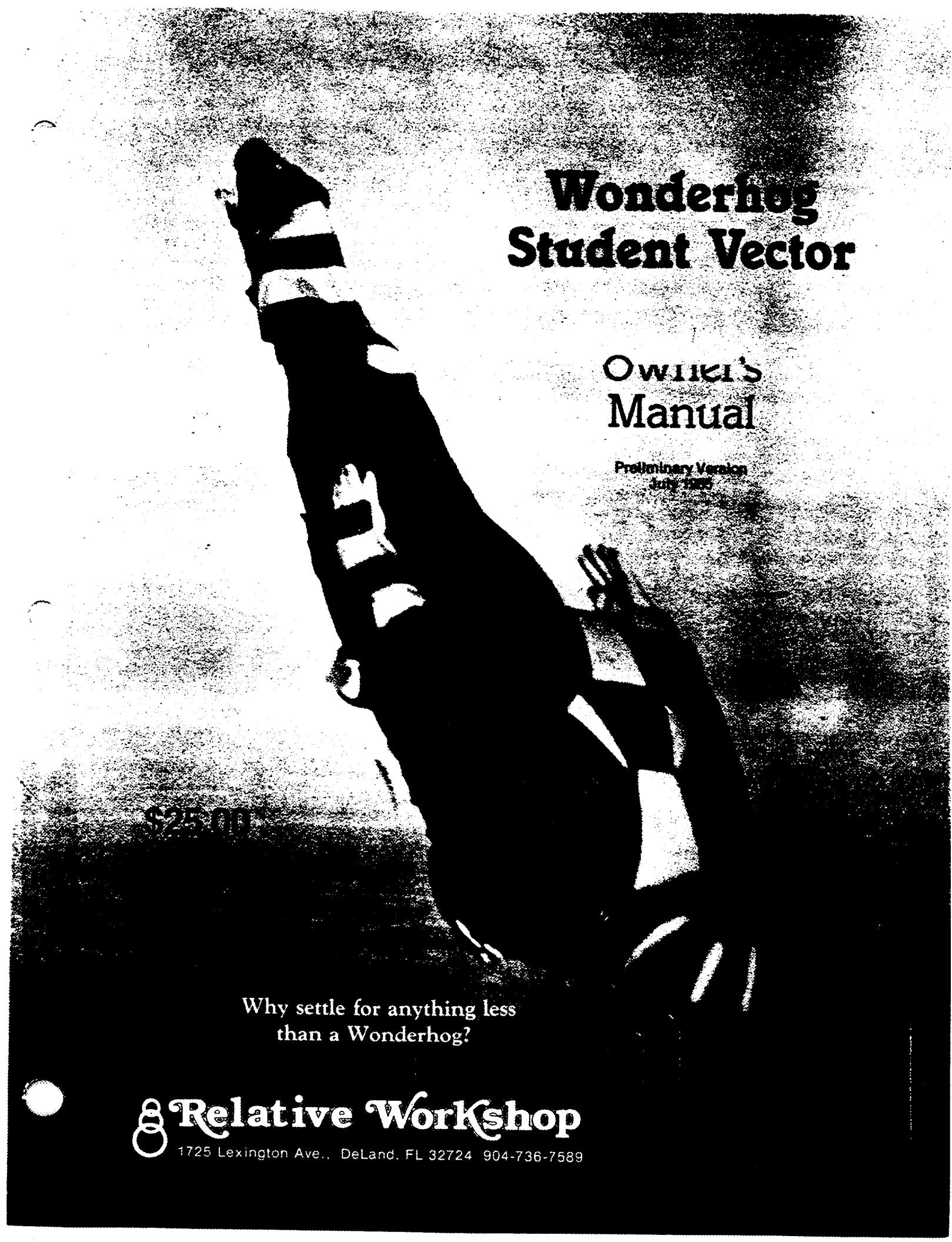

Wonderhog
Student Vector
Owner's
Manual
Preliminary Version
July 1985
$25.00
Why settle for anything less
than a Wonderhog?
Relative Workshop
1725 Lexington Ave., DeLand, FL 32724 904-736-7589

INTRODUCTION

Congratulations!

By choosing the Relative Workshop Vector for your Student training program you have shown your students and your staff that you'll settle for nothing less than the best.

Please read this manual thoroughly before assembling or using the Student Vector. Each of your instructors and jumpmasters must also read this manual and should, if possible, jump the Student Vector himself.

If after reading this manual you still have questions concerning the Student Vector, please contact us. We'll be happy to help you.

If you have any suggestions or see a need for changes in the Student Vector or this manual, please contact us at the Relative Workshop, 1725 Lexington Ave., DeLand, FL 32724. (904) 736-7589.

CONCEPT

The Student Vector was designed to closely resemble the Standard Vector that is popular with experienced jumpers around the world. We believe a parachutist should be required to learn only one set of procedures and then be able to keep using them as he Progresses through the sport.

Here's an example of how the Student Vector makes parachuting easier to learn: The deployment handle, reserve ripcord and breakaway handle on the Student Vector are all in the same places as on the Standard Vector. That means a student's first-jump emergency procedures will remain the same throughout his jumping career. He'll easily transition from "Student" to "advanced" gear.

And another example: Regardless of whether the Student Vector is configured for ripcord or hand deployment, the activation handle is in the same place, and the jumper uses the same motion to pull the handle. This permits a novice to make his first few jumps with a spring-launche pilot chute and easily transition to hand deploy.

The Student Vector provides additional safety features, including an automatic activation device (AAD) and a reserve lanyard (static line).

DESCRIPTION

The Student Vector is a piggyback harness and Container system designed for the special demands of student training. It is available i a wide variety of Container sizes to fit practically any main or reserv canopies, both round and ram-air.

The Student Vector is manufactured in accordance with FAA TSO C23(b). It meets the requirements of the U.S. Parachute Association fo novices training for both accelerated freefall and static-line methods.

Main Container

The main canopy may be deployed by either hand-deploy pilot chute, spring-launched pilot chute or static line. Converting from one deployment method to another takes a few minutes and requires no tools. The same deployment bag is used for all three methods.

The Student Vector main Container can be built to accept ram-air canopies with the bulk equivalent to the GQ Security Unit IV, Glide Path International Manta and National Parachute Industries Hercules.

The main canopy attaches to the harness with the patented 3-Ring release. Pulling a soft handle located on the right main lift web jettisons the risers.

Rerserve

The reserve parachute Container is held closed by a single pin. The reserve ripcord handle is made of metal and fits in a pocket on the left-hand main lift web. The reserve ripcord cable ends in a small loop through which the locking pin is inserted to close the Container.

A lanyard extends from the base of the right-hand riser through a guide ring to the single reserve pin. When the jumper jettisons a partially malfunctioned main canopy and drops several feet, the lanyard acts as a static line to extract the reserve pin. The lanyard will therefore pull the reserve if the jumper doesn't. It also results in the fastest possible reserve deployment.

The reserve system accepts two popular automatic activation devices --the SSE Sentinel MK 2000 and the FXC 12000. The Student Vector MUST be equipped with a properly calibrated and maintained AAD.

The reserve ripcord, lanyard and AAD provide three different ways to deploy the reserve parachute.

The Student Vector reserve Container can be manufactured to accept round or ram-air reserves with a packed volume equivalent to that of a 26-ft. Lopo.

Harness

The harness of the Student Vector features non-slip adjustments on the main lift web so it can fit most jumpers. It is constructed of Type 7 and Type 8 Mil-Spec webbing and new--not reconditioned--hardware.

DISCLAIMHR--NO WARRANTY

Because of the unavoidable danger associated with the use of this harness and Container assembly, the maufacturer makes no warranty, either express or implied. The rig is sold with all faults and without any warranty or fitness for any purpose. Manufacturer also disclaims any liability in tort for damages, direct or consequential, including personal injuries, resulting from a malfunction or from a defect in desian, material, worlunanship, or manufacturing whether caused by negligence on the part of the manufacturer or otherwise.

By using this rig, or allowing it to be used by others, the buyer

waives any liability for personal injuries or other damages arising from such use. If the buyer declines to waive liability on the part of the manufacturer, buyer may obtain a full refund of the purchase price by returning the parachute harness and Container, before it is used, to manufacturer within 30 days from the date of original purchase with a letter stating why it was returned.

TRAINING REQUIRED BEFORE JUMF'ING WITH THE STUDENT VECTOR

The Wonderhog Student Vector may be jumped only by persons who have received thorough instruction on its use from a qualified instructor. It is the responsibility of the owner and those whom he allows to use the rig to insure it is properly assembled, maintained, packed, worn and used, and that the user has the training and skill to use it properly.

This manual is not a course of instruction on how to make a parachute jump.

Nor does it contain the various regulations that govern sport parachuting and related activities. This information is best obtained from government sources.

The person who inspects and packs both the main and reserve parachutes must be qualified to do so.

Finally, nothing in this manual is meant to discourage the reader from using the Wonderhog Student Vector in a reasonable and prudent way.

The information and specifications in this manual were in effect at the time of printing. The Relative Workshop, Inc., however, reserves the right to change specifications or design at any time without notice and without incurring any Obligation.

ABOUT MODIFICATIONS

It is common for jumpers to "improve" their rigs by altering them. A high percentage of these alterations cause malfunctions or make it difficult to use the rig correctly.

Typical alterations include conversion to a "pull-out" pilot chute, changing the configuration of the harness and changing the length of the bridle.

Check with the Relative Workshop before you make any changes to your Student Vector. It was designed and built the way it is *as* a result of years of testing and development. There are reasons for having things the way they are, reasons that might not be apparent at first. Check with the manufacturer before you make any changes; even "insignificant" alterations may have very negative and unforeseen effects.

SECOND-HAND STUDENT VECTORS

If you obtained your Student Vector second-hand from a private party, have a rigger inspect it before it is placed in Service to be sure it is airworthy. The Relative Workshop will perform this at no charge, but the owner must pay for all shipping and any repair costs. If you obtain replacement parts from a source other than a Relative

Workshop dealer, be sure they exactly match the parts they replace. For example, be sure the reserve ripcord is long enough. Consult a rigger whenever you replace any component of your Student Vector.

COMPONENTS SUPPLIED:

The Student Vector comes complete with these components:

Harness and containers
Spring-launched Student Vector main pilot chute
Hand-deploy main pilot chute
Main pilot chute bridle
Main deployment bag
Main pilot chute bridle
Main locking loop
Bag attachment loop
Apex assist
2 Student Vector main ripcords
Spring-launched Vector reserve pilot chute
Reserve ripcord
Reserve locking loop
Reserve lanyard (or static line)
Reserve pilot chute bridle
Automatic activation device (may be purchased from another vendor and sent to the Relative Workshop for installation)
Main risers and steering toggles
3-Ring release handle
The Student Vector Owner's Manual
5 Student Handouts

Once you are sure you have received these components, refer to the TSO label on the pocket for the reserve packing data card. (You'll find the pocket under the Vector monogram by lifting the reserve pin protector flap.) Check to be sure the containers are sized properly for your main and reserve canopies. Appendix X explains the markings on the label.

If you use components that were not originally supplied with the harness and container, be sure they have the correct dimensions and are made of the same materials. For instance, be sure the breakaway cables are of the proper length.

Replacement components for the Student Vector are readily available from the Relative Workshop.

Federal Aviation Administration regulations require that the reserve parachutes be inspected, maintained, assembled and packed by an appropriately rated Senior or Master Parachute Rigger. Other countries may have similar regulations.

MAIN PARACHUTE

Introduction

The Student Vector is compatible with practically any main parachute that will fit into the container. This manual does not provide specific instructions for folding all of the various main

canopies on the market--that information must be obtained from the owner's manual for each canopy that is supplied by the canopy manufacturer.

Assembling the Main Parachute

U.S. Federal Aviation Regulations require that the main parachute be assembled by an FAA-certificated rigger.

Carefully inspect the main parachute for wear or manufacturing defects.

Attach the main parachute to the main risers included with the Student Vector. (Other 3-Ring risers are incompatible because of the reserve lanyard.) Leaving the risers on the harness while attaching th canopy will help prevent confusion.

If the canopy *uses* #5 Rapide links, make sure the barrel nuts completely cover the threads.

You might consider installing slider bumpers to protect the slide grommets on ram-air canopies. In addition to protecting the grommets, slider bumpers also keep the barrel nuts on the links from working loose. Bumpers may be made from practically any 3/4-in inside diameter flexible tubing.

It's important to check that the ram-air main canopy steering lin can't jam between the slider bumpers and the slider grommets. If they jam, the parachute will be rendered unsteerable.

Attach the steering toggles to the control lines of the main canopy. Secure the control lines as shown in figures xxx through xxx.

When a canopy is first installed on risers, it should be carefull checked to insure the steering lines and brake loops are of proper length. Some instructors will not allow a novice to jump a newly installed canopy until it has first been jumped by an experienced jump to insure it is configured properly.

Inspect the canopy installation to make sure the risers aren't reversed or twisted.

Inspect the 3-Ring assembly according to the instructions in this manual.

Installing the Bag and Bridlc

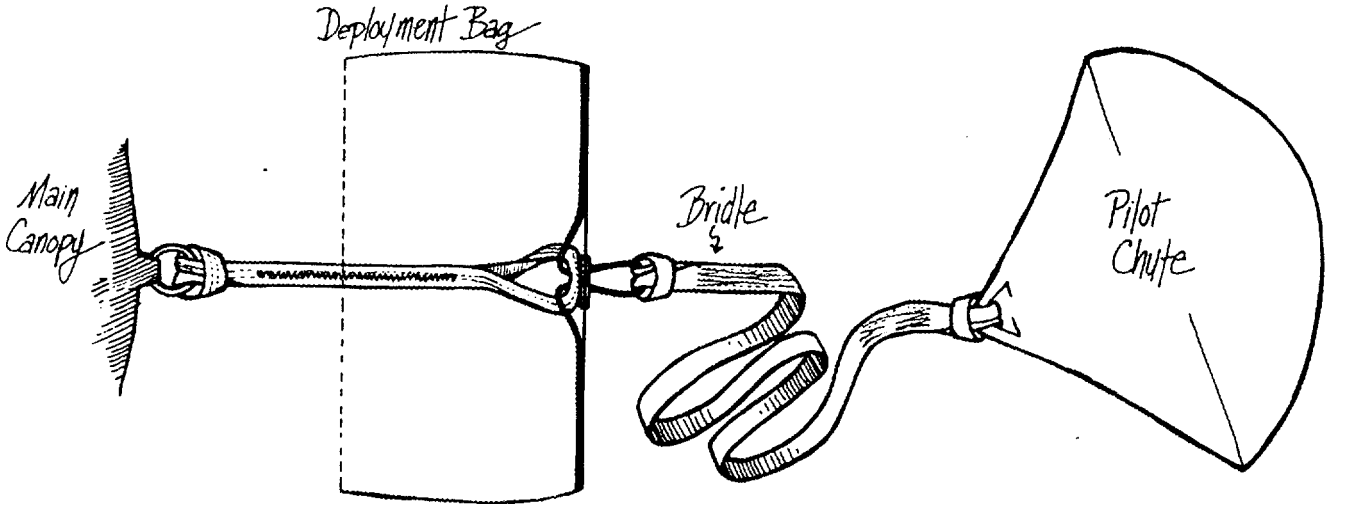
(If a static line is being used, refer to the instructions on page XX, "Converting to Static Line Use.")

a. For freefall deployment of a ram-air canopy:

Attach the bridle attachment loop to the bridle ring on the top (the canopy with a larkshead knot ((check that)).

Attach the bridle attachment loop to the bag: Push the Type 17

loop out of the grommet at the top of the bag, put the bridle attachment loop over the bag loop, then push the bag loop back through the grommet. Then attach the proper end of the bridle to the bag loop with a larkshead knot.



b. For freefall deployment of a round canopy:

Attach the bridle attachment loop to the apex (for Para-Commander type canopies, attach to the junction of the crown lines) of the canopy with a larkshead knot.

Then attach the bridle attachment loop to the bag: Push the Type 17 bag loop out of the grommet at the top of the bag, put the bridle attachment loop over the bag loop, then push the bag loop back through the grommet. Then attach the proper end of the bridle to the bag loop with a larkshead knot.

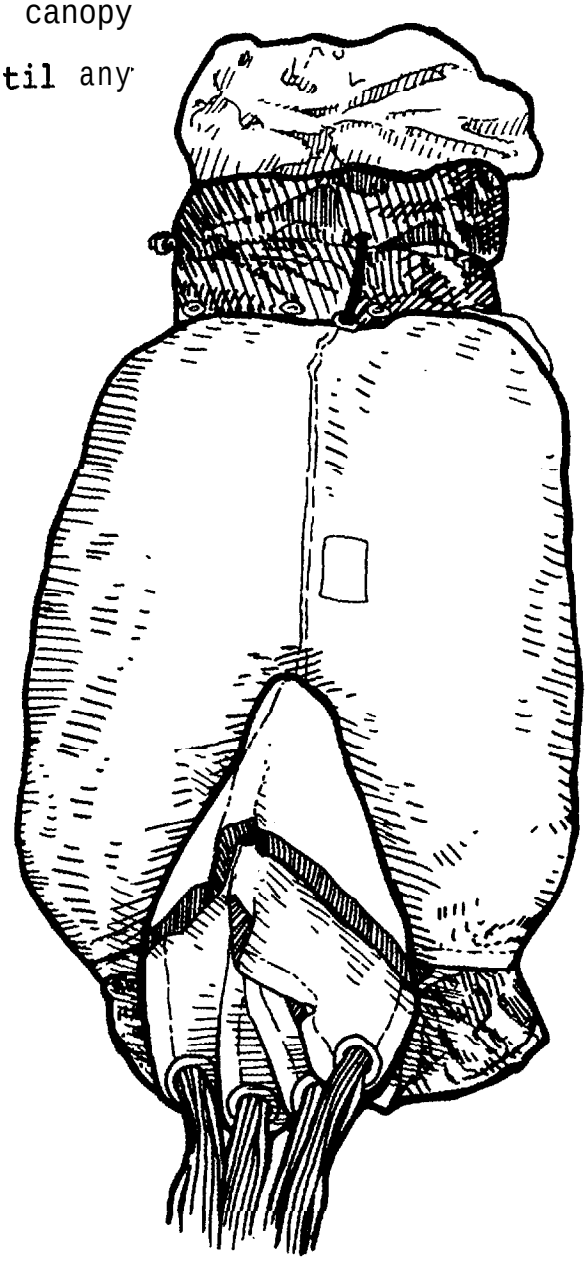
MAIN CANOPY PACRING INSTRUCTIONS

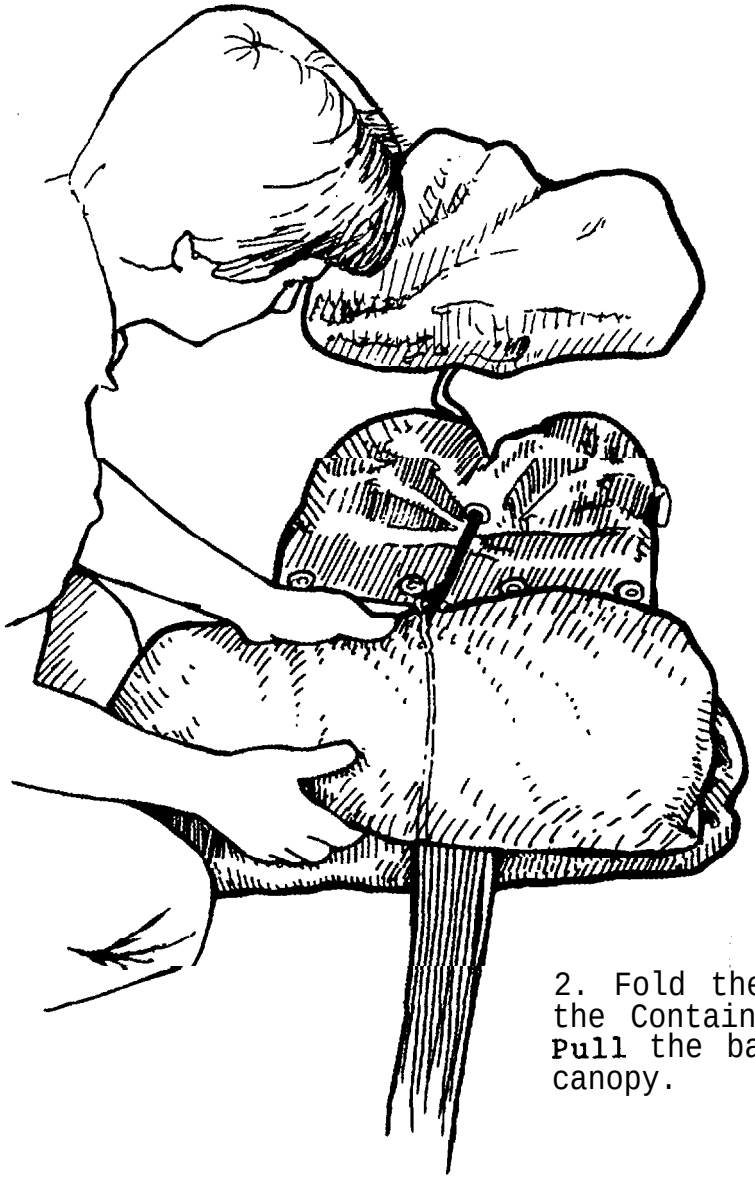
Anyone who has never packed a main canopy in a Student Vector should first do so under the Supervision of a rigger or an instructor who is familiar with the System. Not only does such Supervision enhance safety, it provides an excellent opportunity to learn ways to make the procedure easier.

Instructions for packing specific main canopies are published by the canopy manufacturer and are beyond the scope of this manual. Most canopy manufacturers will provide packing instructions for their products at no Charge.

U.S. Federal Aviation Administration regulations require that the main parachute be packed only by an FAA-certificated rigger or the person who will use the parachute.

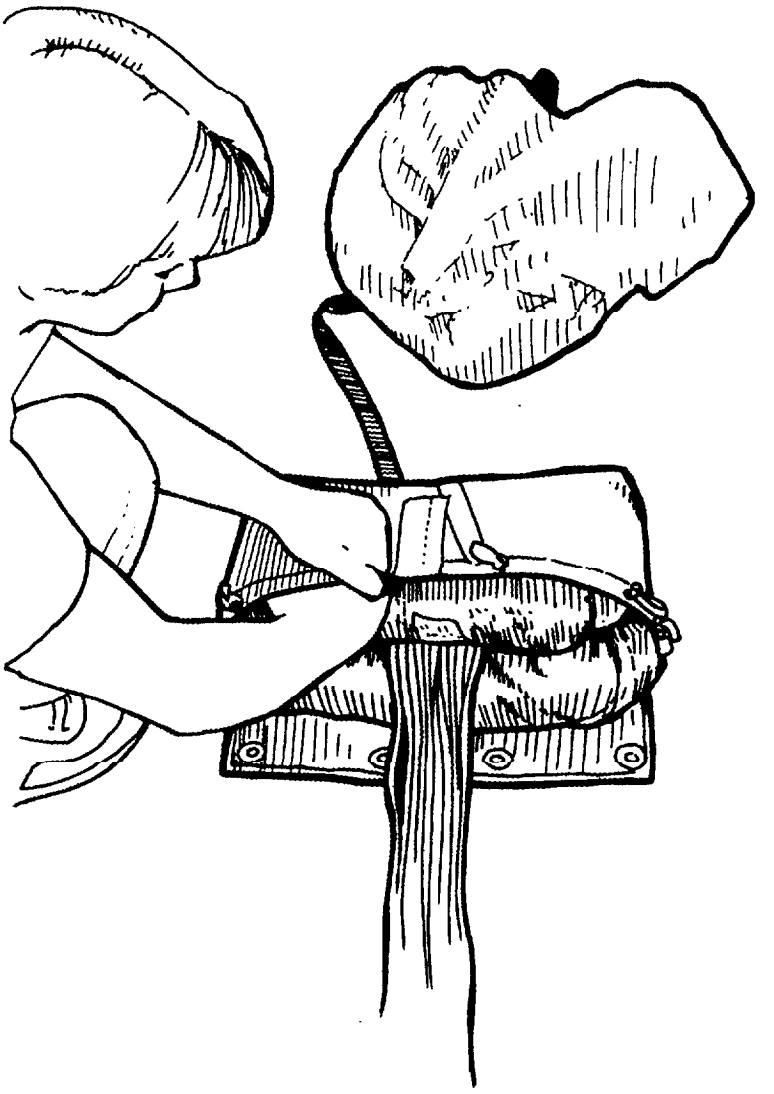
1. Lay out, inspect, flake and fold the canopy according to the canopy manufacturer's instructions. Do not pack the canopy until any anomalies have been corrected.

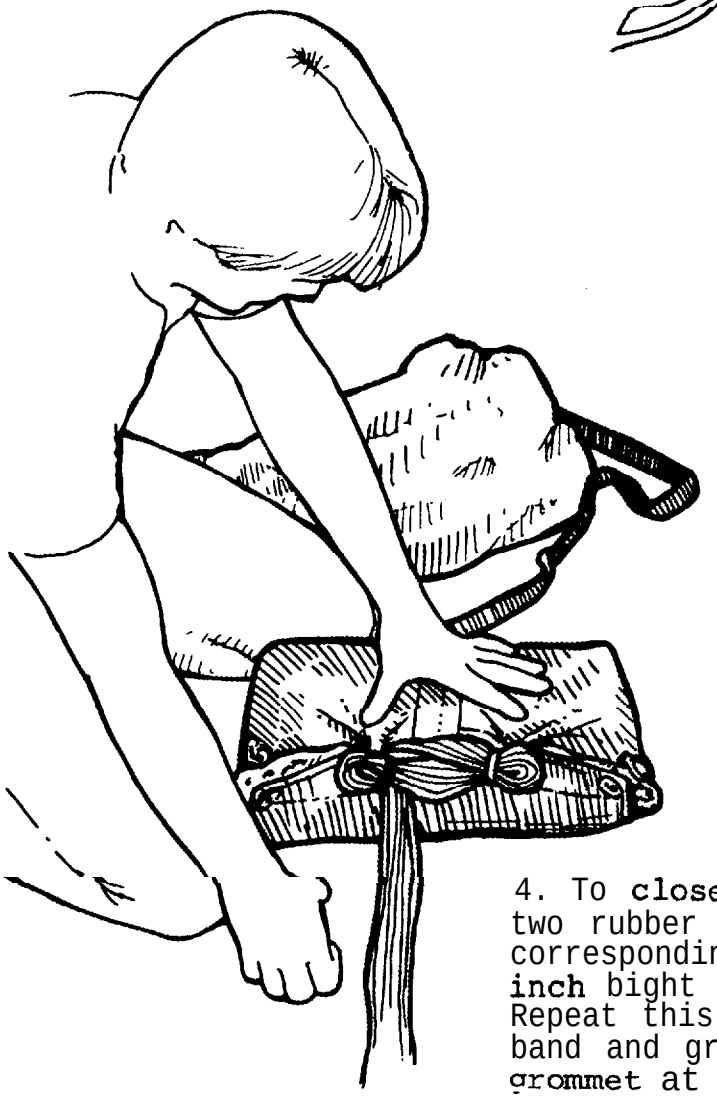




2. Fold the canopy as wide as possible, so the Container will be as flat as possible. Pull the bag down over the top of the folded canopy.

3. Stack the canopy into the deployment bag. Be sure to fill the corners completely.

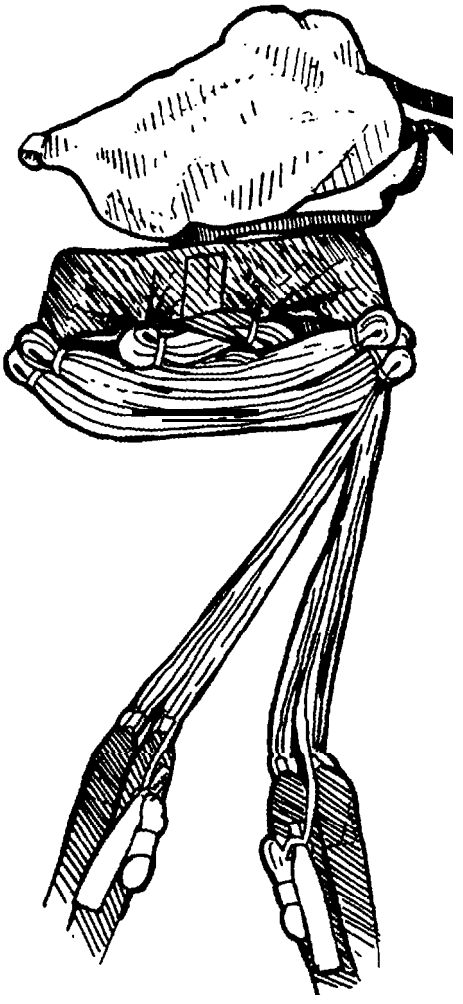


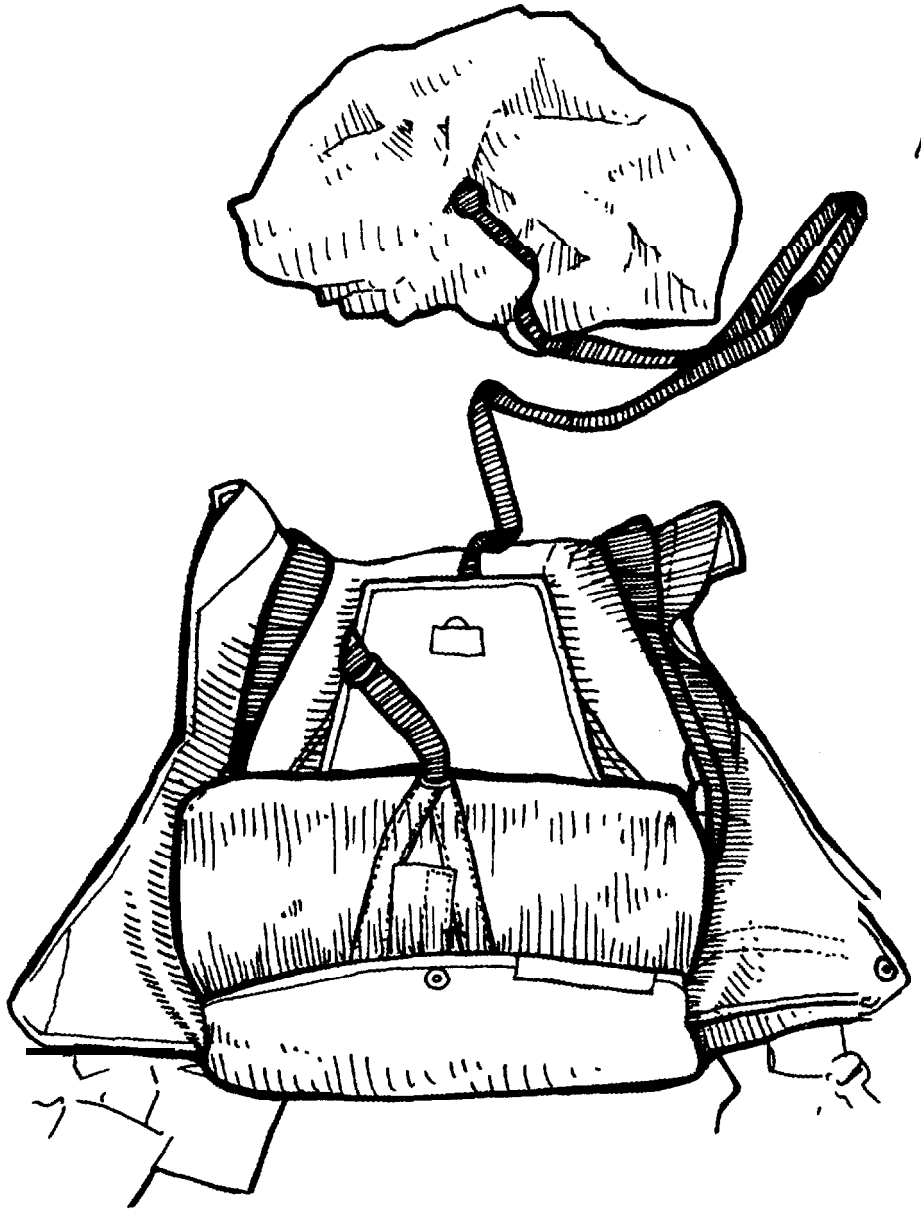


4. To close the bag, pass one of the center two rubber stow bands through its corresponding grommet and insert a 1- to 2-inch bight of lines through the stow band. Repeat this step with the other center stow band and grommet, followed by the band and grommet at each corner.

5. Stow the remainder of the lines across the bottom of the bag in the elastic stow bands. Keep the bights of lines 1 to 2 inches. Leave no more than 15 inches of lines unstowed.

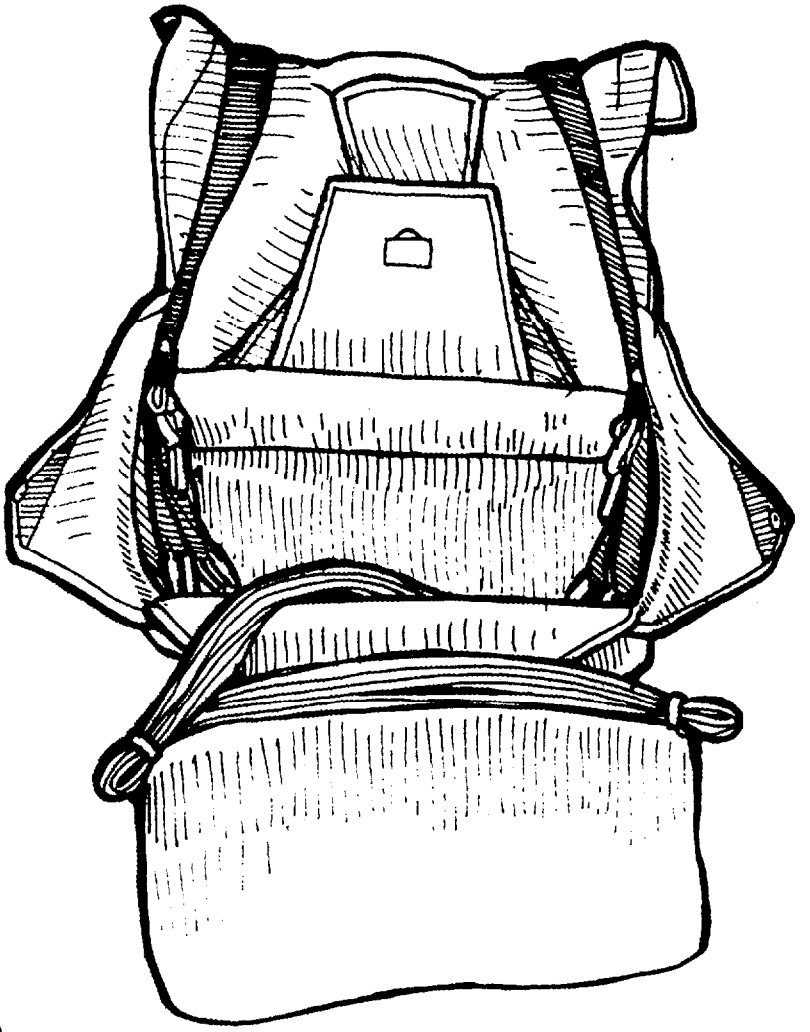
6. Use your knees or feet to "walk" on the bag, squeezing air out and distributing the bulk until the middle is no fatter than the sides.





7. Pick the bag up by sides and set it into Container on the line

8. Follow the risers from the harness and lay them flat along the sides of the reserve Container. Lay the connector links into the Container neatly against the sides making sure that no lines will wrap around them during canopy deployment.

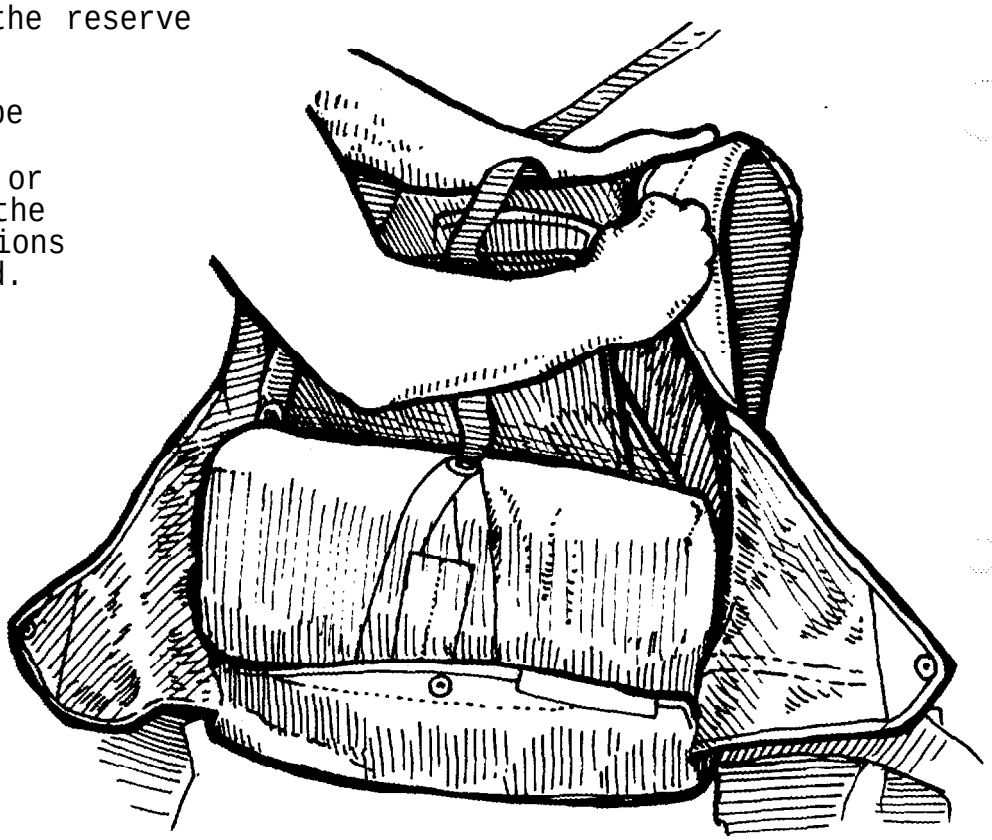


9. Lay the bag down in the Container with the line stows against the bottom flap. Push the top corners of the bag into the top of the main Container so the bag keeps the connector links in place between the bag and the sides of the Container. Make sure that none of the flaps are under the bag. Pull the bridle out to its full length.

10. Kneel on the center of the bag and pull up the main Container side flaps until the bag fills the Container and is flush with the reserve Container.

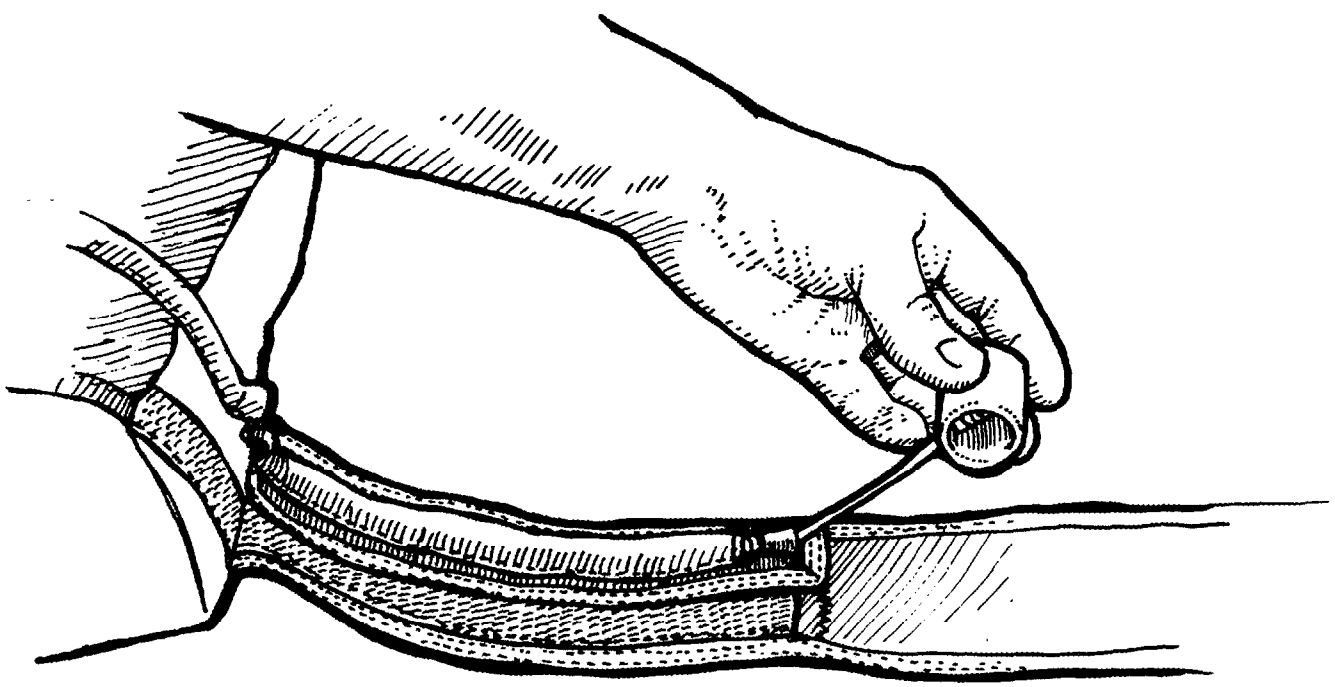
11. Cover the risers with the Velcro flaps at the top of the reserve Container.

The main canopy may be deployed by either a ripcord, hand deploy or static line. Follow the appropriate instructions below for each method.

