



*Mr. Silky &
Mixed Vertical Piloting
Manual*



What is Mr. Bill?

In skydiving, the Mr. Bill is a stunt where a parachutist climbs onto another jumper before starting a skydive or base jump. On exit, the jumper facing into the wind deploys their parachute.

February 28, 1976: Mr. Bill first appeared on Saturday Night Live. The episodes would start innocently but quickly turned dangerous for Mr. Bill and his dog Spot. The violence inevitably escalated, generally ending with Mr. Bill being crushed or dismembered while squealing "Ohhhh nooooooooooooo!" in a high-pitched voice.

With the invention of the ram-air canopy and slider around this time frame, it was the best mascot to adapt for this newly accessible skydiving maneuver. Even with 45 years of sport progression since then, this maneuver is still regarded as sketchy and banned by many drop zones due to its potential risks; Anything but an instant deployment leads to increased opening velocity and the potential to rotate outside of the safe opening axis. When critically failed on cross braced canopies, micro lines can wrap the jumpers and, on inflation, slice through bone. Among other reasons, the risk and the complexity remain too high for this to be manageable on high performance canopies -

This is the sign that the concept itself needed to be reevaluated to increase safety and make the move sustainable for all dropzones, aircrafts, and skill levels.

When designing MVP - without a flawless and precise way to drop a jumper - We would never achieve the first proof of concept. This is where the project found its origin.

To find a solution, we have to outline what malpractices make Mr. Bill dangerous:

- Unsynchronized group exits
- Top pilot unable to body fly on hill
- Top pilot container & pilot chute traffic
- Jumper pair rotating off safe opening axis
- Small pitch window before velocity increase
- Canopy diving is significantly harder to recover with twice the wing load
- Consistently distributing weight evenly without new inputs on the canopy

What is Mr. Silky?

Mr. Silky

/ˈmɪstər ˈsɪlkē/

Verb

Mr. Silky is a stunt performed by two experienced parachutists while using superior logic and rigging to tether the pair. During exit, the top pilot deploys while the bottom pilot sits back comfortably as the Mr. Silky harness is loaded evenly between them. After the parachute is open, the pair can now fly at speeds and orientations never before sustainably possible. When either pilot decides to pull their independent release handle, the bottom pilot breaks off and can now deploy their own parachute safely.

Bottom Pilot Flight Positions



Upright

Delta

Inverted

FlySight speeds recorded on the HK2 60 loaded at 6.0 wing load

Average in MPH	Upright	Delta	Inverted
Vertical Speed	55	57	60
Horizontal Speed	80	84	69
Total Speed	96	101	91
Glide Ratio	1.40	1.47	1.16

The smoothest successor imaginable.

How do the techniques compare?

Mr. Bill



Mr. Silky



Top Pilot

body weight: 200 lbs
parachute system: 20 lbs
Encumberment: 200 lbs

Bottom Pilot


carried: 200 lbs x g-force

Top Pilot

body weight: 200 lbs
parachute system: 220 lbs
Encumberment: 0 lbs

Bottom Pilot

carried: 0 lbs

 In flight, the top pilot can't distinguish if the parachute weighs 20 or 2,000 lbs 

Once you suspend the load evenly into the top pilot's parachute system and position the bottom pilot on a lower level, most deployment complexities are reduced into a poised solo for the top pilot. This also greatly increases bottom pilots safety from entanglement. Now that the bottom pilot no longer has to support their weight, both jumpers can fly controlled without creating diving inputs.

All testing was done on the HK2 60 out of a King Air aircraft. After finding mastery over these concepts, opening 40° off heading is uncommon.

What is Mixed Vertical Piloting?

Mixed Vertical Piloting

/ˈmɪkst ˈvɜːdək(ə)l ˈpɪlətɪŋ/

Verb

Mixed Vertical Piloting or MVP is the 13th and newest discipline in the sport of skydiving as of December 4th, 2021. It's the first canopy discipline to be created in 19 years since the birth of XRW. In this discipline, two highly experienced parachutists connect themselves together using the MVP harness to create an endless dive between two canopies. This is performed safely due to tension from the harnesses continuous webbing connection points. In static flight, with the proper tools, freefallers, for the first time, can dock onto parachutists to build small to big way formations. In dynamic flight, jumpers fly artistic relativity routines together in new yet predictable ways. When either release is pulled, both pilots separate into a recovery arc and resume traditional flight.



Who is qualified?

