

INSTALLATION INSTRUCTIONS
TULMAR 9G Net
P/N: 89100
Cargo Net User Manual

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REVISIONS REGISTER

Revision	Date	Description	Approved
A	2024-01-08	Initial Release	Vishal Dhanani

1. GENERAL DESCRIPTION

The series of Tulmar 9G cargo nets is designed and manufactured to aid 9G types of cargo aircraft resist dynamic loads.

Each of Tulmar's 9G cargo nets is individually serialized, inspected, and supplied with a certificate of conformance. Adherence to quality specifications, as defined by the customer and Tulmar's internal quality control measures, has been ensured before dispatching each 9G cargo net.

- Size of the net laid flat- 18-1/2' x 12-1/4' (Approx)
- Size of the net in installed state- 8' x 7' x 6' (Approx)
- Weight of the net with carabiners- 63 lbs
- Weight of the net without carabiners- 56.5 lbs

2. WARNINGS AND PRECAUTIONS

This section lists the warnings and precautions to undertake when installing and using the 9G Cargo Net.

- Contact with any sharp objects or edges could pull the rope strand out and may cut the fibers. Handle the net with care to make sure that net makes no contact with, or abrade against sharp objects or snags with pointed corners.
- If the visibility in the aircraft is poor, ensure the ceiling lights are on to avoid contacting sharp objects or edges.
- Unfold the net from the packaging box carefully to ensure the assembled straps don't get undone.
- Any point the net must not be exposed to heat source that can elevate temperature to more than 70°. Any rope exposed to $\geq 70^\circ$, regardless of duration of exposure, must be inspected for any burn marks or swelled up fibers.
- DO NOT step on the loose ropes or straps as it can be tangling and is also a trip hazard that may lead to serious injury. Also, stepping on the net may lead to the internal abrasion due to deposition of foreign particles into the fibers. The internal abrasion may cut the filaments and eventually make the net unairworthy.
- DO NOT pull ropes or straps too hard if they get caught with any object or become entangled. Sport the ropes / webbings carefully.
- DO NOT drag the net on the tarmac or ground as the abrasion can deteriorate the rope quality.
- Ensure carabiners, especially on lower sidewall attachments (Rope 1 to Rope 6), move freely without binding into each other. Spliced end of each rope must be looped through carabiner such that it sits along the major axis of a carabiner.

- Post installation checklist must be completed after the deployment of a net before every flight.
- DO NOT alter the net by whatsoever means by adding, removing or modifying net components unless approved by Tulmar.
- Avoid exposure to harsh chemicals such as alkalis, acids, organic compounds or oxidizing agents.
- Ensure the accumulative loads to be carried, irrespective of its nature, size, or packaging, doesn't exceed the organizational ultimate load limit indicated on label ID affixed on strap panel.
- Dynamic loading conditions such as shock loading, overloading, prolonged sustained loading may diminish the residual strength of the net. Avoid such loading conditions to maintain the integrity of the net.

Note: Shock loading is defined as sudden application of force at such a rate of speed that rope can react violently.

Overloading is defined as the condition when cargo load exceeds organizational ULL (ultimate load limit) by two or more times.

3. INSTALLATION INSTRUCTIONS

3.1. Preparations to install

The following instructions pertain to the installation of 9G Net before/after loading of bulk cargo or before loading LD3 containers in bulk cargo or containerized configuration of the aircraft respectively.

