Owner's Manual

5107 Lantana Street
Zephyrhills, FL 33542

Tel: (813) 780-8961 Fax: (813) 788-7072

Email: info@baserigs.com

- **BASE jumping is extremely dangerous! You may be seriously injured or killed.**
- **Morpheus Technologies and all of its affiliates advise you to seriously consider the potential consequences of your actions should you decide to pursue this sport.**
- **Do not use this equipment unless you accept full responsibility for any injury, serious or otherwise, including loss of life.**
- **Do not use this equipment unless you have read and understand all warning labels, owner's manuals and packing instructions.**
- **Do not use this equipment unless you have had complete and controlled instruction in the use of this parachute assembly.**
- **Do not use this equipment without inspecting it and all of its components thoroughly before each and every use. Replace any defective or worn components before use.**

Disclaimer - Warranty

Morpheus Technologies and its affiliates offer no warranty; expressed or implied, as to the reliability or safety of any equipment or product that it sells. This equipment is sold without any guarantee of its quality or performance. It may not perform as it is designed to.

Morpheus Technologies offers these instructions to be used as a guideline only. Ultimately, the responsibility lies with the user. By offering these instructions, Morpheus Technologies and it's affiliates take no responsibility for the performance or quality of this equipment or any equipment that it sells, leases or gives away.

JUMP AT YOUR OWN RISK!

Welcome to Morpheus Technologies

To Our Valued Customer,

It is the goal of Morpheus Technologies to produce and sell the best B.A.S.E. – specific equipment that can be manufactured today and it is our promise to you to constantly strive for ways to better our equipment, which in turn can help to make our sport safer. Therefore, it is important to obtain any feedback that may help our company in this effort. Please feel free to share any observations, suggestions, etc. No matter how insignificant it may seem, we are always open to new ideas and what better place to get them than in the field, where it really counts.

Sincerely,

Robert Jones, President
Morpheus Technologies

Robert & Kathy in Moab

About this manual:

- This manual is designed to offer the user information on specific equipment that Morpheus Technologies' offers. No one piece of equipment is designed to function on it's own. Items are designed to work in conjunction with other items to create a system. It is very important that a person understand components and how they work together.

- This manual is not intended to be used as a course of instruction on how to make a B.A.S.E. jump.

- This manual is designed to be used as a guideline only. It is the responsibility of the user to ensure that his/her container is properly assembled, maintained, packed, worn and used. It is the user's responsibility to seek out and obtain proper training before using this or any B.A.S.E. specific equipment.

- Please read this entire manual before attempting to pack or utilize this equipment in any way.

- If after you have read this manual, you find that you do not understand any element, please consult us here at Morpheus Technologies or contact a qualified rigger for assistance.

- The information and specifications that are included in this manual are in effect at the time of printing. Morpheus Technologies reserves the right to change any equipment that it offers at any time without notice or obligation.

	Sections:	Pages:
1.	**How to use this manual**	**6**
2.	**Packing the Medusa, Velcro container**	**7 - 12**
3.	**Packing the Gargoyle Twin, dual pin container**	**13 - 19**
4.	**Packing the Wingsuit X-treme Container**	**20 - 23**
	4.1: Packing the WS X-treme with top flap closing loop	24
5.	**Packing with dynamic corners**	**25 – 26**
6.	**List of components**	**27**
7.	**Risers**	**28 - 29**
	7.1: Slider down retainer strap	29
8.	**Line & Riser Continuity**	**30**
9.	**Toggles and Settings**	**31**
	9.1: Toggle Attachment – Method 1	31
	9.2: Toggle Attachment – Method 2	32
	9.3: Setting your brakes: Line Mod – No slider	33 - 35
	9.4: Setting your brakes: With slider	36 - 38
10.	**Pilot chutes and bridle**	**39**
	10.1: Jumping hand held	40 - 43
	10.2: Jumping with pilot chute stowed	44 - 45
11.	**Safety Checks**	**46 – 47**
12.	**Inspecting and Maintaining your equipment**	**48**
	12.1: Canopy Check List	48
	12.2: Harness Check List	49
	12.3: Container Check List	49
	12.4: Risers Check List	50
	12.5: Connector Link Check List	50
	12.6: Toggles Check List	51
	12.7: Pilot Chute Check List	51
	12.8: Bridle Check List	52

Appendix A: **Contact information**
Appendix B: **Reference Chart for Freefall Distance**
Appendix C: **Reference Chart for Pilot Chute Recommendation**
Appendix D: **Troll Canopy Specifications**
Appendix E: **Container / Canopy Compatibility**
Appendix F: **'BIG Grab' Toggles**

Section 1: How to use this manual

We know you are excited to receive your new container and will most likely be packing it now as you read this manual. BUT please take time to read this manual completely, regardless of your experience level!

You will learn about:

How to assemble, pack and safely use your:
The great new features of your:
How to get the most out of your:
How to take care of your:

Gargoyle

Medusa

ws X-treme

W A R N I N G

MORPHEUS TECHNOLOGIES – OWNER'S MANUAL

This manual is **not** a course of instruction on how to make a parachute jump, nor does it contain regulations that govern sport parachuting and related activities.

Section 2: Packing the Medusa, Velcro container:

Medusa

The Medusa Container

The Medusa is Morpheus Technologies' Velcro-closed container. It features a snag resistant flap that tucks into the shrivel flap. This allows air to flow cleanly over the top of the container, helping ensure the shrivel flap is not prematurely stripped away during high-speed freefall. This design has also been proven to help prevent the potential of snagging whilst manoeuvring in tight areas.

The distinct design of the pack tray and side flaps makes packing easier, as it holds its shape well when placing the canopy in the tray. Also, the corners at the bottom of the container are not enclosed, giving the canopy the maximum opportunity for an on heading deployment when travelling forward at a high rate of speed.

Our tuck tab riser covers come in Style, Stealth and Streamlined stealth versions and are completely Velcro free to allow for an unhindered deployment and maintenance free use. This design also allows easy access for 3-ring inspection at any time, yet makes it easy to re-close the riser covers when preparing to jump.

The Medusa features a continuous harness system made of type 7 and type 8 webbing, ensuring exceptional strength at every point. It can be ordered with an optional lower articulated harness. The contoured yoke is designed to tailor fit the shoulders, promoting maximum flexibility and comfort.

Packing the Medusa

Before placing the canopy into the container, read this manual through from cover to cover. If there is any element that you do not understand please do not hesitate in contacting us or contact a qualified rigger to assist you in assembly and packing.

Figure 1

Figure 1: Follow the canopy manufacturer's instructions for packing the canopy until it resembles the figure above. Fold the top flap and the yoke area under the container. (This fold is also used at a later stage as a guide to determine where to fold the canopy.) Tuck the bottom flap under the container, as well.

Figure 2

Figure 2: Grasp the canopy and the Tail Pocket so as not to disturb the stowed lines and slide the cocooned canopy over and into the pack tray ensuring the risers don't get twisted. Lay the tail pocket and canopy flat on the bottom of the pack tray with the rear risers toward the inside. If you have Big Grab toggles, just have them face each other in the pack tray. Position the canopy squarely and ensure that the tail pocket fills the bottom corners of the pack tray.

Figure 3

Figure 3: Fold the canopy back on itself toward the bottom of the container. Use the warning label arrows as a guide to determine where to make the fold. Whilst keeping control of the canopy find the three nose cells on one side and tease them out of the pack job. Now fold them inward (2 folds) toward the center of the pack job. Do the same on the other side. Find the center cell and tease it out of the pack job. Be certain that it stays exposed.

Figure 4

Figure 4: Fold the remainder of the canopy toward the top of the container, using the bottom of the pack tray as a guide. (Be sure to fill bottom of pack tray.) This should put the top of the canopy approximately in the center of the container. Be certain that the center cell remains exposed.

Figure 5

Figure 5: Clear the bottom and top flaps from under the container and place them over the canopy, assuring the bridle and shrivel flap are exiting from the top right. Mate the Velcro on the top and bottom flap with the shrivel flap, ensuring that the slotted end of the shrivel flap is at the top of the container near the canopy and the squared off end is at the bottom of the container where the pilot chute and bridle are stored. The bridle should pass to the right side of the top Velcro flap.

Figure 6

Figure 6: Keeping the canopy tidy, grasp either side flap and pull it toward the shrivel flap while working the canopy into the container. Align the Velcro of the side flap so that it is even with the tuck portion of the top flap. Mate the Velcro of the side flap and the coordinating side of the shrivel flap. Repeat this process for the opposite side. Tuck any remaining bridle at the top of the container under the right side between side and top flap.

Figure 7

Figure 7: Lightly pull on the bottom of the shrivel flap bridle, ensuring the top of the shrivel flap begins to peel away from the container. If it does not, STOP immediately and inspect the assembly. Close the riser covers and tuck the top of the shrivel flap into the tuck at the top of the container. Dress the container. It helps to put the rig on your back and rock backwards on the floor to compress the pack job. Be sure that Velcro is mated properly first. Proceed to the pilot chute section and follow instructions according to the type of deployment system that you wish to use.