When the guys that rapidly downsized start talking about how you should not rapidly downsize



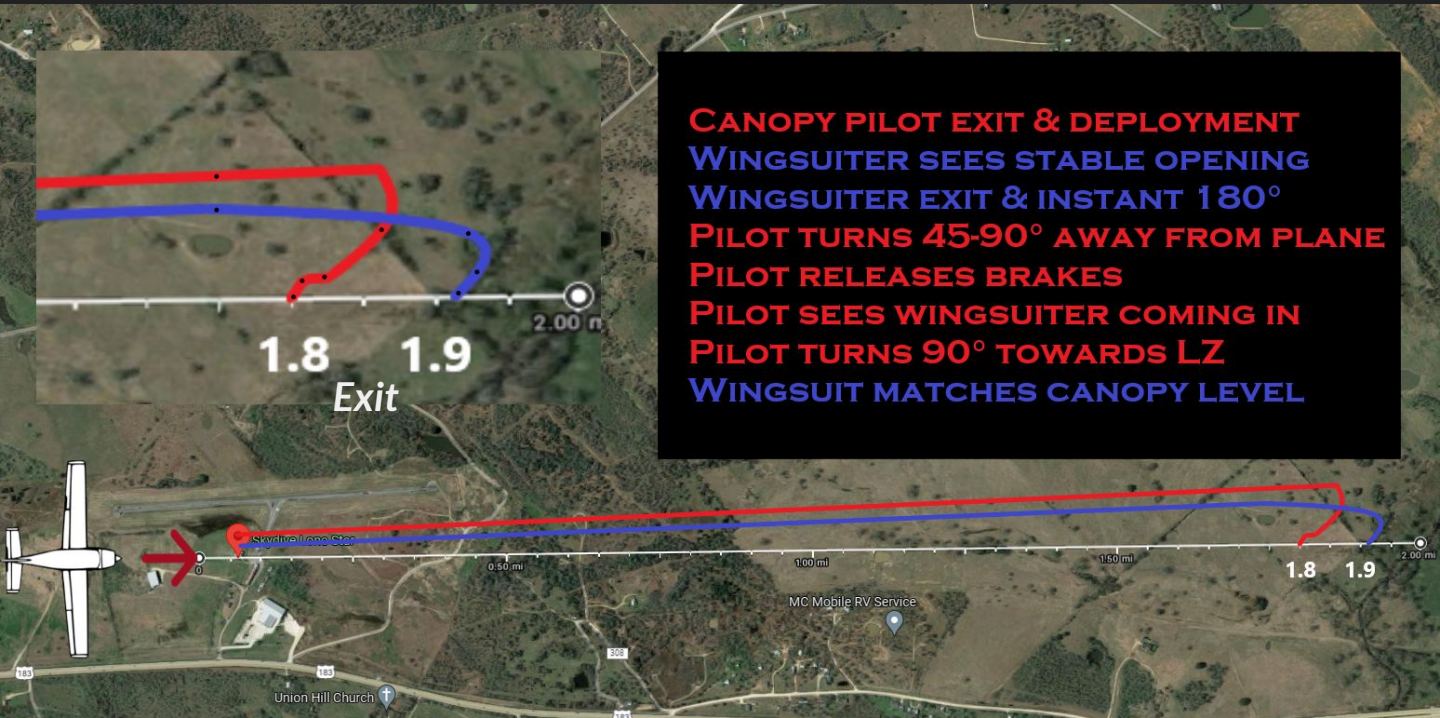
On almost every ram-air square and new generation entry level cross braced canopy, Mr. Bill is still the simpler move. It requires no skill level or reaction to break apart safely. Without a roll sensitive parachute maintaining control for the pair, operators can consistently get away with careless mistakes. This is also a right of passage in a sense. Accomplishing a Mr. Bill on larger parachute then Mr. Bill XRW should be a prerequisite before advancing to an easier but highly technical dive flow with moving parts.

That being said, outside of thrill, it would be pointless for anyone on a square parachute to use this device. Learning CRW and perfecting parabolic grips is a better use of a young canopy pilot's time and focus.

When we used a VK-90 on Mr. Silky jumps, we found it's nearly impossible to lose control. This slowly scales until we hit sub 70 sqft. Any sail/ft30 canopy in the 60s demands a very strict process to ensure success and safety.

With an experienced top pilot, A license and up could fly bottom pilot Mr. Silky. Bottom pilot MVP candidates should have high body and hip awareness. Top pilot Mr. Silky candidates should be current and only use seasoned canopies. Top pilot MVP should only be performed once you have mastery over every role.

Where to exit?



In normal conditions, this is the simplest exit strategy to build XRW formations.

On a sub 70 sqft, because of the glide angle, Mr. Silky should exit at 1 mile past.

Larger canopies should scale accordingly. Expect half your horizontal distance.