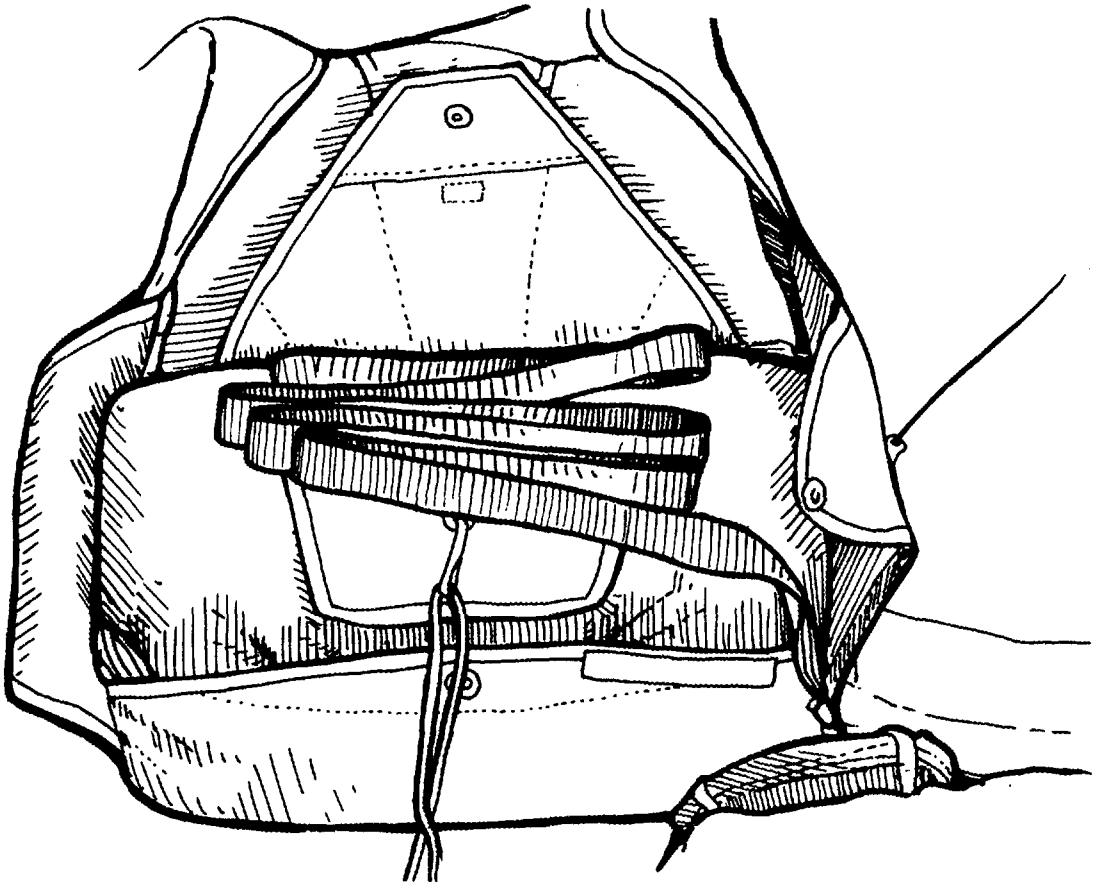


FOR RIPCORD DEPLOYMENT

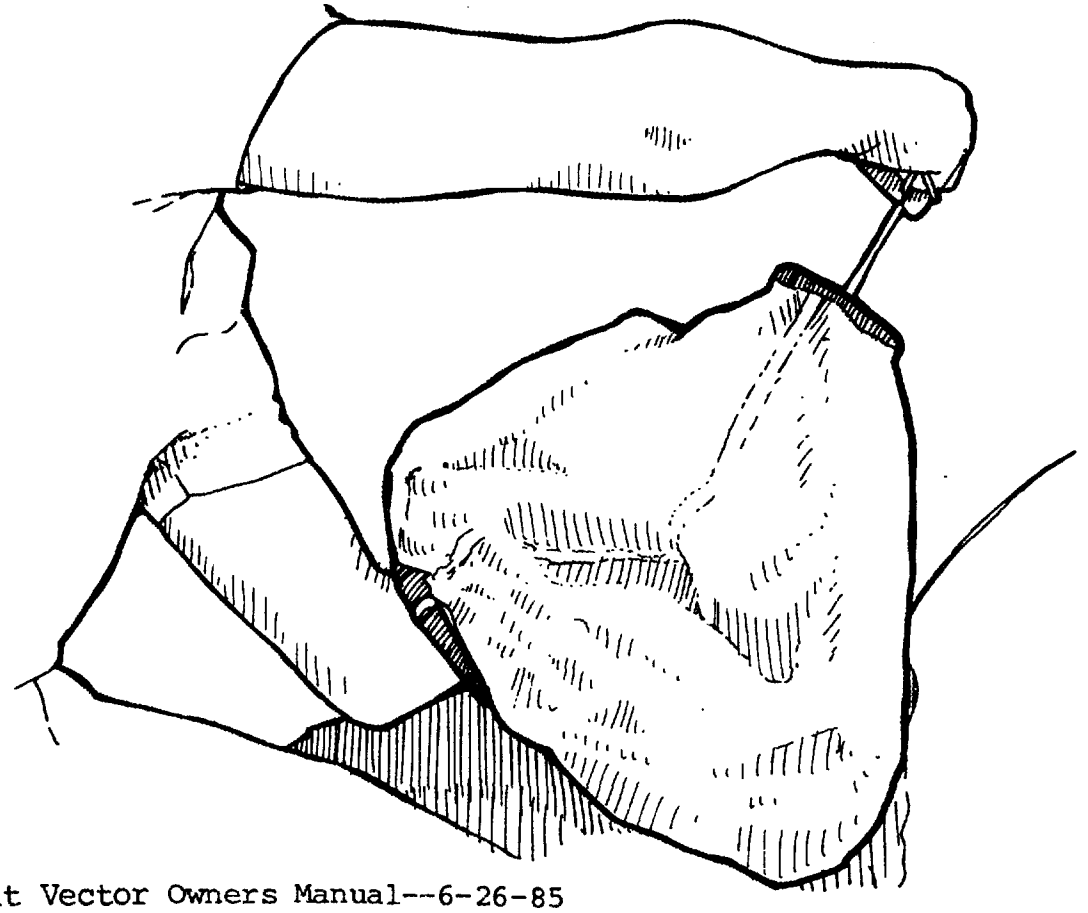
A. Mate the Velcro on the ripcord housing and belly band. Insert the ripcord through the cable housing.



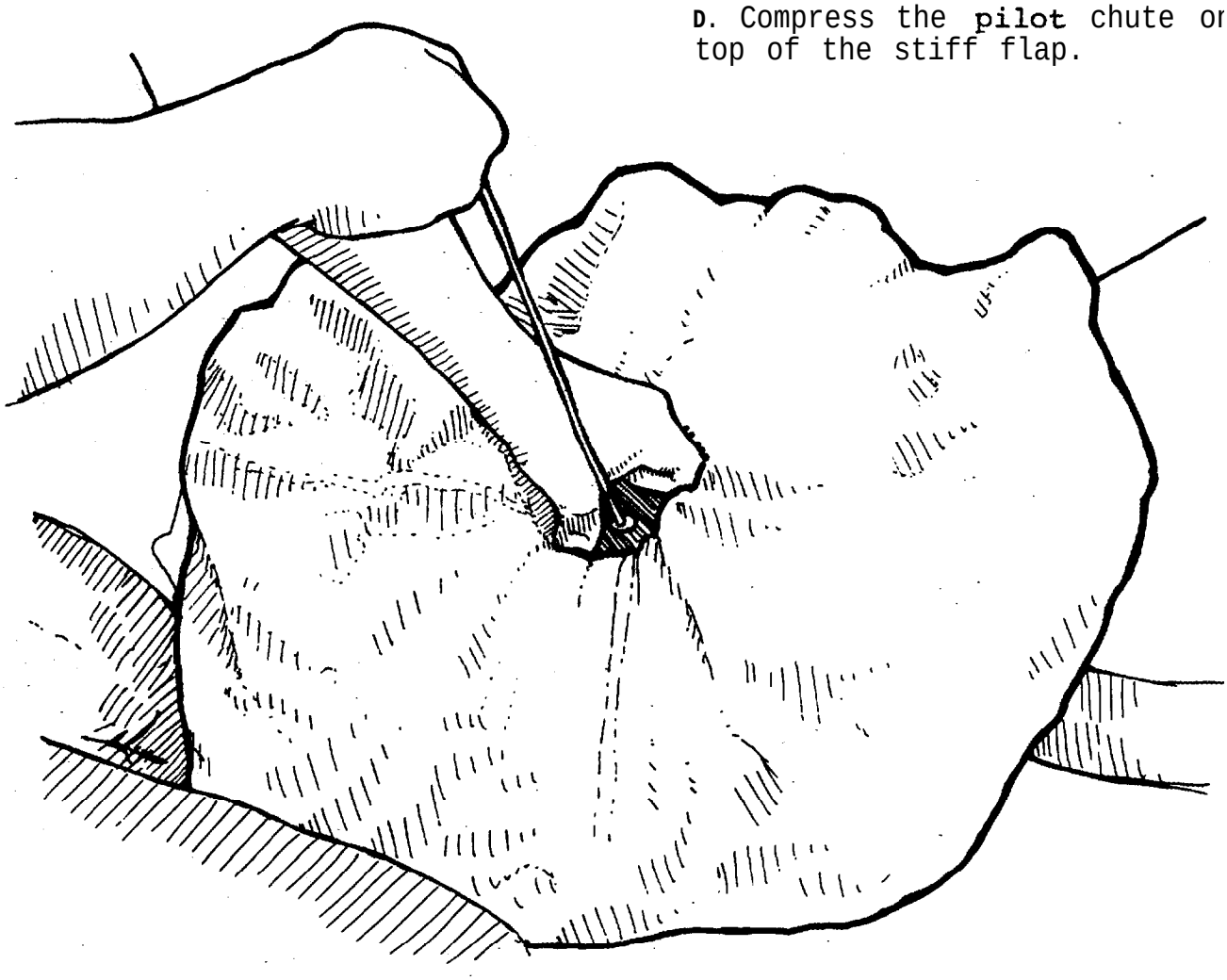
B. S-Fold the bridle neatly on the stiff flap, then thread the pull-up cord through the loop on same flap.



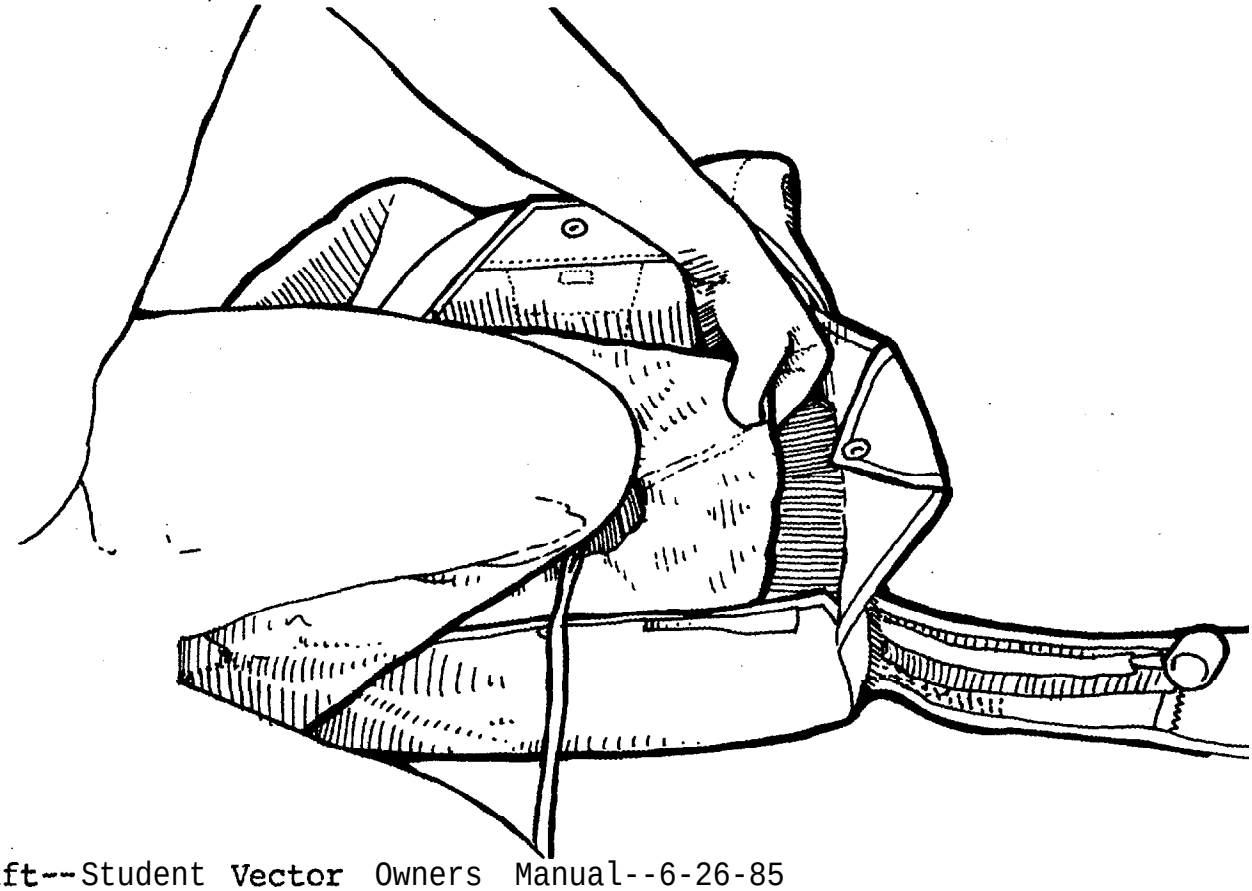
C. Thread the pull-up cord through the pilot chute from the big end (bottom) so it comes out of the grommet on the cap.



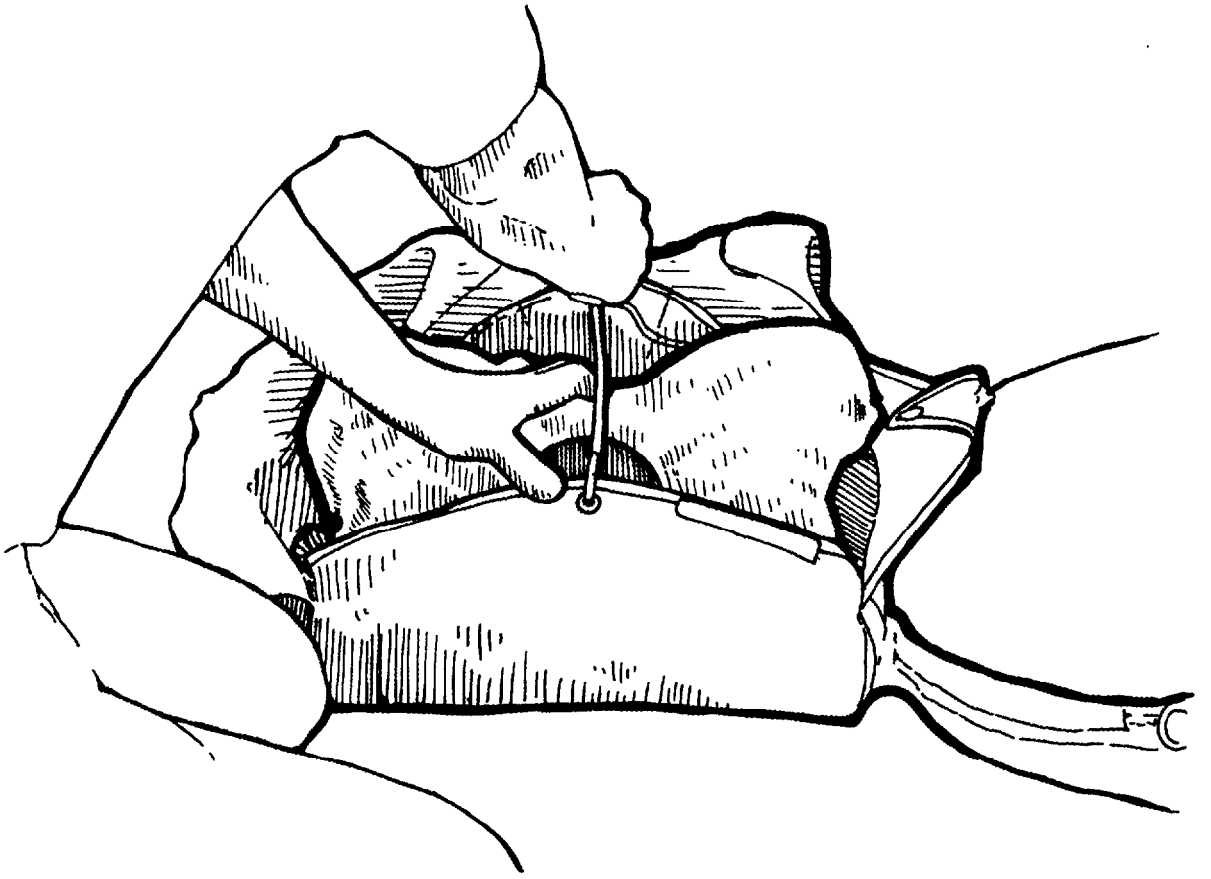
D. Compress the pilot chute or top of the stiff flap.



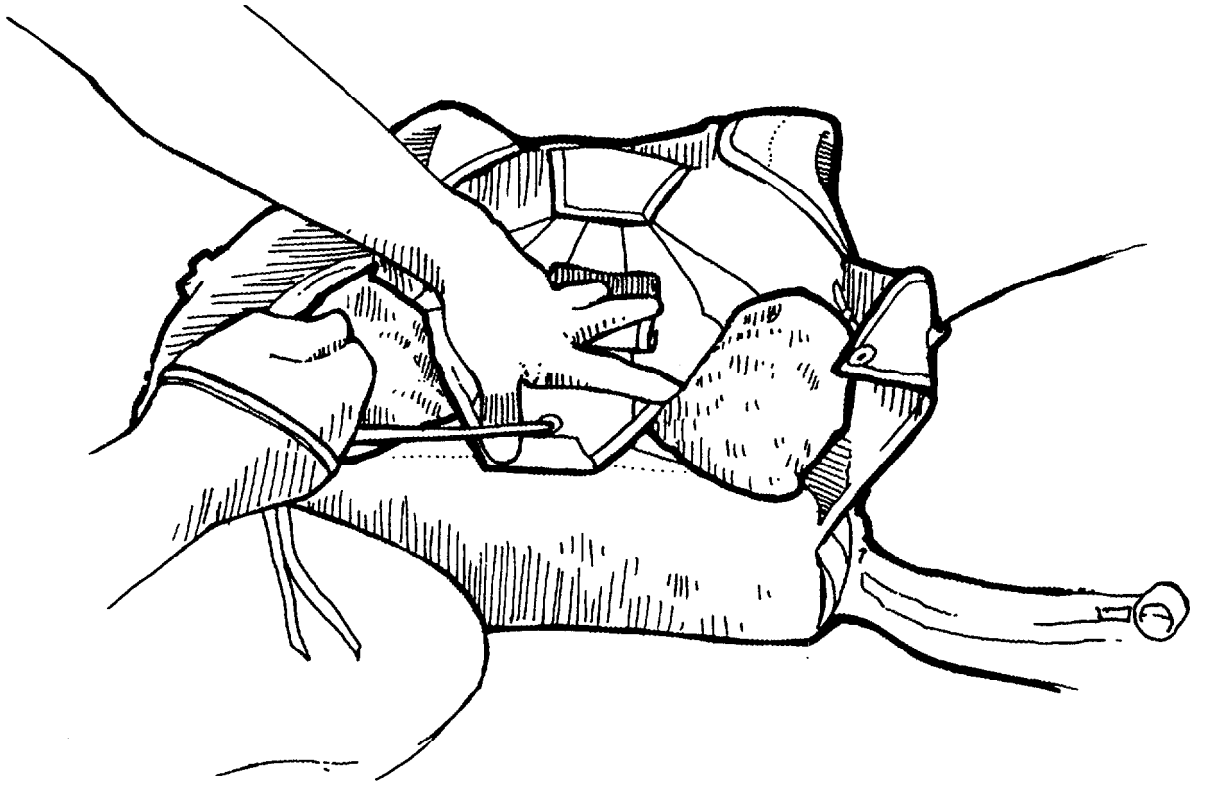
E. Use your knee to hold pilot chute in place, and neatly fold the p chute material, spreading it out so it ccvers most of the bag.



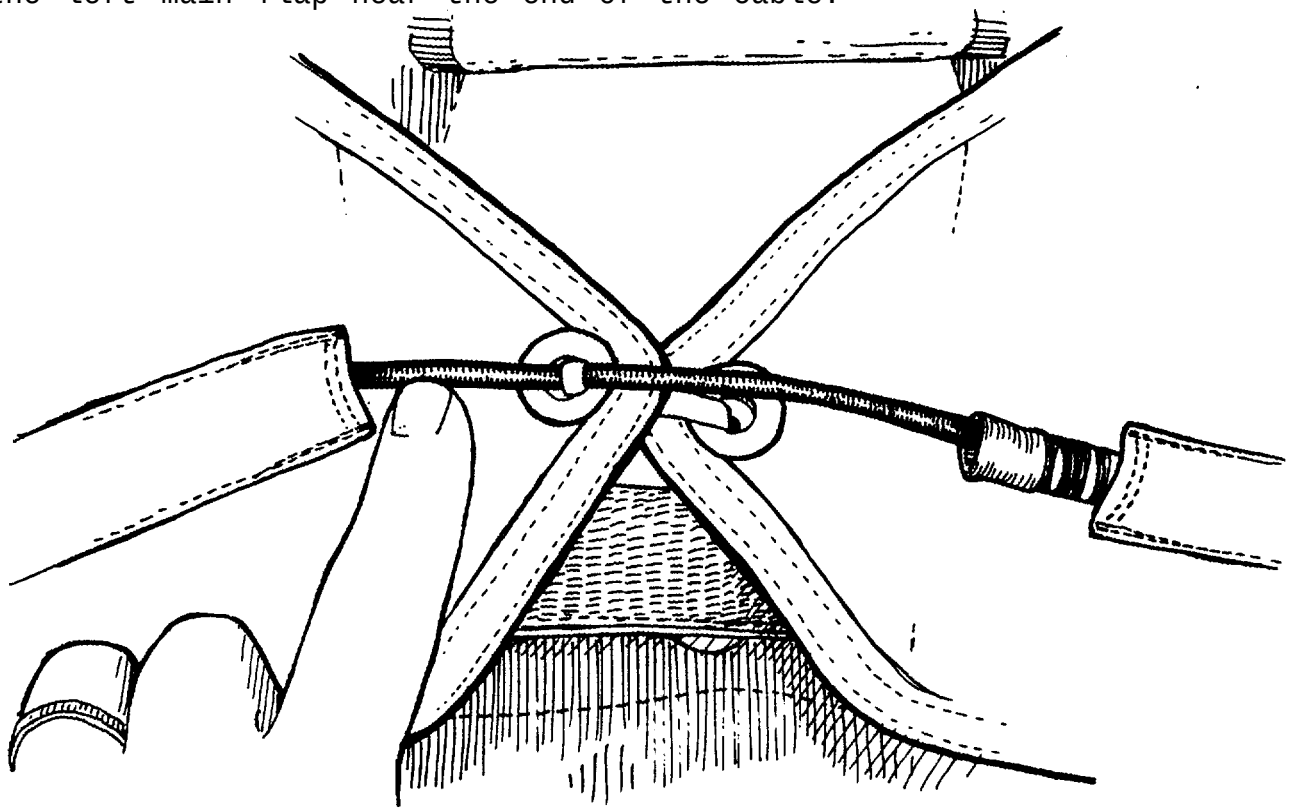
F. Xeeping the pilot chute compressed, route the pull-up cord through the grommet on the bottom flap of the Container. Pull the loop through the grommet by pounding the Container as you pull on the pull-up cord to avoid overstressing the grommets.



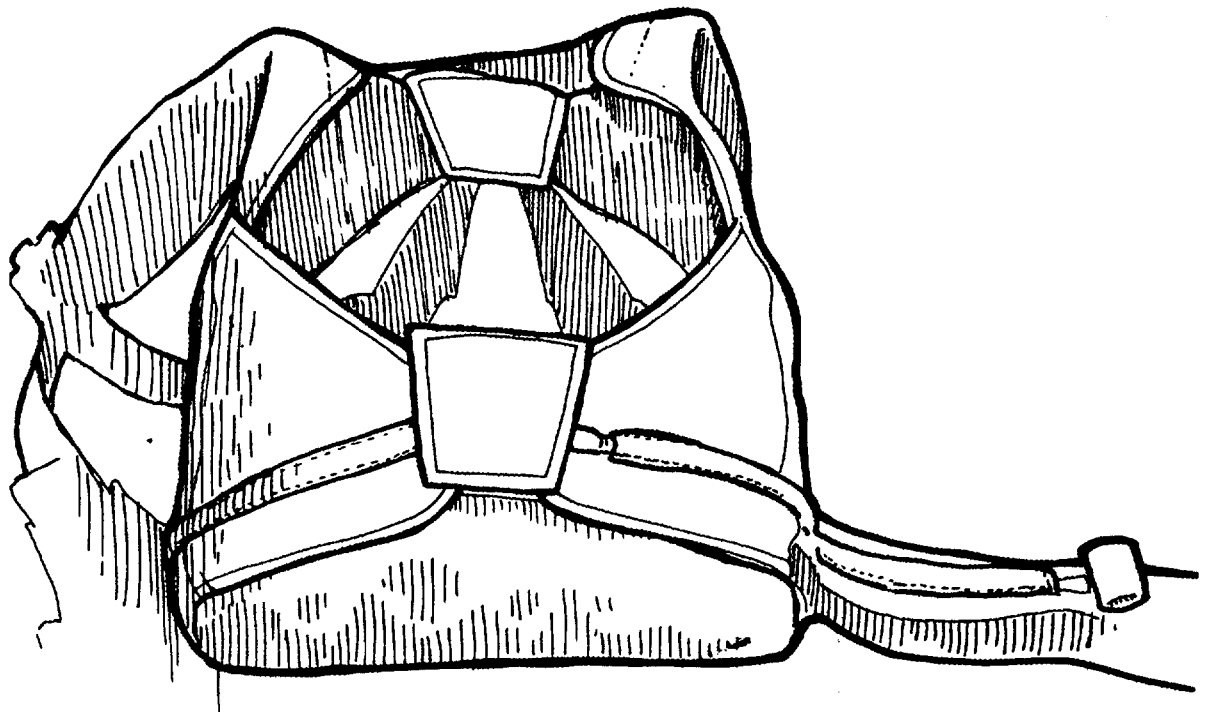
G. Repeat the closing procedure with the top, right-hand and left-hand flaps. (The flaps must be closed in that order.)



H. Insert the end of the ripcord cable through the locking loop. Pull it all the way through the locking loop and insert it into the channel on the left main flap near the end of the cable.



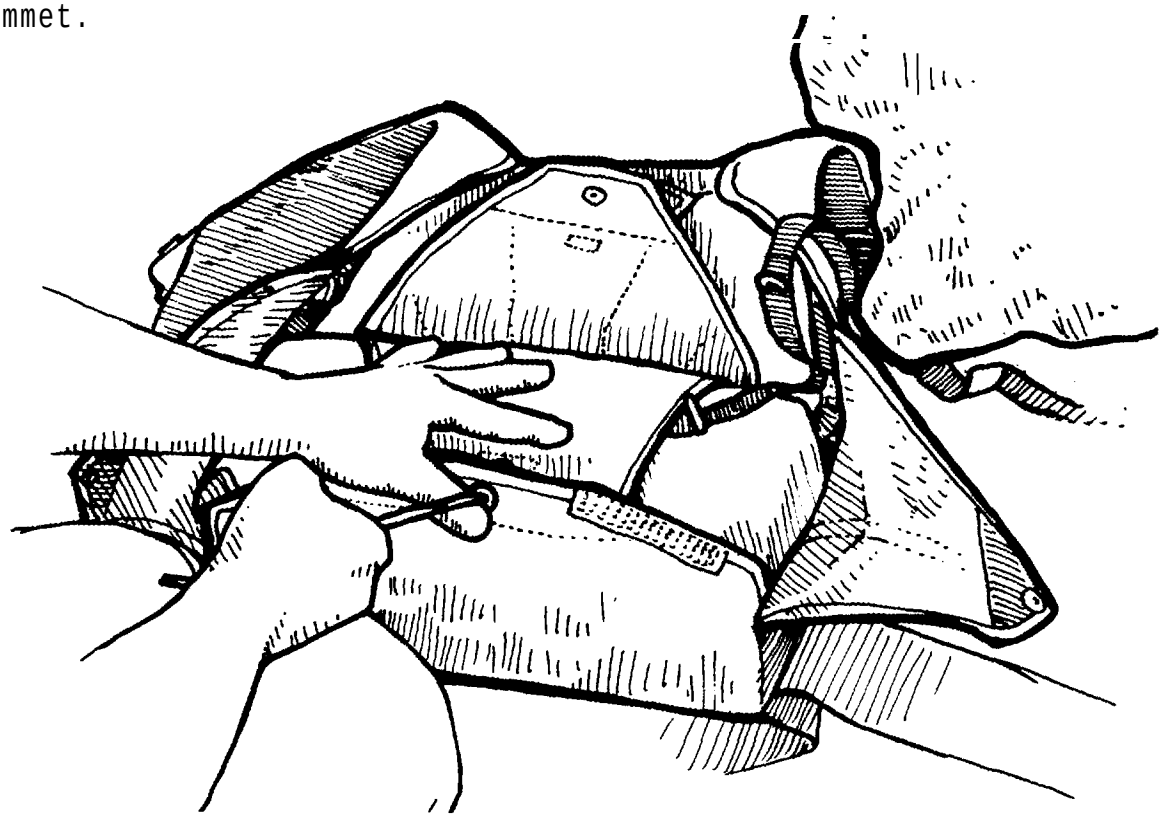
1. Slowly remove the pull-up cord to avoid burning the cable **or** locking loop from excess friction. Close the cover flap.



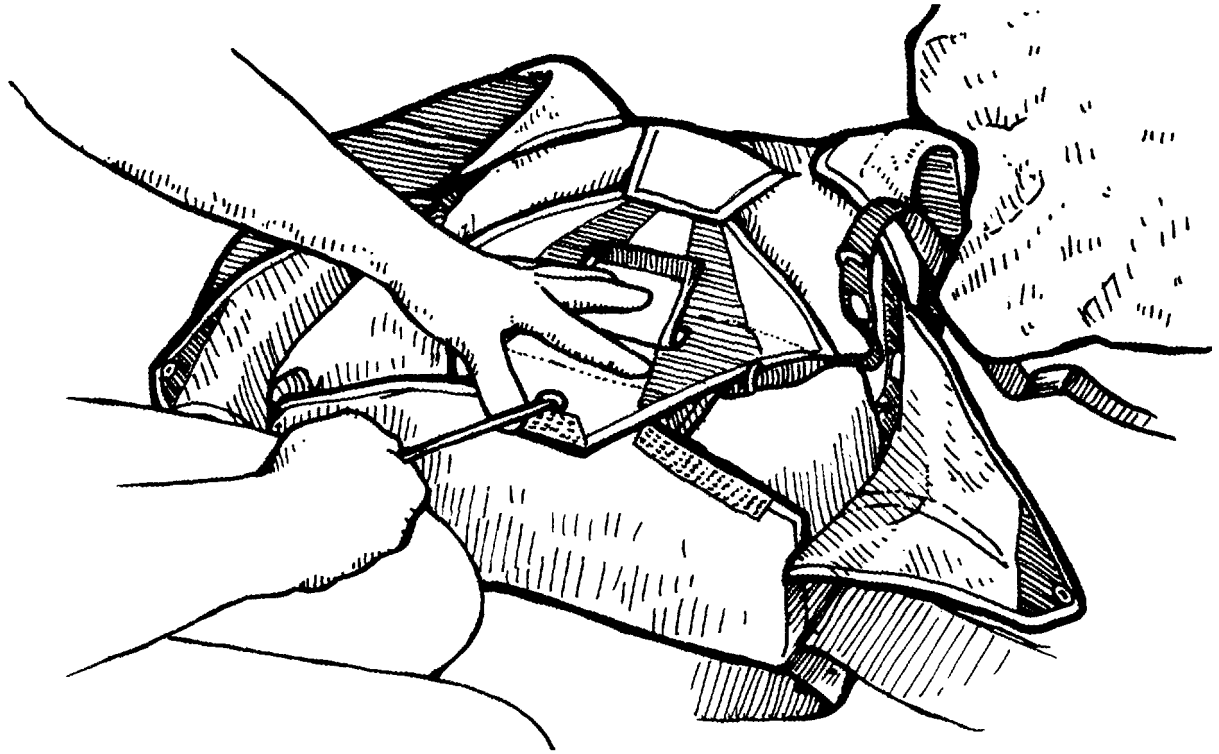
REMOVE THE PULL-UP CORD OR THE CONTAINER WON'T OPEN

Closing the Container

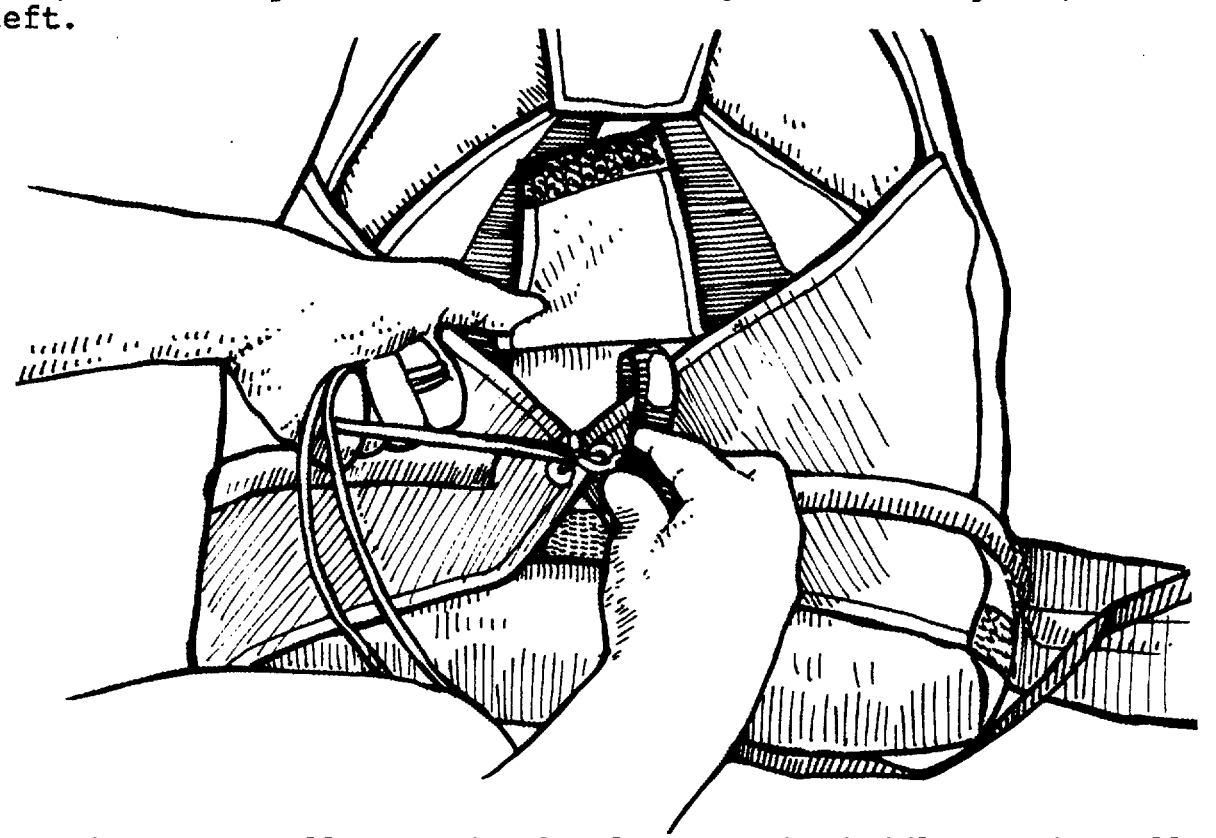
A. Insert a pull-up cord through the loop on the stiff pilot chute flap. Route the bridle to the right of the pull-up cord and out the top of the Container. Thread the pull-up cord through the bottom Container flap grommet.



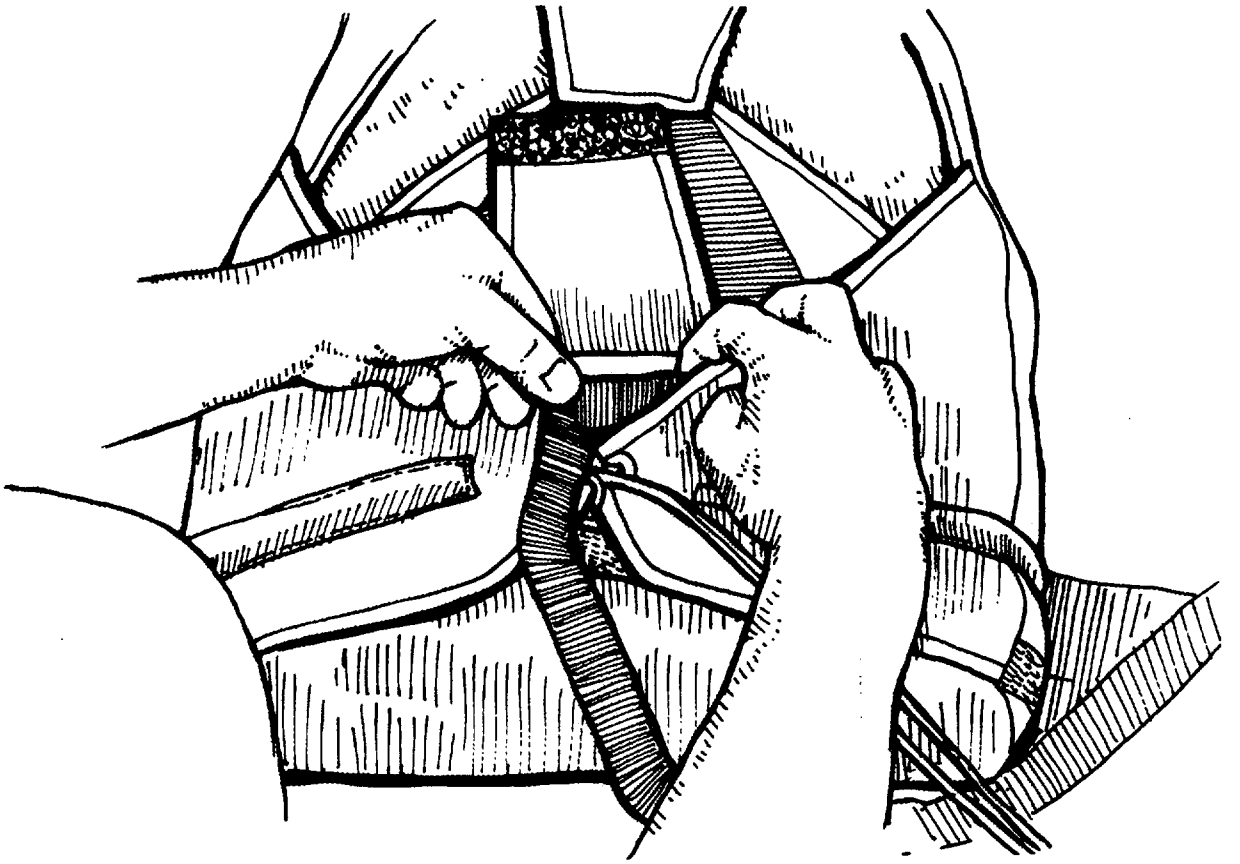
B. Thread the pull-up cord through the grommet on the top flap. Pull the pull-up cord through the grommets by pulling upwards toward the top of the Container. Pound the bottom of the Container until the locking loop comes through the two grommets. Avoid overstressing the grommets.



C. Thread the right-hand then left-hand side flaps using the same pounding technique. (The flaps must be closed in that order. Insert curved pin on the pilot chute bridle through the locking loop from ri to left.

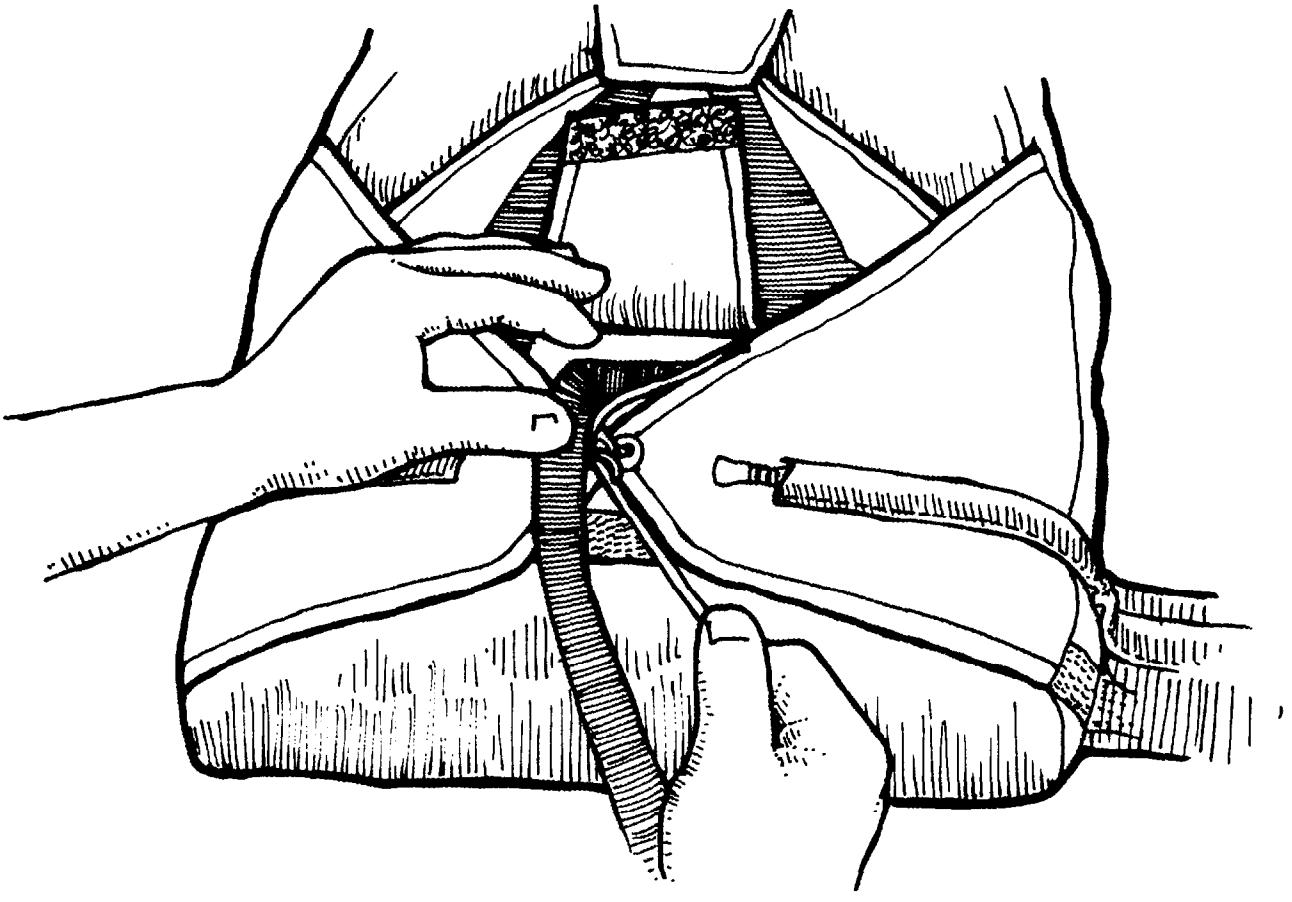


D. Mate the small yellow patch of Velcro on the bridle to the yellow patch on the Container. This provides slack in the bridle between th pin and the pack, allowing the pin to be easily extracted from any direction.

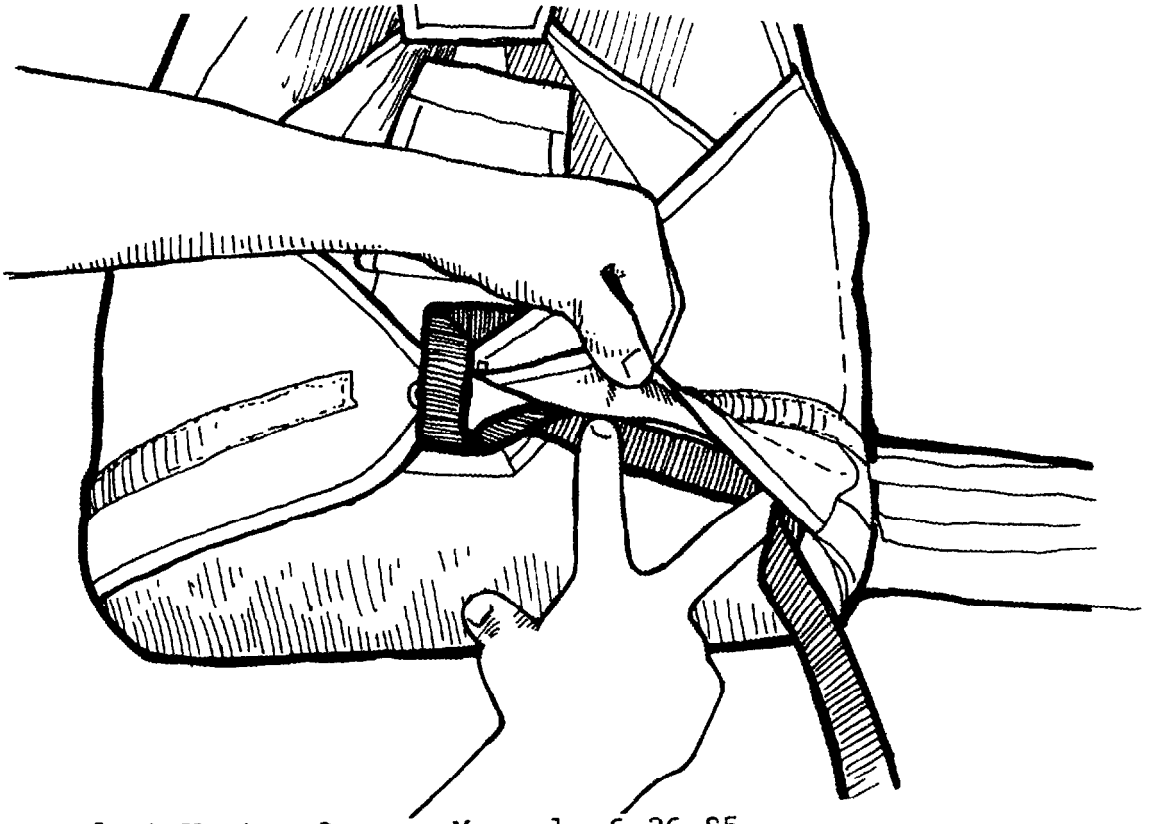


E. Slowly remove the pull-up cord to prevent excess friction from damaging the locking loop. It's best to buffer the locking loop with the curved pin while removing the pull-up cord by passing one end of the loop behing the pin before removing it.

