

# *Butler Parachute Systems, Inc.*

## **Tethered Tandem Bundle Delivery System TT-600 Gen 1 & 2 Packing Instructions**

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Revision IR

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## INTRODUCTION

This manual contains all the required information for packing the Butler Parachute Systems, Inc. TT-600 Tethered Tandem Bundle Delivery System.

Most of the information and procedures contained in this manual are routine for the experienced parachute rigger. However, a few of the procedures are unique to the TT-600 and MUST be followed as written for the TT-600 system to operate correctly.

**Failure to do so could result in injury or death to the operator.**

If at any time you are unsure of a procedure or have a question, stop what you are doing and give us a call...we will be glad to provide you with any assistance you may need.

## SUMMARY OF CHANGES

Effective 1 January, 2006, changes were made to the TT-600 system concerning the canopy vent cap and the way the canopy is attached to the deployment bag. These changes greatly improve the performance of the system and are as follows:

The one-piece vent cap on the HX-600 canopy was changed to a “4-Leaf” vent cap. This change was made to decrease the possibility of damage to the canopy under “High-stress” openings.

The Canopy Bridle was changed to a “Channel Bridle” style to better control the bridle and zipstrip during canopy deployment.

Revision “C” changes Step 96 and adds a warning concerning the Safety Closing Loop length. This change ensures the Safety Closing Loop is loose enough to allow the Safety Cable to move freely through the closing loop.

**ALL TT-600 SYSTEMS MANUFACTURED AFTER JANUARY 1, 2006 UTILIZE THE CHANGES CONTAINED IN THIS MANUAL.**

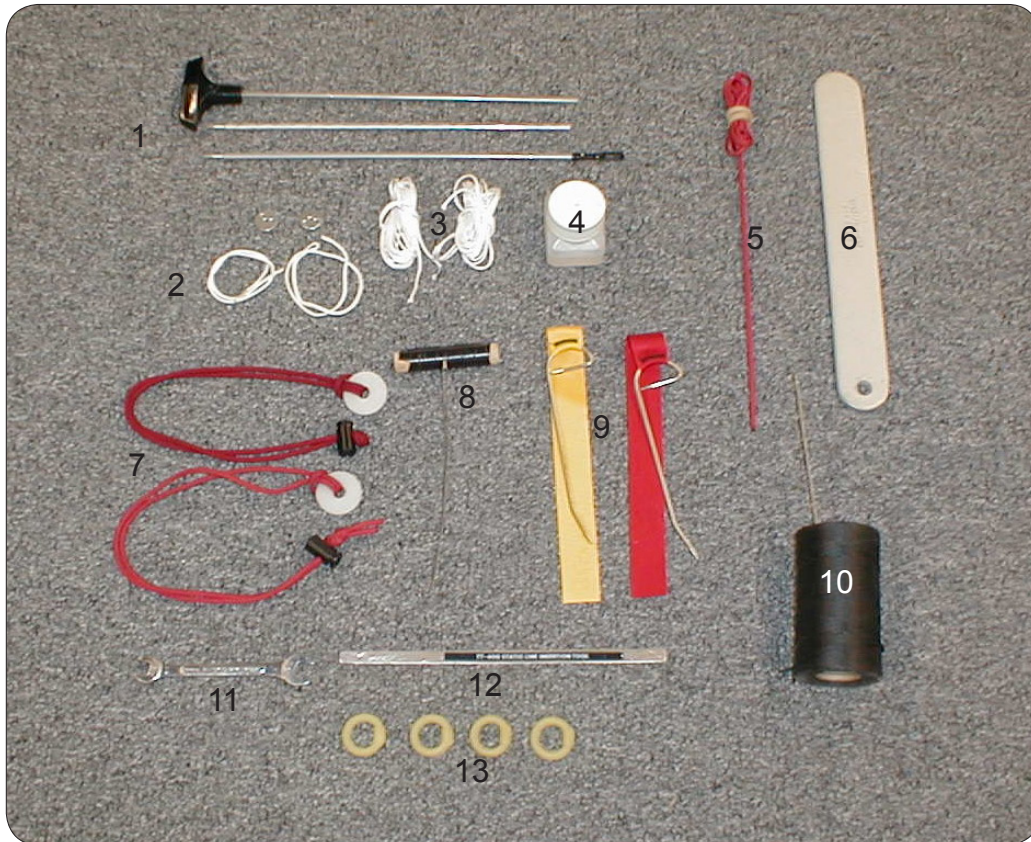
**NOTE: THE PACKING PROCEDURES IN THIS MANUAL ARE THE SAME FOR BOTH GENERATION 1 AND 2 OF THE TT-600 SYSTEM. THE DIFFERENCES IN THE SYSTEM ALL PERTAIN TO THE CONTAINER.**

## GENERAL PACKING PROCEDURES

1. COUNT YOUR TOOLS!
2. Airing and drying – as required.
3. Check layout and line rotation; straighten canopy from the top down.
4. INSPECTION – Record Serial number and other data from all components.
  - a. Pilot chute – snags, bent spring, solid ferrule, proper type.
  - b. Bridle – tackings and knots, proper routing of incremental bridle, T3 break tape.
  - c. Apex – vent and cap, lateral band, straighten vent hem.
  - d. Canopy – radial seams and gore seams, general condition, fabric pull test.
  - e. Lower lateral band – skirt hem, line attachments.
  - f. Suspension lines – snags, kinks, sheathing.
  - g. Connector links – plating, approved type (no speed links).
  - h. Risers – Stitching, condition of webbing.
  - i. Harness/Container – canopy releases, webbing, hardware, release handle and cables, housings, and Cypres installation.
6. Repair and re-inspect as necessary.
7. Pleat, fold, stow, stack, close, dress pack...Neatness Counts!
8. Seal, sign, record data.
9. Count your tools!

