and two right 180° turns under canopy while flying in three-quarters brakes
- Braked approach and landing on a canopy that allows for a safe braked landing
- Cumulative of two unassisted landings within 80 feet of the planned target

Equipment

- One complete pack job with assistance
- Perform a pre-jump equipment check on another jumper fully rigged and ready to jump (ask first)

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Category G

Minimum of Four Jumps with One Current USPA Coach

Freefall skills in Category G address group skydiving maneuvers. They are outlined here for the discipline of formation skydiving (flat, or belly flying) but can be performed in other orientations with a USPA Coach knowledgeable in those techniques. The same performance and advancement criteria for maneuvering, docking, breakoff, and gaining separation for a safe opening apply, however. In Category G, you will review, in more depth, the procedures for avoiding and responding to canopy collisions, which are always more of a risk in jumping with groups. By now, you should be looking for traffic and steering with rear risers before releasing your brakes. After opening, you will explore the performance envelope of the ram-air canopy to prevent surprises near the ground. Practice includes maximum-performance turns, reverse turns, and keeping the wing in balance during performance maneuvers to avoid a line twist. You will learn to feel the turn. You will review how to avoid tree landings and what to do if it is inevitable. By now, you should be packing with minimal assistance, but USPA recommends supervision until your A-License. Along with practicing packing, you will learn how to inspect the equipment for wear and how to prevent it. Before advancing, you should understand the responsibilities of the FAA rigger, who maintains most items. All skydivers need to respect the power of various kinds of weather, which begins with understanding basic weather patterns and reading the danger signals. A pilot or instructor advises you on practical ways to predict the kind of weather that could compromise your safety.

Learning and Performance Objectives

- Group exits
- Floater position
- Forward and backward movement
- Adjusting fall rate
- Start and stop
- Docking
- Break-off and separation
- Maximum-performance reverse canopy turns
- Canopy collision avoidance and response review
- Tree landing review
- Equipment maintenance inspection orientation
- Rigger's responsibilities
- AAD review
- Weather for skydivers

Rules and Recommendations

(Note: An FAA rigger should teach this section.)

1. Read and discuss FAR 65.125 through FAR 65.133 below with an FAA rigger:

It requires at least an FAA senior rigger to maintain and repair the parachute system.

a. A certificated senior parachute rigger may:
   (1) Pack or maintain (except for major repair) any type of parachute for which he is rated; and
   (2) Supervise other persons in packing any type of parachute for which that person is rated.

b. A certificated master parachute rigger may:
   (1) Pack, maintain, or alter any type of parachute for which he is rated; and
   (2) Supervise other persons in packing, maintaining, or altering any type of parachute for which the certificated parachute rigger is rated.

c. A certificated parachute rigger need not comply with the following (relating to facilities, equipment, performance standards, records, recent experience, and seal) in packing, maintaining, or altering (if authorized) the main parachute of a dual parachute pack to be used for intentional jumping.

d. No certificated parachute rigger may exercise the privileges of his certificate unless he has at least the following facilities and equipment available to him:
   (1) A smooth top table at least three feet wide by 40 feet long.
   (2) Suitable housing that is adequately heated, lighted, & ventilated for drying & airing parachutes.
   (3) Enough packing tools & other equipment to pack & maintain the types of parachutes serviced.
   (4) Adequate housing facilities to perform his duties and to protect his tools and equipment.

e. No certificated parachute rigger may:
   (1) Pack, maintain, or alter any parachute unless he is rated for that type;
   (2) Pack a parachute that is not safe for emergency use;
   (3) Pack a parachute that has not been thoroughly dried and aired;
   (4) Alter a parachute in a manner that is not specifically authorized by the Administrator or the manufacturer;
   (5) Pack, maintain, or alter a parachute in any manner that deviates from procedures approved by the Administrator or the manufacturer of the parachute; or
   (6) Exercise the privileges of his certificate and type rating unless he understands the current manufacturer's instructions for the operation involved and has:
      (a) Performed duties under his certificate for at least 90 days within the preceding 12 months;
      (b) Or shown the Administrator that he is able to perform those duties.

f. Each certificated parachute rigger shall keep a record of the packing, maintenance, and alteration of parachutes performed or supervised by him. He shall keep in that record, with respect to each parachute worked on, a statement of:
   (1) Its type and make;
   (2) Its serial number;
   (3) The name and address of its owner;
   (4) The kind and extent of the work performed;
   (5) The date when and place where the work was performed; and
   (6) The results of any drop tests made with it.

g. Each person who makes a record under the section above shall keep it for at least two years after the date it is made.

h. Each certificated parachute rigger who packs a parachute shall write on the parachute packing record attached to the parachute the date and place of the packing and a notation of any defects he finds on inspection. He shall sign that record with his name and the number of his certificate.

i. Each certificated parachute rigger must have a seal with an identifying mark prescribed by the Administrator, and a seal press. After packing a parachute, he shall seal the pack with his seal in accordance with the manufacturer's recommendation for that type of parachute.

2. Read and discuss FAR 105.43 with an FAA rigger:

No person may conduct a parachute operation using a single-harness, dual-parachute system, and no pilot in command of an aircraft may allow any person to conduct a parachute operation from that aircraft using a single-harness, dual-parachute system, unless that system has at least one main parachute, one approved reserve parachute, and one approved single person harness and container that are packed as follows:

a. The main parachute must have been packed within 180 days before the date of its use by a certificated parachute rigger, the person making the next jump with that parachute, or a non-certificated person under the direct supervision of a certificated parachute rigger.

b. The reserve parachute must have been packed by a certificated parachute rigger:
   (1) Within 180 days before the date of its use, if its canopy, shroud, and harness are composed exclusively of nylon, rayon, or similar synthetic fiber or material that is substantially resistant to damage from mold, mildew, and other fungi, and other rotting agents propagated in a moist environment; or
   (2) Within 60 days before the date of its use, if it is composed of any amount of silk, pongee, or other natural fiber, or material not specified above.

c. If installed, the automatic activation device (AAD) must be maintained in accordance with manufacturer instructions for that automatic activation device.

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Equipment

(Note: An FAA rigger should conduct this session.)

1. Detailed identification and inspection of high-wear items requiring rigger maintenance:

   a. Pilot chute and deployment handle:
      (1) Look for broken stitching around the apex and the seam where the pilot chute canopy fabric and mesh meet.
      (2) Check for security at the bridle attachment point.
      (3) The fabric and mesh should be in good condition; both eventually wear out.

   b. Bridle Velcro:
      (1) Velcro anywhere degrades with use and needs to be replaced every 100-250 uses.
      (2) Bridle Velcro is particularly important, because if it comes loose, it can cause a premature deployment.
      (3) Velcro should be clean, dry, and free of debris.

   c. Deployment bag:
      (1) Look for distortion in the grommets, especially at the bridle, and fabric damage around their edges.
      (2) Check the loops that hold the line stow bands.
      (3) If Velcro is used, replace it as necessary.

   d. Closing pin:
      (1) Check that the loop holding the closing pin to the bridle is secure and not being cut by the eye of the pin.
      (2) Check for nicks or corrosion on the pin and replace it if any appear.

   e. Bridal attachment:
      (1) Look for wear where the bridle attaches to the canopy.
      (2) Look for broken stitching on the canopy itself where it is reinforced for the bridle attachment loop or ring.

   f. Likely areas of damage on the top center skin, end cells, and stabilizers:
      (1) Check for small holes on the top skin where the bridle attachment stop-ring has caught fabric in the bag's top grommet (avoidable with good packing technique).
      (2) Look for wear on the top skin and end cells caused by contact with sharp objects or stickers.
      (3) Look for wear in and around the reinforcements in the stabilizers that contain the slider stops.
      (4) Look for broken or missing stitching along the seams.

   g. Slider:
      (1) Inspect for distortion in the slider grommets and wear around their inside edges.
      (2) Sliders are important, high stress components and should be maintained to the highest standard.

   h. Lines:
      (1) Look for wear anywhere along the lines, but especially where the slider grommets contact metal connector links.
      (2) Line damage at the links calls for line replacement, but the rigger can also advise the jumper about link choices, protection, and habits that minimize damage.
      (3) Lines sometimes shrink unevenly over time.
      (4) All lines eventually require replacement; refer to the manufacturer's recommendations.

   i. Slider bumpers (metal connector links):
      (1) Slider bumpers protect the slider grommets and lines from damage by taking it themselves; most require periodic replacement.
      (2) Slider bumpers need to be tight on the link or secured to prevent them from sliding up the lines and stopping the slider.

j. Brake system:
   (1) When Velcro is used, placing the toggles on the risers immediately after landing prevents Velcro damage and tangles.
   (2) Velcro needs to be replaced when worn.
   (3) Velcro and general use wear the lower brake lines, which a rigger can easily replace.
   (4) Examine the brake lock eye for damage and wear.
   (5) Look at the attachment point for the keeper ring, including the attachment ring stitching on the opposite surface of the riser.
   (6) Inspect tuck-tab toggle keepers for security.

k. Riser release system:
   (1) Look for wear in the loops holding the rings and the white retaining loop, especially if you drag your rig when stowing the lines (not advised).
   (2) Be sure that any service bulletins on risers for the system have been completed.
   (3) Check the fittings on both ends of the cable housings for security.
   (4) Look for kinks in the release cable where it contacts the white retaining loop, which may indicate a problem with hard openings or the design & construction of the three-ring assembly.
   (5) Check the front and back of the riser webbing for fraying or strains around the edges of the grommets.
   (6) Look for broken or loose tacking on the cable housings.
   (7) Check riser inserts (for cutaway cable ends) if installed.

l. Riser covers:
   (1) Replace any retaining Velcro when it loses tackiness.
   (2) Replace distorted tuck flaps when they become ineffective (happens with use).

m. Main container closing grommets:
   (1) Inspect for distortion and fabric damage around the edges.
   (2) Feel for severe distortion or breakage of the plastic stiffener inside the fabric where the grommet is set.

n. Main and reserve pin covers:
   (1) Replace Velcro when it fails to stay firmly attached.
   (2) Replace plastic stiffeners when distortion from use renders them ineffective.

2. Store the parachute in a cool, dry, dark place.
   a. Heat weakens AAD batteries; cars are too hot for safe prolonged storage in the summer.
   b. The ultraviolet rays of the sun degrade nylon.
   c. Moisture:
      (1) Corrodes hardware (very dangerous, since rust degrades nylon)
      (2) Promotes mildew (undesirable but harmless to nylon)
   d. Many chemicals and acids damage parachute materials.
   e. Heat may weaken elastic stow bands.

3. Premature deployments become more dangerous near the door and in groups.
   a. Handles
      (1) Check your handles before moving to an open door.
      (2) Be cognizant of your handles when you are near an open door and during climb-out.

   b. AADs:
      (1) Use caution when wearing an AAD, especially near an open aircraft door and during climb-out.
      (2) Adhere strictly to the AAD manufacturer's service standards:
         (a) To improve their chances for correct operation
         (b) To help prevent premature AAD activation
         (c) To comply with the law

   c. Remain clear of the area directly above and below another jumper, in case his or her parachute activates prematurely from the AAD or other unplanned event.

4. Pack one main parachute without assistance.

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Spotting and Aircraft

(Note: An experienced jump pilot or a USPA AFF Instructor should teach this section.)

1. Read and discuss the information on USPA recommendations regarding weather below (SIM Section 5-5) with an experienced jump pilot or USPA AFF Instructor:
   a. Determining winds
      (1) Surface winds must be determined prior to jumping and should be measured at the actual landing area.
      (2) Winds aloft:
         (a) Winds aloft reports available from the FAA flight service are only forecasts.
         (b) Observations may be made while in flight using navigation systems, for example, global positioning satellite systems (GPS).
         (c) Winds can change at any time, so all available information should be checked by the jumper before and during the jump.
   b. Weather conditions hazardous to skydivers:
      (1) Fronts approach with much warning but can catch the unaware off guard.
         (a) Some fronts are preceded by a gust front (a line of sudden and severe weather).
         (b) Frontal approach and passage may be associated with rapid and significant changes in the strength and direction of the winds-aloft and on the surface.
      (2) On calm, hot, humid days, thunderstorms can spontaneously generate and move in unpredictable patterns.
      (3) Dust devils are mini-tornadoes that spontaneously generate on days of high thermal convection activity.
   c. Practical methods to observe weather and where to obtain forecasts on approaching weather:
      (1) The Weather Channel
      (2) www.weather.com
      (3) TV weathercasts
      (4) Pilot assistance (legally responsible to know the weather conditions before flight)
      (5) Continuous observation
   d. Density altitude
      (1) Parachute performance is measured at sea level in moderate temperatures and humidity.
      (2) Altitude, heat, and humidity influence the density of air
      (3) Density altitude is a measure of air density that is calculated according to the temperature and altitude.
      (4) As density altitude increases, airspeed increases by:
         (a) almost five percent per 3,000 feet up to 12,000 feet MSL
         (b) more than five percent per 3,000 feet above 12,000 feet MSL
      (5) As density altitude increases, a ram-air canopy pilot can expect the following:
         (a) a higher stall speed
         (b) a faster forward speed
         (c) a faster descent rate
         (d) higher opening forces
      (6) Additionally, aircraft are affected by higher density altitude in the following ways:
         (a) longer distances required for takeoff and landing
         (b) reduced propeller effectiveness
         (c) poorer turbine and piston engine performance
         (d) slower and flatter rate of climb
         (e) less useful load
      (7) The aircraft pilot is responsible to know the density altitude prior to takeoff, and skydivers are advised to consider the effects of density altitude on canopy performance.

2. Select the spot & guide the pilot to the correct position w/out assistance in routine weather conditions.

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Exit and Freefall

1. Group exits:
   a. Each jumper in a group has an assigned exit position & must know that position before climb-out.
   b. The exit position should include specific, exact foot and hand placement for the best launch position and presentation of hips and limbs into the relative wind.
   c. The jumpers count together with body movement, where possible, for a simultaneous or near-simultaneous launch.
   d. Practice for an efficient climb-out and launch:
      (1) Shortens the group climb-out and set-up times so multiple groups can exit on the same pass.
      (2) Reduces potentially dangerous equipment contact with the door or other jumpers.
      (3) Improves stability on exits which increases working time on training jumps.
   e. Exit priorities:
      (1) Exit into a neutral "box" body position and hold aircraft heading until stable (3 to 5 seconds).
      (2) Relax & establish & confirm stability independently on exit prior to turning towards your coach.
      (3) After establishing a stable heading in the line of flight, you should then look for your coach, who should be in position beside you.
   f. Exit grips:
      (1) If taken, grips should allow all jumpers to leave in a natural flying position.
      (2) Main lift web and chest strap grips are counterproductive for most belly-to-earth group exits.
   g. Rear float exit (for left side door exit):
      (1) Climb outside the plane to the rear of the door. Use an underhanded grip on the inside bar.
      (2) Turn your parachute away from the door frame as you climb out to avoid contact.
      (3) Turn your torso to present directly toward the line of flight and into the relative wind.
      (4) Trail/Drag your outside/upwind leg (your left leg when doing left side door exits) in the wind.
      (5) Crouch slightly without compromising balance (feeling heavy).
      (6) Perform the count by swinging your trailing leg (left leg for left side door exits): "Out, In, Arch"
      (7) On exit, release your hold of the bar rail and drop straight down on exit (lazy exit).
      (8) Neutral "box" is the flyaway position. Apply: "aircraft heading, box, relax, look for coach."
   h. Front float exit (for left side door exit):
      (1) Climb outside the plane to the front of the door. Use an underhanded grip on the inside bar.
      (2) Turn your parachute away from the door frame as you climb out to avoid contact.
      (3) Turn your torso to present directly toward the line of flight.
      (4) Trail/Drag your outside/upwind leg (your left leg when doing left side door exits) in the wind.
      (5) The launch is more dynamic and powerful. Strongly push off the aircraft with your right leg.
      (6) The launch is up and away from the aircraft's fuselage. Lift your left leg as high as possible.
      (7) Neutral "box" is the flyaway position. Apply: "aircraft heading, box, relax, look for coach."

i. Floater track exit:
   (1) This exit allows you to transition from a poised exit to a floater track, maximizing the forward throw of the aircraft to track back "up" and into the relative wind. You must be able to do a successful on-aircraft heading exit and a successful delta and track in order to do this exit.
   (2) To do a floater track exit:
      (a) Exit directly on aircraft heading in a strong, arched, relaxed, neutral "box" body position. (The rest of the group should leave about one second later.)
      (b) Adopt the track position and hold it until you lose the forward throw of the aircraft.
      (c) Transition back into the relaxed, arched, neutral "box" body position at this time.
      (d) Try to fly to a place about 20 feet away horizontally and ten feet above vertically.
      (e) Use the "Start, Coast, Stop" (SCS) method while stopping early to test the fall rate.
   (3) The key is to try to remain as close as possible to the formation and avoid separation. In addition, you need to make sure you are in clean air on the launch, especially if surrounded by other floaters. You may need to launch far out to the side, or drop off a tad early, downward and track back upward. If you are a front float, you need to keep your head turned to watch the formation; when you become an expert, you will be able to rotate your position during the float track and turn to face the formation at the same time.
   (4) The "Super Float" Position is used in larger formations or multi-plane formation jumps, and leaves on "Ready!" In a multi-plane formation, this signals the other aircraft jumpers to exit.
   (5) This type of exit is very useful for formation skydiving when floating and docking on a base. When floater tracking to a base, you have to adjust how much reverse arch or forward movement you require in order to end up in position to dock while still being in control at all times.
   (6) As with any exit, priority one is stability and flying the relative wind. Speed and smoothness will come with experience.

