STRATO CLOUD

FLIGHT MANUAL

RD PFI S 3095

PARA-FLITE Incorporated

CAUTION

The Strato-Cloud is a high performance gliding parachute with unique flight and handling characteristics. A thorough understanding of these characteristics is imperative for safe and effective flight. In the hands of an inexperienced or unprepared parachutist. The Strato-Cloud could be quite dangerous.

As a Strato-Cloud owner, please be very cautious about who you allow to jump it. Everyone who does jump the Strato-Cloud should be familiarized with its handling characteristics. A thorough personal check-out by a competent Strato-Cloud owner is highly recommended.

Although it has high performance characteristics, the Strato-Cloud is a safe and reliable parachute, provided that it is operated in accordance with the instructions in this manual. The Strato-Cloud is intended for use only by experience parachutists.

5801 Magnolia Ave. ■ Pennsauken ■ New Jersey ■ (609) 663-1275

WARNING

CONTAINERS THAT ARE DESIGNED FOR THE STANDARD STRATO-CLOUD (PILOT CHUTE CONTROLLED) ARE NOT COMPATIBLE WITH THE "SLIDER" OR "DIAPER" TYPE. A TOTAL MALFUNCTION CAN OCCUR IF THESE CONTAINERS ARE USED WITH THE "SLIDER". THE "SST" IS ONE SUCH CONTAINER.

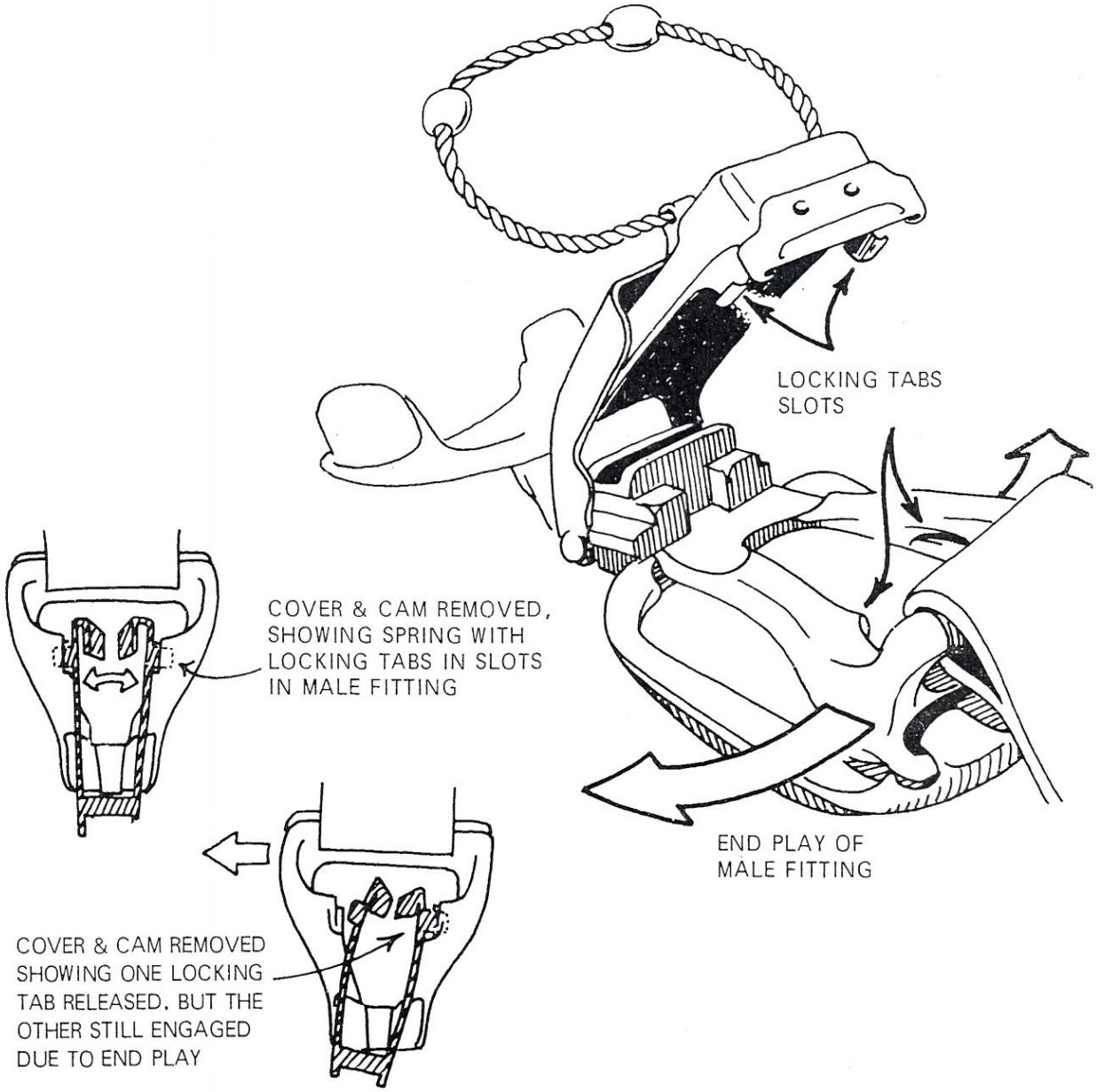
NOTE: IN GUSTY CONDITIONS THE STRATO-CLOUD IS BEST FLOWN WITH APPROXIMATELY 50% BRAKES. MORE THAN 80% OR LESS THAN 20% BRAKES SHOULD BE AVOIDED.

GUST INDUCED STALL OR MOMENTARY DEFLATION OF THE CANOPY IS POSSIBLE DUE TO GUSTS.

WARNING - LANYARD (1½ SHOT) CAPEWELLS

Due to the cam action on the Lanyard (1½ shot) canopy release devices, the travel of the spring is not always sufficient to disengage the locking tabs from the slots in the male fitting, thus preventing proper separation in the event of cut-away during emergency procedure. In addition, end play of the male fitting may prevent complete release of the locking tabs, unless they are correctly adjusted. You must check this adjustment every time you change main canopies or risers or harnesses.

Insure that proper separation is possible by suspension harness tests, release one side at a time. Adjustment to the locking tabs may be necessary.



STRATO-CLOUD FLIGHT MANUAL

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Illustrated by Alec Itenson

Para-Flite, Inc. wishes to acknowledge the helpful contributions made by Mr. Alec Itenson.

INTRODUCTION TO THE STRATO-CLOUD

Although the early work and basic principles of ram air inflated airfoil parachutes must be credited to Domina Jalbert, Para-Flite Incorporated alone was responsible for advancing the technology of high performance gliding parachutes to the point where practical sport parachuting usage became feasible. With the introduction of the Para-Plane and later, the Para-Plane Cloud, sport parachuting, especially in the area of competition accuracy, has been revolutionized, and today, just a few short years later, Strato-Cloud is, without dispute, the finest accuracy vehicle produced.

Two extremely important proprietary developments by Steve Snyder Enterprises, Inc., were responsible for the overwhelming success of the Para-Plane. Firstly, its unique patented configuration was based on the concept of direct suspension line attachment to the canopy lower surface eliminating the bulk and extra drag produced by the then accepted method of incorporating external load distributing members or "flares." This "direct attach" method of carrying the payload produced an extremely efficient and aerodynamically clean high glide configuration. Secondly, the successful application of the very effective pilot chute controlled inflation retardation system (U.S. Patent 3540684) provided a unique solution to the otherwise intolerable high opening shock load inherent to the ram air category of parachutes. This entirely new concept was based on the dynamic interaction between the drag forces exerted by the pilot chute acting against the canopy opening forces in such a manner as to precisely control and regulate the progressive exposure of the parachute's surface during deployment. Simply stated, the drag forces exerted by the pilot chute during deployment were transferred through the mechanics of the system in such a way as to progressively retard the otherwise explosive inflation rate of the canopy.

In refining both the direct attach method of suspension line loading and pilot chute controlled reefing system, Para-Flite has developed the total parachute system, whereby there is complete interaction among the separate parachute components within the system. As currently manufactured, the canopy, the deployment bag, reefing system and container have been specially designed to function in a complementary manner to produce a staged deployment sequence.

Furthermore, novel design and construction techniques have been responsible for reducing the size and bulk of the complete system to a miniaturization that will set standards in the parachuting industry. As for opening reliability the Strato-Cloud has, throughout the entire development and proof test program, demonstrated such remarkable consistency that it promises to offer deployment reliability that may even exceed present day acceptable standards.

STRATO-CLOUD THEORY OF FLIGHT

The Strato-Cloud like the Para-Plane, is an aerodynamically stiffened fabric airfoil which generates lift due to its forward flight through the air. The airfoil angle of attack is maintained by the relative lengths of the suspension lines, such that the leading edge of the wing is slightly lower than the trailing edge portion.

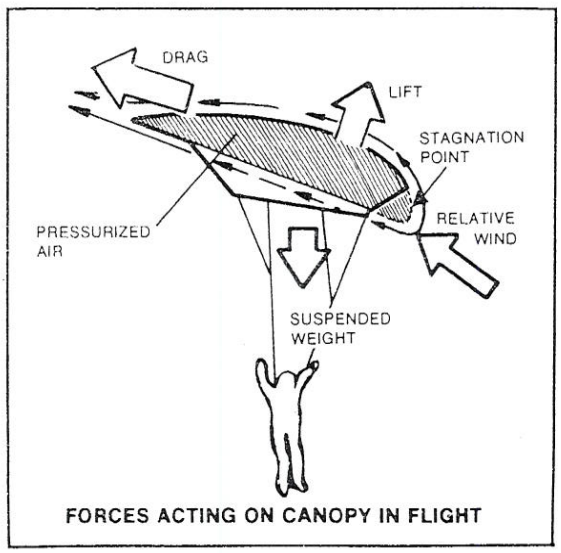
Thus, the airfoil shaped surface of the canopy is forced to slide or plane through the air, very much similar to a glider in descending flight. The Strato-Cloud's wing generates lift in the same manner, relying on the reduced pressure of the air flow over the curved upper surface.

The leading edge of the Strato-Cloud wing is open or physically missing, forming intakes which allow the cell to be ram air inflated. Internal air pressure, however, causes a small amount of stagnant air to be pushed ahead of the airfoil, forming an artificial leading edge. The focal point of this stagnant air acts as a true leading edge, deflecting the relative air above and below. Drag, which acts in a direction parallel to the Relative Wind, is the only force tending to retard the forward motion of the wing through the air. Gravity, plus the resultant sum of these aerodynamic forces on the upper surface, acts to "pull" the Strato-Cloud through the air, thus contributing to the flat glide angle.

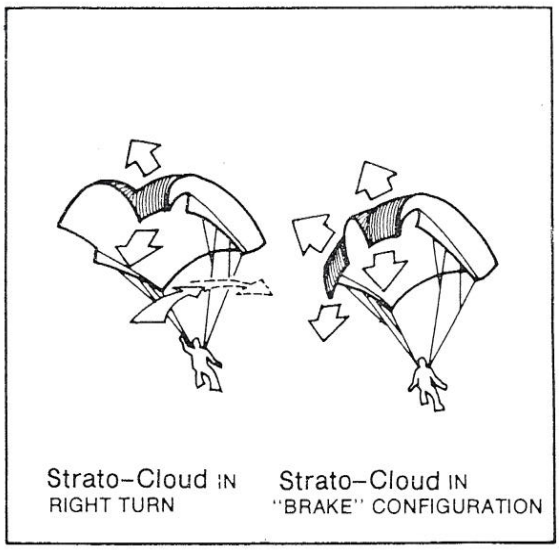
Application of brakes on the Strato-Cloud causes the trailing edge to be deflected downward, creating additional drag and a loss of gliding speed. This also produces a proportionate loss in generated lift, resulting in a steeper glide angle. As full brakes are reached, the wing ceases to generate dynamic lift, the result being an increased rate of descent which is associated with a nearly vertical descent angle. Depressing the toggles beyond full brakes will cause the parachute to enter a stall.