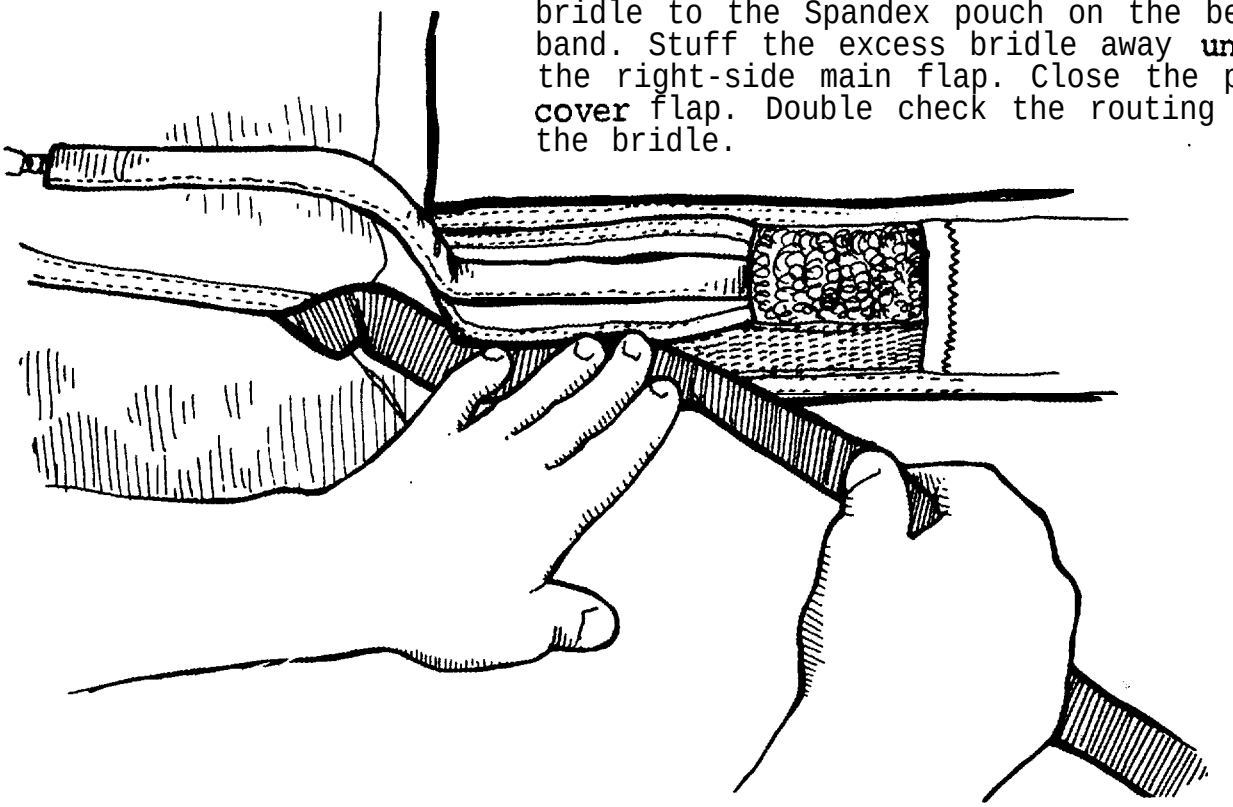
REMOVE THE PULL-UP CORD OR THE CONTAINER WON'T OPEN



F. Mate the Velcro on the bridle to that on the Container beginning with that on the right-hand side of the bottom flap.



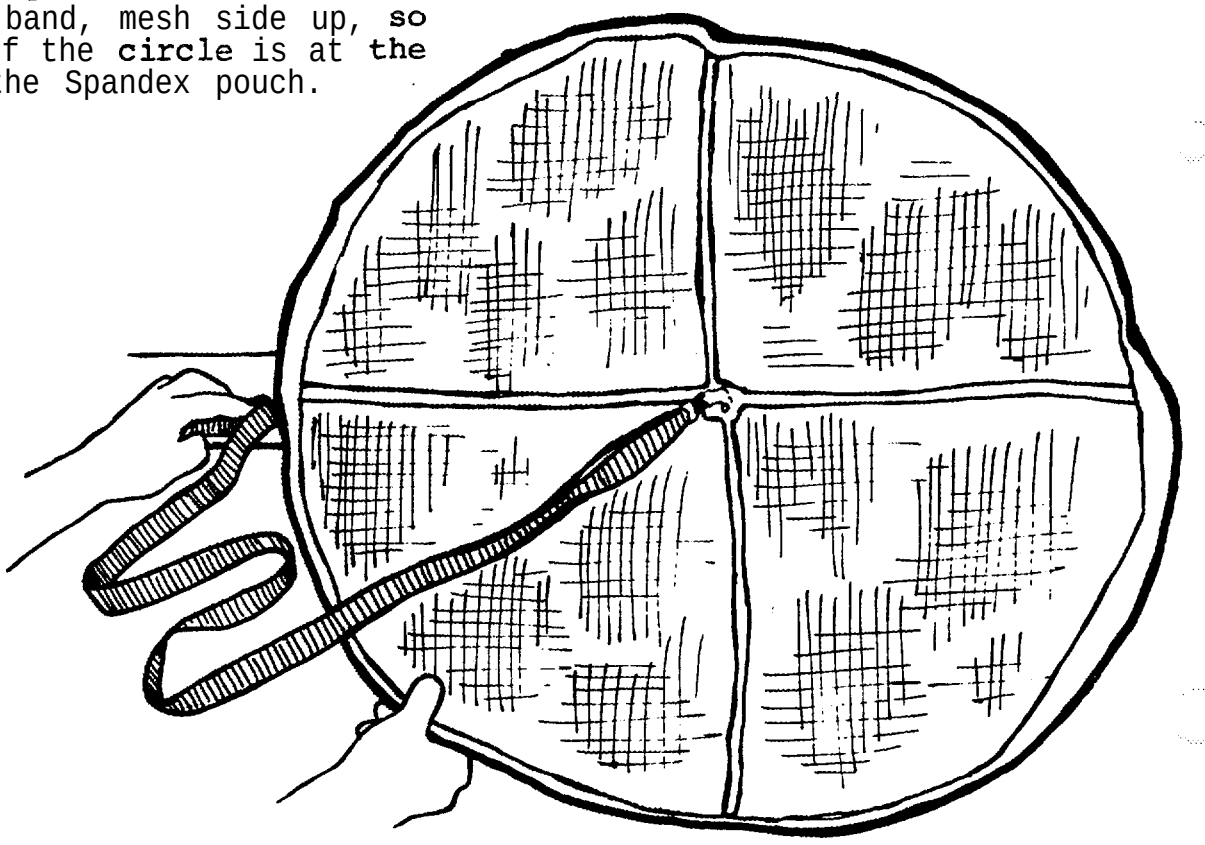
G. Continue mating the Velcro on the bridle to the Spandex pouch on the belly band. Stuff the excess bridle away under the right-side main flap. Close the pin cover flap. Double check the routing of the bridle.



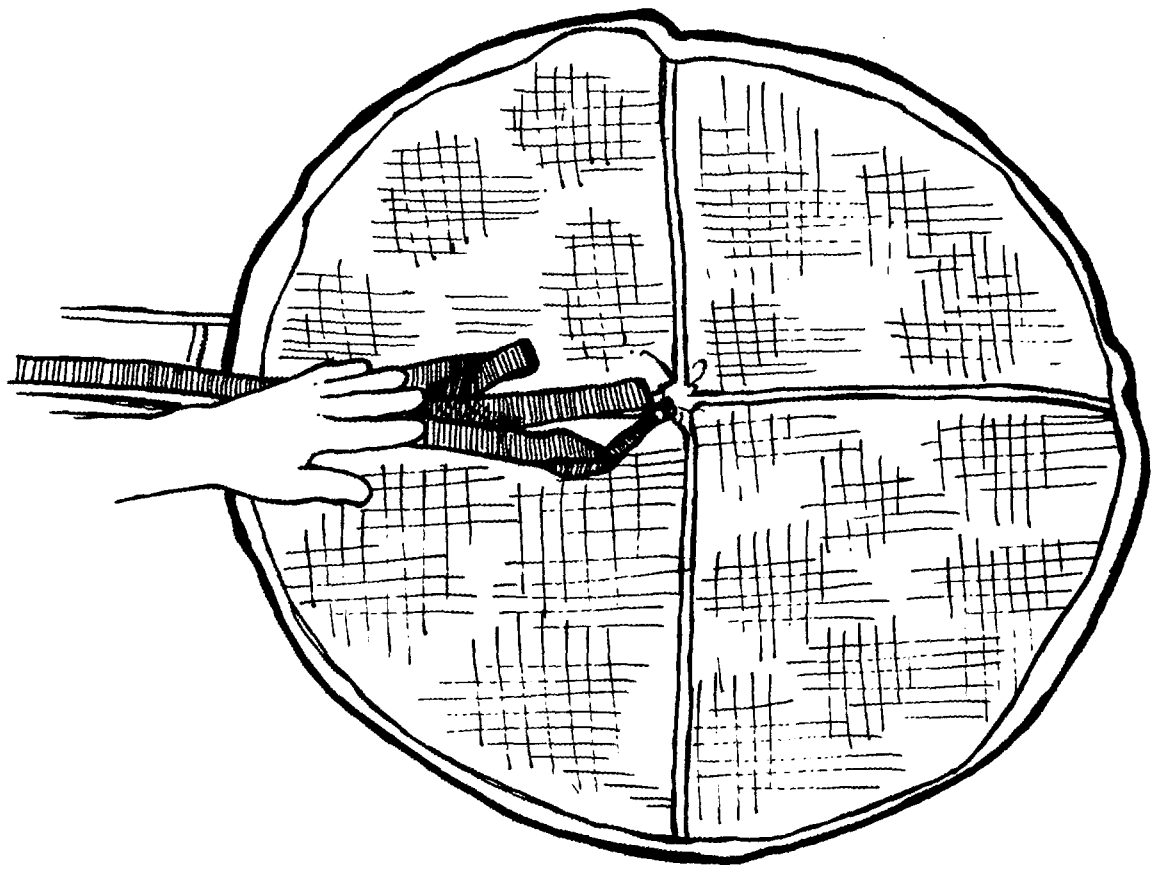
Note: It may be necessary to adjust the length of the locking loop to make the flaps mate properly. The curved pin should be held firmly in place, but move with *no* more than 12 pounds of pull.

FOLDING THE PILOT CHUTE

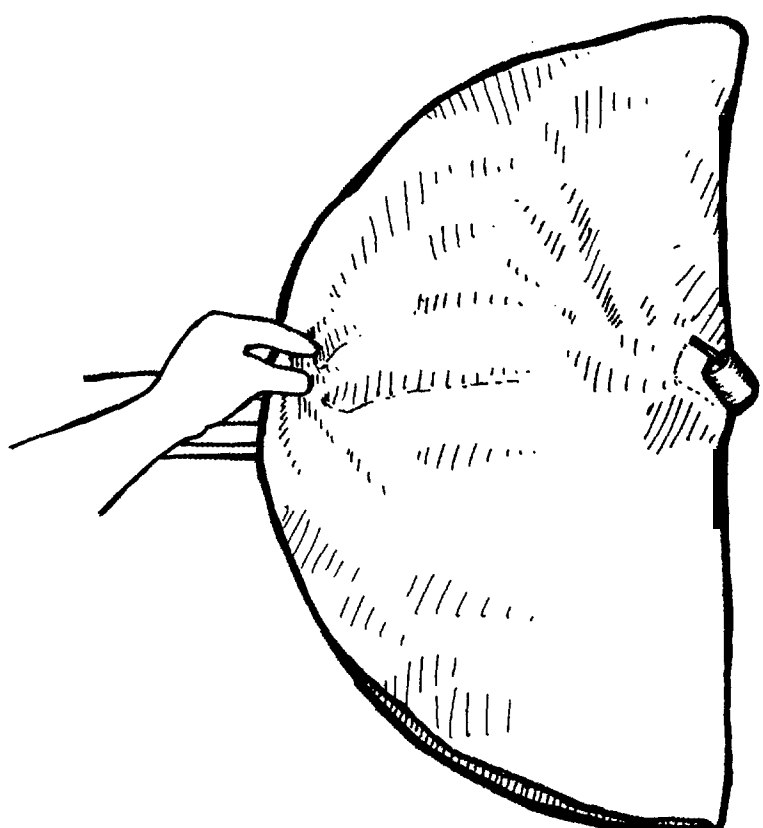
1. Lay the pilot chute out over the belly band, mesh side up, so the edge of the circle is at the mouth of the Spandex pouch.



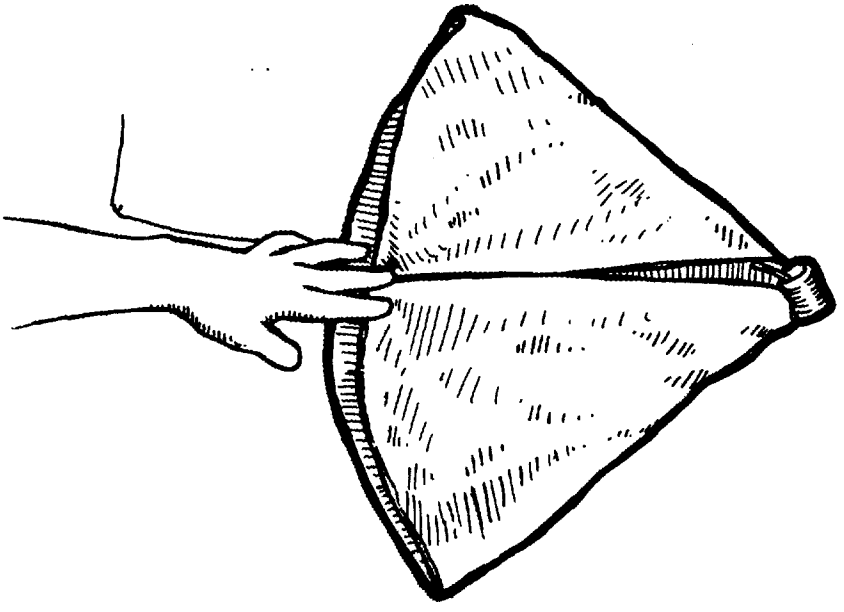
J. S-fold the bridle on the half of the pilot chute over the pouch.



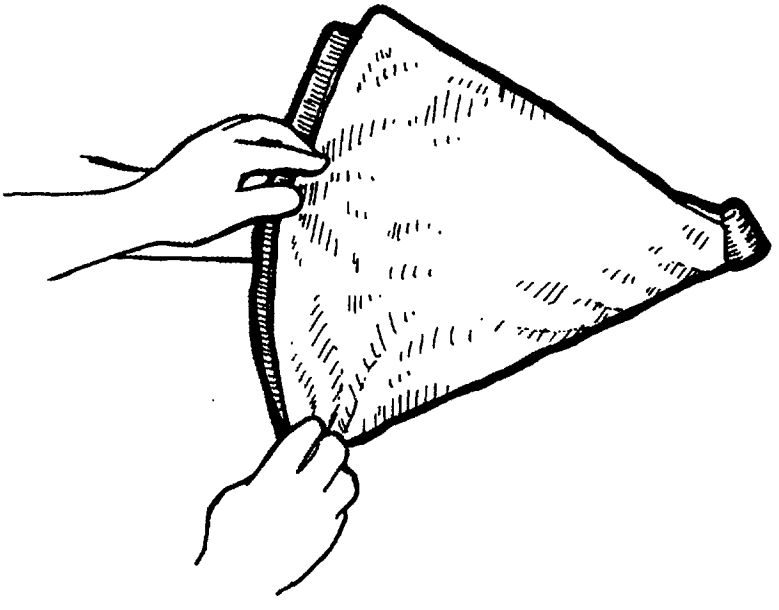
K. Fold the pilot chute in half over the bridle.



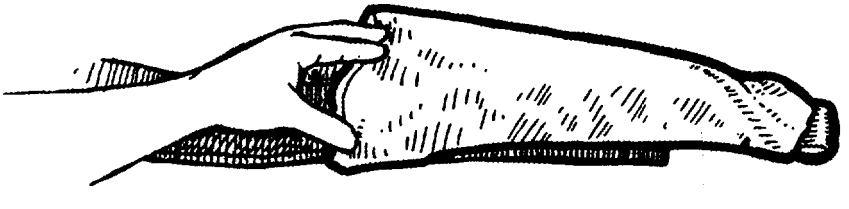
L. Bring the corners down to form a wide triangle.



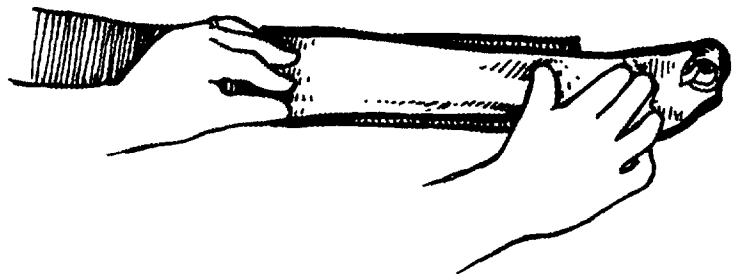
M. Fold the triangle in half, forming a smaller triangle.



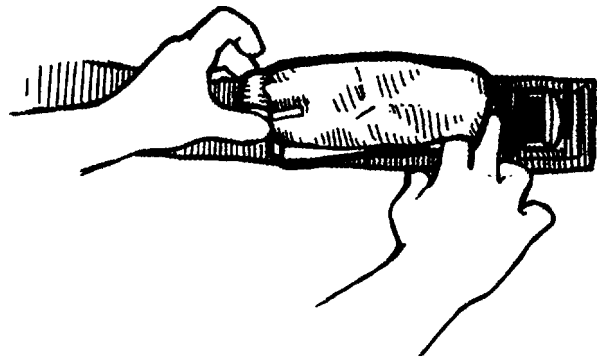
N. Fold the triangle into thirds forming a skinny triangle.



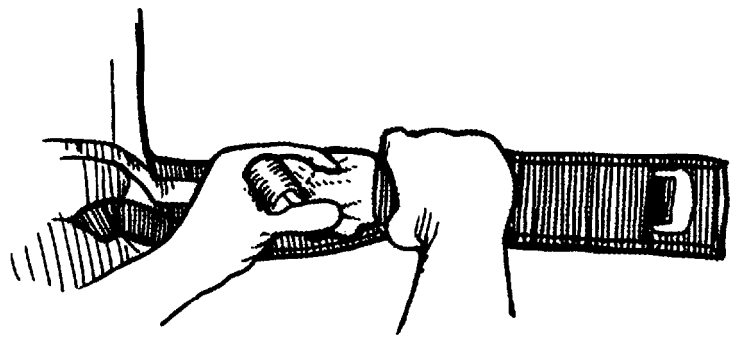
0. Fold once more in half, making a very skinnv triangle.



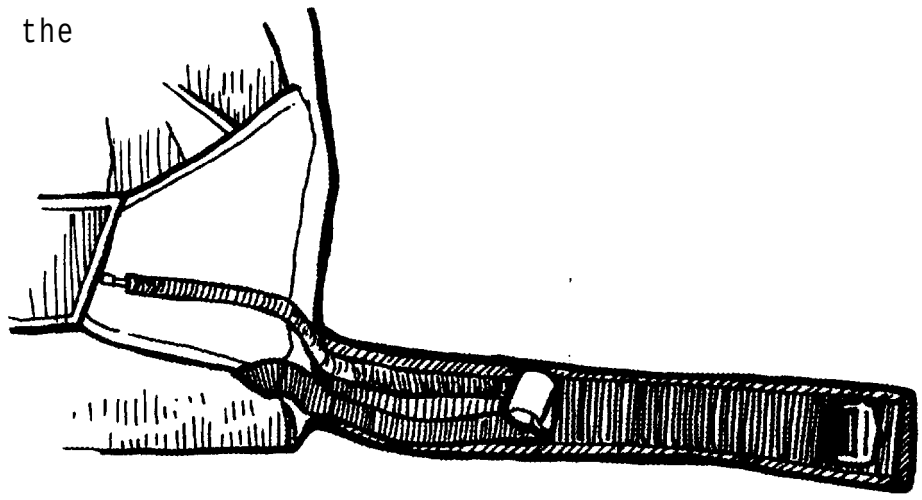
P. Fold the pilot chute in half so that the handle is even with the skirt.



Q. Stuff the folded pilot chute into the Spandex pouch. You will need to separate some of the bridle Velcro to keep from pulling any bridle from inside the folded pilot chute. Remate the bridle Velcro and smooth out the pouch.



R. Make sure that only the handle sticks out.



WARNING

Whether using the ripcord or the curved pin to retain the locking loop, the pull force must not exceed 12 lbs. Adjust the length of the locking loop accordingly.

For hand deploy, the small patches of yellow Velcro cn the bridle and the top Container flap must be mated. Failure to do this may result in a pilot chute-in-tow malfunction.

Removing the pull-up cord too fast when the ripcord is installed can melt a notch in the ripcord cable resulting in a hard pull.

For Static Line Deployment

The Student Vector is supplied with a static line that attaches directly to the deployment bag for static line jumps.

STATIC LINE INSTALLATION AND PACKING PROCEDURES

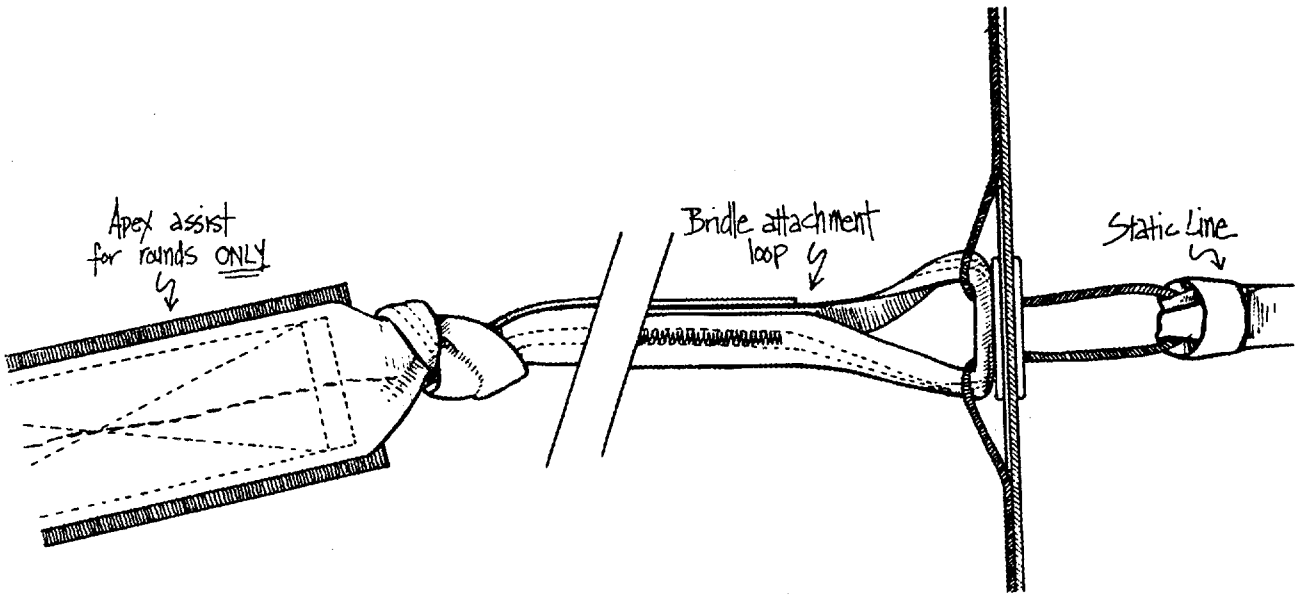
A. If installed, remove the hand deploy or ripcord deployed pilot chute and bridle.

B. Attach the static line to the deployment bag with a larkshead knot.

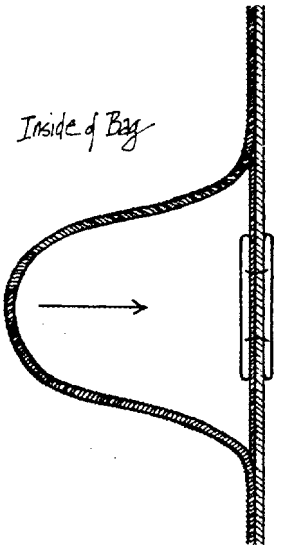
If a round canopy is being used, the apex assist assembly must be installed at the end of the bridle attachment loop with a larkshead knot.

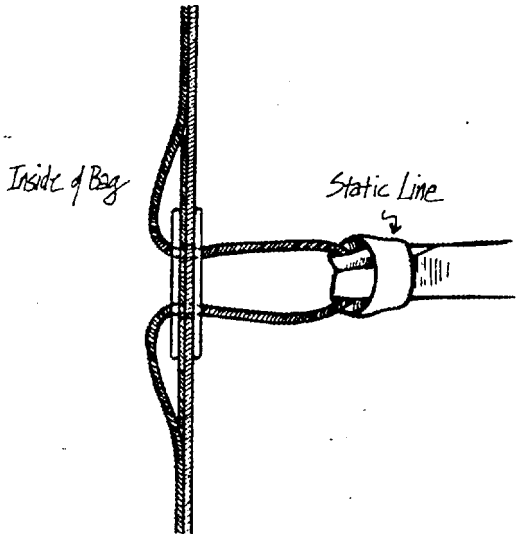
The apex assist assembly helps the round canopy deploy in an orderly manner. It temporarily holds the apex as the jumper falls away from the aircraft, stringing the canopy out. When the canopy is fully extended, it pulls free of the apex assist and inflates.

The apex assist assembly is used for static line jumps of round parachutes only. It is not used for ram-air canopies deployed by static line unless mandated by the canopy manufacturer, nor is it used for any freefall jumps.



If a ram-air canopy is being used, remove the bridle attachment loop.





For complete directions with illustrations, turn to page 10.

C. Layout, flake and fold the canopy according to the instructions supplied by the canopy manufacturer.

D. Fold the canopy as wide as possible, so the Container will be as flat as possible. If a round canopy is being used, attach the apex assist by mating the Velcro securely, Pull the bag down over the top of the folded canopy.

E. Stack the canopy into the deployment bag. Be sure to fill the corners completely.

F. To-close the bag, pass one of the center two rubber stow bands through its corresponding grommet and insert a 1- to 2-inch bight of lines through the stow band. Repeat this step with the other center stow band and grommet, followed by the band and grommet at each corner.

G. Stow the remainder of the lines across the bottom of the bag in the elastic stow bands. Keep the bights of lines 1 to 2 inches. Leave no more than 15 inches of lines unstowed.

H. Use your knees or feet to "walk" on the bag, squeezing air out and distributing the bulk until the middle is no fatter than the sides.

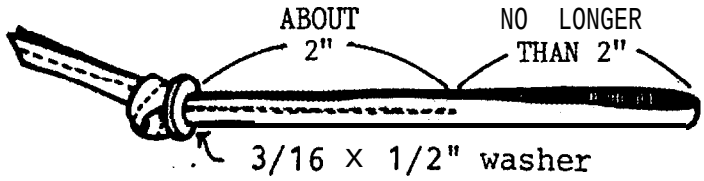
1. Insert a pull-up cord through the loop on the stiff pilot chute flap. Route the static line to the right of the pull-up cord and out the top of the Container. Thread the pull-up cord through the bottom Container flap grommet.

J. Thread the pull-up cord through the grommet on the top flap. Pull the pull-up cord through the grommets by pulling upwards toward the top of the Container. Pound the bottom of the Container until the locking loop comes through the two grommets. Avoid overstressing the grommets.

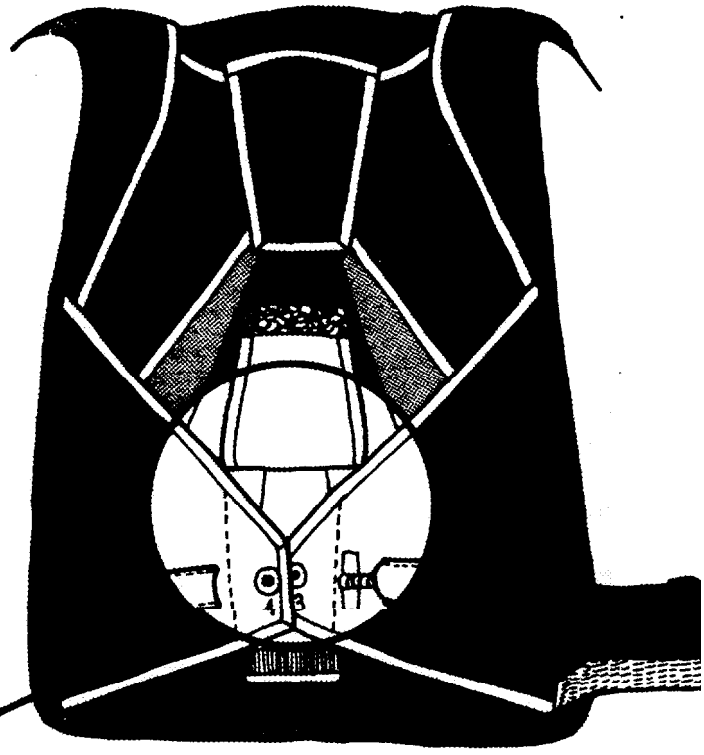
K. Thread the right-hand then left-hand side flaps using the same patting technique. (The flaps must be closed in that order.)

L. Insert the curved pin on the static line through the locking loop from right to left.

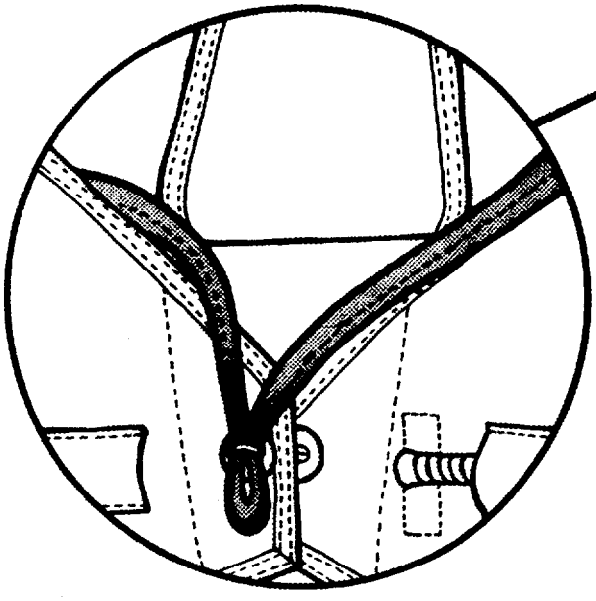
For Static Line Student Vectors WITHOUT a curved pin, disregard L through N on pages 24 and 25 and follow these directions instead.



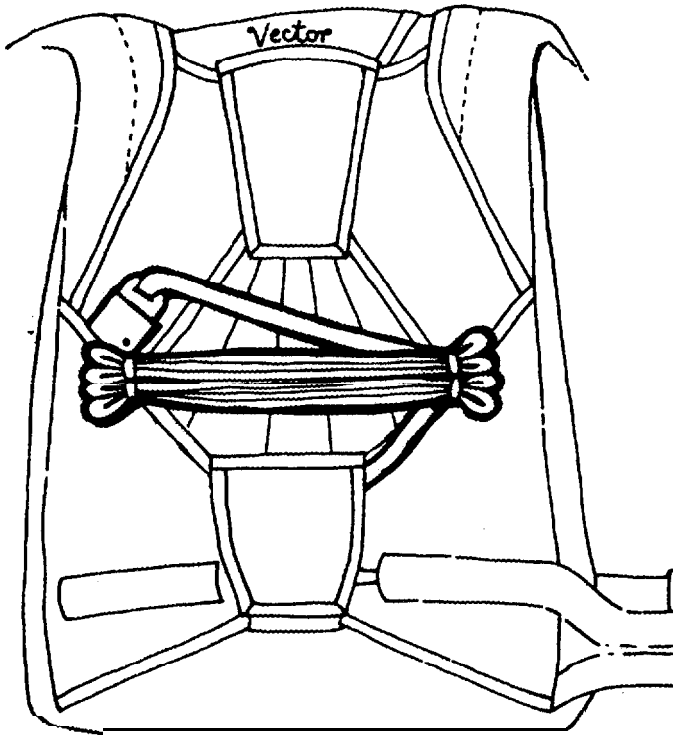
When using the Student Vector static line that has no curved pin, be sure you have the correct closing loop. It should be doubled over 550 cord sheathing (125 lb test), sewn partially closed. The opening of the loop should be no longer than 2". A larger opening might entangle with the knot at the bottom of the pilot chute, causing a total malfunction. The opening is larger than normal because the rig will be closed with a bight of static line instead of a curved pin.



For a right side exit, route the static line from under the left main side flap as shown. Close the flaps in the correct order (bottom, top, right, left) and use a bight of static line to keep the rig closed. The bight should be about one inch long as shown.



NOTE: for left side exit, route the static line from the right.
WARNING: MISROUTING STATIC LINE FROM WRONG SIDE FLAP MAY CAUSE CONTAINER DAMAGE.



Stow the static line in rubber bands installed on the loops on either side of the Container. Stow the static line clip under the left main flap until it is time to hook it up.

M. Slowly remove the pull-up cord to prevent excess friction from damaging the locking loop. It's best to buffer the locking loop with the curved pin while removing the pull-up cord by passing one end behind the pin before removing it.

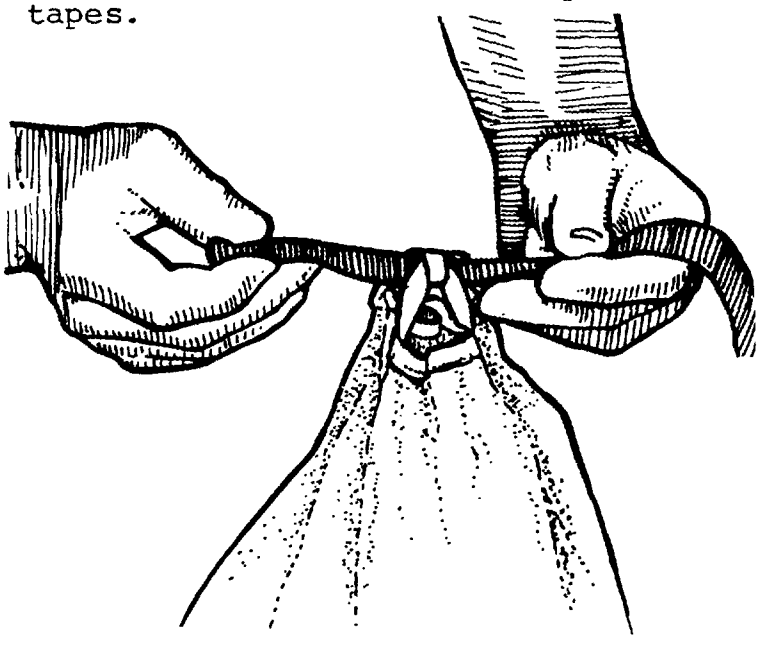
N. Stow the static line in rubber bands attached to the small webbing loops installed on either side of the main Container.

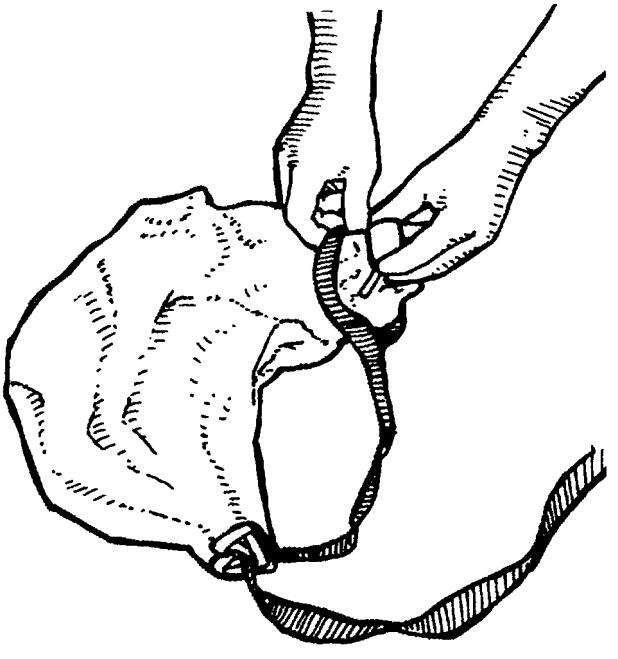
It is the responsibility of the owner to insure the main parachute static line is of the proper length and strength. (A static line that is too long can entangle with the control surfaces of the aircraft, and one that is too short may cause the main canopy to strike the aircraft's tail.)

Converting from One Freefall Deployment Method to Another

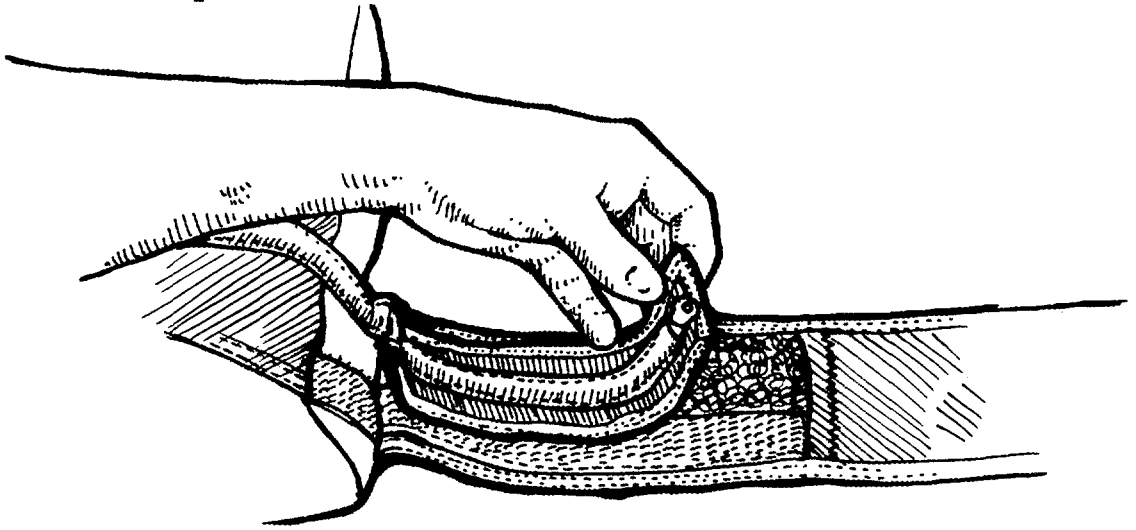
1. From Ripcord to Hand Deployment:

A. Remove the spring-launched pilot chute from the end of the bridle and attach the supplied hand deploy pilot chute using a larkshead knot. (The same bridle is used for both hand deploy and spring-launched pilot chutes.) Be sure the bridle passes around both pilot chute Suspension tapes.

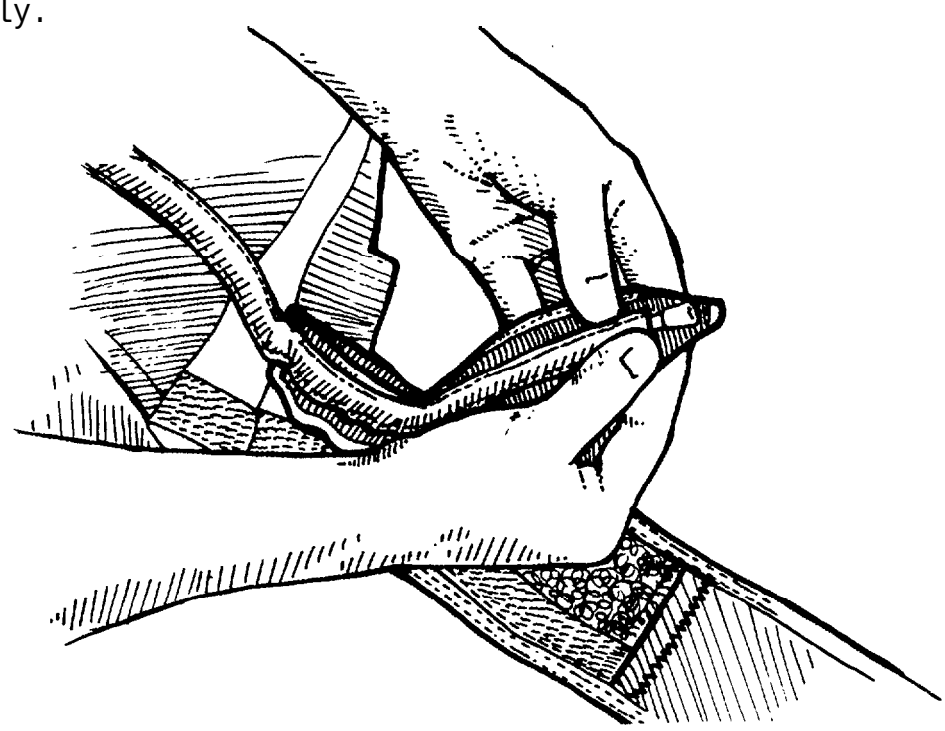




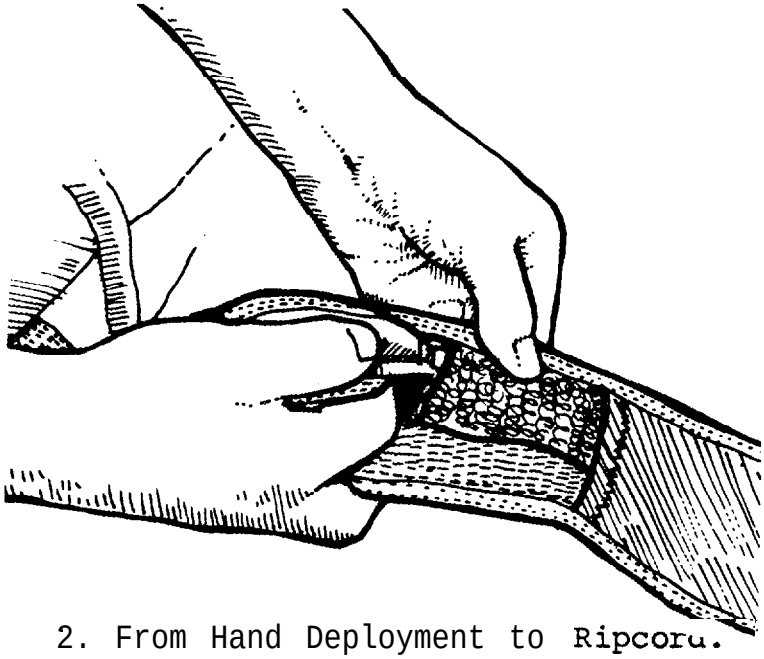
B. Remove the main ripcord and untuck the end of the housing from its slot in the belly band.

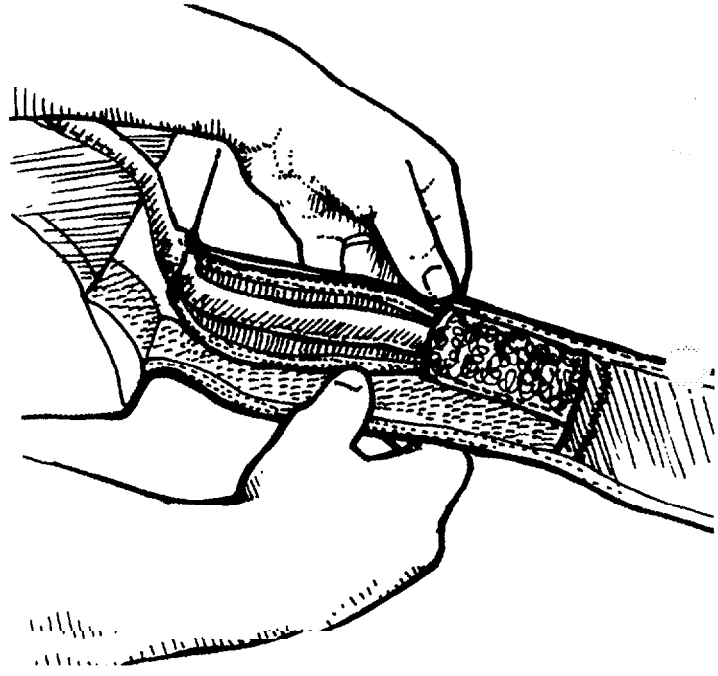


C. Make 45-degree folds at the corners at the end of the main ripcord housing assembly.



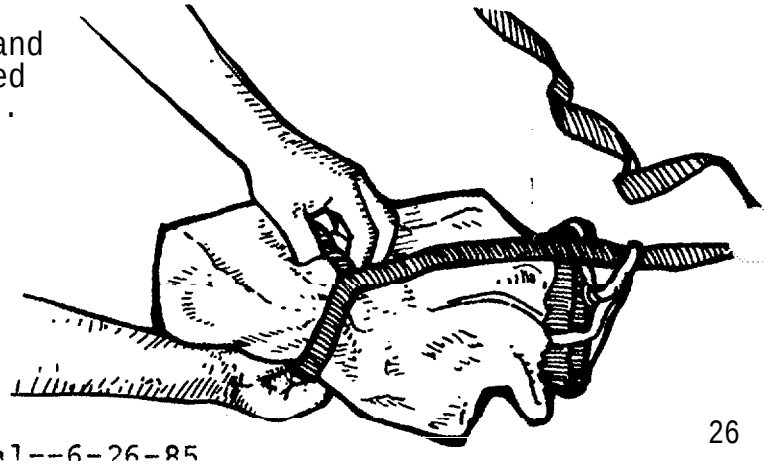
D. Tuck the housing into the slot provided on the belly band and press the Velcro togethor along the entire length.