When first operating the Mr. Silky at a high speeds, even the most veteran jumpers will experience tunnel vision. The severity of that tunnel vision can feel as high as your first aff jump. Zach Sperduti and I had 18,000 jumps between us during R&D and we laughed when we realized we couldn't recall the first few dive flows.

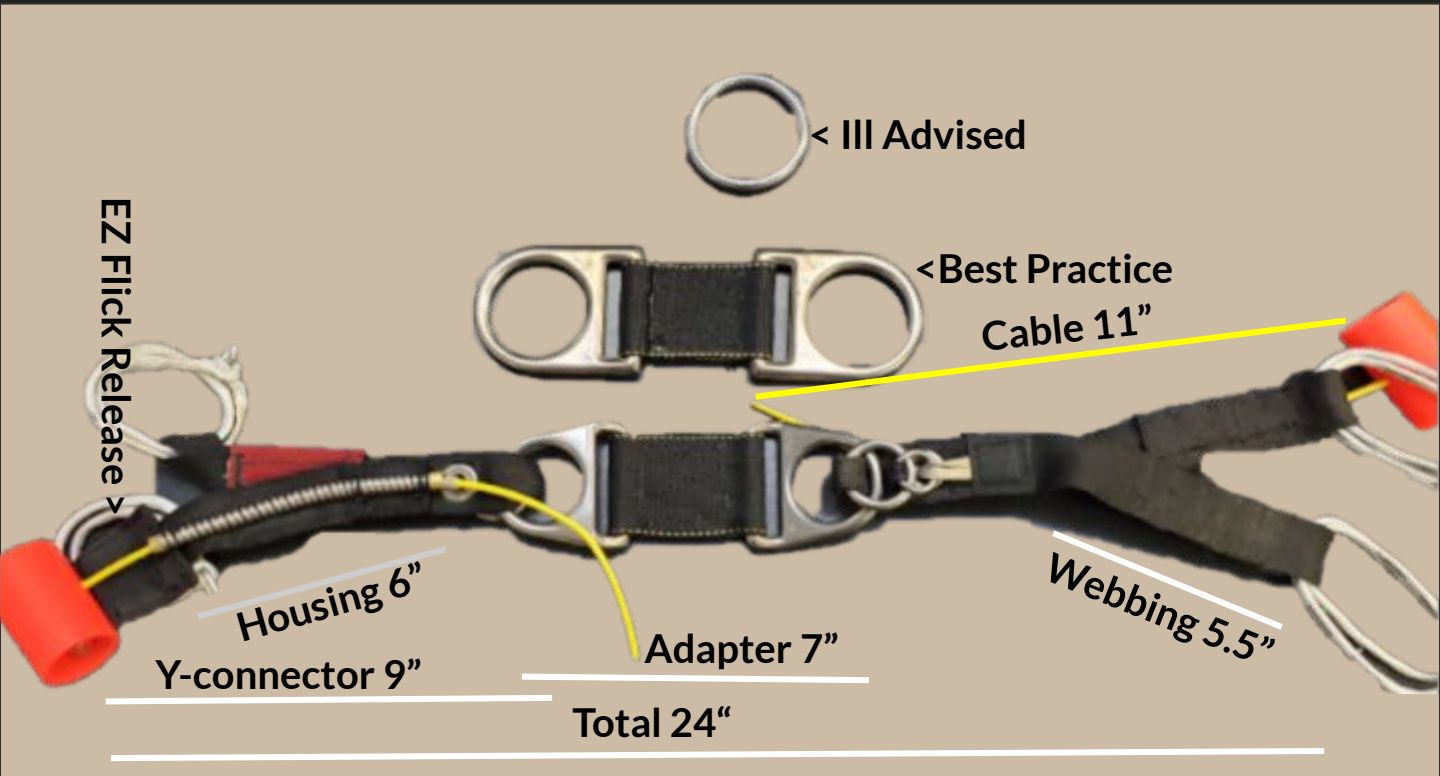
Candidates first learning high performance Mr. Silky should exit at 0.6 miles past.

When intending to fly static as an MVP base, the closer to right on top, the better.

During dynamic MVP movement on VK-90s with additional separation, it's easy to get back on level with tandems and angle past them before reaching break off.

Unless otherwise planned, all MVP movements should fly in the outer wingsuit lane.

Mr. Silky Blueprint



Zach originally made the first y-connector with the invention of the 'sketchy whip'. Observing *under the table* yet competent footage of its use is what lead me to carefully asking him if he thought MVP was possible and that phone call began our partnership.

While designing, the goal was to create the simplest and safest possible devices with a flawless level of functionality. Each pilot must have their own 3-ring system to be indisputably safe. Low quality hardware or a single ring connection could oval and cause release failure. Velcro should be pull tested to ensure optimal functionality.