Differential application of brakes (one side only or one side more than the other) produces an unbalanced drag force at the trailing edge, resulting in a yaw turn toward the side with the highest drag.

Because the "slow" side generates less lift, it tends to drop slightly in a shallow banking motion, much like an airplane. This bank angle will increase as the toggle displacement is differentially increased.



FORCES ACTING ON CANOPY IN FLIGHT



Strato-Cloud IN RIGHT TURN

Strato-Cloud IN "BRAKE" CONFIGURATION

DESIGN AND CONSTRUCTION

Typical of advanced flexible gliders the Strato-Cloud construction is of the multicell configuration, which, when ram air inflated, creates a pressurized semi-rigid wing with upper and lower surfaces and an airfoil section. The cells are formed by ribs, which in the case of the reinforced load carrying ribs, are attachment points for the suspension lines.

The load lines & ribs retain the correct airfoil camber in flight and in the case of the load carrying ribs, function, in the "direct attach" method, to distribute the load evenly along the chord of the canopy without causing distortion to the basic airfoil shape.

Innovative construction techniques and scientific selections of surface and rib material have resulted in a compact system weighing only 13 pounds including the deployment bag and special container.

Construction consists of fifteen rib sections, sewn between upper and lower wing surfaces, forming cells, and true airfoil shape Eight of the ribs are internally reinforced for direct suspension line attachment at the canopy lower surface.

The pilot chute controlled reefing system has evolved from a position on the top surface of the canopy, as in the case with the Para-Plane, to a position on the lower surface of the canopy. The Strato-Star reefing line is routed through the center section of the wing and through reefing line guide rings at the suspension line lower surface junction. Stabilizer panels on each wing tip provide anchor points for the reefing line guide rings. This refined Pilot Chute controlled system is so efficient that dual pilot chutes are no longer required. A single MA-1 pilot chute provides sufficient drag for deployment at terminal velocity.

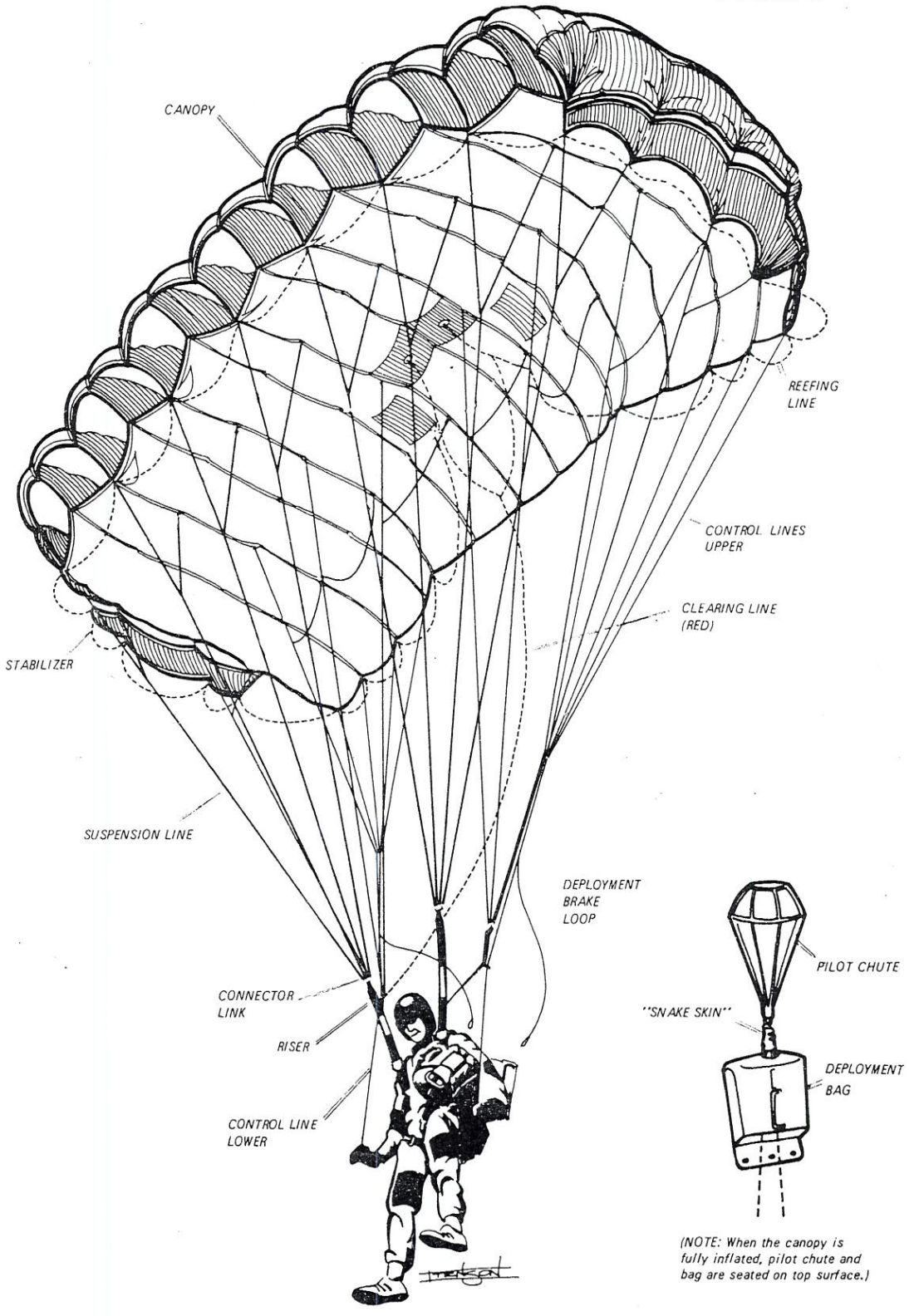
PHYSICAL SPECIFICATIONS

Wing Span	20 ft.
Wing Chord	(approx.) 12 ft.
Wing Area	(approx.) 230sq. feet
Suspended Weights	120-250 lbs.
Canopy Material	1.5 oz. ripstop nylon, calendered 0-5 c.f.m. porosity
Line Test Strength	750 lbs.
Lauching Device	Deployment Bag
Pilot Chute	One MA-1 or equivalent

PERFORMANCE SPECIFICATIONS

	RATE OF DESCENT	SPEED RANGE
Glide	12 - 16 f.p.s.	20-30 m.p.h.
50% Brakes	10 - 14 f.p.s.	10-16 m.p.h.
75% Brakes	10 - 14 f.p.s.	5-10 m.p.h.
100% Brakes	12 - 16 f.p.s.	0-5 m.p.h.
Stall	20 - 26 f.p.s.	0- unstable flight
Full Glide to Flared Landing		2-5 f.p.s. (With proper technique)
Glide Ratio (Lift over Drag)		2.5 to 3:1 (approx.)
Turn Rates		
Full Glide		4-6 sec.
After one revolution		3-4 secs.
Maximum Bank Angle Capability		75 (approx.)
Stall Turn		1.5 sec. - (180°)

STRATO-CLOUD COMPONENT PART



STRATO-CLOUD DEPLOYMENT SYSTEM

Pilot Chute Controlled Reefing System. (US Patent #3540684)

Para-Flite's successful application of their PCR (Pilot Chute Controlled Reefing System—U.S. Pat. 3540684) provides a unique and proven solution to the otherwise intolerably high opening shock loads inherent in ram air paragliders. This proven concept is based on the dynamic interaction between the drag forces exerted by the pilot chute acting against the canopy opening forces in such a manner as to precisely control and regulate the progressive exposure of the canopy's surface area during deployment.

This reefing system has demonstrated remarkable reliability on the production Para-Plane, and as adapted and refined in the Strato-Star system, offers opening reliability perhaps better than existing parachutes.

In conventional parachutes, the sole function of the pilot chute is to extract the bag or sleeve assembly from the container. On completion of the extraction, it ceases to function usefully.

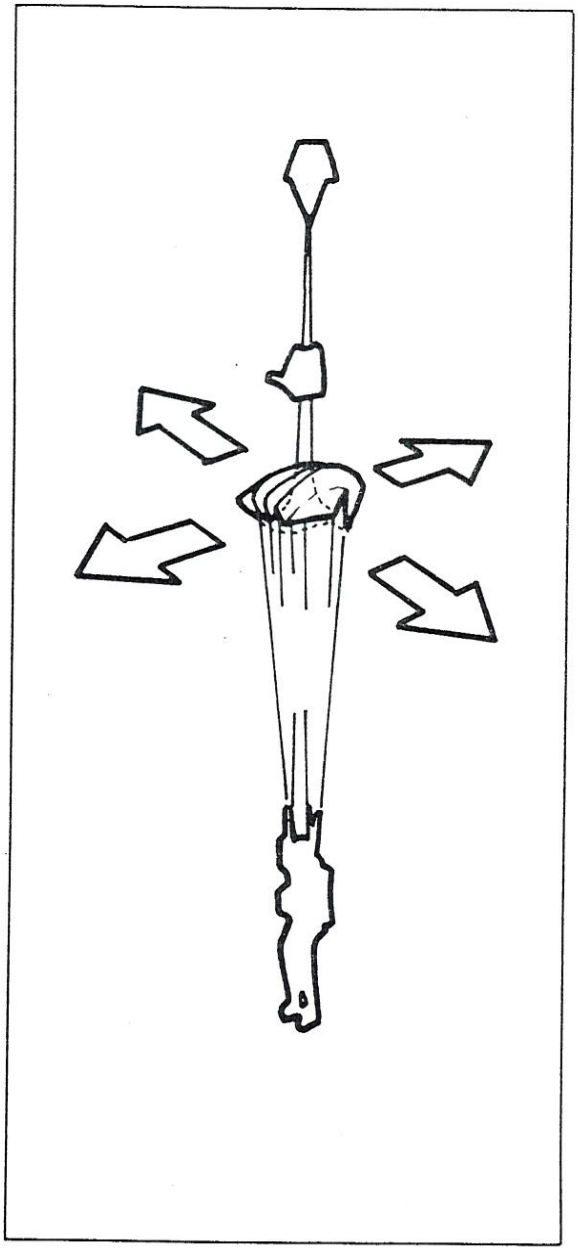
With the Strato-Cloud system, the pilot chute serves a dual purpose:

1. It extracts the bag assembly in the usual way.
2. It maintains a specific amount of drag and retards the inflating forces acting on the canopy.

The mini-container is part of the Strato-Cloud deployment system. (Different containers also usable with the Strato-Cloud system, will become available in the near future).

Not only does the container serve as a pack for the canopy/bag assembly, it also serves as a useful and integrated function during deployment.

When the pilot chute is released, the container is designed to retain the bag assembly until the reefing line is completely played out from the stows on the deployment bag. Only then can the bag assembly be lifted off and the suspension lines played out, ensuring sufficient pilot chute drag on the reefing line.



STRATO-CLOUD DEPLOYMENT SEQUENCE

If you're used to openings, especially ones at terminal velocity—on ram air canopies, the opening shock of the Strato-Cloud system even at terminal velocity will be an unexpected pleasant surprise! Nothing you have previously jumped will have prepared you for it.