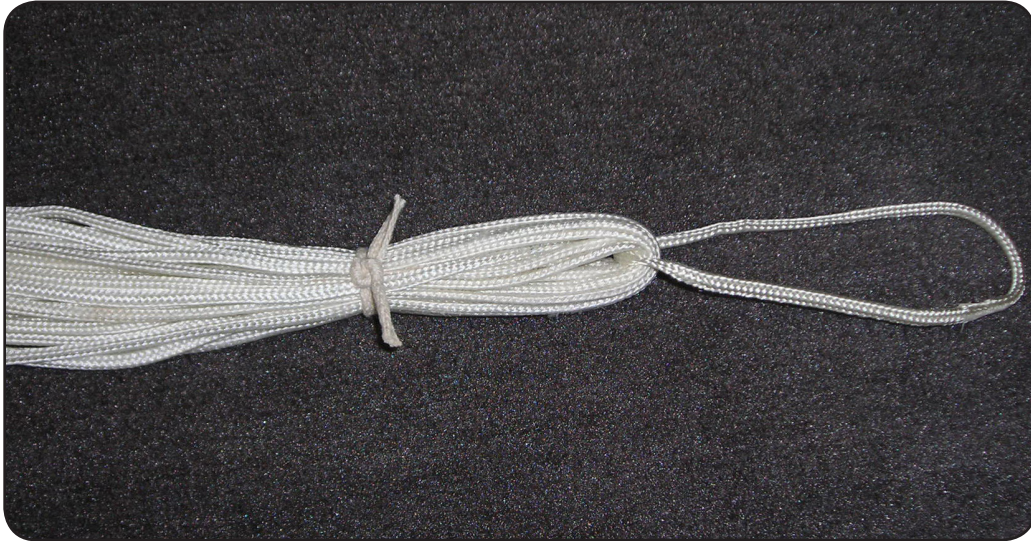
## REQUIRED TOOLS

Before you begin assembling the TT-600, make sure you have all of the tools required to complete the assembly. The following illustration shows all of the tools you will need:



1. Incremental Bridle (Zip-Strip) Tool
2. Cypres Closing Loops and Discs (2) \*
3. Cypres Pull-up Cords (2) \*
4. Cypres Silicone \*
5. Line stow Fid
6. Packing Paddle
7. Locking Pull-up cords (2)
8. Fingertrapping Fid
9. Cypres Temporary Pins \*
10. Supertack (or equivalent) with Tacking Needle
11. 3/8" or Adjustable Wrench
12. TT-600 Static Line Insertion tool
13. Stow bands

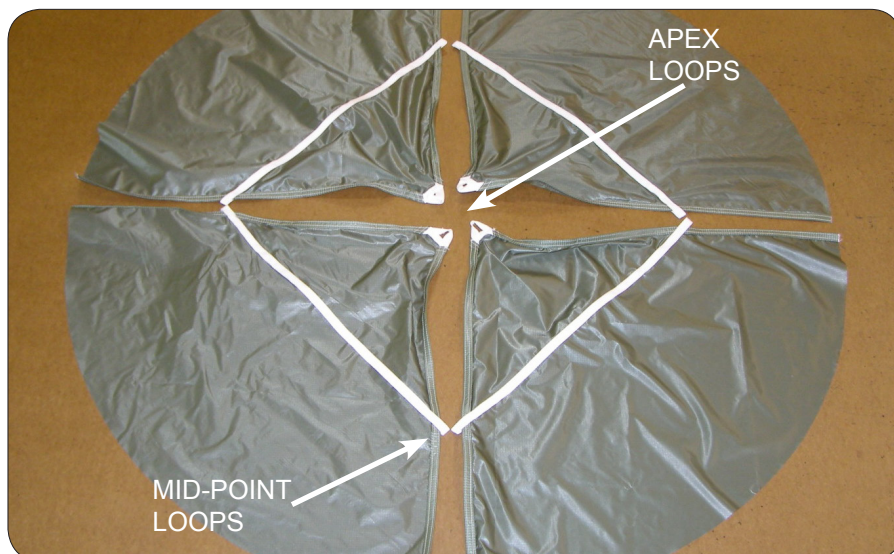
NOTE: Items with an \* are contained in the Cypres



If the Apex Centering Tie is not already tied, ensure upper lateral band is even and then make the Apex Centering Tie with the vent lines, 4 inches from the end using one turn single 80# cotton as shown. Tie with a Surgeon's and Locking Knot, and trim the ends to 1 inch.

### "4- LEAF" VENT CAP

Moving to the Apex of the canopy, familiarize yourself with the configuration of the "4-Leaf" style vent cap. Rather than use a solid vent cap, the HX-600 canopy in the TT-600 system utilizes a vent cap constructed out of 4 individual pieces. Prior to use, the 4 pieces are tied together at the mid-point with, 1 Turn Single Ticket 6 Cotton Cord or 1 turn double Ticket 3 Cotton Cord, and tie at the apex loops with one turn single 80# cotton break tape. If, during deployment, the vent cap experiences a "High-Stress" situation, some or all of the ties will break, thereby reducing the chances of damage to the canopy. The photo illustrates the "4-Leaf" vent cap prior to being sewn on the canopy.



TT-600 PACKING

**NOTE:** If this is a re-pack after system use, start with step 1 and re-rig the vent cap and zipstrip as needed. If this is an initial-use pack job, the vent cap and zipstrip are already rigged and you can begin on step 23.



1. Begin rigging the vent cap by first making sure that the vents lines are clear, with no part of the vent cap panels running through them. Position the canopy so one vent cap panel is flat on the table with the vent lines passing directly overhead. For clarification in the following steps, the panels will be referred to as 1, 2, 3, and 4, with panel 1 being the panel flat on the table.



