

PHASE TWO

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Packing Requirements (after rigger-taught packing class)

Six pack jobs, the first three, supervised, then three unassisted that you jump. Signed off here:

1. _____ Date _____
2. _____ Date _____
3. _____ Date _____

4. _____ Date _____
5. _____ Date _____
6. _____ Date _____

Student is cleared to solo pack: _____ Date: _____

Flat packing and Pro Packing video viewing is required.

FLAT PACKING INSTRUCTIONS

by Fran Strimenos

1. Place the toggles on the Velcro
 2. Stretch out the canopy, lines, bag, bridle, and pilot chute
 3. Bring the slider to the bottom of the lines
 4. Pick up the rear risers (the ones with the toggles) in the right hand and pick up the front risers in the left hand
 5. Walk the lines up to the canopy and shake out the canopy
 6. Lay the canopy on its side by swinging it toward you, then away
 7. Straighten the canopy out by using packing tabs (not all canopies have them)
 8. Perform a four-line check
 9. Roll the nose
 10. Stack the B lines onto the A lines
 11. Stack the C lines onto the B lines
 12. Stack the D lines onto the C lines
 13. Set the brakes
 14. Clear the stabilizers
 15. Count the number of D lines
 16. Flake the tail
 17. Bring the slider up to the canopy
 18. Wrap the canopy in the skin of the center cell
KEEP THE SLIDER COMPLETELY WRAPPED UP IN THE CENTER CELL
 19. S-fold the canopy and put it in the deployment bag
 20. Clear the bridle from the bag
 21. Stow the line in 2 to 3 inch stows
 22. Place the bag in the container with the lines facing down
 23. Straighten out the risers and run them along the side (DO NOT run the risers around the corner of the reserve container)
- Close the container according to your instructor or the manufacturer's instructions

GEAR LIABILITY AGREEMENT

In consideration of the permission extended by _____ (hereinafter referred to a COMPANY) to utilize their equipment to participate in the activities of skydiving, I, _____ hereby agree as follows:

COMPANY is allowing me to use, borrow, rent, repack, COMPANY's equipment on an "as is" basis and condition. COMPANY has not made, and does not make, any representation, guarantee or warranty of merchantability, or fitness for a particular purpose or otherwise. All warranties, representations, and guarantees of any nature are hereby expressly disclaimed. No employee, agent or representative of COMPANY has any express or implied authority to make any warranty, representation, or guarantee of any nature on behalf of COMPANY, or to exclude or limit the operation and effect of this disclaimer. This binding Contract may only be amended in writing and signed by all parties. _____ (initial)

I realize and accept that all of the COMPANY equipment is considered "used," and that is not reliable or dependable for any specific use, purpose, or length of time. I agree to use equipment at my own risk _____ (initial)

I understand that I am responsible for the inspection and packing of all gear that I use on every jump. I further agree that if I have any questions about the gear I will consult COMPANY and master rigger before using the gear. _____ (initial)

I understand that the use of protective gear while jumping COMPANY'S equipment is mandatory. Protective gear shall include a rigid helmet, goggles or eye protection, a jumpsuit and shoes. _____ (initial)

I agree to assume responsibility for any gear I rent and/or borrow for the COMPANY. I agree that I will pay for the cost of all repairs and the replacement of any gear damaged beyond repair or any gear that is not recovered. I also agree to pay for the cost of any reserve or main repacks if they become necessary. _____ (initial)

I have been advised and recognize that my use of COMPANY's equipment is not covered by any personal accident or general liability insurance policy issued to the COMPANY. _____ (initial)

I hereby agree that I will not sue or make a claim against the COMPANY for injuries, damages or other losses sustained as a result of my use of COMPANY's equipment. I further agree to indemnify the COMPANY from any and all claims, judgments, and costs, including attorney's fees and court cost insured in connection with any action brought as a result of my use of COMPANY's equipment. _____ (initial)

I hereby agree that should any part, sentence, or paragraph of this agreement be declared invalid, the remaining parts of this agreement shall remain valid in full force. I further agree that the terms and conditions of this agreement shall continue in force and effect now and in the future at all times during which I use COMPANY's equipment and shall be binding upon my heirs, executors, and administrators of my estate. _____ (initial)

I hereby agree that this Agreement shall be construed and enforced in accordance with the laws of the Commonwealth of Massachusetts and that any action arising out of my use of said equipment shall be filed in Middlesex County, the state Courts of Massachusetts. _____ (initial)