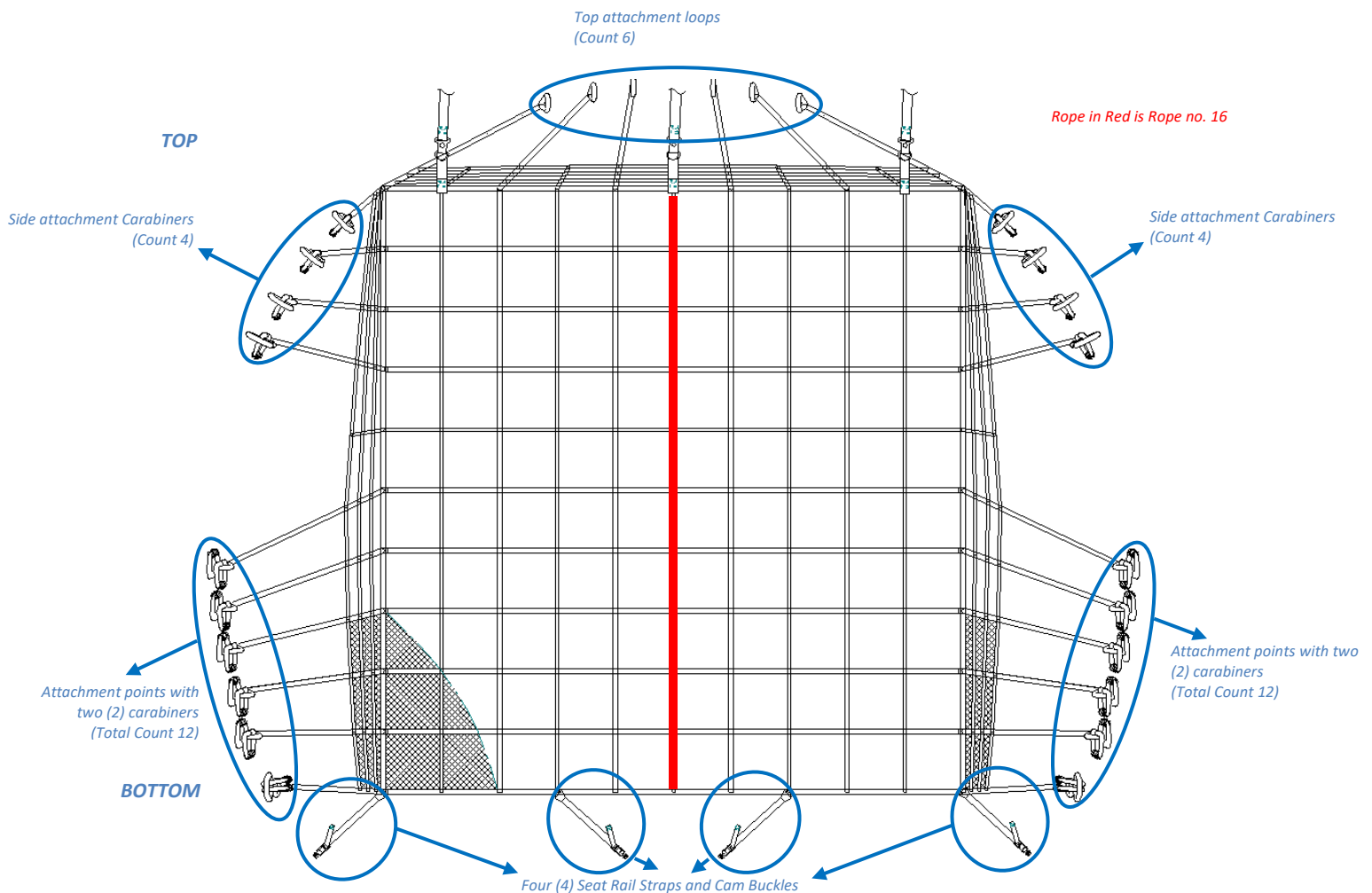


FIGURE 1
Net Parts Identification

- Carefully remove the new Tulmar 9G cargo net from its packaging to limit entangling.
- Lay the net flat on the ground, with the debris mesh facing up, and the bottom of the net toward the cargo rig.
- Both set of side ropes should be bundled at the loop end, hooked to a webbing snapped shut (figure 3).