2. Pass a length of Ticket 6 cotton cord through the mid-point loops of panel 1 and 2 and tie them together using a Surgeon's and Locking Knot. Trim ends to 1/2" (1 cm).



3. Tie panels 2 and 3 together in the same manner.



4. Continue by tying panels 3 and 4.



5. Finish the mid-point ties by tying panels 1 and 4 together.



6. Mid-point ties completed, ready for apex tie.





7. Pass one end of a twelve-inch length of 80# Cotton break tape through the apex loop of panel #1.



8. Pass the ends of the 80# through the apex loops of panels 2 and 4.



9. Pass the left end of the 80# through the apex loop of panel #3.



10. Pulling the 80# snug, tie with a Surgeon's and Locking Knot. Trim ends to 1/2" (1 cm).



11. Lark's Head one loop of the replacement zipstrip onto the vent lines as shown.



12. Lark's Head the canopy channel bridle to the remaining zipstrip loop as shown.



13. Using a 15-inch length of 1/2" Type 3 webbing, create the zipstrip breaktie by passing one end through the canopy ventlines, and the other through the loop on the end of the canopy channel bridle.



14. Bring the ends of the Type 3 together and form a loop approximately 1 inch (2.5 cm) in diameter. Tie the ends together with a Square Knot. Next, tie an overhand safety knot on each end and trim to 1/2 inch (1 cm).



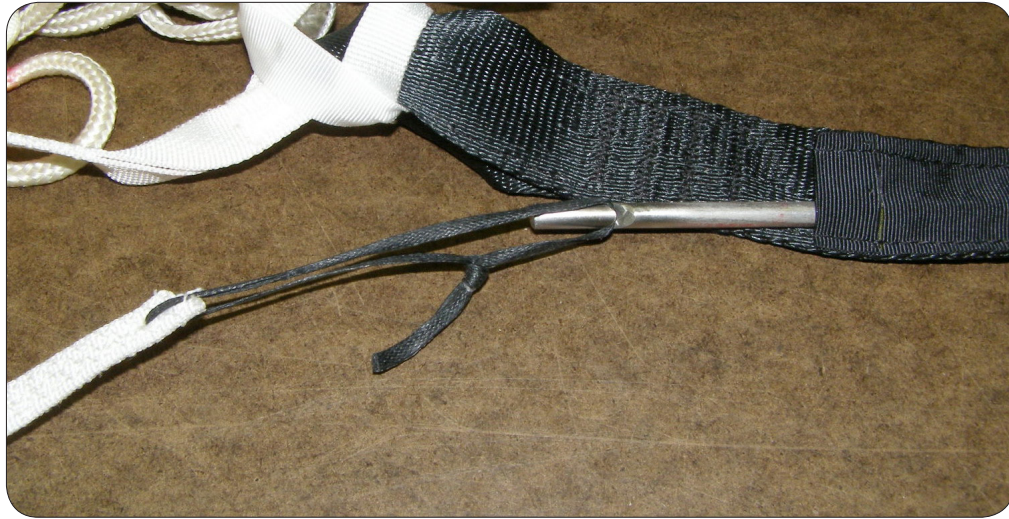
15. Insert Incremental Bridle (Zip-Strip) Tool into the pilot chute end of the canopy channel bridle.



6. Push the Incremental Bridle (Zip-Strip) Tool through the canopy channel bridle until the end is exposed near the zipstrip break tie.



7. Using a tacking needle and a length of Supertack, place a loop through the end of the zipstrip.



18. Attach the Supertack loop to the Incremental Bridle (Zip-Strip) Tool.



19. Pulling the tool back through the canopy channel bridle, carefully insert the end of the zipstrip into the channel.



20. Taking care not to place any twists in the zipstrip, pull the zipstrip fully into the channel.



21. Tack the zipstrip to the channel bridle as shown using red seal thread.





22. Snip one side of the Supertack loop, then pull the remainder out of the end of the zipstrip.



23. Apply tension to the canopy, flake the canopy in the usual manner, then lay the canopy on the table with an equal amount of gores on each side. Gore number 22 (with the data label) should be facing up on the left side.



24. To ensure that the slider is not wrapped around any suspension lines, lift line number 22 and follow it to the skirt of the slider. Straighten the slider as needed.



25. Still lifting line 22, grab the apex of the slider and pull it up towards the canopy skirt. Holding the apex in one hand and the suspension line in the other, pull the slider all the way up into the wind channel of the canopy until the grommets on the slider are against the slider stop rings on the suspension lines.



26. Slider fully inserted into the wind channel of the canopy.



27. Hold the suspension lines together at the skirt of the slider with either a line separator or a soft shot bag.



28. Starting on one side, grab and flake the slider skirt into the corresponding gores of the canopy.



29. After flaking the slider skirt, ensure the canopy skirt is even on both sides.



30. Once the skirt is even, fold the gores as a group 90 degrees so that the skirt is parallel to the radial seam.



31. Long fold the canopy into fifths by first bringing the right-hand gores over to the center of the canopy.



32. Next, bring the left-hand gores to the center.



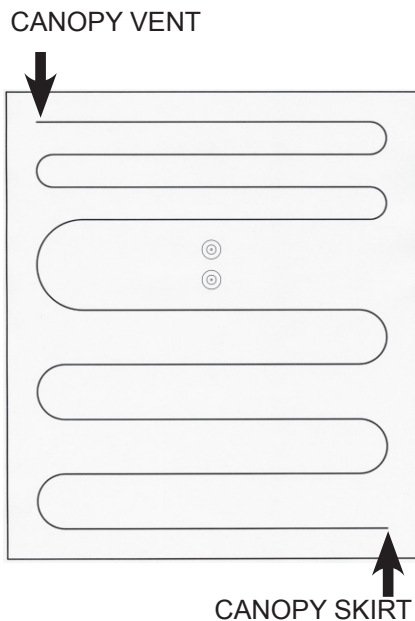
33. Fold the right-hand side over slightly past the center.