2. Forward movement (belly-to-earth):
   a. Purpose: To gain the ability to smoothly start and stop forward motion in order to build formations for group skydives.
   b. For forward movement and steering when within 20 feet of your slot, only use your legs:
      (1) Start from a strong, stable, arched, and relaxed neutral "box" body position (important).
      (2) Only move your lower legs.
      (3) The knees must remain at the same original neutral "box" width (shoulder-width apart or slightly wider). The wider the spread, the better the directional control.
      (4) Smoothly extend both legs to full range of motion while locking out your knees during practice.
      (5) Extending both legs tilts the jumper head-low and begins a slide in that direction.
      (6) Full leg extension may not be needed to perform a final approach to dock.
      (7) Extending one leg more than the other causes a turn in the opposite direction:
         (a) Extending the right leg causes a left turn.
         (b) Extending the left leg causes a right turn.
      (8) Maintain both arms neutral (90-degrees at your shoulders and elbows with your elbows on level with shoulders and limp hands) with no movement during forward movement and docking.
      (9) Once halfway to your slot (assuming you are starting from ten to 20 feet away), return to the neutral "box" body position with legs at 45-degrees to coast in a straight line toward your slot.
      (10) Increase your upper body arch as needed by lifting your elbows above your shoulders.
      (11) To stop forward movement, briefly extend your arms straight out while keeping your hands at their neutral "box" width. Extending your arms for too long will cause you to backslide.

3. Backward movement (belly-to-earth):
   a. Purpose: Backward movement is primarily used to slow and stop forward movement.
   b. Start from a strong, stable, arched, and relaxed neutral "box" body position (important).
   c. Initiate backward movement with upper body only in a two-stage process:
      (1) First, evenly extend both arms straight out, angled upward at about 45-degrees with your forearms above your shoulders and your hands just above eye-level at their original neutral "box" width, and push down to get as much lift as possible from the insides of your biceps.
      (2) Second, flatten your chest slightly by rolling your shoulders forward/down (into the wind) and cup your sternum to make your chest more concave.
   d. Your legs should remain in the neutral "box" position (extended out to 45-degrees or slightly farther with knees at shoulder width or slightly wider) for stability.
   e. Once you begin to move backward, to dramatically increase your power with minimal effort, bring your heels to your butt and slowly bring both legs (including your knees, shins, and ankles) close together, just a little bit at a time, until you are squeezing them both together to get the full effect.
      (1) When you squeeze your legs together, your knees will naturally drop below your hip level.
      (2) Keep your chin up and arch at your hips to maintain stability.
      (3) You should notice an increased amount of air pressure on your upper thighs.
      (4) If you still feel air pressure on your shins, you need to bring your heels closer to your butt.
      (5) This is very effective for reducing your speed in the event that a collision is imminent in freefall.
   f. The full range of leg or arm motion may not be necessary for effective backwards motion.
   g. Extending the arms slightly to take a grip will counter forward movement but cause backsliding if initiated too soon or for too long.

4. Adjusting fall rate for down and up movement (belly-to-earth):
   a. Purpose: To gain the ability to get level with the formation prior to docking. Getting level first prevents collisions from above and below with other jumpers on approach.
   b. Increase vertical freefall speed (downward movement) by streamlining:
      (1) Start from a strong, stable, arched, and relaxed neutral "box" body position (important).
      (2) Push your hips and glutes forward toward the ground and keep your chin up and head back.
      (3) Relax abdominal muscles and lean back into the arch with shoulders back, elbows above your shoulders, and apply breathing.
   c. Slow vertical freefall speed (upward movement) by creating maximum turbulence:
      (1) Start from a strong, stable, arched, and relaxed neutral "box" body position (important).
      (2) Curve the lower spine upward (like a mad cat) & cup the abdomen into a reverse arch position by rolling your pelvis down into your hamstrings (like sucking your belly button to your spine).
      (3) Crunch your knees down and widen them out slightly past shoulder-width.
      (4) De-arch your elbows down through the shoulders & roll the shoulders down & cup the sternum.
      (5) Stretch your arms out forward slightly with your hands just above eye-level while keeping them at shoulder-width apart or slightly wider with your palms facing the ground and pushing down (similar to backward movement) to counter any forward motion.
      (6) Keep both of your legs and feet symmetrical in the neutral "box" position or only very slightly extended (legs evenly extended out to 45° or only very slightly farther with knees slightly wider than shoulder-width and toes slightly pointed).
      (7) Your shoulders, elbows, hands, chest, hips, knees, and feet should all be level with one another.
      (8) Keep your head in the up position as this is upward movement during the final approach to docking (not a low recovery position, which is explained later in section e. on the next page.).
      (9) Extend your arms or legs to counterbalance and maintain a level attitude.

d. If there is any unintentional forward or backward movement during the up and down movement, it should be corrected.

(1) If you see that you are moving forward while going up, you can extend your arms to stop the forward motion and check that your legs are neutral (bring your legs back in to a 45° position).

(2) If you need to maximize your slow fall, fully extend both arms and legs equally while keeping your legs closer together. This will prevent you from going forward while slow falling.

(3) If you see that you are moving backward while going down, you can evenly extend both legs back out to the neutral "box" position (45° or slightly farther) to stop the backward motion.

e. When recovering altitude from below the level of a formation:

(1) Turn 90-degrees relative to the formation and lower your head to get the maximum cup.

(2) While keeping your head down, turn your head to the side to keep the formation in view.

(3) Use the maximum slow fall position to rise at least ten feet above the formation while remaining in your quadrant. Once above, monitor levels, adjust your fall rate to get on level, and attempt to redock only when you are on level, in your slot, and have fully stopped moving.

(4) To avoid a collision, remain clear of the area immediately below and above any group.

f. Recognize the visual cues for level approach (on exit, regardless of the horizon):

(1) Backpack in sight: come down

(2) Front of the leg straps in sight: come up

g. Maintain altitude awareness by checking at least every five seconds and after every maneuver.

5. Docking and grip taking:

a. Grip taking priorities:

(1) Fly on level all the way to the grips.

(2) Fly in your slot.

(3) Take the grips.

b. Dock using a level approach.

c. Start by taking the grips with your thumbs under and fingers over the wrists.

d. Check that your elbows are back to the neutral "box" position at 90-degrees.

e. Equally extend both of your legs and feet out slightly into the wind for positive pressure to counter any tension created in the formation when holding grips.

f. Once docked, arch across your shoulders with your elbows up above your shoulders to maintain the fall rate and stay level with your partner or the formation.

g. Maintain altitude awareness by checking at least every five seconds and after every maneuver.

h. It is important to ensure that a strong, stable, arched, and relaxed neutral "box" body position is maintained during the dock, allowing you to fall straight down while docked.

i. Open your hands when inward/forward pressure is felt on your palms.

j. Use the cue words: "legs, grips, elbows, legs, altitude, palms"

6. Breaking off and tracking:
   a. Check altitude every four or five seconds and after each maneuver.
   b. Breakoff without prompting.
   c. The most positive way to signal breakoff is to turn 180° from the center of the formation and track.
      (1) As a safety back-up in Categories G and H:
         (a) If the coach waves their arms, immediately turn & track to the planned deployment altitude.
         (b) If the coach deploys, deploy immediately without tracking.
         (c) Deploy at planned altitude whether or not you have turned or tracked.
         (d) Never rely on the USPA Coach for breakoff or deployment cues.
      (2) You are always responsible to breakoff and open at the planned altitude on jumps with the USPA Coach, as well as others after you get your license.
   d. Plan the breakoff altitude to be high enough to allow enough time for the jumper with the least experience to track to a safe distance from the formation, 100 feet for groups of five or fewer.
      (1) This is also the minimum distance required to pass Category H and the A-License Check Dive.
      (2) A minimum tracking distance of at least 50 feet is required to pass each Category G jump.
   e. The minimum breakoff altitude recommendations for group freefall (SIM Section 6-1) apply to very experienced formation skydivers jumping at a familiar location, using familiar equipment, and jumping with familiar people. The minimum breakoff altitude for group freefall should be:
      (1) For groups of five or fewer, at least 1,500 feet higher than the highest planned deployment altitude in the group (not counting one camera flyer)
      (2) For groups of six or more, at least 2,000 feet higher than the highest planned deployment altitude in the group (not counting a signaling deployment or camera flyers)
      (3) 500 to 1,000 ft. higher than these recommendations if any of the following conditions are met:
         (a) Groups with one or more jumpers of lower experience
         (b) Jumpers with slower-opening or faster-flying canopies
         (c) Jumpers engaging in freefall activities that involve a fall rate faster than belly-to-earth terminal velocity (freeflying or angle-flying)
         (d) Jumps involving props, toys, or other special equipment, such as signs, banners, smoke, flags, hoops, tubes, items released in freefall, etc.
         (e) Jumps taking place over an unfamiliar landing area or in case of an off-field landing (bad spot recognized in freefall)
         (f) Other special considerations, such as jumps taking place at nighttime or over water
   f. When tracking, establish and maintain the correct heading for the 180° radius of the formation.
   g. For beginners, tracking moderately in a straight line in the right direction is more effective than going fast in a curve or in the wrong direction. Breakoff high enough to gain enough separation.
   h. Develop techniques to scan and steer clear of other jumpers ahead and below.
      (1) Keep looking all around: left side, right side, forward-heading, up-right, up-left, forward-down
   i. To avoid hard openings, flare at the end of your track to stop it and slow down to a minimum freefall velocity before deploying by maintaining a neutral belly-to-earth body position.

j. To ensure that you deploy in clear airspace, look left, right, up, and down for other jumpers in the immediate area as you perform one big, deliberate wave-off to signal deployment to others.

k. Continue looking during deployment so you can steer clear under canopy as soon as it opens.

l. One effective break-off method uses the "count of eight"
(1) Begin to count to eight in one second intervals as the turn for tracking is initiated.
(2) Count two, three, and four while tracking.
(3) Stop the track with a flaring technique at the count of five.
(4) Initiate wave-off at six.
(5) Reach back to grab the main deployment handle at seven.
(6) Throw the pilot chute by eight.
(7) Practice the break-off sequence until smooth.
(8) The count of eight never goes away. However, as you become a more proficient tracker, you will gain more speed and distance, and lose less altitude during that same eight seconds.

7. For additional requirements for breakoffs from freeflying jumps, see SIM Section 6-2 below:

a. Keep the size of your freeflying groups small until you are proficient.

b. Breakoff can be more confusing than usual due to loss of visual contact with other skydivers.

c. Avoid maneuvers near breakoff that increase vertical separation.

d. Plan higher breakoffs than usual (2,000' to 3,000' above the highest planned deployment altitude).

e. Freeflying's faster fall rates mean greater altitude loss during breakoff procedures.

f. Jumpers in fast-fall positions must dive steeply until clear of any jumpers above before beginning an effective flat track with a slower descent rate.

g. Transition from fast-fall rate to normal tracking for separation gradually in case there is a skydiver above the formation in a high-speed descent (i.e., like diving for a coin at the bottom of a pool).

h. It is as important to slow down after breakoff as it is to get separation from other jumpers.

Emergency Procedure Review

Note: A USPA AFF Instructor should teach this section. A canopy formation specialist is also a good source.

1. Review and discuss canopy collision avoidance with a USPA Instructor or a canopy formation specialist:

a. Jumpers must avoid collisions with other jumpers under open parachutes.

b. The best way to avoid a collision is to know where other nearby jumpers are at all times while under canopy, especially during opening. Steer with the rear risers to avoid them.

c. Always look in the direction of a turn before initiating it and during the turn.

d. Most canopy collisions occur soon after deployment when two jumpers open too close to each other, or below 1,000 feet while in the landing pattern (base-final intersection).

e. Higher breakoff altitudes, better planning, and tracking farther can help ensure clear airspace during deployment.

f. If a pending head-on collision is imminent, in most cases both jumpers should steer their canopies clear by turning to the right unless it is obvious that steering left is necessary to avoid the collision (both jumpers are more offset towards the left).

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2. Study and discuss the USPA recommended emergency procedures for canopy collision response:
   a. Both of the jumpers should flare to half-brakes and assume the PLF body position as you would if landing in a tree or power lines to protect your face and operation handles from impact:
      (1) Chin down to your chest, legs slightly bent and pressed tightly together, arms and elbows tucked in tightly against the sides of your body, covering your face and operation handles
   b. This also helps prevent you from contacting the other jumper's suspension lines, which can cause serious injuries if the canopy has small diameter suspension lines.
   c. Avoid hitting the suspension lines of the other canopy or the other jumper, if possible.
   d. Check altitude with respect to the recommended minimum cutaway decision & execution altitude.
   e. Jumpers should know their altitude at all times, because it will often dictate the course of action.
   f. When entanglements occur, jumpers must be prepared to react quickly and creatively.
   g. In many cases, the emergency is one that cannot be prepared for in advance; it may even be a problem no one imagined could happen.
   h. If two jumpers collide and entangle, they must communicate their intentions before taking action.
      (1) Jumpers should be specific in discussing their intentions.
      (2) Communications may be difficult if one or both jumpers are wearing full-face helmets.
   i. If the entanglement occurs with sufficient altitude, the jumpers should attempt to clear the entanglement by following lines out before initiating emergency procedures.
   j. If altitude allows, emergency procedures should proceed only after acknowledgment by others.
      (1) The jumper above can strike the jumper below during a cutaway unless clear or ready for it.
      (2) The jumper below can worsen the situation for the jumper above by cutting away before ready.
   k. If both jumpers are cutting away and altitude permits, the second jumper should wait until the first jumper clears the area below.
   l. The first jumper should fly from underneath in a straight line after opening.
   m. In the event of multiple cutaways and if altitude allows, jumpers should stagger reserve openings to avoid possible canopy collisions.
   n. If in a canopy entanglement with another jumper below 1,000 feet and both canopies are uncontrollable and it appears the canopies cannot be separated in time for a safe landing, it is too low for a safe cutaway and may become necessary at some point for one or both jumpers to just deploy their reserves instead.
   o. If both jumpers are suspended under one flying canopy at a low altitude, it may become necessary to land with only that canopy. In this case, the jumpers should aim to land in a softer area.

3. Read and discuss tree landing avoidance with a current USPA AFF Instructor:
   a. Avoid trees by carefully spotting clear of large areas of trees or other obstacles covering more than 32,292 square feet, opening high enough to clear them in the event of a bad spot, and planning a good approach pattern for the conditions.
   b. Fly in maximum glide to reach a clear area.
   c. Continue steering to avoid trees but avoid sharp turns near the ground.
   d. Make any low-altitude avoidance turns from braked flight to avoid an equally dangerous dive following a turn from full flight.

4. Review and discuss the USPA recommended emergency procedures for an unavoidable tree landing:
   a. Before landing, steer to face into the wind.
   b. With a ram-air canopy, flare to half brakes and hold the toggles there until tree contact.
   c. Prepare for a hard landing by assuming the PLF body position; often the jumper passes through the tree and lands on the ground.
   d. Protect your body.
      (1) Keep feet and knees tightly together.
      (2) Do not cross your feet or legs.
      (3) Cover and protect your face with your hands while holding both of your elbows tightly together against your stomach to protect your underarms.
   e. Try to steer for the middle of the tree, then hold on to the trunk or main branch to avoid falling.
   f. Most tree landings are survivable, but accidents may also occur during the recovery.
   g. The potential dangers of landing in a tree extend until you are rescued and safely on the ground.
   h. If suspended above the ground, stay in the tree and wait for help to get down. Do not attempt to climb down from a tree without competent assistance from rescue personnel or properly trained drop zone staff.

