Breaking New Sky

TM 135 - MARCH 1996

STUDENT NARO

HARNESS/CONTAINER ASSEMBLY

OWNER'S MANUAL

PARACHUTE INDUSTRIES OF SOUTHERN AFRICA (PTY) LTD.
Factory: 29 Duiker Road, Canelands, Natal, South Africa
P.O. Box 1616, Verulam 4340, South Africa
Telephone: (0322) 33 0333 Telex: 6-24458 Fax: (0322) 33 0262

A WARNING

1. TRAINING AND/OR EXPERIENCE ARE REQUIRED TO LOWER THE RISK OF SERIOUS INJURY OR DEATH.
   NEVER USE THIS EQUIPMENT UNLESS YOU HAVE READ AND UNDERSTAND THIS WARNING LABEL, AND ALSO UNLESS:
   A. YOU HAVE COMPLETED A "CONTROLLED PROGRAM OF INSTRUCTION" IN THE USE OF THIS EQUIPMENT
   - O R —
   B. YOU HAVE READ AND UNDERSTAND ALL APPROPRIATE FLIGHT MANUALS & PACKING INSTRUCTIONS, AND HAVE COMPLETED AT LEAST 100 RAM AIR PARACHUTE JUMPS.
   THIS HARNESS CONTAINER SYSTEM IS APPROVED UNDER FAA TSO C-23c AND ALTHOUGH THE FAA REQUIRED PLACARD STATES:

   "CATEGORY B: This parachute is limited to use by persons up to 115kg (254 lb) fully equipped, and up to 150 knots".

2. TO LOWER THE RISK OF DEATH, SERIOUS BODILY INJURY, CANOPY DAMAGE AND HARD OPENINGS NEVER EXCEED THE FOLLOWING LIMITATIONS:

MAXIMUM DEPLOYMENT SPEED	130 KNOTS	130 KNOTS
MAXIMUM GROSS WEIGHT (JUMPER + CLOTHING + EQUIPMENT)	LBS.	LBS.
MANUFACTURER:		
MODEL:		

ATTENTION RIGGER: FILL IN DATA WITH WATERPROOF INK.
CHANGE DATA ON LABEL IF A DIFFERENT CANOPY IS INSTALLED.

3. A. SPORT PARACHUTING IS A HAZARDOUS ACTIVITY THAT CAN RESULT IN INJURY OR DEATH.
   B. PARACHUTES SOMETIMES MALFUNCTION EVEN WHEN THEY ARE PROPERLY DESIGNED, BUILT, ASSEMBLED, PACKED, MAINTAINED AND USED. THE RESULTS OF SUCH MALFUNCTIONS ARE SOMETIMES SERIOUS INJURY OR DEATH.
   C. IF YOU USE YOUR PARACHUTE — OR IF YOU ALLOW SOMEONE ELSE TO USE IT — YOU ARE ACKNOWLEDGING SPORT PARACHUTING'S RISK AND ACCEPTING THE FACT THAT THE PARACHUTE OR ITS COMPONENTS MAY MALFUNCTION.
   D. IF YOU ARE NOT WILLING TO ACCEPT THE RISKS OF SPORT PARACHUTING, OR IF YOU AREN'T WILLING TO ACCEPT THE POSSIBILITY THAT YOUR PARACHUTE OR ITS COMPONENTS MAY MALFUNCTION AND PERHAPS CAUSE YOU TO BE INJURED OR KILLED, THEN YOU SHOULD RECONSIDER YOUR INVOLVEMENT IN SPORT PARACHUTING.

MANUFACTURED UNDER FAA TSO C23c BY:
PARACHUTE INDUSTRIES OF SOUTHERN AFRICA (PTY) LTD.
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P.O. Box 1616, Verulam **4340, South Africa**
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REMOVAL OF THIS LABEL VOIDS THE T.S.O.

AD43

U.S. Department
of Transportation
Federation Aviation
Administration

AIRCRAFT CERTIFICATION OFFICE

c/o American Embassy
27, Boulevard du Regent
B-1000 Brussels, Belgium

In reply refer to: SG/vk/01 /12/125:93

January 12. 1993

Mr B.H. Cowan
Department of Transport
Forum Building
Strubenstraat
Private Bag X 193
Pretoria 0001
South Africa

Dear Mr Cowan,

We accept the CAA South Africa certification of compliance contained in your letter dated December 7, 1992, Ref. .144 331, that te below mentioned parachutes & harnesses manufactured by PARACHUTE INDUSTRIES OF SOUTH AFRICA (Pty) Ltd.. 452 5th St. Bramley. 2018 WynbergSandton, Transvaal. S. Africa, have been examined, tested and found to meet the performance standards of Federal Aviation Regulations (FAR) Part 21. Section 21. 305(b) and Technical Standard Order (TSO) C23c:

PO991-00 TEMPO 150 Reserve Canopy	POI38-00 NARO Harness Container Assembly
PO986-00 TEMPO 250 Reserve Canopy	PO172-00 STUDENT/NARO Harness Container Assembly

On the basis of the CAA certification, the designs of the above mentioned parachutes & harnesses are hereby granted FAA approval and may be identified in accordance with the provisions of FAR 21, 6l7(c). Each parachute exported for installation on United States registered civil aircraft must be accompanied by your Certificate of Airworthiness for Export to facilitate acceptance under FAR 21.502.

The following technical data submitted with the request for TSO design approval are considered to have fulfilled the requirements for data of TSOC23cand are being retained in this office:

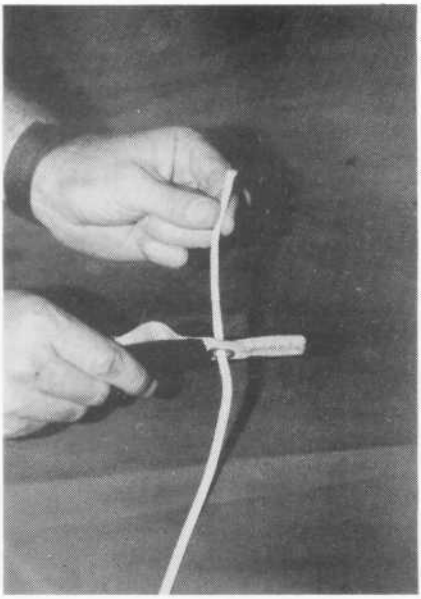
- Operating Instructions, Equipment Limitations
- Inspection and Test Procedures
- Maintenance Procedures & Specifications
- Test Report

Sincerely,

Everett W. Pitman
Manager, Aircraft Certification Office
FAA-Brussels

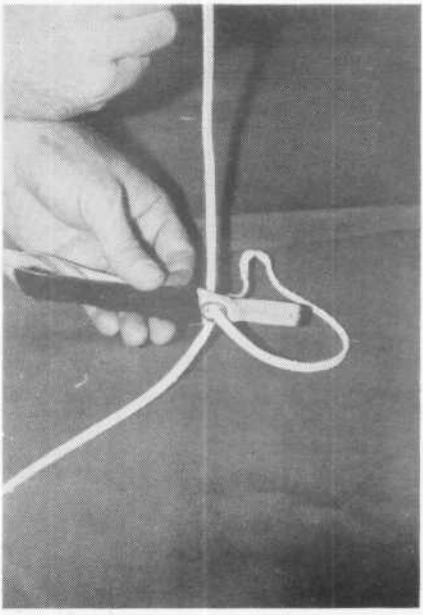
ATTACHING THE STEERING TOGGLES OF THE MAIN AND RESERVE