Slinks or webbing in a larks knot with cobra clips are the only viable ways to connect the harnesses to the hip articulation points. Carabiners should never be used, the gates allow for lines to get trapped inside of them. Cobra clips are for ease and exact fit. Slinks make the attachment slower but allow for universal fit and are an additional cutting point. When creating channels for slinks, the diameter should be a little bigger than an index finger.

How do the harnesses compare?



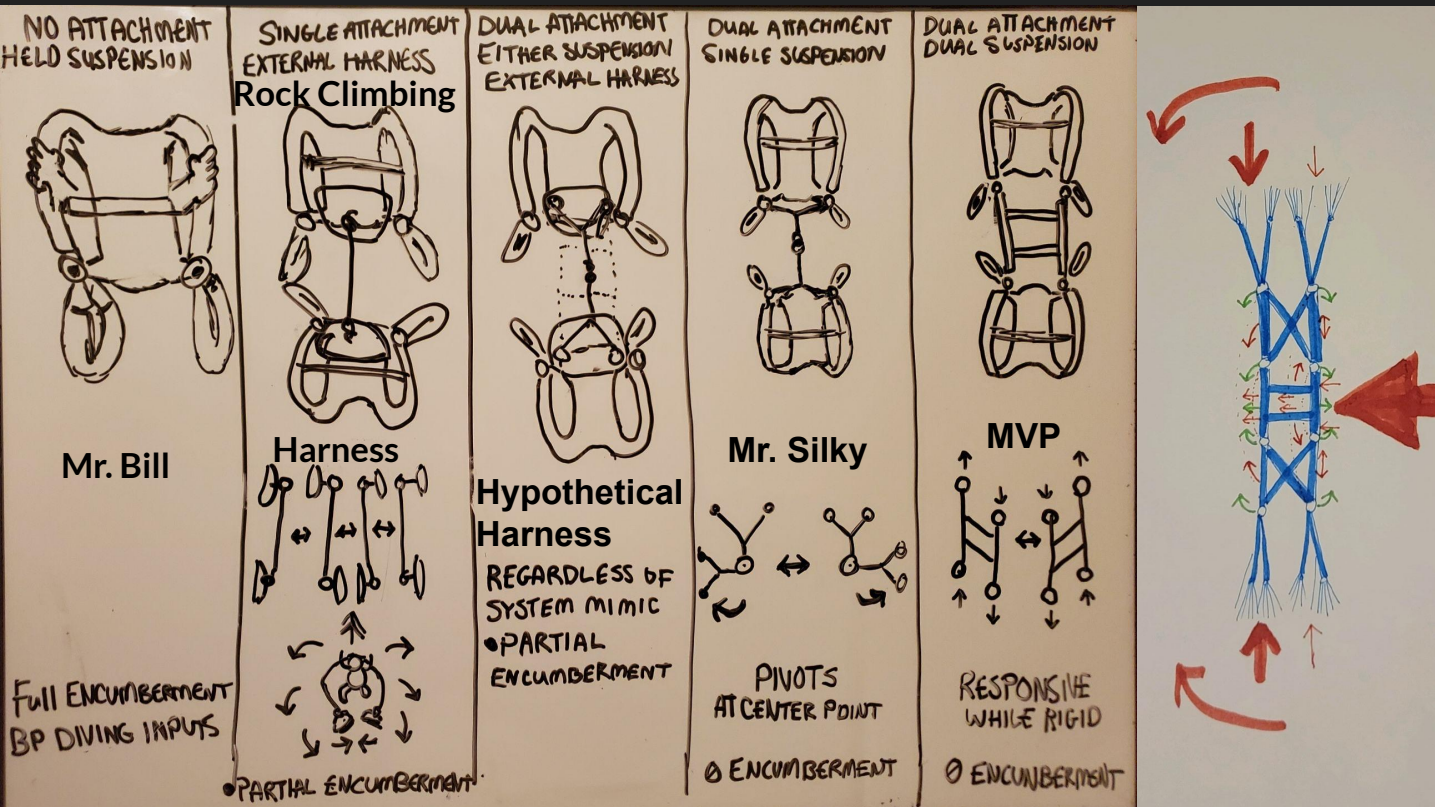
Both harnesses use dual point attachment to each jumper. The main difference is single point vs. dual point suspension.

Single point suspension is the easiest platform for both operators - Centralizing the weight into the hips from a swinging point negates all bottom pilot body input from traveling up into the main. This platform should never downplane, as there is insufficient rigidity in the system to stop the pair from entangling during the second opening or flight.