34. Finally, fold the left-hand side over the right as shown.

Before placing the canopy into the deployment bag, refer to the following illustration showing the correct canopy orientation and suggested number of folds above and below the closing loop grommets.

NOTE: To allow room for the Cypres processing unit, it is important to keep the top of the deployment bag soft. For this reason, the number of folds above and below the grommets is at the rigger's discretion.

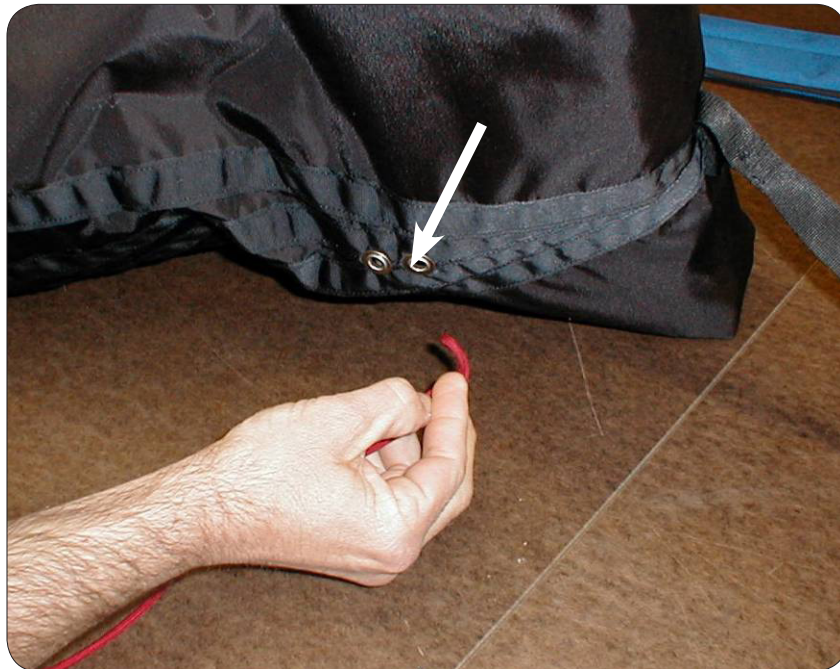


35. Orienting the deployment bag so the elastic line stow flutes are on top, neatly place the folded zip strip and canopy bridle into the top of the bag, then insert the vent into the upper left-hand corner.





36. Making your folds slightly wider than the bag, "S" fold the canopy back and forth into the bag. After placing four layers into the bag,



37. Carefully raise the deployment bag and insert one locking pull-up cord into the grommet closest to the top of the bag.



38. Route the locking pull-up cord through the corresponding grommet on the opposite side of the deployment bag as shown. Secure the cord by attaching a large washer or by tying a knot that will not slip through the grommet.



39. Pull the locking pull-up cord tight and secure with either a cord lock or slip knot.



40. Insert the other locking pull-up cord in the same manner as the first.



41. Continue "S"-folding the canopy into the deployment bag. The last fold should end with the canopy skirt and slider at the lower right corner of the bag.



42. Holding the folded canopy in place, bring the suspension lines to the center of the bag.



43. Carefully standing the deployment bag on its end, bring the right-hand side flap over, pass the tube stow through the bottom flap (the flap without the label), then through the top flap.



44. Place the first bight of suspension lines into the stow band to form the first deployment bag locking stow.



45. Bring the left-hand side flap up and create the second locking stow in the same manner as the first.



46. Continue closing the bag by creating the third locking stow as shown.



47. Finish closing the deployment bag with the fourth locking stow.



48. Begin stowing the suspension lines by bringing the lines up and across to the opposite corner of the deployment bag. Form a bight in the lines while ensuring there is enough length for the lines to reach the first stow loop.



49. Holding the first suspension line bight in one hand, insert the line stow fid through the first stow flute, through the suspension line bight, and back through the flute.



50. Bring the lines across the deployment bag and insert the next bight as shown.

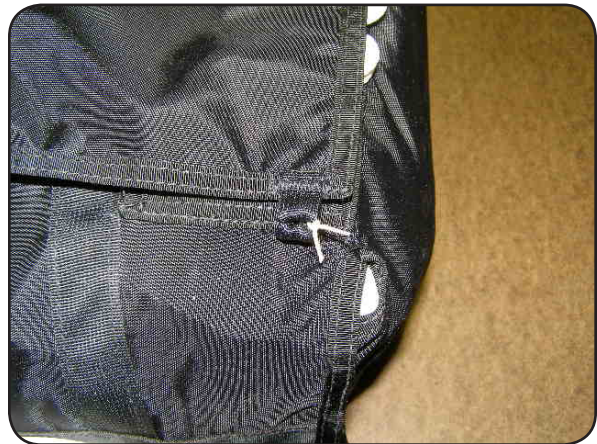


51. Again, being careful not to twist the lines, pull the lines through the second flute. Continue stowing the lines across the width of the bag.





52. Continue stowing the lines back and forth across the deployment bag until approximately 12 inches of lines remain between the last stow and the connector links.



53. Bring the line stow cover over the suspension lines and tie the corners to the loops on the deployment bag with 1 Turn Single Ticket 6 Cotton Cord or 1 turn double Ticket 3 Cotton Cord. Trim the ends to 1/2".