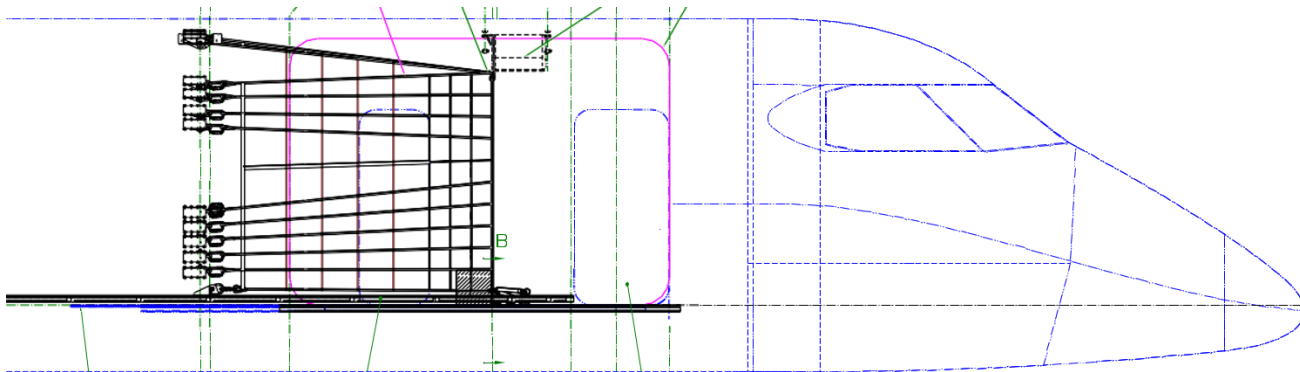


FIGURE 2
Net location onboard aircraft



FIGURE 3
Bundled side attachment loops

3.2. Installation

This section comprises step-by-step instructions to install the net for its initial setup, then deployment instructions are for loading/unloading the cargo in the aircraft.

1. Attach each of the **top** attachment loops to the cargo rig's attachment points by snapping the rope's loop to each of the rig's six (6) aircraft fittings by opening the bolt and lace through the eye splice.

Warning: rope's sleeved loop shall not catch in the threaded hole while screwing the bolt in and it moves freely on the bolt

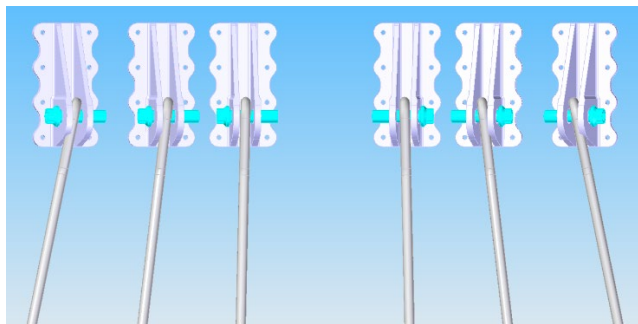


FIGURE 4
Rig to Net Attachment - Top

2. Once all top attachments are secure, ensure they are installed on the right attachment fitting and there are no tangles in the net.
3. Open the carabiner's kit and hook one carabiners to all ten (10) pear-shaped rings on each side of the rig as shown below.

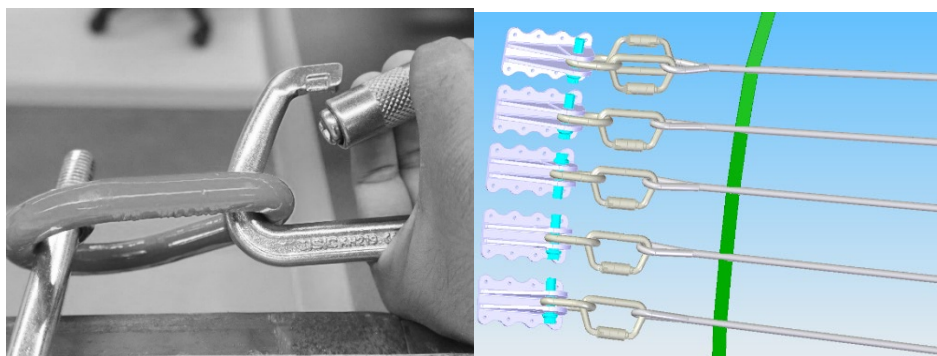


FIGURE 5
Rig to Net Attachment - Side

4. Add a second carabiner to lower six side attachment points, counting from the bottom, on each side (see Figure 1 for reference). Second carabiner is to be installed inverted from the first carabiner (See picture below). The two carabiners should have inverted gates but opened by pushing toward the pear ring.