Canopy

1. Performance-turn initiation and completion with balance:
   a. Enter a turn only as quickly as the canopy can maintain balance (center of lift over the center of load) during the turn.
   b. Surging, lurching, or line twists indicate a turn entered too quickly.
   c. A canopy is more susceptible to collapse from turbulence during entry and exit from a turn.
   d. The canopy dives sharply after a maximum-performance turn.
2. Reverse-turns:
   a. You must know the maximum safe rate of turn entry for each canopy you jump.
   b. Practicing reverse-turns helps you determine the maximum safe toggle turn rate before inducing a line twist.
   c. Make a smooth, but deep, turn at least 90° to the right and then reverse toggle positions smoothly, but quickly, for a 180° turn to the left (four sets recommended to complete Category G).
   d. A line twist at pattern altitudes may be unrecoverable in time for a safe landing, particularly with a higher wing loading.
   e. In case you induce a line twist, you should complete all maximum-performance turns above the 2,500-foot decide-and-act altitude for a cutaway.
3. The potential for collision with other jumpers increases when making performance maneuvers in traffic or near the ground (review):
   a. Other jumpers may be focused more on the target than on traffic.
   b. The lower jumper has the right of way.
   c. It takes only one jumper to avoid a collision.
   d. Jumping a faster canopy requires more attention to traffic.
4. Accumulate two unassisted landings within 65’ of a planned target (total of five required for A-License)

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Category G Quiz

(Must be passed before Category G-1 jump.)

1. **What is the primary directional control when moving forward to dock in freefall?**
   a) Arms
   b) Legs
   c) Shoulders

2. **What is the minimum breakoff altitude for freefall in groups of five or fewer?**
   a) 1,500 feet above planned deployment altitude
   b) 2,000 feet above planned deployment altitude
   c) 1,000 feet above planned deployment altitude

3. **What is the danger of entering a toggle turn too quickly?**
   a) Stall
   b) Line twist
   c) Line over

4. **What does a canopy do after completing a maximum input toggle turn?**
   a) It stalls.
   b) It planes out.
   c) It dives.

5. **What are the three biggest dangers of a hard toggle turn near the ground?**
   a) 1: line twist; 2: collision with jumpers; 3: collision with the ground
   b) 1: stall; 2: collision with jumpers; 3: collision with the ground
   c) 1: line twist; 2: loss of control; 3: stall

6. **What are the first things to do in the event of a collision and entanglement with another jumper?**
   a) Check altitude and establish communication.
   b) Clear entanglement and check condition of the other jumper.
   c) Cutaway and deploy reserve.

7. **What is the most critical aspect of closing the main container?**
   a) Closing pin loop is as far up the closing pin as possible
   b) Bridle routing and placement
   c) Orientation of closing pin

8. **Why is it a bad idea to drag the harness and container system when stowing the lines?**
   a) Foreign objects could be caught in the lines.
   b) It causes unnecessary wear on the three-ring release webbing and loops.
   c) Harness and container fabric colors will fade faster.

9. **When Velcro is used on the brake system, why is it a good idea to place your toggles back on the Velcro after you land?**
   a) It covers the hook Velcro, which can damage other components, and prevents tangles.
   b) It regenerates the Velcro mechanism.
   c) It will prevent future brake fires.

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10. Who is responsible for maintaining a main parachute system?

a) The owner of the system
b) The main parachute manufacturer
c) An FAA rigger

11. Why is it bad to leave a parachute in the sun?

a) Ultraviolet rays degrade nylon.
b) Nylon overheats easily.
c) The colors will fade prematurely.

12. What damage could occur from storing a parachute for prolonged periods in a car during the summer?

a) Car exhaust fumes degrade materials.
b) Nylon retains folds and will not open properly.
c) Shorter life for AAD batteries, stow band degradation.

13. What happens to Velcro touch fastener when it is used frequently?

a) It loses tackiness.
b) Its durability increases.
c) Nothing.

14. What happens to stiffened tuck flaps that are frequently used?

a) Distortion
b) Strengthening
c) Nothing

15. Who publishes and enforces rules regarding parachute packing and maintenance?

a) FAA
b) USPA
c) Parachute manufacturers

16. What may result if recovering altitude (floating up) under a freefall formation?

a) Collision with formation, funnel.
b) Premature AAD fire.
c) Formation will re-form quicker.

17. What extra consideration is required when wearing an AAD near the open door of an aircraft or when climbing out?

a) Aircraft's magnetic field could damage the AAD.
b) No extra consideration is required.
c) AAD activation near the open door of an aircraft presents a dangerous situation.

18. Why is it important to remain clear of the area directly above and below others in freefall?

a) To comply with FAA regulations
b) To guard against possible collisions due to accidental canopy activation or sudden fall-rate change
c) To maintain clear line of sight with the ground at all times

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19. Why is it important to maintain an automatic activation device to the manufacturer's standards?

a) To improve their chances for correct operation, to help prevent premature AAD activations, and to comply with the law.
b) To ensure warranty coverage from the manufacturer.
c) It will not function otherwise.

20. What is the correct response to a canopy entanglement with another jumper below 1,000 feet if it appears the two canopies cannot be separated in time for a safe landing?

a) Both jumpers must not cutaway nor deploy their reserves and just prepare to PLF.
b) Both jumpers must cutaway and deploy their reserves and prepare to PLF.
c) Both jumpers must deploy their reserves immediately without cutting away and prepare to PLF.

21. Describe your procedure for landing in trees:

a) Face into wind, prepare for PLF, flare to half brakes, protect face & underarms, and wait for help.
b) Cutaway 5-10 feet above top of trees and PLF.
c) Use any maneuver necessary to avoid landing in trees.

22. What does a tall cumulus cloud indicate?

a) Calm weather
b) Thunderstorms in the area
c) High temperatures

23. What is the most dangerous part of an incoming front for aircraft and skydivers?

a) Thunderstorms in the gust front; rapid and significant changes in winds
b) Colder temperatures
c) Higher barometric pressure can damage altimeters and AADs

24. How does a canopy's air speed, ground speed, and descent rate change with an increase in density altitude?

a) Each will decrease.
b) Each will increase.
c) No change will occur.

Advancement Criteria

Aircraft and Spotting

- Spot the aircraft, including all procedures, without assistance.

Exit and Freefall

- Two re-docks from ten feet without assistance
- Two re-docks requiring an adjustment in fall rate (one slow-fall and one fast-fall)
- Breakoff at planned altitude without prompting
- Track at least 50 feet within ten degrees of the planned heading

Canopy

- Two right and two left maximum-performance reverse canopy turns
- Two unassisted landings within 65 feet of the target

Equipment

- One complete pack job without assistance

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Category G Dive Flows

Minimum of Four Jumps with One Current USPA Coach

G-1 Freefall Dive Flow

- Perform all spotting procedures without assistance.
- Coach observes the spot to ensure safety.
- Review rear-floater exit position until successful.
- Check in and initiate count after coach says, "OK."
- Face the direction of flight until stable (3-5 secs).
- Turn right 90°. Coach moves into position & docks.
- Check altitude, nod, & receive nod from the coach.
- Move backward five feet using "start, coast, stop."
- Coach adjusts levels as necessary.
- Check altitude, nod, & receive nod from the coach.
- Move forward using start, coast, & stop w/in arm's reach. No grips. Coach adjusts levels as needed.
- Check altitude, nod, & receive nod from the coach.
- Move backward ten feet using "start, coast, stop."
- Coach adjusts levels as necessary.
- Check altitude, nod, & receive nod from the coach.
- Move forward using start, coast, & stop w/in arm's reach. No grips. Coach adjusts levels as needed.
- Check altitude at least every five seconds or after each maneuver, whichever one comes first.
- Repeat forward & backward movement, increasing distance in 5' increments (up to 20') until 6,000 ft.
- Shake head, "No more maneuvers!" at 6,000 feet.
- Breakoff at 5,500' (do so w/o prompting to pass).
- Start the count of eight seconds as you turn 180° away from your coach and track straight.
- The coach remains in place & evaluates the track.
- Must track >50' within 5 sec & within 10° of 180°.
- Wave-off by 4,000'. (Must do so on time to pass.)
- Deploy by 3,500' (Must do so while stable to pass).

Category G Canopy Dive Flow

(Same dive flow for all four Category G jumps.)

- Check altitude, air traffic, & position over ground.
- Correct any common canopy problems.
- Release brakes, conduct a canopy controllability check, and move to the holding area.
- Check altitude, air traffic, & position over ground.
- Make a smooth, deep, sharp, balanced 90° R turn.
- Smoothly, but quickly & aggressively, reverse the toggle position and make a balanced 180° L turn.
- Check altitude, air traffic, & position over ground.
- Repeat to no lower than 2,500', in case of twists.
- Follow planned pattern over landing area or alternate. Coach measures the student's landing distance from a planned target. (Must safely land w/in 65' of planned target unassisted to pass.)

G-2 Freefall Dive Flow

- Same dive flow as G-1 w/center-float exit & docks.

G-3 Freefall Dive Flow

- Perform all spotting procedures without assistance.
- Coach observes the spot to ensure safety.
- Review front-floater exit position until successful.
- Check in and initiate count after coach says, "OK."
- Face the direction of flight until stable (3-5 secs).
- Turn right 90°. Coach moves into position & docks.
- Check altitude, nod, & receive nod from the coach.
- Move backward five feet using "start, coast, stop."
- Check altitude and nod if still above 6,000 feet.
- The coach nods, "OK," and increases fall rate.
- Remain in position and match the coach's fall rate.
- Check altitude and nod if still above 6,000 feet.
- The coach nods, "OK," and slows fall rate.
- Remain in position and match the coach's fall rate.
- Check altitude at least every five seconds or after each maneuver, whichever one comes first.
- Repeat until response is quick and accurate.
- Shake head, "No more maneuvers!" at 6,000 feet.
- Breakoff at 5,500' (do so w/o prompting to pass).
- Start the count of eight seconds as you turn 180° away from your coach and track straight.
- The coach remains in place & evaluates the track.
- Must track >50' within 5 sec & within 10° of 180°.
- Wave-off by 4,000'. (Must do so on time to pass.)
- Deploy by 3,500' (Must do so while stable to pass).

G-4 Freefall Dive Flow

- Perform all spotting procedures without assistance.
- Coach observes the spot to ensure safety.
- Review floater track exit position until successful.
- Check in and initiate count after coach says, "OK."
- Face the direction of flight until stable (3-5 secs).
- Turn right 90°. Coach moves into position & docks.
- Check altitude, nod, & receive nod from the coach.
- Back up ten feet & the coach goes down five feet.
- Match the coach's fall rate until level & then dock.
- Check altitude, nod, & receive nod from the coach.
- Back up ten feet and the coach goes up five feet.
- Match the coach's fall rate until level & then dock.
- Check altitude at least every five seconds or after each maneuver, whichever one comes first.
- Repeat until response is quick and accurate.
- Shake head, "No more maneuvers!" at 6,000 feet.
- Breakoff at 5,500' (do so w/o prompting to pass).
- Start the count of eight seconds as you turn 180° away from your coach and track straight.
- The coach remains in place & evaluates the track.
- Must track >50' within 5 sec & within 10° of 180°.
- Wave-off by 4,000'. (Must do so on time to pass.)
- Deploy by 3,500' (Must do so while stable to pass).

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Category H

Minimum of Four Jumps with One Current USPA Coach

The last category of the ISP finishes preparing you for the USPA A-License so you can supervise yourself as an independent skydiver. These are the last jumps where you require USPA Instructor supervision. Next, you take your test. Freefall skills combine gross movements using the start, coast, and stop principle to dive toward a position in the sky relative to another jumper, followed by the fine movements to safely dock that you learned in Category G. The freefall briefing includes a discussion on safety and the importance of recognizing and controlling formation approach speeds. You will also learn to look around while tracking, signaling for pull, and during deployment. Under canopy, students with sufficient upper body strength explore the use of the front risers. The instructor explains the benefits and dangers of front riser maneuvers. The discussion includes how to recover from a turn made too low, one of the sport's biggest killers. Emergency procedure review covers unintentional water landings. You should be able to demonstrate how to maintain the three-ring release system and replace a main container closing-loop, two common owner operations. Although A-License holders are not qualified for demonstration jumps, you will be authorized to jump off the regular DZ into landing areas meeting the BSRs for students and A-License holders. In this last category as a formal skydiving student, you will study the FAA requirements for jumps into the airspace over a private field, including what additional approvals may be necessary for the jump aircraft. This discussion should be with a jump pilot who can discuss those sections of FAR 105.

Learning and Performance Objectives

- Diving exit
- Diving to dock on a lower skydiver
- Awareness during diving
- Breakoff, tracking, and deployment
- Front riser control
- Low-turn recovery
- Water landing review
- Owner maintenance of gear (three-ring and closing loop)
- Aircraft radio requirements
- FAA notification requirements for jumping
- FAA approvals for jump planes

Rules and Recommendations

Review all the *Rules and Recommendations* sections for each category to prepare for the oral quiz given as part of the USPA A-License check dive.

Equipment

1. Owner maintenance of three-ring release system:
   a. Disassemble the system every month to clean the cable and massage the ends of the risers.
      (1) Nylon riser webbing develops a memory, especially when dirty.
      (2) When disassembled, twist and massage the nylon webbing around the two riser rings.
   b. Clean the cables:
      (1) Most three-ring release cables develop a sludge-like coating that causes them to bind, increasing the required pull force.
      (2) Refer to the manufacturer's instructions for cleaning.
2. Use the correct stow bands for each type of lines:
   a. Smaller lines require the smaller bands.
   b. Larger bands may be required for larger lines.
   c. Line stow bands should grasp the line stow bights tightly, resulting in 6-11 lbs. of force to extract.
   d. Replace each stow band as it stretches, wears, or breaks.

3. Main closing loop:
   a. Damage greater than ten percent warrants replacement.
   b. Tension:
      (1) Tension must be sufficient to keep the container closed in freefall.
      (2) The closing pin should require eight to 11 pounds to extract (or check owner's manual).
      (3) A loose closing loop could result in a premature deployment.
      (4) Freeflying maneuvers increase the importance of closing system security.
      (5) Adjust the closing loop tension by moving the overhand knot or replacing the loop with the knot tied in the correct place.
   c. Use only closing loop material approved by the harness and container manufacturer.

Spotting and Aircraft

1. Overview of aircraft radio use requirements:
   a. The jump aircraft must have an operating radio for jumping to take place.
   b. The pilot must be in contact with air traffic control prior to jumping.
   c. Skim through the FAA's requirements for radio use for jump operations in FAR 105.13 below:
      (1) Except when otherwise authorized by air traffic control:
         (a) No person may conduct a parachute operation, and no pilot in command of an aircraft may allow a parachute operation to be conducted from that aircraft, in or into controlled airspace unless, during that flight:
            1. The aircraft is equipped with a functioning two-way radio communication system appropriate to the air traffic control facilities being used; and
            2. Radio communications have been established between the aircraft and the air traffic control facility having jurisdiction over the affected airspace of the first intended exit altitude at least five minutes before the parachute operation begins. The pilot in command must establish radio communications to receive information regarding air traffic activity near the parachute operation.
         (b) The pilot in command of an aircraft used for any parachute operation in or into controlled airspace must, during each flight:
            1. Continuously monitor the appropriate frequency of the aircraft's radio communications system from the time radio communications are first established between the aircraft and air traffic control, until the pilot advises air traffic control that the parachute operation has ended for that flight.
            2. Advise air traffic control when the last parachutist or object leaves the aircraft.
      (2) Parachute operations must be aborted if, prior to receipt of a required air traffic control authorization, or during any parachute operation in or into controlled airspace, the required radio communications system is or becomes inoperative.
2. FAA notification required before a jump:
   a. A jumper or the pilot must notify the appropriate air traffic control facility at least one hour prior to jumping (no more than 24 hours prior) in most airspace.
   b. Some drop zones have a written notification renewed annually for that location only.

c. Skim through FAR 105.25 and 105.15 for rules on notifications and authorizations prior to jumping:

(1) No person may conduct a parachute operation, and no pilot in command of an aircraft may allow a parachute operation to be conducted from that aircraft:
   (a) Over or within a restricted area or prohibited area unless the controlling agency of the area concerned has authorized that parachute operation;
   (b) Within or into a Class A, B, C, D airspace area without, or in violation of the requirements of, an air traffic control authorization issued under this section;
   (c) Within or into Class E or G airspace area unless the air traffic control facility having jurisdiction over the airspace at the first intended exit altitude is notified of the parachute operation no earlier than 24 hours before or no later than one hour before the parachute operation begins, except as provided below:
      1. For these purposes, air-traffic control facilities may accept a written notification from an organization that conducts parachute operations and lists the scheduled series of parachute operations to be conducted over a stated period not longer than 12 calendar months. The notification must contain the information prescribed below, identify the responsible persons associated with that parachute operation, and be submitted at least 15 days, but not more than 30 days, before the parachute operation begins. The FAA may revoke the acceptance of the notification for any failure of the organization conducting the parachute operations to comply with its requirements.
      2. This section does not apply to a parachute operation conducted by a member of an Armed Force within a restricted area that extends upward from the surface when that area is under the control of an Armed Force.