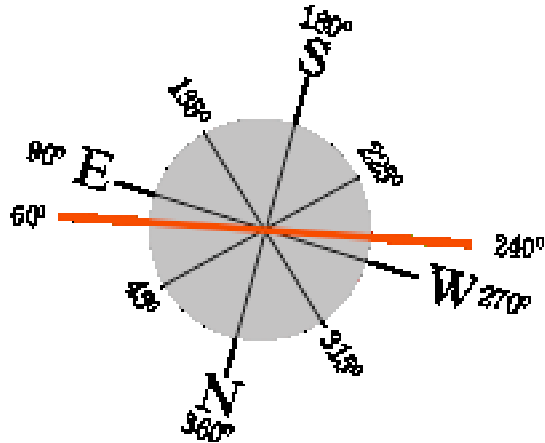
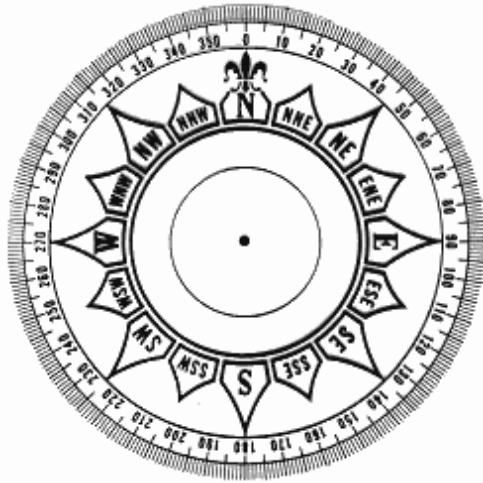
I certify that I understand what is expected of me to safely use COMPANY equipment. _____ (initial)

I further certify that I have carefully read and understand this Agreement and Release of Liability, and sign it of my own free will. I fully understand that I have the option to confer with an attorney prior to the signing of this Agreement and that there are options available to me. _____ (initial)

Signature: _____ Date: _____

Witness: _____ Date: _____

DETERMINE THE EXIT SPOT BEFORE YOU JUMP



1. **Basic Information.** Typically, the "Winds Aloft" are posted outside of Manifest. If not, ask your instructor or call Flight Service at (800) 322-3260 (tell them you are a skydiver and would like the winds aloft for Pepperell, MA and Nashua, NH). The winds that will be affecting your jump are at 12,000, 9,000, 6,000 and 3,000 feet. All skydiving operations at Pepperell are generally conducted between 8 a.m. and sunset. The weather briefer will give you the direction the wind is blowing from and the speed in knots; for example, "12,000 feet 280 at 18 knots."

True North is actually the top of the rotational axis of the planet. Magnetic North is the apex of the magnet fields of the planet. These two vary from place to place and over time. At Pepperell's location: Latitude: 42 degrees 41' 77"N, Longitude: 71 degrees 33' 00"W, in 2003, the magnetic declination = 15 degrees, 32 minutes West.

Our runway is 2,820 feet long and 25 feet wide. It runs 240 degrees (looking towards the hanger) and 60 degrees (looking away from the hanger), roughly East Northeast by West Southwest.

If the wind is forecasted from 360 degrees, it is from the north. If it is forecasted from 180 degrees, it's blowing from the south.

Here is an example:

Altitudes	Wind Direction	Wind Velocity
12,000	290	35
9,000	270	28
6,000	270	22
3,000	260	15
Surface	240	—
Averages	266	25

Above, we have averaged the winds from 12,000 feet to the surface winds, and the velocities from 12,000 feet to 3,000 feet. So, we know the winds are averaging from 266 degrees, and 25 knots. (1 knot = 1 nautical mile per hour = 6076 feet per hour
1 mph = 1 mile per hour = 5280 feet per hour. 1 knot equals about 1.15 miles per hour)

Now, the question is, "What is the best starting and ending point for a jump run at 13,500 feet that will allow a planeload of skydivers to exit and all have a reasonable chance of getting back to the drop zone safely?"

To calculate the "drift" of a skydiver in freefall (to 3,000 feet) use this formula:

Formula: Freefall drift = average wind velocity ÷ 60 (seconds) x 5280 feet.
Our example: $25 \div 60 = .41 \times 5280 = 2200$ feet or .41 of mile.

2. Calculate the Exit Window: the first and last "spots" where a planeload of skydivers averaging 6 groups, can safely exit the plane. Allow for 6 seconds between groups. The jump run, from the first to the last group existing will last approximately 30 to 45 seconds. If the speed at exit is roughly 85 mph during the jump run the plane will cover close to a mile (5600 feet).