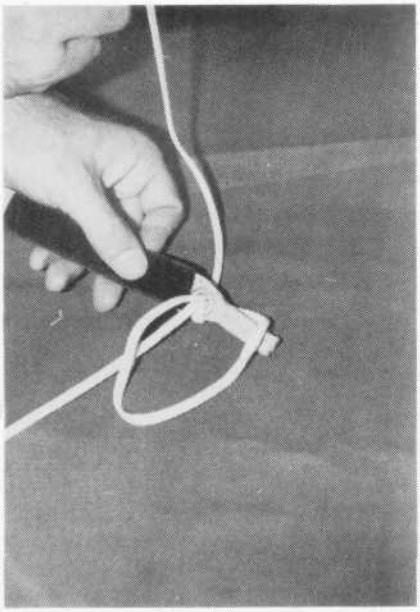
Ensure that the steering line has been correctly routed before attempting to tie-on any toggles!



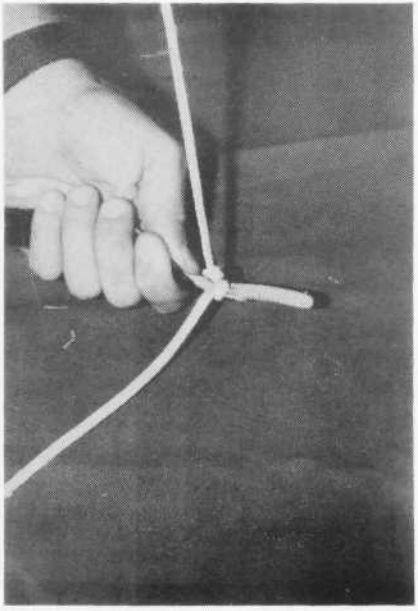
Thread the sealed end of the steering line through the grommet and pull it up to the mark.

Holding the mark in place take the sealed end of the steering line and pass it around the toggle and thread it through the grommet again in the same direction and manner as previously.

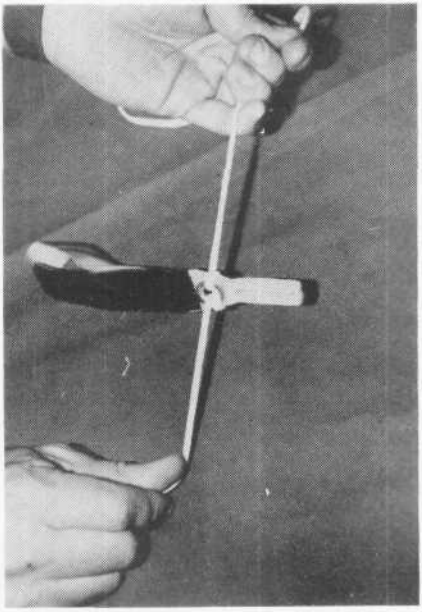




Pull up tight making sure that the mark on the steering line has remained positioned at the grommet.



Then take the sealed end again and pass it around the toggle in the opposite direction so as to follow a figure-of-eight pattern around the toggle and thread it through the grommet for the third time.



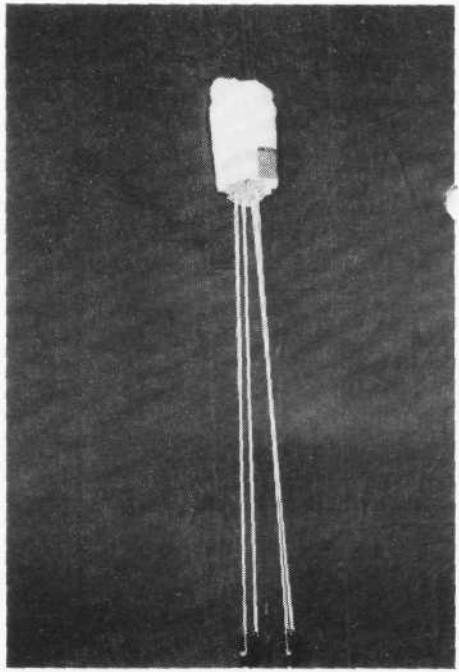
Tie-off the sealed end with an overhand knot.
(*Caution:* When tying-on Spectra Type main steering lines a more suitable type of knot may be required to ensure that the steering line does not release from the toggle).

STOWING THE RESERVE PARACHUTE

Pack the reserve parachute according to the manufacturers instructions. The individual packing the reserve parachute must be a qualified and experienced reserve parachute packer and/or rigger.

STOWING THE CANOPY

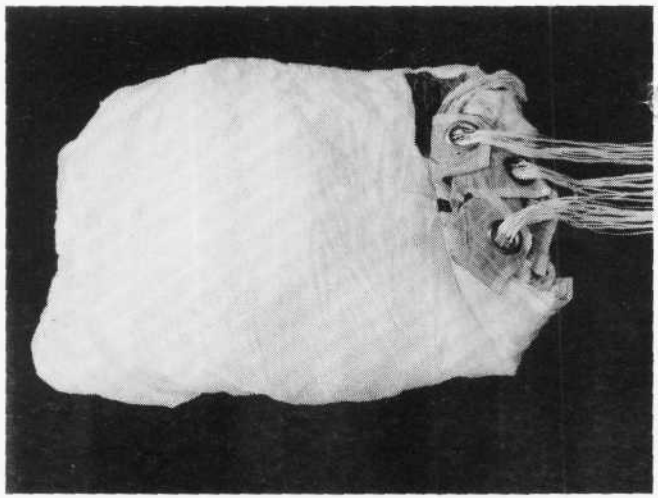
1 The canopy is packed ready to be packed into the freebag.



NOTE: The freebag must first be prepared by inserting one end of a pull-up through both the grommets in the bag and tying it to the other end of the pull-up, to prevent it from slipping out.

2

Fold the bottom 20cm of the canopy towards the top, then S-fold this part of the canopy to make a 10cm long fold.



3

Fold the top of the canopy over towards the container, locate all the top mid-seams of the cell openings and ensure that they are exposed.