Section 3:Packing the Gargoyle Twin, dual pin container:

Gargoyle Twin

The Gargoyle Twin Container

The Gargoyle Twin is a two-pin BASE specific container that features a "no tension" pin protector flap. This flap is designed to open cleanly and quickly at low airspeeds, yet has been thoroughly tested at terminal and withstands the performance of radical freefly manoeuvres

The Gargoyle does not have enclosed corners at the base of the container. This ensures the opportunity for optimum, on heading deployment. It's streamline design and curved yoke contours to the user's body shape and length, allowing for maximum comfort and flexibility. It comes standard with a complete bridle protection pocket and features a continuous harness system made of type 7 and type 8 webbing. This assures maximum strength at crucial junctures. The Gargoyle Twin can be ordered with Style, Stealth or Streamlined Stealth riser covers.

Through observation and discussions with locals at several popular wingsuit cliff sites, we saw a need to improve upon container opening characteristics during wingsuit deployments. Hence the development of "Dynamic Corners". This design allows the tray to open fully, leaving no edges for the canopy or tail pocket to snag during high-speed horizontal deployments.

The Gargoyle can also be ordered with an optional lower articulated harness. This, combined with contoured legpads allow for a complete un-constricting range of motion and comfort. The features are extremely useful whether jumping flat and stable or performing any of today's aerial manoeuvres.

Packing the Gargoyle Twin

Before placing the canopy into the container, read this manual through from cover to cover. If there is any element that you do not understand please don't hesitate contacting us or contact a qualified rigger to assist you in assembly and packing.

Figure 1

Figure 1: Follow the canopy manufacturer's instructions for packing the canopy until it resembles the drawing above. Fold the top flap and the yoke area under the container. (This fold is also used at a later stage as a guide to determine where to fold the canopy.) Tuck the bottom flap under the container, as well.

Figure 2

Figure 2: Grasp the canopy and the Tail Pocket so as not to disturb the stowed lines and slide the cocooned canopy over and into the pack tray ensuring the risers don't get twisted. Lay the tail pocket and canopy flat on the bottom of the pack tray with the rear risers toward the inside. If you have Big Grab toggles, just have them face each other in the pack tray. Position the canopy squarely and ensure that the tail pocket fills the bottom corners of the pack tray.

Figure 3: First fold (Nose cell exposed for slider off pack job)

Figure 3: Fold the canopy back on itself toward the bottom of the container. Use the warning label arrows as a guide to determine where to make the fold. Whilst keeping control of the canopy find the three nose cells on one side and tease them out of the pack job. Now fold them inward (2 folds) toward the center of the pack job. Do the same on the other side. Find the center cell and tease it out of the pack job. Be certain that it stays exposed.

Figure 4

Figure 4: Fold the remainder of the canopy toward the top of the container, using the bottom of the pack tray as a guide. (Be sure to fill bottom of pack tray.) This should put the top of the canopy approximately in the center of the container. Be certain that the center cell remains exposed.

Figure 5

Figure 5: Clear the top flap from under the container and place it over the canopy. Bring the left side flap over and feed the pull-up cord through the top closing loop located on the top flap. Feed the pull-up cord through the top left grommet and then through the top right grommet. Be certain that the bridle exits between the top flap and the right flap.

Figure 6

Figure 6: Place the pin that is closest to the canopy through the loop. Clear the bottom flap from under the container and bring it up over the canopy. Feed the pull-up cord through the bottom closing loop located on the bottom flap, then through the bottom left grommet and finally through the bottom right grommet. Ensuring that the bridle is not twisted, place the remaining pin (pin that is closest to the pilot chute) through the closing loop.

It is very important that the closing loops on the Gargoyle Twin do not exceed 3/4" in length. A small drop of Super Glue placed on the closing loop knot can help reduce slipping over time.

Figure 7a: Top closing loop

Figure 7b: Bottom closing loop

Figure 7a and 7b: Take special care when threading the pins through the closing loops. Ensure that you do not twist the closing loops and pass the pin through loop from left to right so the pin shape resembles the **arch** of a bridge, with the end of the pin passing under the right stiffener (therefore reducing the risk of the pin being pushed out). The bridle should remain straight and **not twisted**, the bridle below the bottom pin should be tucked under the right side flap and then fed in to the bridle protector flap.

Figure 8

Figure 8: Close the pin protector flap, taking care to keep the bride in its central position. Proceed to the pilot chute section and follow instructions for the type of deployment that you wish to use.

Note: Alternate Bridle Routing: Recently jumpers in the field have started threading the bridle out of the middle of the container (in between the two pins) rather than out of the top as shown in figure 9. Morpheus Technologies sees no advantage or difference to using this bridle routing. It is personal preference to which of these two possibilities you choose. Just ensure the instructions for figure 7 regarding pin insertion and the bridle position are always followed.

Figure 9: Alternative bridle routing

Section 4: Packing the Wingsuit X-treme Container

The Wingsuit X-treme Container

The Wingsuit X-treme is a two pin BASE specific container developed in cooperation with Robert Pečnik (wingsuit pilot and owner of Phoenix-Fly) in response to the growing popularity of high performance wingsuit flying and tracking. The Wingsuit X-treme's low profile design helps improve airflow over the flyers shoulders and back increasing lift and reducing drag. The Wingsuit X-treme uses a specially shaped pack tray with low line side walls to distribute the packjob into a more aerodynamic shape. The top closing loop is anchored using a floor plate (similar to that used in a reserve tray) this allows for packjob to be compressed more in the yoke area.

The Wingsuit X-treme can also be packed using the standard top flap closing loop method (recommended on non-terminal jumps).

The WS X-treme incorporates many features of the Gargoyle twin, such as the "no tension" pin protector flap. This flap is designed to open cleanly and quickly at low airspeeds, yet has been thoroughly tested at terminal and withstands the performance of radical freefly manoeuvres

It's streamline design and curved yoke contours to the user's body shape and length, allowing for maximum comfort and flexibility. It comes standard with a complete bridle protection pocket and features a continuous harness system made of type 7 and type 8 webbing. This assures maximum strength at crucial junctures. The WS X-treme comes standard with Streamline Stealth riser covers and a wingsuit BASE pouch bridle pocket.

The Wingsuit X-treme comes standard with "Dynamic Corners". This design allows the tray to open fully, leaving no edges for the canopy or tail pocket to snag during high-speed horizontal deployments.

The Wingsuit X-treme container comes standard with integrity risers but the 3-ring release option is also available for no extra charge.

Packing the WS X-treme

Before placing the canopy into the container, read this manual through from cover to cover. If there is any element that you do not understand please don't hesitate contacting us or contact a qualified rigger to assist you in assembly and packing.

Figure 1

Packing the wingsuit X-treme is exactly the same as for the Gargoyle Twin up until after you have made the first canopy fold in the container (see figure 1 – 3 of Section 3: Packing the Gargoyle Twin) as above in Figure 1.

Figure 2a and 2b:

Figure 2a 2b: At this point you must split the pack job to allow space for the top closing loop to pass through. Use the mid rib of the center cell to guide you were to split the pack job.

Note: The top closing loop passes through the grommet of the floor plate, held in place by the standard knot and washer. The closing loop needs to be approximately 2" – 3" in length depending on the canopy size. The closing loop must obviously be shortened if you intend to use the standard top flap closing method.

Figure 3

Figure 3: Close the top of the container by passing the pull up chord through the top flap grommet, then the left and right side flap grommets consecutively, not forgetting to route the bridle out of the top right corner. Insert the pin that is closest to the canopy attachment point through the closing loop. Ensure the canopy does not slide in the tray as you close the container. Please refer to figure 7 of Section 3: Packing the Gargoyle Twin for details of the correct method to insert the closing pins and route the bridle.

Figure 4

Figure 4: Fold the tail on top in the normal manner, to complete the closing sequence refer to the **Section 5: Packing with Dynamic Corners.**

Section 4.1: Packing the WS X-treme with top flap closing loop

Figure 5: Mylar insert holding the top closing loop in place

The Wingsuit X-treme container can also be packed in the exactly the same manner as the Gargoyle Twin container by using the normal $^{3}/_{4}$" closing loop attached to the top flap. The small Mylar stiffener provided is then inserted into the pockets either side of the grommet to keep the loop in position, as shown in Figure 5.

It is recommended to use the normal top flap closing loop on non-terminal jumps.

Section 5: Packing with dynamic corners

Figure 1

Figure 1: After closing the top flap the pack job should resemble Figure 1

Figure 2

Figure 2: Fold the Dynamic Corner inward and place this fold along the side of the container between the container sidewall and the folded canopy. Repeat for the other side.

Figure 3

Figure 3: Before closing the bottom flap, the packjob should resemble the photo.

Figure 4

Figure 4: Close the bottom flap in the normal way. The container should now resemble the photo above.

.

Section 6: List of components

Gargoyle Medusa ws X-treme

May Include:

- Harness / Container
- Risers (with slider down retainer strap) & Control Toggles
- Pilot Chute & Bridle
- Hard housings (installed)
- Elastics for Leg & Chest Straps
- Release Handle

- Gargoyle: Closing loops
- Medusa : Shrivel Flap
- WS X-treme: Dynamic Corners, Integrity risers and Mylar stiffener for top flap closing loop closure.

Section 7: Risers

We, at Morpheus Technologies use Type 8 webbing for our risers. Type 8 is proven to have superior strength yet maintains a high level of flexibility. We follow the measurements of construction that The Relative Workshop uses. Since they are the company that designed the 3-ring system that is commonly used today, they continue to do extensive testing and assure that the latest performance specifications are accurate and reliable. All of our BASE risers come standard with a slider down/off line-release modification. We utilize hard housings on all of our containers as standard. The only time you want to cut away from a single parachute container is after you have landed. Generally, this can mean that you have landed in a tree or in the water. It has been proven that soft housings can jam once they get wet, so we feel that hard housings are considered safer for use in this application.