(2) Each request for a parachute operation authorization or notification required under this section must be submitted to the air traffic control facility having jurisdiction over the airspace at the first intended exit altitude and must include the information prescribed below.

(3) Each person requesting an authorization and each person submitting a notification must provide the following information (on an individual or group basis):
   (a) The date and time the parachute operation will begin.
   (b) The radius of the drop zone around the target expressed in nautical miles.
   (c) The location of the center of the drop zone in relation to:
      1. The nearest VOR facility in terms of the VOR radial on which it is located and its distance in nautical miles from the VOR facility when that facility is 30 nautical miles or less from the drop zone target; or
      2. The nearest airport, town, or city depicted on the appropriate Coast and Geodetic Survey World Aeronautical Chart or Sectional Aeronautical Chart, when the nearest VOR facility is more than 30 nautical miles from the drop zone target.
   (d) Each altitude above mean sea level at which the aircraft will be operated when parachutists or objects exit [sic] the aircraft.
   (e) The duration of the intended parachute operation.
   (f) The name, address, and telephone number of the person who requests the authorization or gives notice of the parachute operation.
   (g) The registration number of the aircraft to be used.
   (h) The name of the air traffic control facility with jurisdiction of the airspace at the first intended exit altitude to be used for the parachute operation.

(4) Each holder of a certificate of authorization issued under this section must present that it for inspection upon the request of the Administrator or any Federal, State, or local official.

(5) Each person requesting an authorization under this section and each person submitting a notice under this section must promptly notify the air-traffic control facility having jurisdiction over the affected airspace if the proposed or scheduled parachute operation is canceled or postponed.

d. Study the overview of notification & authorization requirements from AC 105.2, Appendix 1 below:

Location of Jump	Kind of Authorization Required	When to Apply or Notify	Where to Apply or Notify	Title 14 CFR Section Reference
Over or onto any airport	Prior approval	Prior to jump	Airport management	§ 105.23
In or into Class E or G airspace	Air Traffic Control (ATC) notification	Between 24 hours and 1 hour prior to jump	ATC facility having jurisdiction	§ 105.25
In or into Class A, B, C or D airspace	ATC authorization (Verbal authorization normally issued)	Prior to jump	ATC facility having jurisdiction	§ 105.25
Over or within a restricted or prohibited area	Prior authorization	Prior to jump	Controlling agency, as noted on section chart	§ 105.25
Over or into a congested area or open-air assembly of persons	FAA Form 7711-1, Certificate of Authorization	10 working days prior to jump	Flight Standards District Office (FSDO) having jurisdiction over the area where jump is to be made	§ 105.21

3. Aircraft approved for flight with door removed:
   a. Some aircraft are unsafe for flight with the door open or removed.
   b. Aircraft approved for flight with the door removed may require additional modifications and usually require additional FAA field approval.
   c. Other modifications to a jump aircraft, e.g., in-flight doors, handholds, or steps, require additional field approval or a supplementary type certificate.
   d. Review with the pilot the certificates of approval for modifications on the jump aircraft.
   e. Skim through AC 105.2, Appendix 2 (operation of aircraft approved for flight with door removed or modified for parachuting operations) below:
      (1) Operating Limitations: Contact your local Flight Standards District Office (FSDO) for information on getting an authorization to operate your aircraft with the door removed and/or a door modified to open/close in flight. Aircraft that have approved procedure and operating limitations in their FAA-approved Aircraft Flight Manual (AFM) or a FAA-approved Supplemental Type Certificate (STC) may operate in accordance with those documents.
      (2) Operation with Modified or Removed Door. Any aircraft type, utility/normal category model that has had FAA-approved data used for skydiving operations or door removal can be considered.
         (a) Required Data. It is the responsibility of the applicant to supply the FAA aviation safety inspector (ASI) with any data necessary to have his or her aircraft approved to operate with a door removed or a door modified to open/close in-flight during jump operations. If the aircraft is altered and operated in accordance with an STC, no other limitations are required.
         (b) Approved Data. Many aircraft have jump door and/or restraint systems approved by type certificate (TC), STC, or field approval. Aircraft that have not been FAA-approved by TC, STC, or field approval must have the required data to address the alteration from a Designated Engineering Representative (DER), Organization Designation Authority (ODA), or other FAA-approved data. This data will allow the owner/operator the ability to apply for a field approval or one-time STC for that aircraft.
         (c) Previously Approved Field Approvals. Applicants can present a previously FAA-approved field approval for jump door, handles, step, and skydiver restraint systems as data for the field approval process if the FAA-approved data are for the same aircraft make, model, and series (M/M/S).

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Exit and Freefall

1. Diving exit (from a left side door of an aircraft larger than a Cessna 206):
   a. Position yourself in the door to place your hips and chest into the air coming from ahead of the aircraft, with your body oriented side-to-earth.
      (1) Orient your back toward the tail of the aircraft and your chest toward the direction of flight.
      (2) For a left side door, place your left foot forward with your toes along the edge of the door.
      (3) Crouch down over your left foot with your weight forward on the ball of your left foot.
      (4) Place your right leg back and poised for balance.
      (5) Drop your left elbow/arm to your left knee.
      (6) Raise your right elbow/arm up above your head.
      (7) Bend forward so that your shoulders are lower than your hips.
   b. This exit is passive; just drop down through the door over your left foot without pushing and lead with your upper body for a very lazy launch. This prevents you from doing a 360° turn on the hill.
   c. Raise the right knee and right arm high after you clear the door and keep your chest and hips presented square to the forward relative wind. You are actually going to dive out sideways, reaching for the tip of the wing as you launch.
   d. Extend both of your legs to the neutral "box" position (extended out to 45° or slightly farther with your knees at shoulder width or slightly wider) for the flyaway position. Apply aircraft heading, box, relax, and look for coach. It is just like a rear float exit except 90° off heading.
   e. Exit in a slow fall body position to arrest your forward throw from the aircraft, which is moving you away from your coach.
   f. Before starting to dive, hold the slow fall body position hard for two to three seconds or until you arrest the forward throw of the aircraft and begin to level out. You will automatically rotate left on the airflow to face down and toward the rear toward your coach; just let it happen naturally.
   g. If your body rotates more than 45° toward the ground while you are still on the hill (before you are leveled off with your belly to earth), extend both of your arms out straight above your head and tuck both of your legs into your buttocks. This helps prevent you from flipping forward on the hill.
2. Use a delta position to begin diving toward your coach:
   a. Maintain a strong, relaxed, arched, symmetrical, neutral body position throughout the dive (important).
   b. Initiate the dive by first fully extending both of your legs equally, locking your knees, pointing your toes, and keeping your knees at the neutral "box" width (shoulder width or slightly wider).
   c. Press your chest forward, as though the chest is leading.
   d. After fully extending both legs first, smoothly sweep back both arms equally just past 90° with your elbows locked, palms down, and your hands above/behind your hips to spill air.
   e. As when learning to track, a wide body stance helps maintain stability and directional control. Getting too narrow can affect your control of direction. It is important to maintain directional control over speed. Streamlining of the delta dive occurs as you become competent and comfortable with the position. Remember that eye contact and directional control are the most important factors from a safety point of view. As you become competent and comfortable with the position, you can begin to bring your arms closer to your sides so your hands are only two or three inches away from your hips and narrow your legs so your feet are as close as six inches apart.
   f. If you are having trouble moving in a straight line, you need to widen your knees and bring your arms closer to 90° in relation to your torso.

3. Using your spine to adjust dive angle:
   a. Follow the person ahead closely, but be prepared to slow rapidly.
   b. Pitch up or down by curving your spine to increase or flatten the angle of the dive.
   c. To trim the angle further, arch the upper spine as far as comfortable. Press your chest forward as far as comfortable, pulling your shoulders back and squeezing your shoulder blades together, and push your head back towards the reserve container to maintain visual contact with other jumpers. Sweeping your arms slightly behind the plane of your torso will keep your head raised a bit more.
   d. Use fast- and slow-fall technique to adjust vertical position relative to the diver ahead.
   e. The delta dive position has a range of motion that extends from a slow forward speed and moderate increase in fall rate to a near vertical dive (slight horizontal speed), depending on arm, leg, and head positioning. The more streamlined the body is the quicker and steeper the angle.
   f. High closing speeds experienced in these positions demand caution in their use. For safety and to prevent a collision, dive with an escape path in mind. Aim for a point about ten to 20 feet horizontally away from and on level with your slot. Always dive toward the right side of your target (never directly at).

4. Traffic on approach to the formation:
   a. Dive in a straight line and maintain eye contact with the formation and other divers in front of you.
   b. Prevent collisions by watching for other jumpers while on approach to the formation.

5. Start, coast, and stop (SCS) stair-step approach:
   a. This is a series of starts and coasts that is used to maintain control while diving to the formation.
   b. Once you are about halfway to the target, return to a more neutral position and coast to assess both your vertical and horizontal distance to the formation.
      (1) You can start to increase your speed to the target again if you find you have slowed too soon.
      (2) If during the coast phase of a dive you see you are close (within 20 feet horizontally) but high, you should use downward motion to get level. Remember to use start, coast, and stop (SCS).
   c. Use the flare body position to slow and stop at a position on level with the formation and approximately ten to 20 feet away from the target in the final approach zone:
      (1) This is a combination of the full de-arch used to stop downward motion and the full backward motion used to stop forward motion.
      (2) To initiate the flare, extend both of your arms with hands at the original neutral "box" width and press forward and downward, while de-arching by rolling your shoulders forward and cupping your sternum and rolling your pelvis into your hamstrings and cupping your abdomen and slightly dropping both of your knees evenly (while keeping them at shoulder-width apart).
      (3) The longer the coast phase, the less aggressive the stop will need to be.
      (4) This also helps to ensure ending up on level with the formation at the end of a dive.
   d. If you see you are level but far away, you should track to close the distance while conserving altitude. Remember to use start, coast, and stop (SCS) when you are doing this.
   e. Begin a level approach using only your legs to move forward to close the distance and take grips.

f. Visual cues:

(1) Back of pack in view: approaching too high.

(2) Front of harness in view: approaching too low.

g. Remain aware of traffic to each side and for errant jumpers below the approach path.

h. You should always keep the formation and the approach path in sight during the dive.

6. Flare to rapidly arrest forward movement (very effective):

a. Combine the backward movement and slow-fall techniques together: extending both arms forward, cupping your sternum and abdomen, bringing both legs together, placing your heels on your butt, and dropping both knees. This is useful to avoid freefall collisions and to stop your track.

7. Breaking off and tracking:

a. Check altitude at least every four to five seconds and before and after each maneuver.

b. Breakoff without prompting.

c. The most positive way to signal breakoff is to turn 180° from the center of the formation and track.

(1) As a safety back-up in Categories G and H:
(a) If the coach waves their arms, immediately turn & track to the planned deployment altitude.
(b) If the coach deploys, deploy immediately without tracking.
(c) Deploy at planned altitude whether or not you have turned or tracked.
(d) Never rely on the USPA Coach for breakoff or deployment cues.

(2) You are always responsible to breakoff and open at the planned altitude on jumps with the USPA Coach, as well as others after you get your license.

d. Plan the breakoff altitude to be high enough to allow enough time for the jumper with the least experience to track to a safe distance from the formation, 100 feet for groups of five or fewer.

(1) This is also the minimum distance required to pass Category H and the A-License Check Dive.

e. The minimum breakoff altitude recommendations for group freefall (SIM Section 6-1) apply to very experienced formation skydivers jumping at a familiar location, using familiar equipment, and jumping with familiar people. The minimum breakoff altitude for group freefall should be:

(1) For groups of five or fewer, at least 1,500 feet higher than the highest planned deployment altitude in the group (not counting one camera flyer)

(2) For groups of six or more, at least 2,000 feet higher than the highest planned deployment altitude in the group (not counting a signaling deployment or camera flyers)

(3) 500 to 1,000 ft. higher than these recommendations if any of the following conditions are met:
(a) Groups with one or more jumpers of lower experience
(b) Jumpers with slower-opening or faster-flying canopies
(c) Jumpers engaging in freefall activities that involve a fall rate faster than belly-to-earth terminal velocity (freeflying or angle-flying)
(d) Jumps involving props, toys, or other special equipment, such as signs, banners, smoke, flags, hoops, tubes, items released in freefall, etc.
(e) Jumps taking place over an unfamiliar landing area or in case of an off-field landing (bad spot recognized in freefall)
(f) Other special considerations, such as jumps taking place at nighttime or over water

f. When tracking, establish and maintain the correct heading for the 180° radius of the formation.

g. For beginners, tracking moderately in a straight line in the right direction is more effective than going fast in a curve or in the wrong direction. Breakoff high enough to gain enough separation.

h. Develop techniques to scan and steer clear of other jumpers ahead and below.

(1) Keep looking all around: left side, right side, forward-heading, up-right, up-left, forward-down

i. To avoid hard openings, flare at the end of your track to stop it and slow down to a minimum freefall velocity before deploying by maintaining a neutral belly-to-earth body position.

j. To ensure that you deploy in clear airspace, look left, right, up, and down for other jumpers in the immediate area as you perform one big, deliberate wave-off to signal deployment to others.

k. Continue looking during deployment so you can steer clear under canopy as soon as it opens.

l. One effective break-off method uses the "count of eight"

(1) Begin to count to eight in one second intervals as the turn for tracking is initiated.

(2) Count two, three, and four while tracking.

(3) Stop the track with a flaring technique at the count of five.

(4) Initiate wave-off at six.

(5) Reach back to grab the main deployment handle at seven.

(6) Throw the pilot chute by eight.

(7) Practice the break-off sequence until smooth.

(8) The count of eight never goes away. However, as you become a more proficient tracker, you will gain more speed and distance, and lose less altitude during that same eight seconds.

8. For additional requirements for breakoffs from freeflying jumps, see SIM Section 6-2 below:

a. Keep the size of your freeflying groups small until you are proficient.

b. Breakoff can be more confusing than usual due to loss of visual contact with other skydivers.

c. Avoid maneuvers near breakoff that increase vertical separation.

d. Plan higher breakoffs than usual (2,000' to 3,000' above the highest planned deployment altitude).

e. Freeflying's faster fall rates mean greater altitude loss during breakoff procedures.

f. Jumpers in fast-fall positions must dive steeply until clear of any jumpers above before beginning an effective flat track with a slower descent rate.

g. Transition from fast-fall rate to normal tracking for separation gradually in case there is a skydiver above the formation in a high-speed descent (i.e., like diving for a coin at the bottom of a pool).

h. It is as important to slow down after breakoff as it is to get separation from other jumpers.