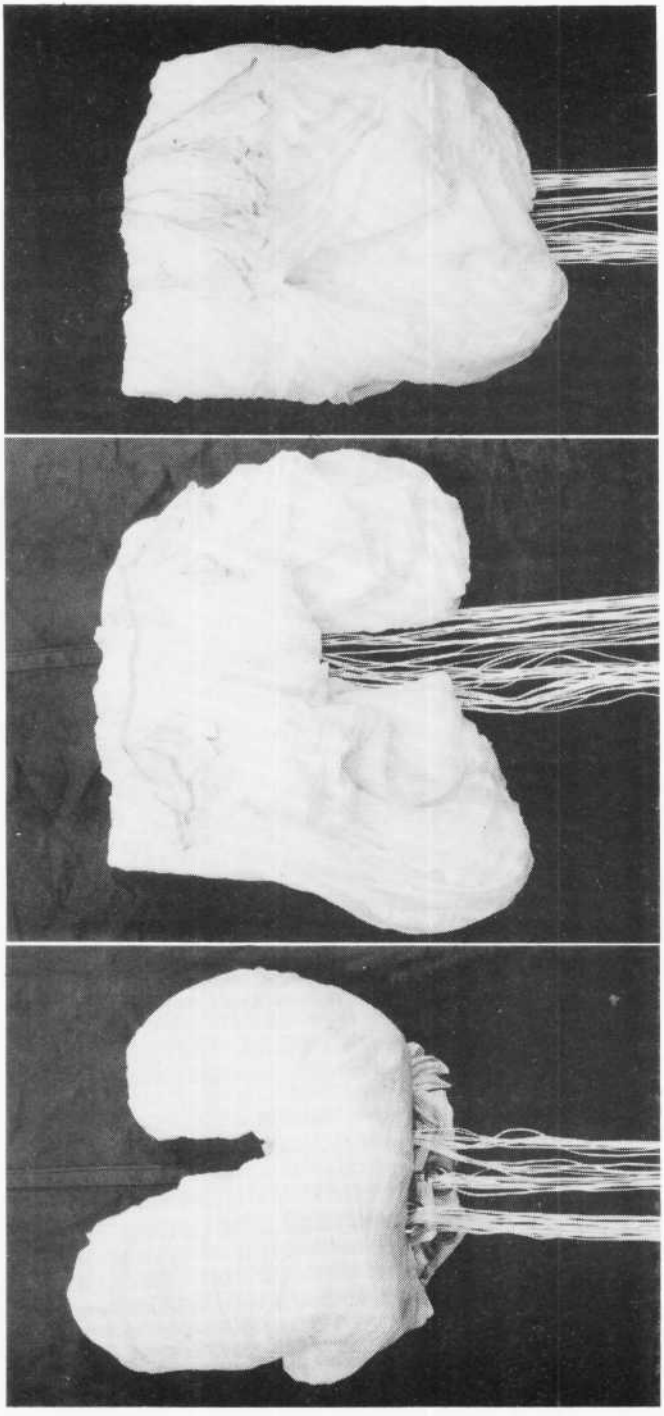
4

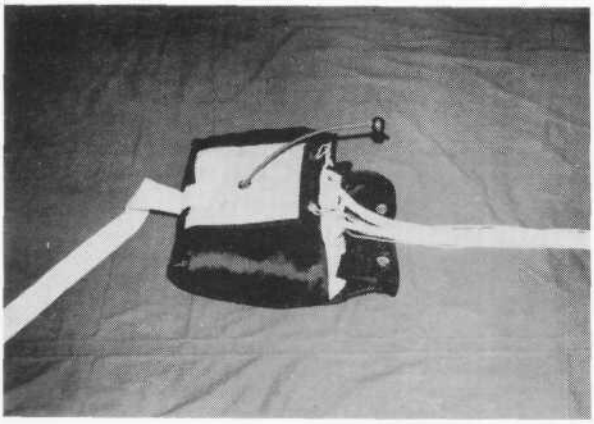
Neatly split the canopy down the centre from the top to create two "ears".

NOTE: If an FXC 12000 AAD is installed, split the canopy such that the bulk of the canopy will be on the side of the container where there is no AAD i.e. split a 7-cell into 4 and 3 cells respectively.

5

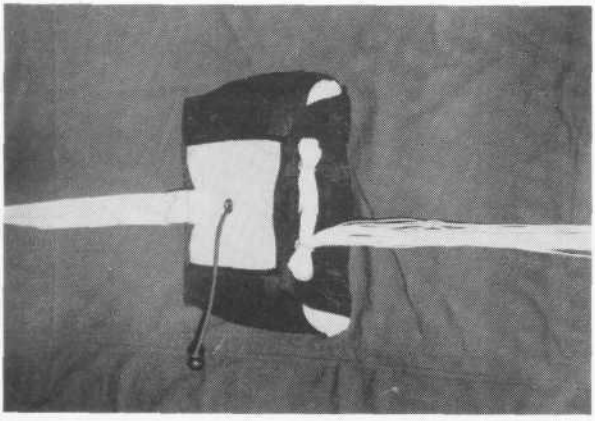
Fold the ears over and dress them for the freebag.





6

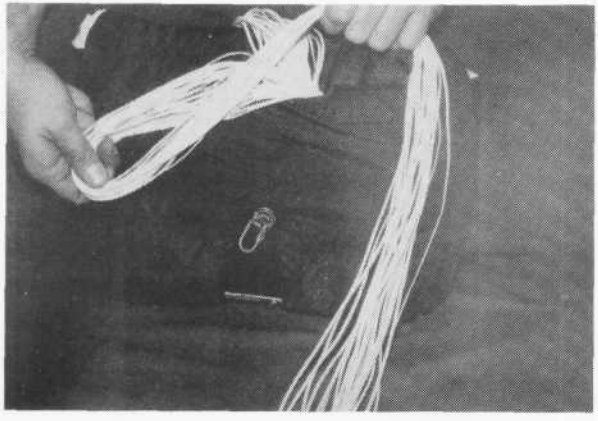
Slide the top left of the canopy into the top left corner of the bag. Holding this corner fast, repeat the procedure on the right side. Now place the rest of the stacked canopy into the bag.



STOWING THE SUSPENSION LINES

1

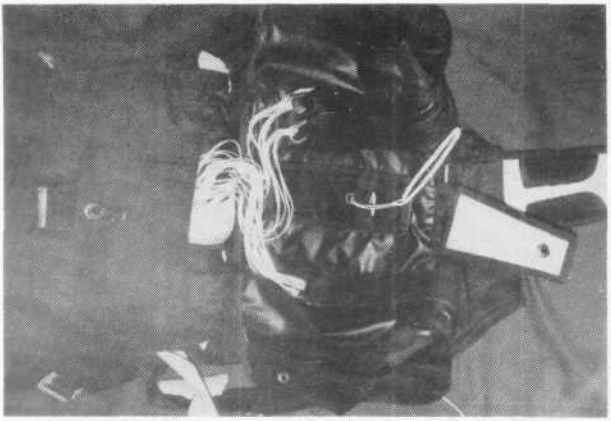
Close the bag with two locking stows. Make the bights 25-30mm long.



2

S-Fold the remainder of the lines neatly into the line stowage pouch. Close the line stowage pouch ensuring that the lines pass between the two velcro strips. Leave approx. 20cm of line unstowed.