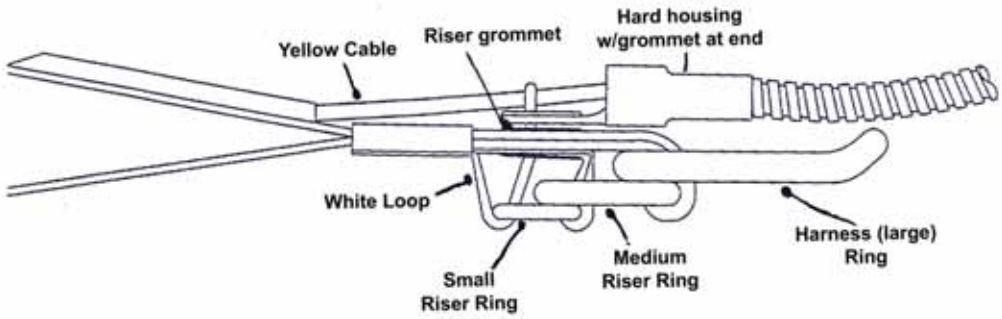


Figure 1: 3-Ring Release System

Assembly

Before assembling the 3-Ring release system, be certain that the risers are not twisted or reversed.

1. Lay the container face down as you would when packing it. Insert the yellow cables into their appropriate hard housings. Remember that the long cable is to be inserted into the long housing that goes around the user's left shoulder and the short cable is inserted to the shorter housing that ends on the right side of the user's body.

2. Be certain to maintain continuity and grasp the right riser, making sure that the rings of the riser are facing toward the floor. Pass the middle-sized ring on the end of the riser through the right side harness (large) ring from above. The riser must stay in front of the harness ring.

3. Next fold the middle ring back toward the canopy and risers.

4. Next, thread the smaller riser ring through the middle ring in the same manner. Be certain that the smaller ring does not pass through the large harness ring, this mistake is easily made with the "small ring" version of the 3-Ring system.

5. Now bring the white loop over the small ring only and then through the riser grommet until it pokes out the back of the riser.

6. Continue threading the white loop though the grommet on the end of the cable housing. The flat side of the cable housing grommet should be against the riser.

7. Thread the yellow cable through the white loop: making certain that the loop is not twisted. Be careful not to bend the cable too sharply or kink it. Insert the free end of the cable into the channel provided on the back of the riser.

Section 7.1: Slider down retainer strap

The slider down retainer strap is situated on the front left riser. To use the strap simply release the strap from the popper as shown in figure 2a. Thread the strap through the front left slider grommet and re-attach the strap on the popper as shown in figure 2b.

Figure 2a & Figure 2b: Attaching the slider down retainer strap

Section 8: Line & Riser Continuity

Left Rear Left Front Right Front Right Rear

Remember that each connector link has to show continuity from the lines to the canopy. Check each one for proper assembly.

Each of the links will have four cascading lines. The two control lines each cascade into five.

Once you have orientated the lines properly on the #5 links, inspect them. Finger-tighten all 4 connector links. Then apply a 1/4 turn with a 9mm wrench. Do not over tighten as this can strip or crack the link and cause it to fail. Slide the slider bumpers (covers) over the links.

Note: The slider retainer strap is attached to the left front riser, this strap is used to hold the slider in position on slider down jumps. When not in use it should simply wrapped around the riser and held in place using the popper.

Section 9: Toggles and Settings

Section 9.1: Toggle assembly – Method 1; Standard Brake line attachment procedure

Note: Remember to adjust the toggle attachment point when removing the toggle to change between slider up and slider down. The length of the brake line increases when not threaded through the riser guide ring.

Figure 1

Figure 1: Make a half hitch knot at the desired point along the brake line (use a magic marker to make a mark on the line).

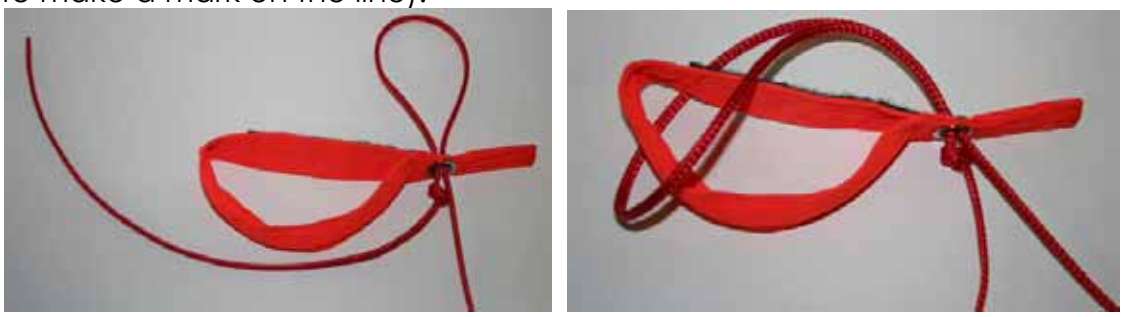


Figure 2a and 2b

Figure 2: Make a loop of brake line above the knot and thread it through the **FRONT SIDE** of the toggle as shown in figure 2a Then pass the loop over the **BOTTOM** of the toggle as shown in figure 2b.

Figure 3

Figure 3: Pull the excess line back through the grommet. The assembled toggle should look like photo above. (the excess line can be left hanging free, it allows for adjustment later on)

Section 9.2: Toggle assembly – Method 2; Brake lines with pre-installed toggle attachment loops

Figure 1

Figure 1: Pass the control line through the toggle's grommet from the Velcro side of the toggle.

Figure 2

Figure 2: Then thread the bottom of the toggle through the toggle attachment loop, pulling the slack brake line back through the grommet.

Figure 3

Figure 3: The assembled toggle should look like photo above.

Section 9.3: Setting your brakes: Line Mod – No slider

Figure A

Figure A: Be certain to ensure proper control line continuity and make sure that when the brakes are unstowed, the control lines run straight from the toggle (your hand) to the trailing edge of the canopy without passing through anything else. The top of the toggle must never pass through the guide ring.

Figure 1

Figure 1: Determine which brake setting will be used and place the white loop on the riser through the cat's eye loop on the control line.

Figure 2

Figure 2: Then pass the white riser loop through the riser guide ring (when using the line mod, the control line DOES NOT pass through the guide ring)

Figure 3a and 3b

Figure 3: Put the top of the toggle through the white loop on the riser and stow the top of the toggle in the elastic keeper provided on the riser.

Figure 4

Figure 4: S-fold and stow the excess control line to the inside of the riser and around to the elastic keeper, located on the front side of the rear riser. Check proper routing. Be certain that the control line leading to the canopy is routed to the outside.

Figure 5

Figure 5 : Be certain that the Velcro on the toggle mates with the Velcro on the riser. Also make certain that the top of the toggle does not pass through the guide ring.

Section9.4: Setting your brakes: With slider

Figure B

Figure B: Take time to ensure that you have the proper set-up for jumping with a slider. The control lines MUST pass through the riser guide rings and the appropriate slider grommets. The top of the toggle must never pass through the guide ring.

Figure 1a and 1b

Figure 1: Pull the toggle down so that the appropriate cat's eye is below the guide ring. When jumping slider up, this is typically the brake loop closest to the toggle.

Figure 2

Figure 2: Route the top of the toggle through the cat's eye and stow the top of the toggle through the elastic keeper provided on the riser. The white riser loop is not utilized when a slider is being used. Just lay it to the side.

Figure 3

Figure 3: S-fold and stow the excess control lone to the inside of the riser and around to the elastic keeper, located on the front side of the rear riser. Check proper routing. Be certain that the control line leading to the canopy is routed to the outside. Be certain that the Velcro on the toggle mates with the Velcro on the riser.

Figure 4

Figure 4: This is how it should look when finished. Be certain that the top of the toggle is through the appropriate cat's eye only and that it does not pass through the white riser loop or the guide ring.

Section 10: Pilot Chutes and Bridles

Pilot Chute:
Pilot chutes are made of zero porosity fabric. Morpheus Technologies offers pilot chutes in six sizes (32", 34", 36", 38", 42" and 46") The 38", 42" and 46" pilot chutes come standard constructed with high-drag large mesh. This has been proven to allow faster inflation at low airspeeds. The smaller pilot chutes 32", 34" and 36" come standard with marquisette netting (although large mesh is available on request). Both types of pilot chutes have eight reinforcing load tapes. This helps to eliminate distortion during deployment and gives it longer durability. The 38" - 46" pilot chutes come standard with a custom coloured Cordura-lined foam disc. The 32", 34" and 36" pilot chutes come standard with a light weight tube handle for easy grasping, although a Wiffle ball handle is also available. Either option can be interchanged on pilot chute sizes to meet individual needs. F111 material is available on request for 38" pilot chutes and below.

Bridle:
Our bridles are custom made for each container size and type and are made of Type 4 webbing.