In single parachute flight, the bottom pilot may intentionally get asymmetric but it can easily be compensated for via the top pilots flight controls. If both systems are built to proper dimensions, The top pilot should be able to comfortably stand on the bottom pilot's container to control pitch and yaw.

Dual point suspension can achieve both single and dual parachute jumps. It allows either pilot to control both parachute systems. The rigid flexibility in the webbing is what creates a buffer for the canopies to take aggressive inputs safely towards each other. This is basically what side body flight is. The only downside is it's possible to half release the system due to user error and requires serious diligence.

What doesn't work



Any design with more than 2 attachment points adds unnecessary complexity. External harnesses may shift under dynamic forces and cause a loss of control. There's nothing stopping single point suspension from slamming together like a bear trap upon receiving a dock. Removing all weight and fatigue from the canopy pilots should be a top priority when building and flying any harness. Creating a system too long now allows the bottom pilot to drop. During a hard opening this can severely injure the bottom pilot. When suspended lower than 28", you're only adding danger while practicing these processes.

When replicating the harnesses, it's best make the slink version exactly as stated and only reinvent the wheel after using this safety blanket of knowledge to nail proficiency and comprehension. If the length needs to be longer on the Mr. Silky, increase the adapter size. If the Mr. Silky needs to fit a wider waist, use longer slinks. Once you know exactly what you want from the system, then introduce cobra clips and modifications. Using a smaller pilot chute can burble and wrap the canopy on the bottom pilot's back. Other than packing error, pitching a small pilot chute is the only way to put the bottom pilot's canopy off heading and result in a release.

Logical Progression



- Learn both roles of the Mr. Silky dive flow
- Attach and operate the Mr. Silky harness
- Practice the new gear checks / 20+ handle touches
- Door exit practice
- Hanging / ergonomics practice
- Walk the dive flow
- Group EP rehearsal
- Candidate jumps as Mr. Silky bottom pilot with some induced force from diving
- Candidate jumps as Mr. Silky top pilot until comfortable and proficient
- Candidate learns both roles of flying MVP base
- Attach and operate the MVP harness / 20+ handle touches
- Candidate jumps as MVP bottom pilot. Three practice touches then deployment
- Candidate proves proficiency at housekeeping and operates the new release
- Candidate jumps as MVP top pilot
- First freefaller dock after a collection of 50+ total jumps flying dynamic MVP on 84-96 sqft canopies and strictly static MVP on sub 70s
- High speed dynamics require the highest level of mental and physical unity.

Attachment & The new gear check

Before your first tethered jump, you must acknowledge that you are now responsible to fully comprehend and maintain your partners parachute system. Error can only be avoided by both jumpers following a systematic way to check the gear and confirm that their partner is too. On your first assembly, the handle is suggested to be placed on your dominant hand side. Once rehearsed, under no circumstance should you change this. A hanging harness is invaluable but a mock up bar could be a quick fix. If the slinks are difficult to attach and a canopy pilot ends up racing their altimeter to assemble, this can heavily affect their performance. When using a belly band, route the slinks above the leg pads and below the belly band to prevent asymmetry.

1st - Check of 3s

AADs must be ON, RSLs must be OFF, Comms should be considered mandatory. Before equipping, both pilots fully inspect both parachute systems and the harness being used. Both pilots confirm who is carrying the Mr. Silky adapter if used. Full assembly to hips at this time. Comms should be synced before boarding.