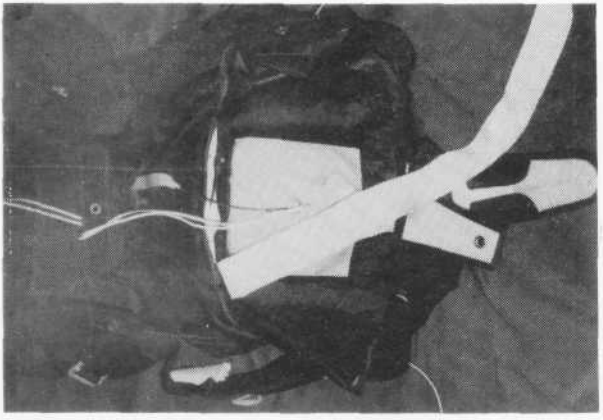
PLACING THE BAG INTO THE CONTAINER



1 Place the reserve parachute which has been packed into the free bag onto the main container and carefully position the reserve container. Spread the links rather than stacking them on top of one another. Ensure that the reserve risers have entered the container so that they will lie flat over the shoulders.

WARNING! USE ONLY THE SPECTRA 1000-825 CLOSURE LOOPS SUPPLIED! USE OF ANY OTHER TYPE OF CLOSURE LOOP WILL INVALIDATE THE TSO!

2 Pass the other pull-up cord through the reserve closure loop. If a T-bar was passed through the bag, thread the ends of the pull-up cord through the hole in the end of the T-bar. Remove the T-bar from the bagged canopy, pulling the closure loop and pull cord through it. If the pull-up cord was passed through the bag, untie it and tie the end protruding from the underside of the bag around both ends of the second pull-up cord that has been passed through the closure loop. Carefully pull on the other end to pull the closure loop and second pull-up cord through the packed canopy. Untie the original pull-up cord and set it aside.



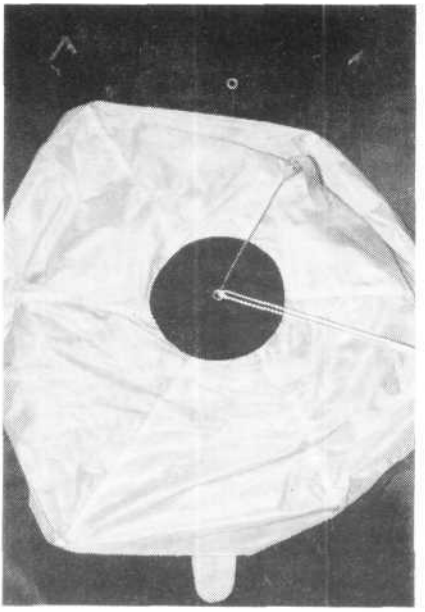
CLOSING THE RESERVE CONTAINER

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

1 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 closure loop up through **the** bagged canopy. Secure the bag in position with a temporary pin. Make long S-Folds with the bridle from the top of the bag to the bottom right hand corner of the reserve container until half the bridle has been stowed in this manner, then make long S-Folds in the bridle from the top of the bag to the left hand corner of the container as shown.

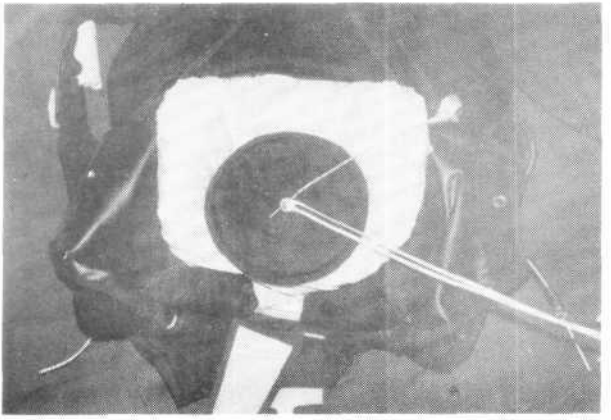
2 Thread the pull-up cord through the bottom of the pilot chute and out the top. Centre the base of the pilot chute over the stiffener plate on the free bag.

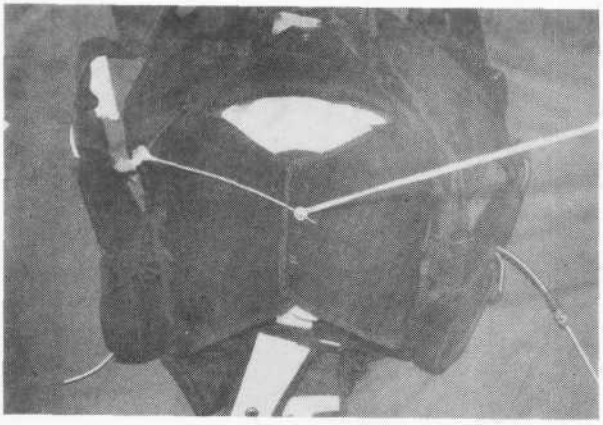
3 Make sure the base of the pilot chute is centred over the loop, then collapse the pilot chute and lock it with a temporary pin.



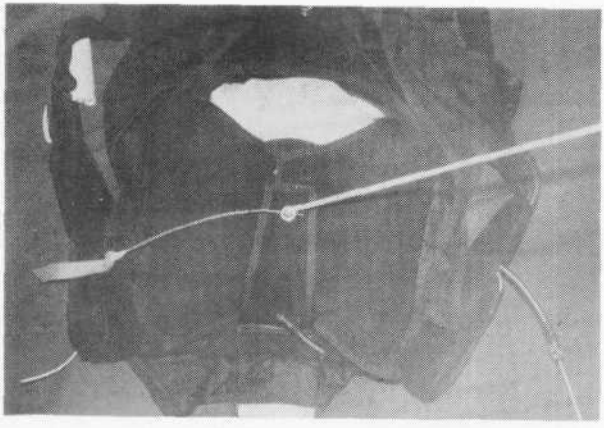
4 Pull all the canopy fabric out from between the spring. Folding the fabric rather than stuffing it between the coils reduces the bulk of the packed container. After pulling the fabric from between the spring, check to be sure the pilot chute base is centred under the crown.

5 Now fully compress the spring to see how much loop can be pulled through the top of the pilot chute. If you can pull more than 20mm through, the loop is too long. Now would be the best time to open the container and shorten the loop. Lay the fabric flat all around the pilot chute and fold it under in wide folds to the centre. Fold the top and bottom first, then the sides. Keep the fabric folds of the pilot chute out from the open flaps.



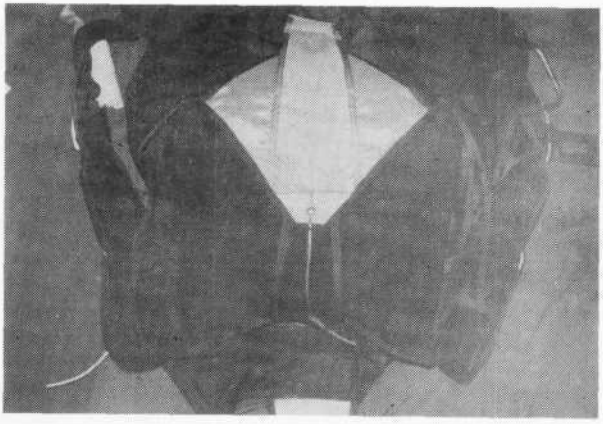


6 Thread the pull-up cord through the side flaps (flap 1 and 2) and close and secure with a temporary pin. Make sure that the folds in the pilot chute stay flat and neat.