Assembly:
The **Medusa** bridle has a loop at each end. One is 3" and the other loop is 5". To attach the bridle to the shrivel flap, the smaller loop is lark's headed to the flat end of the shrivel flap. To connect the shrivel flap to the canopy, the loop that exits the rounded end of the shrivel flap bridle is lark's headed to the canopy. Make sure that the rounded end of the shrivel flap extends to the canopy. The larger loop on the other end of the bridle (furthest from shrivel flap) is larks headed to the pilot chute. To do this, pass the bridle loop through the bridle attachment point, making sure that bridle goes through the centreline as well as behind each of the radial tapes. Now pass all of the pilot chute fabric through the loop in the end of the bridle. Remove any twist that may be in the bridle loop. Tighten the lark's head knot around the bridle attachment point. Let the pilot chute hang from the bridle and pull on the deployment handle or pud to tension the center line

The **Gargoyle** bridle consists of the bridle and 2 pins. Both ends of the Gargoyle bridle have 5" loops. To attach the bridle to the canopy, the loop that is closest to the pins is lark's headed to the canopy. To attach the pilot chute to the bridle, lark's head the opposite loop (loop that is furthest away from the pins) to the pilot chute. To do this, pass the bridle loop through the bridle attachment point, making sure that bridle goes through the centreline as well as behind each of the radial tapes. Now pass all of the pilot chute fabric through the loop in the end of the bridle. Remove any twists that may be in the bridle loop. Tighten the lark's head knot around the bridle attachment point. Let the pilot chute hang from the bridle and pull on the deployment handle or pud to tension the center line

Section 10.1: Jumping Hand Held

Figure 1

Figure 1: After packing your container, put it on as normal. Make all harness adjustments and stow all the excess webbing. Grasp the bridle with your right hand. Make certain that the bridle runs from shrivel flap/ bottom pin directly to your hand without passing around or through anything that could cause a pilot chute in tow malfunction.

Figure 2

Figure 2: Keep the bridle between your right hand and forefinger and lift the bridle to full arm extension. S fold the remainder of the bridle into your hand using approximately 6" folds, working your way toward the pilot chute. When finished, the pilot chute should be hanging by the bridle attachment point. Drag the pilot chute through the air, causing it to inflate and then let it rest. If the pilot chute does not inflate, STOP! Do not continue. Inspect your pilot chute.

Figure 3a and 3b:

Figure 3a and 3b:Continue S-folding the mesh into the right hand, and then continue to S-fold the pilot chute into your hand. The centreline of the pilot chute should stay elongated throughout the entire procedure.

Note: The larks head knot can be placed in a fold to reduce the bulk in the hand.

Figure 4

Figure 4: Extend the arm to check bridle length and routing. It is VERY IMPORTANT to ensure that the bridle exits over the hand, between the thumb and forefinger. Otherwise, the bridle could wrap around your arm and cause a hesitation or malfunction.

Section 10.2: Jumping with your pilot chute stowed

Figure 1

Figure 1: Grasp the pilot chute at the bridle attachment point and hang the pilot chute so that the centreline becomes completely elongated. With the other hand, grasp the mesh and slide your hand toward the pilot chute fabric, stopping at the seam between the mesh and the fabric. Flip the pilot chute so that it resembles a mushroom shape with the disk/handle at the top.

Figure 2

Figure 2: Whilst keeping this shape, use the other hand to S-fold the mesh into your hand, making approximately 6" – 8" folds. Make certain that the bridle attachment point faces towards the disc / handle. Continue S-folding the bridle on top of the mesh, leaving between 10"-12" of bridle at the bottom of the container.


Figure 3a and 3b:

Figure 3a and 3b: Bring the mushroom shaped fabric down over the S-folded mesh and bridle, keeping the disc / handle at the top. Work the air out of the fabric, keeping folds tidy. You should have a bulbous shape at the disc / handle. (The bridle attachment point and the start and finish of each S-fold should be incorporated in the disc / handle area. This makes for a good grip at pull time) The length of the pilot chute should be approximately the same length as the BOC pilot chute pocket.

Figure 4

Figure 4: Place the excess bridle in the pouch. This slack helps the pilot chute extend from the pocket without tension. Place the pilot chute in the pouch, keeping control of the disc / handle area. Tuck any excess bridle coming from the pouch under the bridle protector flap.

Section 11: SAFETY CHECKS - Before Every Jump!

Check Your Equipment. It is a wise decision to get in the habit of methodically checking your equipment before every jump. It is best to have a 2nd knowledgeable person to check the back of the container, but if there is not a 2nd person available, be certain to check the back of the system before gearing up. It is best to follow a pattern of some description. Either top to bottom or front to back.

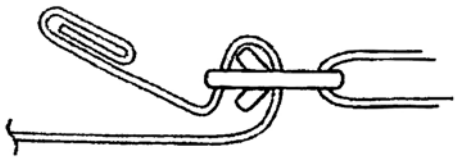
Starting at the front:
Check that the 3-Ring System is assembled correctly. Make certain that the white loop passes through the small ring, the two grommets that the yellow cable goes through the loop and is inserted into the channel provided on the riser. (see illustration on page 24)

Check the chest strap for proper threading and be certain that any excess webbing is stowed. (See illustration bellow for proper threading)

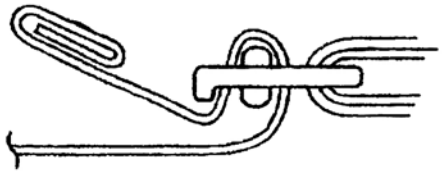
Be sure that the main lift webs are not twisted.

Check threading of leg straps and tuck away any excess webbing (see illustration below for proper threading)

CHEST STRAP



LEG STRAP



Moving to the back:

Medusa Container (Velcro)
Check the Shrivel Flap by tugging gently on the bridle at the bottom of the container. This should make the shrivel flap begin to peel away from the top of the container. Re-mate the Velcro. Only on low jumps do you want to prime the Velcro. Do this by running your finger between the two layers of Velcro on each side of the container.

Check the routing of the bridle. Be certain it goes directly to the hand (for hand held) or directly into the bridle protection flap and into the BOC (for going stowed) without passing through or around anything else.

Be certain that there is nothing to snag or interfere with the bridle or pilot chute during deployment (i.e. clothing, protective gear such as elbow or knee pads etc.)

Moving to the back:

Gargoyle Twin (Dual-Pin)

Check under the pin protector flap. Make certain that the pins are set properly. Generally his would mean that approximately $^{3}/_{4}$" of the pins are through the loops.

Ensure that there is about 2" of slack in the bridle between the top pin and the canopy. If you will be taking a terminal delay, you can tuck this excess under the side flap, but be certain that the proper slack is there during packing.

Check to be certain that the pins will slide with adequate force. They must be able to move freely.

Check the routing of the bridle. Be certain that it goes directly into the bridle protection flap and into the BOC (for going stowed) without passing through or around anything else. Additional care should be taken when using hand held deployment methods with a pin-closed container. It is much easier to dislodge a pin with a snatch of the bridle, than to peel off an entire shrivel flap. To help avoid this, tuck an extra 2 or 3 inches of bridle than normal into the bridle protection flap and take extra care when extending the arm to check bridle length.

Be certain that there is nothing to snag or interfere with the bridle or pilot chute during deployment (i.e. clothing, protective gear such as elbow or knee pads etc.)

Your Leap of Faith: Whenever we make a parachute jump, we rely on a number of things to get us safely to the next jump. One of which is our equipment. By taking the time to perform these safety checks before each and every jump, we are helping to increase our odds on that particular jump. On the other hand, be sure to understand and rehearse emergency procedures before every jump as well. Emergencies may include but are not limited to unstable exits, line overs, line twists, off heading openings, object strikes, loss of control toggles (when using line mod.) and many more. (Step right up and get your "Big Grab" toggles)

Every site is different and offers its own set of variables. Each jump must be assessed according to what the object is, its launch point, wind speed and direction, elevation above MSL and the landing area. These are just to name a few. Time and experience help all of us make more informed decisions. Be sure to get qualified, direct instruction before participating in any BASE jumping activity.

Section 12: Inspecting and Maintaining your Equipment

Your equipment will last longer, look better and function correctly if it is inspected on a regular basis and maintained accordingly. Generally, your gear should need very little maintenance unless it is subjected to unusual conditions. Let's face it though; in BASE jumping, we can be a little rough on our equipment, so it is a good idea to go over it thoroughly after every jump. This will detect the obvious but it is important to perform an intensive planned inspection from time to time. You can gauge this by how often you jump and the types of jumps that you do, performance of the equipment, openings, landings, etc. You should perform this type of inspection at least every 10 jumps. Remember BASE jumping is a lot more demanding on our equipment than skydiving is.

There are several things that can damage a parachute system. You must avoid exposure to acids, chemicals, excessive heat, sharp objects, water, prolonged sunlight or anything that may damage the structural integrity of the system. Also remember that this is a single parachute system, so it should be inspected to the airworthiness of a reserve system, not a main.

Section 12.1: Canopy Check List:

- Lines (4 riser groups)
- 2 Sets of Control Lines (Cat's eyes)
- Bartacks
- Line Attachment Tabs
- 1-7 Cells – Bottom
- 1-7 Cells – Inside and crossports
- 1-7 Cells – Top surface
- Bridle Attachment Point (top, bottom and internal)
- Stabilizers
- Slider Stitching
- Slider Fabric and Tapes
- Slider Grommets
- Tail Pocket Tabs and Velcro

Lower control lines do wear out due to slider wear. Brake settings wear out as well and wear out quicker with no slider deployments. Inspect them on a regular basis and replace them when they show signs of wear. Be sure to keep the slider grommets free from burs and sharp or rough edges. This can cause damage to the lines.