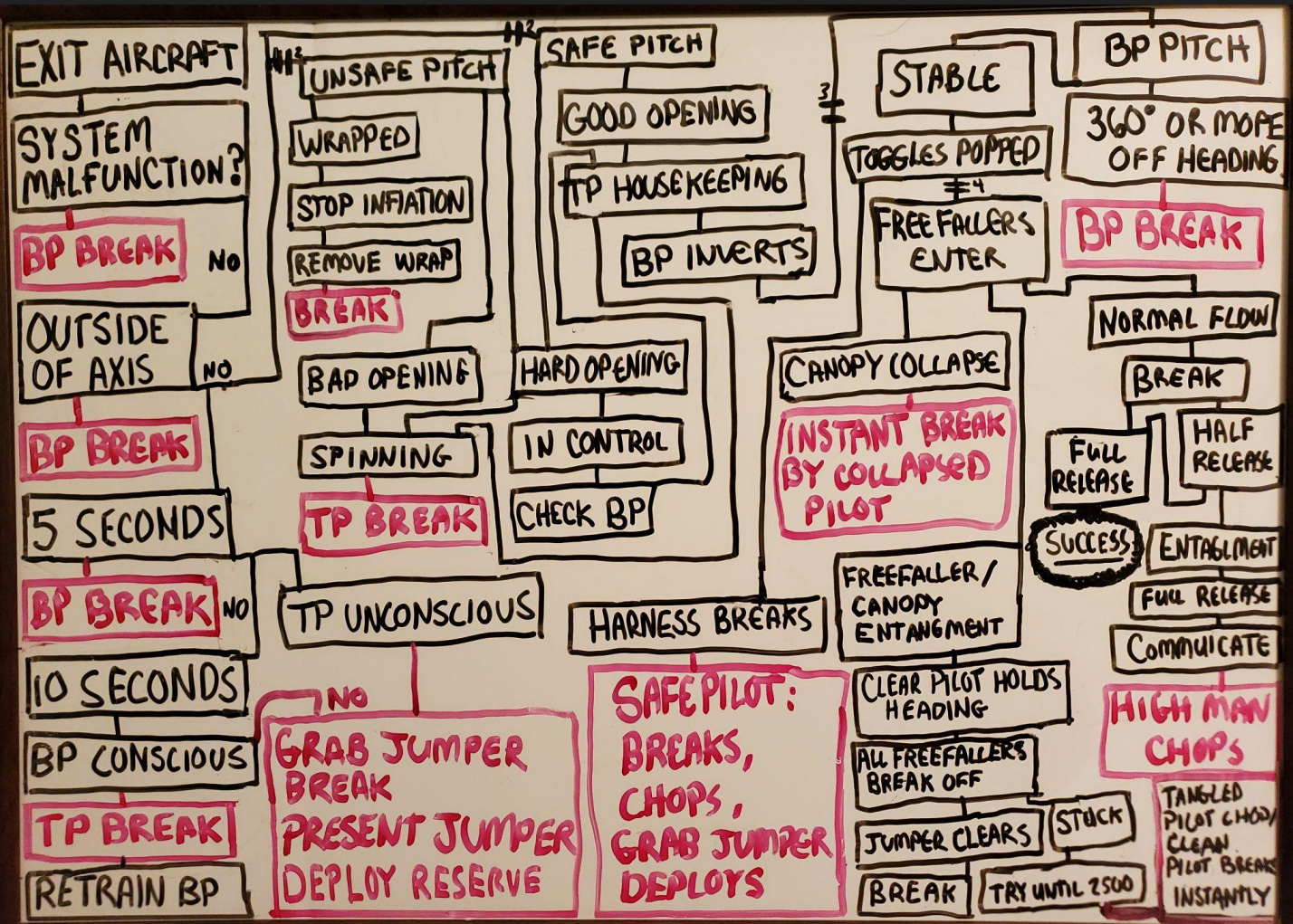
2nd - Check of 3s

Both pilots exercise a pre-boarding check. On boarding, the bottom pilot should sit on the bench near the door and the top pilot should sit adjacent on the other bench.

3rd - Check of 3s

Around 9k, jumpers perform an individual full system check on their own equipment. All roles but Mr. Silky bottom pilot open their own riser covers at this point. Afterwards, rotate 90° towards the other jumper to connect the harnesses. MVP bottom pilot orients the hip rings symmetrically inward 90° to assemble. Once assembled, both jumpers inspect the tether's: slinks, webbing, release handles, 3 ring routing, and cable routing. Next, both jumpers mirror a left sided hug to physically and visually check the other jumper's: pilot chute, bridle line, and flap routing without opening them. Now dual inspect the other jumper's: riser covers, RSL, 3 ring routing, chest strap, handle and cable functionality. Both jumpers confirm to each other that the system is ready. Cameras, comms, and flysights should be handled at this time. If there's concern about a helmet malfunction, you can prime your items before this phase to avoid altering and potentially skipping steps in this important process.

Emergency Procedures



The entire process boils down into four phases.
Freefall, 1st Canopy, 2nd Canopy, Bottom End

It's important to act out every scenario with with your partner to reduce reflex time. The only time centrifugal force is deadly is when it's prolonged. Controlled induced force is incredibly fun to experience. All top pilots should perfect their first and only reflex to instantly operate the release when diving out of control.

Trying any other resolution can lead to rendering your partner unconscious and you can't land with them. Timing on the EP where a freefaller is entangled in the base is critical. If an MVP pilot cuts away and the other pilot doesn't release immediately, the force from the recovery arc may knock the lower pilot out near decision altitude.

Level 1 – Mr. Silky – Freefall

Removable instead of RDS should be used until highly proficient. If the aircraft you're exiting has a lower airspeed, you may need a bigger pilot chute.