7 Thread the pull-up cord through the out-side top flap (Flap 3) close and insert a temporary pin.

8 Thread the pull-up cord through the outside bottom flap (Flap 4) close and insert the temporary pin. If the force necessary to close the last two flaps seem excessive, the loop may be too short. Use a scale to determine how much force is needed to extract the pin; up to 10 kg's (22 lbs) is correct for the TSO.



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

(See reserve lanyard installation).

10 Place the rig on a clean surface with the backpad facing up and walk on it with stockinged feet or clean shoes to help expel the air from the container and make it flatter.

1. Dress the container, seal, sign and log.
2. COUNT YOUR TOOLS!!

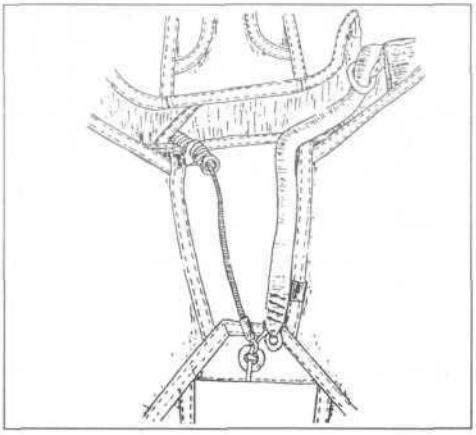
INSTALLING A RESERVE LANYARD (Reserve Static Line)

Installation without AAD

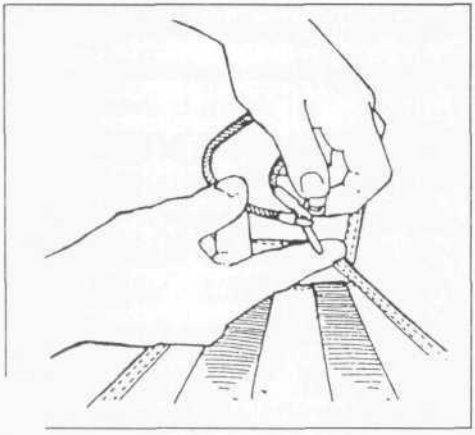
1. Inspect the RSL: Check that the snap shackle is operating smoothly and that the spring will retain the locking pin. Be sure the Velcro is clean and has sufficient resistance to hold the reserve lanyard. The pin should be curved from the eye to halfway down its length. The rest of the pin should be straight.
2. Route the RSL along its Velcro path from the right-hand riser. Insert the pin-end of the RSL through the guide ring on the wearer's right hand shoulder. Match the patch of pile Velcro on the top reserve flap.
3. After threading the reserve ripcord through the housing and placing the ripcord handle into its pocket, insert the lanyard pin through the loop at the end of the reserve ripcord cable.
4. Place the rig on a clean surface with the backpad facing up and walk on it with stocking feet or clean shoes to help expel air from the container and make it flatter.
5. Replace the temporary pin with the lanyard pin.
6. Attach the main parachute risers to the harness.
7. Hook up the reserve lanyard shackle to the ring on the right-hand riser and mate the lanyard Velcro to that the comfort pad.
8. Dress the container, seal, sign and log the reserve.
9. Count your tools.

Installation with an AAD

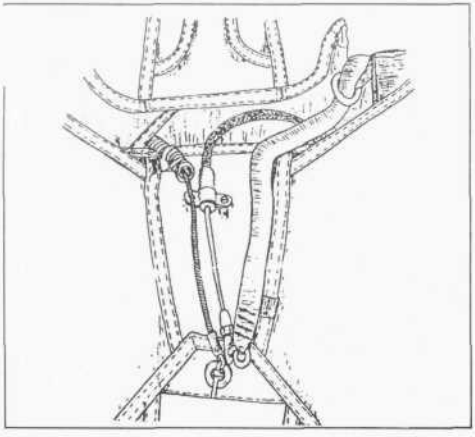
1. Inspect the reserve lanyard. Check that the snap shackle is operating smoothly and that the spring will retain the locking pin. Be sure the Velcro is clean and has sufficient resistance to hold the reserve lanyard. The pin should be curved from the eye to halfway down its length. The rest of the pin should be straight.



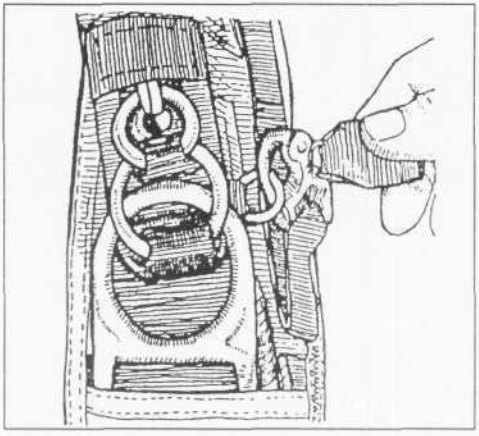
Note 1 — Optional #3.5 Rapid Link.



2. Route the reserve lanyard along its Velcro path from the right-hand riser. Insert the pin end of the RSL through the guide ring on the wearer's right hand shoulder. Mate the patch of pile Velcro to the patch of hook Velcro on the top reserve flap.
3. Referring to the manual for the particular AAD, inspect the device. Make sure it is armed.
4. 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.



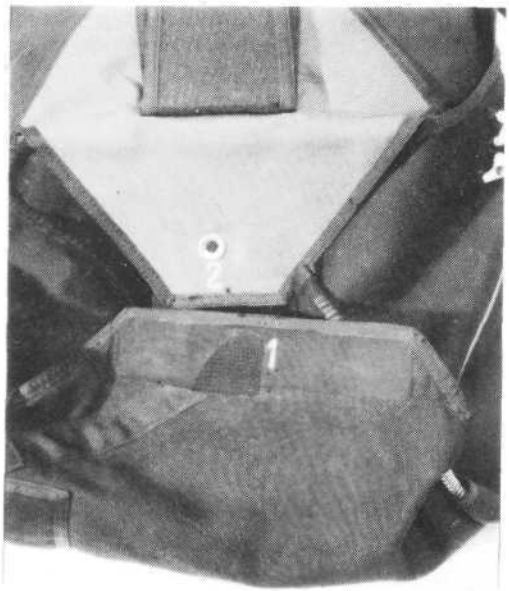
5. After threading the reserve ripcord through the housing, insert the lanyard pin through the loop at the end of the reserve ripcord cable. If the holes are aligned properly, the cables should run straight from the reserve pin to their housings.
6. Replace the temporary pin with the lanyard pin. Insert the ripcord handle into its pouch on the main lift web.
7. Attach the main parachute risers to the harness.
8. 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.



9. Dress the container, seal, sign and log the reserve.
10. Count your tools.

NOTE: The STUDENT NARO is manufactured for use in either Static-Line, AFF, or Freefall or a combination of these operations.