The fabric that the canopy is made of is very durable, but it must be inspected thoroughly as it is not indestructible. It is very important to inspect the entire canopy. Inspect the external portion of the canopy but be sure to crawl inside of the cells to inspect the internal portion of the canopy for structural integrity. Any hole that is larger than $^1/_4$ of an inch or that is within 10 inches of a line attachment or the bridle attachment point should be repaired before putting it back into service.

It is advised to have a qualified rigger to make repairs. Patches should be made in accordance with parachute industry standards. Major repairs should be returned to Morpheus Technologies or given to a master Rigger for repair. A major repair is one that gets into any seam, reinforcement tape or line attachment. Or any repair that if done incorrectly could affect the flight characteristics of the canopy. Do not wash any canopy. In the event that the canopy is subjected to salt water rinse it thoroughly with fresh water and dry it away from direct sunlight. Do not pack or jump a wet parachute.

Section12.2: Harness Check List:

- Webbing and Stitching
- Hardware
- Cutaway Housings
- Cutaway handle and cable

Inspect your equipment before every pack job, but be sure to thoroughly inspect it at least every 10 jumps. Check all stitching on the harness, including under the ring covers. Look for any broken stitches and / or fraying of the webbing.

Insect the hardware on your harness for any damage (burrs, rough edges) Be sure that the cutaway housing is in tact and free of obstructions.

Inspect the yellow cutaway cable and be certain that it is free of kinks and periodically clean it with a paper towel and a food-grade silicone spray. This keeps it moving freely through the housing for ease of cutting your canopy away. (after landing only) Check the cutaway handle Velcro and replace if worn.

Section12.3: Container Check List:

- Container flaps and stiffeners
- Stitching
- Flap Velcro (Medusa)
- Flap Grommets (Gargoyle)
- BOC spandex

Inspect the flaps (including riser covers) on your container and be certain that none of the stiffeners have become cracked or broken. Go over the stitching on your container, looking for broken stitches or wear on the container.

If you own a Velcro container, keep Velcro well maintained and replace when beginning to show signs of wear. A shrivel flap has lots of Velcro and you can expect to replace it about every 75 jumps. Inspect the bridle and check for wear at both ends.

If you own a pin-closed container, look for damage or wear to the grommets and change any frayed closing loops. Do not wait for a closing loop to fail. Replace with Type 2A Nylon. (Remember, closing loops should be 3/4 ") Inspect the bridle and check for wear on both ends and check the curved pin's tape and stitching for wear.

The BOC Spandex on a container gets lots of use if you jump with a stowed pilot chute. Replace it when it becomes worn. It can be very dangerous when it begins to wear out as it could cause a premature deployment.

Section 12.4: Risers Check List:

- Webbing
- Three-ring Assembly
- White loop at three-ring
- Link attachments
- Guide ring webbing and bartacks
- Velcro and elastic

Inspect your risers closely. Check webbing for any fraying or broken stitching.

Check for proper routing of three-ring assembly (page 24). Manoeuvre the rings of the three-rings on occasion to make certain they are moving freely. Inspect the white Three-ring loop. This is a highly critical point. If there is any damage or wear, it must be replaced before the next jump.

Section 12.5: Connector Links Checklist:

Make certain to inspect the #5 connector links at the risers. Be sure that they are tight, but do not over tighten them as this can cause stripping or cracking of the link. This could cause failure. When placing them on the risers, finger-tighten then and then tighten 1/4 turn with a 9mm wrench.

Inspect the slider bumpers (covers) and be sure that they cover the links. Replace them if they are cracked or broken. They protect the slider grommets from contact with the links when the slider comes down during deployment.

Section 12.6: Toggles Check List

- Assembly
- Velcro

Be certain that the toggles are assembled to the control lines correctly (Refer to Section 9). Failure to ensure this could result in loss of a toggle.

The pile Velcro on your toggle will wear out with use over time. This Velcro should be replaced after about seventy-five uses or before if it becomes too worn to create a good bite.

If any other parts of the toggle become damaged or worn, it should be repaired or replaced.

Section 12.7: Pilot Chute Check List:

- Bridle Attachment
- Pilot Chute Mesh
- Zero Porosity
- Handle

Pilot chutes tend to take a lot of abuse. Although the pilot chute itself can be pretty low maintenance component, it must be inspected regularly as it is the first thing out during deployment and the last thing in when packing. They can sometimes get dragged along the ground after landing or get snagged on bushes or limbs. Although we use Zero-P fabric and it is very durable, it is still subject to tears and holes if abused. The same applies to the high-drag large mesh.

Inspect the load tapes and make certain that all the stitching is in tact. Be certain to inspect all bartacks. Pay special attention to the bartack that connects the centreline to the apex of the pilot chute.

Inspect the mesh and the zero-p fabric for any holes or tears and replace the pilot chute if you find any.

If the pilot chute has a handle, the bartacks that secure the handle must be in good condition.

Section 12.8: Bridle Check List:

- End loops
- Pins

Be certain to inspect the loops on each end of the bridle. Check for any wear or loose or broken stitching.

If you own a pin-closed container, check the stitching on the webbing that attaches the curved pins to the bridle. If it becomes damaged in any way, be sure to have it repaired. Make sure that the pins are in good condition and free of any damage that could interfere with them being extracted at deployment time.

Appendix A

Contact details

Morpheus Technologies
5107 Lantana Street
Zephyrhills, FL 33542

(813) 780-8961

(813) 788-7072 fax

Robert@baserigs.com
kathy@baserigs.com

http://www.BaseRigs.com

Morpheus Technologies are proud to use the following equipment:

Atair aerodynamics

http://www.atair.si/

http://www.Phoenix-Fly.com/

Appendix B

Reference Chart for height, delay, pilot chute and slider*

Height	Delay	46"	42"	38"	36"	34"	32"	PC Location	Slider
200	0<1	Yes	No	No	No	No	No	SL or PCA	No
300	0-1	Yes	No	No	No	No	No	Hand	No
400	1-2	Yes	No	No	No	No	No	Hand	No
500	2-3	Yes	Yes	No	No	No	No	Hand	No
600	2-3	Yes	Yes	No	No	No	No	Hand/ Stowed	Mesh
700	3-4	No	Yes	Yes	No	No	No	Hand/ Stowed	Mesh
800	4-5	No	Yes	Yes	No	No	No	Hand/ Stowed	Mesh
900	4-6	No	No	Yes	Yes	No	No	Stowed	Mesh
1100	6-7	No	No	No	Yes	No	No	Stowed	Mesh
1500	7-9	No	No	No	Yes	Yes	Yes	Stowed	Mesh
2000	9+	No	No	No	No	Yes	Yes	Stowed	Mesh

Note: Use of sail is **NOT** recommended for BASE jumping due to the inconsistent opening speed and unreliable heading performance.

***** This chart is to be used as a reference only. It is wise to consider all of the factors involved in a particular jump when choosing deployment options. The object itself or the landing area may very well play a part in your choice of delay and equipment. When in doubt, be conservative.

Appendix C

Reference Chart For Freefall Distance

Freefall Delay	Distance Fallen	Speed
1 second =	16 ft. =	22 mph
2 seconds =	63 ft. =	42 mph
3 seconds =	138 ft. =	61 mph
4 seconds =	242 ft. =	72 mph
5 seconds =	365 ft. =	87 mph
6 seconds =	500 ft. =	96 mph
7 seconds =	650 ft. =	103 mph
8 seconds =	808 ft. =	107 mph
9 seconds =	971 ft. =	111 mph
10 seconds =	1138 ft. =	114 mph

* This chart is to be used as a reference only. These numbers can be greatly affected by variables that are specific to the environment in which you are jumping. Do not take these speeds and distances as pure fact when considering your delay.

Appendix D

Troll DW Canopy Specifications

Model	Troll 205	Troll 225	Troll 245	Troll 265	Troll 285	Troll 305
Number of Cells	7	7	7	7	7	7
Surface area ft^2	205	225	245	265	285	305
Span ft.	21.5	22.5	23.5	24.6	25.6	26.2
Chord ft.	10.2	10.7	11.2	11.7	12.1	12.5
Aspect Ratio	2.1	2.1	2.1	2.1	2.1	2.1
Pack Volume in^3	465	492	534	580	638	698
Canopy Weight (lbs.)	7.1	8.4	9	9.6	10.2	11.2
Average Body Weight lbs	114	135	157	180	202	225
Average Body Weight kg	51	61	71	82	92	102

Appendix E

Container / Canopy Compatibility

Container / Troll	205	225	245	265	285	305
Medusa	M-1	M-2	M-3	M-4	M-5	M-6
Gargoyle Twin	GT-1	GT-2	GT-3	GT-4	GT-5	GT-6
WS X-treme	WSX-1	WSX-2	WSX-3	-	-	-

Appendix F

"Big Grab" Toggles

In lieu of incidents that can and have occurred involving fumbling for toggles after deployment, we felt a need to address the situation. Morpheus Technologies offers Big Grabs as standard with every container that we sell. They can also be purchased separately for $30.00.

Big Grab toggles are made of Type 4 webbing and come standard in Fluorescent Orange. They are lightly stiffened with Lolon coated cable to give the loop shape. This makes them very easy to see and to grab upon deployment, yet they do not get in the way when reaching for rear risers first. It is important to be able to grab your toggles without fumbling when a quick response is needed.

They are easy to pack into the container. Just lay the risers in the tray as normal and have the Big Grabs rest in the tray facing one another. They will not interfere with your packjob.