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Emergency Procedure Review

1. Refer to SIM Section 6-5 for "Water Landing Recommendations." Refer to the USPA BSRs (below) for equipment requirements on jumps near water, but many drop zones have waivers on file.
2. Water hazards:
   a. Definition: An open body of water is defined as a body of water in which a skydiver could drown.
   b. Flotation gear/devices:
      (1) Are required for all skydivers wearing a round main or reserve canopy and all solo students when the intended exit, opening, or landing point is within one mile of an open body of water
      (2) Are recommended for jumpers using ram-airs when jumping within a mile of water
   c. Adjust the planned spot to avoid bodies of water.
3. Review and discuss the emergency procedures for an unintentional water landing (SIM Section 5-1.F):
   a. Continue to steer to avoid the water hazard while enough altitude remains to do so safely.
   b. If possible, land close to shore or to a boat, buoy, or other floating object. Land close to others.
   c. If landing in water with waves, land away from where the waves break to avoid the undertow.
   d. Activate or inflate the flotation device, if available.
   e. Disconnect or loosen the chest strap to facilitate getting out of the harness after landing in the water. Keep your hands in the steering toggles to maintain control if possible. However, this may require taking your hands out of the steering toggles first.
   f. Disconnect the reserve static line (if applicable) to reduce complications in case the main needs to be cutaway after splashing down.
   g. Steer into the wind, if possible. If there is a flowing current, land against it to facilitate escape.
   h. Loosen the leg straps slightly to facilitate getting out of the harness after splashing down.
      (1) If you loosen the leg straps too much, you may not be able to reach the toggles.
      (2) Leave the leg straps fastened until you have landed and your feet are in the water.
   i. Releasing the main canopy and attempting to fall away into the water is not recommended.
      (1) Altitude above water can be difficult to judge.
      (2) Falling from a significant height into water can result in fatal injuries.
      (3) The water may be shallow or there may be unseen objects below the surface.
   j. Prepare for a PLF at 300 feet (feet & knees together, knees slightly bent, & toes slightly pointed).
   k. Flare the parachute to half brakes at ten feet above the water. This may be difficult to judge, due to poor depth perception over the water.
   l. Enter the water feet-first in a PLF position with your lungs fully filled with air.
   m. After entering the water, release the toggles, bring your hands to your ribcage, throw your arms back, and slide forward out of the harness. Shrug the container and harness off your shoulders using a breaststroke motion. Then disconnect or slide off the leg straps.
      (1) Remain in the harness and attached to the canopy until actually in the water.
      (2) If cutting away (known deep water only), do so only after both feet contact the water.
      (3) If flotation gear is not used, separation from the equipment is essential.
      (4) The container can also serve as a flotation device if the reserve canopy is still packed inside.
      (5) Caution must be used to avoid the main canopy suspension lines if using the reserve to float.
      (6) Tests have shown that a container with a packed reserve will remain buoyant for up to 45 minutes or longer.
   n. Dive down deep and carefully swim away upwind if there is no current (or up/cross-stream if there is a flowing current) and swim out from under the collapsed canopy while keeping movement to a minimum to avoid entangling in the suspension lines. Once clear, swim to shore and get out.
   o. If the canopy lands on top of you or you become covered by the canopy:
      (1) Dive down deep and swim forward out and away from under the collapsed canopy, or
      (2) Punch up to create an air pocket (like a tent), then pull the canopy off your head by following one of the rib seams to the edge of the canopy until clear of it while remaining clear of the lines
   p. In swift or shallow water, pull one toggle in or cutaway if you landed under your main canopy.
   q. Take a deep, full breath of air and refill your lungs at every opportunity.
   r. Remove any full coverage helmets in the event of breathing difficulties.
   s. Even if you are in shallow water or are a strong swimmer, leave the parachute system behind.
   t. Swim toward the nearest shore, buoy, or boat while using any currents to your advantage.

4. Study USPA recommendations on recovery from a turn made too low (SIM Section 5-1.I):
   a. Low turns under canopy are one of the biggest causes of serious injury and death in skydiving.
   b. A low turn can be premeditated or result from an error in judgment or experience with a situation.
   c. To avoid low turns, fly to a large, uncrowded landing area free of obstacles and:
      (1) Fly a planned landing pattern that promotes a cooperative traffic flow.
      (2) If landing off-field, plan a landing pattern by 1,000 feet.
   d. Once a jumper realizes that a turn has been made at an unsafe altitude:
      (1) Stop turning and neutralize the turn to get the canopy back overhead by letting the toggle back up and pulling the other toggle down until both toggles are even and then perform a full flare.
      (2) While doing this, prepare to perform a hard parachute landing fall (PLF).
      (3) Manage the speed induced by the turn.
         (a) Expect more responsive flare control with the toggles due to the increased airspeed.
         (b) Expect a longer, flatter flare.
   e. In case of premature contact with the ground, no matter how hard, keep flying to keep the canopy level and overhead and finish the full flare to reduce further injury.

Canopy

1. Using front risers:
   a. Front risers may be used to dive the canopy:
      (1) To lose altitude rapidly
      (2) To maintain position over ground in strong winds
      (3) To catch up with another jumper under canopy below
      (4) To have fun
   b. Heading control with front risers depends on:
      (1) Airspeed
      (2) The rate of turn
      (3) The speed of turn entry
   c. Heading control with front risers takes practice to become predictable.
   d. Practice heading control with front risers:
      (1) Pull both front risers down to dive straight ahead.
      (2) Pull one front riser to complete two 90-degree and two 180-degree turns.
   e. Initiate a sharp, deep front riser turn, raise the riser slightly to decrease the turn rate, and then pull the riser fully down again to attempt to increase the rate of the turn:
      (1) The rate of turn may not increase.
      (2) The resistance on the riser may make it too difficult to pull the riser down farther after raising it
      (3) This exercise demonstrates the different nature of front riser heading control.
   f. Complete all front riser maneuvers by 2,000 feet. Then return to only using toggles for control.

2. Front riser safety:
   a. Watch for traffic below and to the sides prior to initiating a front riser dive.
   b. Front riser maneuvers can be very dangerous near the ground:
      (1) Turbulence may affect canopy heading or descent rate.
      (2) A mishandled front riser turn can lead to an undesirable heading, e.g., towards an obstacle, without time to complete the turn safely before landing.
      (3) A crowded landing pattern is never the place for high-speed maneuvers.
   c. Keep both steering toggles in hand when performing front riser maneuvers to make heading changes more reliably and quickly if necessary.

3. Perform the remaining unassisted landings within 65 feet of the planned target to meet the USPA A-License requirements (total of five required for A-License).

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Category H Quiz

(Must be passed before Category H-1 jump.)

1. **Why is it important to look ahead during a dive toward other jumpers in freefall?**
   a) To maximize your speed
   b) To maintain heading
   c) To see others and avoid a collision

2. **What is the fastest way to slow down from a freefall dive approach?**
   a) Aggressive arch
   b) Neutral body position with arms forward and knees down
   c) Arms back at waist and legs straight

3. **What is the danger of a loose or worn main container closing-loop?**
   a) Premature deployment
   b) AAD fire
   c) Line over malfunction

4. **Why must three-ring release cables be cleaned periodically?**
   a) Oxidation will cause microscopic burrs on metal, which could tear fabric.
   b) To remove tar.
   c) Corrosion deposits cause them to bind.

5. **If you see that you have begun to turn too low to the ground for a safe landing, what should be your first response?**
   a) Quickly use toggle controls to turn in the opposite direction.
   b) Neutralize the turn and get the canopy overhead.
   c) Prepare to PLF.

6. **What effect does pulling on the front risers have on the canopy?**
   a) Dramatic increase in rate of descent
   b) Dramatic decrease in rate of descent
   c) Dramatic increase in forward speed

7. **When performing front riser maneuvers, what should you do with the toggles?**
   a) Stow them.
   b) Keep them away from the front risers.
   c) Keep them in your hands.

8. **What are the two biggest dangers of front riser maneuvers near the ground?**
   a) Collisions with other jumpers and collision with the ground
   b) Broken lines and collision with the ground
   c) Canopy stalls and collision with the ground

9. **What are some of the possible results of a turn made too low to the ground?**
   a) Horseshoe malfunction
   b) Serious injury or death
   c) Increased chance of landing on target

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10. What is the procedure for landing in water?

a) Inflate flotation device, disconnect chest strap and RSL, prepare for PLF, face into wind, flare, hold breath, cutaway once feet are wet, remove leg straps, swim upwind; if under the canopy, dive deep and swim away or follow one seam until out from underneath.
b) Inflate flotation device, disconnect chest strap and RSL, prepare for PLF, face into wind, flare, hold breath, cutaway five to ten feet above water, remove leg straps, swim upwind; if under the canopy, dive deep and swim away or follow one seam until out from underneath.
c) Inflate flotation device, prepare for PLF, face into wind, flare, hold breath, remove leg straps, swim upwind; if under the canopy, dive deep and swim away or follow one seam until out from underneath.

11. What is the maximum percentage of visible wear allowable on a main closing loop?

a) Fifty percent
b) Twenty-five percent
c) Ten percent

12. Can a jump be legally made from an aircraft without an operating radio?

a) No
b) Yes
c) Yes, as long as the aircraft has an operating GPS system

13. What is the least notification the FAA requires before any jump or series of jumps may be made?

a) Twenty-four hours
b) One hour
c) One month

14. Where can a pilot look to determine if a plane is approved for flight with the door removed?

a) No approval is needed
b) AC 105.2, Appendix 2, or aircraft owner's manual
c) FAR 105.3

15. Whose name will the FAA require when filing a notification for parachute jumping?

a) The person giving notice
b) The local safety and training advisor
c) The pilot

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Category H Dive Flows

Minimum of Four Jumps with One Current USPA Coach
(The freefall and canopy dive flows are the same for all four jumps in Category H.)

Category H Freefall Dive Flow

- Dive from the door one second after the coach.
- Present belly to the wind in the slow fall position and maintain it for two to three seconds.
- Coach establishes fall rate and holds heading (facing jump run). Turn left toward coach.
- Dive using "Start, Coast, Stop" to gauge approach and stop on level about ten to 20 feet out in front.
- Check altitude before and after every maneuver or every five seconds, whichever one comes first.
- Initiate forward approach using "Start, Coast, and Stop" and take grips using proper technique.
- Altitude permitting (>6,000 feet), coach turns 90° off the jump run heading and dives to a point 50 to 100 feet horizontally and 20 to 40 feet below.
- Coach turns 180° to face student and nods, "OK."
- Check altitude, follow, & repeat docking procedure.
- Altitude permitting (>6,000 feet), coach turns 180° away from student, staying perpendicular to jump run, and dives to a point 50 to 100 feet horizontally and 20 to 40 feet below.
- Coach turns 180° to face student and nods, "OK."
- Check altitude, follow, & repeat docking procedure.
- Continue to repeat the maneuvers while staying perpendicular to jump run and checking altitude before and after every maneuver or every five seconds, whichever comes first, until 5,000 feet.
- Initiate breakoff at 5,000 feet without prompting. (Must do so on time & without prompting to pass.)
- Start the count of eight seconds as you turn 180° away from coach and track straight ahead.
- Coach remains in place and evaluates track. (Track must reach at least 100 feet of horizontal distance within five seconds and be within ten degrees of the 180° heading in order to pass.)
- Wave-off by 3,500 feet while checking for clear airspace (must do so on time in order to pass).
- Deploy by 3,000 feet (must do so stable to pass).

Category H Canopy Dive Flow

- Check altitude, air traffic, & position over ground.
- Correct any common canopy problems.
- Unstow the toggles, conduct a full canopy controllability check, and move to the holding area.
- Check altitude, air traffic, & position over ground.
- Perform an on-heading front riser dive by pulling on both front risers evenly (keep toggles in hands)
- Check altitude, air traffic, & position over ground.
- Look right, ensure clear airspace, and perform a 90° right front riser turn (keep toggles in hands).
- Check altitude, air traffic, & position over ground.
- Look left, ensure clear airspace, and perform a 90° left front riser turn (keep toggles in hands).
- Check altitude, air traffic, & position over ground.
- Look right, ensure clear airspace, and perform a 180° right front riser turn (keep toggles in hands).
- Check altitude, air traffic, & position over ground.
- Look left, ensure clear airspace, and perform a 180° left front riser turn (keep toggles in hands).
- Check altitude, air traffic, & position over ground.
- Look right, ensure clear airspace, and initiate a sharp, deep right front riser turn, raise it back up halfway to decrease the turn rate, and then pull the riser fully down again to begin the turn again in attempt to increase the rate of the turn (keep toggles in hands).
- Check altitude, air traffic, & position over ground.
- Look left & repeat the same maneuver to the left.
- Complete all front riser maneuvers by 2,000 feet. (These maneuvers can be waived if too difficult.)
- Follow planned pattern over landing area or alternate. Prepare to PLF on final at 300 feet.
- Flare at head height to land.
- Coach measures your landing distance from a planned target. (Must safely land within 65 feet of the planned target unassisted in order to pass.)

Advancement Criteria

Exit and Freefall

- Two dive-and-docks with minimum assistance
- Breakoff at planned altitude without prompting
- Track at least 100' within 10° of 180° heading

Equipment

- Disassemble, perform owner maintenance, and reassemble three-ring release system
- Remove, adjust, and replace a main container closing loop

Canopy

- Perform at least one left 90° and one right 90° front riser turn (may be waived if too difficult)
- Perform at least one left 180° and one right 180° front riser turn (may be waived if too difficult)
- Total of five unassisted landings within 65 feet of the target (A-License requirement)
- Should be standing up landings consistently.

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USPA A-License Exam Guidelines

1. The examining USPA Instructor conducts a 50-question written USPA-developed A-License exam & an oral quiz of at least 20 questions taken from the USPA Integrated Student Program syllabus, especially the "Rules and Recommendations" & "Book Stuff" sections of the SIM, with emphasis on the following:
   a. cloud clearance and visibility requirements (table in FAR 105.17)
   b. equipment operation and maintenance (SIM Section 5-3)
      (1) wing loading and its effects (SIM Section 4, ISP Category C, B.1; and SIM Section 5-3.B)
      (2) closing loop (SIM Section 4, ISP Category H, D.3)
      (3) Velcro and tuck flaps (SIM Section 4, ISP Category G, D.1)
      (4) packing and authorization to pack (FAR 105.43.a and .b)
      (5) maintaining automatic activation devices (FAR 105.43.c)
   c. canopy flight (SIM Section 6-10)
      (1) traffic patterns and collision avoidance (SIM Section 5-1.H)
      (2) braked turns and obstacle avoidance (SIM Section 5-1.F)
      (3) low turn avoidance and recovery (SIM Section 5-1.I)
      (4) downwind landing procedures (SIM Section 4, ISP Category C, B.7)
      (5) obstacle landing emergency and recovery procedures (SIM Section 5-1.F)
   d. aircraft procedures (SIM Section 5-6)
      (1) during jump run and exit to observe balance limits (SIM Section 5-6)
      (2) distance between groups to maintain separation (SIM Section 5-7.C)
      (3) aircraft emergency procedures (SIM Section 4, ISP Category A, D)
   e. group freefall and breakoff recommendations (SIM Section 6-1; and SIM Section 6-2.E.5)
   f. parachute emergency procedures (SIM Section 5-1.E)
      (1) deployment malfunctions
      (2) cutaway decide-and-act altitude
      (3) two-canopies-deployed scenarios
   g. accountability for FAR compliance (SIM Section 9-1)
      (1) All sections of FAR Part 91 listed that pertain to skydiving (including .7, .107.A, and .211.A)
      (2) FAR Part 65 Sections 65.125, 65.127, 65.129, 65.131, and 65.133
      (3) FAR Part 105 (including Sections 105.13, 105.15, 105.17, 105.23, and 105.43)

2. The examining USPA Instructor conducts or arranges the review training required for the student to answer all questions correctly.

3. The examining USPA Instructor conducts a skydive with the applicant to verify practical knowledge in the following areas:
   a. choosing the spot and selecting and guiding the pilot to the correct exit and opening point in routine conditions
   b. pre-jump equipment checks for self and others
   c. planning an effective group breakoff
   d. right 360, left 360, and a back-loop
   e. docking from 20 feet
   f. breakoff altitude recognition and tracking for a minimum of 100 feet
   g. signal before deployment and overall awareness during and after deployment
   h. planning and flying a logical landing pattern that promotes a smooth traffic flow and avoids others
   i. packing and preparing equipment for the next jump

4. Once the student has successfully completed the A-License check dive, answered all questions correctly on the oral exam, and passed the written exam with a score of at least 75%, the certifying USPA Instructor may sign the student's A-License Proficiency Card or the approved equivalent and apply the official USPA A-License stamp as proof of license qualification.

5. The card is then considered a valid USPA A-License for a 60-day time period.

6. The completed card must be submitted to USPA Headquarters for processing to be considered a valid license beyond the 60-day time period.