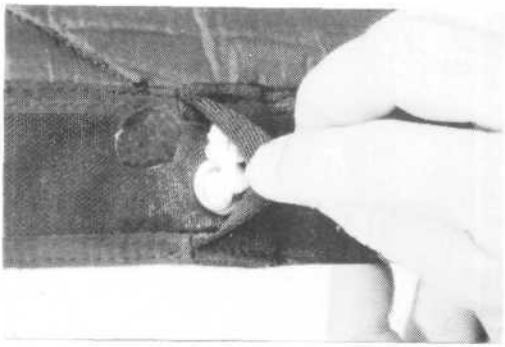
SETTING UP THE MAIN CONTAINER



A - NO SECONDARY AFF HANDLE INSTALLED

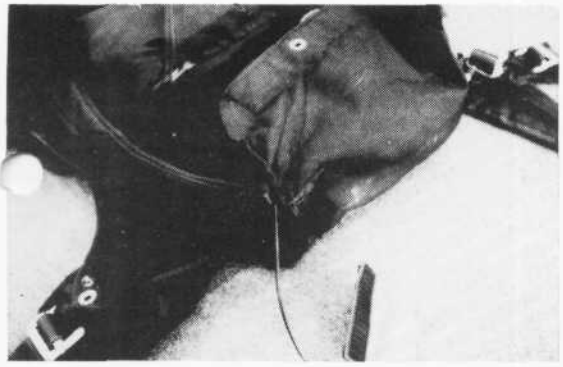
1. Use of a standard type of closure loop is recommended - Nylon or Spectra line with a washer.

2. Length of the loop may vary between 25mm (1") up to approximately 60mm(2.5") in order to obtain best operating results.



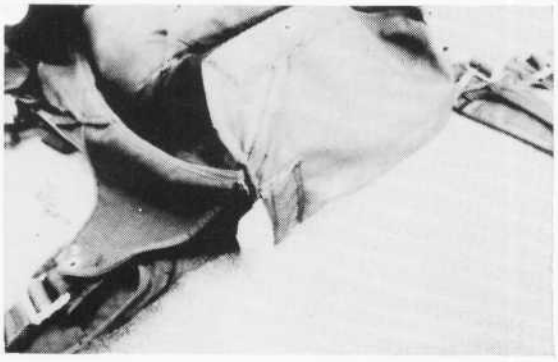
3. The closure loop is set up on **Flap** 1 (Main container bottom flap) and secured by a piece of elastic tape.

AFF SECONDARY HANDLE SETUP



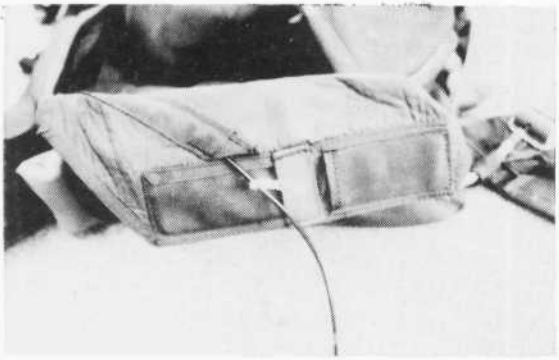
1

Use only the double loop closure loops that are supplied with your System! (6 off). Use of any other loop type is not recommended! Route the teflon coated cable to the AFF Secondary Release Handle through a hole on the bottom left (wearer's left) corner of the container adjacent to the webbing tunnel sewn to the inside bottom flap of the main container and then into the webbing tunnel.

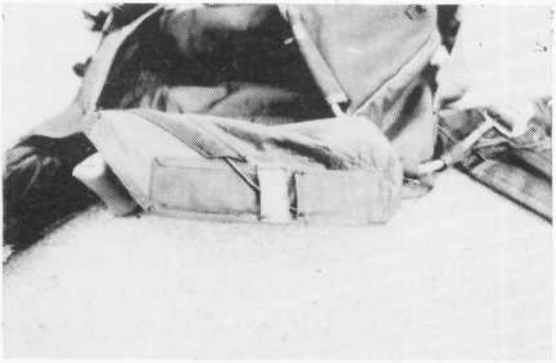


2

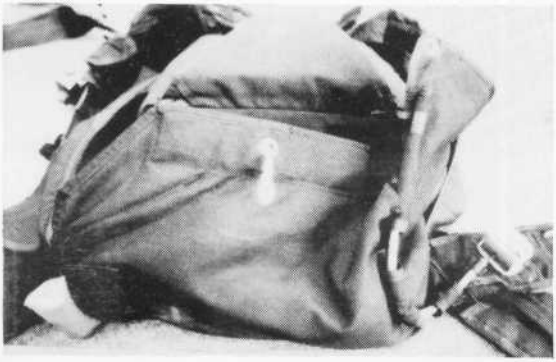
Position the release handle on the velcro inside the pocket on the bottom of the container. Make sure the cable is pulled all the way into the webbing tunnel.



3 Thread the cable end of the release handle through the small loop of the double loop closure loop provided. (6 loops supplied with system). Thread the big loop end of the closure loop into the grommet on the bottom flap.



4 Route the end of the release cable under the elastic loop retainer and into the protective pocket next to it.



5 Check for correct installation of the loop.

GENERAL MAIN CONTAINER INFORMATION

The static line direct bag is made from brightly coloured parapack for easy identification and has no hardware to damage aircraft. The AFF/Freefall bag is black and has grommets!

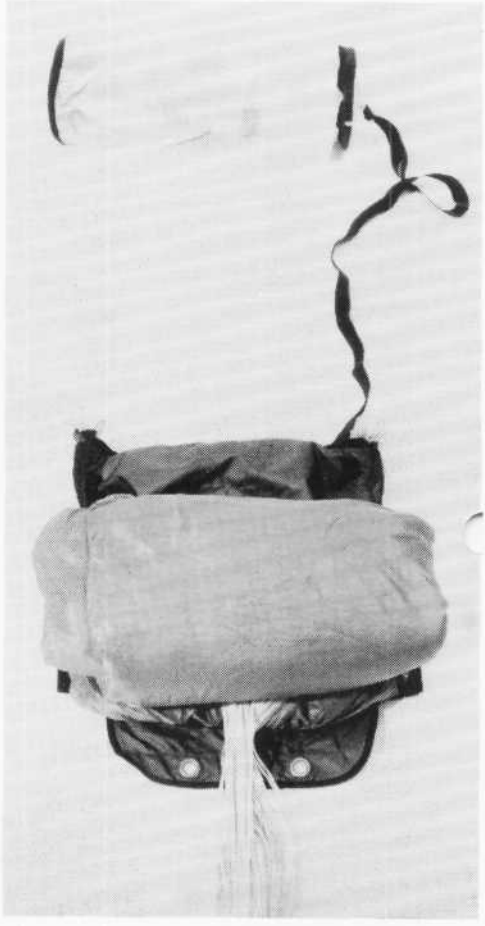
When using either bag it is recommended that the canopy be packed according to the manufacturers instructions.

The bag has two normal elastic closure loops for securing the mouth of the bag.