Figure 1: Big Grab Toggles

End

Troll DW

Canopy User Manual

Version 1.0 – May 2005

Disclaimer:

The following information must be read and understood before any use of this equipment.

The user knows the risks of skydiving and BASE jumping and accepts that:

Skydiving and BASE jumping cause deaths and serious injuries. Many of these deaths and injuries can be attributed to equipment malfunctions. Skydiving and BASE jumping equipment can fail, even if the user takes all possible precautions.

Failure to open the main or reserve parachute (or to follow emergency procedures) at a safe altitude, and/or equipment failures can result in severe injury or death.

It is the user's responsibility to:

- Receive proper training before any use of all skydiving and BASE equipment.
- Be extremely careful and cautious.
- Read and understand all owner's and operations manuals for all skydiving and BASE equipment.
- Check all skydiving and BASE equipment and replace any defective or worn component prior to use.
- Review emergency procedures before each use of this and all skydiving and BASE equipment.
- Check equipment warnings - do not exceed equipment limitations.
- Never violate the training and experience requirements for the specific equipment in use.

Because of the unavoidable dangers involved in the use of this and all parachute equipment, Atair (including, but not limited to, all owners, officers, staff and employees) makes no warranties of any kind, expressed or implied. It is sold with all faults and without any warranty of fitness for any purpose. By using this equipment or allowing it to be used by others, owner/buyer waives any liability of Atair for personal injuries, death or damages from such use. Any promises or representations inconsistent with, or in addition to this statement of warranty are not authorized by Atair and shall be not binding.

Skydiving and BASE jumping are high-risk activities which may cause or result in serious injury or death.

Sections:		Pages:
1.	**How to use this manual**	**63**
2.	**Introducing Atair**	**64**
3.	**Features of your Troll DW canopy**	**65 - 66**
4.	**Recommended sizing & wing loading**	**67**
5.	**Setting up your Troll DW canopy**	**68**
6.	**Recommended drills for first flight**	**69**
7.	**Packing your Troll DW Canopy**	**70 - 71**
	7.1: Packing with the Tail Gate, slider off	**72 - 73**
	7.2: Packing with the slider	**74 - 75**
	7.3: Packing continued	**75 - 77**
	7.4: Packing tips for comfortable openings	**77 - 78**
8.	**Toggle assembly**	**79**
9.	**Inspecting and maintaining your equipment**	**80 – 81**

Appendix A: Contact Info

Dear Valued Customer,

We'd like to thank you for purchasing a new Atair Canopy. We're confident you'll be pleased with it in every way and that you'll enjoy how it opens, flies and lands.

We ask you and your rigger to carefully inspect your new canopy to completely familiarise yourself with its features and the quality workmanship. Should you find anything that does not seem right or if you have any questions please don't hesitate to contact us: stane@basetroll.com

Thank you again for selecting an Atair canopy. With proper care it should last many years and hundreds of jumps.

Blue Skies!

Stane Krajnc
The Atair Canopies Team

Troll DW

In memory of **D**wain **W**eston. Jan 31st 1973 - October 5th 2003

Dwain Weston, changed the face of modern BASE jumping. He took the sport to a new level, leaving it much richer than when he found it. Dwain is remembered for his incredible aerial skills but his contribution, achievements and passion for BASE jumping will live on in all of us.

Photo by: Yuri

Dwain was the first to spot the potential of the original prototype Troll canopy during the Petronas tower event in Malaysia, he approached Atair and asked to try the canopy. Dwain performed many jumps with the canopy from various objects and provided Atair with invaluable input on how to improve the canopy.

Dwain spent much time with Stane, the owner of Atair, discussing the optimum characteristics of BASE canopies and the desired features he would like to see in future canopies. These discussions were instrumental in the design of the Troll DW canopy.

Section 1: How to use this manual

We know you are excited to receive your new canopy and will most likely be packing it now as you read this manual.

But please take time to read this manual completely, regardless of your experience level!

You will learn about:

How to assemble, pack and safely use your : Troll DW
The great new features of your :
How to get the most out of your :
How to take care of your :

WARNING

ATAIR TROLL DW CANOPY - USER MANUAL

This manual is **not** a course of instruction on how to make a parachute jump, nor does it contain regulations that govern sport parachuting and related activities.

Section 2: Introducing Atair

www.AtairCanopies.com or www.BaseTroll.com

Atair was founded in 1992 by Stane Krajnc and his wife Magdalena in Slovenia. With a strong background in paragliding design, Atair was formed to supply the paragliding industry with reserve canopies. With a strong passion for both paragliding and skydiving, Atair naturally dedicated their resources to developing new technological advances in Skydiving and BASE canopies. To date Atair has manufactured over 12,000 rounds and several thousand skydiving and BASE canopies.

In the past, Atair canopies have been sold through private labelling (Alpha, Ace, Viper, Impulse, Space, etc.). Now all of the Atair products are available directly from Atair.

Stane Krajnc, the owner of Atair, has been involved in air sports for the past 30 years. In 1973 Stane designed, constructed and flew his own hang glider. He has now accumulated over thousands of hours on hang gliders & paragliders, 700 skydives and over 300 BASE jumps.

Atair does not only make canopies for skydiving and BASE jumping, recent special projects have included:

- Specialised large canopies for cargo applications,
- Drag chute for speed ski world record,
- Special low glide ratio canopy for a cave BASE jump.

Section 3: Features of your Troll DW Canopy

Atair is proud to introduce the Troll DW canopy.

The Troll DW is a low aspect ratio 7-cell canopy that is constructed of the highest quality materials and is heavily reinforced in crucial high load areas such as bridle and line attachment points. This enables it to withstand the heavy demands of BASE-jumping. The Troll's unique aerofoil has a specially shaped upper surface that creates uniform skin tension and prevents deformation. This makes for a more efficient wing with less drag.

Mission of the Troll DW Canopy

A Canopy that has:

- Good on-heading performance
- Consistent deployment altitude and inflation time
- Excellent openings (slider up and down)
- An excellent speed range, superior glide in full flight whilst stable and controllable in steep deep brake flight
- Good flare power from full flight and also from deep brakes
- Performs flat turns efficiently without diving.

Features of Troll DW

- New wing design with thicker airfoil section with improved performance at low air speed. The airfoil provides more lift at low air speed giving better performance when conducting deep brake approaches.

- Increased material tension on the leading edge, thanks to specially shaped top skin, further reducing drag and improving performance.

- Triple cross-porting allows excellent pressurization in both slider-up and slider-down configurations.

- Load-bearing seams have chord-wise reinforcing at the line attachment points and the lower surface has span–wise reinforcement in all high stress areas.

- The Mono Directional Valve technology (or MDV) system has been redesigned, incorporating a fifth air in-take in the center, the surface area of the vents is the same with each vent made smaller. This redesigned version of the MDV has even better inflation characteristics in terms of symmetrical inflation and inflation times.

MDV Technology

The MDV from Atair is unique in that it is a zero-p tubular shaped funnel that is about 6" long. They are attached to mesh inlets on ribs 2, 3, 4, 5 & 6.

This design allows the air to flow in during pressurization and also during deep brake decent, but the valve closes when air is rushing in from the nose or when you have back pressure coming from the tail. The Troll in its standard form is already a very stable canopy. The MDV Troll offers more stability by increasing the range in which you can fly in deep brakes before you actually reach the stall point. The canopy has a great flare in both its standard form and with the MDV technology.

The MDV inlets have increased the speed in which the canopy pressurizes slider up as well as slider down. Obviously, the true benefits to having inlets are for slider down jumps. When the canopy is jumped in the slider down configuration it offers single stage pressurization and slider up it opens a little faster than the standard Troll. If you are going to do many terminal jumps at a given time, it is advisable to switch sliders to a marquisette mesh (small hole mesh slider). This helps take the edge off of the opening without compromising consistency. Sail sliders have been known to cause opening/heading inconsistencies on BASE jumps and we don't advise their usage. MDV technology offers superior pressurization, giving the jumper control over the canopy immediately. Control = Confidence!

Standard with each Troll:

* Integrated Primary-Stow tail pocket for safer low-speed deployments
* Standard and custom deep brake settings
* High visibility "contrasting" steering lines
* Mesh Slider choice of large hole mesh / small hole mesh (Sail Slider available upon request. Advised for skydiving only)
* Tail Gate Reefing Device (BR)
* Optional black lines available.

Section 4: Recommended Sizing & Wing loading

The Troll DW is available in five precisely scaled sizes: (Note – Atair measures surface area by measuring the span x chord of the bottom skin. Stane Krajnc, the designer of the Troll, feels that this measurement best represents a flying canopy).

* 205 ft.2 = PIA spec 219
* 225 ft.2 = PIA spec 240
* 245 ft.2 = PIA spec 260
* 265 ft.2 = PIA spec 282
* 285 ft.2 = PIA spec 301
* 305 ft.2 = PIA spec 322

Model	Troll 205	Troll 225	Troll 245	Troll 265	Troll 285	Troll 305
Number of Cells	7	7	7	7	7	7
Surface area ft²	205	225	245	265	285	305
Span ft.	21.5	22.5	23.5	24.6	25.6	26.2
Chord ft.	10.2	10.7	11.2	11.7	12.1	12.5
Aspect Ratio	2.1	2.1	2.1	2.1	2.1	2.1
Pack Volume in³	465	492	534	580	638	698
Canopy Weight (lbs.)	7.1	8.4	9	9.6	10.2	11.2
Average Body Weight lbs	114	135	157	180	202	225
Average Body Weight kg	51	61	71	82	92	102

Section 5: Setting Up Your Troll DW Canopy

List of Components

- Canopy and lines
- Tail Gate (BR) and rubber bands 1 1/4“ by 1 3/16“ (3.2 cm by 0.5cm)
- #5 Stainless Steel Links
- Rubber Slider Bumpers
- Slider

Attaching to risers, checking continuity

Line & Riser Continuity

Left Rear Left Front Right Front Right Rear

Remember that each connector link has to show continuity from the lines to the canopy. Check each one for proper assembly.