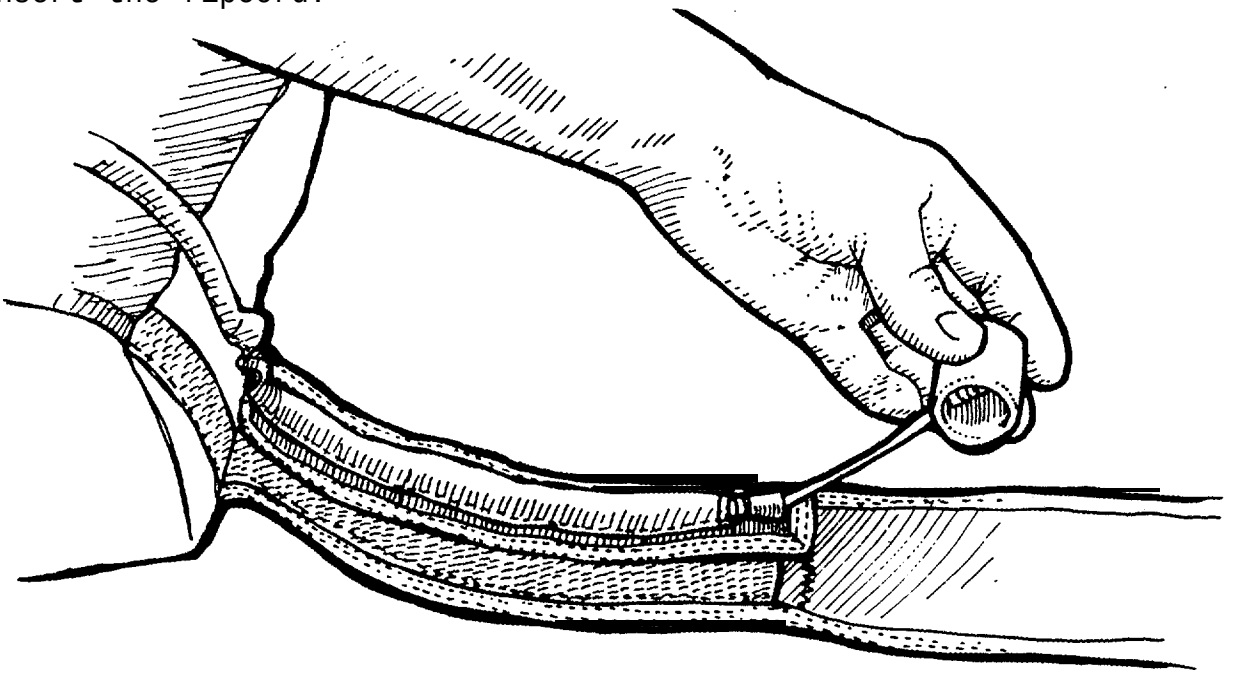
2. From Hand Deployment to Ripcord.

A. Remove the hand deploy pilot chute from the end of the bridle and attach the supplied spring-launched pilot chute using a larkshead knot. (The same bridle is used for both hand deploy and spring-launched pilot chutes.)



1. Untuck the housing end from its slot in the belly band.

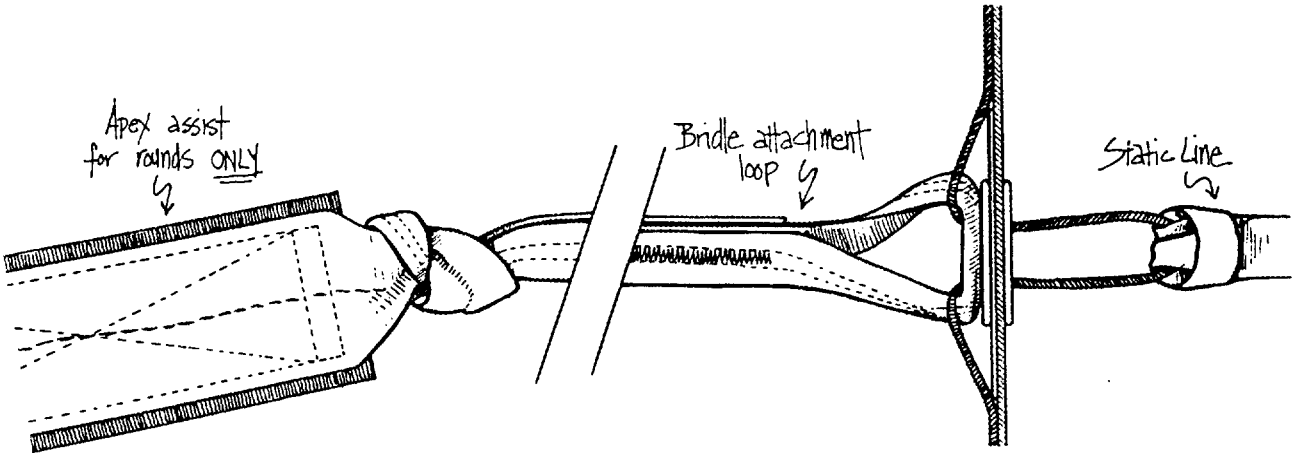
2. Insert the ripcord.



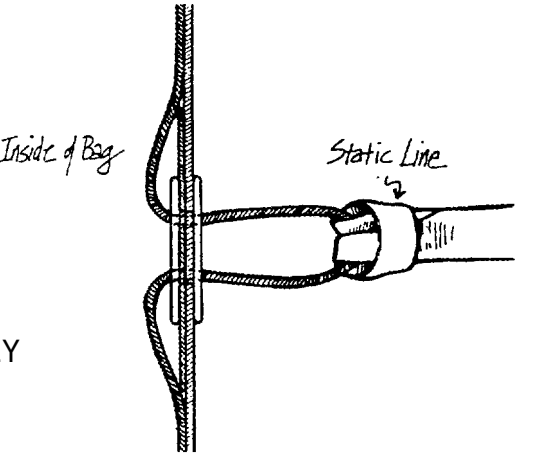
Changing From Freefall to Static Line Deployment

1. Remove the pilot chute bridle and pilot chute. If a ripcord was used, tuck the end of the housing into the slot on the belly band.

2. Attach the static line to the deployment bag. If a round canopy is being used, the apex assist assembly must be installed at the end of the bridle attachment loop with a larkshead knot.



Static line set-up for round canopies ONLY



Static line set-up for square canopies ONLY

STUDENT VECTOR RESERVE PACKING INSTRUCTIONS

Introduction

The first part of this chapter describes procedures for packing round reserve canopies into the Student Vector while the second part covers ram-air reserves.

Instructions later in this chapter tell how to install the FXC 12000 and SSE Sentinel Mk 2000 automatic activation devices.

Federal Aviation Administration regulations require that the reserve parachutes be inspected, maintained, assembled and packed by a appropriately rated Senior or Master Parachute Rigger. Other countries may have similar regulations.

It is assumed that the rigger has knowledge and experience on inspecting, assembling, packing and maintaining sport piggyback assemblies such as the Student Vector. This manual is not a parachute rigging course.

For those owners who cannot locate a qualified rigger, the Relati Workshop will pack and maintain the reserve your Student Vector. The owner bears the costs of all shipping, parts and labor, and the compan cannot guarantee immediate turnaround.

For the Round Reserve:

Because of the great variety of reserve canopies on the market, this manual does not contain instructions on inspecting, assembling a folding the reserve parachute canopy. The rigger must refer to the packing instructions provided by the canopy manufacturer for the information.

Required Tools:

One temporary pin
One pull-up cord (48 in. of 550 cord sheathing)
One packing paddle

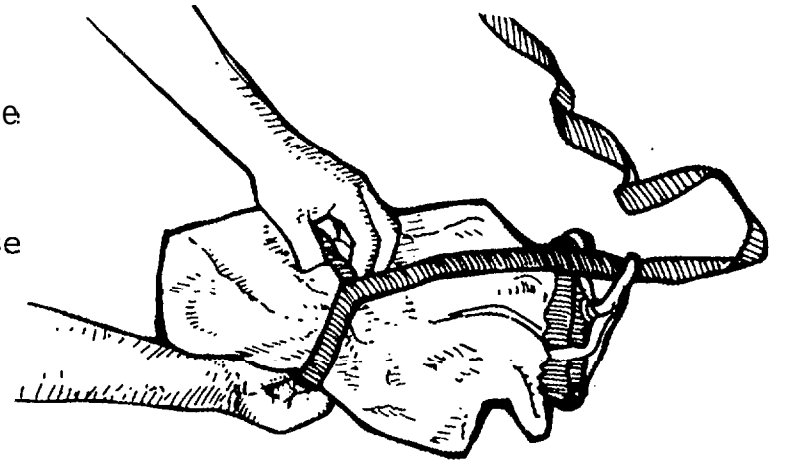
The reserve flaps are numbered 1 to 6 for reference. Close them that sequence.

It is a good idea to read all of these instructions before start to pack the reserve.

1. Attach the canopy to the risers with the steering modifications and/or data panel facing to the wearer's rear. If L-bar links are use make sure their screws are throoughly tightened. If using Rapide link tighten them to snug, plus a quarter turn.

2. Follow the canopy manufacturer's instructions to set up the steeri System.

3. Attach the Vector reserve pilot chute to the apex of the canopy using the Type 4 bridle provided. The larger loop of the bridle wraps around the apex lines and the smaller attaches to the pilot chute. Do not Substitute other bridles because the length of this bridle is important for fast deployment. Do not Substitute another pilot chute for the Vector reserve pilot chute.



4. Inspect the entire reserve system carefully, beginning with the pilot chute and ending with the harness.

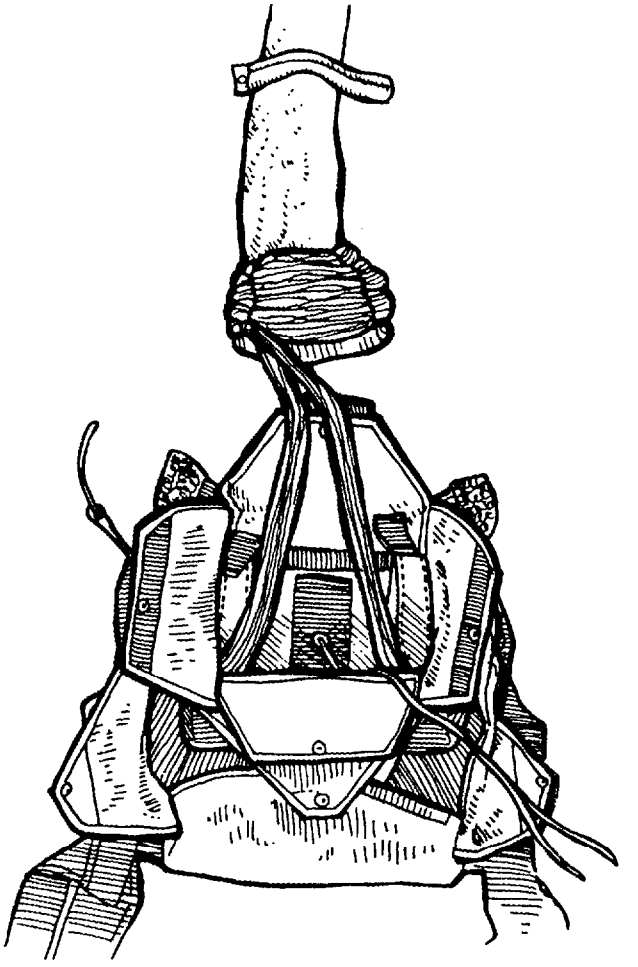
5. Flake the reserve canopy according to the manufacturer's instructions.

6. If your reserve canopy does not have a diaper or other deployment device, fold the skirt up parallel to the radial seams and then long fold the canopy into fifths.

7. If your canopy is equipped with a diaper or similar device, close it according to the manufacturer's instructions.

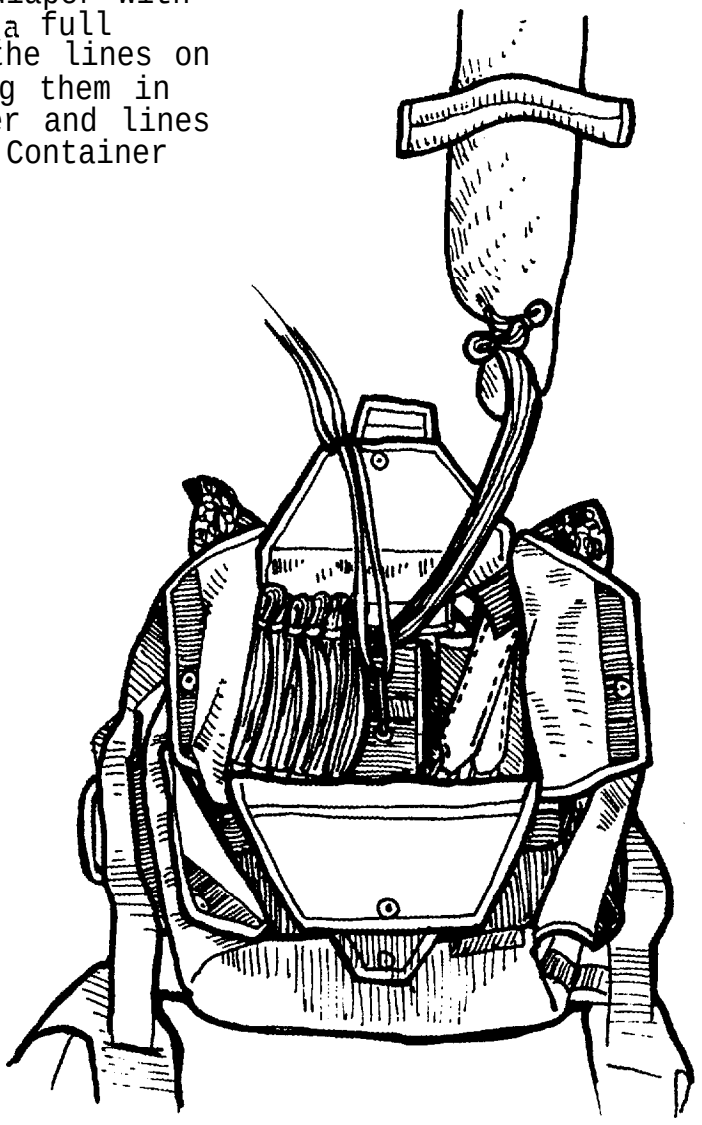
8. Placing the canopy in the pack tray:

Place the reserve risers into the reserve Container with the links lying between the line stow loops and the grommet stiffener plate. Fan the riser ends out rather than stacking them on top of each other,



Stow the lines vertically on the right-hand side of the pack tray, starting from the outside and working toward the middle of the Container.

NOTE: If the canopy has a diaper with all the lines stowed on it (a full stowage diaper), then stow the lines on the diaper instead of stowing them in the pack tray. Lay the diaper and lines on the opposite side of the Container from the power unit.



9. Check the length of the reserve closing loop. The length from the stiffener plate to the end of the loop should measure approximately 2 to 2-1/4 inches for the Pioneer K-XX and Featherlite canopies. For other canopies, the loop will have to be lengthened accordingly.

Two factors determine thc correct loop length. First, it should not take an excessive amount of effort to close the last flap (Flap #6). And when the Container is closed, you should not be able to compress the pack more than 1/4 inch when you push down on the top of the pilot chute.

If excessive play in the spring has developed after the reserve has been packed for a while, unpack the reserve and shorten the loop.

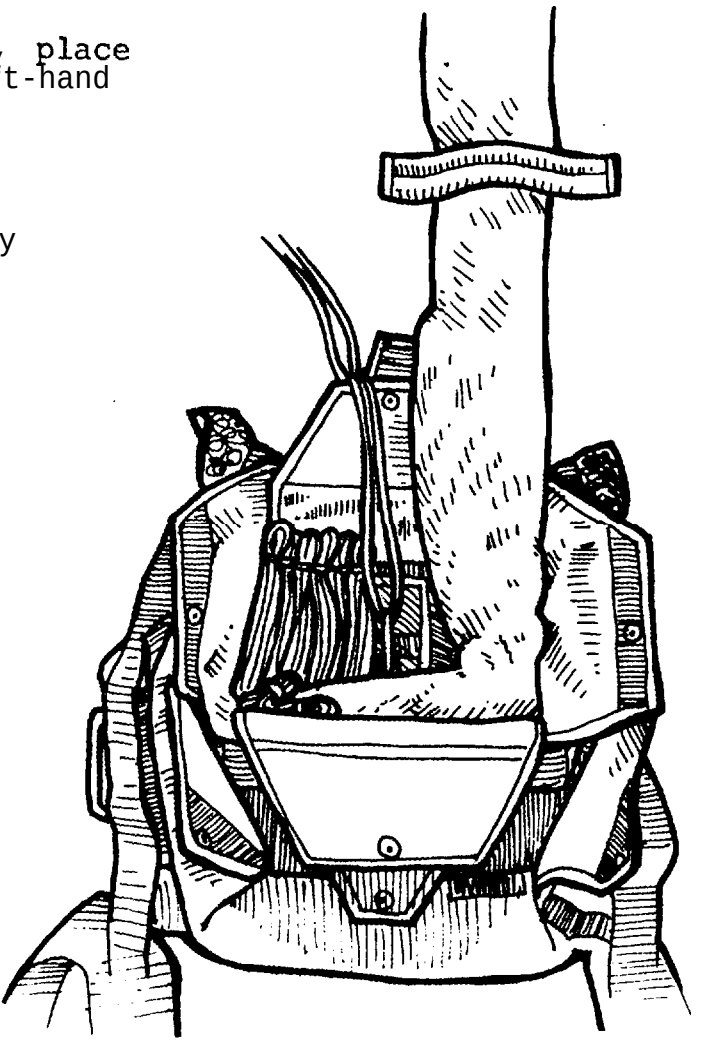
10. Insert the pull-up cord through the reserve locking loop.

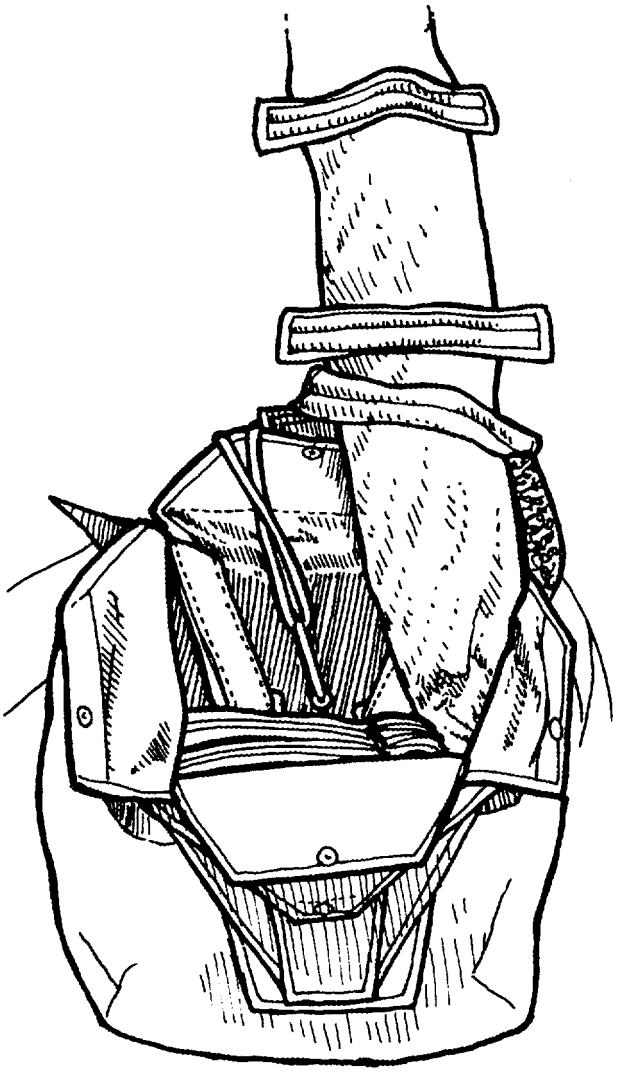
11. Folding the canopy into the Container.

A. The First Fold:

For a canopy without a diaper, place the canopy skirt at the bottom left-hand of the Container into the corner.

For a canopy with a two-bight diaper, such as those built by Pioneer and Strong Enterprises, lay the skirt along the bottom, starting in the left-hand corner, with the two diaper stows facing toward the top (wearer's head) of the container-

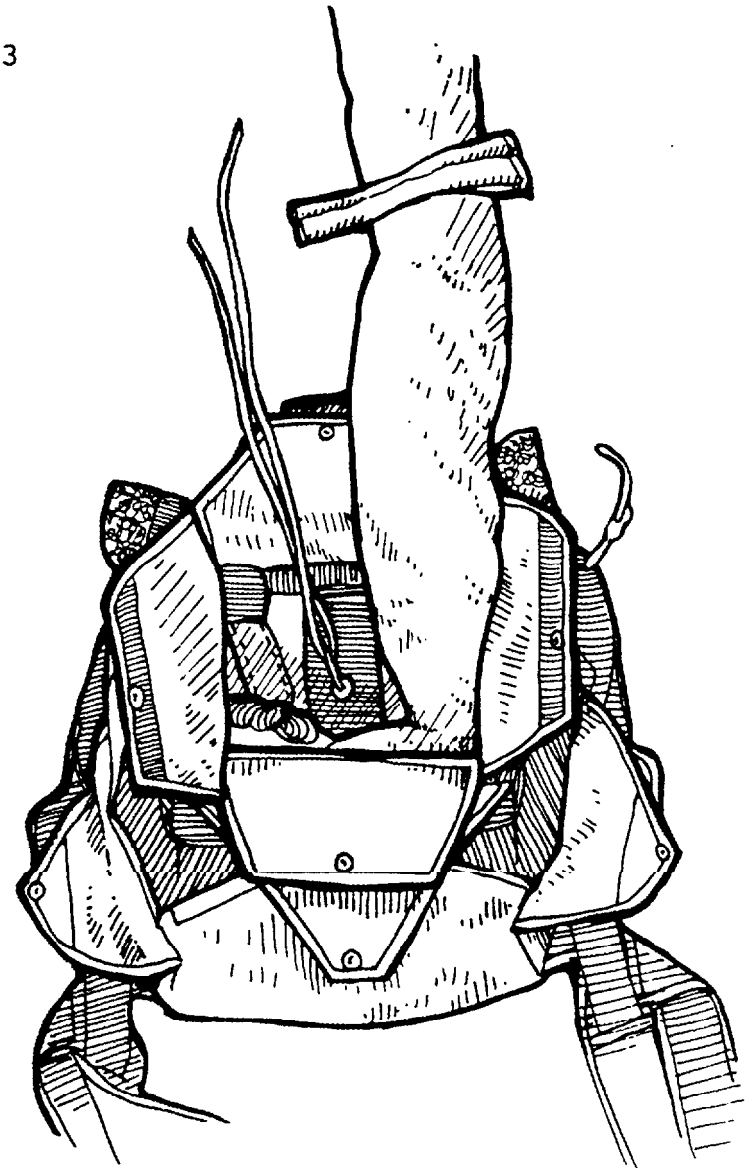




For a canopy with a full diaper cne which the lines stow vertically (such as a Strong Lopo Lite), lay the diaper against the flap that divides the reserve and main Containers, with the skirt in the bottom left-hand corner.

With a Piglet-style diaper such as the Featherlite, about 1/3 of the diaper should be folded -- lengthwise so that the fold lays against the wall between the main and reserve Containers.

B. The Remaining Folds:



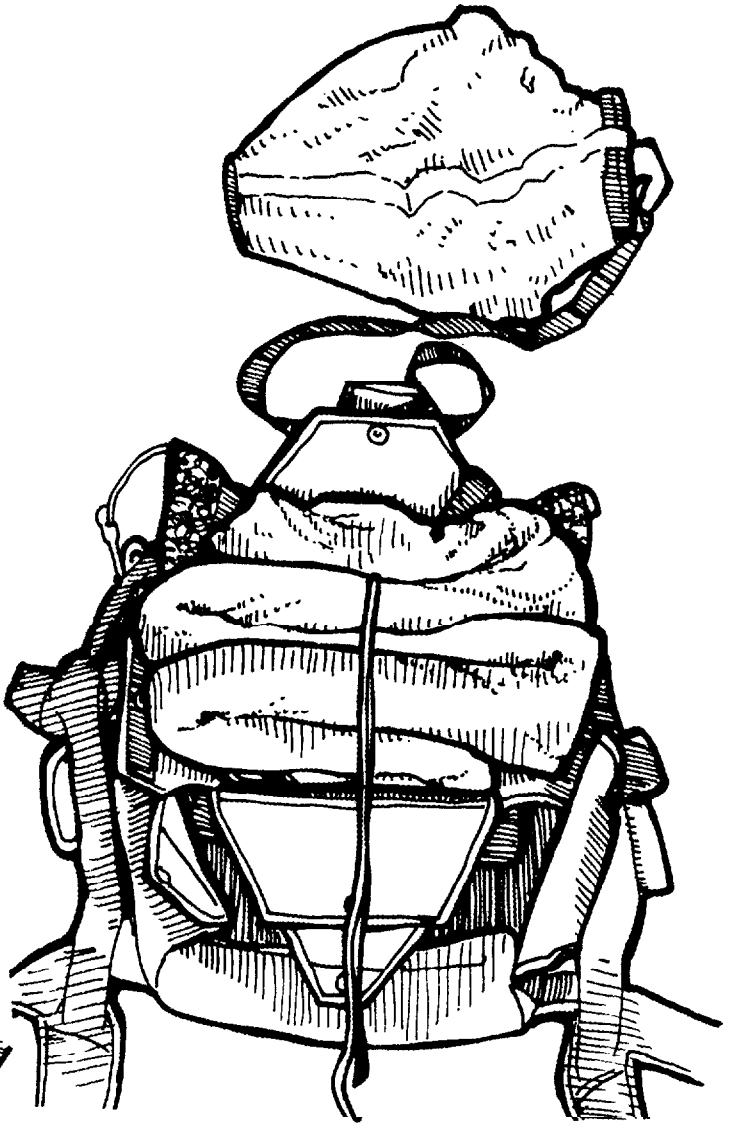
For a canopy with no diaper or a two bight diaper, the canopy can now be S-folded into the Container. Make the folds about an inch wider than the Container to fill the sides better.

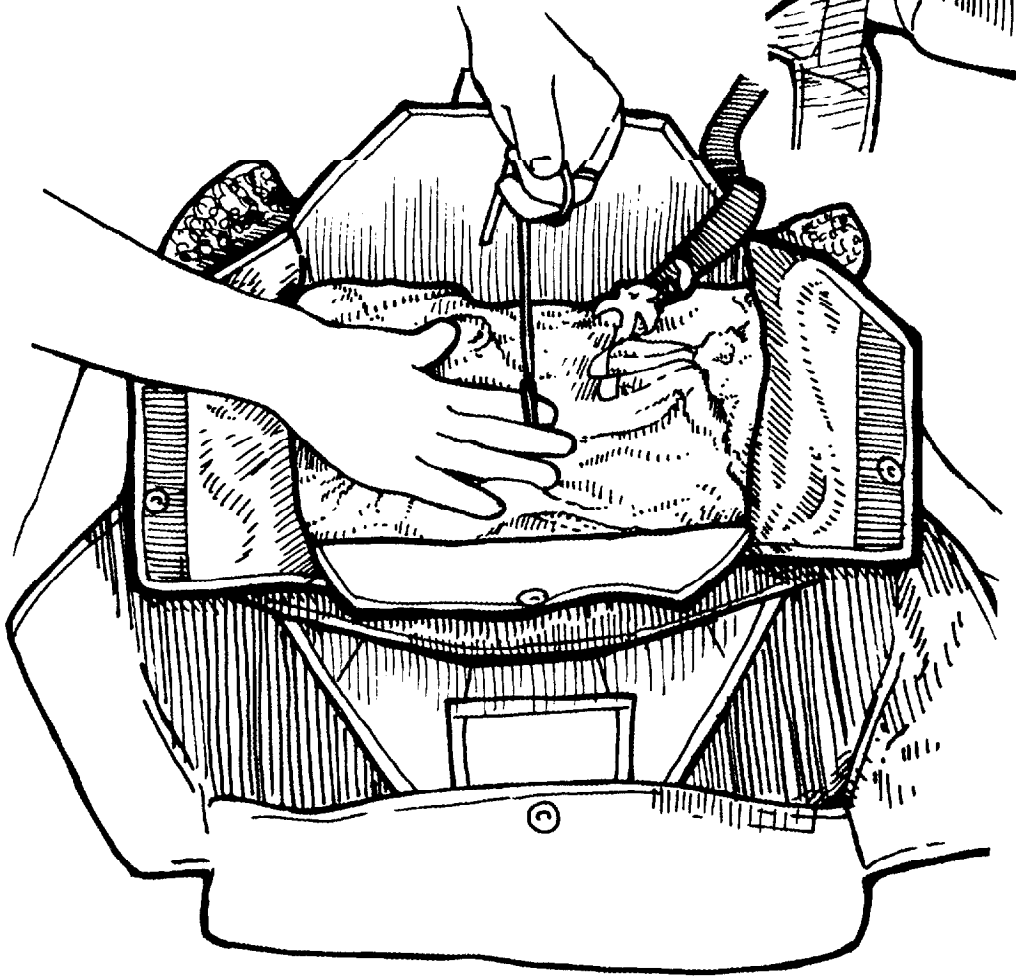
For a canopy with full diapers such as the Preserve 3 and the Featherlite, a short fold or two must be made in the Container corner opposite from the skirt to even out the bulk. The next fold can then be spread out on top of the diaper to give the Container its proper thickness. Then S-fold the rest of the canopy toward the top of the Container, keeping each fold about two inches wider than the Container.

With small canopies such as the National Phantom 22 and or the Pioneer KXX, the best appearance results from having no more than two folds above the loop.

With larger canopies, it may be necessary to fold extra canopy above the loop, as well as lengthen the loop.

Make the folds above the closing loop two inches wider than the Container to fill the space under the side flaps.

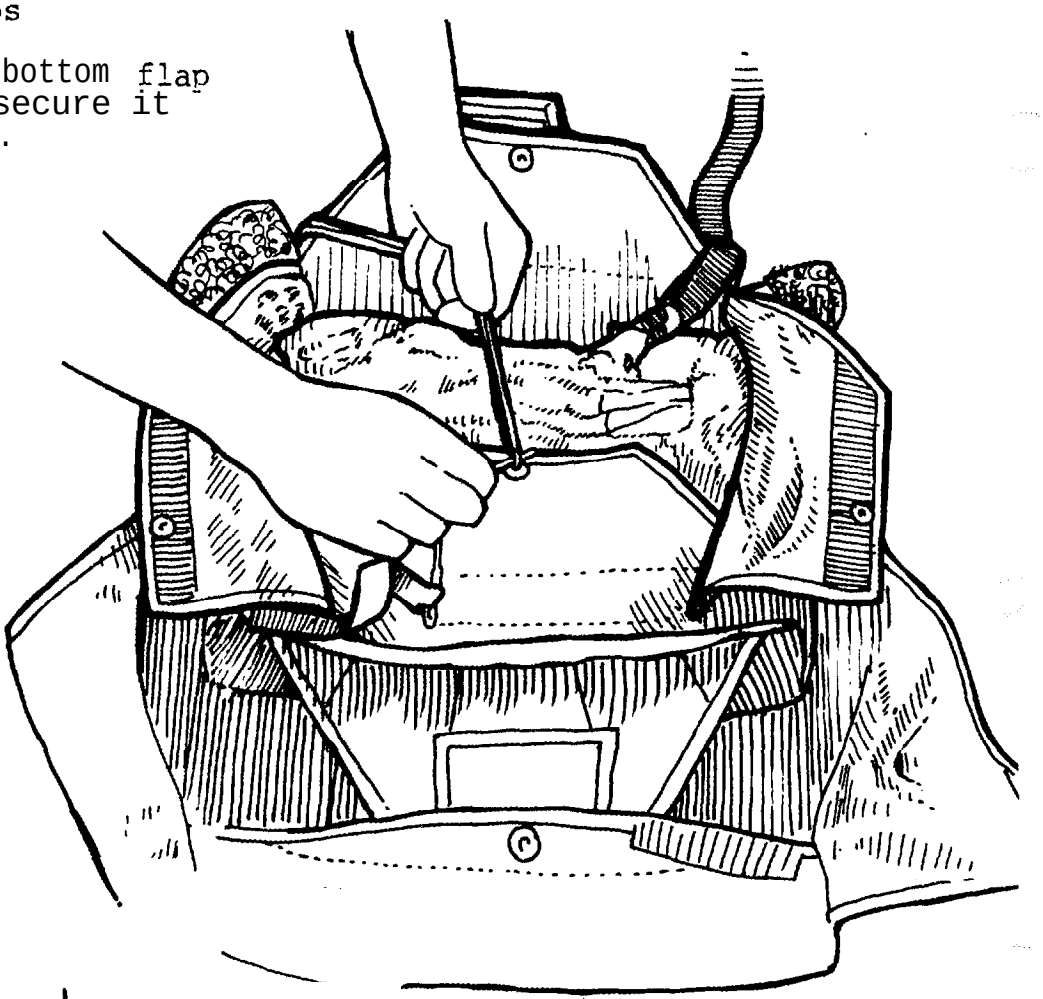




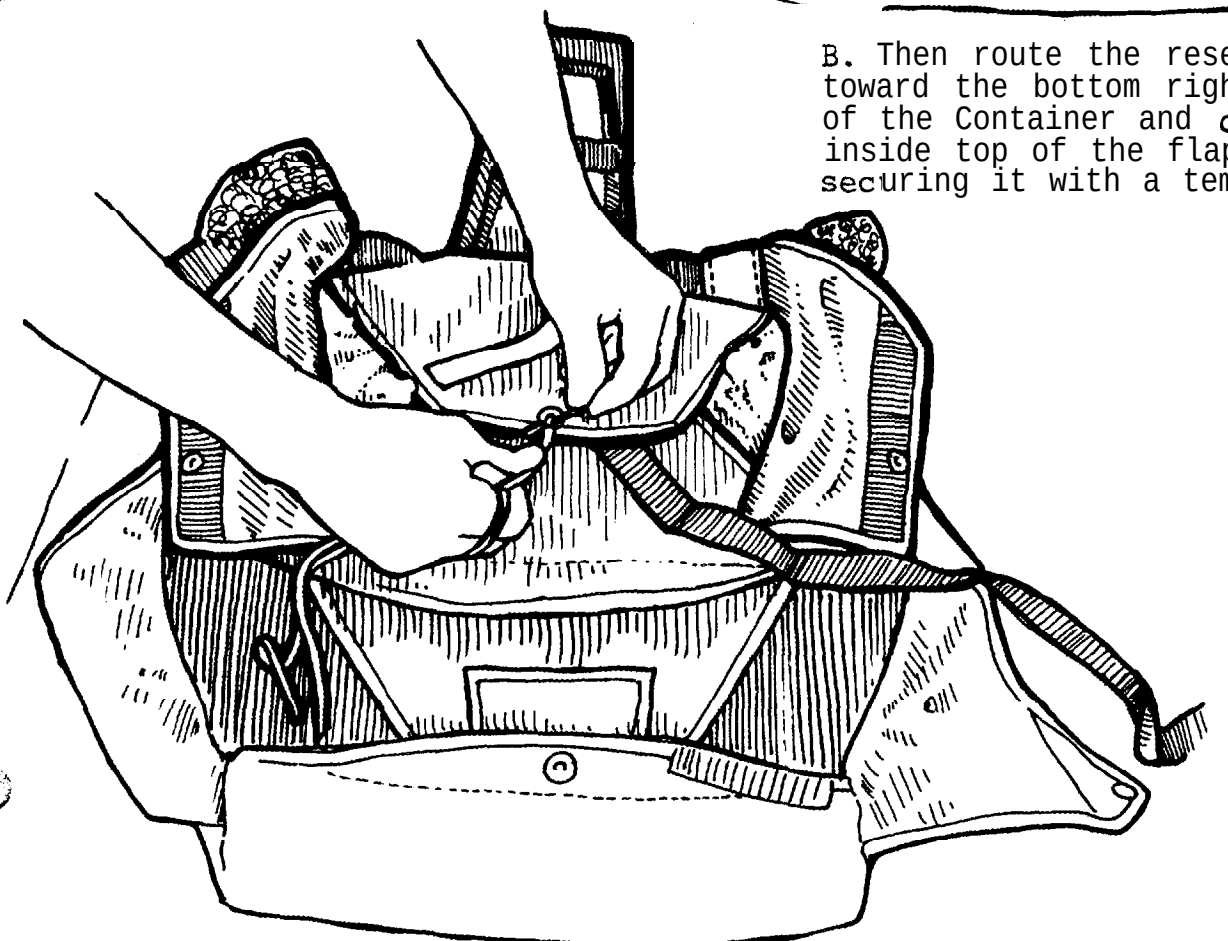
12. Route the pull-up cord and locking loop straight up through the folds in the canopy.

13. Closing the Flaps

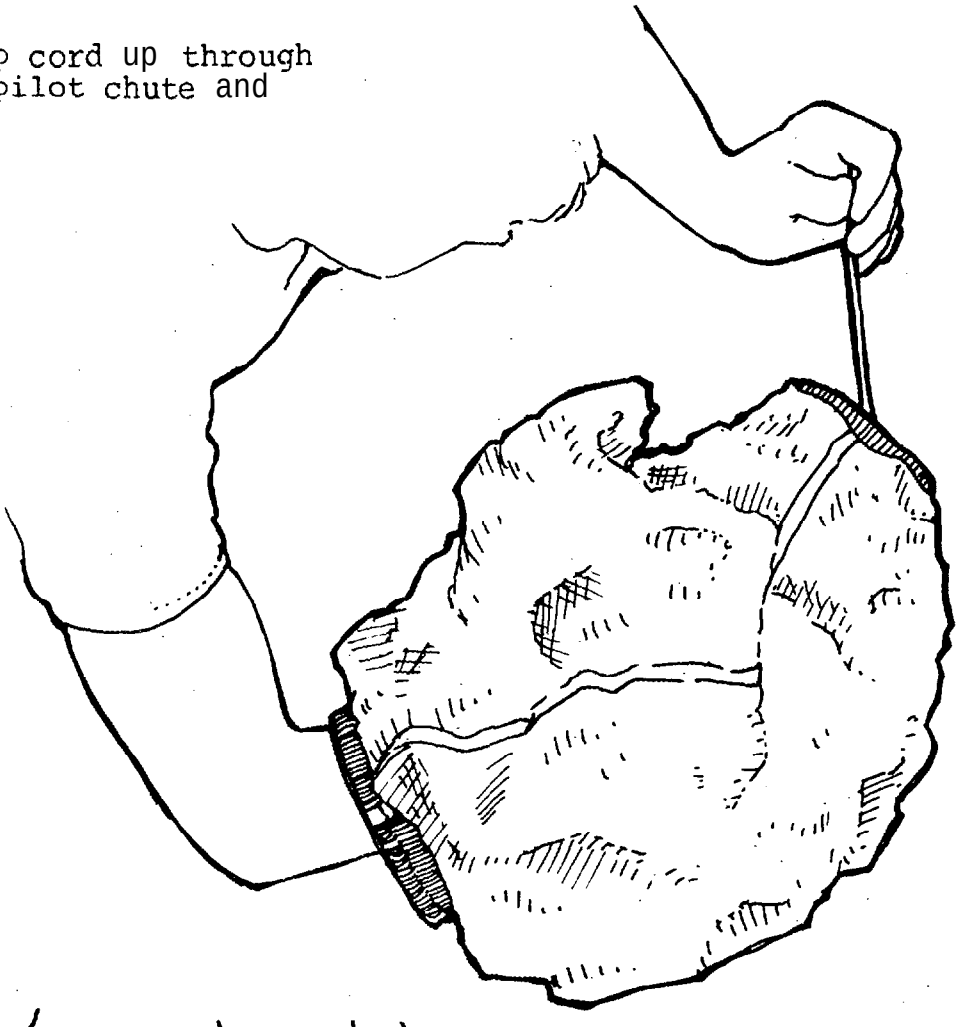
A. Close the inside bottom flap first (Flap #1) and secure it with a temporary pin.

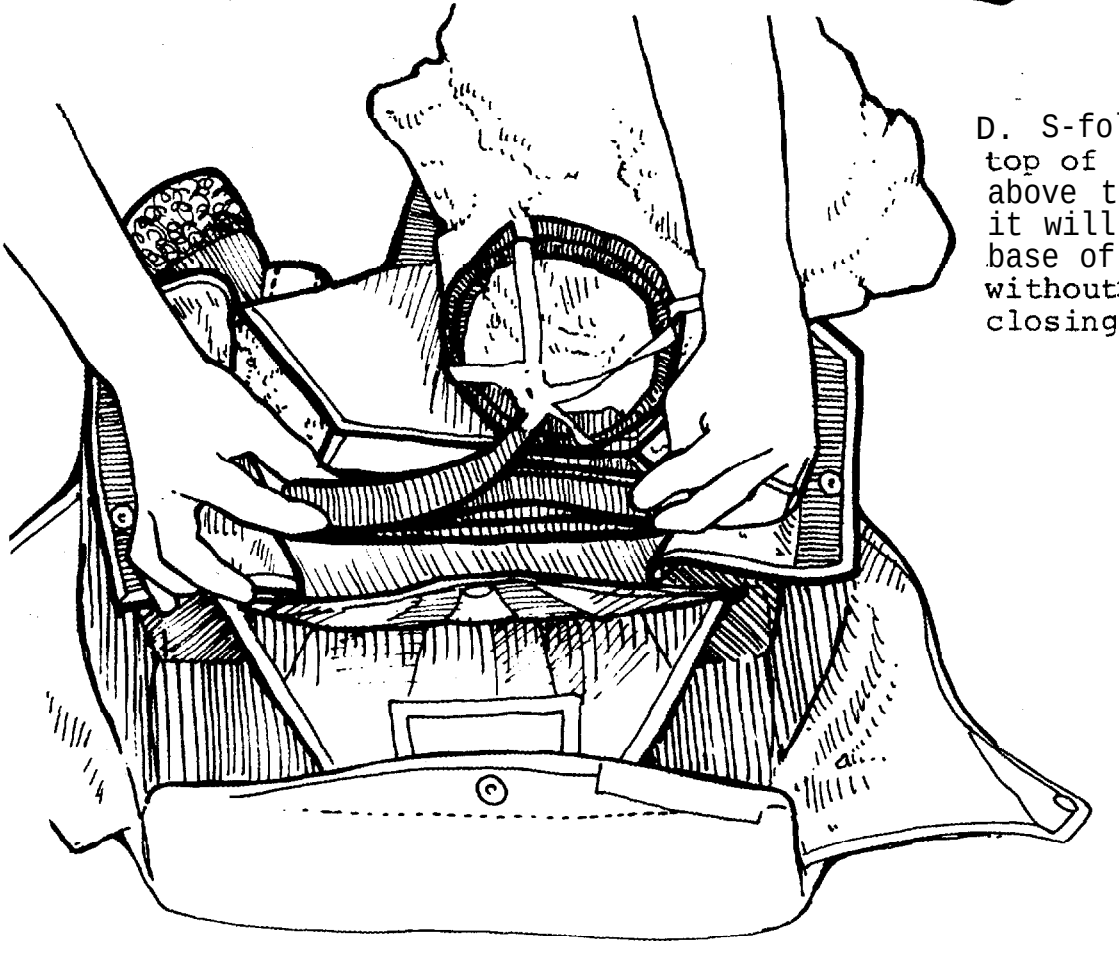


B. Then route the reserve bridle toward the bottom right-hand side of the Container and close the inside top of the flap (Flap #2), securing it with a temporary pin.