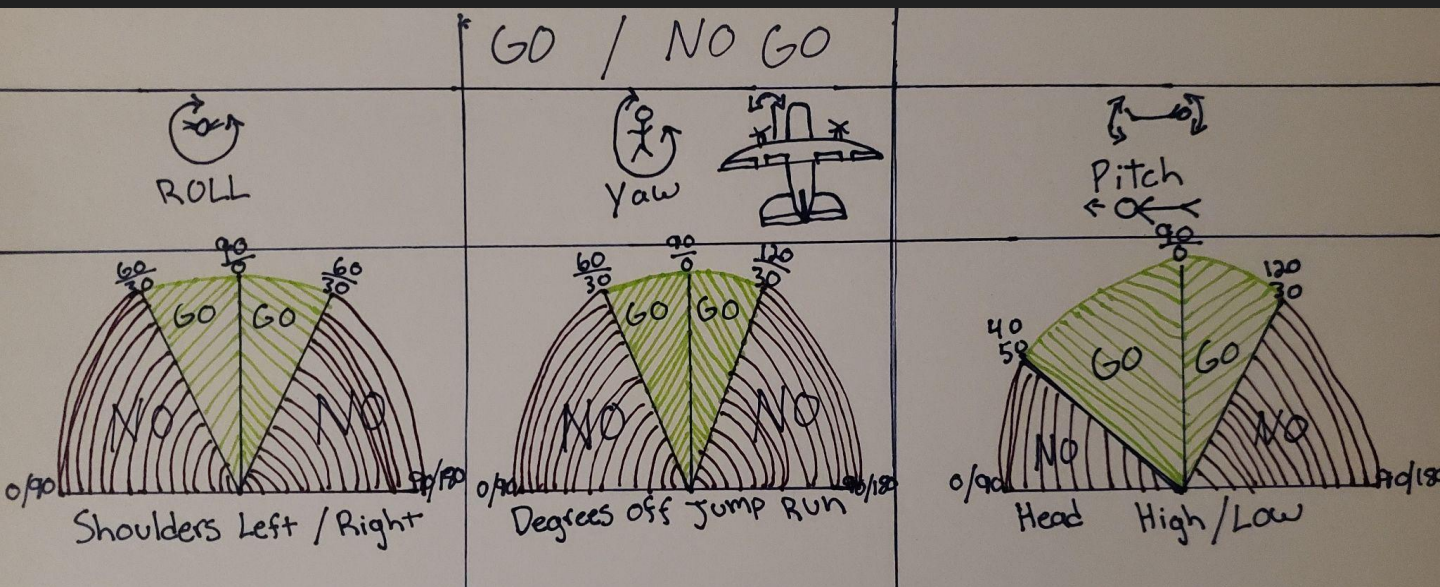
High pullers will usually exit last. The pair should have a moment to slide down, breathe, and check their main handle one last time for peace of mind. The best exit strategy we found for the king air was for the top pilot to pivot to rear float and force slack in the harness. This can be difficult because this system is designed to never go slackless and create an opportunity to shock force into the bottom pilot's body. The bottom pilot sets up first by front floating a low back fly exit in the door. Once in position, the top pilot grabs the outer bar, then their pilot chute, then maneuvers onto the step. The bottom pilot uses their outside hand to lightly grab the top's leg pad. The top pilot gives the count and as the pair leaves, the bottom pilot lightly matches their grip and sits back. The top pilot exits as poised and stable as possible.

Rapidly rushing the extraction process is the only way to prevent the extreme dangers of deploying off axis. Every instant stable pitch resulted in comfortable and controlled openings. When leaving the aircraft with the pilot chute stowed but already in hand, we eliminate the only way to add human error into the equation. When pitching as you lift that arm to get stable, there's no delay.

The bottom pilot should start counting out loud and by 5 seconds, if there's no extraction, assess the top pilots consciousness and if okay, release from the pair. The top pilot has the same role as a tandem instructor during this time. Get stable! By the 10 second mark, if there's no extraction and release, it is now the top pilots job to assess consciousness of their partner and then release.

In the event that a jumper is unconscious, you're aware and problem solving at the highest altitude. The jumper gains control over their partner, operates a releases handle, orients their body belly to earth with their head facing the landing area, and deploys their reserve. Additionally the coherent jumper will track off and quickly deploy to spot their partner. As they regain consciousness, comms and clean concise commands can be used to guide their heading and help them check in.

Level 1 – Mr. Silky – 1st Canopy



The only reason the top pilot shouldn't release the pilot chute instantly is if the group gets outside of the safe opening axis. After exiting, if you break these degrees, no operator should aspire to fly back into a safe margin for deployment. This only leads to pitching with higher velocity, which could mimic drogueless tandem speeds. It's very simple to exit correctly and should be the only plan. Releasing when questionable and flying conservatively will prevent the possibility of filleting the jumpers with micro lines.