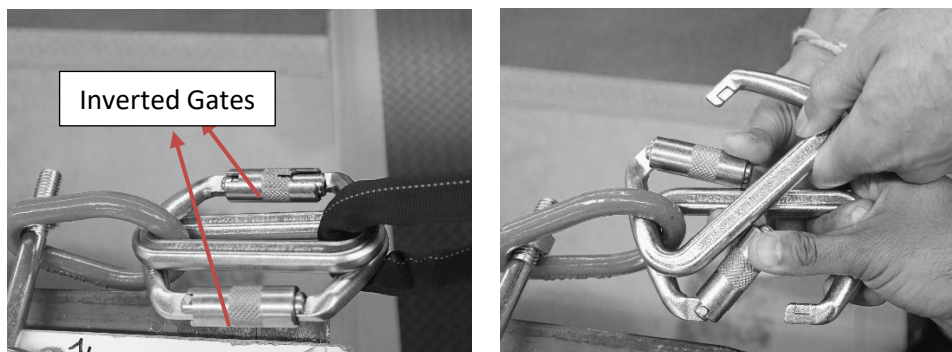


FIGURE 6
Installation of carabiners on pear-shaped rings

5. Complete the cargo net's initial installation as follows:

- 5.1. Install all five (5) stowage straps for tenting (you will only use three (3) of these prior to stowage), by removing them from their bag and hooking each on their respective anchor plate. To do so, hook the stud fitting with a D-ring on the anchor plate located aft (X 57) and the cam buckle with a single stud on anchor plate located forward (X 39). Look for the ID label on each ceiling strap (Kit in bag is ID no.89102-001).

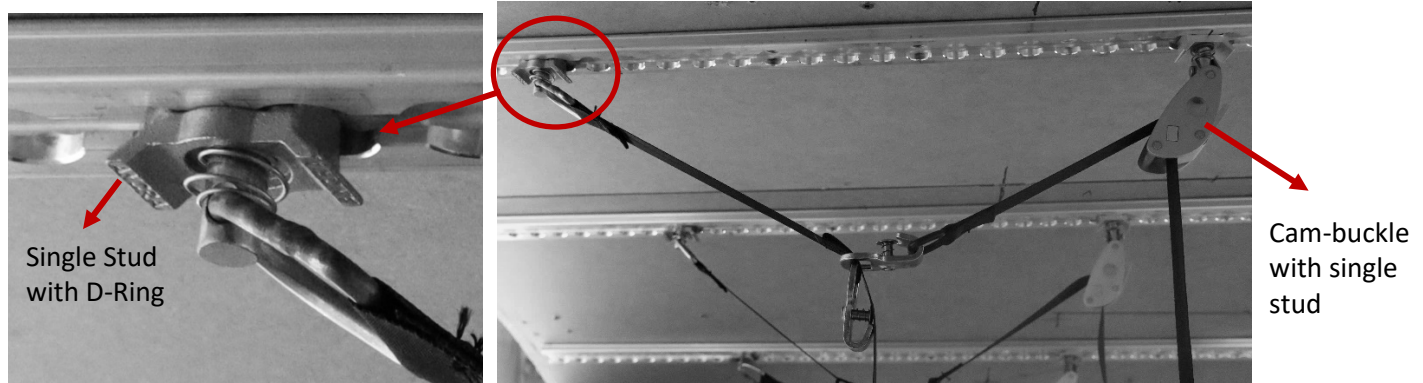


FIGURE 7
Ceiling Attachment

- 5.1.1. The strap ID no. 89102-004 is the central strap (to use with rope 16);
5.1.2. Both straps ID no. 89102-003 are on each side of the central strap (to use with rope 14 & 18);
5.1.3. Both straps ID no. 89102-002 are at each extremity (to use with rope 12 & 20).

REFER TO APPENDIX C FOR ROPE IDENTIFICATION



FIGURE 8
Ceiling Attachment Strap

- 5.2. Undo the webbing straps holding the side cords in a bundle. Clip the spliced eye of the rope attachment into the carabiners while making sure that the ropes are not crossed to each

other.

- 5.3. On ceiling straps 89102-002 & 89102-003, clip the sewn in snap hooks onto the D-rings which are sewn into strap loops attached to the net directly under it. Connect the D-rings on the cam buckle strap at the loose snap hook then pull it tight.