C. Pass the pull-up cord up through the bottom of the pilot chute and out the top.

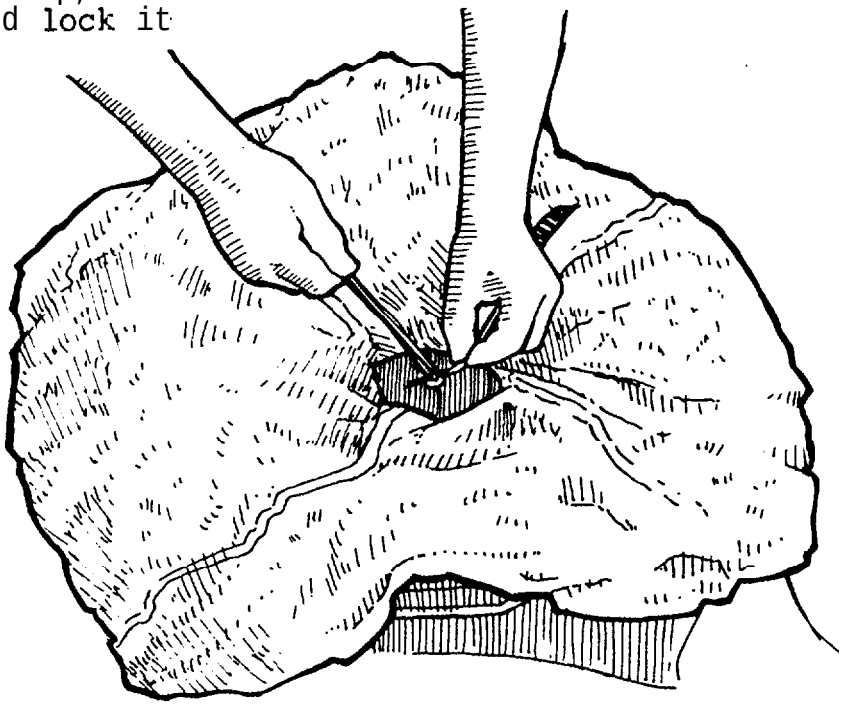




D. S-fold the bridle on top of the Flap #2, just above the loop, so that it will be under the base of the pilot chute withoutfouling the closing loop.

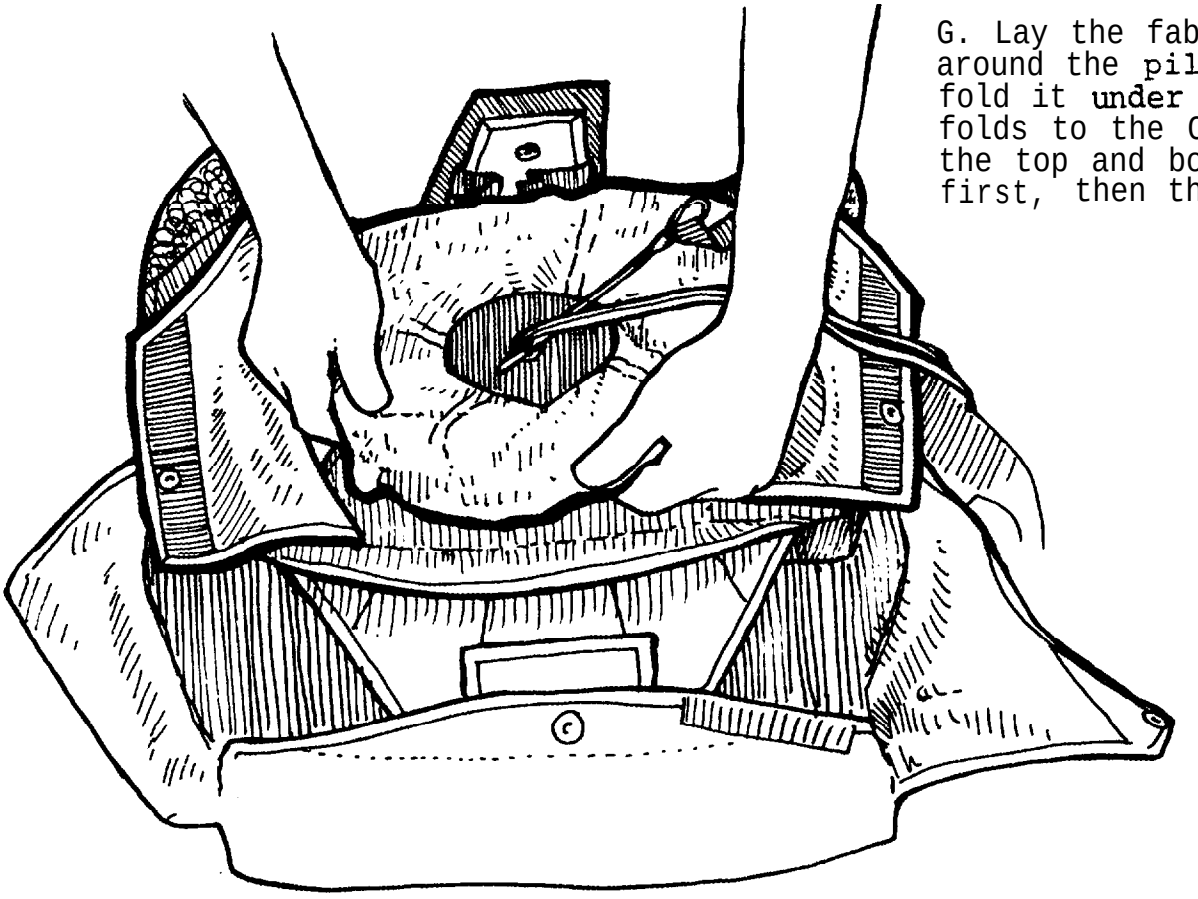
E. Making sure the base of the pilot chute is centered over the loop, collapse the pilot chute and lock it with the tempcrary pin.

F. Pull all the canopy fabric out from between the spring. Folding the fabric--rather than stuffing it between the coils--reduces the bulk of the packed Container.



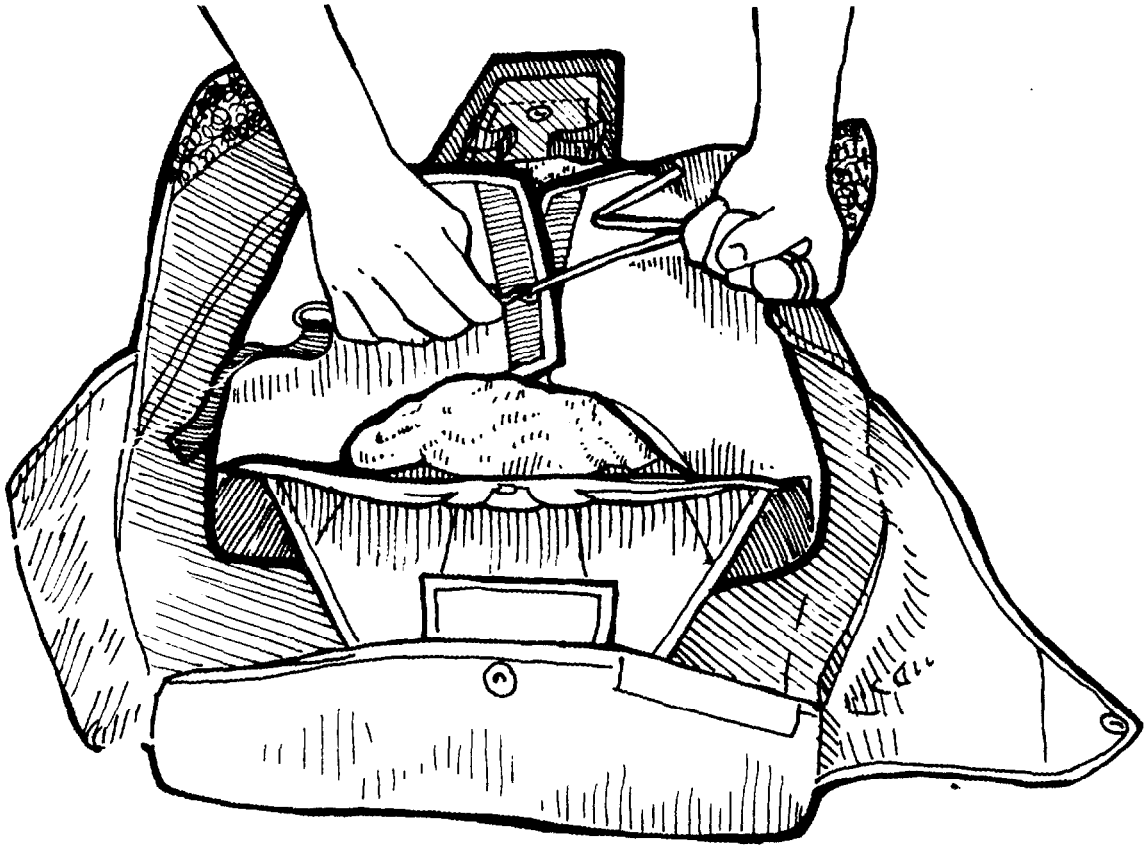
After pulling the fabric from between the spring, check to make sure the pilot chute base is centered under the crown.

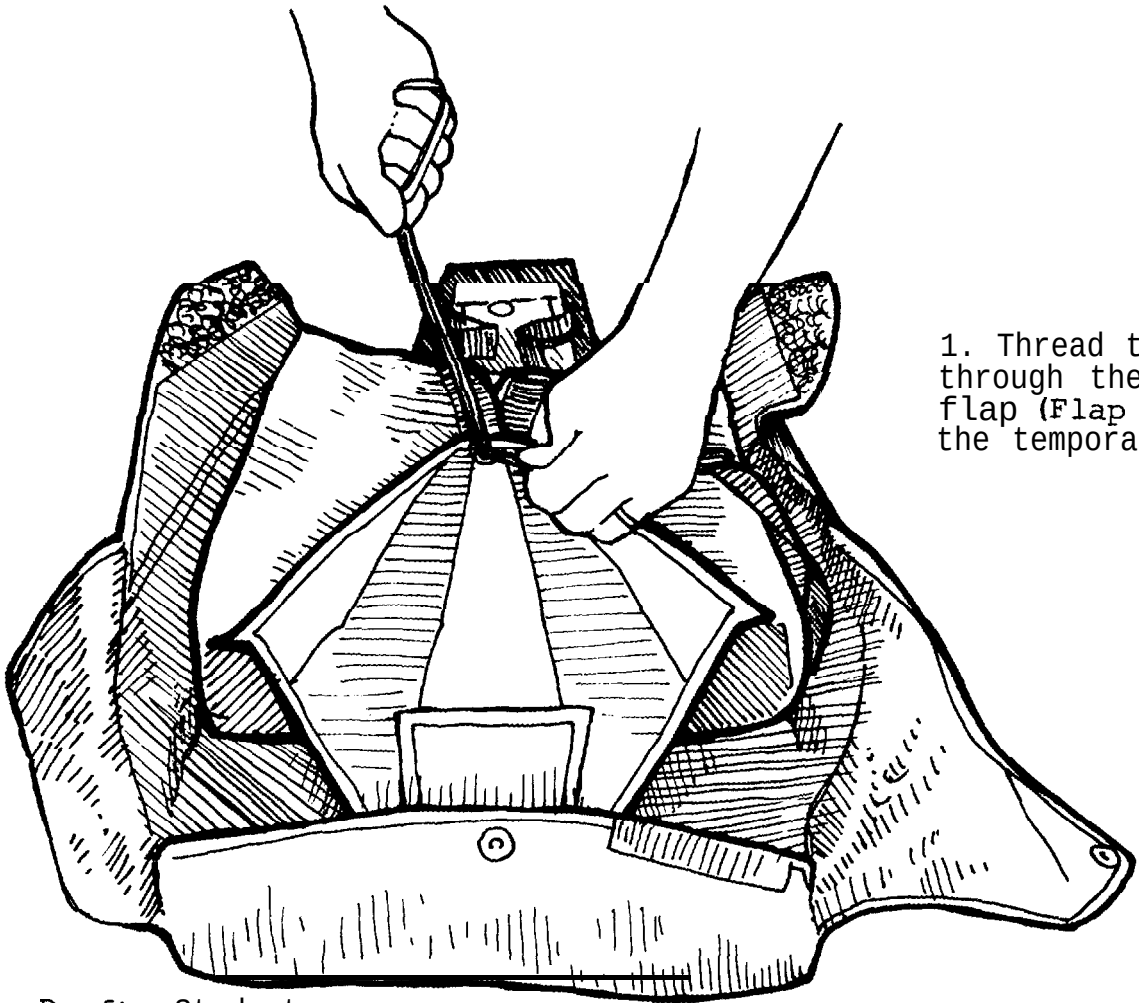
Now fully collapse the spring to see how much loop can be pulled through the top of the pilot chute. If you can pull more than 1/2 to 3, inches through, the loop is too long. Now would be the best time to ope the Container and shorten the loop.



G. Lay the fabric flat a around the pilot chute a fold it under in wide folds to the Center. Fol the top and bottom under first, then the sides.

H. Thread the pull-up cord through the side flaps (Flaps #3 and #4) and close and secure with a temporary pin. Make sure that the folds in the pilot chute stay flat and neat.





1. Thread the pull-up cord through the outside bottom flap (Flap #5) and insert the temporary pin.

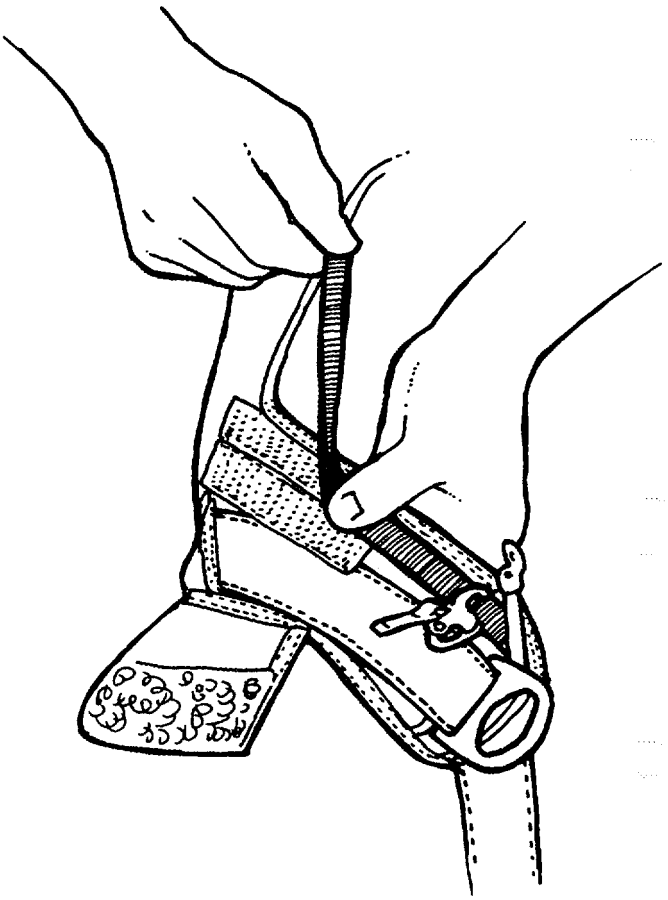
1. Thread the pull-up cord through the outside top flap (Flap #6) and insert the temporary pin. If the force necessary to close the last flaps seems excessive, your loop may be too short. Use a scale to check the force required to extract the pin. With the canopy packed properly and the loop sized correctly, 8 to 12 lbs. of force should extract thc pin.

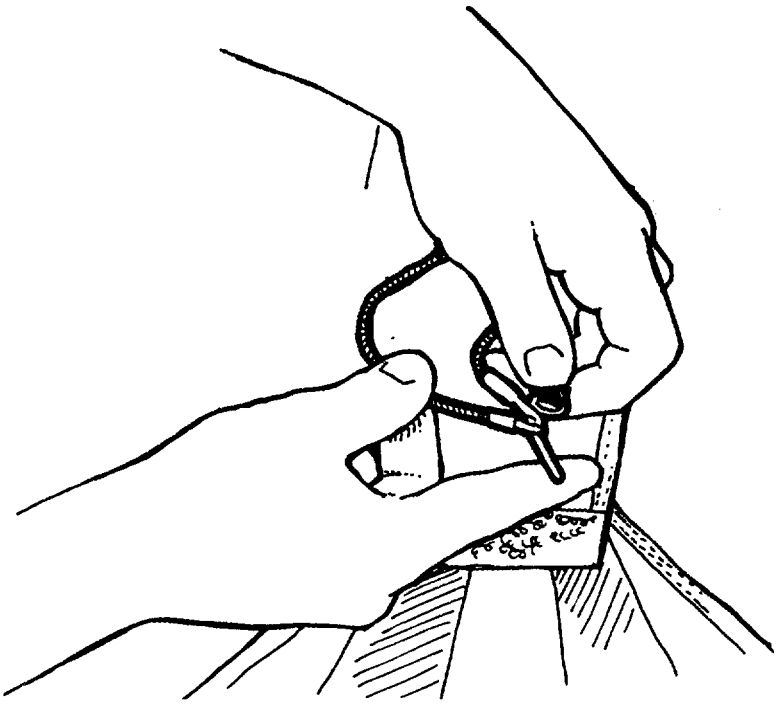
14. Install the reserve lanyard (static line):

A. Inspect the reserve lanyard for damage, and replace if necessary. Check that the snap shackle is operating smoothly anä the spring will retain the locking pin. Be sure the Velcro is clean and sufficiently tacky to retain the reserve lanyard. The pin should be curved from the eye to halfway down its length. The rest of the pin should be straight.

B. Route the reserve lanyard along its Velcro path frcm the right-hand riser. Mate the patch of yellow pile Velcro to the patch of hook Velcro on the top reserve flap.

C. Refering to the manual for the particular AAD, inspect the device. Make sure it is armed.



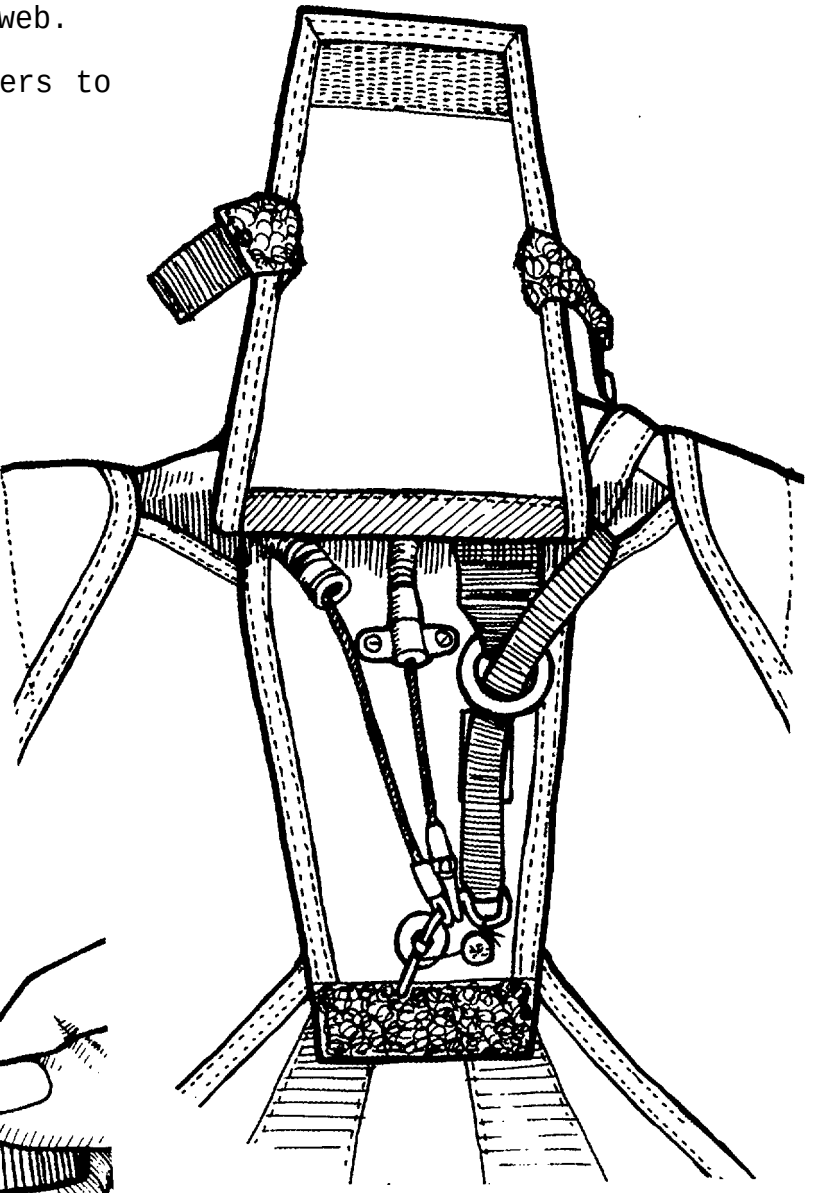


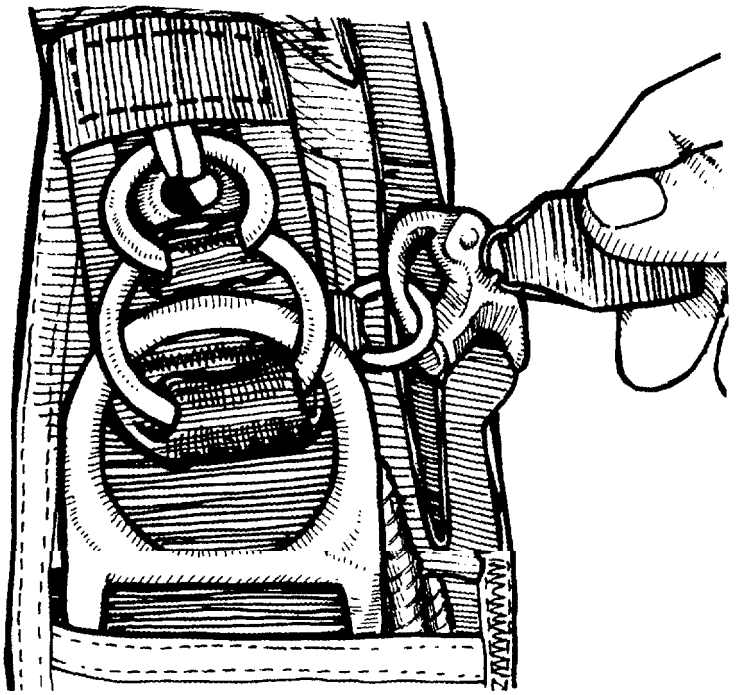
D. Thread the curved lanyard pin through the eyelet on the terminal end of the AAD cable. Note the angle of the hole in the terminal end; it must correspond to the angle of the inserted pin.

E. After threading the reserve ripcord through the housing, insert the lanyard pin through the loop at the end of the reserve ripcord cable. If the hcles are alligned prcperly, the cables should run straight from the reserve pin to their housings.

F. Replace the temporary pin with the reserve pin. Insert the ripcord handle into its pouch on the main lift web.

G. Attach the main parachute risers to the harness.





H. Hook up the reserve lanyard shackle to the ring on the right-hand riser and mate the lanyard Velcro to that on the comfort pad.

15. Place the rig on a clean surface with the backpad facing up and walk on it with stocking feet or clean shoes to help expell air from the Container and make it flatter.

16. Dress the Container, seal, sign and log the reserve.

17. Count ycur tools.

For the Ram-air Reserve with the Vector Free Bag, Bridle and Pilot Chut System--

Because of the wide variety of ram-air reserve canopies available today, this manual does not contain instructions on inspecting, assembling and packing instructions provided by the canopy manufacturer

The procedures required to pack a ram-air reserve into a Student Vector and its free bag are different than those specified by Para-Flite, Inc., for the free bag system it supplied with its ram-air reserves. Para-Flite approves the procedures described here for use wi its reserves in the Vector.

Instructions later in this chapter tell how to install the FXC 12000 and SSE Sentinel Mk 2000 automatic activation devices.

Federal Aviation Administration regulations require that the reserve parachutes be iaspected, maintained, assembled and packed by a appropriately rated Senior or Master Parachute Rigger. Other countries may have similar regulations.

It is assumed that the rigger has knowledge and experience on inspecting, assembling, packing and maintaining sport piggyback assemblies such as the Student Vector. This manual is not a parachute rigging course.

For those owners who cannot locate a qualified rigger, the Relativ Workshop will pack and maintain your Student Vector. The owner bears the costs of all shipping, parts and labor, and the Company cannot guarantee immediate turnaround.

REQUIRED TOOLS:

One temporary pin
Two pull-up cords (About 6 ft.long)
One packing paddle

Part One: Packing the Canopy

1. Thoroughly inspect the pilot chute, bridle, deployment bag, canopy, lines, links, locking loop, risers, Container and harness.

2. Follow canopy manufacturer's instructions for:

A. Attaching the canopy to risers
B. Attaching toggles and/or steering lines.
C. Flaking the canopy.
D. Folding the nose and canopy.
E. Setting deployment brakes.
F. Splitting the tail.
G. Stowing the slider.
H. Dressing the canopy.

3. The rigger can choose between two methods cf placing the canopy int the deployment bag. One method is for smaller canopies, the other for larger ones. If the canopy is larger than 200 sq.ft., go to the sectio below titled "Alternate Method."

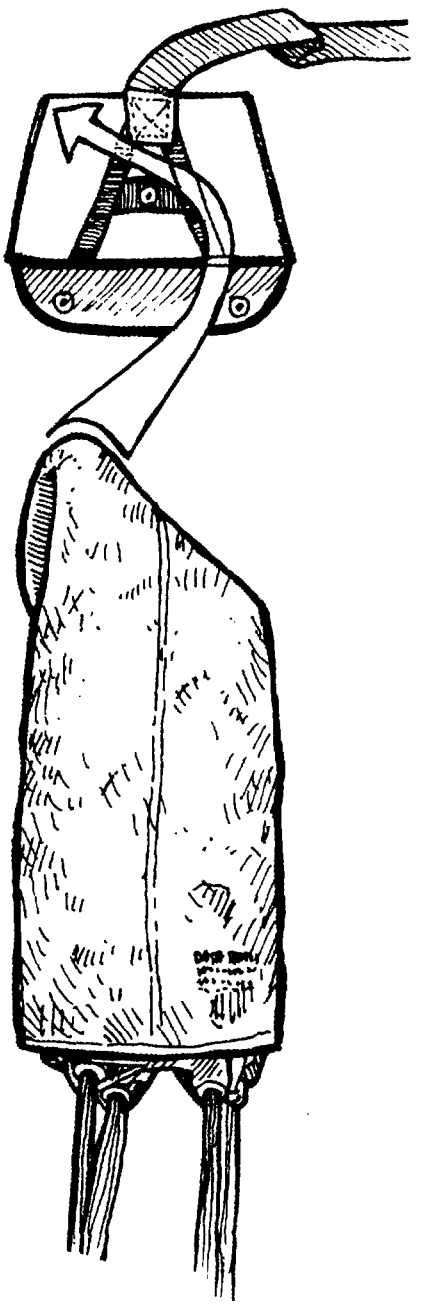
A. PRIMARY METTOD, For smaller ram-air reserves, those with 200 or fewer sq.ft.:

1. Facing the top of the canopy and straddling the lines, kneel on the edge of the tail at the bottom of the canopy.

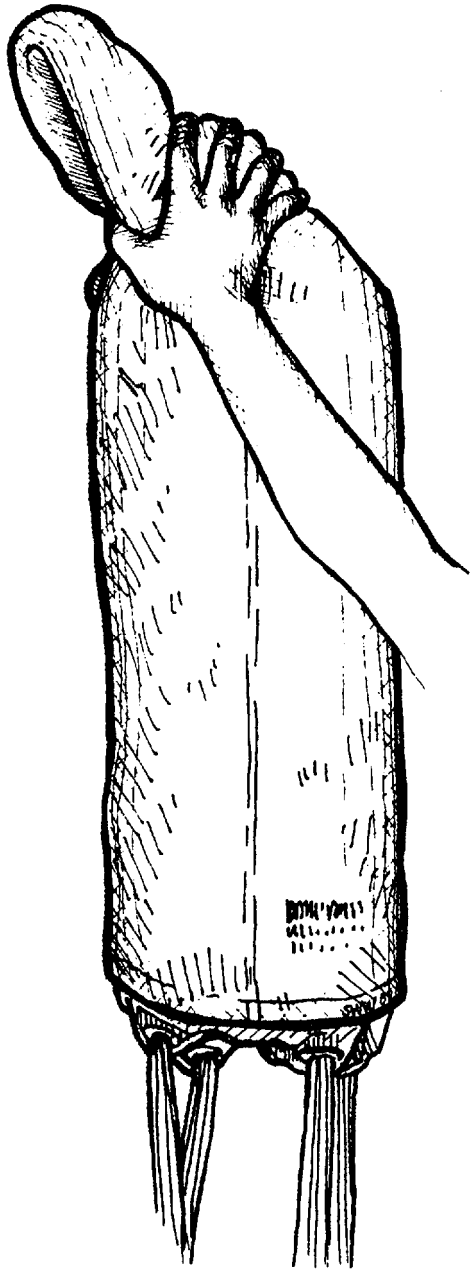
2. Reach underneath the canopy and fold it all back into your lap, exposing the folded nose. Spread the nose of each cell across the front, so they will be the first part of the canopy to take air.

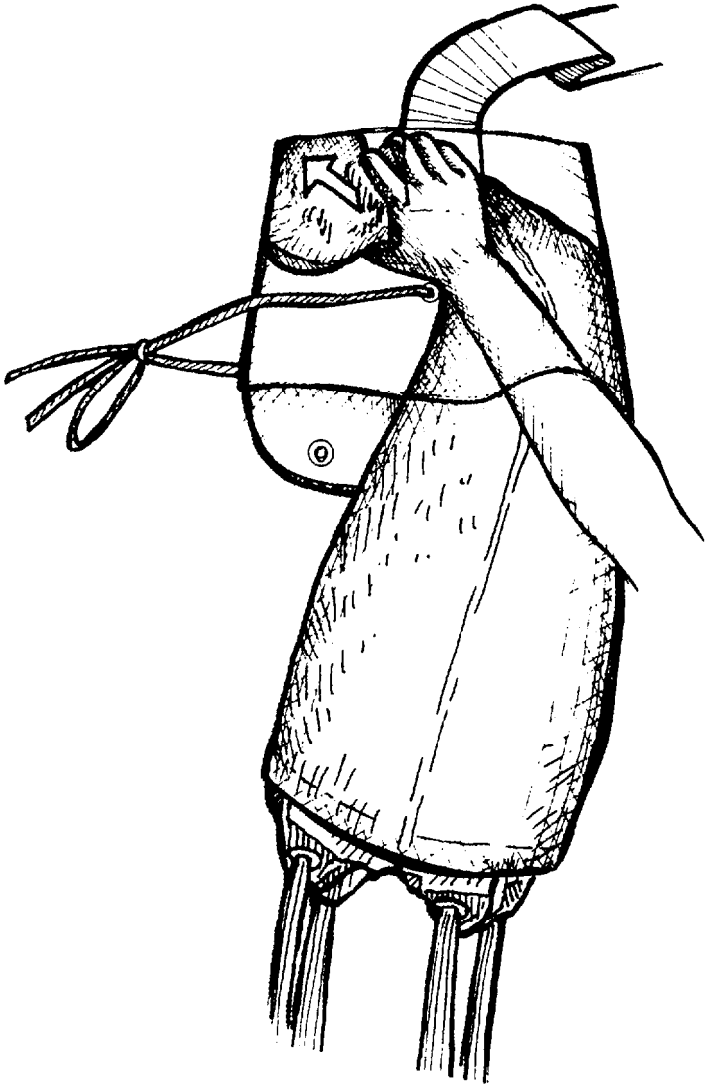
3. Grasp the top right corner of the flaked canopy and fold it across and under the left side in a 45 degree angle. Be sure not to cover the exposed nose. Lay the canopy back on the table.

4. Insert one cnd of a pull-up cord through the grommets in the top and bottom of the bag. Tie it to the other end so it won't slip out during the rest of the packing procedure. (Note: Some riggers prefer to use a T-bar instead of a pull-up cord, inserting it through the bag from the bottom. A pull-up cord is easier and in therefore recommended.)

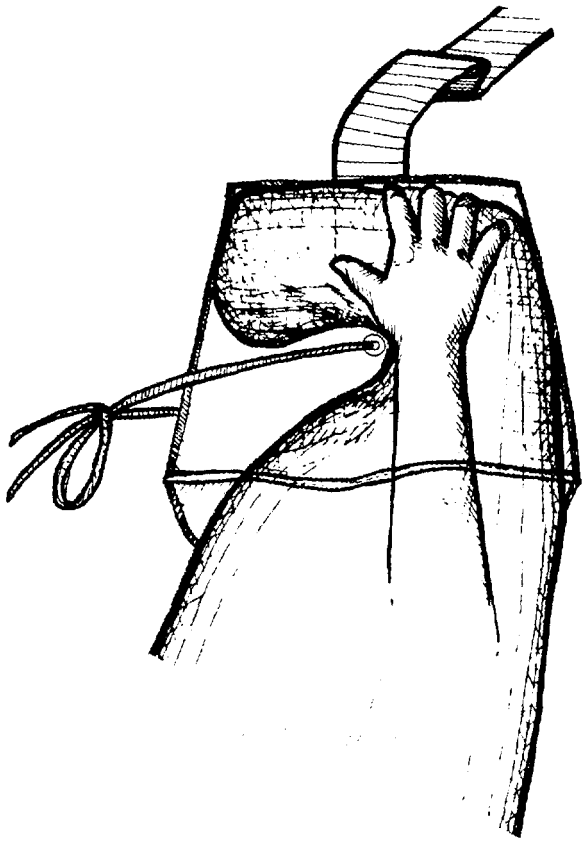


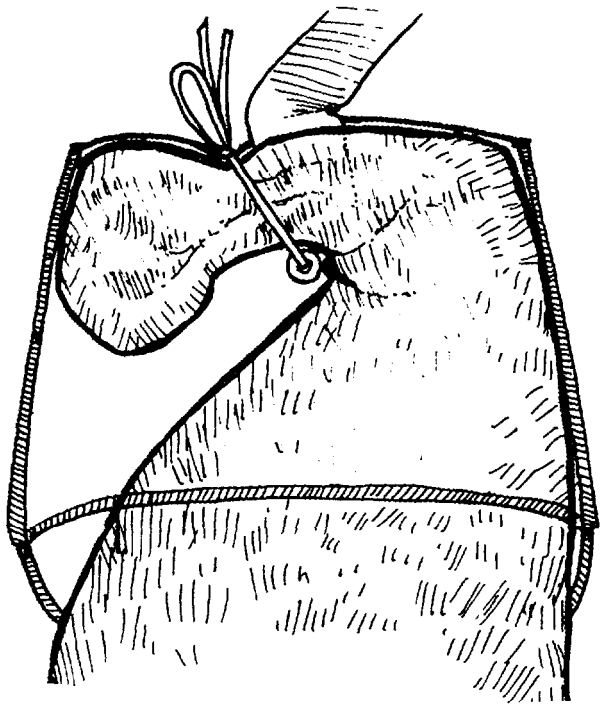
5. Kneeling as before, grasp the top left corner of the flaked canopy and going around to the right of the pull-up cord, place the corner of the canopy into the tog left corner of the bag. Be sure to fill the corner.





6. Without pulling the left corner free, reach into the bag and over the canopy to grasp the previously folded right corner under the canopy. Manuever this corner of the canopy into top right corner of the bag. Be sure to fill the corner.

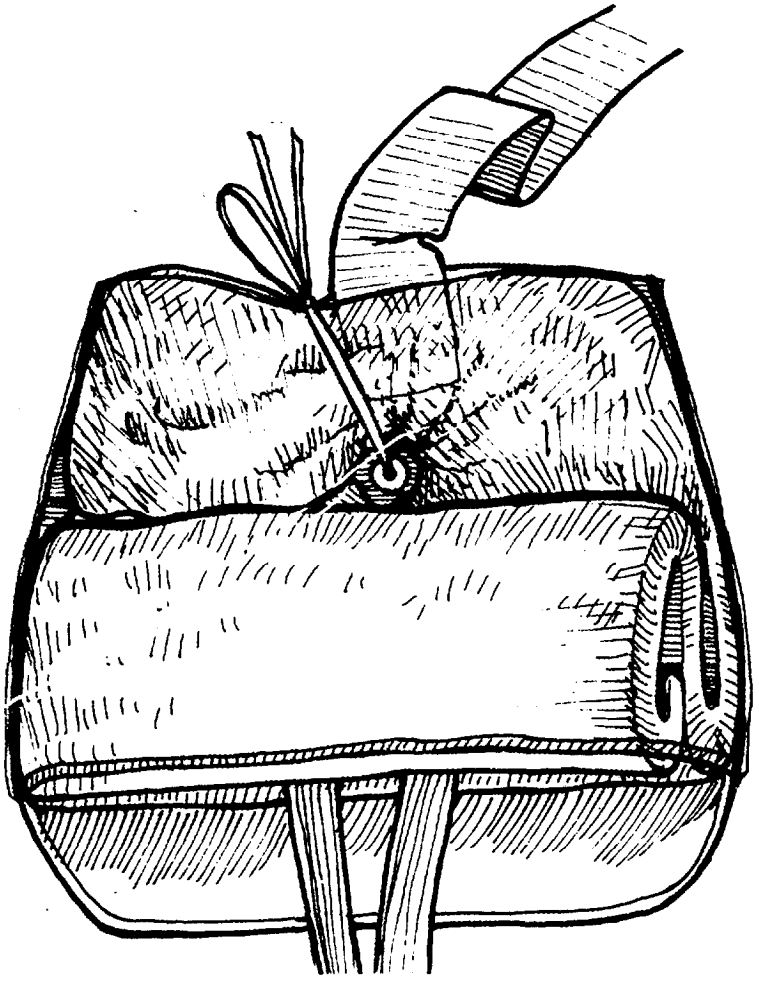


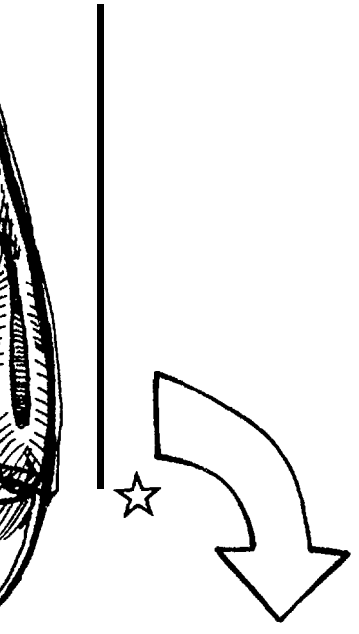


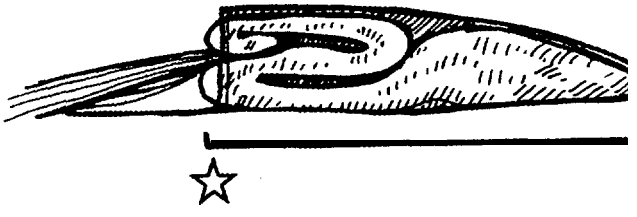
7. Retie the pull-up cord tightly around the top S-fold until the top and bottom grommets are no more than 1 in. apart. This retains the S-fold in the top of the bag throughout the rest of the packing procedures.

8. Dress the remaining canopy to a width 2 inches wider than the bag each side.

9. Fold the slider and 4 inches of the bottom of the canopy toward th top of the canopy and under the tail.







10. Making very short folds---no longer than the distance from the mou of the bag to the pull-up cord--stack the canopy on top of itself. Be sure the top (first) fold of the canopy stays in the bag.

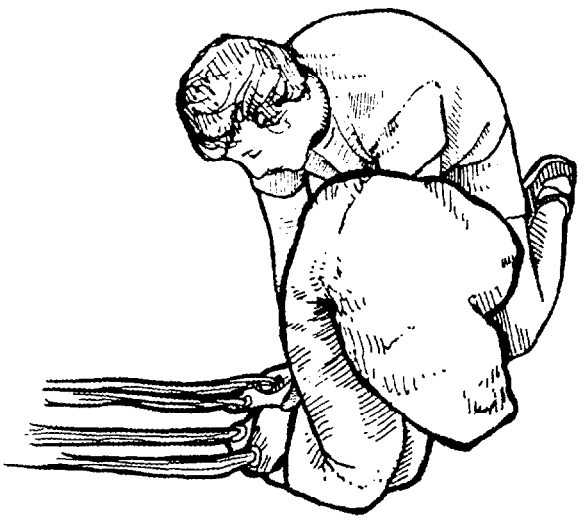
11. Carefully place the stacked canopy into the bag. Close the bag wi the four locking stows starting with the two center stows. (O-rings used, not rubber bands.)

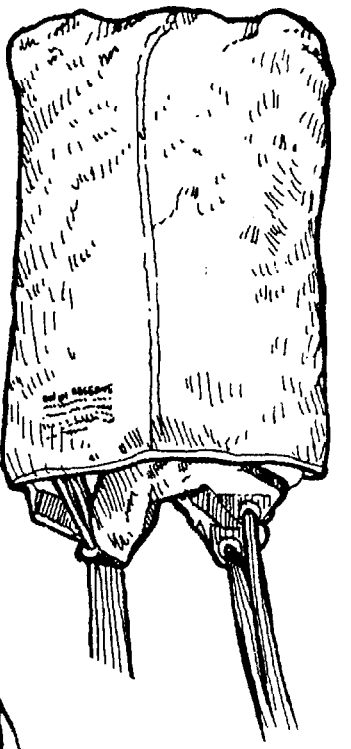
12. Stow the remainder of the Suspension lines into the pouch on the underside cf the bag using S-folds that extend from ***one*** side of the pouch to the other. Be sure none of the lines are trapped between th Velcro at the mcuth of the pouch.

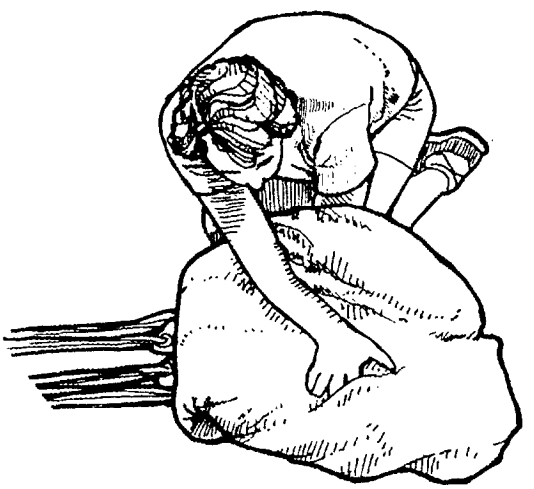
Skip the next section titled "Alternate Method" and continue with the one titled "Placing the Canopy in the Container"

B. ALTERNATE METHOD of placing the canopy in the deployment bag, for larger ram-air canopies, those with more than 200 sq.ft.:

1. Dress the canopy to a width 4 in. wider than the bag (2 in. on each sid+).



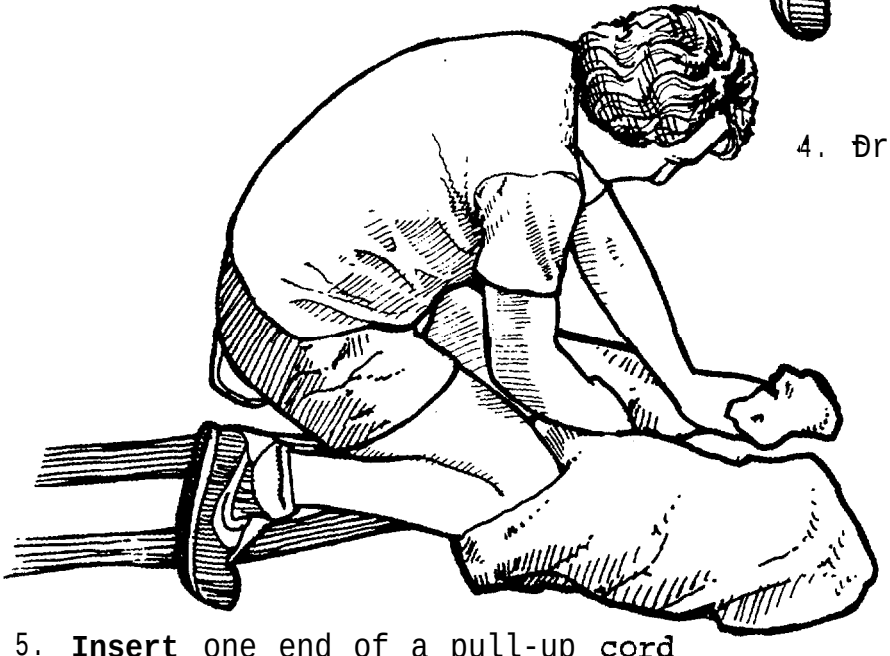




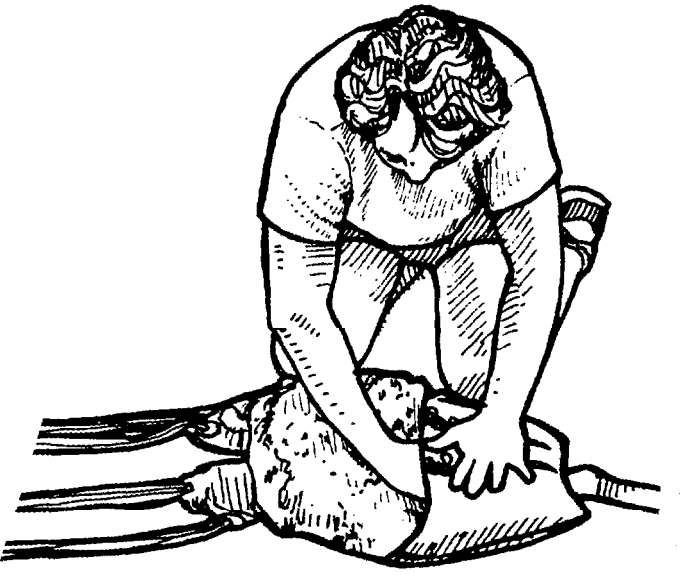
2. Stack the canopy on top of itself, making each fold no longer than the distance from the mouth cf the bag to the grommets in the center of the bag.