There is a mild opening shock! You will find yourself in a vertical position, watching the canopy streamer momentarily and then actually fill in much the same manner as a conventional canopy.

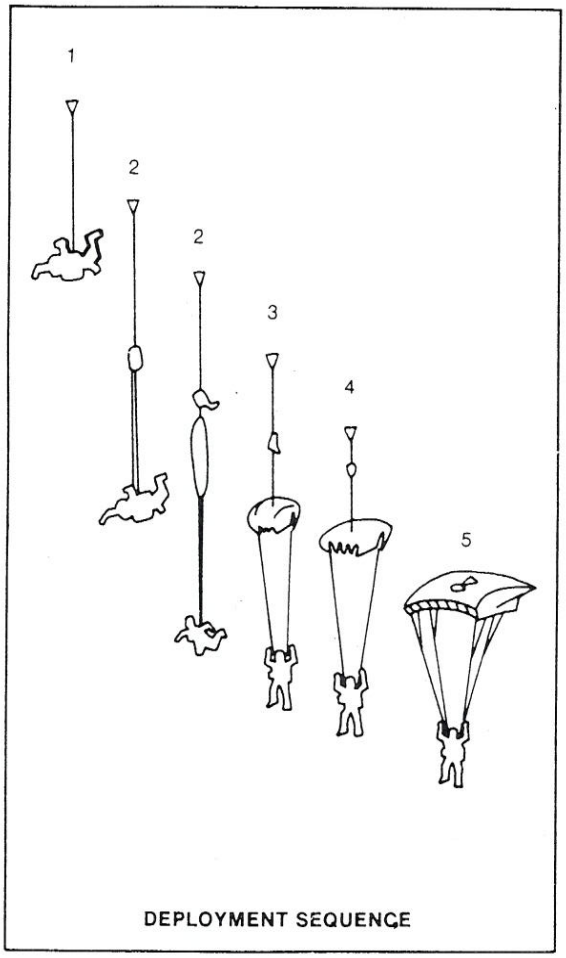
1. When the pilot chute is released, the retardation bridle, or reefing line, is fed off the back of the deployment bag, where it is stowed. The Strato-Cloud container is specially designed to prevent the bag from lifting off until the reefing line is fully extended. This eliminates the possibility of premature bag lift off before the pilot chute and reefing line become fully extended.

2. When the reefing line is fully extended the deployment bag lifts off and the suspension lines are played out. When the lines are fully extended, the Velcro flap is opened allowing the canopy to escape.

3. Tension in the retardation bridle, applied by the pilot chute, controls the progressive expansion rate of the canopy.

4. When the canopy cells are inflated, the pilot chute and deployment bag are seated on the top surface in the center of the canopy. In most cases, final centering of the pilot chute must be accomplished manually with the red pilot chute clearing line located on the right front riser.

5. After the pilot chute is seated, the deployment brakes can be released and the canopy allowed to fly.



DEPLOYMENT SEQUENCE

NOTE: Do not modify the reefing system in any manner. One standard 36" coilspring pilot chute must be attached directly to the bridle line. Remember, without sufficient pilot chute drag, the inflation rate cannot be retarded. Too much drag will prevent correct inflation.

STRATO-CLOUD FLIGHT CHARACTERISTICS

Although the Strato-Cloud is a very docile and forgiving parachute, when compared to other ram air canopies, it still must be emphasized that it is a high performance gliding parachute. In the hands of an inexperienced jumper, or one ignorant of proper handling techniques, it is, by virtue of its high performance, potentially dangerous. It is therefore absolutely imperative that the parachutist possess a working knowledge of flight capabilities and limitations and that he fully understand the handling techniques.

This, on the other hand, is not overly complicated, but since Strato-Cloud is basically a fabric wing section, a very basic knowledge of aerodynamics is necessary in order to better understand the flight and handling characteristics of the vehicle.

As we've previously mentioned, the Strato-Cloud "planes" or glides through the air at about 20-30 miles per hour. It always flies at this speed regardless of wind conditions except when brakes are applied.

This flying speed is called AIR SPEED, and remains constant regardless of whether the parachute is headed up wind, down wind, or cross wind. The only variation in flying up or down wind is a change in GROUND SPEED, which is often mistaken for a change in air speed.

Wind only affects GROUND SPEED and has NO EFFECT on AIR SPEED.

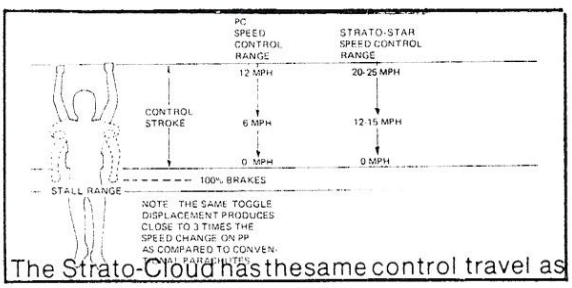
The air speed of the Strato-Cloud is controlled with brakes, using conventional control lines and toggles. It is significant to note that 50% of toggle travel on a conventional parachute such as the Para-Commander or Papillon will reduce air speed by about 6 mph, whereas comparative toggle travel on the Strato-Cloud will cause a speed reduction of close to 12 mph.

Unlike other ram air canopies, and even the conventional ones like the Para-Commander and the Papillon there is almost no surge on deployment, and there is no wind noise at all until after the brakes are released. For those not previously exposed to flight characteristics of ram air canopies, the wind noise created by forward speed can be used as a rough "air-speed indicator." Reducing the wind noise level can be used as a "stall warning."

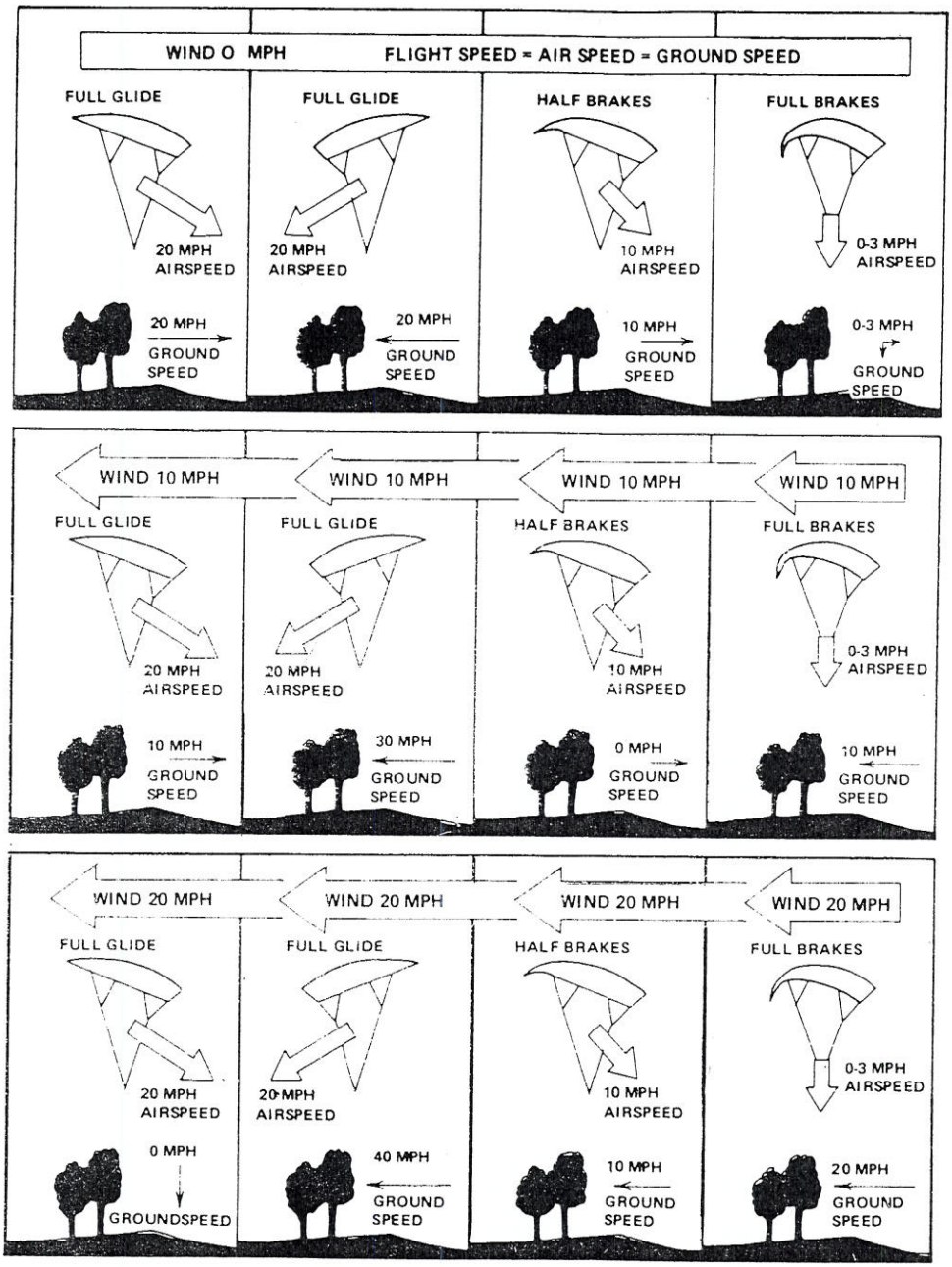
Once you have grown accustomed to the canopy, you will no longer even notice the wind noise, and you'll have learned to fly the canopy by feel, and you will have ample stall warning. The Strato-Cloud is a docile canopy, and will signal its intentions well in advance. Although the toggle pressure is much lighter than that of the Cloud, there is still sufficient "feel" to sense canopy reaction such as the shudder that precedes a stall.

It would be wise to remember that when controlling the canopy's flight, the rate of control motion from one position to another is as critical as the relative position of the toggles. As a general rule, all rapid and generous (more than 30%) application of both toggles will cause a rapid decrease in air speed, and the Strato-Cloud will decelerate into the stall range of approximately 0-3 mph air speed. (Depending upon the wind speed, ground speed at this point could still be fairly high.)

Due to the high penetrating ability of the Strato-Cloud it is often difficult to determine wind direction without the aid of a wind sock, streamer, or smoke on the ground. All landings should be made upwind to minimize ground speed.



The Strato-Cloud has the same control travel as conventional parachutes but controls two to three times the air speed, making any control motion two to three times as effective and sensitive.



The Strato-Cloud moving with and through a mass of air is much the same as a boat moving with and through a mass of water (river). If a speed boat has a constant speed of 20 mph, this is comparable to the air speed of the Strato-Cloud.

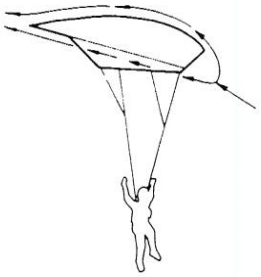
If the boat is in a river flowing at 20 mph, the same conditions exist as if you were jumping the Strato-Cloud in 20 mph winds.

If you point the boat downstream, you would be moving through the water at 20 mph—but your speed relative to the river bank would be 40 mph.

If you turned the boat upstream, you would still be moving at 20 mph but your speed relative to the river bank would now be zero.

Facing the Strato-Cloud into a 20 mph wind would also yield zero ground speed.

FULL GLIDE



With toggles up the Strato-Cloud will glide at about 20 - 30 mph with a rate of descent of approximately 13-16 fps and track straight and stable. Bias turns can usually be traced to an uneven harness adjustment and any bobbing or oscillation is usually an indication that the pilot chute is not fully seated.