Sewn-in snap hook
Attached to D-ring strap
On the net

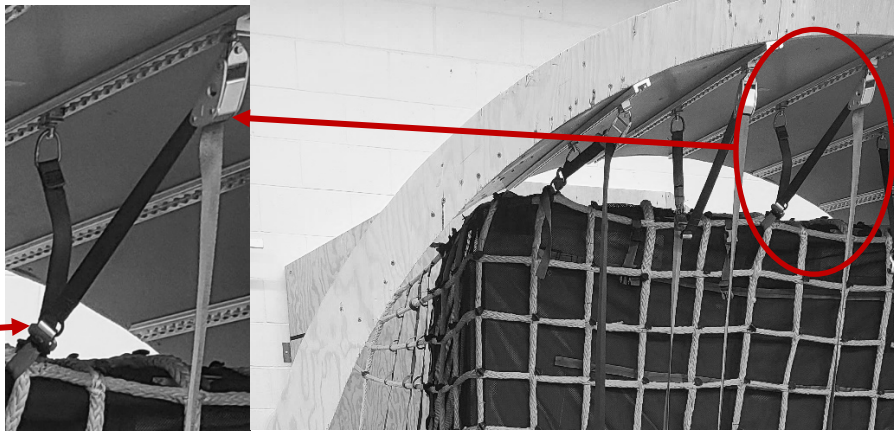


FIGURE 9

Initial Net Deployment

- 5.4. Install all four (4) seat rails straps and cam buckles at the bottom of the net, by inserting the base of the cam buckle into the rail while making sure that strap doesn't get twisted, same as for ceiling straps.
- 5.4.1. The ID on the strap label is 89103-002.
- 5.5. Clip the D-rings of cam buckle ceiling straps 89103-002 onto the snap hook to prevent them from swinging around (for visual reference, see page 12 in the deployment section).
6. Complete the visual check using the checklist in Appendix A. Use Appendix B for reference on potential damage types.

END OF INITIAL NET INSTALLATION / FIRST DEPLOYMENT

4. STOWAGE INSTRUCTIONS

This section comprises step-by-step instructions for stowage of the net to ensure smooth movement of Bulk Cargo or LD3 containers- in and out of aircraft.



FIGURE 10

Side cords bundling

1. Unhook the ten (10) attachment cords on each side.
2. Weave the webbing strap fastened to the bottom rope (the eye-splice of rope 1 on each side) through all loops on one side and close the snap to secure the bundle.
3. Repeat for the other side.

NOTE: Skip steps 1 through 3 above if this is the post-installation stowage, as side ropes should already be bundled.

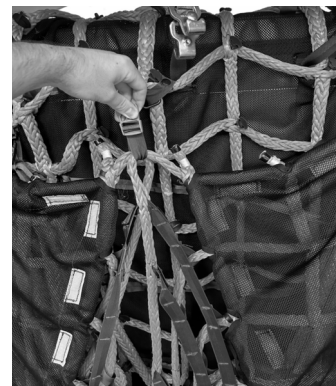


4. Join the male portion of the side release buckle that is part of the bundled side cords to the female portion of the side release buckle on the net.

CAUTION: Ensure the red webbing loop does not get undone during this step. If it does, close the snap back.



5. Unclip all the cam buckles attached to the seat rails.



6. Collect the two sides of the netting and cross them over each other. Loop the center buckle through both sides (topmost square directly outside the mesh-covered area) and clip it.

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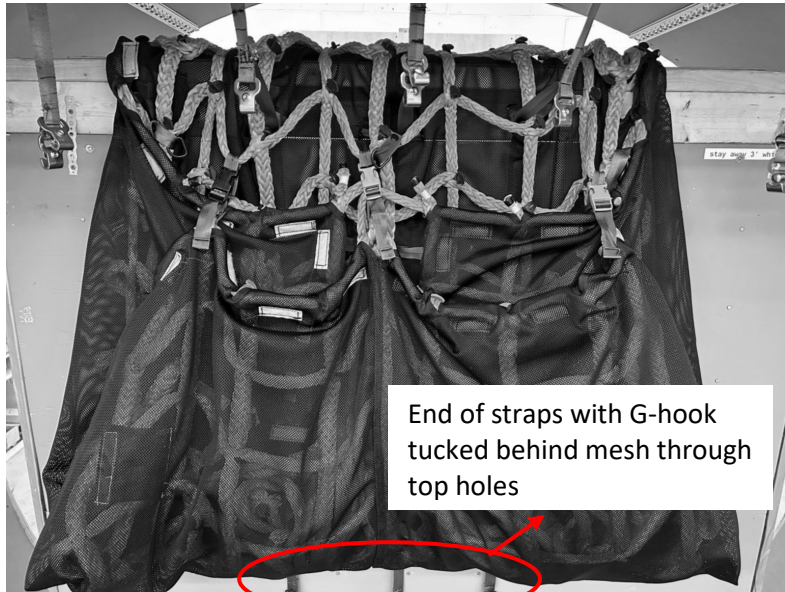
7. Locate the two green straps sewn with double D-rings on the right-side edge of the mesh.