## CLOSING THE CONTAINER

### GROMMET ORIENTATION

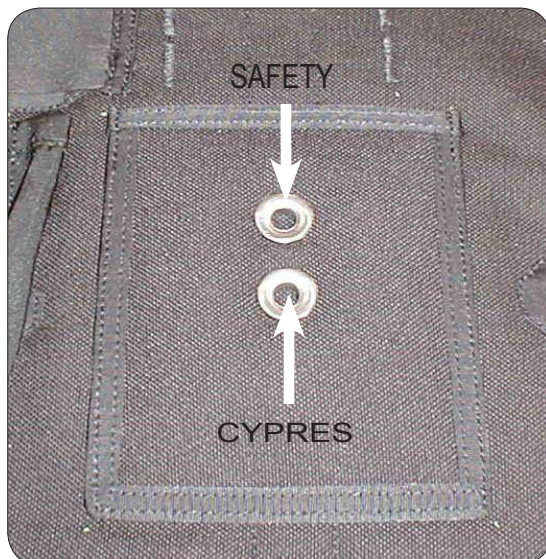
With the container laying flat on the table and all flaps folded back, the top grommet on the top flap is the grommet the CYPRES closing loop will pass through, yet the top grommet on the bottom flap is the grommet the SAFETY closing loop goes through. Confusing? It can be if you're not careful.

So, prior to inserting the deployment bag into the container and beginning the closing process, take a moment and fold the flaps in place to see how the grommets are aligned.

Take a look at the two grommets on the closing loop base and you will see that one is in the center of the base and one is closer to the top flap. The grommet in the center is for the CYPRES closing loop, and the one near the top flap is for the SAFETY closing loop. As you fold the container flaps in place, you will see that the top grommet on the top flap actually becomes the CYPRES loop grommet, and the top grommet on the bottom flap becomes the SAFETY loop grommet.

Now take a look at the pilot chute crown and see that one grommet is centered while the other is closer to the edge of the crown. The center grommet is for the CYPRES loop, and the other is for the SAFETY loop.

Once you start closing the container and have the pilot chute compressed, ALWAYS REMOVE THE CYPRES TEMPORARY PIN FIRST WHEN CLOSING SUBSEQUENT FLAPS! Since the Cypres loop is in the center of the pilot chute, doing this will keep the pilot chute flat.





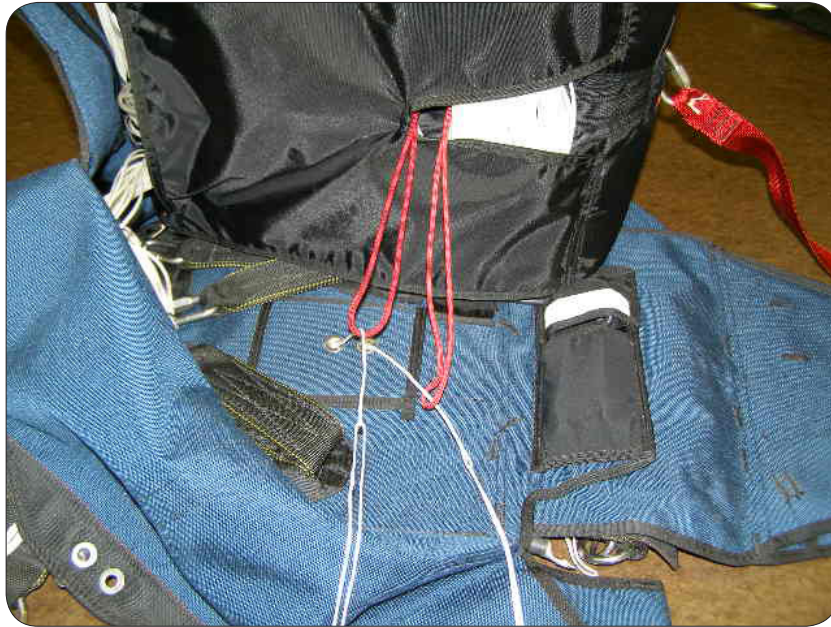
54. At times, it may be difficult to see which temporary pin is holding which closing loop in place. To alleviate any confusion, mark one of the pin flags “SAFETY” and the other “CYPRES”.



55. Insert your pull-up cords through the closing loops and remember to lubricate the Cypres Loop only with Cypres Silicone as per the instructions in the Cypres manual. Note: It is recommended to use a Type 2A (guttled 550 cord) pull cord for the Safety Loop so you don't confuse the pull cords. It is **required** to use Cypres pull cord with the Cypres Loop.



56. Holding the lines, carefully flip the deployment bag into the container as shown.



57. Lifting the deployment bag away from the packtray, pass the CYPRES loop pull-up cord through the first locking pull-up cord, the gently pull the CYPRES pull-up cord through the deployment bag.

Pull the SAFETY closing loop pull-up cord through the deployment bag in the same manner.