3. After the canopy is stacked on itself, unfold the top portion into two sections or "ears."

4. Dress each section neatly.

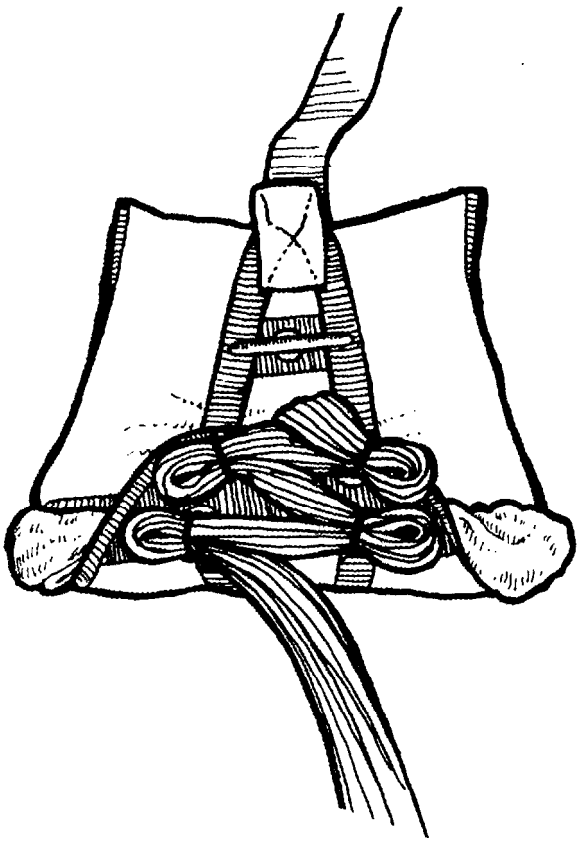


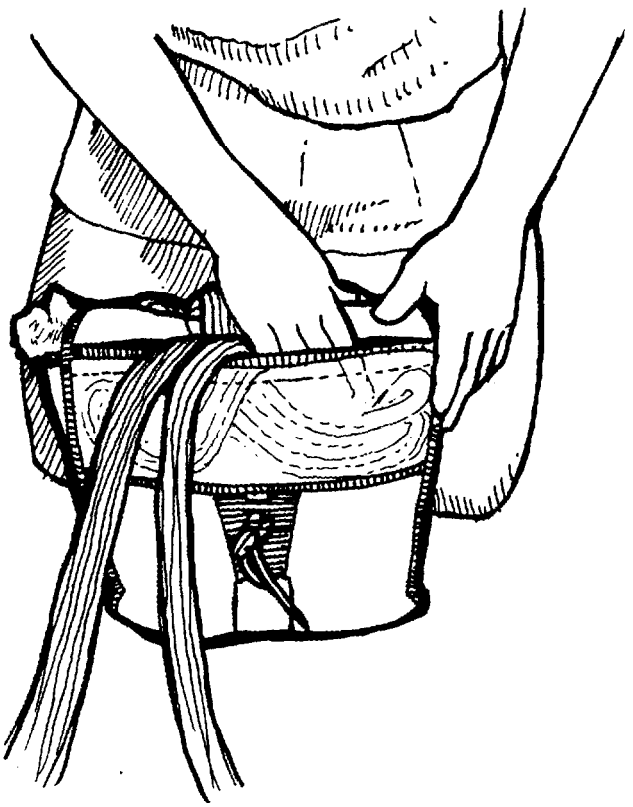
5. **Insert** one end of a pull-up cord through the grommets in the top and bottom of the bag. Tie it to the other end so it won't slip out during the rest of the packing procedure. (Note: Some riggers *prefer* to use a T-bar instead of a pull-up cord, inserting it through the bag from the bottom.)



6. Carefully **slide the** bag **over the** canopy, pushing each "ear" into the top corners of the bag, filling the corners evenly and leaving a tapered shape. Then pass a pull-up cord or T-bar or pull-up cord from the top through both grommets in the middle of the bag. (The T-bar or pull-up cord will be used later to pull the locking loop through the bagged canopy.)

7. Lock the bag closed with bytes of Suspension line, starting with the inside grommets. (O-rings are used to close the bag, not rubber bands.)





8. Stow the remainder of the Suspension lines into the pouch on the underside of the bag using s-folds that extend from one side of the pouch to the other. Be sure none of the lines are trapped between the Velcro at the mouth of the pouch.

Part Two: Placing the Bag into the Container

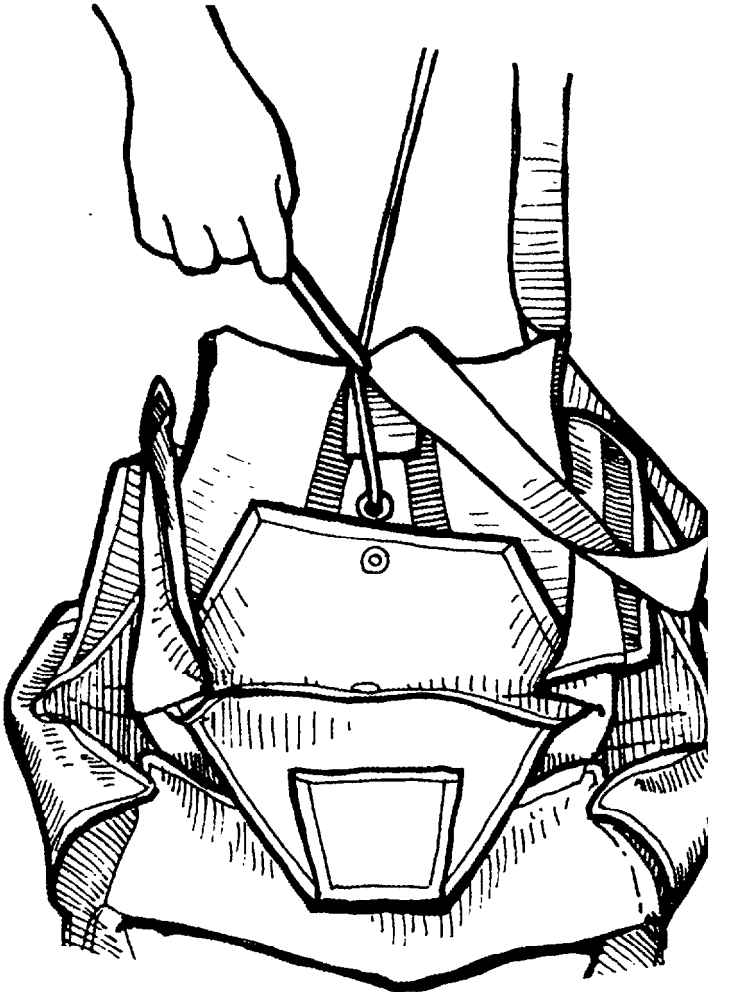
1. Set the bagged canopy on the main Container and position the reserve risers in the reserve pack tray. Fan the links rather than stacking them on each other, placing the rear links to the outside. Be sure to place the reserve risers far enough in the pack tray so they will lie flat over the shoulders.

2. Pass the other pull-up cord through the reserve locking loop.

If a T-bar was passed through the bag, thread the ends of pull-up cord through the hole in the end of the T-bar. Remove the T-bar from the bagged canopy, pulling the locking loop pull-up cord through it.

If a pull-up cord was passed though the bag, untie it and tie the end protruding from the underside of the bag around both ends of the pull-up cord that was passed through the locking loop. Carefully pull on the other end to pull the locking loop pull-up cord through the packed canopy. Untie the other pull-up cord and set it aside.

3. Place the bagged canopy in the pack tray, taking extra care to fill the lower corners. Then use the pull-up cord to pull the locking loop up through the bagged canopy, Secure it with a temporary locking pin.

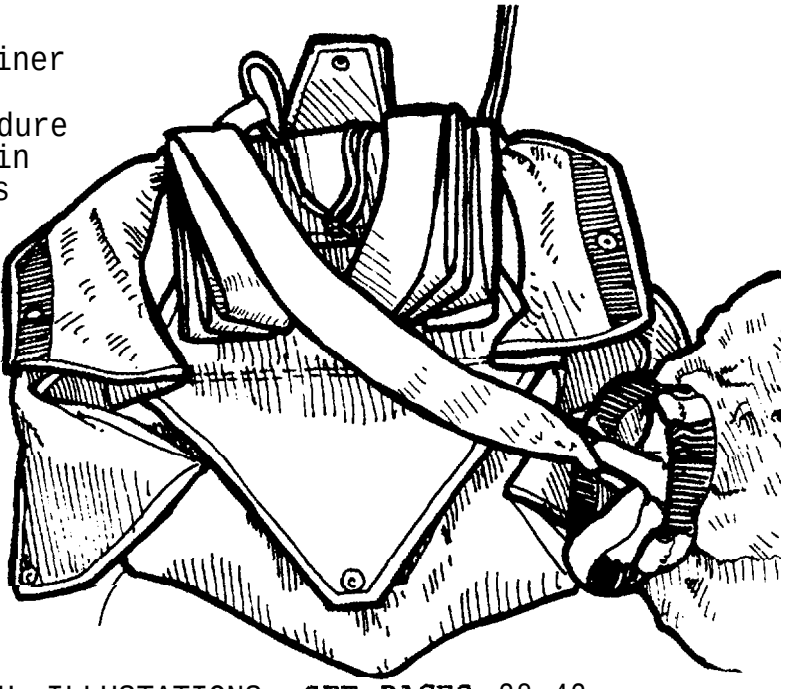


Part Three--Closing the Container

Regardless of what procedure was used to place the canopy in the bag, the same procedure is used to close the Container.

1. Close the inside bottom flap (Flap #1) and the inside top flap (Flap #2) and secure them with a temporary pin. The bridle should come out between these two flaps.

2. S-fold the bridle on top of #1 and #2 flaps from top to bottom.



FOR COMPLETE INSTRUCTIONS WITH ILLUSTATIONS, SEE PAGES 38-42

3. Thread the pull-up cord from the bottom out the top of the pilot chute. Center the base of the pilot chute over the two flaps. Compress it straight down and lock it with the temporary pin.

4. Pull all of the canopy fabric out from between the spring coils. If the fabric is extracted and neatly folded, the pilot chute can be full compressed for a flatter pack job.

5. With the fabric pulled clear, you can see clearly inside the pilot chute to make certain the base is still centered over the two flaps.

6. Fully compress the spring to see how much loop you can pull out the top of the pilot chute. If you can expose more than 1/2 to 3/4 inches, the loop is too long. Now would be the best time to open the Container and shorten the loop.

7

7. Lay the fabric flat all around the pilot chute and fold it neatly under in wide folds to the Center. Fold the top and bottom first, then the sides.

8. Thread the pull-up cord through the side flaps (Flaps #3 and #4) and insert a temporary pin. Make sure that the folds in the pilot chute stay flat and neat.

9. Thread the pull-up cord through the outside bottom flap (Flap #5) and insert a temporary pin.

10. Thread the pull-up cord through the outside top flap (Flap #6) and insert a temporary pin. If the force necessary to close the last two flaps seems excessive, the loop may be too short. Use a scale to determine how much force is needed to extract the pin; 8 to 12 lbs. is the correct reading.

11. Install the reserve lanyard (static line):

A. Inspect the reserve lanyard for damage, and replace if necessary. Check that the snap shackle is operating smoothly and the spring will retain the locking pin. Be sure the Velcro is clean and sufficiently tacky to retain the reserve lanyard. The pin should be curved from the eye to halfway down its length. The rest of the pin should be straight.

B. Route the reserve lanyard along its Velcro path from the right-side riser. Mate the patch of yellow pile Velcro to the patch of hood Velcro on the top reserve flap.

C. Refering to the manual for the particular AAD, inspect the device. Make sure it is armed.

D. Thread the curved lanyard pin through the eyelet on the terminal end of the AAD cable. Note the angle of the hole in the terminal end.

E. Thread the reserve ripcord through the housing. Thread the lanyard pin through the loop at the end of the reserve ripcord cable.

F. Replace the temporary pin with the reserve pin. Insert the ripcord handle into its pouch on the main lift web.

G. Attach the main parachute risers. Hook up the reserve lanyard shackle to the ring on the right-hand riser and mate the adjacent Velcro that affixes the lanyard to the harenss.

12. Place the rig on a clean surface with the backpad facing up and walk on it with stocking feet or clean shoes to help expell air from the Container and make it flatter.

13. Dress the Container, seal, sign and log the reserve.

14. Count your tools.

INSTALLING AUTOMATIC ACTIVATIONDEVICES

The FAA classifies the installation of an AAD as a major alteration. Therefore, it must be done by a Master Rigger.

Two AADs are currently approved for installation on the Vector: the Pin Puller version of the SEE Sentinel Mk 2000 and the FXC Model 12000. Although other AADs can probably be safely installed on the Vector, the Relative Workshop had not yet developed the methods to do so.

Because both the Sentinel Mk 2000 and the FXC 12000 are manufactured and serviced by companies not associated with the Relative Workshop, the owner must direct questions on calibration, use, maintenance, testing and upgrades to the AAD manufacturer. Nothing in this manual is meant to contravene any instructions or advice from the manufacturers of these devices.

An AAD is a back-up emergency device that, like any complex mechanical instrument is subject to failure or malfunction. It is not a substitute for proper training and supervision.

Both the Sentinel Mk 2000 and the FXC 12000 are delivered with installation kits that contain various brackets, screws, mounting plates and terminal ends to accommodate various types of parachutes. These components must be used to correctly install these devices on the Vector.

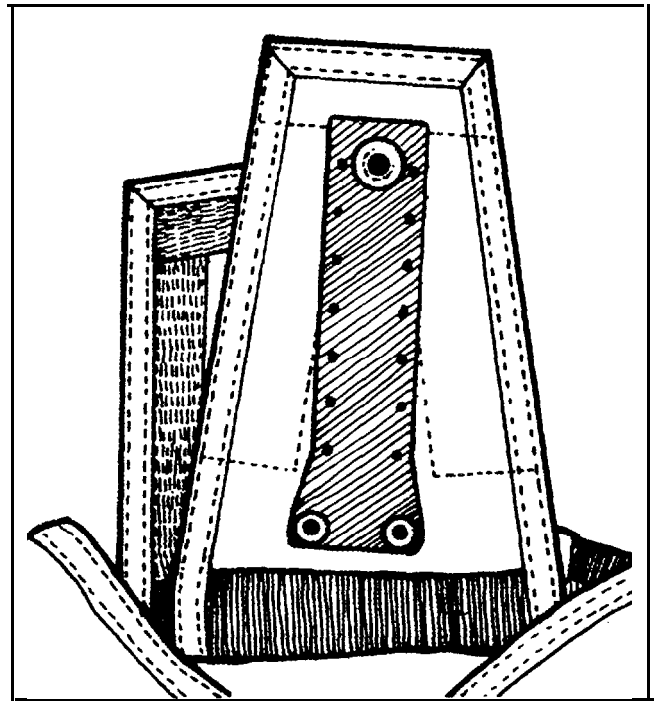
Installing the Pin Puller Version of the SEE Sentinel Mk 2000

1. Inspect the entire AAD assembly. Perform a calibration check to insure the pyrotechnic charge is in good shape.

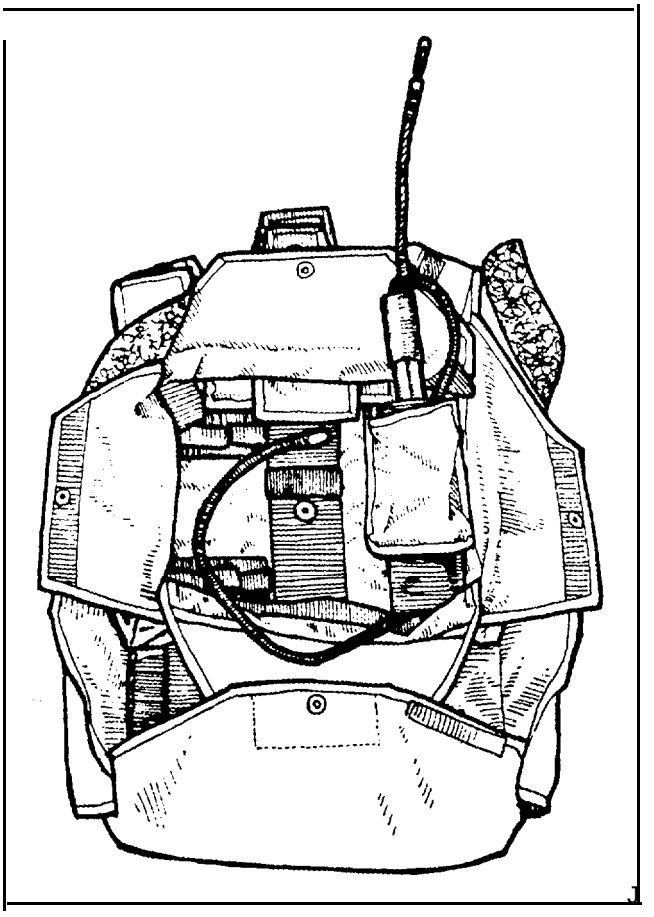
2. Remove the grommet from the top reserve flap (Flap #6).

3. Position the mounting plate on the top of the top reserve flap (Flap #6) so that its larger hole is centered over the flap's grommet hole and the plate is along the center line of the flap. Use a pen or pencil to mark the two bolt holes in the other end of the plate. Use a 1/16-inch drill bit to drill holes for the bolts.

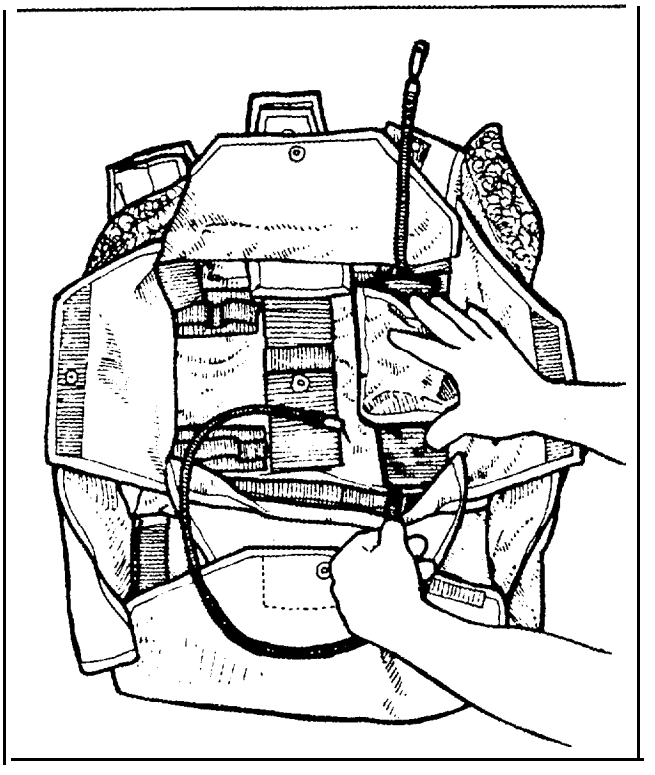
4. Position the mounting plate on the underside of the top reserve flap (Flap #6) and attach with a size 0 spur grommet. (Be sure the grommet is correctly seated and there are no sharp edges that could darnage the nylon locking loop.) Insert two 6-32 x 3/8" screws down through the cable bracket, through the flap and through the plate. Tighten the screws to secure the cable housing to the bracket. If the screws protrude from the nuts, file flush.



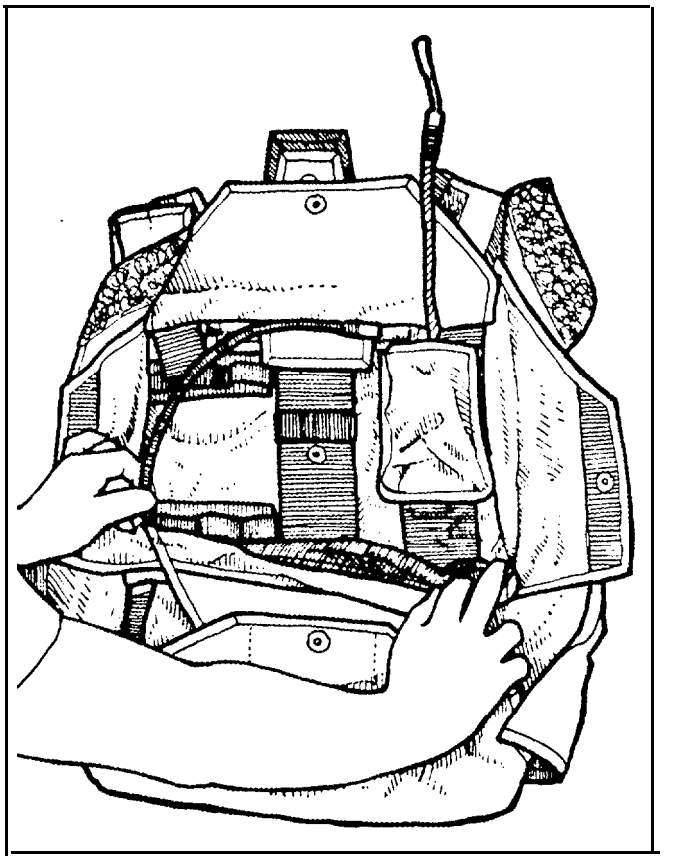
5. Thread the activation unit cable through the long thin Pin Puller pouch on the right side of the reserve pack tray and out the bottom. Slide the activation unit into the pouch.



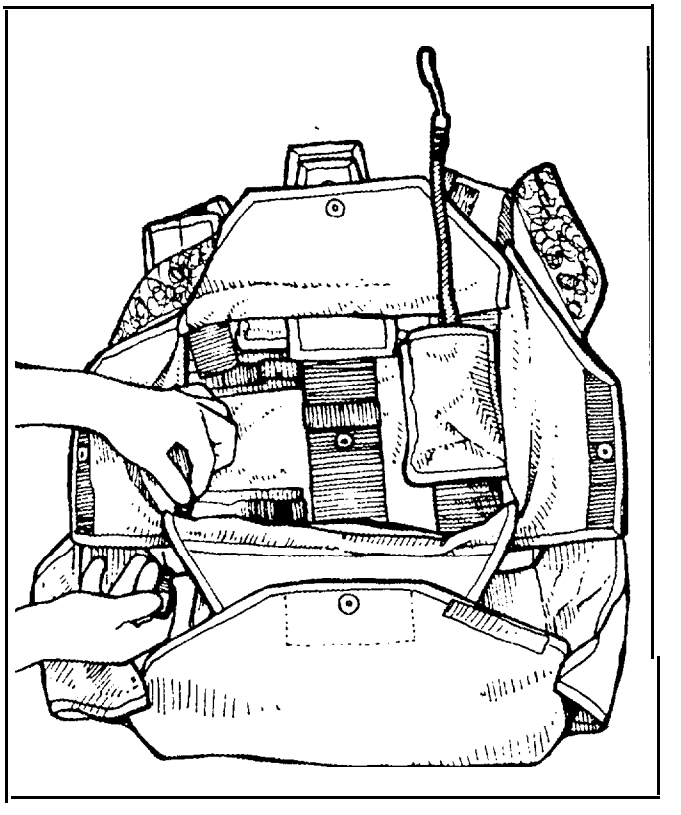
6. Pull the cable gently to seat the unit in the pouch and remove any slack in the cable.



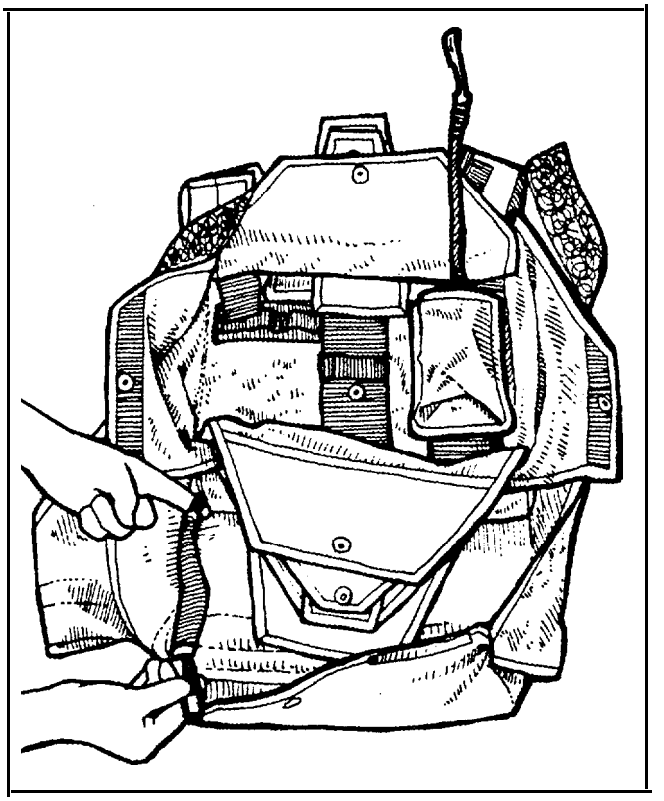
7. Thread the activation unit cable carefully from left to right through the channel that runs along the bottom of the reserve pack tray.



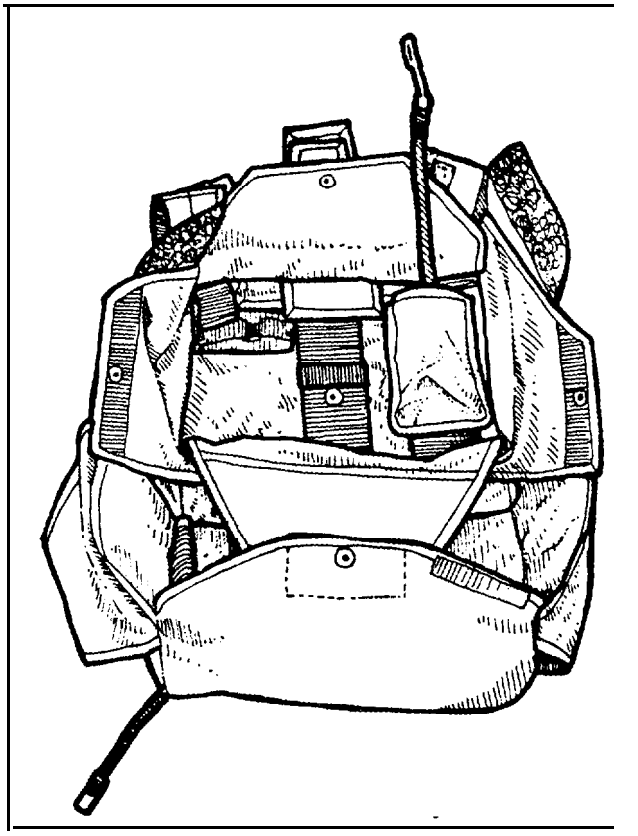
8. Next, route the activation unit cable through the small hole in the bottom left hand corner of the reserve pack tray.



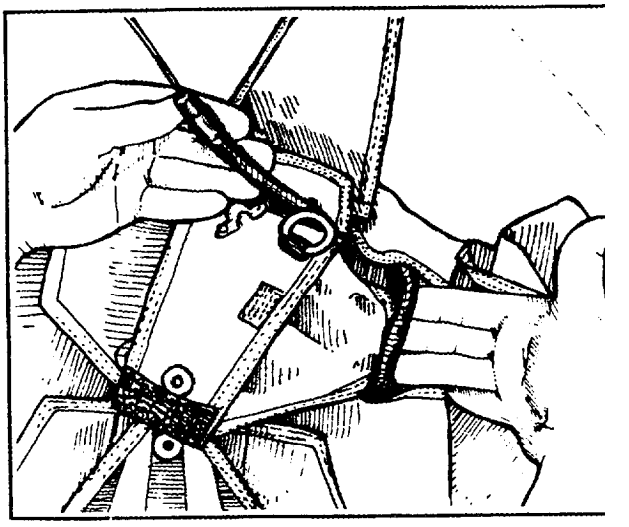
9. Thread the activation unit cable through the channel that runs along the left side of the main pack tray.



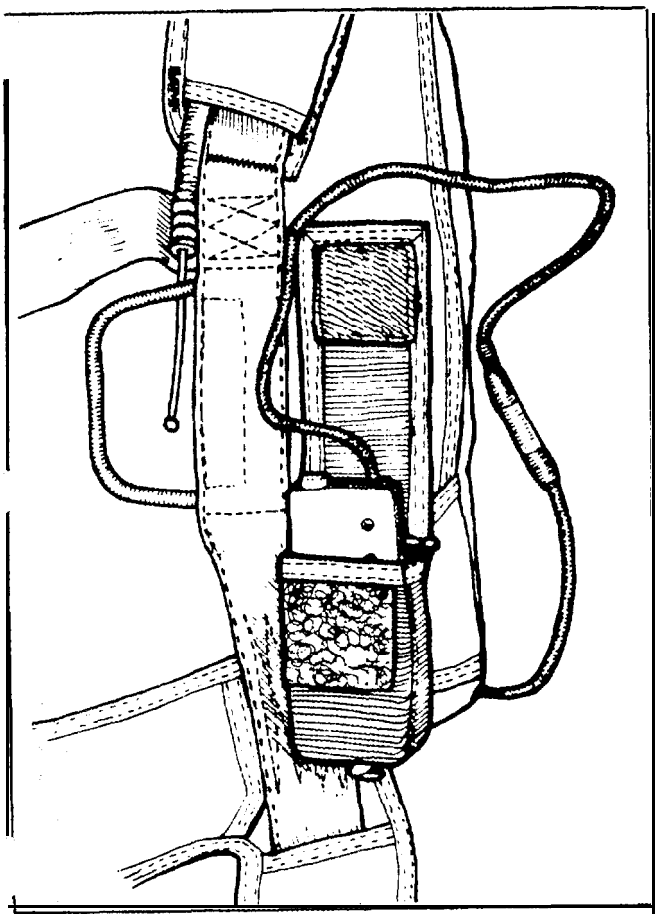
10. Route the activation unit cable through the hole in the lower left hand corner of the mair Container. Attach the activation unit cable you have just threaded to the sensing unit cable.

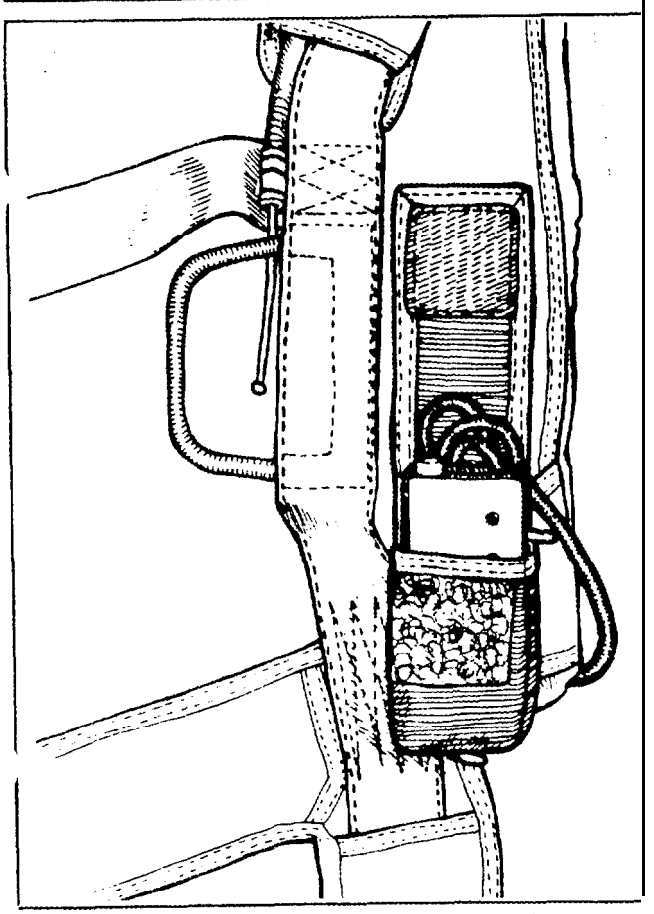


11. Thread the cable housing at the top of th activation unit irom right to left through th small slot in the Container yoke near the upp corner of the reserve pin protector flap.

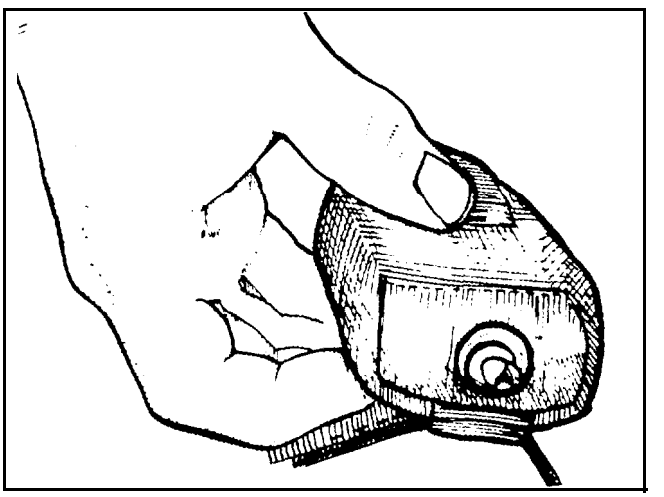


11. **Using the pouch provided, mount the sensing unit to the diagonal strap. Coil the extracableand tuck it into the pouch.**

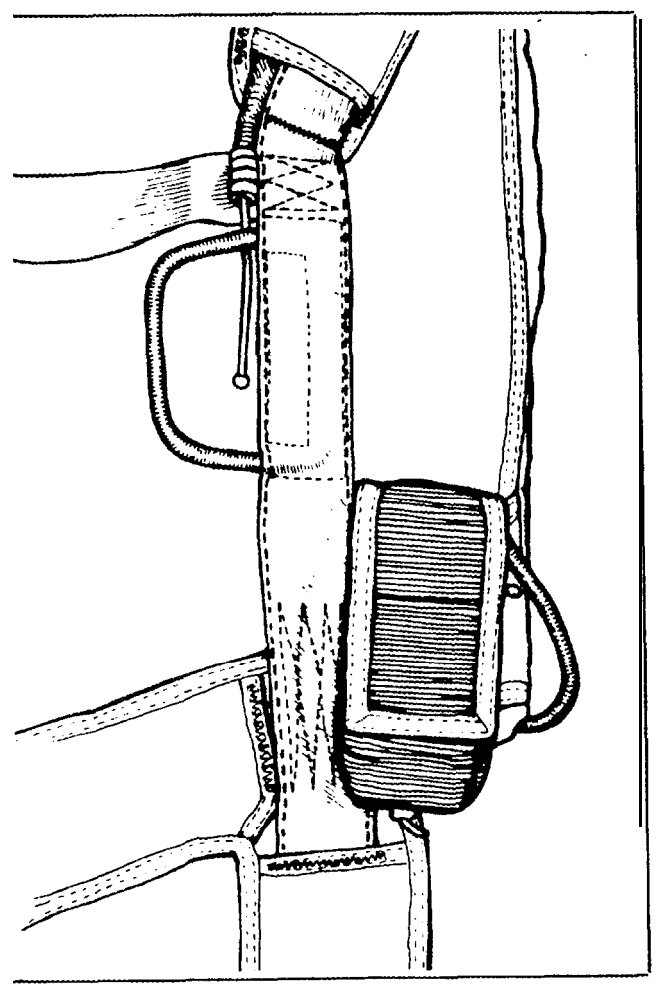




12. **Secure the sensing unit into the pouch with a piece of Type 3 sheathing by passing one end through the grommet in the bottom of the pouch, through the hole in the bottom of the unit and back out the grommet. Then pass a small metal washer over both ends of the Type 3, snug it up and tie an overhand knot. Cut off the excess Type 3 and sear the ends.**



13. **Close the Velcro flap on the pouch. Inspect the entire assembly. Log the installation on the packing data card and in your logbook.**



Installing the FXC Model 12000 AAD

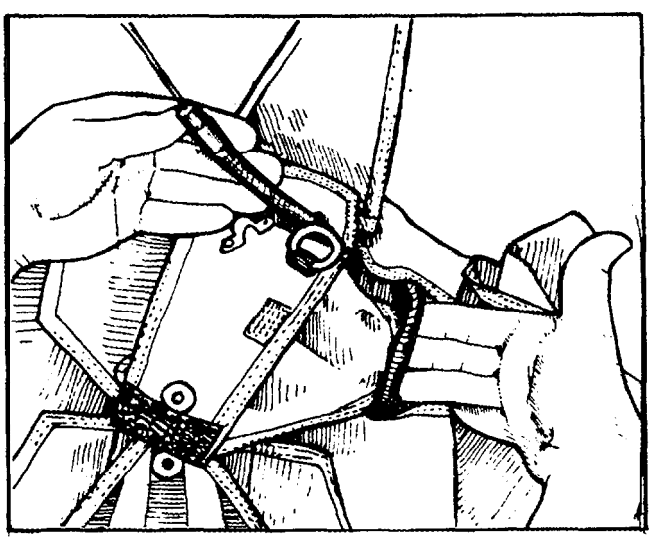
1. Installation of the FXC Model 12000 on the Vector requires a small-hole terminal fitting on the activation cable and longer screws. This fitting is available from either FXC or the Relative Workshop; it is not routinely provided with each Model 12000 sold.

2. Inspect entire AAD assembly. Cock unit.

3. Modify the mounting plate by using a hacksaw to cut the "tail" off the T-shaped plate. (Only the crossbar of the plate will be used.) Smooth any rough edges with a file.

4. Insert activation unit into pouch on the wearer's right-hand side of the reserve container. The activation cable should extend towards the right and the sensing cable to the left.

5. Route the activation cable along the right side of the pack tray. The cable end is threaded from right to left through a small slot in the Container yoke near the upper corner of the reserve pin protector flap.



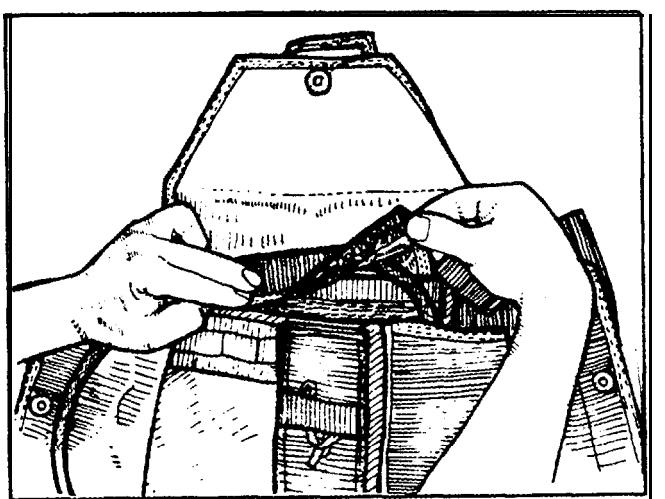
6. Measuring along the center line of the reserve top flap (Flap #6), measure up 4 inches from the center of the grommet and mark. This mark indicates the lower edge of the mounting bracket.

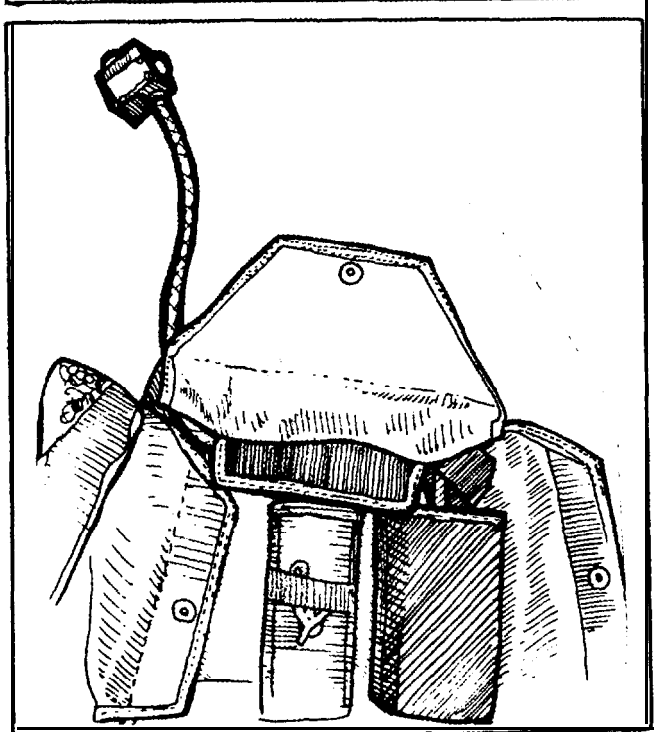
NOTE: If the bracket is mounted too closely to the grommet, the ripcord pin may not be completely withdrawn from the locking loop when the AAD fires and the Container will stay shut.

7. Place bracket on center line of top reserve flap and use a pencil or pen to carefully mark holes. Remove bracket and drill holes in top flap using a 1/16-in. drill bit.

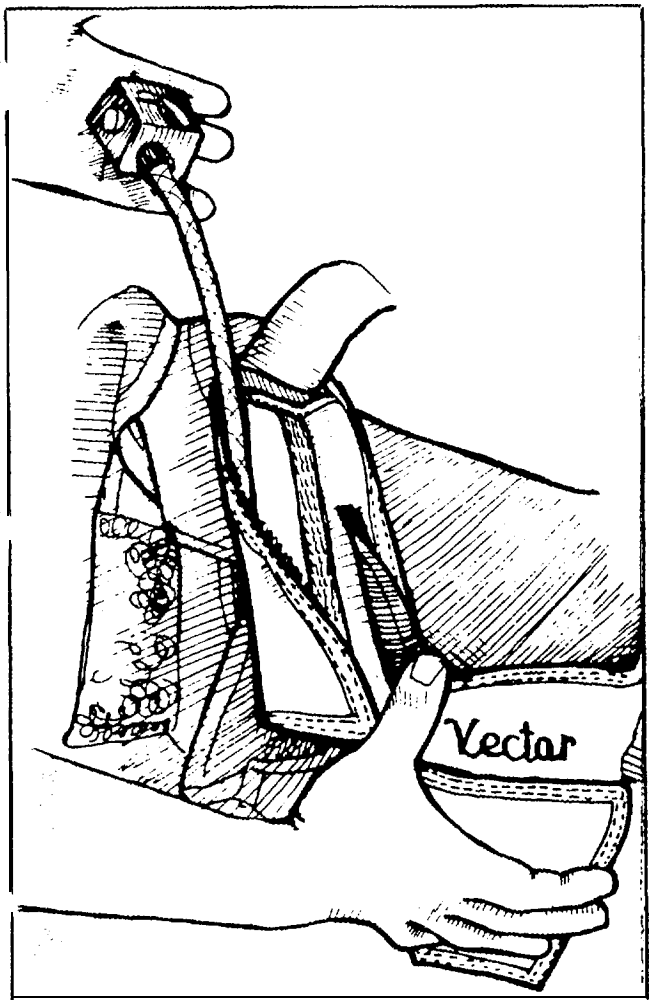
8. Position the bracket on the outside of the top reserve flap and the mounting plate on the underside. Using the longer of the screws provided, insert each through the bracket, through the flap and through the plate. Slip the end of the cable housing into the bracket. Snug screws down to firmly hold the housing. File the ends of the screws flush if necessary.

9. Route the sensing unit cable under the Velcro flap across the top of the reserve container and under the Velcro flap on the left side (where the reserve risers will be placed).