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A-License Check Dive

Must be conducted by a current USPA AFF Instructor

- Select the correct equipment and ensure it is appropriately sized and adjusted for this specific jump.
- Calculate the current wing loading on the selected canopy size using the exit weight while fully geared.
- Plan an appropriate landing pattern based on the current wind conditions.
- Calculate the appropriate opening point and exit point based on the current winds aloft forecast.
- Perform a full equipment check using a checklist before donning the equipment.
- Properly determine the appropriate boarding order based on group sizes and disciplines.
- Perform the three checks of three & request gear check from the instructor prior to boarding the plane.
- Perform a full equipment check on the instructor. (Be sure to ask for permission first.)
- Protect all three operation handles while in and around the aircraft. Check them before the door opens.
- Correctly fasten the seatbelt to the parachute harness and unbuckle it at 1,000' before the door opens.
- Perform the three checks of three & request a pin check from the instructor about 3,000' prior to exit.
- Ask the instructor if he or she would like you to perform a pin check on his or her parachute system.
- Remain forward in the aircraft to maintain balance until the preceding group exits the aircraft.
- Correctly spot the aircraft and verify the exit point that was predetermined on the ground **(spot must be correct in order to pass)** with the instructor. Check for the green light before exiting the aircraft.
- Instructor climbs out into a rear-float exit position and checks with student to ensure readiness to exit (make eye contact, give a smile, a head nod, and a thumbs-up to signal readiness to instructor).
- Instructor gives a leg count and exits stable while facing line of flight to watch student's diving exit.
- Dive out of the plane after waiting one second after the instructor exits **(must be stable w/in 5 sec)**.
- Wait the appropriate amount of time after the previous group has left the plane before exiting (determined based on current ground speed of jump run and the size of the previous group).
- Hold a slow-fall body position for two to three seconds after exit to arrest forward throw from aircraft.
- Initiate a dive and stop on level 20 feet out in front of the instructor. **(Must not overshoot to pass.)**
- Check altitude. Move forward using start, coast, and stop and dock gently on the instructor's arms.
- Check altitude. Back up and stop five feet away in front of the instructor while facing the instructor.
- Check altitude. Demonstrate a 360° right turn. **(Must stop within 45° of original heading to pass.)**
- Check altitude. Demonstrate a 360° left turn. **(Must stop within 45° of original heading to pass.)**
- Check altitude. Demonstrate a back-loop. (**Must stop w/in 60° of original heading to pass.)**
- **Must check altitude before and after every maneuver and remain on level in order to pass.**
- If any maneuvers are unsuccessful, they may be reattempted as long as remaining altitude permits.
- Initiate breakoff at the appropriate altitude (this must be correctly predetermined on the ground to allow enough time to gain adequate separation for a safe deployment) by turning 180° away from the center point between the instructor. **(This must be done without prompting in order to pass.)**
- Track straight for **five seconds** to achieve a minimum horizontal separation distance of **100 feet** while maintaining the correct heading. **(Must track within 10° of the 180° heading in order to pass.)**
- Wave-off by 3,500' and deploy by 3,000'. **(Must do so on time and while stable in order to pass.)**
- Safely follow the pre-planned pattern that was correctly predetermined on the ground.
- Make any necessary corrections based on the current wind conditions while at a safe altitude to do so.
- **Must safely land w/in 30° into the wind, or the planned direction if no wind, in order to pass.**
- Prepare for a PLF once on final at 300 feet and properly flare at the correct height and attempt a safe stand-up landing only if you touch down softly, are in control of all variables, and are confident that you can remain comfortably on your feet. **(Must stand up landing safely in order to pass.)**
- Land within 65 feet of the planned target. **(Must do so safely in order to pass.)**
- Properly stow the toggles and daisy chain the lines and safely return to the hangar.

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Presenting a Completed A-License Proficiency Card

1. The completed A-License Proficiency Card signed by the certifying USPA Instructor and bearing the official A-License stamp is proof of a valid USPA A-License for 60 days.
2. An A-License holder may permanently register the license with USPA by sending a copy with the appropriate license registration fee:
   a. Fax both sides of the completed license application to USPA with a credit card authorization.
   b. Photocopy both sides of the completed license application and mail it with payment.
   c. Scan and email a copy of the card to safety@uspa.org
   d. A completed and signed A-License application need not be stamped to be registered with USPA (USPA keeps a copy of all USPA Instructor signatures on file); however, an A-License Proficiency Card is not considered official unless stamped or until an A-License number is issued.
3. Once a new A-License has been registered with USPA, the applicant will receive a new membership card with the license number, which is also published in Parachutist Magazine.

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Hand Signals

Note: If your instructor/s is/are shaking you in freefall, ARCH and RELAX!

Check Arms
(Verify 90° angles at elbows & shoulders)

Extend Legs Out to 45°
(4”-6”, slow and smooth)

Bring Legs In to 45°
(4”-6”, slow and smooth)

Circle of Awareness
(Check Altitude)

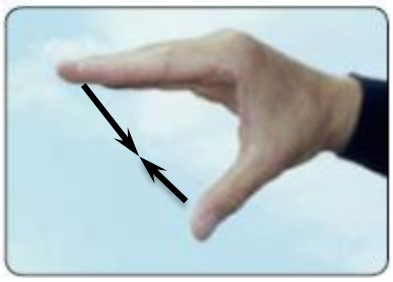
Relax and Breathe

Arch
(Push Pelvis Forward)

Open Hand
(Release Pilot Chute)

Pull Immediately!

Spread Knees Farther Apart
(to shoulder width)



Two Toe Taps (if done quickly at least twice consecutively with finger-thumb contact);
or
Bring Knees Closer Together (if done slowly without finger-thumb contact)

Practice Pilot Chute Touch

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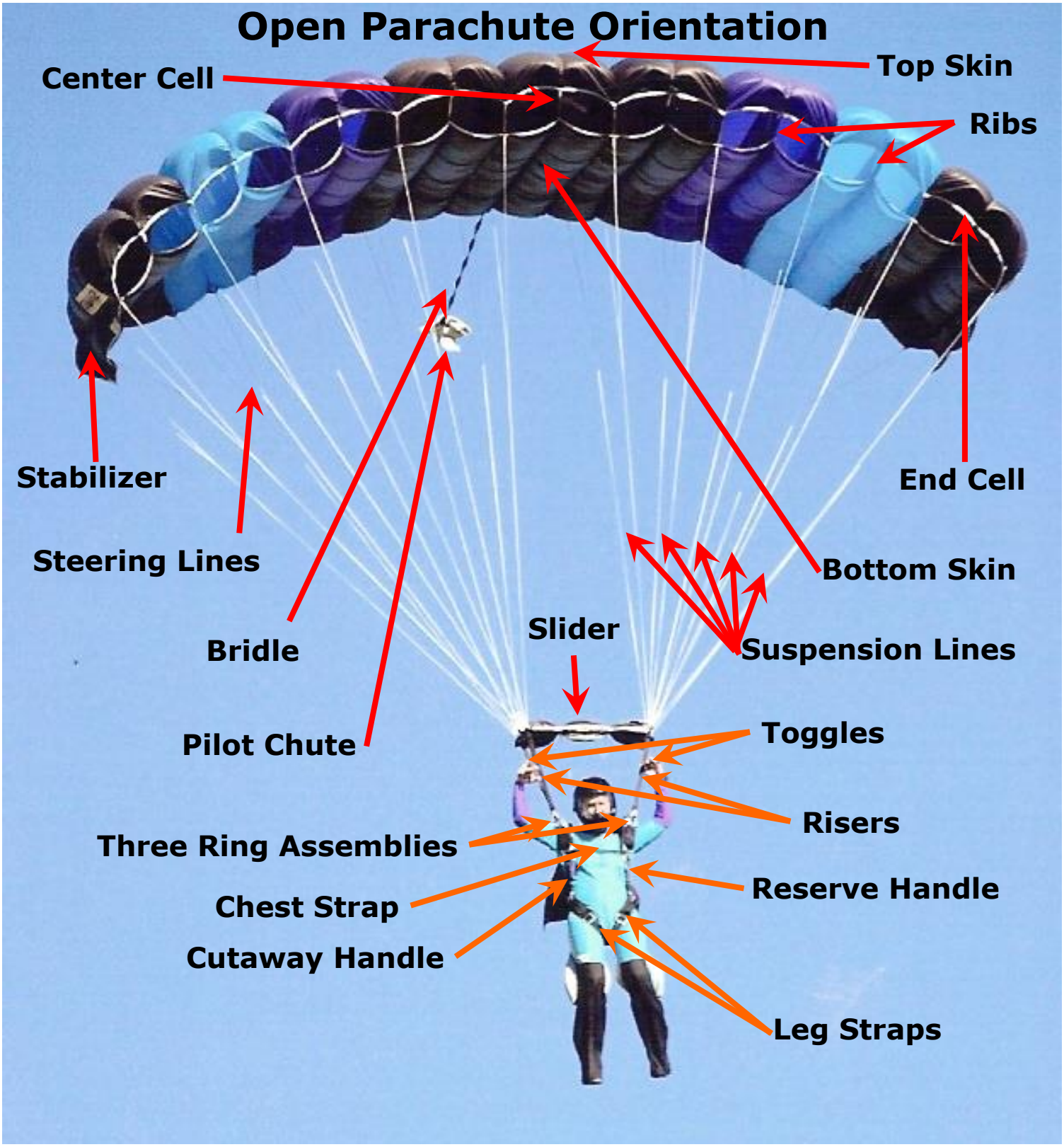
Open Parachute Orientation



Jumper: Tristan Donley
Photo By: Mike Ashley

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Aerial Photo Overview

Start Skydiving Landing Safety Rules

- Avoid crossing the paved runway below 1,000 feet.
- Avoid the ends of all runways below 2,000 feet.
- Avoid landing on any runway, including the grass strip.
- Always look both ways before crossing any runways, both in the air and on the ground.
- Only 90° turns are permitted unless cleared by S&TA.
- Landing in the B, C, & D-license areas:
  - Follow the landing direction signs, fly the set pattern, and land parallel with the runway.
  - If landing to the southwest with hangars on the left, fly a left-handed landing pattern.
  - If landing to the northeast with hangars on the right, fly a right-handed landing pattern.

Freefall Time Table

FREEFALL TIME TABLE						
Recommended Exit Altitude (in Feet AGL) with Pack Opening at 3,000 Feet Above Drop Zone	Length of Freefall (in Feet)	Estimated Freefall Time in Seconds (with Average Terminal Velocity of Given Orientation)				
		165 MPH	120 MPH	109 MPH	98 MPH	50 MPH
3,500	500	6	6	6	6	10
4,000	1,000	8	9	10	10	17
4,500	1,500	11	12	13	14	24
5,000	2,000	13	15	16	17	31
5,500	2,500	15	18	20	21	37
6,000	3,000	17	21	23	24	44
6,500	3,500	19	24	26	28	51
7,000	4,000	21	26	29	31	58
7,500	4,500	23	29	32	35	65
8,000	5,000	25	32	35	38	71
8,500	5,500	28	35	39	42	78
9,000	6000	30	38	42	45	85
9,500	6,500	32	41	45	49	92
10,000	7,000	34	43	48	52	99
10,500	7,500	36	46	51	55	105
11,000	8,000	38	49	54	59	112
11,500	8,500	40	52	57	62	119
12,000	9,000	42	55	61	66	126
12,500	9,500	44	58	64	70	133
13,000	10,000	46	60	67	73	140
13,500	10,500	48	63	70	76	146
14,000	11,000	50	66	73	80	153
14,500	11,500	52	69	76	83	160
15,000	12,000	55	72	80	87	167
15,500	12,500	57	75	83	90	174
16,000	13,000	59	77	86	93	183
16,500	13,500	61	80	89	97	190

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Glossary

A

A-License: The first level license that signifies that a skydiver has advanced beyond the student phase. Persons holding a USPA A-License are able to jumpmaster themselves, perform basic group freefall jumps and water jumps, participate in certain USPA collegiate competition events, and pack their own main parachute.
AAD: (See **Automatic Activation Device**)
Accelerated Freefall (AFF), USPA: A harness-hold freefall skydiving-student training discipline developed under Ken Coleman and adopted by USPA. AFF-rated USPA Instructors accompany the student in freefall during the initial training jumps.
AGL: Above ground level. Refers to altitude, e.g., 5,000 feet AGL.
Aircraft: Any machine or device, including airplanes, helicopters, gliders, balloons, etc., capable of atmospheric flight. For the purposes of regulation, parachutes are not considered aircraft.
Airspeed: The speed of an airborne aircraft or parachute, relative to the air.
Alterations: Any change or modification to any part of the parachute assembly from its original manufacturer's specifications. (See also **Major Alteration** and **Minor Alteration**)
Altimeter: A device that measures height above the surface (altitude); for skydivers, typically above the intended skydiving landing area. (See also **Audible Altimeter**)
Angle of Attack: The relative pitch (leading edge up or down) angle of a wing measured between the chord line and the relative wind.
Angle of Incidence: The relative pitch (leading edge up or down) angle of a wing measured between the chord line and the horizon.
Approach Angle: (See **Glide Path**)
Appropriately Rated: (adj.) Refers to a USPA Instructor or Instructor Examiner rated in the method-specific instructional discipline necessary to perform a particular task in accordance with the BSRs.
Arch: (n.) Position skydivers use to orient the front of their torso to the relative wind. Described, it is hips forward with back arched; legs extended to 45 degrees, toes pointed; knees at shoulder width; arms bent 90-120 degrees at the shoulders and elbows and relaxed; head up.
Artistic Events: Skydiving competition events that include freeflying, freestyle skydiving, and skysurfing.
AS 8015 (Aerospace Standard 8015): Standard of tests and minimum safety and performance requirements that must be met to receive approval under technical standard order (TSO) certification. AS 8015A, the standard for TSO C-23c was adopted in 1984 to supersede NAS 804, the standard for TSO C-23b. In June 1994, AS 8015B became the standard for TSO C-23d.
Aspect Ratio: The aspect ratio of a ram-air parachute canopy is the ratio of its length (span) to its breadth (chord).
Audible Altimeter: An alarm used by skydivers to alert them about reaching one or more pre-set altitudes.
Automatic Activation Device (AAD): A self-contained mechanical or electro-mechanical device that is attached to the interior of the reserve parachute container, which automatically initiates parachute deployment of the reserve parachute at a pre-set altitude, time, percentage of terminal velocity, or combination thereof. (FAR 105 definition)
Auxiliary Parachute: (See **Reserve Parachute**)

B

B-12s: (jar.) Clip hardware sometimes used for leg-strap attachment on a parachute harness. Refers generally to the MS 22044 hardware originally used on the U.S. Army B-12 parachute assembly. (See also **Thread-Through**)
B-License: The second level USPA license. Persons holding a USPA B License are authorized to participate in the USPA collegiate 4-way formation skydiving event, perform night jumps, and when qualified, apply for a USPA Coach rating.
Bag: (n.) (See **Deployment Device**)
Bag Lock: (n.) A malfunction of a deployed parachute where the canopy remains in the deployment bag.

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B.A.S.E. Jumping: An activity involving the use of a parachute for descent from fixed objects. The acronym derives from the first initials of four possible launch categories: buildings, antennae, spans (bridges), and earth (cliffs). Because B.A.S.E. jumping does not meet the FAA's definition of "the descent of an object to the surface from an aircraft in flight," it is not regulated by the FAA or addressed by USPA.
Base: (n.) **1.** When building a freefall or canopy formation, the initial target individual or group of people to which the others fly. **2. Base (Leg):** (n.) The portion of the three-legged landing pattern where the jumper flies across the direction of the wind downwind of the landing area before turning for final approach into the wind toward the target.
Basic Safety Requirements (BSRs), USPA: Minimum standards overseen and published by USPA and generally agreed upon as the acceptable standard for safe skydiving activities. The BSRs form the foundation of self-governing by skydivers. USPA oversees the BSRs.
Belly Flying: (See **Flat Flying**)
Board of Directors (BOD), USPA: Those representatives elected by the general members of USPA every two years as set forth in the USPA By-Laws; authorized by the by laws to have general charge and control of the affairs, funds, and property of the organization and to carry out the objectives of the organization and its by-laws; elects officers from among current USPA Board members. The USPA Board of Directors consists of: 1. National Directors—those directors elected at large by the general membership; 2. Regional Directors—those Directors of a specified geographical area, elected by and responsible for representing the interests of the skydivers in a USPA Region; and 3. An ex officio member representing the National Aeronautical Association.
Braked Turn: A turn under an open parachute canopy made by using the steering toggles to slow the forward speed of the canopy and then allow one side to fly slightly faster to change heading. Used to reduce altitude loss in a turn.
Brakes: (n.) **1.** The steering controls of a ram-air parachute. (See also **Toggles**) **2.** (n.) The position of the parachute steering controls, measured in relative increments (quarter brakes, deep brakes, etc.), to control speed and descent in a stable state of flight.
Breakoff: (v.) Act of a group of jumpers separating from a freefall or canopy group.
Breakoff: (n.) Procedure in group skydiving where jumpers cease group activity and separate. In freefall, jumpers begin to track at a predetermined altitude for a clear area to open safely; jumpers building canopy formations breakoff at a predetermined altitude to gain safe separation and allow jumpers to prepare for a landing approach.
Breakoff Altitude: Planned altitude for initiating separation of jumpers during a group jump.
Bridle: The device usually made of webbing or tape that connects the pilot chute to the deployment bag or the canopy.
BSRs: (See **Basic Safety Requirements, USPA**)

C

C-License: The third level license issued by USPA. USPA C-license holders may apply when qualified for the USPA AFF, IAD, and Static-Line Instructor ratings, ride as passenger on USPA Tandem Instructor training and rating renewal jumps, and participate in intermediate-altitude jumps and open field and level 1 exhibition jumps.
Canopy: The major component of the parachute system comprised of fabric membranes that connect to the parachute harness by suspension lines and provide the means for the jumper to descend safely.
Canopy Formation (CF); Canopy Relative Work (CRW): (n.) **1.** The intentional maneuvering of two or more open parachute canopies in proximity to or in contact with one another during descent. **2.** The FAI competition discipline involving the building of canopy formations.
Canopy Release: A device that allows immediate separation of the parachute canopy and risers from the harness.
Cascade: The point where two or more lines of a canopy join into one.
Cell: (n.) A chord-wise section of a parachute canopy between the load-bearing ribs. Sometimes, any portion of a canopy separated by vertical ribs.
Certificated: (adj.) Refers to FAA-approval status of parachute components, technicians (riggers), and aircraft pilots.