58. Ensure that the deployment bag is fully seated into the bottom corners of the container.

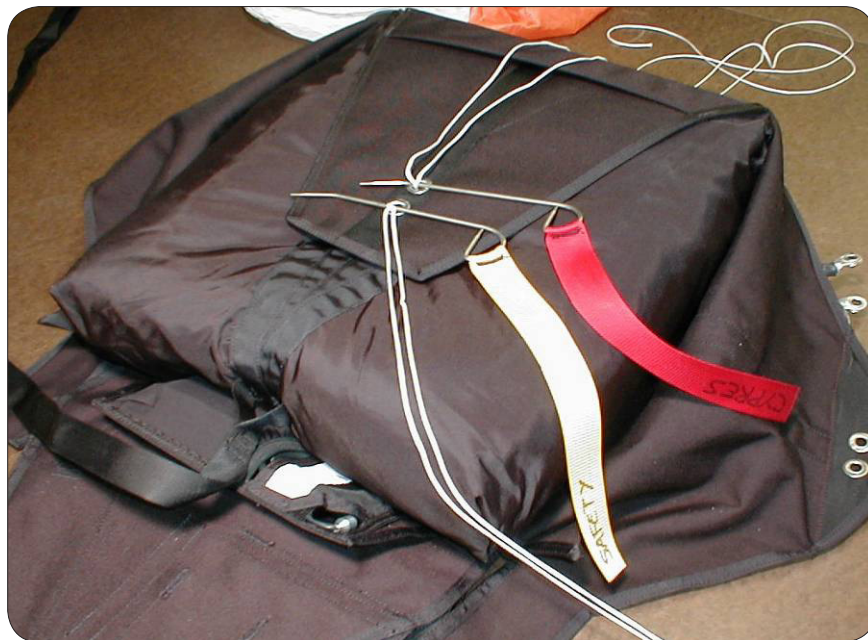


59. Bring the bottom flap up, pass the CYPRES loop pull-up cord through the Cypres release unit, then through the bottom flap grommet.



60. Pull the bottom flap all the way into position and pin it in place with the temporary pin you marked “CYPRES”.

NOTE: AT THIS POINT, IF THE CLOSING LOOPS ARE TOO SHORT OR TOO LONG, STOP AND ADJUST THEM AS NECESSARY, ENSURING THE SAFETY LOOP IS 1/2” LONGER.



61. Thread the SAFETY loop pull-up cord through the other grommet and pin the SAFETY closing loop in place with the “SAFETY” temporary pin.



62. Remove any twists in the pilot chute bridle, then place the base of the pilot chute near the top of the deployment bag. Make sure to have the Kevlar loops facing down towards the top flap to keep them clear of the pull cords.

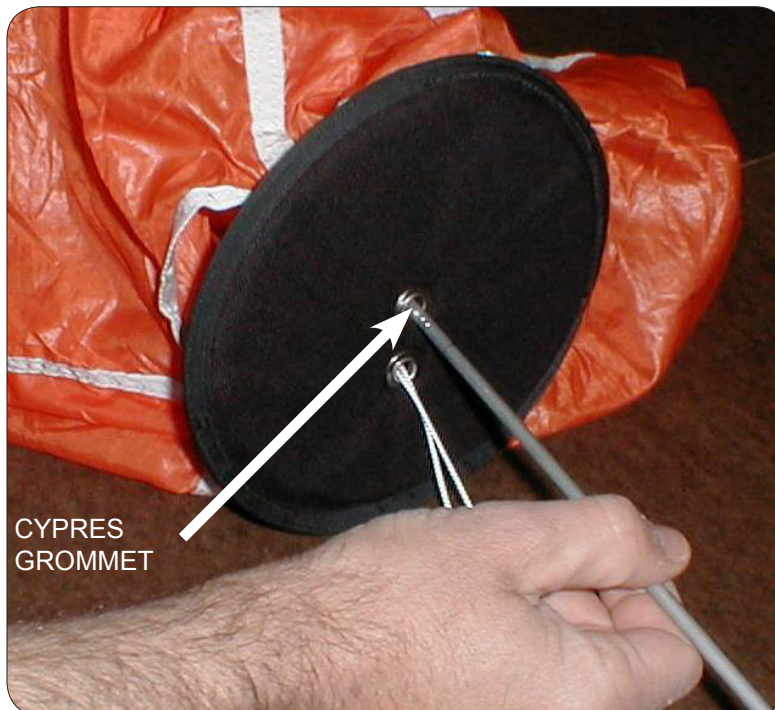


63. Insert your Incremental Bridle (Zip-Strip) Tool into the SAFETY grommet on the pilot chute crown and route it to the bottom of the pilot chute. **MAKE SURE THE TOOL GOES STRAIGHT DOWN THE CENTER OF THE PILOT CHUTE AND DOES NOT GO AROUND THE SPRING!**





64. Pass the rod through the grommet on the pilot chute base, then insert your SAFETY pull cord as shown. Bring the pull-up cord through the pilot chute by slowly withdrawing the Incremental Bridle (Zip-Strip) Tool.



65. After bringing the SAFETY pull cord through the top of the pilot chute, remove the cord from the rod. Insert the rod into the CYPRES grommet and, taking care not to wrap around the SAFETY pull cord, pass the rod back through the pilot chute and bring the CYPRES pull cord through in the same manner as the SAFETY pull cord.



66. Remove slack in the pull-up cords and place the base of the pilot chute on the temporary pins.



67. Making sure the grommets on the pilot chute crown are correctly oriented, carefully compress the pilot chute while pulling the pull-up cords through the crown as you compress. **WARNING: DO NOT TWIST THE PILOT CHUTE AS IT COMPRESSES! DOING SO WILL CAUSE THE CLOSING LOOPS TO TWIST AROUND EACH OTHER!**



68. With the pilot chute fully compressed, insert your CYPRES temporary pin into the CYPRES closing loop.



69. Insert the SAFETY temporary pin into the SAFETY closing loop.



70. Pull all of the pilot chute material clear of the pilot chute spring.



71. Starting at the bottom of the container, carefully fold the pilot chute material and place it against the compressed pilot chute.



72. Rotate the container as needed and fold the pilot chute at the top of the container.



73. Rotate the container again. Fold and tuck the pilot chute on the left side.



74. Finally, rotate the container again, then fold and tuck the pilot chute on the right side of the container.



75. Close and pin the left side flap in place.



76. Close and pin the right side flap in place.



77. Using a packing paddle, carefully tuck the side flap tuck tabs in place between the packtray and the deployment bag.



78. Soften the top of the deployment bag to make room for the Cypres by pounding on the top of the bag. Re-tuck the side flap tuck tabs again if they should become loose.



79. "S" fold the pilot chute bridle and place it on the top of the deployment bag as shown.