Ideally, we exit upwind of the drop zone... but how far? The complexity of this procedure is enhanced by the factors of opening altitude and glide ratios of the various types, sizes, and configurations of parachutes.

Example. If you are open at 4000 feet with a normal student parachute, your descent rate is approximately 1000 feet per minute. This gives you a four-minute canopy ride. The glide ratio of a typical student parachute is about 2.5:1. This means that for every two and a half feet you move forward you descend approximately one foot down, in a zero wind condition. In our freefall drift example, the average wind from 4000 feet to the surface is 15 knots. For our landing pattern we would like to be 1000 feet high, opposite the target on an imaginary line that runs perpendicular to the line of flight before turning downwind. This means that we have about 3,000 feet or three minutes to get to our 1000-foot maneuvering position to begin the downwind leg of our planned landing pattern. 15 knots is the average wind, plus the 20 knot forward speed of the canopy = 35 knots of ground speed when we turn downwind. $35 \text{ knots} \div 60 = .58$ of a mile every minute x 3 (3000 feet of altitude) = 1.74 miles or 9,240 feet. Now add the freefall drift of 2,200 feet (above) for a total of 11,440 feet or 2.17 miles. In theory, a skydiver could exit the jump aircraft on the wind line about 2.17 miles upwind of the target and because of freefall drift and average canopy flight characteristics make it back with no problem.

If you don't have a mainframe computer handy to assist in these calculations, try rounding off the numbers. For example, if you are freefalling in a column of air that's moving at 60 knots for 60 seconds you will drift about a nautical mile (1.15 miles). Or if the column of air is averaging 15 knots, you will drift 1/4 of a nautical mile.

Other spotting tips:

- Deploy into the wind whenever possible to avoid flying downwind at almost 40 mph until you can turn back.
- Exit the aircraft upwind of the target and along the line of flight whenever practical.
- When checking for the exit spot in the aircraft be sure the wings are level and that the plane is flying straight. (Wing to horizon.)
- Flat flyers should exit first and the largest groups of flat flyers first.
- Free flyers should exit after flat flyers, they fall faster and have less freefall drift, and again, the larger the group, the earlier they exit in the order.

- The stronger the winds aloft, the more time between groups.
- Avoid tracking along the line of flight. This can result in freefall collisions with groups that exited before or after you. Track perpendicular to the line of flight.
- If your opening altitude is going to higher than normal (2,000 to 3,000 feet) your exit order needs to be adjusted to allow higher openers to exit later.

FREEFALL TIME CHART (revised 2004)

Exit Altitude Opening At 2500	Length of Freefall	98 mph	109 mph	120 mph	Vertical 160 mph	Wing suit 50 mph
3,500	500	10	10	6	5	10
4,000	1,000	14	13	9	7	17
4,500	1,500	17	16	12	9	24
5,000	2,000	21	20	15	12	31
5,500	2,500	24	23	18	14	37
6,000	3,000	28	26	21	16	44
6,500	3,500	31	29	24	16	51
7,000	4,000	35	32	26	18	58
7,500	4,500	38	35	29	23	65
8,000	5,000	42	39	32	25	71
8,500	5,500	45	42	35	27	78
9,000	6,000	49	45	38	29	85
9,500	6,500	52	48	41	31	92
10,000	7,000	55	51	43	33	99
10,500	7,500	59	54	46	35	105
11,000	8,000	62	57	49	38	112
11,500	8,500	66	61	52	40	119
12,000	9,000	70	64	55	42	126
12,500	9,500	73	67	58	44	133
13,000	10,000	76	70	60	46	140
13,500	10,500	80	73	63	48	146
14,000	11,000	83	76	66	50	153
14,500	11,500	87	80	69	52	160
15,000	12,000	90	83	72	55	167
15,500	12,500	93	86	74	57	174
16,000	13,000	97	89	78	59	181

Note: there is also a chart like this inside most standard skydive logbooks.

LANDING PROCEDURES

Things TO DO...

1. Enter the target approach by merging into a path that heads downwind alongside the target (roughly 1000 feet)
2. Control your canopy smoothly to adjust the horizontal and vertical distance from the next jumper ahead in the pattern
3. Turn a "base" or crosswind leg downwind of the target (roughly 500 feet). The distance downwind depends on the wind speed and obstacles in and around the landing area
4. Turn a final approach leg into the wind (roughly 300 feet), and fly straight ahead
5. Scan, scan, scan... there is always something you have missed
6. Your first priority in landing is to land safely.