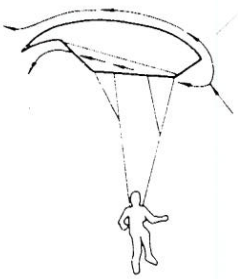
Under certain rough air conditions, the canopy may bounce mildly in full flight in much the same manner as an airplane in turbulence.

Increased penetration can be gained by pulling down the front risers 4-6 inches. Directional control can be maintained with the front risers. Since the rate of descent will increase proportionately, it is not advisable to land the Strato-Cloud in "overdrive".

Remember that in event of a broken control line or when maneuvering immediately after opening, when the deployment brakes are still secured, the rear risers can be used for full directional control.

Acceptable Flight Trim — **The toggles may be adjusted up to 6" differentially to maintain straight flight.**

HALF BRAKES

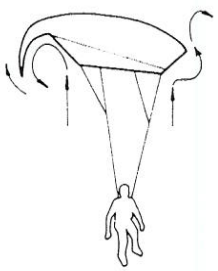


Braking is effected by altering the airflow along the lower surface of the wing. This is accomplished by distorting the trailing edge in much the same manner as flaps on an airplane.

From full glide, depress both toggles slowly to about chest level or slightly below. At this point, forward speed will be 9-12 mph and corresponding rate of descent 10-14 fps.

Toggle pressure on the Strato-Cloud is much lighter than that of the Cloud, yet there is sufficient resistance to afford excellent "feel" of the canopy's reaction.

FULL BRAKES

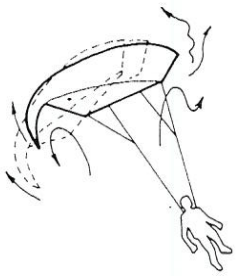


Under normal flight conditions, the fully braked attitude will be reached by depressing both toggles slowly until nearly all the forward speed is reduced. In this mode, the direction of travel will be almost vertical. The forward speed will be around 5 mph or less, and the rate of descent about 10-16 fps. Directional stability can be maintained in the 75-100% braked condition.

Further braking will result in sink or mush, which is on the verge of a stall

STALL—STEADY STATE

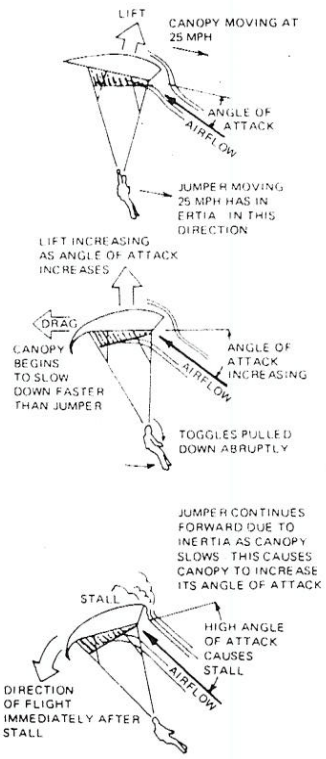
A stall (steady state) can be induced by depressing the toggles slowly to the fully braked position, and then flexing the wrists to permit a further 3-4 extra inches of toggle travel past the fully braked position.



In this attitude, the airfoil loses its efficiency as a lifting device. The forward speed goes to zero as the canopy sinks and then gently rocks backwards.

The Strato-Cloud may attempt to fly backwards or turn off to one side. Recovery from this type of stall is accomplished by simply raising the toggles smoothly 6-8 inches to the 75%-80% braked conditions. The Strato-Cloud will accelerate smoothly out of the stall.

CAUTION: Never release the toggles completely or let them up abruptly. If the toggles are released in such a manner, the Strato-Cloud will surge forward.



STALL—DYNAMIC

A dynamic stall is initiated by making an abrupt displacement of the toggles, causing additional drag to be placed on the canopy. The canopy decelerates rapidly, while the jumper, due to his inertia, reacts much more slowly, causing him to swing out, in front of the canopy.

The jumper oscillates forward, causing an artificial increase in the angle of attack. This new angle of attack yields a high amount of lift for a very short period of time, followed by an abrupt loss of lift or "stall" of the canopy due to the loss of forward air speed. Because the trailing edge has been deflected substantially downwards, reversing the air flow, the canopy now attempts to fly backwards unless corrective measures are taken.

Recovery from the dynamic stall is properly accomplished by smoothly raising the toggles to the 75%-80% braked position.

Do not let the toggles up any higher than chest level, otherwise the canopy may surge forward. The same conditions exist here as in entering the stall—that is, the canopy will accelerate much faster than the jumper.

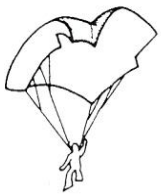
Although the Strato-Cloud is a docile parachute, without the violent stall characteristics usually associated with ram air parachutes, it is still recommended to avoid dynamic stalls below 500 feet AGL.

TURNS—FULL GLIDE

Turns from full glide are very responsive, but due to the high forward speed, the turns will encompass a wide arc. These turns are made by depressing either toggle, leaving the other one at the keeper. In this type of turn, the parachute will bank and actually dive, causing the parachute to lose altitude quickly.
The further the toggle is depressed, the steeper the bank angle.

The additional increase in rate of descent is partially due to the loss in lift resulting from the bank angle.

SPIRAL TURNS



Spiral turns are basically turns from full glide but maintained for more than 360 degrees of rotation. The parachute will begin diving in a spiral. The first turn will be fairly slow, with shallow bank angles, but both the turn speed and bank angle will increase rapidly if the spiral is maintained.

Increasing the turn rate will cause excessively fast diving speed with a rapid loss of altitude and therefore should be avoided below 500 feet AGL.

TURNS—50% BRAKES

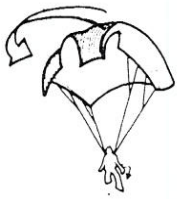
Turns from the 50% braked condition are made by further depressing either toggle. Canopy response in this mode is much faster, with minimal banking, resulting in almost flat turns desirable when flying the target approach legs.

TURNS—75-100% BRAKES

This is the canopy's optimum control range with extremely quick response. When flying in this mode, the jumper should be keenly aware that he is operating very near the stall range.

Turns are best made with directional cross control—by slightly raising the opposite toggle. This is done to prevent the canopy from stalling. There is little or no banking and the resulting heading changes are quick and flat.

STALL TURNS



If the Strato-Cloud is flying in the 90-100% brake range and either of the toggles is further depressed, a stall turn will result.

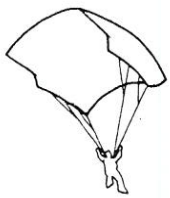
Stall turns produce a very quick, pivoting action, with the stalled side of the canopy flying backwards.

Since the stalled side generates very little lift, the rate of descent will increase.

Stall turns should be used with extreme caution.

FLARED LANDINGS

The flared landing is in essence a carefully controlled dynamic stall, timed so that touchdown occurs during the exact moment of high lift yield caused during the artificial change in angle of attack. This is just an instant prior to the stall, and the jumper should be extremely careful not to stall too high.



Flared landings are made into the wind and should start at an altitude of 10-20 feet, with plenty of room ahead.

Ease both toggles all the way up, allowing the air speed to build up. (A flared landing cannot be accomplished without sufficient air speed.)

At about 10 feet off the ground, slowly depress both toggles downwards, timing the movement to coincide the 100% brake position at touchdown.

The flared landing, when properly executed, practically eliminates both horizontal and vertical velocities for a short period. If the Strato-Cloud has been slowed down prior to the flare attempt, depressing the toggles further will result in a "sink".

If, on a misjudged flare attempt, the parachute enters a dynamic stall, dynamic stall recovery must be initiated.

LANDING

The Strato-Cloud can be safely landed without flaring. On final approach, simply fly the canopy at 50-75% brakes, with final braking increase immediately prior to landing.

This is similar to landing conventional parachutes, and the ground speed will be dependent on the wind velocity.

LANDING APPROACHES

The recommended Strato-Cloud landing approach is one similar to standard aircraft practice. It is a simple procedure consisting of a downwind leg, a base leg, and a final approach upwind, towards the target. It is usually difficult visually to gauge variations in altitude accurately, so a reliable altimeter is suggested while under the canopy.

DOWNWIND LEG:

The downwind leg is flown along the wind line, passing the target area at an altitude of between 1000-1500 feet while tracking approximately 400 feet to the side of the target.

Jumpers who are used to downwind approaches on conventional parachutes are usually quite reluctant to overfly the target at an altitude of 1000 feet, but this initial discomfort soon vanishes, although it will still require considerable practice to hit this first "window"—a point between 1000-1500 feet above and 300-400 feet to the side of the target.

Continue the downwind leg to a distance approximately 300-400 feet downwind of the target.

BASE LEG:

At this point, approximately 300-400 feet downwind of the target, begin a gentle 90 degree turn to fly the base leg, across the wind line. This leg is usually flown at 30-60% brakes, depending upon the wind conditions, and the base leg may be either shortened or extended to reach the proper rotation altitude.

Under low wind conditions, the base leg is flown to a rotation point approximately 400 feet directly downwind of the target and at an altitude of just above 500 feet.

FINAL APPROACH:

Under light wind conditions (0-5 mph), rotation towards the target is made at this point, 400 feet downwind of the target, with a braked turn.

Final rotation must be completed no lower than 500 feet.

On final approach, descent and glide are controlled through proper braking technique in order to bring the jumper down in the designated target area.

Once final rotation is completed, the approach angle must be assessed, and any major control corrections performed immediately, while there is sufficient altitude and distance to the target.

Excess altitude can be traded off by making shallow S-turns back in a "base leg" position. If, on the other hand, more penetration is required, it can be increased by pulling down the front risers 4-6 inches to alter the Strato-Cloud's angle of attack. Do not, however, land with the front risers pulled down because the rate of descent will increase proportionately with the increased penetration.

CAUTION: Do not make sharp or hook turns on final approach and do not attempt a salvage 360 degree turn. The Strato-Cloud loses altitude rapidly in sharp turns.

LANDING:

On the initial jumps, it is not recommended that the jumper attempt flared landings. A properly executed flared landing requires not only good altitude assessment and good timing, but a feel of the canopy gained only with experience.

Although the Strato-Cloud is docile and forgiving, and does not exhibit the violent stall and stall recovery characteristics usually associated with ram air canopies, a flared landing is in essence a dynamic stall, and if performed at too high an altitude, could result in serious injury.

VARIATIONS ON THE APPROACH:

As stated previously, under light wind conditions, rotation on final approach should be made at a distance 400 feet downwind of the target at an altitude of 500 feet. Depending on the wind conditions, the final approach can be varied from almost vertical to a very flat angle. (The application of brakes will also alter the angle of approach. A very steep approach angle can be achieved through heavy braking, while easing up on the toggles will extend the approach angle.)

Under zero wind conditions, the downwind leg may be extended past the 500 foot distance to permit a longer and flatter final approach.

Under high wind conditions, the downwind leg can be shortened to allow for decreased penetration, or for more consistent accuracy, the normal rotation distance can be maintained, but the rotation altitude increased.

A basic rule is to increase the rotation height by 100 feet for every mile per hour increased wind velocity, starting at 400 feet for 0-5 mph winds.

For winds in excess of 12 mph, rotate no farther downwind than 200 feet from the target and as high as possible. Remember, under high wind conditions the Strato-Cloud can be backed up by applying brakes to decrease the air speed.