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Check of Threes: Pre-jump equipment self-check performed in the aircraft: check three-ring release system (and RSL) for correct assembly; check three points of harness attachment for snap assembly or correct routing and adjustment; check three operation handles—main activation, cutaway, reserve—in place.
Chord: (n.) The longest dimension from the front to the back of a wing at any given point along the span.
Chute Assis: (n.) French for "falling seated," a freeflying orientation credited to that country. (See also **Sit Flying**)
Cleared: (adj.) Refers to a student who has received a signature from a USPA Instructor to advance.
Climb-Out: (n.) The act of a jumper positioning himself or herself in or near the door or on protuberances or structures outside the aircraft to prepare for launch, usually with a group.
Closing Loop: A lace that when threaded through eyelets in the parachute container flaps and locked with a closing pin, keeps the parachute contained until activation.
Coach: (n.) A non-rated operative who provides advanced skydiving training. (See also **Coach, USPA**)
Coach, USPA: (n.) The entry-level USPA instructional rating whose holder may teach the general (non-method-specific sections of the first-jump course) and conduct group freefall skills training and jumps with students, all under the supervision of a USPA Instructor.
Coach Jump: (n.) A Coach jump is any jump where a USPA Coach jumps with any person and provides instruction and/or critique to that person.
Collapsible Pilot chute: A hand-deployed pilot chute that automatically collapses after deployment.
Collapsible Slider: A slider rigged so the jumper can compress or wrap it to reduce drag. (See also **Slider**)
Container: The portion of the parachute system that closes around and stores the folded parachute canopy and deployment device until deployment.
Cork: (v.) (jar.) During high-speed group freefall maneuvers, to lose control and decelerate rapidly.
CREW: (See **Canopy Formation**)
Cross-Braced: (adj.) Refers to a canopy designed with longitudinal trussing between the vertical ribs to flatten and stiffen the wing in flight.
Cross Connectors: Straps attached between the risers. Used for canopy formation, they should be from front to rear only to prevent the docked jumper from sliding back up the lines. Especially important for plane formations. Also used with some reserve static-line systems and attached from side to side to prevent premature reserve deployment if only one riser is released.
Cross-Port: (n.) A vent cut into the structural rib of a parachute canopy to equalize air pressure between two cells.
Crosswind: Perpendicular to the direction of the wind.
CRW: (See **Canopy Formation**)
Cutaway: (n.) Procedure where the jumper releases from the main parachute prior to activating the reserve parachute. Used in the event of a main parachute malfunction to prevent an entanglement with the deploying reserve; in the event of a canopy entanglement with another jumper; and also in case the wind causes the canopy to drag a jumper after landing.
Cutaway Handle: Pillow or loop handle of a two-handled system, normally located on the jumper's right-side chest, used to initiate a cutaway. Sometimes referred to as a three-ring release handle.

D

D-License: The fourth and highest level or license issued by USPA. USPA D-license holders may participate in all competitions at the national level, apply when qualified for all USPA instructional and proficiency ratings, and participate in high-altitude jumps.
Delta: Freefall position with legs extended and arms back to initiate a forward dive.
Demonstration Jump (Demo): (See **Exhibition Jump**)
Density Altitude: An expression of air density relative to standard atmospheric pressure at sea level. The pilot calculates pressure altitude and temperature and compares the result with an equivalent altitude MSL at standard temperature.
Deployment: After activation, extraction of the parachute from the container and full extension of the system prior to inflation.
Deployment Device: An intermediate container, usually a bag (D-bag), that contains or constricts the folded parachute through complete line deployment.

Descent Rate: The downward horizontal speed of an aircraft or parachute, usually measured in feet per minute.
Diaper: A type of deployment device consisting of a fabric panel attached near the lower part of a canopy that prevents canopy inflation until full line stretch. Used frequently with round parachutes to reduce opening shock and malfunctions.
Direct Supervision: 1. The attentive oversight of an activity taking place in the immediate presence of the supervisor, who is personally responsible for the proper conduct of the activity. (USPA definition) **2.** A certificated rigger personally observes a non-certificated person packing a main parachute to the extent necessary to ensure that it is being done properly, and takes responsibility for that packing. (FAR 105 definition) (See also **Supervision**)
Dive Blocks: Hand grips (not loops) on the front risers to facilitate diving the canopy.
Dive Loops: Handles on the front risers to facilitate diving the canopy.
Diver Exit: Leaving an aircraft by diving out of the aircraft door; made without positioning or bracing to achieve a stable entry into the airstream.
Dock: (v.) To make physical controlled contact with another skydiver while in freefall; or, when building canopy formations, with another jumper's canopy.
Door Exit: (See **Diver Exit**)
Downwind: 1. (adj.) The direction toward which the air is moving. **2.** (adv., adj.) Positioned farther along the wind's path. **3.** (n., jar.) A downwind-facing landing.
Downwind leg: The portion of the landing approach flown with the wind blowing from behind the jumper.
Drogue: A trailing drag device used to retard the movement of an object through the air, used in skydiving to regulate the fall rate of tandem skydivers.
Droguefall: In tandem skydiving, the portion of the descent where a drogue has been deployed between freefall and main parachute deployment.
Drop Zone: (n.) **1.** Skydiving establishment or intended parachute landing area. (USPA definition) **2.** Any predetermined area upon which parachutists or objects land after making an intentional parachute jump or drop. The center point target of a drop zone is expressed in nautical miles from the nearest VOR facility when 30 nautical miles or less; or from the nearest airport, town, or city depicted on the appropriate Coast and Geodetic Survey World Aeronautical Chart or Sectional Aeronautical Chart, when the nearest VOR facility is more than 30 nautical miles from the drop zone. (FAR 105 definition) (See also **Sanctioned Drop Zone**)
Dual Assembly: Refers to a two-canopy parachute system. Includes the main and reserve canopies, harness and container system, and all other components.
Dummy Ripcord Pull (DRCP): (See **Practice Deployment**)
Dynamic Stall: (n.) An action that occurs following the flare of a ram-air canopy, where the load (jumper) has swung forward under the canopy from the braking action and begins to swing back. (See also **Reverse Flight** and **Stall**)

E

Elliptical: (n., adj., jar.) Refers to a class of canopies with a tapered or approximately elliptical planform.
Emergency Parachute (AKA, Bail-Out Rig): A certificated parachute that is intended for emergency use; typically, the parachute a pilot wears. (See also **Auxiliary Parachute** and **Reserve Parachute**)
End Cell: The last chord-wise section of a parachute canopy on either end.
End Cell Closure: Deflated end cell. Routine opening problem, usually correctable.
Exhibition Jump: An exhibition jump, also called a display or demonstration jump, is a jump at a location other than an existing drop zone done for the purpose of reward, remuneration, or promotion and principally for the benefit of spectators.
Exit Point: The point on the ground over which skydivers leave the aircraft.
Exit Weight: The combined weight of the jumper and all his or her equipment for that jump.
Extraordinary Skydive: (n.) Night jump, water jump, jump from above 15,000 feet MSL, exhibition jump, preplanned cutaway jump, and other jumps requiring special equipment and procedures that might be unfamiliar to most jumpers.

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F

FAA: (see **Federal Aviation Administration**)
FAI: (see **Federation Aeronautique Internationale**)
FARs: (see **Federal Aviation Regulations**)
Farmer McNasty: (jar.) Unenlightened term for a disenchanted drop zone neighbor with whom communications with jumpers are strained or have broken down.
Federal Aviation Administration (FAA): An agency of the U.S. Department of Transportation whose primary function and responsibility is to control the nation's air traffic, including the certification of all civil aircraft and accessories, licensing of all civil pilots, mechanics, and riggers, and administration of the Federal Aid to Airports Program.
Federal Aviation Regulations (FARs): The parts of the Code of Federal Regulations that apply to aviation.
Federation Aeronautique Internationale (FAI): An international organization that governs all aviation sports, certifies all official aviation and space records, and governs official international competitions. Operates through a non-profit National Aero Club in each country.
Final Approach: The final portion of flight before a jumper or aircraft lands.
Flare: 1. (v.) Under canopy: To convert the downward speed of a parachute shortly into lift. **2.** (v.) In freefall: To decelerate prior to approaching a formation. **3.** (n.) The act of flaring. **4.** (n.) A membrane used to distribute the load of a parachute at the line attachment points of some canopies.
Flat Flying: Freefall orientation primarily belly to earth.
Flat Delta: Freefall position with the body on one plane, legs extended and arms swept back, used as a starting or intermediate position when developing a track.
Floater: A jumper positioned outside the aircraft to leave slightly prior to the person or group designated as the target for the initial freefall formation (See also **Base**). A floater maneuvers from a position below the base relative to the horizon.
Foreign Parachutist: A parachutist who is neither a U.S. citizen nor a resident alien and is participating in parachute operations within the United States while using parachute equipment not manufactured in the United States. (FAR 105 definition)
Formation Skydiving (Relative Work): 1. Aerial maneuvers by two or more freefalling skydivers with each other, usually to form geometric formations. **2.** Competition discipline of flat flying.
Freefall: The portion of a parachute jump or drop between aircraft exit and parachute deployment in which the parachute is activated manually by the parachutist at the parachutist's discretion or automatically, or, in the case of an object, is activated automatically. (FAR 105 definition)
Freefly: (v.) To exit unlinked with other jumpers.
Freeflying: (n.) **1.** An unrestricted freefall discipline characterized by varied presentations to the relative wind. (See also **Sit Flying** and **Head Down**) **2.** (n.) The competition event of freeflying.
Freestyle: 1. A solo freefall discipline that involves choreographed multi-orientation static and dynamic maneuvers. **2.** The competition event of freestyle performed as part of a team with a camera flyer (freestyle skydiving).
Full Flight: The stabilized state of hands-off canopy flight under an open and fully functioning parachute.
Funnel: (n., v.) A freefall skydiving formation which has become unstable, usually due to one or more jumpers flying out of position, causing the participants to collapse the formation and land on top of each other.

G

Glide: (n., v.) The combined horizontal and vertical movement of a descending canopy.
Glide Angle: (See **Glide Path**)
Glide Path: The trajectory of a parachute as it descends in flight towards a landing point on the ground.
Go-Around: (n., jar.) An in-flight operation where the aircraft circles at jump altitude.
Governance Manual, USPA: The official bound collection of the USPA Constitution and By-Laws.
Ground Speed: The speed of an airborne aircraft or parachute relative to the ground it traverses in a given period.

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H

Hand-Deployed Pilot Chute: A small parachute thrown by hand in freefall to extract the main parachute from its container. (See also **Pull Out** and **Throw Out**)
Harness: (n.) The webbing of a parachute system that surrounds and retains a jumper.
Harness and Container System: The major component of a parachute system, usually unitized, which the jumper dons for the jump. It contains the canopies and certain accessory devices.
Harness Hold: A skydiving training discipline where a student is trained for independent, solo freefall but is accompanied by at least one USPA AFF Instructor until meeting the requirements in the BSRs for self-supervision in freefall. On the initial jumps, the AFF Instructor(s) assist the student on exit via a harness grip.
Head Down: (adj., adv.) Inverted vertical or nearly vertical freeflying orientation.
Hook Knife: A hook-shaped knife with an inside cutting edge. Used in certain emergencies to sever problem lines or components of a parachute system.
Hook Turn: (jar.) A canopy-maneuver that results in a steep dive.
Horseshoe: (n.) A partial parachute malfunction where part of the deployed parachute is entangled with the jumper or his or her equipment.

I

IAD: (see **Instructor -assisted deployment**)
Instructor, USPA: The holder of a USPA Instructor rating qualified in one or more of four methods of instruction: USPA Accelerated Freefall, instructor-assisted deployment, static line, or tandem. The mid level of the USPA instructional rating hierarchy. A USPA Instructor may train and certify a student for the USPA A-License, supervise USPA Coaches, and is eligible for appointment as USPA Safety & Training Advisor.
Instructor-Assisted Deployment (IAD): A method of passive deployment used for training skydiving students making their initial jumps. A USPA IAD Instructor controls a hand-deployed pilot chute while a student moves into position and jumps, at which point the instructor releases the pilot chute.
Instructor Rating Course, USPA: A course registered with USPA Headquarters to train, qualify, and test applicants for the USPA Instructor rating.
Instructor Examiner (I/E), USPA: The highest level of the instructional rating program. An I/E is an experienced USPA Instructor who has met additional proficiency requirements and passed a series of written examinations on a wide variety of skydiving related subjects. An I/E has all of the privileges of a USPA Safety & Training Advisor.
Instructional Rating Manual (IRM), USPA: The manual containing the collected documents and references required to conduct any course for USPA Coach or USPA Instructor ratings.

J

Judge: The official who evaluates a competitor's performance. USPA issues judge ratings at both the Regional and National levels. The FAI issues a rating for internationally recognized judges.
Jump Altitude: Actual altitude of an aircraft above the ground at the time a skydiver exits.
Jump Run: The flight of the aircraft prior to exit, generally following a predetermined path.
Jumpmaster: (n.) **1.** A skydiver, typically a senior jumper or instructional rating holder, who coordinates boarding and exit order, jump flight procedures, spotting, and emergency operations with the pilot. **2.** (v.) To dispatch jumpers. **3.** (n.) Prior to 2002, a USPA instructional rating for supervising student jumps.

L

Landing Pattern: (n.) The deliberate flight path, usually rectangular, that a jumper uses in the final phase of descent under canopy.
Line Dock: The docking of two canopies with the docker's canopy above the head of the person receiving the dock.
License: Certificate of proficiency recognizing that a skydiver has met a specified level of experience, skill, and knowledge. There are four classes of USPA licenses: A, B, C, and D. USPA licenses are recognized internationally through the FAI.

Line Twist: (n.) A condition of parachute opening where the canopy has attained full or nearly full inflation but one or more complete twists have developed in the lines and/or risers. Can be dangerous when associated with a spin.
Line-Over: (n.) A partial malfunction of a deployed parachute resulting in lines going over the top of the canopy. Also refers loosely to the partial inversion of a round canopy. (See also **Partial Inversion**)

M

Mae West: (n., jar., archaic) WWII term for partial inversion. (See also **Partial Inversion**)
Main Parachute: A parachute worn as the primary parachute used or intended to be used in conjunction with a reserve parachute. (FAR 105 definition)
Maintenance: Inspection, overhaul, repair, preservation, and replacement of parts.
Major Alteration: An alteration not listed in the manufacturer's specifications that might appreciably affect weight, structural strength, performance, flight characteristics, or other qualities affecting airworthiness or that cannot be done by elementary operations. (See also **Alteration)**
Major Repair: A repair that if improperly accomplished may affect weight, structural strength, performance, flight characteristics, or other qualities that determine airworthiness.
Malfunction: The complete or partial failure of a parachute canopy to accomplish proper opening, descent, or flight characteristics.
Master Rigger: The higher of two certification levels for FAA riggers. May perform more complex repair tasks and approved alterations. (See also **Senior Rigger**)
Mentor (Skydiving): An experienced skydiver, usually D-licensed, who can offer advice and guidance on skydiving related matters to jumpers with less experience.
Mini Three-Ring: Refers to a scaled-down version of the original three-ring release system. (See also **Three-Ring Release**)
Minor Alteration: An alteration other than a major alteration. (See also **Alteration** and **Major Alteration**)
Minor Repair: A repair other than a major repair. (See also **Major Repair**)
MSL: Altitude measured from sea level.