Things NOT TO DO...

1. Do not enter the pattern from above in a steep spiral
2. Do not cross the "wind line" or the imaginary line through the target parallel with the wind. This keeps people flying right hand patterns on one side of the target and people flying left hand patterns on the other
3. Do not do S-turns to lose altitude on final approach

The most critical spot in the pattern is the area where jumpers turn onto final approach. The potential for a collision increases with jumpers coming from at least three directions: left, right, and a long straight-in final. It's another reason to avoid the wind line, period.

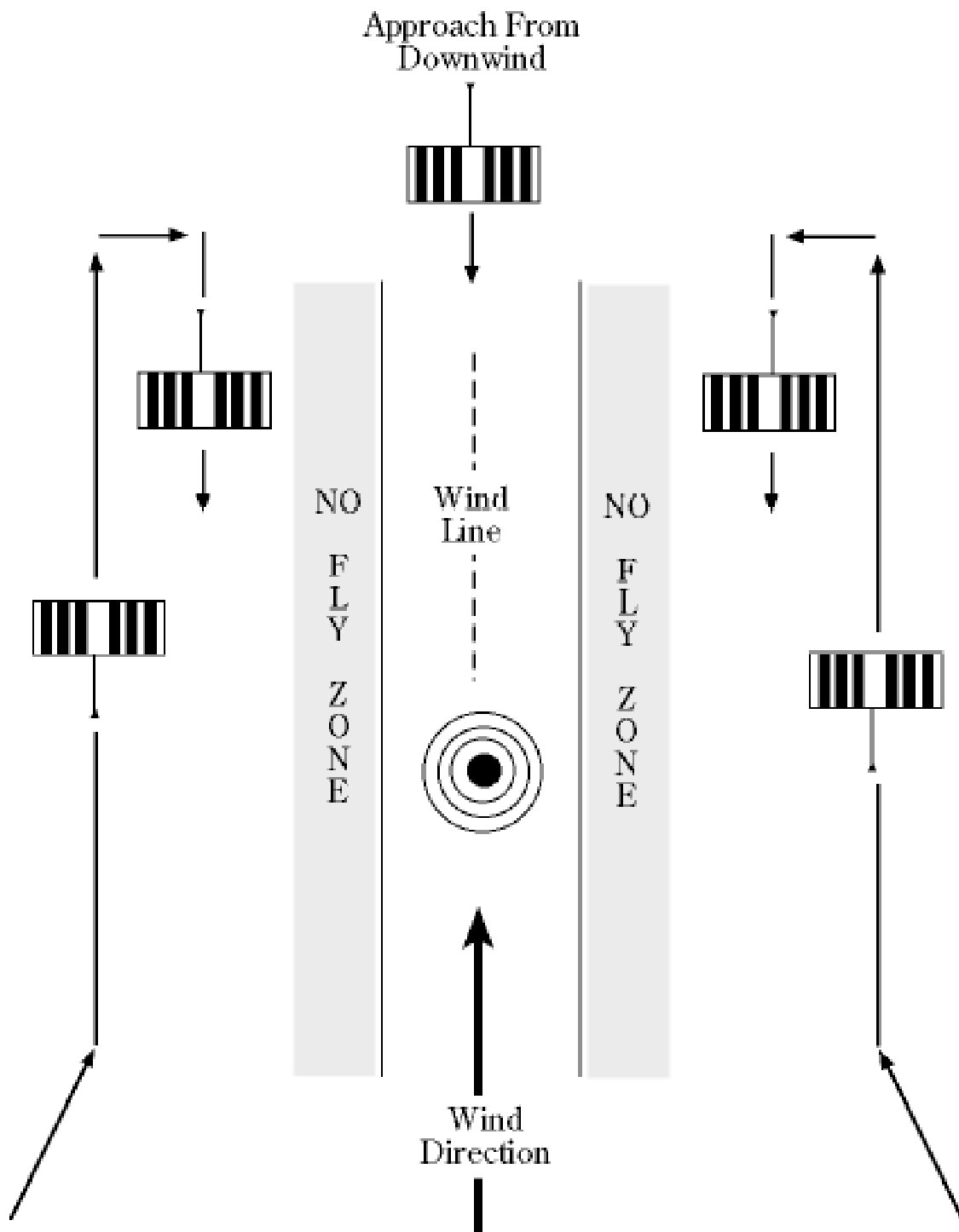
Of course, many jumpers still haven't gotten the message about flying a pattern, and it can be a free-for-all. Newer jumpers have to keep this in mind when they decide to go on a big boogie.