Each of the links will have four cascading lines. The two control lines each cascade into five.

Once you have orientated the lines properly on the #5 links, inspect them. Finger-tighten all 4 connector links. Then apply a 1/8 turn with a 9mm wrench. Do not over tighten as this can strip or crack the link and cause it to fail. Slide the slider bumpers (covers) over the links.

Section 6: Recommended Drills for first flight

Atair **strongly recommends** you perform some skydives with your new canopy before using it in the BASE environment.

To do this we recommend packing your Troll DW into a large skydiving container (as used for student skydivers).

Perform a hop 'n pop from a suitable legal altitude (with clearance from the dropzone).

During the flight, try the following drills:

- Gradual flare to locate stall point
- Full flare to simulate landing
- Full stall and recovery by slowing and equally releasing brakes
- Flare from half brakes
- Flare from deep brakes
- Full toggle turns
- Elevation turns (in braked flight release one toggle slightly to turn)
- Half brake turns
- Deep brake turns
- Rear riser turns
- Front riser turns
- Check length of brake line between cats eye and toggle, are you getting a full flare when you bring your hands to waist level?
- Sharp 180º turn using alternate rear risers (simulating 180º off heading drill)

Remember to pay attention to your altitude and position relative to the dropzone.

Atair also advises you to tune your brake settings by making subsequent skydives on the canopy.

To make adjustments to the brake settings, mark the stall point on the brake lines at the level of the guide ring using a marker pen. Consult an experienced rigger when adjusting the position of the deep brake and normal brake setting position.

If the length of brake line between the brake setting and toggle is too long take a wrap of line around your hand and estimate how much the toggle attachment point should be shortened ; again consult an experienced rigger when adjusting the position of the toggle attachment.

Section 7: Packing your Troll DW Canopy

Before you begin this section, please read the entire manual. If there is any element that you don't understand, please contact us or a qualified rigger to help you with the assembly.

Ensure that you have correctly assembled the canopy onto the risers (see section 5) and that you have proper line continuity. Be certain to secure the container so that it does not move during the packing process. Make sure that the risers are even and remain even at all times.

The first packing method to be described is without slider or slider down. Make certain that the control lines go directly from the toggle to the outside of the canopy without passing through anything. Make sure the toggles are attached to the control line correctly (see section 8).

If the container you are using does not have a slider retainer you must use a suitable material to fix the slider in place, consult your local rigger if you have any doubts. The other alternative is to completely remove the slider by releasing each connector link in turn using a spanner: this is time consuming and there is a risk of re-connecting the lines in the incorrect manner.

Figure 1a

Figure 1b

Figure1a: To start of the pack job you should perform a PRO (Proper Ram-Air Orientation) pack job. Flake the canopy in a traditional pro pack manner. Before you bring the tail around, count the three nose cells on one side and bring the tail around behind them. In other words do not cocoon the tail around the nose. Leave the nose cells exposed.

Do the same on the other side, leaving the center cell to hang down in the middle. Gently place the canopy on the ground, keeping tension on the lines. The neater you place the canopy, the easier it will be to redress it once it's on the ground. Find the three nose cells on each side and tease them out gently. They should be resting neatly on top of one another, resembling figure 1b above.

Figure 2

Figure 2: Pick a side to start redressing. From the bottom stabiliser, reach in between the A and B lines and flake all of the fabric to the outside, keeping the lines orderly in the center. From the next stabilizer, reach between the B and C lines, flaking all of the fabric to the outside, keeping the lines orderly in the center. Now reach in between the C and D lines, flaking all of the fabric to the outside, keeping the lines orderly in the center.

Be certain to maintain tension on the lines by gently pulling the appropriate fabric from the top of the canopy during this process. Next, be sure to clear the fabric between the D lines and the control lines. This is done by placing your hand between the D lines and the control lines and pulling away from the container. This will remove the slack in the fabric between these two points. Repeat all of this on the other side and redress by lifting the tail up so that the lines are exposed. From either side, you can ensure that the fabric is all pulled away from the container and that the stabilizers are clear of the lines as well. During this process, be sure to keep tension on the lines. Ensure that the pack job is symmetrical by looking at the line attachment points on each side and making certain they are even.

To flake the tail, grasp the small portion of stabilizer between the D and tail on one side and pull the fabric outward keeping the seam in the center and going straight up and down. This should place the outer upper control line to the center. Continue by stacking all of the seam to the tail in the center, pulling the fabric out and away from the center. Use the seams as a guide. These will be half-cell folds. Continue all the way across and include the center cell tail pocket. Remember, not every fold will incorporate a control line. Do this on both sides until all seams are on top of one another and in the center. Make certain that the canopy is completely symmetrical at this time.

Section 7.1: Tail Gate Installation
(for packing with a slider, see next section)

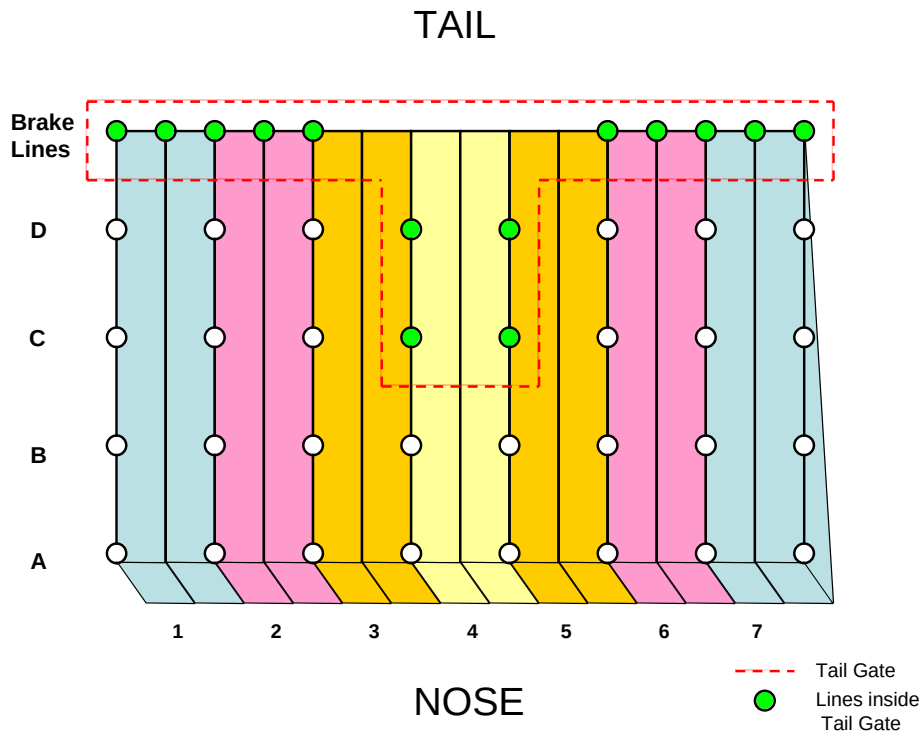


Figure 3: Diagram showing lines included in Tail Gate

The Tale Gate (BR) reefing device is used to help reduce brake line malfunctions during no slider jumps. The Tail Gate helps keep the lines in the center of the canopy; the lines included in the Tail Gate are shown in the diagram above.

Refer to figures 3a and 3b. The slot for the Tail Gate is on one of the center C lines approximately 4" down from line attachment tab. Find this slot and place the Tail Gate into it. When utilizing the Tail Gate, you should use a rubber band $^{1}/_{4}$ inches by 1 $^{3}/_{16}$ inch (3.2 cm by 0.5cm). Some people like to lark's head the rubber band to the Tail Gate. Using the lark's head is not recommended for extreme low-speed deployments as it could cause a hang up in release of the Tail Gate.

Figure 3a

Figure 3b

Ensure that there are no twists in the risers. Grasp the inner most line on both rear riser links and then grasp the two lower control lines. Walk these four lines toward the canopy. These four lines will cascade into 12 (or 14) lines. These are the 12 (or 14) lines that will be placed into the Tail Gate. Make certain that there are no other lines caught up in these 12 (or 14) lines. The illustration represents the lines as viewed from the bottom surface of the canopy. Be certain that only the lines that are encompassed in the 'T' are inside the Tail Gate.

The C line that the Tail Gate is attached to MUST be inside the Tail Gate, so as not to load the insert piece. Place all 12 (or 14) lines into the Tail Gate. Close the Tail Gate with two to three wraps of the rubber band, as shown in figure 3a and 3b. Check to be certain that there are 12 (or 14) lines in the Tail Gate and that the Tail Gate C line is inside the Tail Gate. Go to section 7.3 to continue with the packing process.

Section 7.2: Packing with a Slider

DO NOT USE A TAIL GATE WHEN PACKING WITH A SLIDER. Ensure proper line continuity and be certain that the control lines go from the outside of the canopy through the slider grommet of the rear riser on its corresponding side. Then take the control line through the guide ring on the corresponding riser. Refer to section 8 to ensure proper control line routing and toggle assembly.