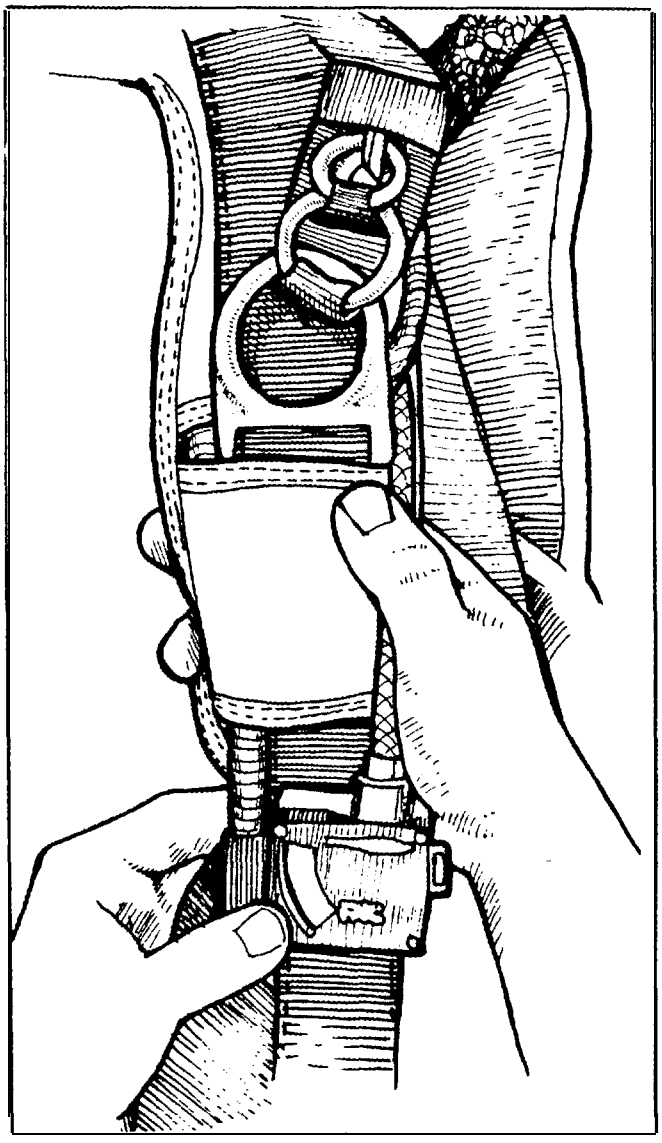




10. Route the sensing unit cable under the Velcro flap on the left hand shoulder yoke.



11. Attach the sensing unit to the Type 17 loop provided on the fabric panel below the large harness ring.



12. Inspect the entire assembly. Log the installation on the packing data card and in your logbook.

Altitude Testing Chamber

Because AADs are reliable only if they are properly installed and maintained, anyone who purchases a Vector must have access to an altitude testing chamber. The FXC chamber costs more than the one from SSE, Inc., but it tests the entire system rather than just the Sensor.

It is possible to construct an inexpensive altitude chamber using readily available components. These "home-made" devices can fail, however, endangering those nearby. Caution must be used when using any altitude chamber.

Altitude Testing Chamber

Because AADs are reliable only if they are properly installed and maintained, anyone who purchases a Student Vector must have access to altitude testing chamber. The FXC chamber costs more than the one from SSE, Inc., but it tests the entire system rather than just the Sensor.

It is possible to construct an inexpensive altitude chamber using readily available components. These "home-made" devices can fail, however, endangering those nearby. Caution must be used when using any altitude chamber.

THE 3-RING RELEASE SYSTEM

Introduction

The 3-Ring Release System was invented by the Relative Workshop several years ago. It was the first practical release that allowed parachutists to jettison their main canopies in one motion by simply pulling a single handle.

Not only is the 3-Ring easier to operate than previous canopy release system, it is also more reliable. Failures of a properly built and assembled 3-Ring system are virtually unknown.

Once the main is jettisioned, the only things left on the harness are two smooth rings that cannot snag a deploying *reserve.* Some other popular release Systems tan--and have--interfered with the deploying reserve.

MODIFYING THE 3-RING RELEASE

The great reliability of the 3-Ring system results from the proper functioning of every one of its individual components. Therefore, the owner should not modify the system in any way, nor should he replace genuine 3-Ring parts with others.

These modifications (among others) will cause the system to not work properly:

--Tacking the cable housings to the chest strap. The housings must "float" through their keeper.

--Substituting risers that don't have Type 3 sheathing for the locking loop. Don't use risers that have loops made of Kevlar solid cord.

--Not using a breakaway handle with cable with the special yellow coating. This Teflon-impregnated coating is important; other plastic coatings may cause the cables to bind in the housings loops, making it difficult or impossible to jettison the riser

--Using a breakaway handle with cables of the wrong length. The length of the cables is critical to insure each risers release in the proper sequence. Since the Student Vector *is* equipped with a reserve static line, a reserve malfunction could result if the right-hand riser released before the leit-hand one. Replacement handles are available from the Relative Workshop.

The 3-Ring Release is now found on other rigs besides Student Vectors as the Relative Workshop has licensed its use to other manufacturers.

AN INTRODUCTION OF THE 3-RING AND HOW IT WORKS

Knowing how the 3-Ring release works will help a skydiver assemble and inspect it properiy. This section was written with the student and his instructor in mind.

Begin by peeling the release handle from the Velcro on the harness. Peeling, rather than pulling, makes it easier to separate the handle from the webbing.

Look behind the ris+rs near the harness and observe the movement of the yellow cable as you pull the handle. When the cable clears the white loop, the release is disengaged.

(The Student Vector was designed so the left riser releases before the right. Otherwise the reserve lanyard could deploy the reserve before the left-hand riser was released.)

Now gently 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.

Each ring forms a lever with a ten-to-one mechanical advantage as it passes through the other. A force of 1,000 lbs. on the large harness ring exerts a force of only ten pounds on the white loop. (Opening shock usually totals about 1,000 lbs., or 500 lbs. on each riser.)

Because of the mechanical advantage provided by the 3-Ring design, only a force of approximately a pound on the top ring keeps the release together.

That's why it's important to keep foreign matter like bits of grass and sticks out 3-Ring assembly. A small stick in the white loop could prevent a riser from releasing.

It is also important to understand one of the properties of the nylon components of the system.

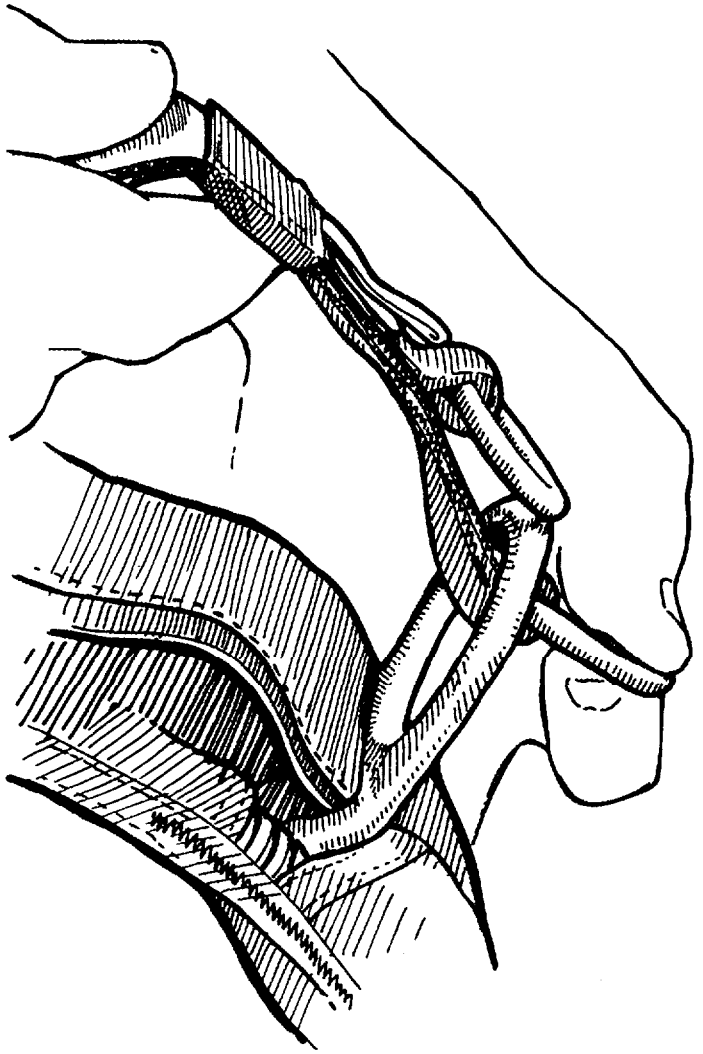
When nylon stays in the same position for a long time, it begins to conform to that position--it takes a "set." If the 3-Ring release system stays assembled for too long, the nylon can become so stiff that the low drag from a malfunction (such as a streamer) won't pull the riser off the ring.

The 3-Ring release system must be disassembled, flexed and inspected every month. Procedures for this are listed in Section XX.

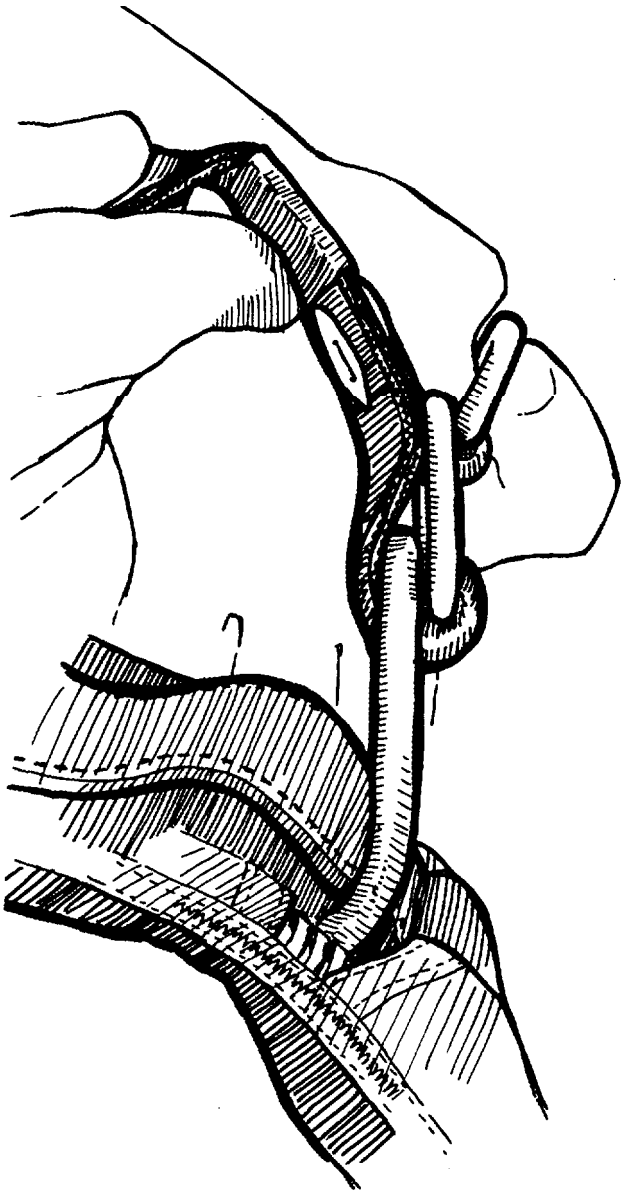
ASSEMBLY

Before assembling the 3-Ring release, make sure the risers aren't twisted or reversed. Lay the Student Vector face down, as you would to pack it.

1. Thread each cable into its housing and stick the handle to the harness. The handle should be positioned as close to the ends of the housings as possible so that no cable is exposed.

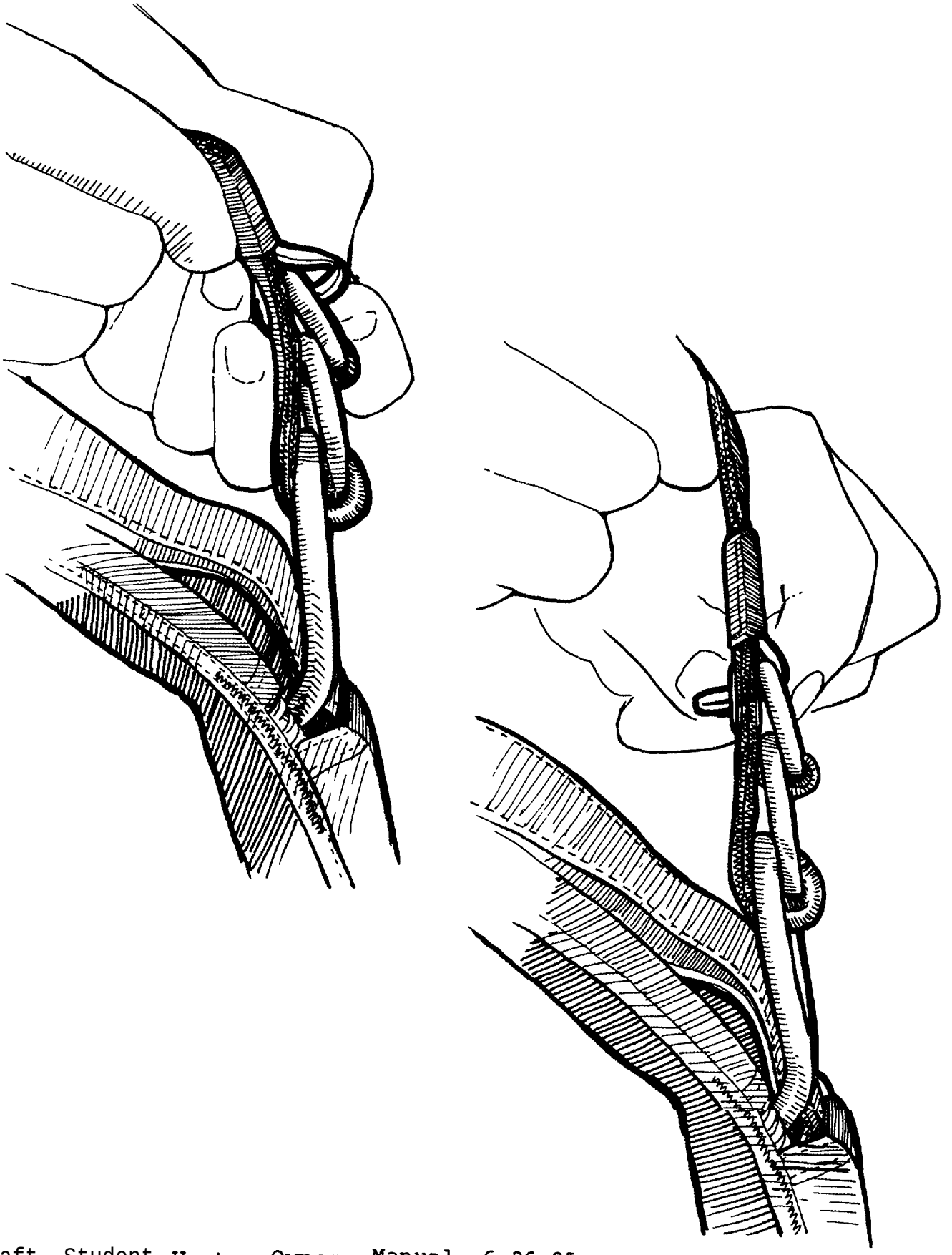


2. With the rings of the riser facing toward the floor, pass the middle ring on the end of the riser through the large harness ring from above. Fold it back toward the canopy and risers.

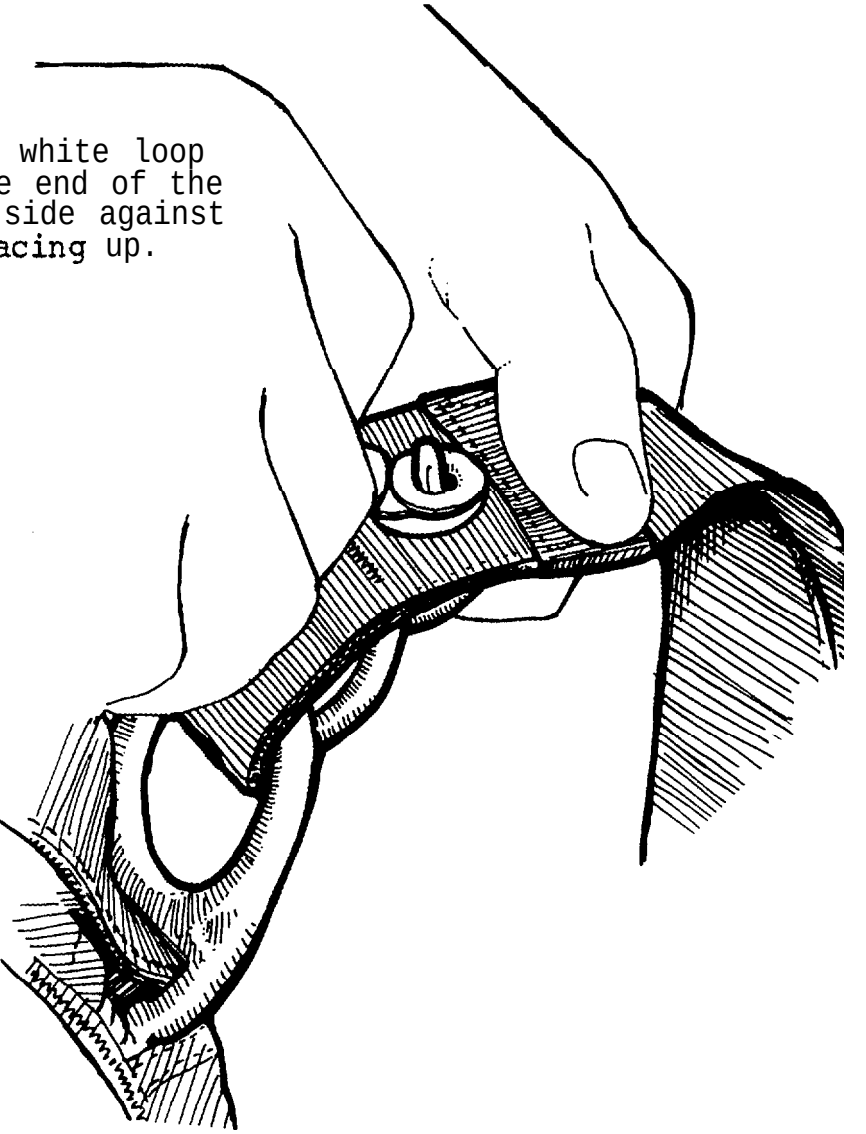


3. Thread the smallest ring through the middle ring in the same way, but make sure it doesn't pass through the large ring.

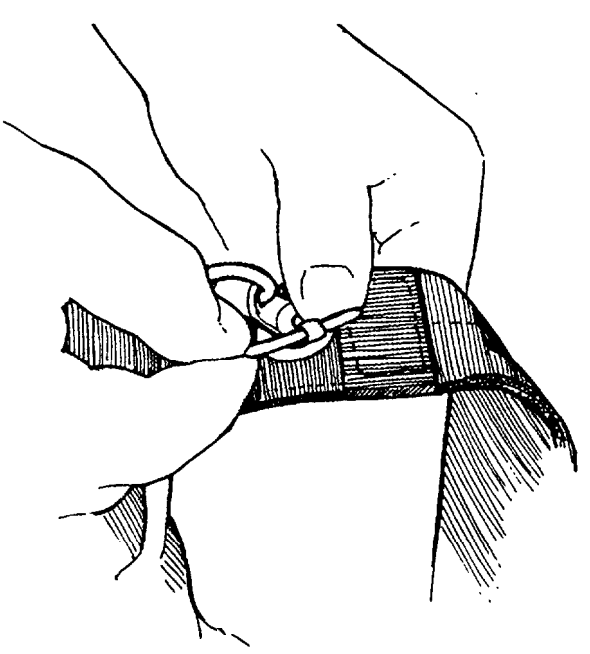
4. Bring the white loop over the small ring only and then through the riser grommet so it pokes out the back of the riser.

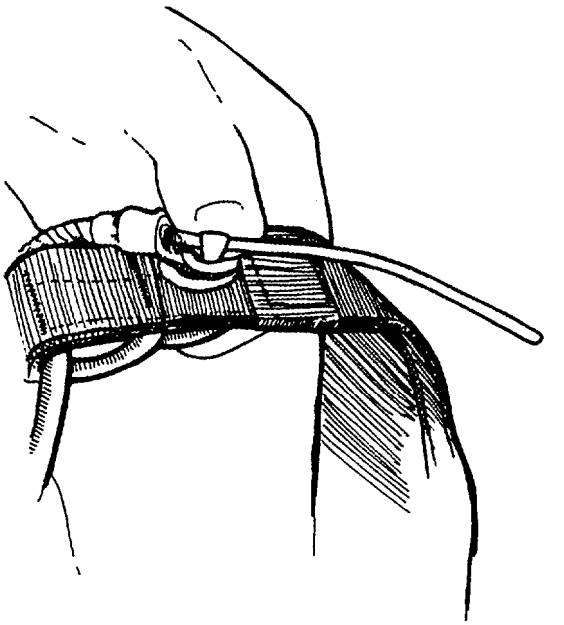


5. Continue threading the white loop through the grommet on the end of the cable housing, with flat side against the riser and the cable facing up.

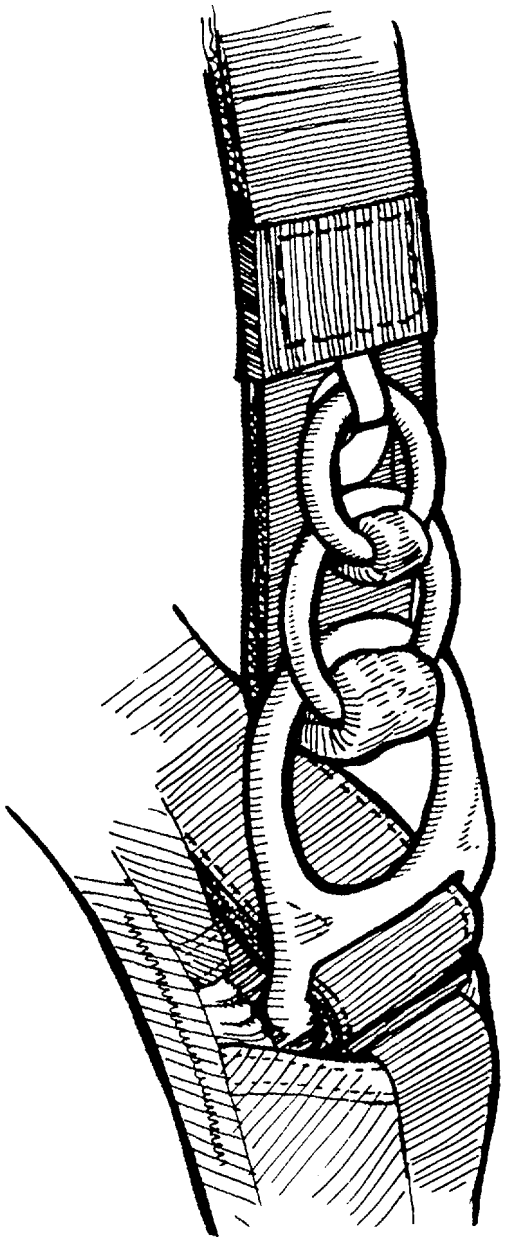


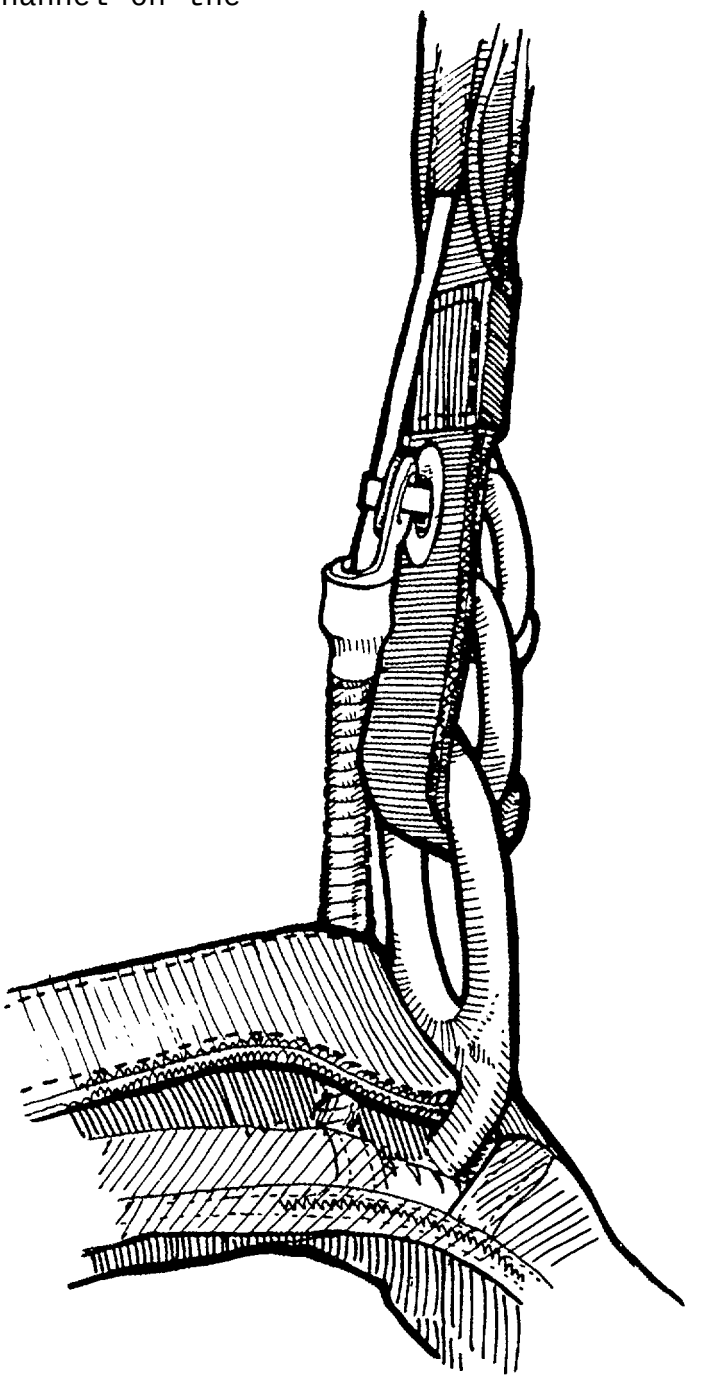
6. Thread the yellow cable through the white loop, making sure the lo isn't twisted. Be careful with the cable so you don't bend it too sharply or kink it.





7. Insert the free end in the channel on the back of the riser.





8. Repeat the above steps with the other riser.

3-RING RELEASE PRE-JUMP INSPECTION

Before jumping the Student Vector, check the 3-Ring release system for the following:

1. Each ring passes through only one other ring.

2. The white loop passes through only the small ring.

3. The white loop passes through the grommet on the end of the cable housing without twisting.

4. Nothing passes through the white loop except the yellow cable (bits of sticks or stiff grass might cause Problems).

5. The 3-Ring release handle is securely stuck to the harness, and no cable is visible between the handle and the cable housings.

MAINTENANCE & CARE OF THE STUDENT VECTOR

INTRODUCTION

Your Student Vector will last longer, look better and function correctly if it is maintained. A Student Vector actually requires very little maintenance unless it is subjected to unusual conditions such as a jump into salt water or a muddy landing.

INSPECTION

The best approach in maintaining your rig is to periodically spend a few minutes examining every detail on it. This inspection should be done at least every month. If any wear or damage is found, fix it immediately. Putting off repairs might result in a malfunction.

In addition to inspecting the ring yourself, ask your rigger to inspect the entire assembly when the reserve is repacked.

Particular attention should be given to these areas:

1. Breakaway System. Refer to the 3-Ring section in this chapter for detailed information on inspecting the canopy releases.

2. Reserve System. This includes the reserve ripcord, locking loop, pins, handle, housing, Container and associated sewing. You should not attempt any repairs or modifications to any of these items unless you are an appropriately rated rigger. You can, however, spot little problems before they become major.

3. Harness. The harness should be inspected periodically for broken stitching or frayed webbing.

4. Main Container. Inspect the plastic stiffeners in the Container flaps and replace any that are broken. Replace any grommets that are badly deformed or pulling out of their setting. A rigger must replace grommetc or plastic stiffener.

5. Main Pilot Chute. Check the centerline (a length of nylon tape inside the pilot chute that extends from the handle to the base) of the main pilot. It must be firmly sewn at each end; there must be no broken stitches or torn fabric.

Inspect the seam that joins the pilot chute mesh to the pilot chute fabric. If the mesh is torn or badly frayed , replace the pilot chute.

6. Locking Loop. The main Container is held shut with a locking loop made of nylon Suspension line sheathing. This loop is subject to wear. If it wears out and breaks, the main canopy may release prematurely and a malfunction may result. Replace the loop with a duplicate if wear is noticed.

CAUTION

Never jump a Student Vector with a worn locking loop.

7. Velcro. Velcro tape has many applications in parachuting. However, it wears out and loses its adhesive ability after a while. It also gets "clogged" with dirt and bits of grass and should be cleaned occasionally. Check the riser keepers or riser covers (on the shoulders) and the main protector flap to see if the Velcro is adequately tacky. Velcro on the main pilot chute bridle should be replaced after several hundred jumps, too.

CARE

Your Student Vector is manufactured mostly from nylon. Nylon is very durable, but is susceptible to damage from several sources:

1. Sunlight. The ultraviolet rays in sunlight quickly and permanently weaken nylon. Keep your Student Vector out of direct sunlight as much possible.

2. Acids. Nylon is also damaged by acids. Keep your Student Vector away from hangar floors, dirty car trunks and similar areas where acids may be found. If such contamination does occur, immediately and thoroughly wash the rig with plenty of warm soapy water. Until a rig can be washed baking soda will neutralize most acids. If acid damage occurs or is suspected, a rigger should thoroughly inspect your Student Vector.

3. Oils and Grease. Most Petroleum compounds do not weaken nylon; they simply stain it. Such stains should be promptly removed by a rigger using the proper Petroleum solvent.

4. Water. Water will not damage your Student Vector, but may cause some fabric colors to run. Salt water will rust the hardware if not promptly and thoroughly washed off with plenty of fresh water. Your rig will maintain its new appearance longer if it is kept dry.

5. Soil. Soil will not damage your Student Vector. Brush off the soil after is has dried and gently wash with warm soapy water. Be sure that the soil is not in the housings, snaps, 3-Ring release or reserve ripcord pins or loops. Consult a rigger if your rig is heavily soiled or extremely dirty.

6. Abrasion. Nylon quickly frays if dragged over concrete or other rough surfaces. Do not drag your rig on the concrete while packing.

FAA regulations require that reserves worn in the U.S. be repacked every 120 days by a certificated rigger.

REQUIRED PERIODIC MAINTENANCE FOR TI-IE 3-RING

The Booth 3-Ring Release System has been in use for many years with excellent results. Although the system is as durable as the rest of the harness and Container assembly, it requires periodic maintenance and inspection to ensure proper Operation.

Generally, it is NOT recommended that the risers be attached to the harness when new and "forgotten." Like all skydiving gear, the 3-Ring Release should be carefully inspected and operated on a regular basis.

The procedures below should be done at least every month. This is especially important if the rig has not been used for a month or more such as during the Winter. Immediate inspection is required if it has been subjected to some abuse such as a drag across the runaway, a wa landing or exposure to a lot of dust or sand.

1. Every month operate the 3-Ring release system on the ground. Extract the cable completely from the housings and disconnect the risers.

2. While the system is disassembled, closely inspect it for wear. Check the white locking loops (the ones that pass over the smallest ring and through the grommet) to be sure they are not frayed.

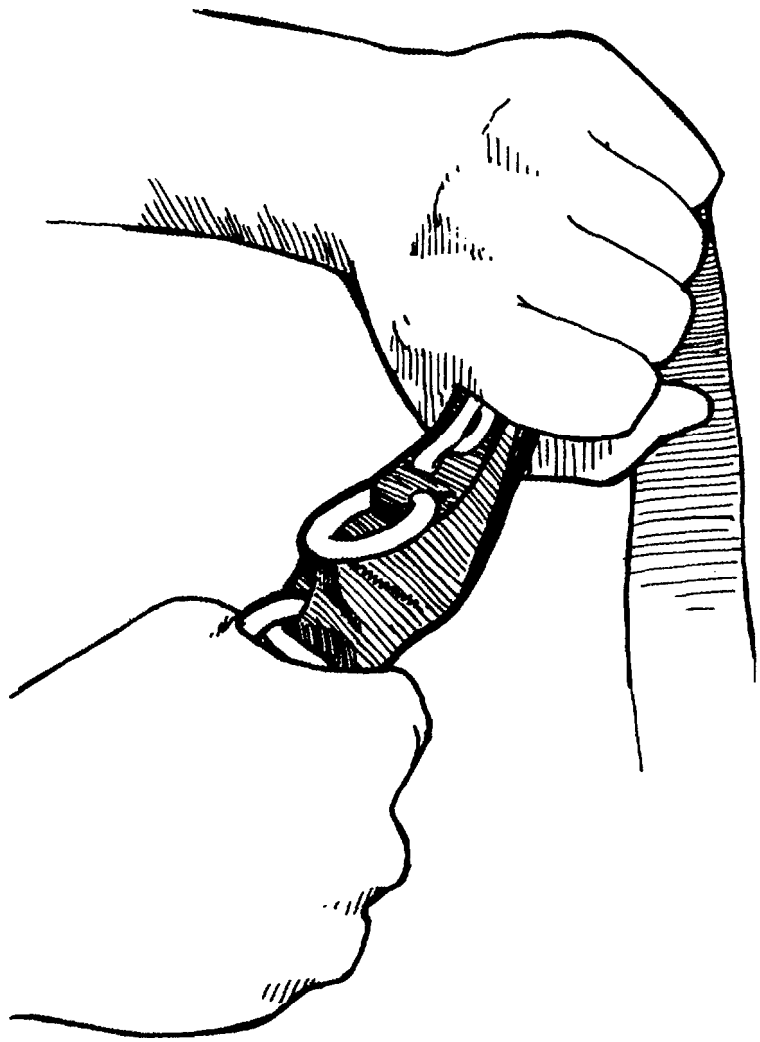
3. Check the Velcro on the breakaway handle and main lift web to be sure it is clean and adequately holds the handle.

4. Check the cable ends for a smooth finish. The ends are finished at the factory to have a smooth, tapered surface. This prevents the cable from hanging up in the loop. Check the cable ends and consult a rigger or the manufacturer if a burr or "hook" is present.

5. Check the stitching, including that which holds the large rings to the harness and the hand tackings that prevent the housings from sliding through their keeper. (This keeper is a loop of narrow webbing located a few inches above the release handle.)

6. Pull downward on the housings. They shouldn't move downwards more than 1/2 inch, but should be free to move upwards 1 to 2 inches.

7. Take each riser and vigorously twist and flex the webbing near where it passes through each ring. The idea is to remove any set or defonnation in the webbing. Do the same thing to the white loop.



8. Check the housings for dents or other obstructions. Use the cable to do this.

9. Clean and lubricate the release cable with a light oil such a "3-in 1" brand. Put a few drops on a paper towel and firmly wipe the cable a few times. A thin, invisible film should remain--too much will attract grit and dirt, or the oil could become tacky cold weather, requiring more force to extract the cable during a breakaway.

10. Inspect the security of the fittings at the end of each housing. If one of these fittings were to come off the housing, a riser might release prematurely.

11. If any wear is found, consult the manufacturer or a rigger before using the Vector.

12. Reassemble the System. Double check it. Make sure the risers aren't reversed.

The Relative Workshop appreciates any comments from users that relate to the safety, Operation or maintenance of the 3-Ring release.

It's important to maintain the system even more frequently in humid, muddy or freezing conditions. If the Student Vector becomes immersed in mud or muddy water, clean the 3-Ring release system with a mild Solution of soap and water. Any rusted components must be replaced.

REPLACEMENT PARTS

The Relative Workshop supplies replacement parts for its rig at a reasonable cost. When ordering parts for your rig, include the serial number, type and date of manufacture of your Student Vector so the proper items can be quickly supplied. This information is written on the TSO label tucked under the collar between the top two flaps of the reserve.

HOW TO USE THE STUDENT VECTOR

This section provides specific procedures for using the Student Vector. It is not a training syllabus. (Recommended training procedures may be obtained from a variety of sources, including the U.S. Parachute Association.)

It is obviously the responsibility of the instructor to insure the Student knows everything he needs to make a safe parachute jump, including how to use his equipment.

SUGGESTED EQUIPMENT

Training Harness

It's essential that the Student repeatedly practice normal and emergency procedures on the ground before the jump. This practice should be done using training aids that duplicate the equipment he will be using in the air.

The Relative Workshop can provide a Student Vector training harness. It is equipped with simulated breakaway, reserve and main deployment handles that are located in the same positions as the Student Vector. If you build your own practice harness, make sure the main, reserve and breakaway handles are located in the same positions as on the Student.Vector.

Using a Student Vector for lengthy ground practice may quickly fatigue the Student and put additional wear on the Student Vector.

STUDENT HANDOUT

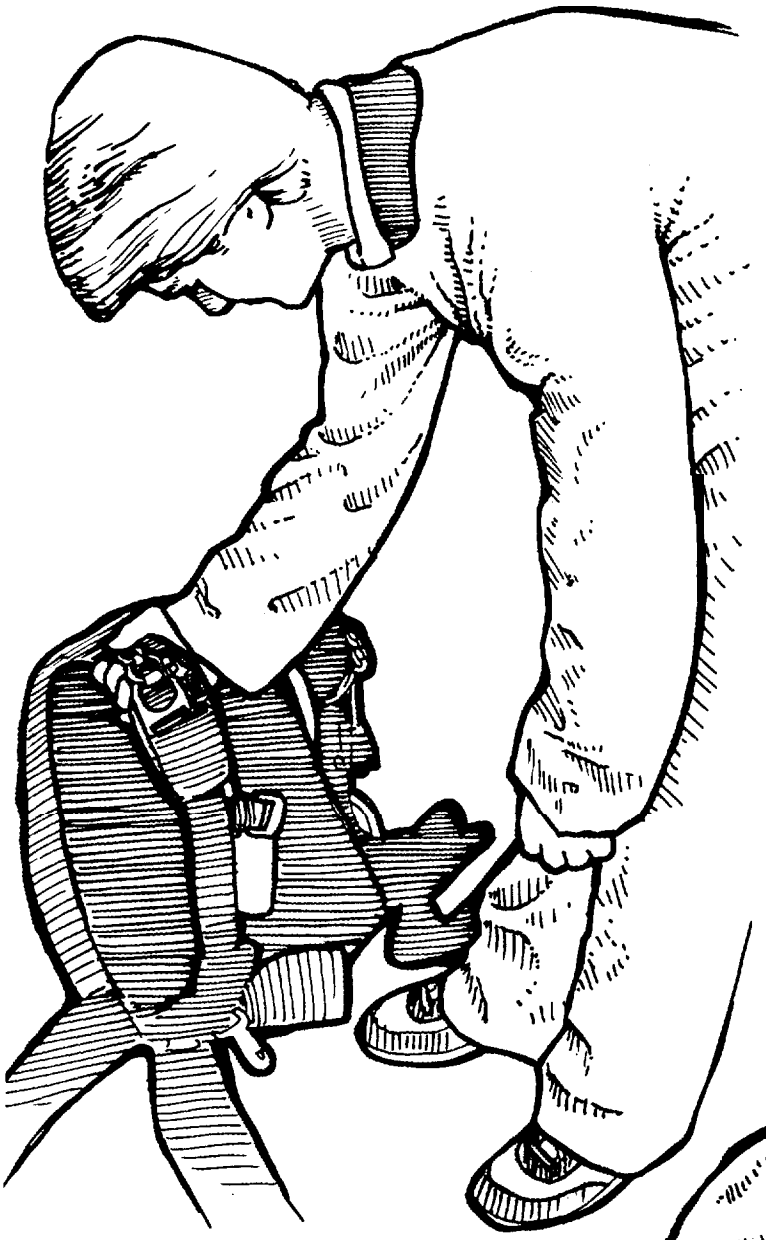
Included with the Student Vector are several copies of a brochure that will help your Student understand his equipment before the jump. It is a brief Synopsis of procedures on handling and caring for the rig.

Although it is protected by Copyright, you may copy the Student handout booklet for free distribution to your customers, or you may order replacements from the Relative Workshop..

We hope the Student Handout will make your job easier and make your Student Vector last longer.

DONNING AND ADJUSTING THE STUDENT VECTOR

The Student Vector is designed so that it fits snugly, yet comfortably, when the harness is properly adjusted. You may use the following directions to teach the Student to put on and adjust his own gear:

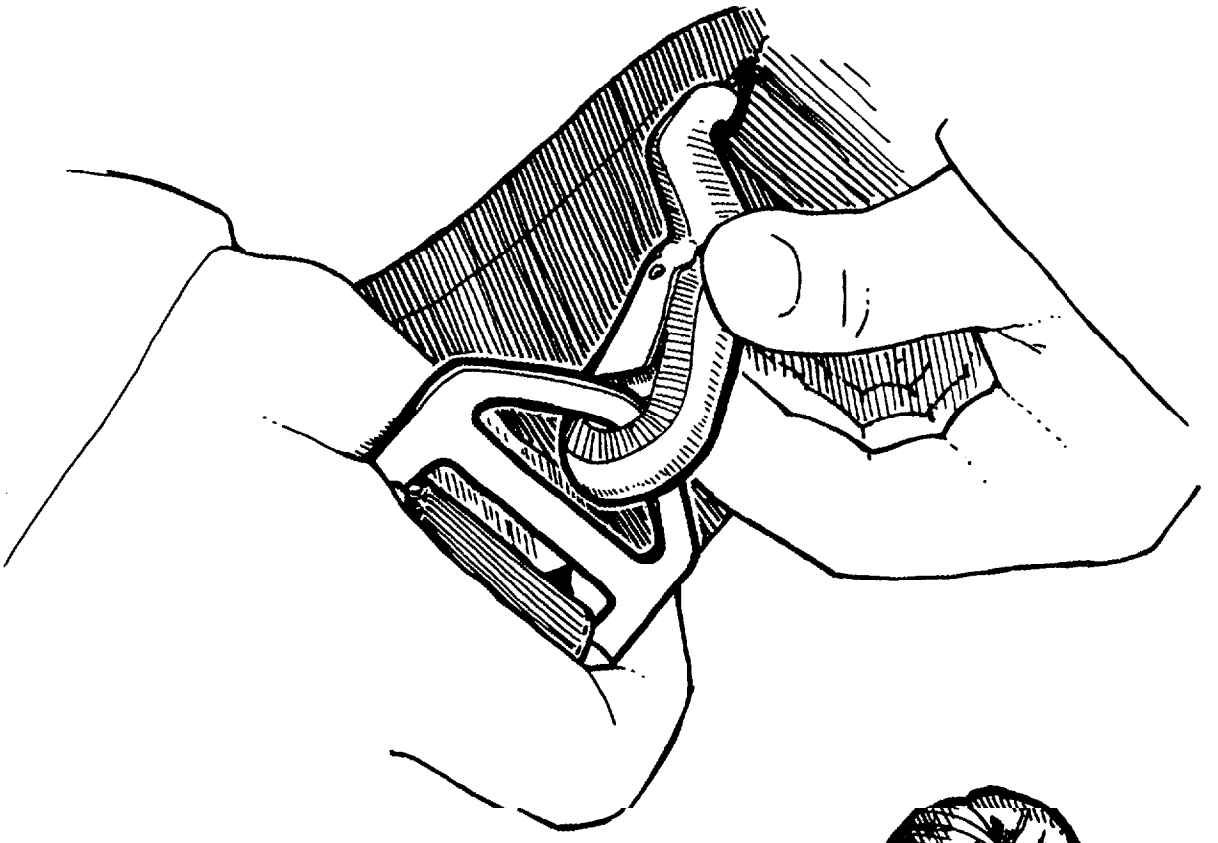


1. To pick up the Student Vector, grab it by the main lift web where the 3-Ring release is.

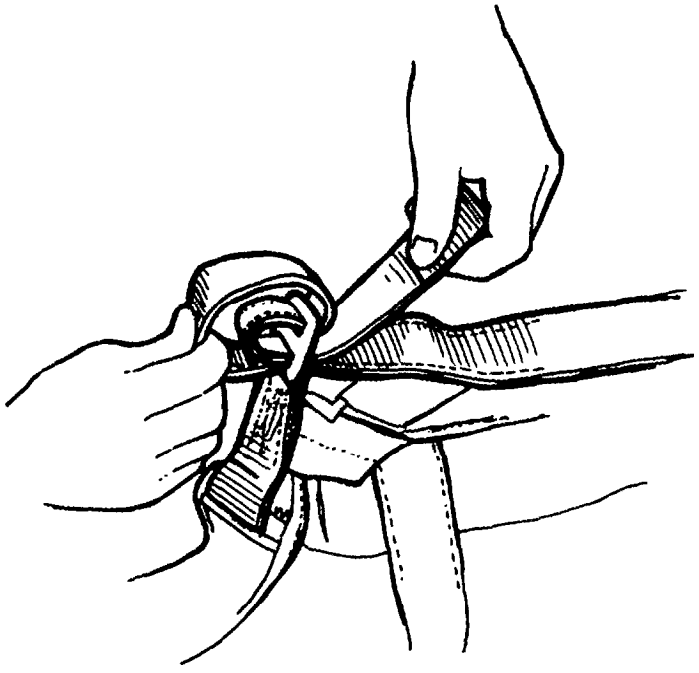
2.You can put it on as you would a coat.