80. Bring the top flap up into position.



81. Route your pull-up cords through the inner top flap grommets and pin the flap in place.

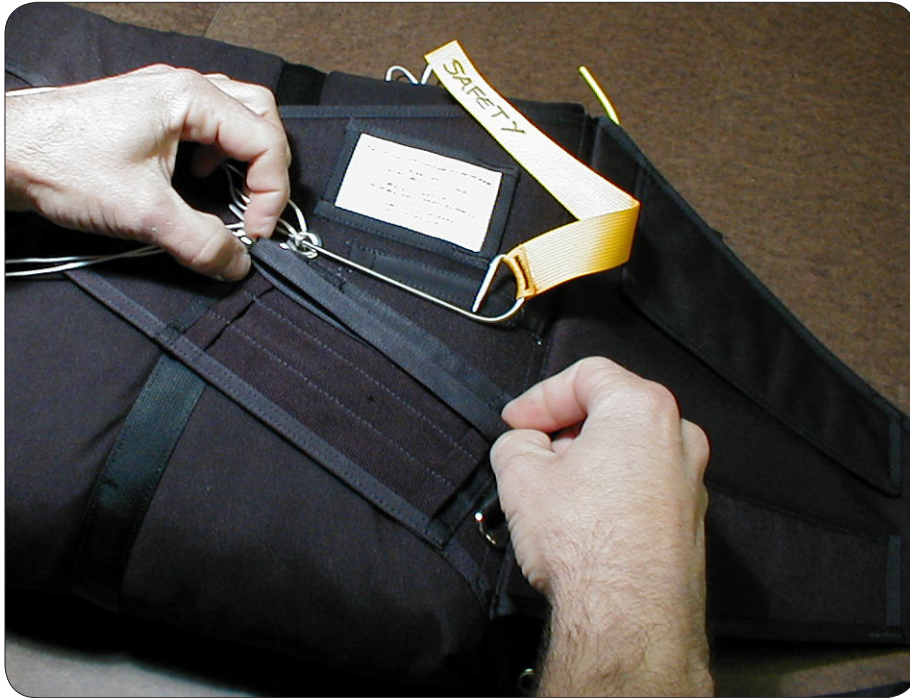


82. Mate the Velcro on the static line to the Velcro on the inner top flap.

**NOTE: The Static Line can be stowed prior to packing while the container is empty.**



83. Mate the Velcro on the static line to the Velcro on the inner top flap



84. Measure the first stow of the static line the same way you measured the suspension line stows.



85. Using the static line insertion tool, place the first bight of the static line into the first of the static line stow flutes.



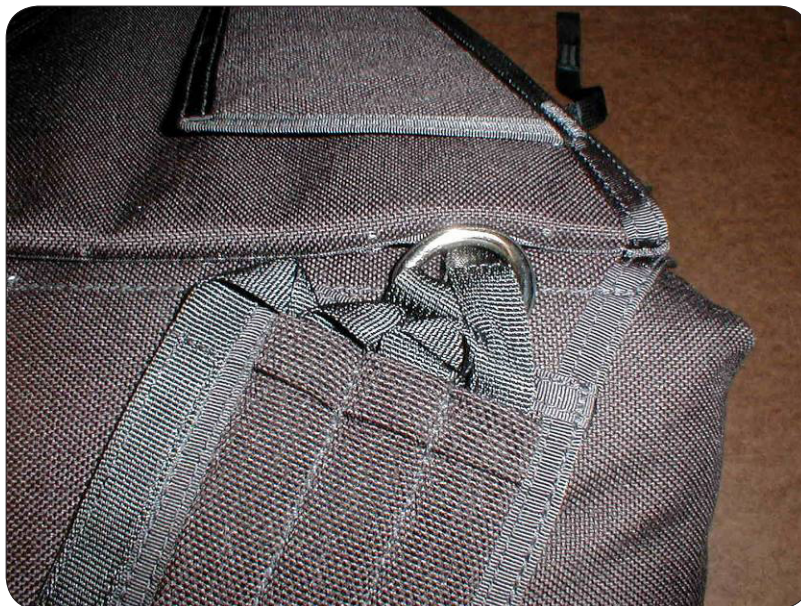
86. Place a second bight of static line ON TOP OF the bight in the first stow flute, then continue stowing the static line by placing two bights in the second stow flute.



87. Place one static line bight into the last stow flute.



88. Place a second bight of static line into the last stow flute until the static line Velcro is approximately 1 inch from the top of the flute.



89. Pass the static line through the static line guide and through the opening between the inner and outer top flap.

**WARNING** FAILURE TO PASS THE STATIC LINE THROUGH THE STATIC LINE GUIDE COULD RESULT IN DAMAGE TO THE CONTAINER AND POSSIBLE FAILURE DURING DEPLOYMENT.