CAUTION: In turbulent air or gusty wind conditions, do not fly the Strato-Cloud ***at or near full brakes. An unexpected gust could induce a stall or cause directional instability.***

INDOCTRINATION JUMPS

Initial Strato-Cloud jumps should be oriented towards flight and handling characteristics familiarization.

In spite of the fact that the canopy does not surge on inflation, large star relative work with the Strato-Cloud is not recommended until he is fully familiar with the paracnute. There is no set number of jumps for the familiarization and indoctrination period because the rate of progression is dependent upon individual experience and skill.

The prime measure of successful indoctrination is the individual jumper's personal admission that he is relatively comfortable with the Strato Cloud in all the various brake modes and flight regimes.

It is recommended that several familiarization jumps be made in light wind conditions with terminal velocity openings at an altitude of 4000-5000 feet. This extended flight time under the canopy will offer the jumper an opportunity to wring out the Strato-Cloud at altitude and to gain a feel for the parachute.

On these jumps, the opening and exit points should be adjusted accordingly, and although all previous spotting techniques still apply, the Strato-Cloud allows a much greater margin of error—to the extent that spotting can be casual. The wise jumper, however will continue to spot for his reserve.

Any stable face to earth position can be used for opening. After opening, do not release the deployment brakes immediately. Practice checking for other traffic until it is second nature, maneuvering, if necessary, with the rear risers.

Using the rear risers, turn the canopy on a heading towards the target area and check the canopy for proper inflation and pilot chute seating. If the pilot chute is not secured, the cells will not be fully inflated and the canopy will have a tendency to bob or oscillate sideways.

Do not release the deployment brakes until the pilot chute is pulled onto the top center of the canopy, as any additional airspeed will hinder this maneuver. To secure the pilot chute on the top surface of the wing, simply pull on the red pilot chute clearing line located on the right front riser. Reel in on the line until solid resistance can be felt. Do not be timid with this maneuver.

After the pilot chute is properly seated, the deployment brakes can be released, and the canopy will fly in a stable mode.

On these initial high jumps, make an effort to attempt as many flight maneuvers as possible, instead of merely flying a pattern.

Keep an eye on the target, allowing yourself enough altitude to overfly the target area at approximately 1000 feet.

Fly the base leg and rotate on final with half brakes. The final approach should be flown at 50% brakes, directly on heading. On initial jumps, do not attempt precision accuracy, and do not be overly concerned about landing short or overflying the target. No major canopy corrections should be made on final approach. Do not forget that the Strato-Cloud loses considerable altitude on banked turns.

Fly the canopy to the ground carefully applying the brakes the last few feet. Although the Strato-Cloud is somewhat easier to flare than the Cloud for example, this maneuver requires precision timing. Until one is more experienced, it is far safer to ride the canopy in with brakes.

Considerable practice at flying in deep brakes is essential for good Strato-Cloud familiarity. It is highly desirable to practice stalls and stall recovery on every jump.

PRECAUTIONARY FLIGHT RULES

The Strato-Cloud is a high performance gliding parachute with unique flight and handling characteristics. The following rules must be clearly understood and followed.

1. It is imperative that the Strato-Cloud jumps be oriented totally towards familiarization. . Do not attempt relative work or percision accuracy until at least ten to twenty-five jumps have been completed. It is also not advisable to jump into restricted target areas until completely familiar with the parachute's capabilities.

2. When on final approach, whether attempting precision accuracy or merely landing within a designated area, do not attempt salvage 360 degree turns. Like any other ram air parachute, the Strato-Cloud loses altitude rapidly in tight turns. Sharp turns or hook landings should not be attempted below 200 feet

3. Partially because of its relative short suspension lines, the Strato-Cloud does not exhibit the abrupt stall characteristics normally associated with ram air parachutes. It is still, however, recommended that all major control corrections be made carefully and smoothly. Large variations in toggle movement should not be made rapidly, otherwise a jumper may experience fast canopy response resulting in unusual or extreme altitude loss.

4. When recovering from either a steady state or dynamic stall, do not release the toggles completely or let up abruptly past 75% brake position. A toggle movement of 4-8 inches above the stall point is sufficient travel for a rapid and controlled stall recovery.

5. Increasing the turn rate beyond the steep spiral range may cause excessively fast diving speeds. Spiral turns should be avoided below 500 feet, even if the intended landing area is a body of water.

6. In gusty wind conditions, do not fly the Strato-Cloud at or near full brakes as sudden gust loads can induce a stall or directional instability.

7. Under no circumstances should the rigging trim or reefing system be altered without consulting Para-Flite Incorporated. See maintenance section.

8. A close surveillance of other parachutists in the air must always be maintained, especially in large star relative work, canopy collisions are always a potential hazard.

9. In spite of the forgiving stall characteristics of the Strato-Cloud, flared landings must not be initiated above 15 feet. This could result in a dangerous stall. If a flared landing is initiated at too high an altitude, do not panic Bring both toggles up to the 50% brake position immediately and stabilize the canopy heading into the wind.

If after opening you experience difficulty in control due to pilot chute interference with the control or suspension lines, or if you see anything out of the ordinary, do not waste time—consider exercising your emergency procedure immediately.

NOTE: The Strato-Cloud's stall point will vary from day to day due to variations in altitude density and atmospheric conditions. It will also vary with different suspended weights. The stall point should be ascertained on each and every jump at a safe altitude.

STRATO-CLOUD PACKING INSTRUCTIONS

Your container should be fitted to your harness, using your own ripcord and ripcord housing. The matching of the harness and container may be done by you, and requires a minimum amount of equipment to install. If you are not familiar with this type of installation, we suggest you have your local rigger attach your container to the harness.

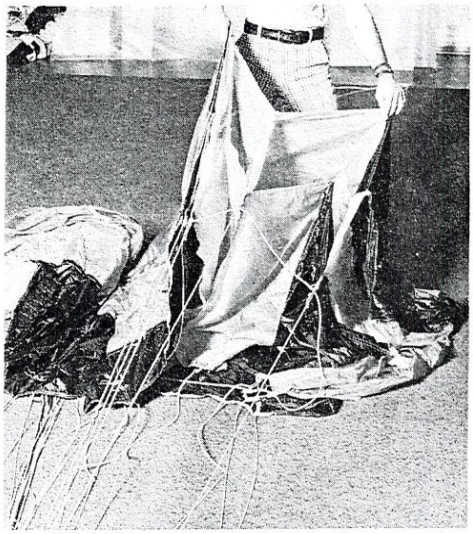
Packing the Strato-Cloud is quite different than packing any other parachute. Because of the mechanics involved in this system, there must be a systematic sequence to packing.

At first the packing techniques may seem complicated, but after learning the basic steps of packing, it becomes quite simple.

PROCEDURE

1. CANOPY LAYOUT

(A) Grasp the canopy by the high points on the leading edge, starting on either the right or left side. (Fig. 1)

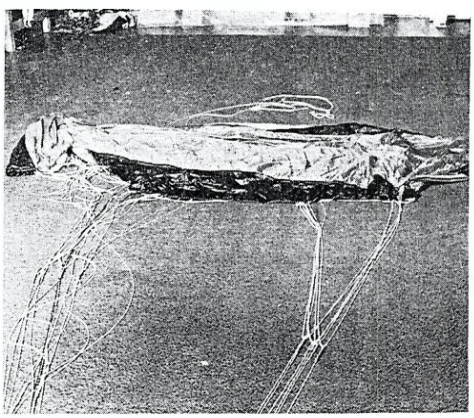


1

Go from one high point to the other until all cells have been folded. (Fig. 2)

2

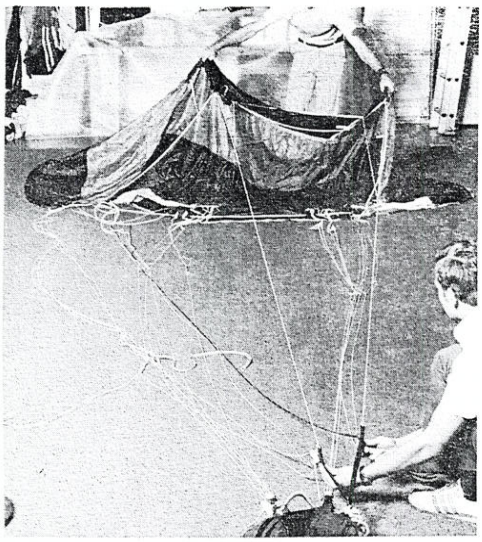
(B) Flip or shake the canopy and place on its left side. (Fig. 3)



3

2. LINE CHECK

(A) Grasp the two top outboard lines, elevate them so as to separate them from the other lines. At this time, check to see that they go to the outside of the right front,right rear riser connector links. (Fig. 4)



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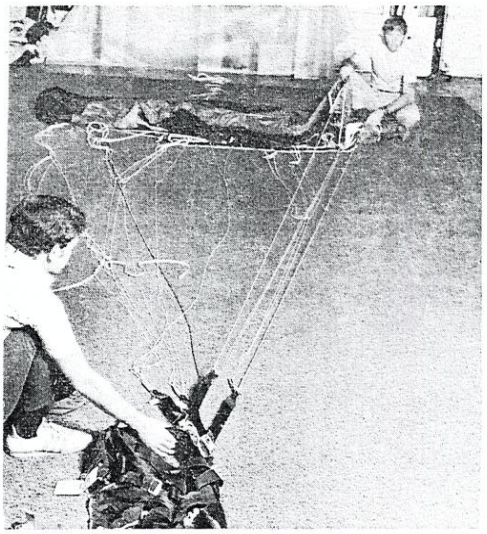
(B) Orient risers and container with direction of flight, grasp the bottom outside front suspension line (left front). Check to see that it is routed to the left front riser connector link (outside). (Fig. 5)



5

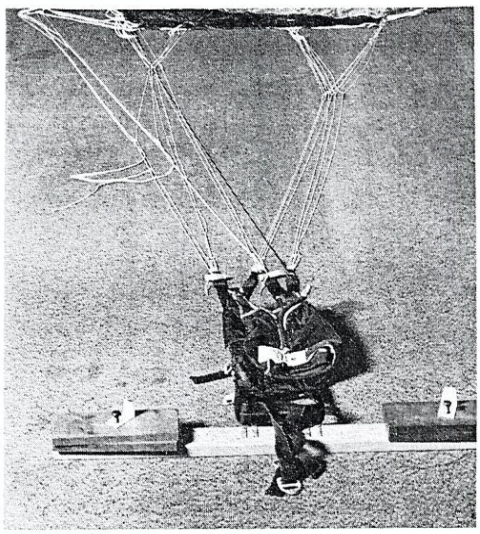
3. FLAKING THE CANOPY

(A) After the line check has been accomplished, lay the canopy back on its left side. (Fig. 3)

(B) Throw the tops of all the cells forwards towards the pack tray. Grasp the bottom cell high point and pull both front and back taut. (Fig. 6)

6

(C) Work from high cell to high cell until all cells have been flaked and all lines are taut. Make sure line groups are together at the canopy and that the steering lines are separated from the rear suspension line groups. (Fig. 7)