8. Attach the green straps and pull them tight.



9. Complete folding the side rope netting as shown above.



10. Fold the bottom of the net up. Loop the clips through the three corresponding red loops on the bottom of the net and clip the buckles back up. Also, tuck the end of straps ID 89102-003 and 89102-004 with the G-hook behind the mesh through corresponding holes, located on top of the net.



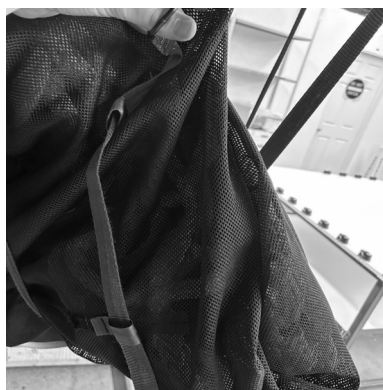
11. Fully loosen all five cam webbing straps. Hook the long end of straps 89102-003 & 89102-004 onto the corresponding G-hooks hanging behind the net.



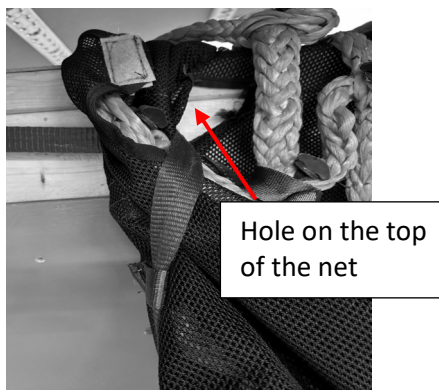
12. Pull the straps up through the top holes in the mesh.



13. Detach the D-ring strap from the G-hook and clip the D-rings onto the sewn-in snap hooks.



14. For both straps 89102-002, take the cam strap's D-ring and thread it through the sewn webbing loops on the back of the mesh from bottom to top.



15. Loop the D-ring through the mesh hole, then pull it downwards and outwards.



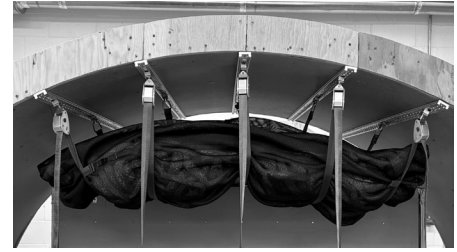
16. Clip the D-ring to the sewn-in snap hook. Loop the side straps under the bundled net so it supports the net.

17. Tighten the straps in the following steps:

17.1 Tighten center strap 89102-004 halfway.



17.2 Tighten corner straps 89102-002 to match center strap 89102-004.



17.3 Tighten in between straps 89102-003 so they match the others.



17.4 Tighten the center strap 89102-004 as far as it will go.



17.5 Tighten both corner straps 89102-002 as far as they will go.



17.6 Position straps 89102-003 (these are between the corner straps and central strap) out around the baggiest parts of the package, then tighten as much as possible.



17.7 Tighten the center strap 89102-004 as much as possible.



17.8 Tighten both corner straps 89102-002 as much as possible (they should have further to go).



17.9 Tighten between straps 89102-003 as much as possible. Tuck loose straps and loose mesh away as needed.

Note: The cam webbing may twist or jam if cinched at an angle. If this happens, loosen the strap until the jam comes out. Re-cinch the webbing keeping one hand on the cam buckle to maintain a straight angle to prevent further twisting of the webbing.



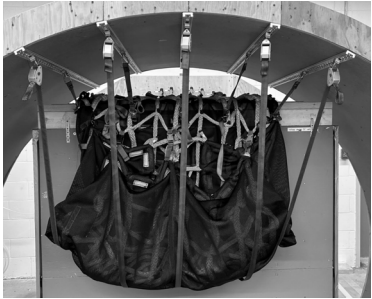
FIGURE 11
Fully stowed cargo net

Note: If stowed net looks too bulgy on one side, loosen each cam-buckle strap one by one until the folded net drops about 5-6 inches from the ceiling. Massage the net lightly to reduce any bulky area and go back to step 17.3 to 17.9 to re-adjust as necessary.

5. DEPLOYMENT INSTRUCTIONS

The deployment of the net is carried out after cargo is loaded/unloaded in order to prepare the aircraft for the next flight.