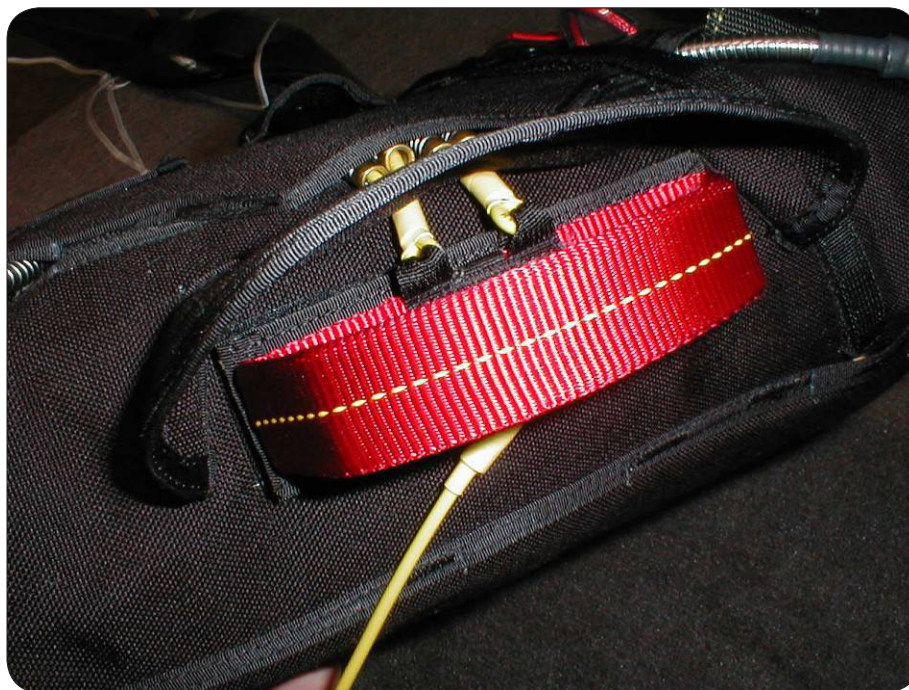
90. Pull the static line through the static line opening until the end of the static line Velcro is even with the Velcro on the top flap.



91. Mate the static line Velcro to the top flap and harness cover Velcro as shown.



92. Straighten the four three-ring release cables on the release handle. Pass the cables through the opening at the base of the handle protector and into the four cable housings as shown.



93. Feed the release cables into the housings and seat the release handle onto the top flap Velcro.

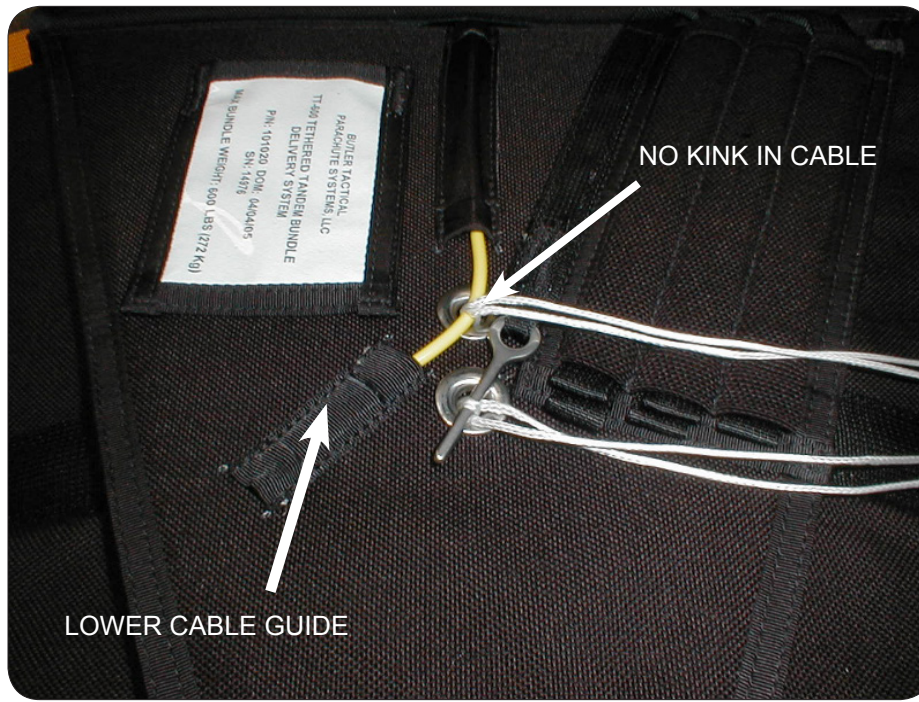


94. Insert the safety cable into the opening between the inner and outer top flaps.



95. Place the end of the safety cable into the upper cable guide.





96. Route the safety cable through the upper cable guide, through the SAFETY closing loop, and into the lower cable guide. During this step, ensure that the safety closing loop is loose enough to allow the safety cable to move very easily through the closing loop. If the loop creates ANY kink in the cable, then the loop is too tight; open the container and lengthen the loop as necessary.



**WARNING** The Safety Closing Loop is NOT the primary closing loop of the TT-600 system and only acts as a safety to ensure the container remains closed until the system is activated by the operator pulling the release handle. Therefore, the loop must not be as tight as the Cypres closing loop. As noted in the TT-600 Packing Manual, if the loop creates ANY type of kink in the Safety Cable, then the loop is too short and must be adjusted accordingly.

**IF THE SAFETY CLOSING LOOP IS TOO TIGHT, IT MAY INCREASE THE AMOUNT OF PULL FORCE REQUIRED BY THE OPERATOR TO ACTIVATE THE SYSTEM.**



97. Carefully remove your pull cords.



98. Fold the outer top flap into position. Insert the tuck flaps UNDER the inner top flap and the bottom of the flap into the bottom flap tuck pocket as shown.



99. Attach the carabiner to the static line, then using one turn single Supertack, tack the static line loop snug against the carabiner .



100. Place the bottom of the carabiner into the carabiner pocket, then clip it to the keeper.



101. Snap the carabiner pocket closed.



102. Attach the belly bands to the container



103. Stow the end of the release cable in the opening provided on the bottom flap of the container.



104. Note that the RW-10 / Butterfly snaps have one of the butterfly tabs removed. The remaining tab **MUST** face **OUTBOARD** when attached to the harness. Prior to installing the hardware to the harness, make sure you have the correct piece.



105. With the snap opening facing **AWAY** from the harness cover, install the RW-10 / Butterfly rings to the harness as shown.



106. Stow the excess release cable in the pockets located on the harness.



107. Sign the Packing Data Card and insert it into the pocket on the Inner Top Flap.

Packing the TT-600 is now complete. Place the system in its carry bag until needed.

**COUNT YOUR TOOLS!**

RIGGER'S NOTES:

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