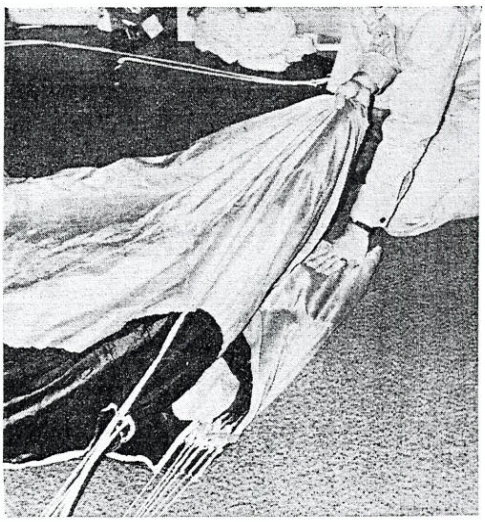
7

4. LONG FOLDING THE CANOPY

(A) 1st Fold. With canopy laying on its side, fold nose back onto itself. (Fig. 8)

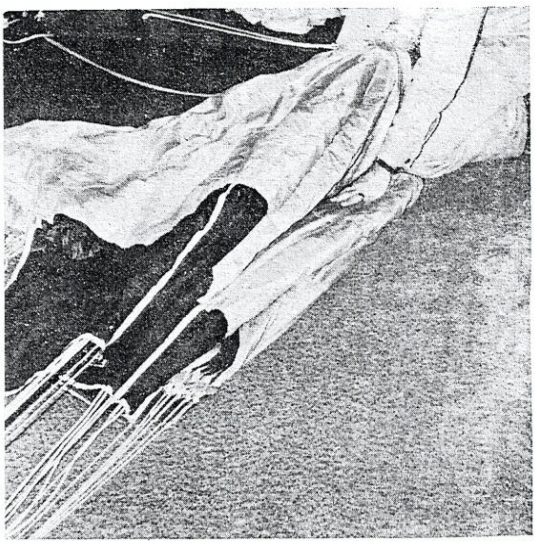
8

(B) 2nd Fold. Grasp the canopy at the top in a line with the second group of suspension lines, (make sure you have all panels) pull the lines taut and make the fold so as to place the second group of suspension lines on top of the first group of lines. (Fig. 9)



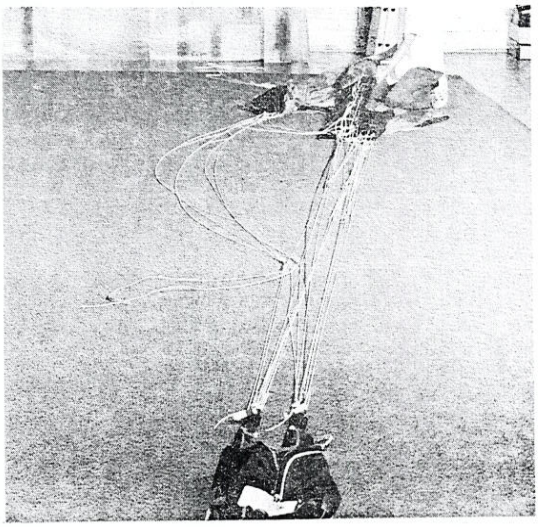
9

(C) 3rd Fold. Repeat the process, grasp the top of the canopy in a line with the third group of suspension lines, pull taut and place the third group of suspension lines on top of the first and second group. (Fig. 10)



10

(D) Repeat the process until the canopy has been folded and all lines except the steering lines have been placed on top of one another and pulled taut. (Fig. 11)



11

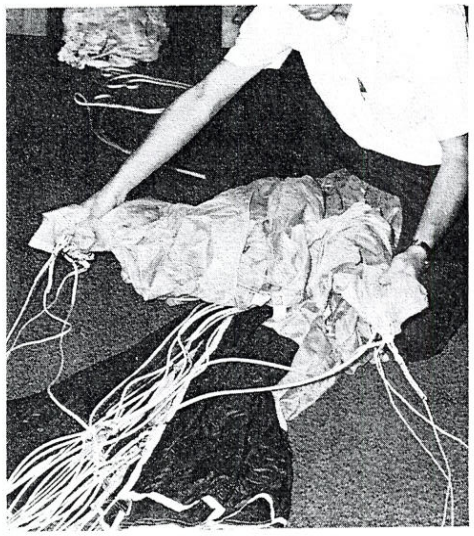
5. CLEARING THE STABILIZER PANEL

(A) Stabilizer panels should be cleared the same as on a P.C. or Pap. in that they are pulled to the outside. (3 panels on each side) (Fig. 12)

12

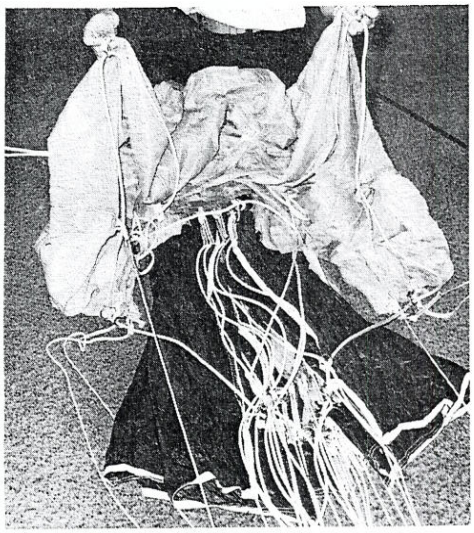
6. CLEARING THE REEFING LINE

(A) Pick up the trailing edge of the canopy, splitting it into two groups, left and right, using respective steering line groups. (Fig. 13)



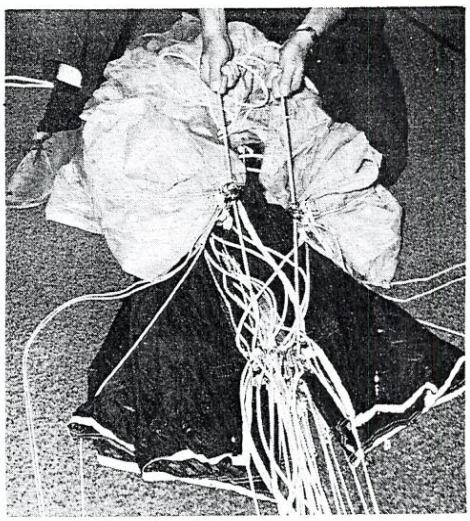
13

(B) Find the center of the trailing edge work out both left and right until the first reefing rings are located. (Fig. 14)



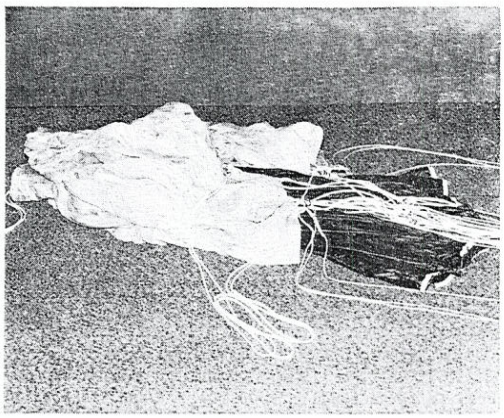
14

(C) Pull reefing line slack out through the left and right trailing edge rings towards center of the trailing edge until the reefing line has completed the routing and can be slide back and fourth through all lower reefing rings freely.



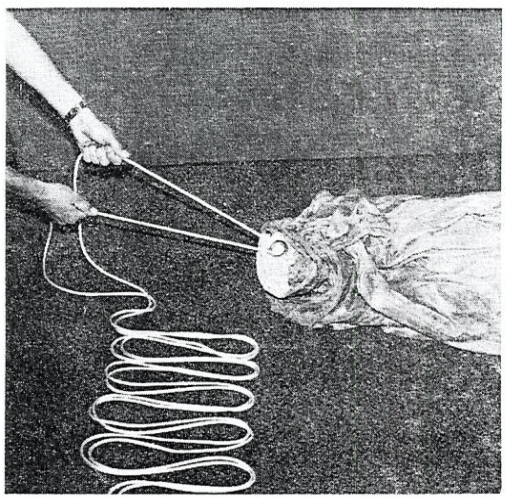
15

(D) Place reefing line slack off to one side of the canopy. (Fig. 16)



16

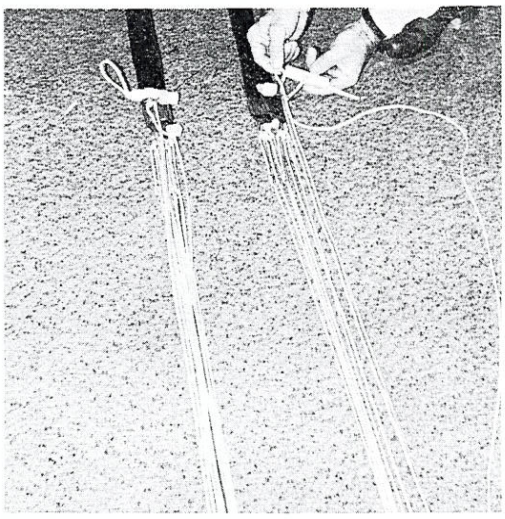
(E) Pull the remaining slack through the top of the canopy at the pilot chute end, continue to pull until all slack has been taken out and the reefing line can be pulled or slid both left and right without stoppage. (Fig. 17)



17

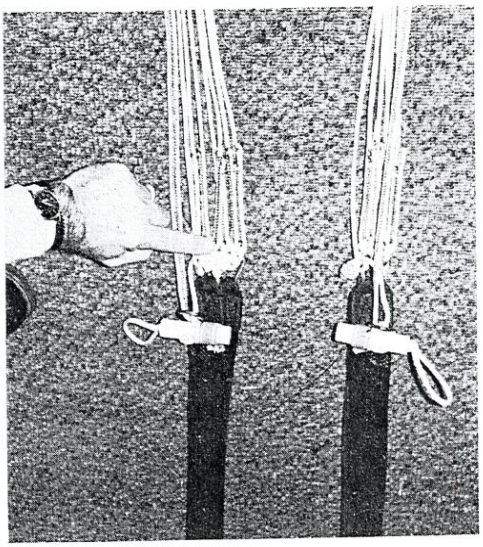
7. INSTALLING DEPLOYMENT BRAKES

(A) Pull each deployment brake loop down to steering line guide ring, pass the looped end of the lanyard through the guide ring and insert toggle knob into loop provided. (Fig. 18)



18

(B) Place toggle knob into elastic provided on riser.
Stow excess steering line on retainer band attached to connector. (Fig. 19)



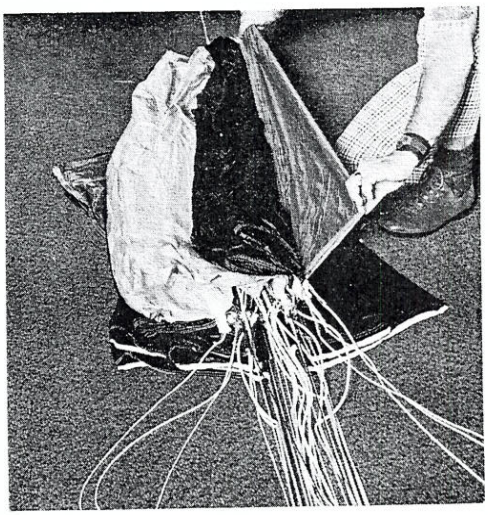
19

8. FOLDING THE TRAILING EDGE

(A) At this time trace the reefing line up inside the canopy to the point where the reefing line goes through the grommets in the bottom of the canopy, making sure the reefing lines are clear of all material and tangles. (Fig. 20)