You can practice flying in a crowd even when you have the sky to yourself. At our own DZ, fly a planned pattern, ending in a straight final approach. Notice how easy it is to stare at the target. Instead, remind yourself to look all around during the entire ride down.

By the way, touching down isn't the end of it. Keep one eye on other jumpers landing until you are well clear or you're sure everyone is on the ground.

– *With Thanks to Kevin Gibson, Parachutist*

TYPICAL LANDING PATTERN



SOME THINGS TO THINK ABOUT #1

– Courtesy of Jack Gregory at Zephyrhills, Florida (1987)

The timing of a high-speed malfunction....

Assume that a skydiver decided to be open at the minimum altitude allowed by law for a D-License holder, 2000 feet above the ground. Unexpectedly, he or she has a high-speed malfunction like a pilot chute in tow, a bag lock, a streamer, or a horseshoe. Here is what happens if everything goes perfectly:

	<u>Reaction Time</u>	<u>Feet Fallen</u>	<u>Altitudes</u>
Time to realize there's a problem	1 to 1.5 seconds	200 - 250	1800 - 1750
Decision reached	1 to 1.5 seconds	200 - 250	1600 - 1500
Action taken	1.5 to 2.5 seconds	250 - 350	1350 - 1150
Reserve deployed	1.5 to 3.0 seconds	250 - 450	1100 - 700

This is fairly optimistic scenario. Best case your reserve would be open around 1000 feet and worst case you'd be under 700 feet, which would leave you with a 40-second canopy ride and very little time to pick a safe place to land.

So, if you pull at 3,000 feet, you will be in much better shape all around (just add 1000 feet to all of the altitudes). It's really pretty basic.

SOME THINGS TO THINK ABOUT #2

- Adapted from an article by the staff of SkyDance Skydiving

Seven Super Slick Safety Secrets

1. **Wear Seatbelts.** It's mandatory. It's keeps stuff from flying around in the event of a crash. You will so thank yourself if that ever happens. So will the other skydivers around you.
2. **Always Get an Equipment Check. Every Jump.** Who knows, your friends might notice something: an inverted handle. A misrouted chest strap. A misrouted bridle. A pin almost out. And, they might say, "OK" and thump your rig. Either way it was a good thing.
3. **Check Your Own Equipment. Every Jump.** The "Check of Threes." The AAD. Who knows you might save your own life.
4. **Track For Separation.** Track flat, track straight, and track hard. Always watch for other jumpers, stay altitude aware, and wave off.
5. **Watch For Canopy Traffic.** Keep track of where other canopies are in the air, especially as you get closer to the landing area. It's sort of riding dodge 'em cars at the county fair, except if you get bumped, it's not funny, it's deadly.
6. **Be Aware Of Your Blind Spots.** Don't do anything radical under canopy without checking your blind spots. Always, always look in the direction of your turn BEFORE starting the turn.
7. **Keep Your Options Open.** While running back from a bad spot and while on final approach always give yourself an out ... some place to go if you can't land where you planned. Remember the Roadrunner ... he never got caught.

SOME THINGS TO THINK ABOUT #3

Words Of Wisdom

"Every takeoff is optional, landings are mandatory."

"Canopies aren't dangerous, crashing canopies are."

"Learn from the mistakes of others. You'll never live long enough to make them all yourself."

"The probability of your survival is inversely proportional to your angle of arrival."

"Skydivers arrive with a bag full of luck and no experience. The trick is to build up your experience before you run out of luck."

"In the battle between flesh and bone going way too fast at impact, and the hard, cold ground just waiting there, not moving at all ... the ground always wins."

"Keeping looking around, there's ALWAYS something you've missed."

"When the most experienced jumpers are staying down ... you should to."

"Just because it's too windy to land does not mean it's a good time to do a cross country."

"Just because you can afford to buy a smaller canopy, doesn't mean you should."

"I wear a reserve because my main can fail. I wear a Cypres because my brain can fail."

"Know safety, no pain. No safety, know pain."

SOME THINGS TO THINK ABOUT #4

The Priorities of Every Skydive You Will Ever Make

1. Pull
2. Pull at the assigned altitude
3. Pull at the assigned altitude with stability
4. Check the canopy
5. Activate the reserve, if there is doubt about controllability
6. Land in a clear area
7. Land safely

The Priorities of Every Landing You Will Ever Make

1. Land with wings level
2. Land with wings level and flare
3. Land with wings level and flare into the wind

CLOUD CLEARANCES