Deployment prior to use is as follow:



1. Loosen all the straps as much as possible.



2. Unclip all five D-rings (on the cam straps) from the snap hooks and loop them back through the mesh so they come away from the net.



3. Straps 89102-002 need to be unthreaded from the webbing loops. Tuck the strap ends with the G-hook behind the mesh, passing through top holes in the mesh.



4. Unclip the three side release buckles and unloop them from everything they were holding up.

CAUTION: Ensure the red webbing loop does not become undone during this step.

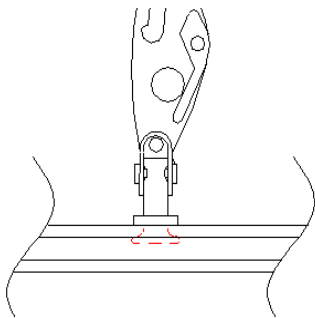
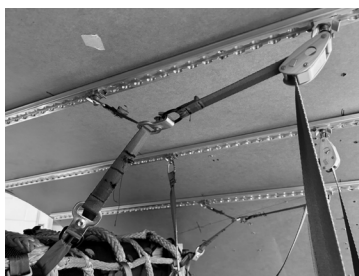
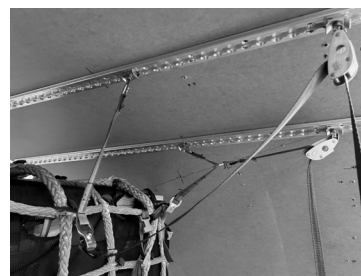


5. Undo the double D-rings to let the net hang loose.



6. Undo the webbing straps (fastened on eye splice of rope 1) holding the side cords in a bundle. Attach each loop to a carabiner (2 carabiners for rope 1-6).

CAUTION: Ensure all carabiners gates are oriented correctly, as explained in step 4 of section 3.2.



7. Clip the cam buckles of the webbing floor straps assemblies on the seat rails.
8. On the corner straps 89102-002 & the center strap 89102-004, clip the sewn in snap hooks onto the D-rings which are sewn into the strap-loops attached to the net, directly under it. Connect the D-rings on the cam buckle strap to the floating snap hook and pull it tight.
9. Clip the D-rings of the cam buckle straps 89102-003 onto the snap hook to prevent them from swinging around

10. Refer to Appendix A for visual net installation checklist.



FIGURE 12
Fully Installed and Deployed Cargo Net

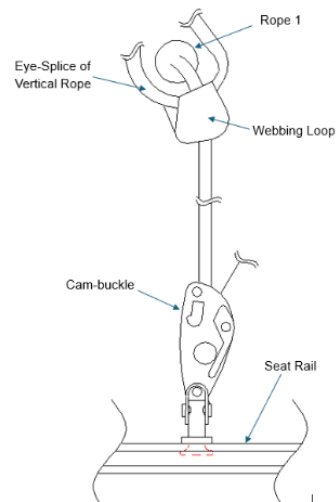


FIGURE 13
Seat Rail Webbing Strap Assembly

READY TO FLY

6. INSTALLATION KIT

The Tulmar 9G Net installation kit, includes the following items:

Part or Document Number	Description	Quantity required for each installation.
89100-002	9G Net Standard (without attachment hardware)	1
4475-001	9G Net attachment hardware: Iron carabiners	32
89100-001	9G Net Standard with attachment hardware [Includes: 89100-002(x1) & 4475-001(x32)]	1
89102-001	Tether Ceiling Straps Kit [Includes 89102-002(x2), 89102-003(x2) & 89102-004(x1)]	1
89103-001	Attachment Floor Straps Kit – For Seat Rails [Includes 89103-002 (x4)]	1

Associated and/or Optional items:

Part or Document Number	Description	Quantity required for each installation.
53065-001	Tulmar Safety Systems Inc. User Manual – Tulmar 9G Net	1
50-50 (53066-001)	Tulmar Safety Systems Inc. Component Maintenance Manual (CMM) with Illustrated Parts List	1

Appendix A

Visual Check - Checklist

Net's Identification: _____ Serial Number: _____

Date of Manufacturing: _____ Date of Expiry: _____

Inspector's Name: _____ Date of check: _____ Time of check: _____

- ☐ Ensure the node locks closed to the spliced eye at anchor point are present and in good condition. Ensure none are in the opened position. Also check if any node lock has fallen off on the floor/seat rails/within net itself

☐ Count: _____ / 26 (Fastened closed to rope attachment with carabiner)

- ☐ Ensure that all carabiners are present, in good condition and function as intended

☐ Count: _____ / 32

- ☐ Ensure that all hooks, and stud fittings function properly

- ☐ Check that TSO label is present and visible. Verify expiry date.