3. The straps that hang the lowest are the leg Straps, but don't get the left one confused with the belly band. Take one, check it for twists, and pass it under your leg.

4. Snap the V-ring to the hook. Repeat with the other leg strap.



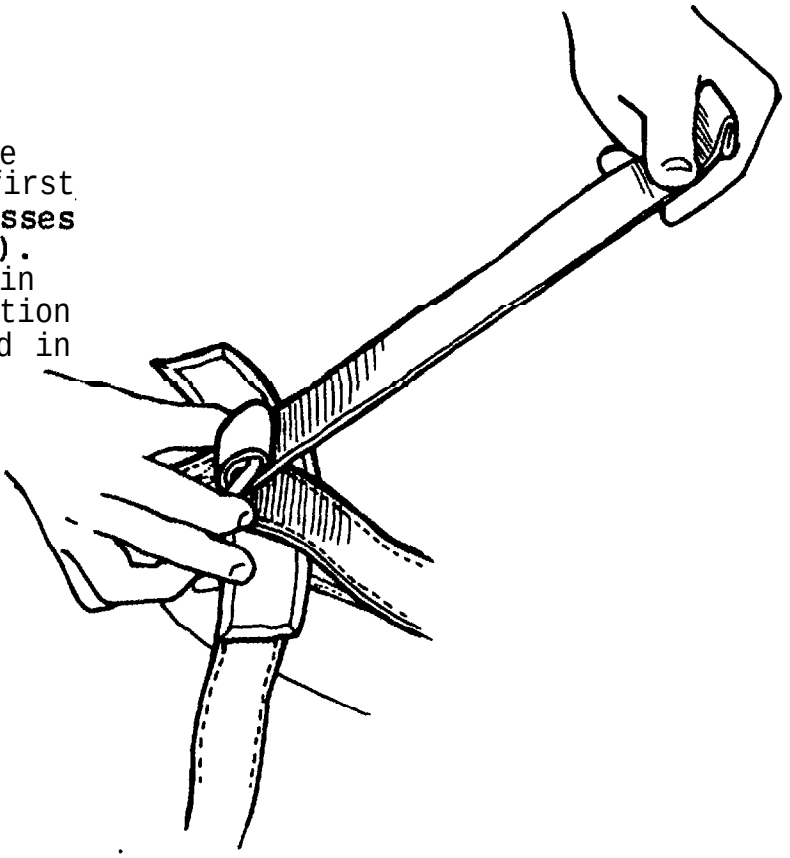
5. Tighten the leg straps until they are snug. Stow the extra strap in the pockets on the pads so they won't flop around in the air.

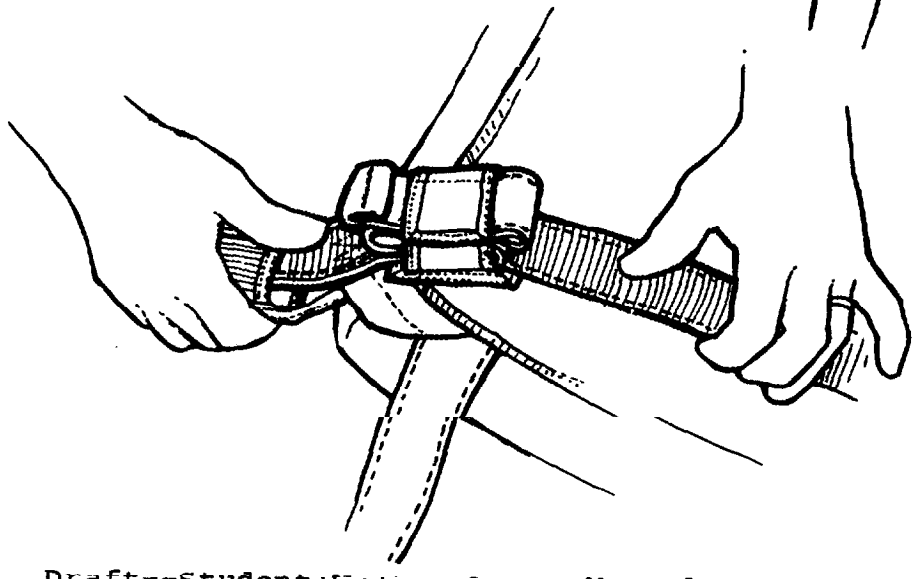


6. There are two adjustment fittings towards the bottom of the main lift webs. They are not made to slide or adjust easily, so an instructor will need to shorten or lengthen the main lift web.

Adjust the main lift web until you have no slack when you stand straight up, yet not tight enough to compress your torso.

Instructors: To adjust the length of the main lift web, first loosen the webbing where it passes around the metal fitting (left). Pull on the free end of the main lift web to retighten the junction (Center), and stow the free end in the Velcro tabs (right).

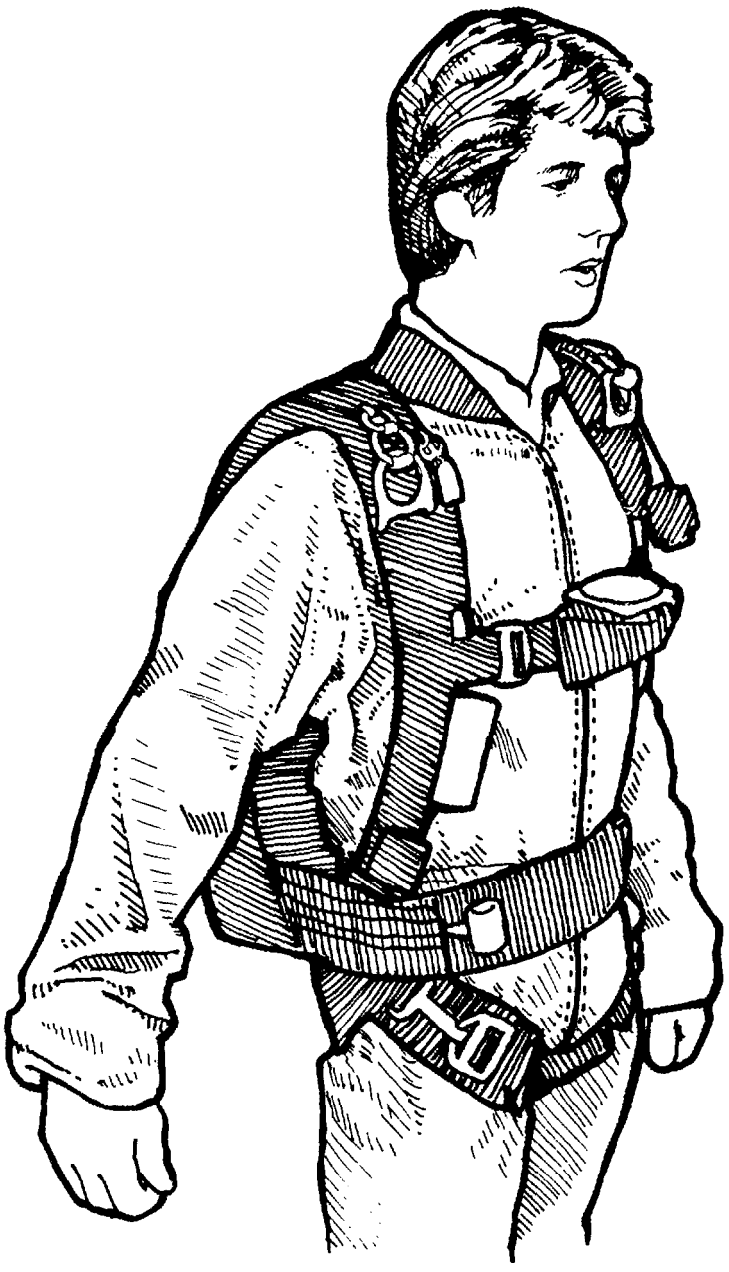




7. Thread the chest strap. (If altimeter is worn on the chest strap, put it on first.) The strap enters the adjuster from behind (the wearer's chest side around the sliding bar, and bac through between the bar and the end of the adjuster. Adjust it the main lift webs are parallel when the chest strap is tight.

An improperly threaded che strap will not hold the jumper the harness.

6. Find the belly band and check it carefully for twists. (If a hand deployed main pilot chute is being used, a twisted belly band will result in a malfunction of the main parachute called a pilot chute in tow.) Always check for twists. Thread the belly band just like the chest strap. Adjust it until the rig hugs your back. The weight of the rig should be on your hips instead of your shoulders.



Your Student Vector is now ready for an equipment check.

SUMMARY

To summarize the above adjustment procedure:

Put the packed rig on over your jumpsuit.

Hook the leg Straps, checking that they are not twisted, and position the comfort pads properly.

Tighten the leg straps until snug and stow the loose ends.

Stand up straight and close the chest strap; it should not be cinched too tightly.

Adjust the main lift webs if necessary.

Firmly cinch the belly band after first checking to be sure it is not twisted. It should be positioned as far down your waist as possible.

Adjust the back diagonals a bit to take out the slack. Once adjusted, both diagonals should be tacked so the webbing cannot slip. You may want to change this adjustment later, such as during the winter months when more clothes are worn.

Get a "pin check."

PRE-JUMP EQUIPMENT CHECK

The equipment check should follow a logical order like top to bottom, front to back.

Starting at the front:

1. Make sure the 3-Ring system is assembled properly and free of dirt or other foreign matter.

2. Make sure the reserve lanyard is hooked to the ring on the right-hand riser above the 3-Ring assembly. Check the shackle to see that it is fully and securely closed. The lanyard should be held firmly in place by the Velcro all along its length until it enters the reserve pin-protector flap. Make sure the lanyard goes back to the reserve pin-protector flap without routing around any other part of the rig.

3. Slide the reserve ripcord cable back and forth in its housing to be sure it moves freely.

4. Calibrate and arm the AAD according to the instructions provided by its manufacturer.

5. Check the reserve ripcord handle. Its pocket should hold it firmly in place. Don't remove it from the pocket unless you suspect a problem, because the Velcro will wear out too soon.

6. Check the chest strap for proper threading, and to be sure it hasn't been threaded through the reserve ripcord handle. If an altimeter is being worn, be sure it is calibrated properly.

7. Check the 3-ring release (breakaway) handle. It should be mated to the Velcro on the harness properly. No more than 1/2 inch of yellow cable should be visible between the breakaway handle and the cable housings.

8. Check the main ripcord (if used). It should be seated so no black cable shows between the handle and the housing. The student should at the main pilot chute handle to see that it can be grasped easily, but that it is not hanging too far out of the pocket.

9. Check the leg straps for proper mating and no twists. Be sure the spring in the snap has not broken; the gate should click when opened and released.

Turn the jumper around:

10. Lift the reserve pin-protector flap and check the following:

A. The pin at the end of the lanyard is at least halfway through the reserve locking loop.

B. The loop on the end of the AAD cable lies between the locking loop and the metal loop in the reserve pin.

C. The loop at the end of the reserve ripcord cable lies between the AAD fitting and the reserve locking loop.

D. The Velcro on lanyard is stuck to the yellow Velcro patch.

E. The lanyard passes through the large guide ring.

11. Lift the main Container pin-protector flap and check the following:

A. If a ripcord is used, it passes through the locking loop and continues into the stowage pocket for the extra cable. No pull-up cord or other foreign matter should pass through the locking loop.

B. If hand deploy is used, the curved pin must be at least halfway through the locking loop. Be sure the yellow Velcro patches on the bridle and contianer flap are mated.

C. If static line is used, be sure the curved pin is seated in the locking loop. The static line must not pass under any strap or flap; to check this, unstow it from it rubber band keepers. The static line snap must function properly.

12. If hand deploy is used, make sure the bridle is routed correctly on the belly band. Routing the bridle around the leg strap or belly band will cause a pilot chute in tow malfunction.

13. Check the jumper's personal gear (helmet, footwear, goggles, gloves, jumpsuit and altimeter) for a proper fit.

HOW TO USE THE STUDENT VECTOR

INTRODUCTION

This chapter contains recommended procedures for operating the Student Vector. These procedures must be integrated into the complete course of instruction given by a qualified instructor.

DEPLOYING THE MAIN PARACHUTE

If a Ripcord is Used:

The action required to pull the Student Vector's main ripcord is essentially identical to the motion used for hand deployment. (This means the novice will not have to learn a different proceudre when if he switches to hand deploy later in his jumping career.)

The ripcord is pulled in three steps: Look, Reach and Pull.

1. While falling in a stable Position, he shoul say "Look" and look at th main ripcord.

2. At "Reach" he should grasp the handle with his right hand while compensating for stability with the left.

3. On "Pull" he should briskly pull the ripcord straight out from his side and resume his freefall body position. (One end of the housing will peel from the belly band for a short distance.)

On the last few jumps before using hand deploy for the first time, the student should actually throw the ripcord away to simulate throwing the pilot chute.

If Hand Deploy is Used:

The procedure for hand deployment is similar to that for ripcord deployment: look, reach, pull. Before a novice is allowed to use hand deploy, he should first perfectly mimic the procedure on the prior jump.

It's not enough to simply release the pilot chute into the airstream. The jumper must THROW the pilot chute out and away from his body. Otherwise it may blow back into the turbulent air behind him and cause a malfunction. The motion of his arm should be parallel to the ground. If it isn't, the pilot chute and bridle may pass under his arm, possibly causing a malfunction.

Any wave-off procedure should be completed before pulling the hand deployed pilot chute. Waving off with the pilot chute in hand could cause a premature pack opening and possibly a malfunction.

Many jumpers watch the pilot chute inflate and begin extracting the main canopy, then lower their heads while the main inflates.

DEPLOYING THE RESERVE PARACHUTE

This section is not a detailed course in coping with parachuting emergencies. It discusses the causes of some total and partial malfunctions and how a jumper wearing a Student Vector might react to them.

Total Malfunction

A total malfuntion exists when the main canopy is still in its Container after some effort has been made to deploy the main pilot chute. The pilot chute may or may not be trailing behind the jumper.

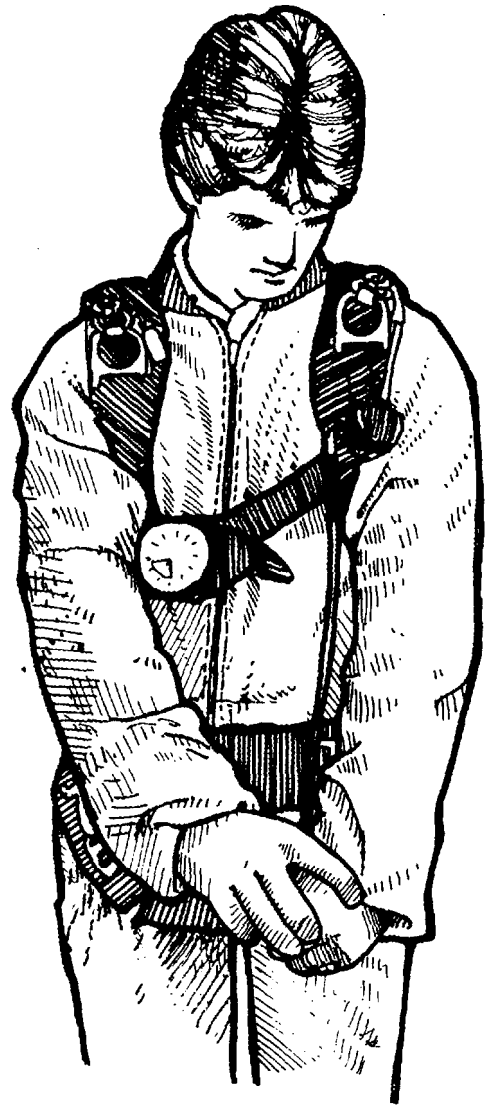
A total malfunction may result from a variety of Causes, most of which can be prevented by proper packing, maintenance and use of the Student Vector.

Because the jumper is descending at a high rate of speed, he has little time to attempt to correct a total malfunction.

The reserve ripcord should be pulled using a "Look, reach, pull," procedure.

The ripcord should be grasped with both hands and pulled until the arms are completely extended.

When presented with a total malfunction, it is usually not prudent to jettison the risers before pulling the reserve ripcord. Doing so wastes the limited time and altitude available.



Typical total malfunctions and the jumper's response include:

1. Towed pilot chute. The pilot chute is out behind the jumper, but does not extract the main canopy for some reason. (Causes include misrouting the hand deploy bridle during packing, not mating the yellow Velcro patches on the bridle and flap, twisting the belly band, and others.)

RESPONSE: Assume a flat and stable position and immediately pull the reserve ripcord. It is unlikely the jumper will be able to identify or correct the cause of a pilot chute in tow before impact with the ground. Trying to reach back and grasp the bridle is usually a waste of time.

2. Pilot chute hesitation. The pilot chute may become trapped in the turbulent air over a jumper's back and stay there. (Causes include no throwing a hand deploy pilot chute vigorously to the side, spring-launched pilot chutes that have been improperly packed, and others.)

RESPONSE: The jumper should roll over on his side momentarily. This should blow the pilot chute off his back or out of the turbulent air. it doesn't leave immediately, the jumper should roll back over and assume a flat and stable position and pull the reserve ripcord.

3. Lost or stuck deployment handle. Jumpers will sometimes be unable locate the deployment handle or, if they do locate it, not be able tc pull it.

RESPONSE: The jumper should look at the deployment handle. If he cani see it or feel it in a couple seconds, or if a couple hard pulls on i won't deploy the main canopy, he should assume a flat and stable position and pull his reserve.

Partial Malfunctions

A partial malfunction results when the main canopy comes out of Container and extends above the jumper but does not open correctly. N partial malfunctions result from incorrect packing or problems with t canopy itself.

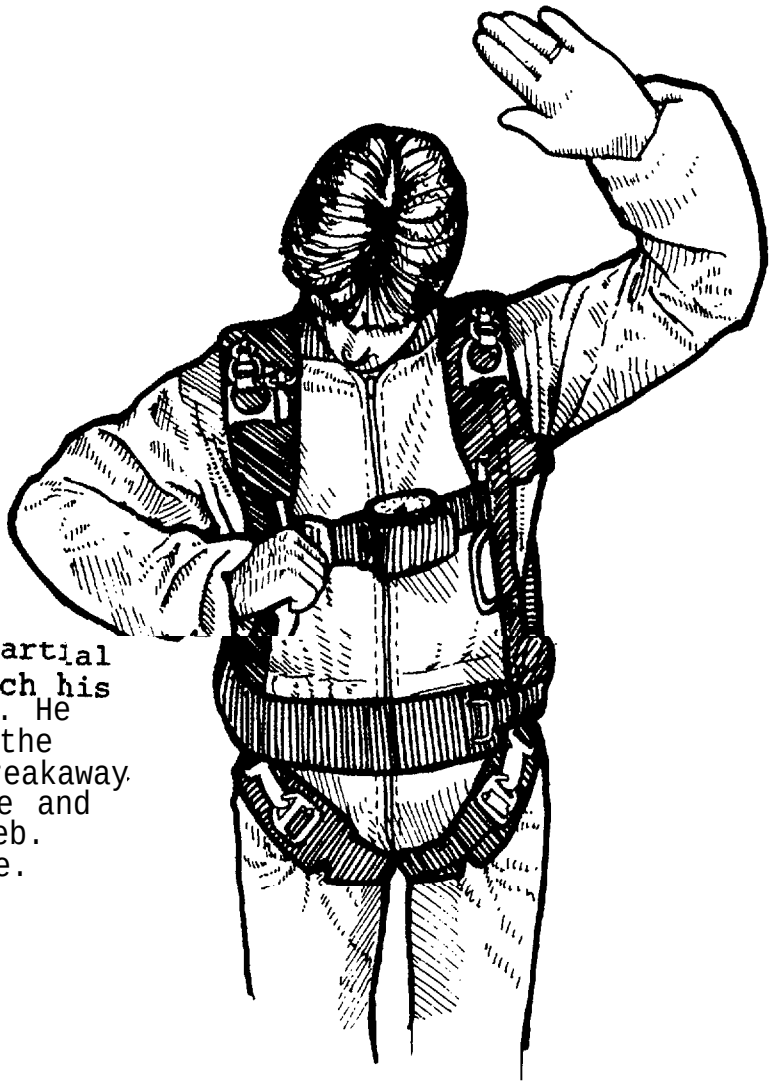
Some partial malfunction can be corrected by the jumper in the a Others might not require the use of the reserve parachute and can be landed safely. Identifying and dealing with such situations is the responsibility of the jumper.

Some jumpers delay several seconds between jettisoning their mai and pulling the reserve ripcord. This allows them to insure they are stable before the reserve deploys. However, such a delay can be fata the jumper is close enough to the ground. Such a delay also allows th jumper to begin rolling or tumbling.

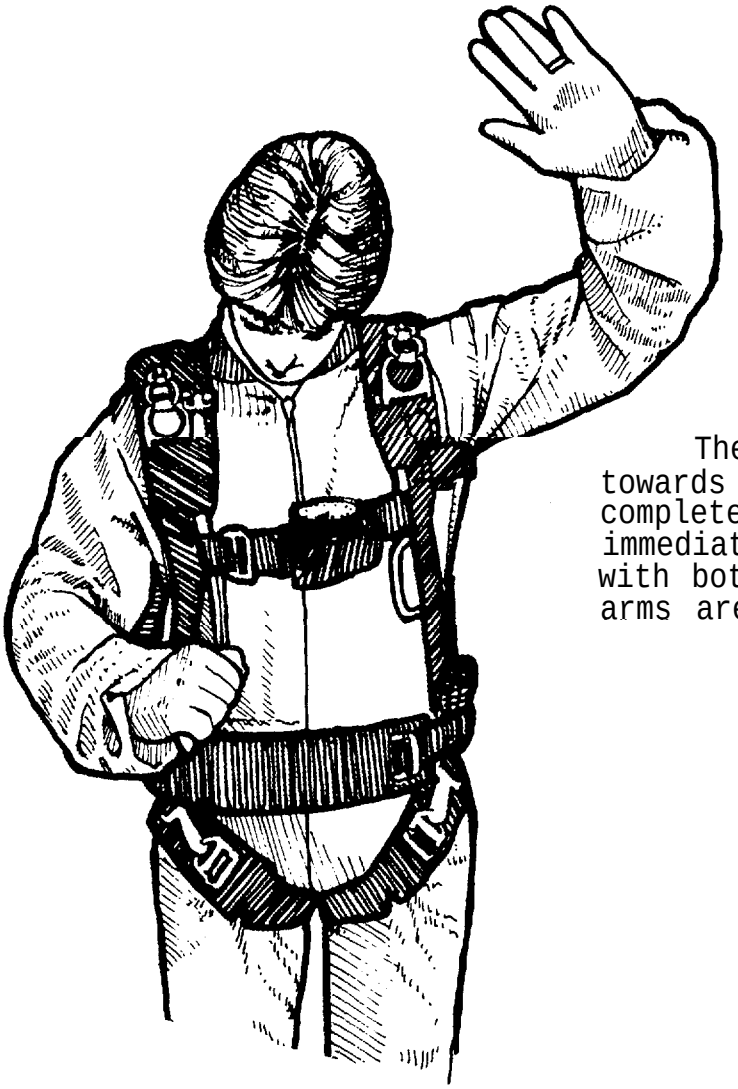
And some jumpers put one hand on the breakaway handle and the ot on the reserve ripcord handle and then attempt to pull them both simultaniously or in rapid succession. There have been incidents, however, where this technique resulted in the reserve deploying befor the risers were jettisonned--a dangerous Situation.

Therefore, experience has so far shown that the "two-step" meth is usually best.

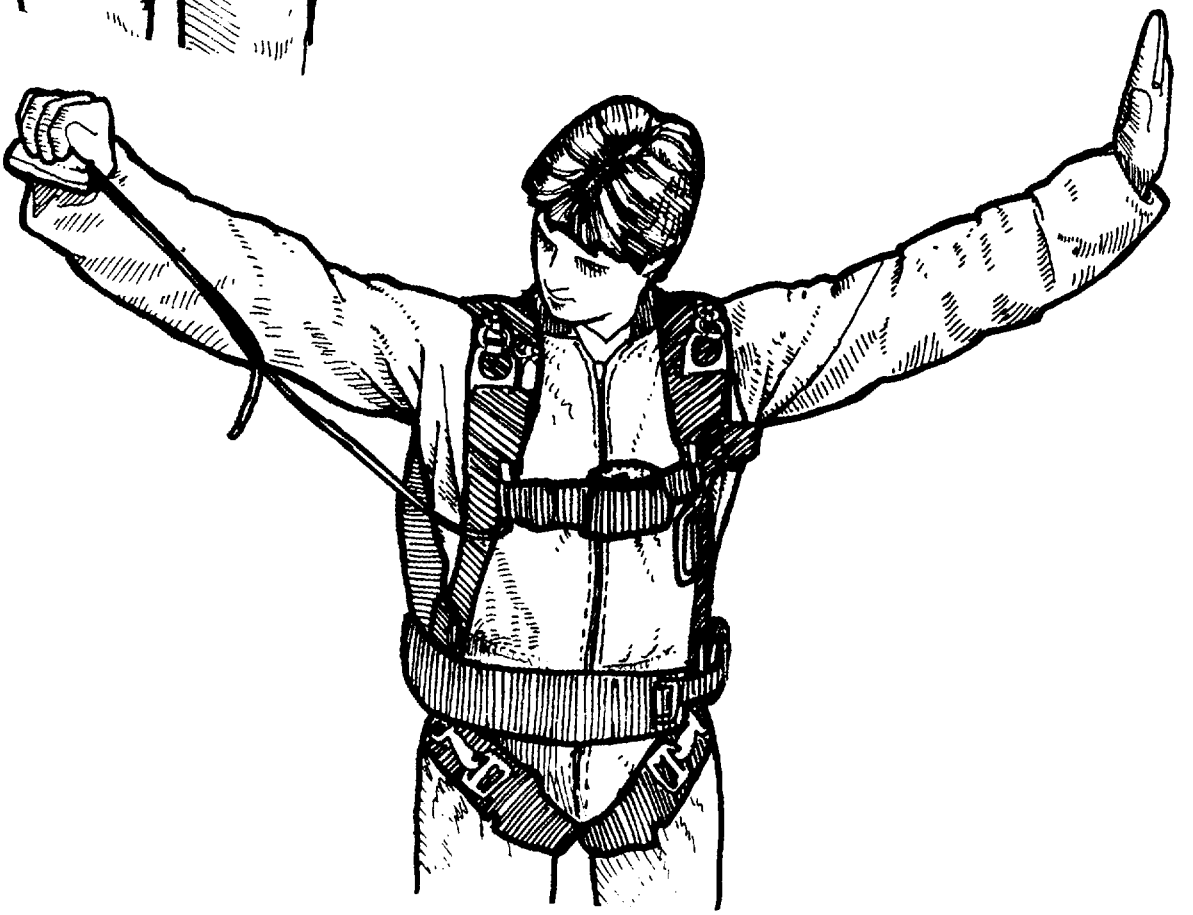
Note that the procedures for dealing with malfunctions do not condsider either the reserve static line nor the AAD. Since both are back-up devices, the jumper should be trained to act as if they werer there.



RESPONSE: When presented with a partial malfunction, the jumper should arch his back and tuck his legs behind him. He should then look down and locate the reserve ripcord handle and the breakaway handle. Grasp the breakaway handle and peel it away from the main lift web. Look at the reserve ripcord handle.



Then pull the breakaway handle down towards the knees until the arm is completely extended. Throw it away and immediately grasp the reserve ripcord with both hands and pull it until the arms are completely extended.



AAD Malfunctions

A novice may find himself under his reserve canopy if his automatic activation device on the Student Vector malfunctions, or if it was improperly operated, or if he descended below the preset altitude at a high rate of speed.

The instructor must develop specific procedures for the equipment being used and teach them to the student. Here are general guidelines:

If the reserve canopy is completely inflated and the main Container is still closed, the jumper should land under the reserve canopy as he was trained by his instructor.

If the reserve canopy is completely inflated and the main Container is open but the main canopy is not inflated, the main canopy should be jettisoned using the breakaway handle.

If both the reserve and the main canopy are open and inflated, the jumper should respond as he was trained by his instructor. (If the main canopy is a ram-air, many instructors teach their students to jettison it land under the reserve. Procedures for round main canopies depend on a number of factors--such as the exact type of main--that are beyond the scope of this manual. Likewise, a reserve canopy that is not completely or correctly inflated presents a difficult Situation that cannot be adequately discussed here.)

Other Emergencies

A skydiver may be faced with any number of emergencies not listed here, including those in the aircraft, during climb out or exit, in freefall, under canopy, during landing. As stated above, training for any and all emergencies must be provided by the student's instructor.

Attaching the Main Canopy Steering Toggles

The Student Vector is supplied with steering toggles for the inai canopy that compatible with the Student Vector risers. It is importa that the toggles and risers be compatible to prevent malfunctions.

It is also important that the toggles be located along the steer lines so the canopy is in a true no-brake mode when the toggles are resting against the guide ring. If not, the canopy will have diminish glide and probably won't land as well.

Likewise, if the toggles are mounted too far down the steering lines, the canopy will be less responsive and jumper might not be abl to apply full brakes or stall the canopy.

These situations are likely to occur when a main canopy is hasti switched from one set of risers to another. If the guide rings on bc sets of risers are located the same distance from the connector links, the steering toggles must be moved to another location.

It is also important to securely attach the toggles to the steer lines. Although most jumpers can successfully cope with "lost toggle without resorting to deploying the reserve, some can't.

Installation Procedure--Ram-Air Canopies

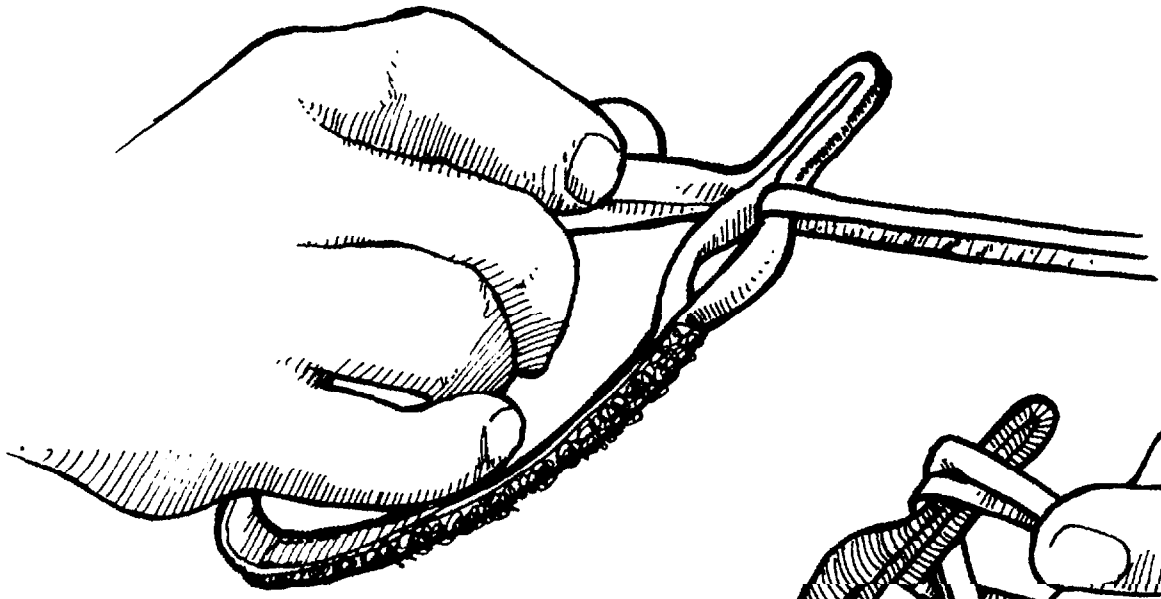
After the main canopy has been properly attached to the risers a while it is still laid on its side, attach the toggles to it by following these steps:

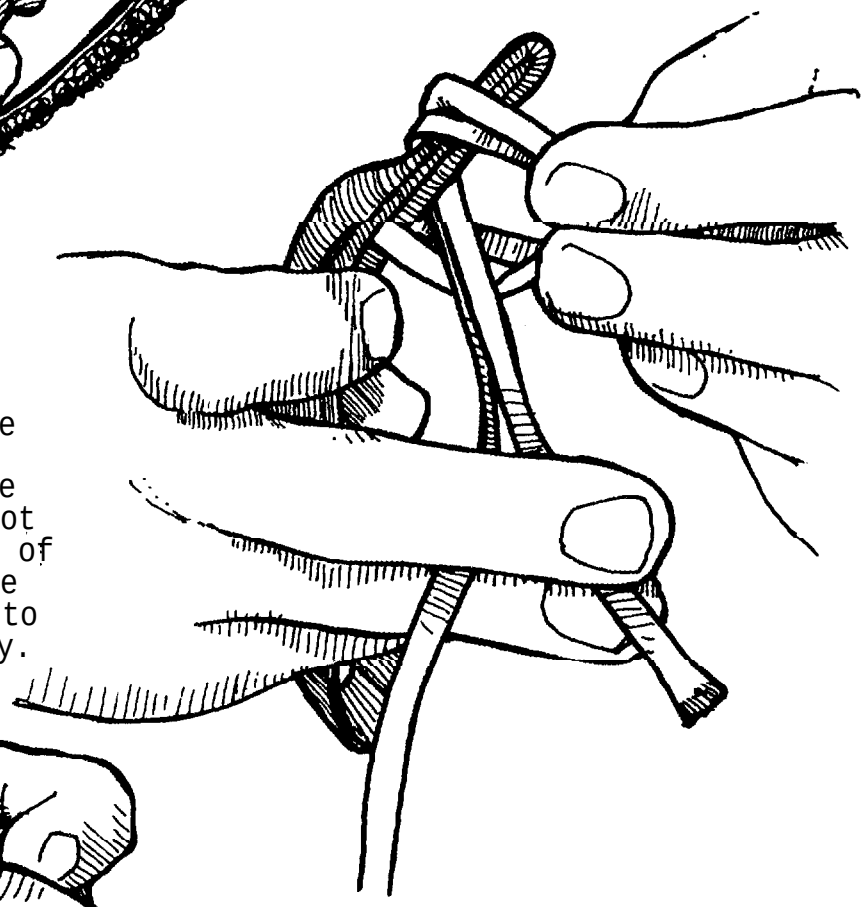
1. Starting at the tail of the canopy, trace the upper steering lines down to the lower steering line. The idea is to be sure the steering lines are routed correctly; they should not wrap around any Suspensic line. The right-hand steering line must pass through the right-hand r slider grommet, and the left-hand line must pass through the left-ha rear slider grommet.

2. If the main canopy is already equipped with toggles, mark each steering line where the steering line is knotted to the toggle. The purpose of this mark is to insure the new toggle is installed at exac the same point in the steering line.

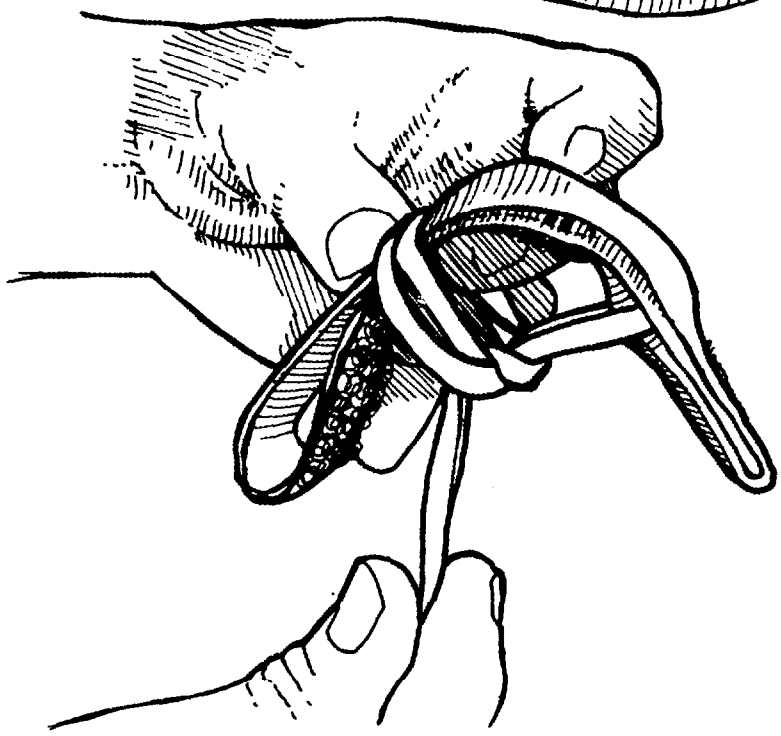
3. Remove one of the old toggle, pass the steering line through the keeper ring on the riser.

4. Pass the end of the steering line through the small hole in the Vector steering toggle. Adjust it so the mark on the steering line i approximately the same distance from the Vector toggle as it was fro the old toggle.

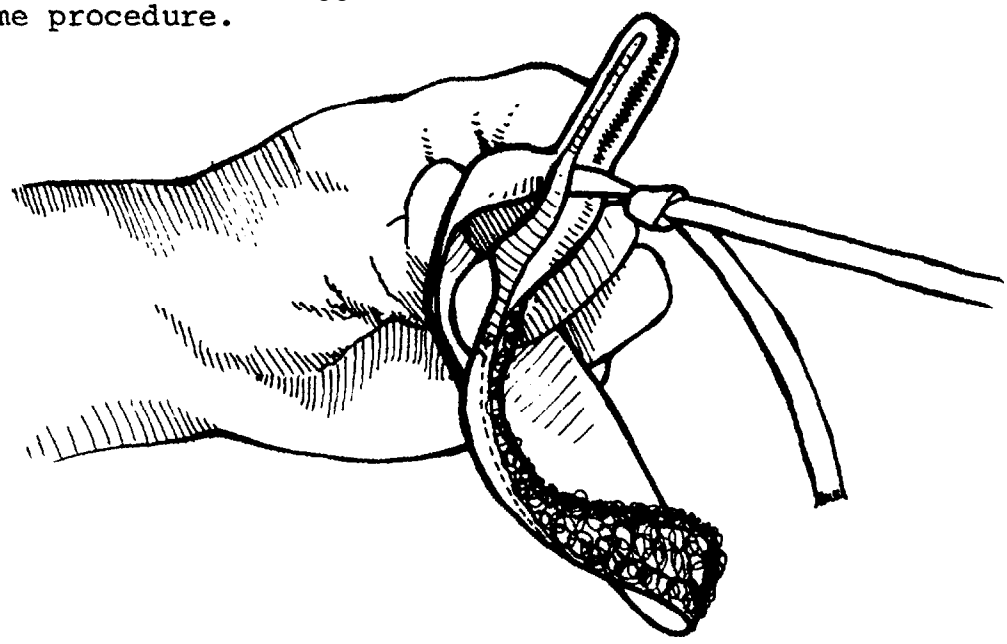




5. Double the end of the steering line back over the standing part and tie an overhand knot to attach the toggle to the line. The knot must be on the Velcro side of the the toggle. Adjust the knot before tightening it to position the mark correctly.



6. Attach the other Vector toggle using the same procedure.



7. Check the canopy with the opening brakes both attached and unattached to be sure the canopy is correctly configured. The owner's manual of the canopy provides the proper brake settings and steering line lengths; there are no standardized dimensions. Unless the steering lines are of the proper length, the canopy may not open or fly correctly.

8. Once the measurements have been verified, tighten the overhand knot at the toggle. It is generally not a good idea to cut off the excess steering line, as the rigger may want to adjust the toggles after jumping the canopy. Any excess line should be daisy chained on itself and securely stowed in a rubberband or by tacking it to the toggle.

9. Inspect the installation. Check to be sure the steering lines are routed correctly.

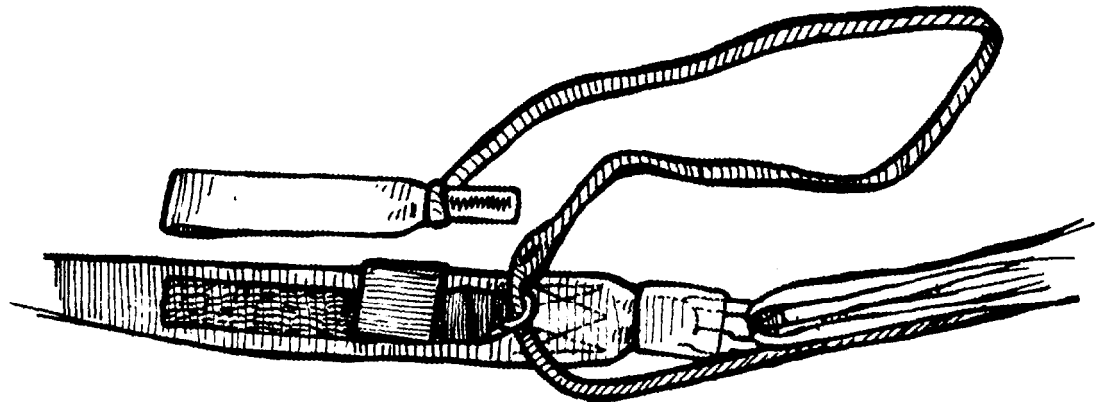
Setting the Deployment Brakes--Ram-Air Canopies

Every ram-air canopy on the market today is equipped with "deployment brakes" to make it open more gently and reliably. The brakes work by keeping the tail of the canopy pulled down several inches during deployment. This prevents the canopy from surging forward as it inflates and begins flying.

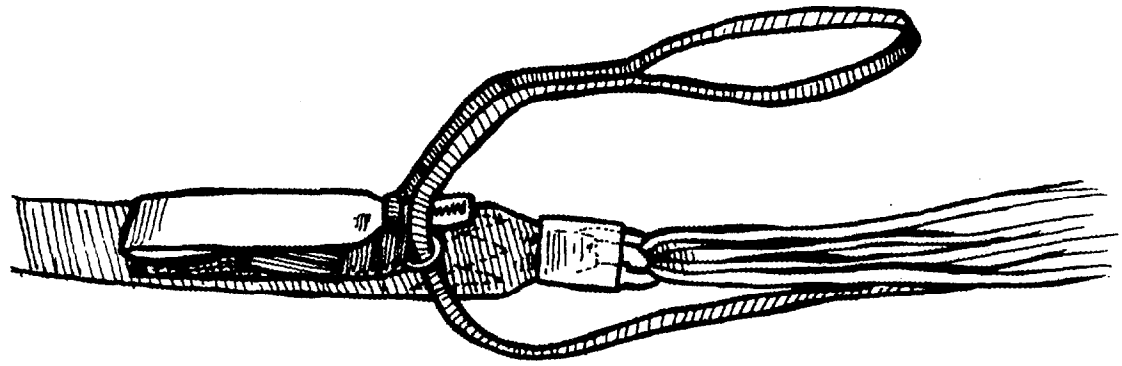
As mentioned previously, malfunctions and poor deployments can result of the brakes *are* not set during packing, or if they are set incorrectly, or if one or both releases before the canopy is completely inflated and stabilized. Combining incompatible toggles and risers can also create the same Problems.

Not all rigs have risers that are configured like those shipped with the Student Vector. Different designs require different procedures, and an instructor or rigger should be consulted for the correct one.

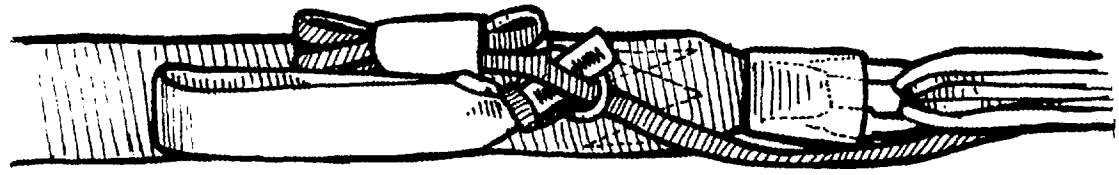
Procedure



1. After the canopy is inspected, flaked and folded, use the toggle to pull the right-hand steering line down until the brake loop just passes through the guide ring.



2. Insert the tapered end of the toggle all the way into the loop. Pull on the steering line above the guide ring to seat the toggle against the ring. Mate the toggle Velcro with that on the riser. Check to be sure the tapered end of the togqle is completely seated in the loop. (It shouldn't be inserted past the end of the taper, or it may be difficult to extract it under canopy.)



3. Fold the bight of line between the toggle and loop with 3-in. folds and stow it in the Velcro tab next to the toggle.

4. Repeat the procedure for the left-hand toggle.

Installation Procedures--Round Canopies

Only a few round main canopies have deployment brakes, and those that do use widely different brake Systems. Therefore, the rigger should consult the canopy's owner manual or manufacturer for specific instructions. The toggles supplied with the Student Vector may or may not be suitable for use with a particular round canopy.

Setting the Deployment Brakes--Round Canopies

The procedure to set the deployment brakes of those few round canopies that have them must be obtained from the canopy's owner's manual or manufacturer.