Stowing instructions for main canopies into the STUDENT NARO follow:

STOWING THE MAIN - FREEFALL & STATIC LINE OPERATION

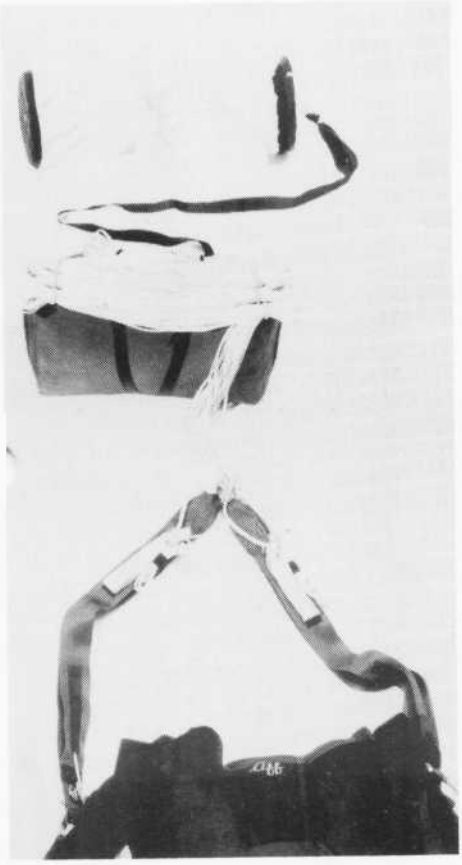
1. Flake and fold the canopy according to the canopy manu facturer's instructions. Be sure the canopy is folded as wide as possible so that it will fill the corners when put in the bag.



2. Stack the canopy on itself so that it is about the depth of the bag.

3. Slide the canopy into the deployment bag, being sure to fill the corners completely.

4. To close the bag, pass one of the two rubber stow bands through its corresponding loop/grommet and insert a 30-50mm bight of lines through the stow band, the same for the second stow band.



5. Stow the remainder of the lines across the bottom of the bag in the rubber bands. Keep the bights of the lines 30-50mm long.

   Leave no more than 350mm of lines unstowed between the bag and the connector links.

Point 6 refers to the freefall version only.

6. Ensure that the excess pilot chute bridle is out of the top of the bag ie. seat the ring on the top of the canopy against the grommet in the bag. Push any canopy fabric that protrudes back into the bag with your finger, this keeps it from being damaged.

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

8. Pick the bag up by its sides and set it into the container on its line stows.

9. Gently roll the bag out of the way. Follow the risers over the shoulders of the rig and down along the sides of the reserve container into the main container. Position the connector links, ensure that no lines will wrap around them during canopy deployment

10. 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 that the connector links are kept in place between the bag and the bottom flap of the reserve container. Make sure that none of the flaps are under the bag. Pull the bridle to its full length.

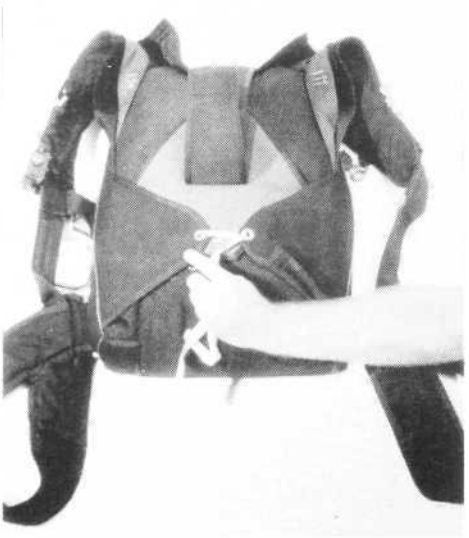
11. Kneel on the centre of the bag and pull up the main container side flaps until the bag fills the container and is flush with it.

CLOSING THE CONTAINER - 1 : FREEFALL (SPRING LOADED PILOT CHUTE)

A. Insert a pull-up cord through the closure loop attached to the bottom of the main container **(Flap 1).** S-fold the bridle across the bag.

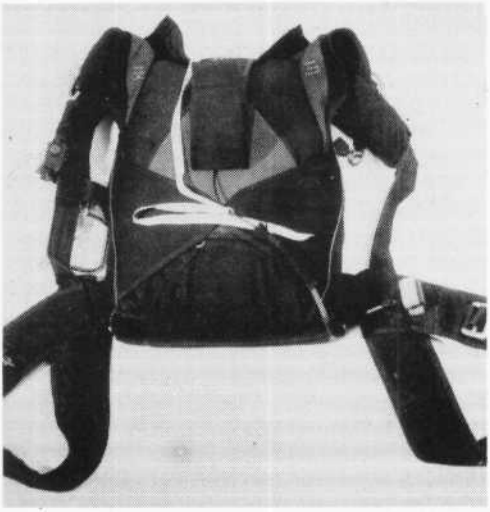
B. Collapse the pilot chute onto the bag.

C. Thread the pull-up cord through the top container flap grommet **(Flap 2).**
Pull the pull-up cord through the grommets by pulling towards the bottom of the container. Pat the bottom of the container till the loop comes through the grommet. Avoid overstressing the grommets.
Hold the loop in place with your knees.



D. Thread the left-hand **(Flap 3)** then the right-hand flap **(Flap 4)** using the same patting technique. (The flaps must be closed in that order.)

E. Insert the teflon coated ripcord cable into its housing and then route it through the locking loop from right to left. Finish off by threading the teflon cable end under the main top flap.



F. Slowly remove the pull-up cord to prevent excess friction from damaging the locking loop. It's best to pass the pull-up cord under the teflon cable while extracting it, as doing so will reduce wear on the loop. Secure the top flap by tucking the top flap tongue under it's corresponding flap to prevent any accidental deployment.

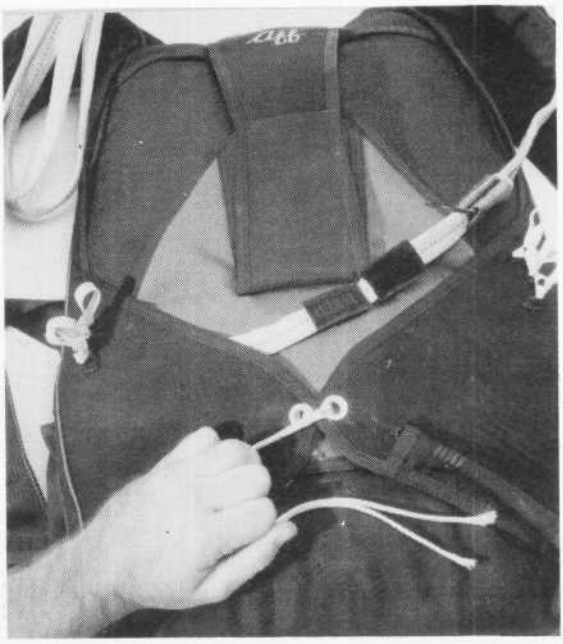
Finish up by dressing the main riser covers.