Figure 4a

Figure 4b

Follow the previous packing instructions up through figure 2. For slider placement, ensure proper line continuity, keeping the left and right separation with the front slider grommets closest to the canopy. The slider tape should be facing upward. Pull the slider so that the front grommets rest against the bottom of the stabilizers at the B line slider stops on both the left and right hand side. Gently lift the tape between the two rear grommets of the slider and pull up until the grommets are resting against the bottom of the stabilizers at the C line slider stops on both the left and right side.

The slider tape and fabric between the front and rear grommets should be placed between the B and C fold of the canopy. Be certain that this is done to the left and right side. This is basically quartering the slider. We don't stow our sliders. Go to section 7.3 to continue with your pack job.

Section 7.3: Packing Continued

Figure 5

For packing with a slider refer to section 7.2 and then return to this section.

Figure 5: Make certain that all the lines are to the center and that the canopy is symmetrical with the left side of the canopy to the left of the center and the right side of the canopy to the ride side of the center. There should be a nice channel down the center of the canopy. Locate the center cell Tail pocket and bring it down to the edge of the stabilizers. Grasp the tail fabric on each side and above it. While kneeling on the Tail Pocket, bring the bottom outer portion of one side of the tail back and expose the stacks of canopy. Fold the outside edge of the first two stacks inward towards the canopy. This should be done in one long fold. We don't utilize clamps, but if you like to use them, this is when you would want to secure this fold. Repeat this on the other side. Next, fold the outside edge of the bottom stack inward towards the canopy using the same technique as on the first two stacks. This fold should be beneath the fold of the first two stacks. Do the same on the other side.

Whilst kneeling on the canopy at the Tail Pocket, run your forearm at a 90˚ angle up the canopy from the Tail Pocket. Let your arm rest about half way up the canopy while you use the other hand to tuck small portions of the tail around the entire canopy. Having your arm across the width of the canopy helps ensure that you don't pull any lines away from the center of the canopy whilst wrapping/tucking the tail. Make the finished width of the fold even with the edges of the Tail Pocket. Do not cover the nose. Work the air out and count the nose cells on each side, making sure that you count three on the left and three on the right.

The center cell is underneath and will be accounted for when placing the canopy in the container. Lightly tuck these cells under the pack job, your canopy should now resemble Figure 5.


Figure 6a & 6b: Primary Stow

Figure 6: Once you have cocooned the canopy and made it the width of the Tail Pocket, release the tension from the container. Sit on the canopy facing the container. Open the Velcro closures on the Tail Pocket. Using the rubber band located between the Tail Pocket and the canopy, grasp approximately 6" of line below the rubber band. Place the bite of line in the rubber band and make a double stow, as shown in Figure 6a, be certain not to over wrap the lines with the rubber band. Next, tuck the primary stow between the canopy and the Tail Pocket, as shown in figure 6b.


Figure 7a & 7b: S-fold lines into Tail Pocket (Slider in "down" position)

Figure 7and 7b: Bring 8" or so of line toward the Tail Pocket, creating an S-fold and lay this bite in either upper corner of the Tail Pocket. Continue S-folding the lines back and forth across the Tail Pocket. Each S-fold will slightly overlap the one before it. Stow the lines to within 5" of the top of the risers. The lines MUST enter and exit between the two Velcro tabs at the bottom center of the Tail Pocket. This helps ensure that the Velcro does not actually need to open to complete line deployment. Close the Tail Pocket by mating the Velcro to its coordinating piece. Start at the corners and work the Velcro up the sides and across the bottom making certain no lines get caught in the Velcro. Be sure to mate the Velcro exactly.

Refer to your container manual for instructions on how to pack the canopy into the container to complete the pack job.

Section 7.4: Packing for comfortable openings

When jumping the Troll DW / MDV for terminal slider up jumps you can try to follow adjustments to your pack job to help make the openings more comfortable:

1. The most significant factor that affects your openings is freefall speed. If you deploy your canopy from a track you are much more likely to experience hard openings. If possible, return to a box position before deploying to help dissipate some of your horizontal speed prior to deploying (assuming the object offers safe altitude to do so).

2. Check the suitability of your pilot chute for the delay / canopy size. An over sized pilot chute can cause line dump and center cell stripping. If you have any questions please contact us.

3. Rolling the nose is also an option on large terminal objects which allow significant object separation.

Figure 1a

Figure 1b

3. (cont)The nose can be rolled once the canopy has been placed into the container and the first fold (at the top of the container) has been made.

   Carefully pull the 3 left nose cells away from the pack job and roll the load tapes towards the center cell a few times. This process is then repeated for the 3 right nose cells, as shown in figure 1a. The center cell is left straight in the middle of the pack job in-between the two "rolls" of nose cells. The number of rolls applied to nose must be the same for each side of the canopy and can be increased up to several rolls if necessary. Once both sides of the nose have been rolled, the pack job should resemble figure 1b.

4. Direct slider control can also help slow down terminal openings. This involves attaching a bungee to the canopy C-line attachment tape and using the bungee to stow the center of the slider mesh during packing. During deployment this bungee ensures the slider only starts descending once the canopy bottom skin is inflating.

   The bungee is larks headed to the C-line load tape. You should use a rubber band 1 and $^{1}/_{4}$ inches by 1 $^{3}/_{16}$ inch (3.2 cm by 0.5cm). To make the stow take the center of the slider and make a small fold in the mesh, wrap the bungee around this bite of material twice, as shown in figures 2a and 2b.

Figure 2a

Figure 2b

Section 8: Toggle Assembly

Figure 1

Figure 1: Pass the control line through the toggle's grommet from the Velcro side of the toggle.

Figure 2

Figure 2: Then thread the bottom of the toggle through the attachment loop, pulling the slack control line back through the grommet.

Figure 3

Figure 3: The assembled toggle should look like this.

Section 9: Inspecting and Maintaining your Equipment

Your equipment will last longer, look better and function correctly if it is inspected on a regular basis and maintained accordingly. Generally, your gear should need very little maintenance unless it is subjected to unusual conditions. Let's face it though, in BASE jumping, we can be a little rough on our equipment, so it is a good idea to go over it thoroughly after every jump. This will detect the obvious but it is important to perform an intensive planned inspection from time to time. You can gauge this by how often you jump and the types of jumps that you do, the performance of the equipment, openings, landings, etc. You should perform this type of inspection at least every 10 jumps. Remember BASE jumping is a lot more demanding on our equipment than skydiving is.

There are several things that can damage a parachute system. You must avoid exposure to acids, chemicals, excessive heat, sharp objects, water, prolonged sunlight or anything that may damage the structural integrity of the system. Also remember that this is a single parachute system, so it should be inspected to the airworthiness of a reserve system, not a main.

Canopy Check List:

- Lines (4 riser groups)
- 2 Sets of Control Lines (Cat's eyes)
- Bartacks
- Line Attachment Tabs
- 1-7 Cells – Bottom
- 1-7 Cells – Inside and cross-ports
- 1-7 Cells – Top surface
- Bridle Attachment Point (top, bottom and internal)
- Stabilizers
- Slider Stitching
- Slider Fabric and Tapes
- Slider Grommets
- Tail Pocket Tabs and Velcro

Lower control lines do wear out due to slider wear. Brake settings wear out as well and wear out quicker with no slider deployments. Inspect them on a regular basis and replace them when they show signs of wear. Be sure to keep the slider grommets free from burs and sharp or rough edges. This can cause damage to the lines.

The fabric that the canopy is made of is very durable, but it must be inspected thoroughly as it is not indestructible. It is very important to inspect the entire canopy. Inspect the external portion of the canopy but be sure to crawl inside of the cells to inspect the internal portion of the canopy for structural integrity.

Any hole that is larger than $^1/_4$ of an inch or that is within 10 inches of a line attachment or the bridle attachment point should be repaired before putting it back into service. It is advised to have a qualified rigger to make repairs. Patches should be made in accordance with parachute industry standards.

Major repairs should be returned to Atair or given to a master rigger for repair. A major repair is one that gets into any seam, reinforcement tape or line attachment, or any repair that, if done incorrectly could affect the flight characteristics of the canopy.

Do not wash any canopy. In the event that the canopy is subjected to salt water rinse it thoroughly with fresh water and dry it away from direct sunlight. Do not pack or jump a wet parachute.

Appendix A: Contact details

Atair Aerodynamics d.o.o
Stane Krajnc
Partizanska cesta 9,
4220 Skofja Loka,
Slovenia

Phone: + 386 451 265 65
Fax: + 386 451 265 60
Email: stane@basetroll.com
http://www.basetroll.com or http://www.ataircanopies.com

The Atair team are proud to be associated with:

Morpheus Technologies
North America Distributors of the Troll Canopy
5107 Lantana Street
Zephyrhills, FL 33542. USA
Phone : (813) 780-8961
Fax: (813) 788-7072
info@baserigs.com
http://www.BaseRigs.com

Phoenix-Fly
Ul. Platana 2
10434 Strmec
Phone: + 385 98 326 123
Fax: + 385 1 6346 964
info@phoenix-fly.com
http://www.Phoenix-Fly.com/

End

Gargoyle ws X-treme Medusa Troll DW

5107 Lantana Street
Zephyrhills, FL 33542

Tel: (813) 780-8961 Fax: (813) 788-7072

Email: info@baserigs.com

Published January 2006