N

NAA: (See **National Aeronautical Association**)
NAS 804 (National Aircraft Standard 804): defines the tests, minimum performance, and safety standards that must be met for a parachute to receive approval under TSO C-23b. Adopted in 1949 and superseded in 1984 by AS 8015A.
National Aeronautic Association (NAA): The National Aero Club of the USA that represents the FAI. USPA is a division of the NAA.
National Director: (See **Board of Directors**)
Night Jump: A skydive made from one hour after official sunset to one hour before official sunrise. The FAA considers any jump made after sunset and before sunrise to be a night jump that requires equipment specified in FAR 105.
NOTAM (Notice to Airmen): An air traffic advisory or notice filed with an FAA Flight Service Station by an airspace user.

O

Object: Any item other than a person that descends to the surface from an aircraft in flight when a parachute is used or is intended to be used during all or part of the descent. (FAR 105 definition)
Open Body of Water: A body of water in which a skydiver could drown.
Opening Point: The ground point of reference over which the skydiver opens the parachute.
Opening Shock: (jar.) The decelerating force exerted on the load as the parachute deploys and inflates. Caused by the resistance of the canopy and items associated with it.
Oscillation: 1. The swinging or pendulum motion of the suspended load under a canopy. **2.** In canopy formation, the swaying or swinging of a formation caused by poor docking, turbulent air, or too much movement of the people in the formation.
Outboard: Facing to the outside, such as a ripcord facing to the side of the jumper rather than toward the breastbone.

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P

Pack: (v.) To fold and close a parachute system in preparation for jumping.
Parachute: A fabric device that slows the descent of a falling object; derived from the French words "para," to shield, and "chute," to fall. Thus, parachute literally means, "to shield from a fall."
Parachute Drop: The descent of an object to the surface from an aircraft in flight when a parachute is used or intended to be used during all or part of that descent. (FAR 105 definition)
Parachute Jump: A parachute operation that involves the descent of one or more persons to the surface from an aircraft in flight when a parachute is used or intended to be used during all or part of that descent. (FAR 105 definition)
Parachute Landing Fall (PLF): (n.) A method developed by the U.S. military to minimize the chance of injury from a hard landing under parachute. The jumper distributes the force of the landing in an orderly manner over the most robust areas of the body.
Parachute Operation: The performance of all activity for the purpose of, or in support of, a parachute jump or a parachute drop. This parachute operation can involve, but is not limited to, the following persons: parachutist, parachutist in command and passenger in tandem parachute operations, drop zone or owner or operator, jumpmaster, certificated parachute rigger, or pilot. (FAR 105 definition)
Parachutist: A person who intends to exit an aircraft while in flight using a single-harness, dual parachute system to descend to the surface. (FAR 105 definition) (See also **Skydiver**)
Parachutist in Command: The person responsible for the operation and safety of a tandem parachute operation. (FAR 105 definition) Not necessarily a USPA instructional rating holder.
Paragliding (also Parapente): (n.) An activity involving the use of a ram-air inflated wing, resembling a parachute, for gliding. Flights typically initiate by foot launching from a hill or from a ground-based tow. Because paragliding jumping does not meet the FAA's definition of "the descent of an object to the surface from an aircraft in flight," it is not regulated by the FAA or addressed by USPA.
Partial Inversion: An inflation malfunction of a round canopy where one side passes through and inflates between two lines of the other side, resulting in two inflated lobes. (See also **Line-Over**)
Passenger Parachutist: A person who boards an aircraft, acting as other than the parachutist in command of a tandem parachute operation, with the intent of exiting the aircraft while in flight using the forward harness of a dual harness tandem parachute system to descend to the surface. (FAR 105 definition) USPA further defines a passenger parachutist as either a licensed skydiver or a tandem student.
Permeability: The amount or volume of air that can pass through a fabric assembly.
Pilot Chute: A small parachute used to initiate and/or accelerate deployment of a main or reserve parachute. (FAR 105 definition)
Pilot Chute Assist: A method of rigging a static line to a parachute where the static line opens the container and positively extracts the pilot chute before separating from the system. Typically, a Velcro strip or break cord of known strength is used.
Pin: 1. (v.) To fly to another jumper and take grips on the jumper (freefall) or canopy (canopy formation). **2.** (n.) The first jumper to make contact with the base, or target jumper, to begin a formation. **3.** (n.) Retaining device that when passed through a closing loop, locks the parachute system closed until activation.
Pin Check: (n., jar.) Pre-jump inspection of the parachute.
PLF: (See **Parachute Landing Fall**)
Plane: (n.) A compressed vertical canopy formation.
Planform: The shape or footprint of a wing surface.
Planing: (v.) The act of compressing a parachute stack.
Poised Exit: A departure from an aircraft wherein the jumper uses an external structure as a brace to assist in gaining a stable position immediately upon leaving the aircraft.
Porosity: The ratio of open area to closed area in a fabric. Graded as high, low, or zero. Tightly woven and treated material has a lower porosity than loosely woven material.
Practice Deployment: An in-air exercise used to learn how to locate and operate a parachute deployment handle prior to opening. It may consist of pulling or throwing a practice or dummy handle (instructor-assisted deployment or static-line jumps) or touching the actual deployment handle in freefall or tandem drogue-fall.
Premature Opening: Unintentional opening of a parachute.

Projected Landing Point: The expected landing spot on the ground, based on the glide path of the parachute.
Prop Blast: 1. (n.) The airflow created by a propeller that is developing thrust. **2.** (n., jar.) relative wind on exit.
Pud: (n., jar.) A soft handle with an aerodynamically low profile that is ergonomically designed to fit into a clenched fist. Used for various parachute operation handles.
Pull Out: (n.) A type of hand-deployed parachute activation system. The jumper pulls a handle connected to the container closing-pin and the internally packed pilot chute. (See also **Hand-Deployed Pilot Chute**)
Pull-Up Cord: A packing aid used to thread the closing loop through eyelets in the container and removed once the closing pin is inserted.

R

Ram-Air Parachute: A parachute with a canopy consisting of an upper and lower surface that is inflated by ram air entering through specially designed openings in the front of the canopy to form a gliding airfoil. (FAR 105 definition)
Rating Renewal Seminar, USPA: A meeting of USPA instructional rating holders to exchange information, to introduce and discuss new ideas, and to develop, improve, or assure the quality of skydiving instruction.
Recommendations, USPA: Principles, policies, and concepts applicable to skydiving or a related subject that are derived from experience or theory, compiled by USPA, and offered for guidance.
Regional Director, USPA: Members of the USPA Board elected from a specified geographical area and responsible for representing the interests of the skydivers in that USPA Region.
Relative Wind: The relative airflow opposite a body's trajectory, irrespective of the horizon.
Relative Work (RW): (See **Formation Skydiving**)
Reserve Parachute: An approved parachute worn for emergency use to be activated only upon failure of the main parachute or in any other emergency where use of the main parachute is impractical or use of the main parachute would increase risk. (FAR 105 definition)
Reserve Static Line (RSL): A connection between the main risers and the reserve activation system intended to initiate reserve activation following the release of a deployed main parachute.
Reverse Flight (Full Stall): A non-flying canopy maneuver that collapses the canopy and may cause it to spin. Results from depressing the toggles until the trailing edge is lower than the leading edge. May result in an unrecoverable malfunction. (See also **Stall** and **Dynamic Stall**)
Rib: A vertical and longitudinal fabric membrane that forms the airfoil shape and primary structure of a ram-air canopy.
Rig: (jar.) **1.** (n.) The complete parachute system used for skydiving. **2.** (v.) The act of maintaining, repairing, or modifying a parachute system. **3.** (v.) To don a parachute (**Rigging Up**).
Rigger: An FAA-certificated parachute technician. (See also **Master Rigger** and **Senior Rigger**)
Ripcord: An assembly, usually constructed with a metal cable that, when pulled, activates an operation on a parachute system.
Riser(s): Webbing straps that connect the main lift webs of the parachute harness to the lines of the canopy.
Riser Dock: In canopy formation, a momentum dock that puts the risers into the hands of the receiver. A very advanced technique.
Riser Loops; Riser Blocks: Gripping loops or devices on a riser that make it easier to grasp.
RSL: (See **Reserve Static Line**)

S

Safety & Training Advisor (S&TA), USPA: A local person appointed by the USPA Regional Director as his or her representative and who is available to provide advice and administrative assistance as the USPA representative at an individual drop zone or specified area.
Sanctioned Drop Zone: A drop zone that has been verified by a USPA Safety & Training Advisor or a USPA Regional Director as complying with the minimum drop zone requirements as stated in the USPA Basic Safety Requirements section of the USPA Skydiver's Information Manual. (See also **Drop Zone**)

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Self-Supervision: The point within a student's training when he has been cleared by a USPA Instructor to jump without instructor supervision but has not yet completed all of the requirements for the USPA A-License. *See Category E: Introduction of the Integrated Student Program.*
Senior Rigger: The initial certification level for FAA riggers that allows its holder to pack and maintain a parachute system and perform simple repairs. (See also **Master Rigger**)
SIM: Abbreviation for the USPA Skydiver's Information Manual. (See **Skydiver's Information Manual**)
Single-Harness, Dual-Parachute System: The combination of a main parachute, approved reserve parachute, and approved single-person harness and dual-parachute container. This parachute system may have an operational automatic activation device installed. (FAR 105 definition)
Single Operation System (SOS): Refers to a parachute harness and container operation system with a combined single-point riser release and reserve ripcord handle. Pulling one handle will both release the risers and pull the reserve. (See also **Two-Handled System**)
Sit Flying: Upright vertical freefly orientation based on a seated position. (See also **Chute Assis**)
Skyboard: (See **Surfboard**)
Skydive: 1. (n.) The descent of a person to the surface from an aircraft in flight when he or she uses or intends to use a parachute during all or part of that descent. **2.** (v.) To jump from an aircraft with a parachute.
Skydiver: A person who engages in skydiving.
Skydiver's Information Manual (SIM), USPA: The official bound collection of the USPA Basic Safety Requirements, USPA recommendations, relevant FAA references, and other USPA policies and programs that affect the majority of skydivers.
Sky-Surfer: A skydiver who jumps with a surfboard (skyboard).
Skysurfing: 1. A freefall skydiving discipline using a specially rigged surfboard (skyboard). **2**. The competition event by that name.
Slider: A device that controls a canopy's inflation by progressively sliding down the suspension lines during inflation. Found on most ram-air canopies.
Slinks: A type of Spectra fabric connector link developed by Performance Designs, Inc., for attaching the lines of the parachute to the risers.
Solo Jump: A jump where a skydiver is not engaged in formation skydiving.
Solo Jumper: A skydiver who is not engaged in formation skydiving.
Solo Skydiver: (See **Solo Jumper**).
Solo Student: A skydiving student who uses a single harness, dual-parachute system.
SOS: (See **Single Operation System**)
Span: The dimension of a wing measured from tip to tip.
Spotting: Selecting the correct ground reference point over which to leave the aircraft, selecting the course for the aircraft to fly, and directing the pilot on jump run to that point.
Stability: That property of a body that causes it, when its equilibrium is disturbed, to develop forces or movements tending to restore the original condition. In skydiving, control of body position during freefall.
Stable Freefall Position: A position attained by a freefalling skydiver in which only controlled, planned movements are made.
Stack: A vertical canopy formation with the jumpers gripping the canopy or lines just below the canopy.
Stall: (n.) The state of canopy flight control characterized by decreased glide and increased rate of descent. (See **Dynamic Stall** and **Reverse Flight**)
Static Line: A line of cable or webbing, one end of which is fastened to the parachute, the other to some part of the aircraft, used to activate and deploy or partially deploy the parachute as the load falls away from the aircraft.
Static Line Jump: A parachute jump during which a static line is used to deploy or partially deploy the parachute. Used for training student skydivers.
Step-Through: (See **Thread-Through**)
Student: A skydiver trainee who has not been issued a USPA A-License.
Supervision: The general oversight of an activity that takes place where the supervisor is readily available for counsel and direction and who is responsible that the activity is satisfactorily completed. (See **Direct Supervision**)
Surfboard (Skyboard): (n.) A rigid panel, similar to a snowboard, attached to a jumper's feet.

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Suspension Lines: Cords attached from the bottom of the parachute canopy to the risers that distribute and suspend the weight of a skydiver under the inflated canopy.
Swoop: 1. (v.) To rapidly dive toward and then make a controlled approach relative to a target. **2.** (n.) The controlled flight from above of one body to meet or fly close to another body, a stationary object, or the ground.
Swoop Pond; Swoop Ditch: A water obstacle used as a high-performance landing area.

T

Tandem Jump or **Tandem Skydive:** Any skydive made using a tandem parachute system with a tandem student or licensed skydiver attached.
Tandem Jumping: A method of skydiving, typically used for training student skydivers or introducing newcomers to the sport, where one jumper shares a tandem parachute system with another.
Tandem Parachute Operation: A parachute operation in which more than one person simultaneously uses the same tandem parachute system while descending to the surface from an aircraft in flight. (FAR 105 definition)
Tandem Parachute System: The combination of a main parachute, approved reserve parachute, and approved harness and dual parachute container, and a separate approved forward harness for a passenger parachutist. This parachute system must have an operational automatic activation device installed. (FAR 105 definition)
Tandem Student: Any person making a tandem skydive who has not been issued a USPA license.
Target: The landing area on a drop zone. For officially sanctioned competition, a three-centimeter disk.
Technical Standard Order (TSO): Issued by the FAA, requires compliance with minimum performance standards and specifications for material and products. Parachute specifications are referenced in TSO-C23.
Terminal Velocity: The equilibrium velocity that a freefalling body can attain against the resistance of the air. The greatest speed at which a body falls through the atmosphere.
Thread-Through (Step-Through): (n., jar.) A leg strap configuration on a parachute harness that uses a single piece of adjustable hardware. The leg strap must be unthreaded to be disconnected, or the jumper simply steps into the connected leg straps when donning the rig. (See also **B-12s**)
Three-Ring Release: A type of single point release invented by Bill Booth. The system is based on three interlocking rings on each riser held in place by a small loop that is retained by a cable. Pulling one handle releases both main risers simultaneously or nearly simultaneously.
Throw Out: 1. (n., adj.) A type of hand-deployed parachute activation system. The pilot chute is folded into an external pouch, extracted, and thrown. A curved closing pin or equivalent locking device on the bridle is extracted as jumper falls away from the pilot chute and bridle, allowing the container to open. (See also **Hand-Deployed Pilot Chute**) **2.** (v., jar.) To initiate deployment.
Toggles: (n.) Handles attached to the ends of the steering lines of a parachute canopy. (See also **Brakes**)
Track: 1. (n.) A freefall position with the legs fully extended, knees locked, arms swept back, elbows locked, and torso fully extended and slightly bowed forward to achieve the maximum horizontal speed. **2.** (v.) To move at maximum horizontal speed in freefall.
Trim Tabs: A front riser pulley system for adjusting a canopy's angle of incidence or flight attitude.
TSO-C23: (See **Technical Standard Order**)
Turbulence: Disturbed air that can affect canopy flight and integrity.
Two-Handled System: Refers to a parachute harness and container operation system that uses separate handles for the canopy release and for reserve activation. (See **Single Operation System**)

U

United States Parachute Association (USPA): A not-for-profit, voluntary membership association of skydivers whose purpose is promoting and representing skydiving. As a division of the NAA, it is the official representative of the FAI for skydiving in the U.S.
Upwind: The direction from which the wind is blowing.

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W

Waiver: (n.) **1.** Exception to the BSRs filed by a USPA official indicated in SIM Section 2-2. **2.** (jar.) A liability release.
Water Jump: (n.) A skydive which includes intentionally landing in an open body of water.
Whuffo: (n., jar.) Term for a non-skydiver. ("Whuffo you jump out of airplanes?") Considered insensitive.
Wind Drift Indicator (WDI): (n.) A device used to determine the wind drift that a descending parachute will experience, so constructed as to descend at a rate comparable to a skydiver of average weight descending under a fully deployed main canopy of average specifications. Usually, a weighted strip of crepe paper 10 inches wide and 20 feet long.
Wing Loading: (n.) The jumper's exit weight divided by the area of the parachute canopy, expressed in the United States in pounds per square foot.
Wing Suit: (n.) A gliding jumpsuit designed with fabric membranes between the legs of the jumper and from each arm to the torso.