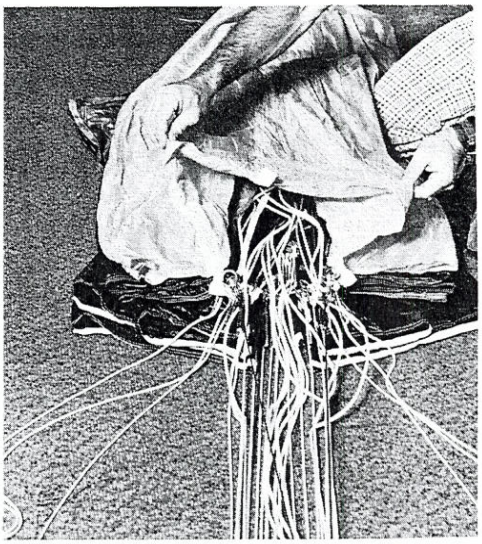
20

(B) Trailing edge should be folded one panel at a time from left to right or right to left, making sure all material is clear of the reefing rings. Continue folding until all panels have been folded. (Fig. 21)



21

(C) After all panels have been folded, split the trailing edge of the canopy forming a "wind" channel. (Fig. 22-23)

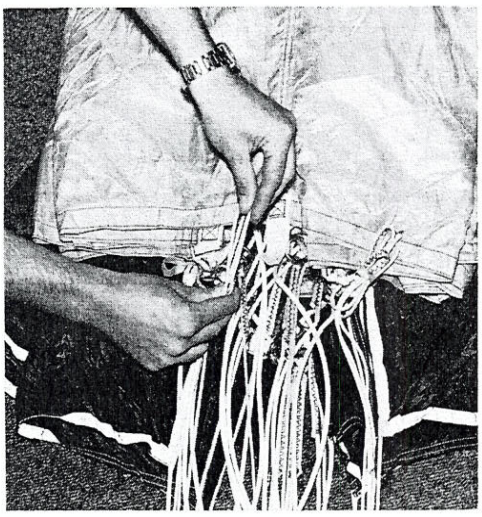


22

(D) Wrap trailing edge around canopy top to stabilizers prior to bag "stuffing", to help "contain" the folds when folding into the bag.
NOTE: Do not contain bottom of stabilizers in "wrap".

23

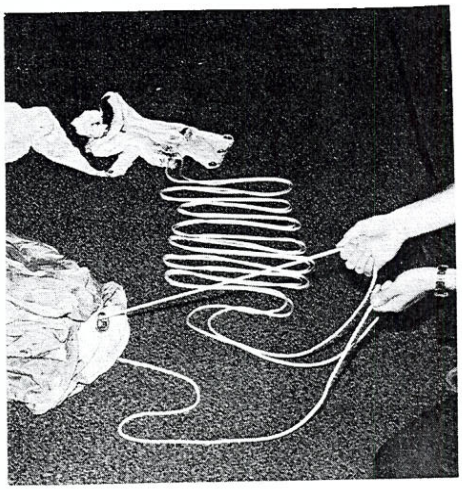
(E) After the trailing edge has been folded and cleared, stow excess steering line in retainer bands placed on the outside trailing edge reefing rings. Do not double loop the rubber bands! (Fig. 24)



24

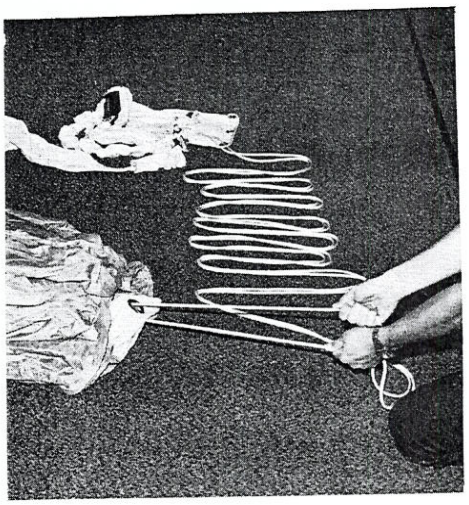
9. REEFING LINE CHECK

(A) Before putting the canopy into the bag, the reefing lines must be straightened and evened. Starting from the pilot chute, milk the two reefing lines towards the canopy keeping the lines even down to within 2 to 3 feet of the canopy. At this time, you will notice one line being longer than the other. (Fig. 25)



25

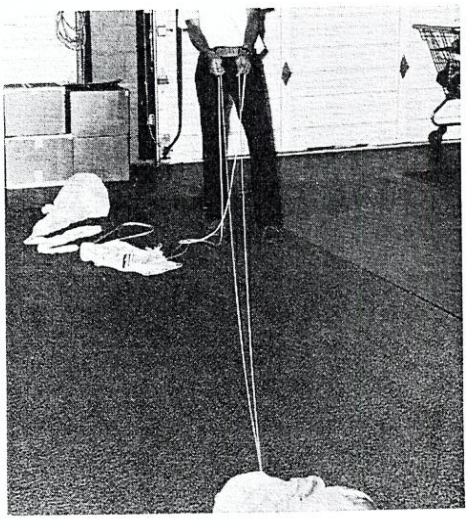
(B) Pull the taut line, this will slide the long side through the reefing rings and will even the reefing line. Check to see that the reefing line is free to slide both ways. (Fig. 26)



26

(C) After this is accomplished, remove all twists, turns and tangles from the reefing line. (Fig. 27)

NOTE: The pilot chute should be pulled to maintain some tension in the reefing lines. Each line should have the same amount of "sag" or "droop", thus indicating that both lines are of equal length.



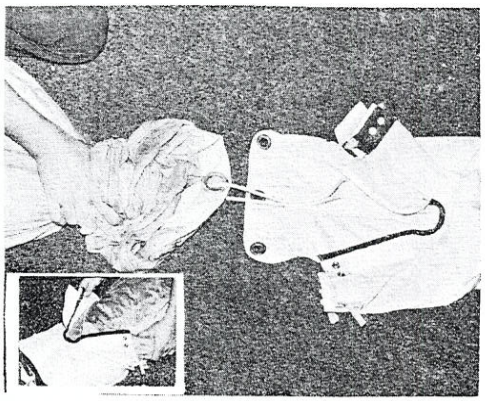
27

10. FOLDING OR BAGGING THE CANOPY

(A) Expose grommets in top center of folded canopy, insure all material is pulled away from buffer pad and grommets. (Fig. 28)

28

(B) Fill the top of the bag moderately with the canopy. (Fig. 29)

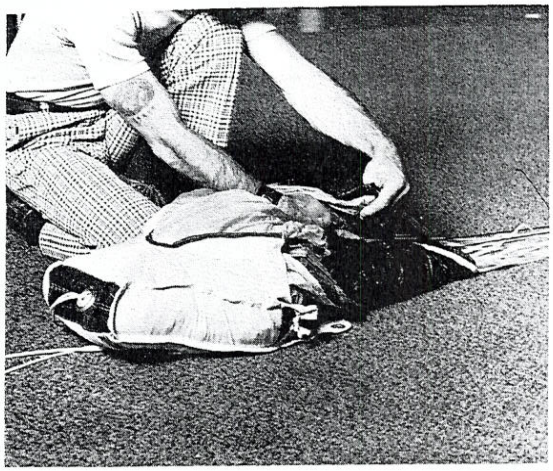


29

(C) Make the first fold the length of the deployment bag. (Fig. 30)

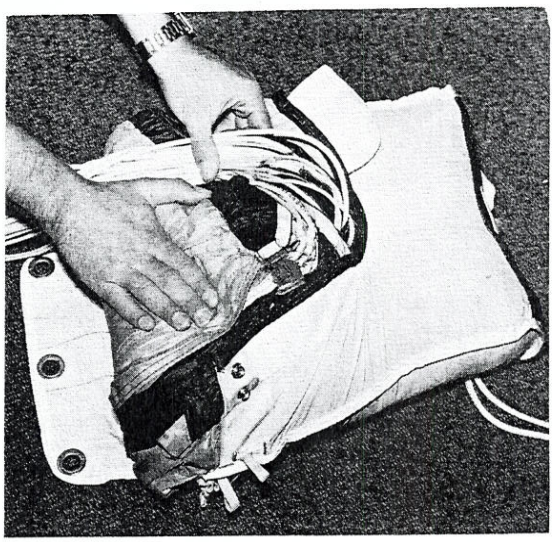
30

(D) Fold stabilizers around suspension lines at bottom of canopy. (Fig. 31)



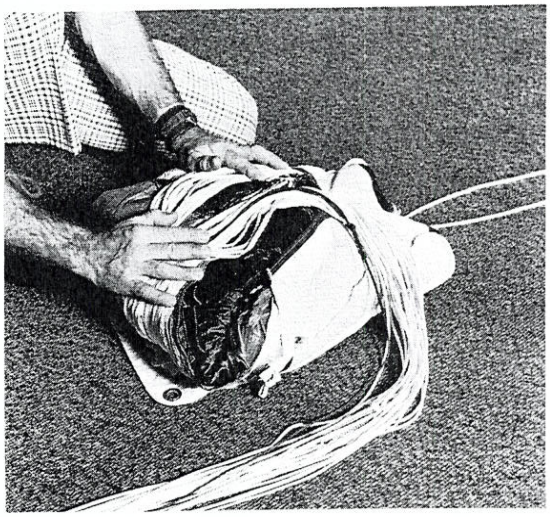
31

(E) Make second fold into the bag. Do not place reefing rings above key hole in deployment bag. (Fig. 32) Do not double Teflon into a tight radius, rather lay the Teflon sideways making a gentle radius.



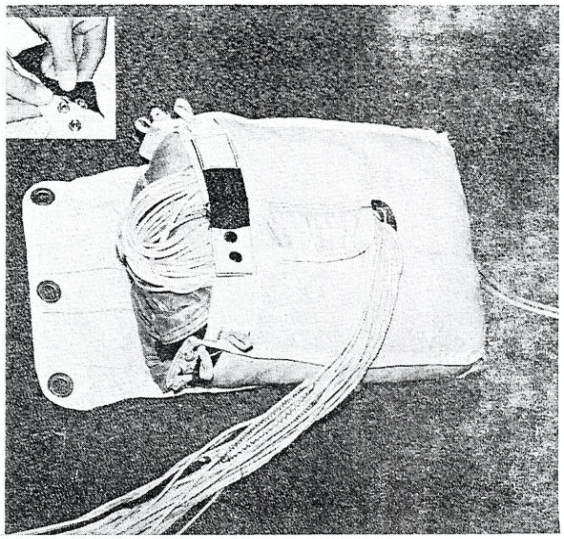
32

(F) Let the suspension lines down to the mouth of the bag and form another gentle turn until the lines are routed out of the top keyhole on the deployment bag. (Fig. 33)



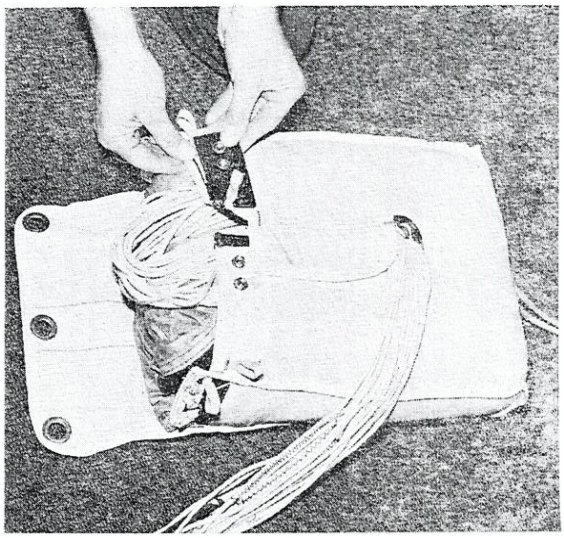
33

(G) Close the deployment bag. Snap temporary retention flap in place to help keep bag from splitting open if further "stuffing" is required. (Fig. 34)



34

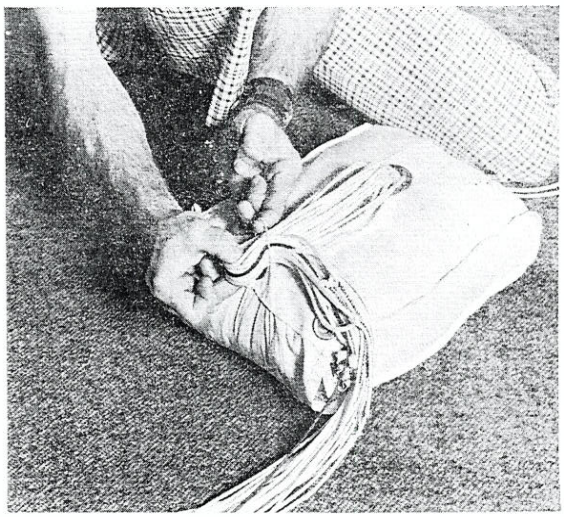
(H) Unsnap the temporary retention flap after stuffing bag and place against the Velcro retainer as provided. (Fig. 35) This will expose the center bag flap locking rubber band.