CLOSING THE CONTAINER - 2: STATIC LINE (DIRECT BAG)

A. Insert a pull-up cord through the closure loop of the main container. Route the static line to the left of the pull-up cord and out the top of the container. **(NOTE: This is for a right door C182 exit! For a left door exit route the static line to the right!)**

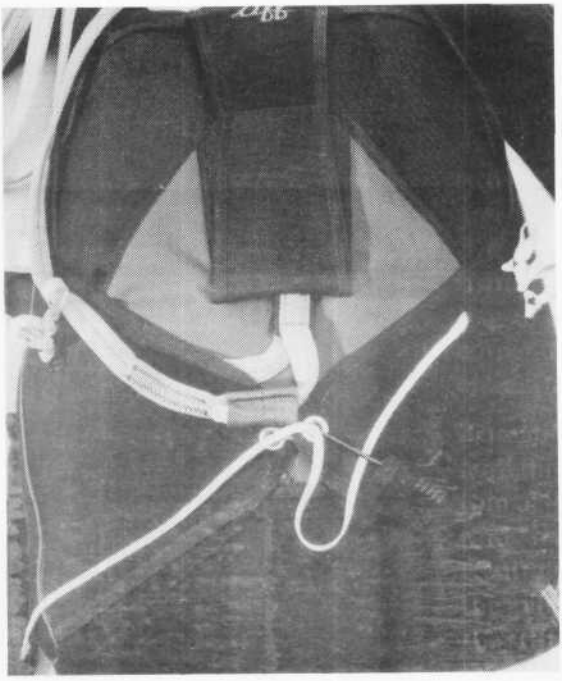
B. Thread the pull up cord through the top container flap **(Flap 2)** grommet. Pull the pull-up cord through the grommets by pulling down towards the bottom of the container till the loop comes through the grommet. Avoid overstressing the grommets. Hold the loop in place with your knee.

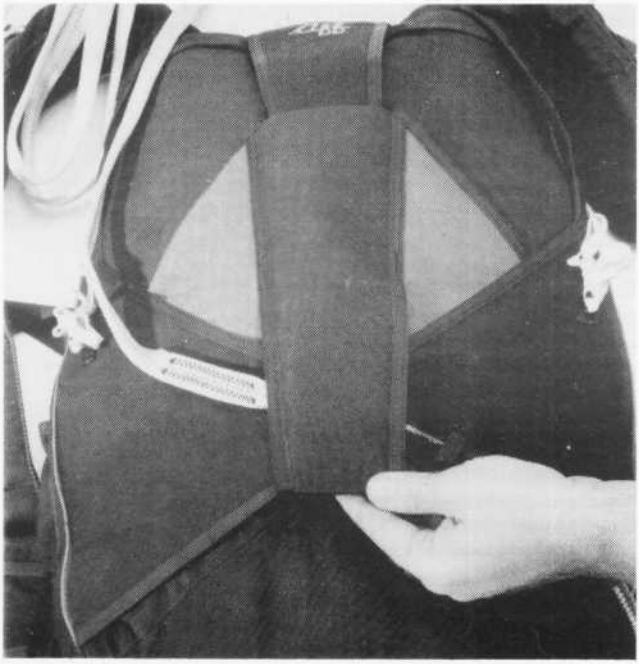
C. Thread the left hand **(Flap 3)** then right-hand **(Flap 4)** flaps using the same patting technique. (The flaps must be closed in that order!)



D. Insert the teflon pin after routing the static line around the top flap and attaching the small piece of velcro to its opposite piece from left to right or right to left (depending on exit type).

E. Slowly remove the pull-up cord to prevent excess friction from damaging the locking loop. It's best to pass the pull-up cord under the teflon pin while extracting it, as doing so will reduce wear on the loop.





F. Secure the top flap by tucking the top flap tongue under it's corresponding flap to prevent any accidental deployments.

Finish up by dressing the main riser covers.

STOWING THE STATIC LINE

The static line gets stowed across the main flap (left to right) using doubled elastic stows from bottom to top. The static line may be routed either left or right of the container depending which aircraft type is utilised ie. wearers left for right door exit or wearers right for left door exit.

The snap may be stowed in the stow pocket on the wearers left of the main container.

INSTALLING AUTOMATIC ACTIVATION DEVICES

FXC MODEL 12000

1. Check that your STUDENT NARO was ordered with the FXC 12000 option - this can be seen on the order form and on the harness/container. There will be a pocket inside the reserve container for housing the activation unit and there will be a Type 4 nylon tape loop provided on the wearer's left main lift web just below the base ring cover.

2. Inspect the FXC 12000 unit and ensure that it has a small hole terminal fitting on the activation cable. Cock the unit prior to installation into the reserve container.

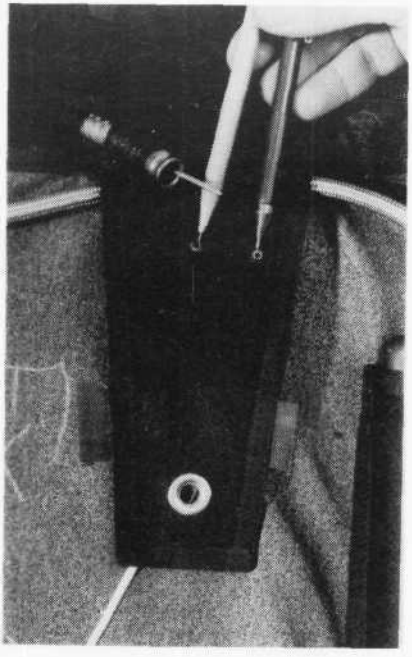
3. Cut the "T" off the T-shaped plate (only the top of the "T" is required). Smooth all sharp edges

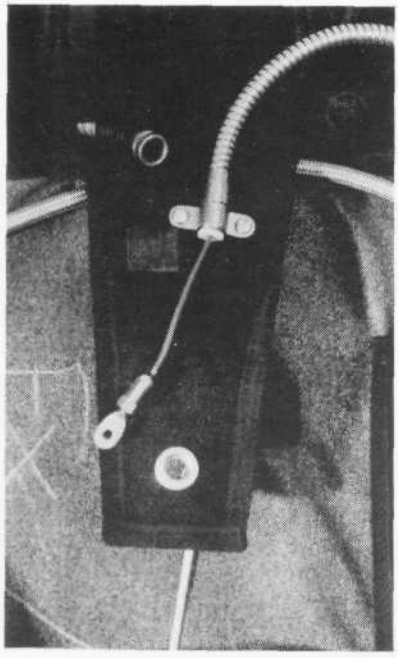
4. Place the activation unit in the pocket on the wearer's right side of the reserve container. The cable for the sensing unit should be on the left.

5. Measure from the centre of the grommet up to the right hand side of the reserve top flap **(Flap 3)** to place the mounting bracket. This dimension is critical to ensure that when the FXC 12000 is activated it will extract the ripcord pin. This position may vary depending on the cocked length of the activation cable.

(Packing the reserve to check this prior to drilling any holes is highly recommended! - the pre-drilled holes may not suit your FXC!)

6. Mark and drill two holes (2mm/0.07" dia) in the top flap for the screws to mount the bracket.





7. Position the bracket on the outside of the top flap around the activation cable and using the screws, screw them through into the cut-off "T" mounting plate.

8. Tighten the screws down and file smooth if necessary. Cover the mounting plate with a piece of "Duct" tape if possible.

11. The sensing unit can then be attached to the Type 4 loop provided. Depending on the length of the sensing cable, the additional fabric cover may be used to cover the cable just above the sensing unit.