- ☐ Check all the ropes' integrity (Ref Appendix B for more information)

☐ No loosened/frayed fibers

☐ No fully/partially severed cord sections

☐ No burn marks or fused/melted fibers

☐ No heavy soilage

- ☐ Check the debris mesh for excessive tearing and ensure all Velcro flaps are closed

- ☐ Verify all cam buckles to ensure they have no heavy dents or breaks causing sharp edges and function as intended

- ☐ Verify that all webbing integral to the net is intact

☐ Free of heavy soilage

☐ Stitches keep them secure to the net

☐ No tear larger than half the webbing's width

☐ All straps are fastened at both ends on all sides of the net

- ☐ Ensure there is no premature wear of straps and webbing sleeves on all (26) rope anchors. Check inside condition of webbing sleeve for any sign of tear & rope exposure as a result of it

- ☐ Ensure none of the stowage webbing straps and buckles are missing and are fastened properly

- ☐ Verify all stowage straps

☐ No heavy soilage

☐ No tear larger than half the webbing's width

- ☐ Validate if the copy of user manual is latest revision or not

OTHER NOTES:

Appendix B

Damage Payload Table

Component Name	Description of issues	Solutions	Airworthy to Fly (Yes/ No)
ID Label	If the identification label become illegible or missing	Send the net for inspection and repair (Urgent)	No
	Expiry date has passed	Scrap and replace	No
Debris Mesh	Heavily soiled; has more than one (1) large tear; has more than ten (10) localized smaller tears	Send the net for inspection and repair	Yes
	Slight abrasion, fluffing	Repair not required	Yes
Node Locks	Missing or broken node locks (any number)	Repair on site as per CMM	Yes
Carabiners	Missing carabiner	Repair on site as per CMM	No
	Damage or missing components affecting functionality	Repair on site as per CMM	No
	Small dents, scratch marks, discoloration	Repair not required	Yes
Cords (Ref Appendix C for	Fully severed cord near the edges, or cord with damages resulting in 3 or more fully severed strands at one or multiple spots anywhere in the net	Scrap Net and Replace	No
	Partially Severed cord at weave intersection	Send the net for inspection and repair	No
	More than 25 points of snagging, partially severed cord, fraying, heavy melting / fused fibers or compaction.	Send the net for inspection and repair	No
	Less than 25 points of snagging, partially severed cord or fraying, light melting / fused fibers.	Repair on site as per CMM	Yes
	Discoloration at one or multiple spots with fibers intact	Repair not required	Yes
	Random loose fibers without excessive fraying	Repair not required	Yes
	Burn marks or melted fibers/strands	Send the net for inspection and repair	No

Continued next page...

Webbing Integrated in Net	Soiling, fluffing & slight abrasion but no fraying	Repair not required	Yes
	Tears and holes anywhere	Send the net for inspection and repair	Yes
	Tears on webbing sleeve at rope anchor exposing rope underneath	Send the net for inspection and repair	Yes
Floor Straps	Missing entire strap or Cam Buckle	Repair on site as per CMM	No
	Cam buckle Striated / Dented resulting in sharp edges	Repair on site as per CMM	Yes
	Cam buckle Fallen off from strap	Repair on site as per CMM	Yes
	Soiling, fluffing & slight abrasion of the webbing but no fraying	Repair not required	Yes
	Tears, holes or broken stitches	Send the net for inspection and repair	No
Ceiling Straps	Missing entire strap or Cam Buckle	Repair on site as per CMM	Yes
	Cam buckle Striated / Dented resulting in sharp edges	Repair on site as per CMM	Yes
	Cam buckle Fallen off from strap	Repair on site as per CMM	Yes
	Soiling, fluffing & slight abrasion of the webbing but no fraying	Repair not required	Yes
	Tears, holes or broken stitches	Send the net for inspection and repair	Yes

Appendix C

Rope Identification Map