35

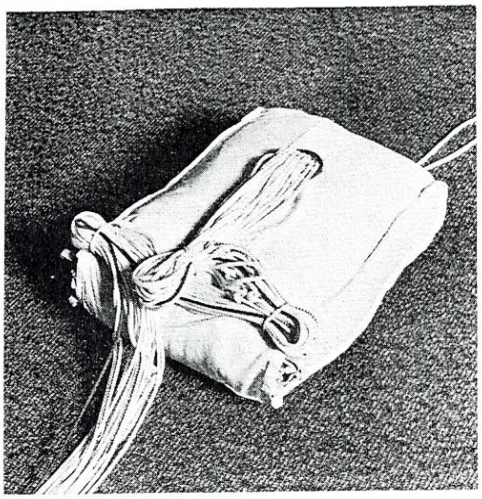
11. STOW SUSPENSION LINES

(A) Close center locking grommet using appropriate rubber band, fold the first locking stow under the band. (Fig. 36)



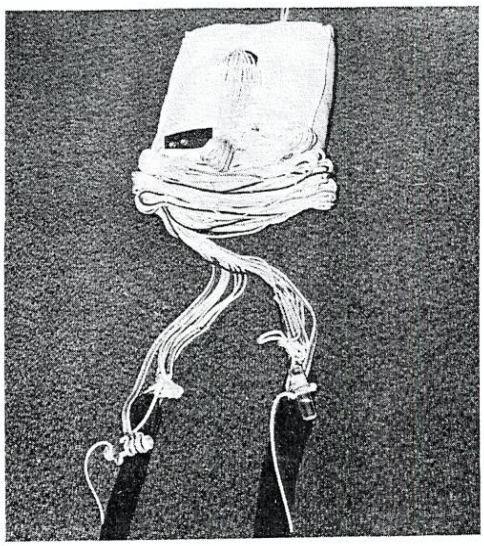
36

(B) Continue on the next two locking stows. (Fig. 37)



37

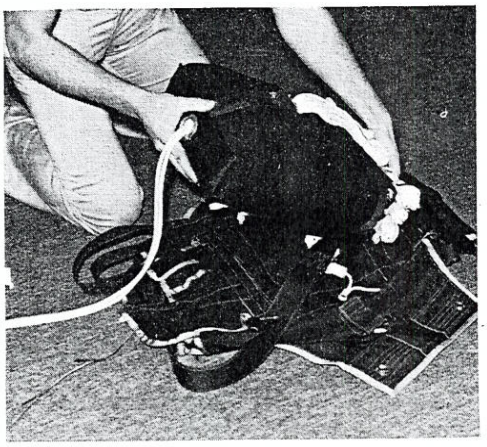
(C) From this point lines are stowed as normal using retainer bands provided. Continue to stow lines approximately 12-18 inches from connector links. (Fig. 38)



38

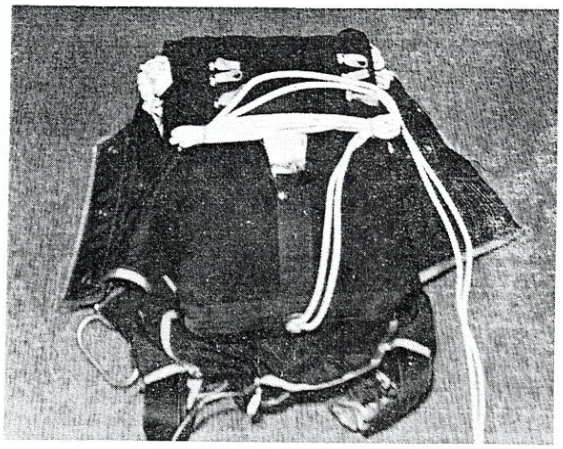
12. FITTING BAG INTO CONTAINER

(A) Pick bag up and lay onto container; rotate over. (Fig. 39)



39

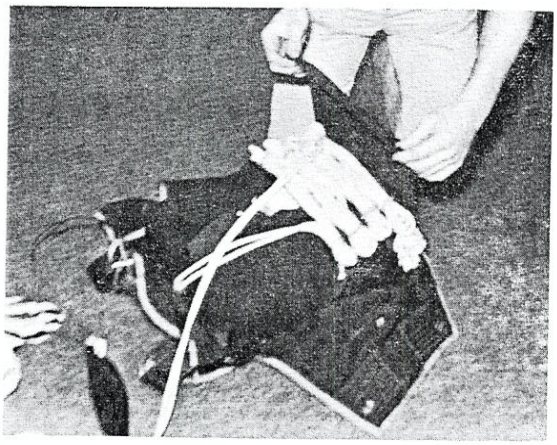
(B) Fit bag into container. Lock bag into container, with the flap being locked by the reefing line. (Fig. 40)



40

12A. STOWING REEFING LINES

(A) Care should be taken in stowing the reefing line. It should be stowed in three seperate stows. Leave a minimum of 36 inches of reefing line unstowed. (Fig. 41)



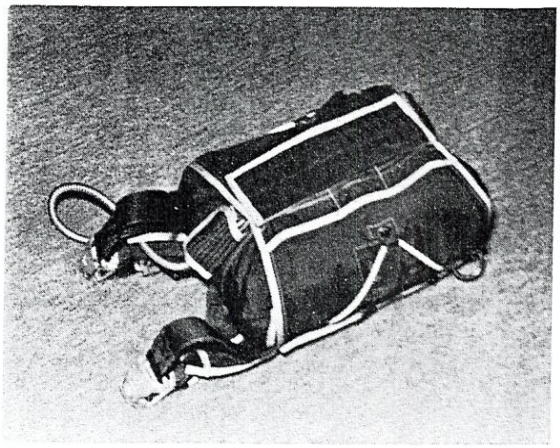
41

13. CLOSING THE CONTAINER

(A) Using a "Pull up cord" close the center pin first over the pilot chute. Close the top pin second and the bottom pin last. (Fig. 42)

42

(B) Dress container, snap pack opening bands. (Fig. 43)



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CARE and MAINTENANCE

Although it would be ideal, it is not practical to minutely inspect the SC wear and damage after each jump. However, the whole system should be regularly examined for signs of wear. Any part of the system requiring maintenance should be marked for later repair and replacement.

Pay special attention to the Reefing Line and Reefing Rings. Should any part of the deployment system become frayed or require maintenance, be sure to take care of it before making subsequent jumps.

Repairs: Small holes and tears should be repaired with ripstop tape. Wherever possible put ripstop tape on both sides.

Medium size tears should be repaired by laying a patch over the damaged area and zig-zaging the patch around the edges.

For any major damage consult Para-Flite Inc.

Special attention should be given to the bag. Loose grommets should be replaced immediately. When replacing these parts, make sure they are installed properly.

Replacement parts for the SC may be obtained from Para-Flite Inc.

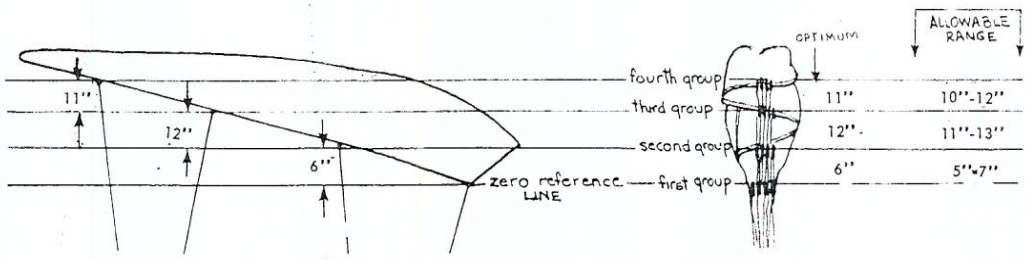
STRATO-CLOUD FLIGHT TRIM CHECK METHOD

The following information represents the most current method available to establish and/or check the proper "trim" or "rigging" of the Strato-Cloud Model.

1. Arrange all 4 connector links in a vertical stack and anchor them firmly in that position.
2. Check for proper canopy layout and proceed with the first "S" fold.

   Compare the distance between the first and second groups of suspension line attach points. It should be 6 inches with equal tension applied to each group.
3. Make the second "S" fold.
   Compare the distance between the second and third groups of suspension line attach points. With equal tension applied to each group, the distance should measure 12 inches.
4. Make the second "S" fold.
   Now compare the distance between the third and fourth groups of suspension line attach points. It should be 11 inches with equal tension applied to each group.

The diagrams below illustrate the method described.



NOTE: If parachute becomes wet or damp - DRY IMMEDIATELY - colors may run if left damp.

WARNING—NO WARRANTIES—DISCLAIMER

It is expressly understood and agreed that by the use hereof by the Buyer or any subsequent user that the Seller shall in no way be deemed or held liable or accountable, upon or under any guaranties or warranties, expressed or implied, statutory, by operation of law or otherwise, beyond that expressed herein. It is sold with all faults and **Without Any Warranty** of **Merchantability** or **Fitness for Any Particular Purpose,** expressed or implied for the particular purpose the Buyer intends to use it.

It must be understood that this is a gliding type parachute which has flight characteristics unlike conventional parachutes, and therefore must be used and controlled by persons who thoroughly understand these performance capabilities and limitations. Certain control maneuvers, improperly executed by the user may cause serious injury and death, especially if these maneuvers are performed at too low an altitude. Further, this is a sensitive device which may be easily damaged, and a malfunction may occur from improper use, accidents, striking, alteration, excessive use, misuse or abuse, for any and all of which the Seller will not be liable.

It must also be understood that this device is designed for intentional parachute jumping and should not be solely relied upon by the user. The liability of the Seller is limited to replacement of defective parts found upon examination by the manufacturer to be defective in material or workmanship within 90 days after its purchase, and which has not been caused by an accident, striking, improper use, alteration, tampering, excessive use, misuse or abuse.

The period is limited to 90 days because after that period of time, its normal use without inspection by the Seller may affect it. The damages of the Buyer and/or user shall be deemed liquidated in the costs of replacement as above. The Seller and/or manufacturer shall in no event be liable for personal injuries or for any other damages, whether direct or consequential to any person, and have no other liability in connection with this device, and the Seller further DISCLAIMS and the Buyer and/or user hereby **waives** any such liability.

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