The canopy comes out three different ways, stable, unstable, and hard opening. A Hard opening could be salvageable, and in MVP, for the first time, the bottom pilot may choose to downplane then release to avoid freefall and opening shock from a traditional deployment. Stable allows us to grab rears and start navigating.

In the event of instability, the bottom pilot is in a seated position observing the entire process with the top pilot's handle in direct access. It is the most mandatory concept in this manual that the bottom pilot stays up right until after housekeeping. This puts them in control of their safety. If at any moment they're upside down and spinning with their arms up, they have to fight centrifugal force to operate their release. Leaving them unlikely to recover and reliant on top pilot to keep them safe. With a couple practice jumps, the *1st canopy* opening process becomes effortless.

Level 1 – Mr. Silky – Full Flight

During the opening, the bottom pilot will pitch higher in relation to the top pilot. To unify the load, the top pilot should lightly pinch with their calves. As soon as the top pilot has the rear risers, the canopy is in control while trimmed. Top pilot should be the only person flying the first canopies deployment. After a stable opening, experienced bottom pilots may coordinate with the top pilot prior to the jump and navigate on the hill to accelerate housekeeping. It's simplest to slow down, watch any suits in your group exit while navigating to the landing area then trade control to the bottom pilot.

Once the pair is on the correct heading and calm, the pair should communicate that they're switching control. The bottom pilot treats the leg pads as if they're parafoil kite handles and has a one-dimensional job of keeping the wing level. The top pilot's hip inputs become nearly null as you now feel like the middle a weird human slinky. You cannot rely on top pilot's hip inputs to keep the wing level for the pair.

The key with this entire stage is rushing through it without knotting your rear rings in your break lines. The canopy is struggling and flutters when the chest strap is narrow and the brakes are set. While stable before housekeeping, letting go of the rears can result directly into a dive without bottom pilot intervention. This is still true but significantly reduced when the canopy is in controlled full flight.

When flying excessively loaded in full flight for the first time. Expect to feel more control than normal. The canopy feels more powerful and with proper symmetry in the system comes speed and dynamic precision. Once in full flight and on the rear risers, it's finally green light for the bottom pilot to fly *Delta* or *Inverted*.

The true magic and perfection in this system, when the harness is at the correct length, is that the top pilot can stand on bottom pilots container laterals in *Delta*. The closer to the direct center, the less strain on the top pilots legs to aid the bottom pilot's pitch and yaw. Stretching the system apart removes all asymmetry and turns the pair into a piece flying at its lowest parasitic drag and highest potential terminal velocity.

It's important to check off maneuver proficiency boxes in a logically progressive order. Fast flick then slow dive rotating 90°, 180°, and 360° in Upright, then Delta, then Inverted. During this process, it's important to learn where your partners limits are at.

Level 1 – Mr. Silky – Separation

The release handles are the bottom pilots life line. Drill them heavily on the ground.

In the shown rigging design, a small portion of the yellow release cable is exposed from the housing. This gives the pilots an effortless way to flick release the system.

The initial release handle operations are considered training for emergency procedures. Depending on your navigation and bottom pilot's main, dropping at 4,000 ft is a safe height to start at. It's mandatory that the top pilot spot and relay verbal safety for the group before either pilot operates the release handle.

The first group release should be operated by the bottom pilot in the upright position on the top pilot's release handle while under a level wing. This skill is the bottom pilots first line of safety on the hill. Next should be bottom pilot operating their release while in delta flight and under a level wing. Afterwards, The top pilot needs to operate their handle with a level wing. We combined my stable release proficiency jump with transferring my bottom pilot onto a wingsuit. Take additional care to have the wingsuiter fly forward as to not drop their heads directly into each other before releasing if performing this maneuver.

Now that we've got the basics out of the way, operating the release handle while playing with diving velocity is the most exhilarating way to separate. This can be done two ways. Using hip and front riser input or using a rear riser. Front and hip input makes the canopy dive evenly and builds slightly more vertical speed. Rear riser input makes the wing orbit from nose low to nose high in an egg shape. Timing a release perfectly can throw the bottom pilot temporarily above the canopy. At this apex, return to pure hip input to enjoy a momentary surreal glimpse of relativity. It's mandatory that the pilot keep rotating if confused. This keeps them in their own column and gives them time to plan a safe heading direction to stop on.

The top pilot's proficiency can easily be judged on flysight by how close the group ended their flow to the landing area and by how many heading changes were made.

It's time to send it

Level 2 – MVP 84/96 sqft – Preflight

By this point you should be feeling alive and confident. Regardless of what size main you were practicing on in the last level, it's necessary to upsize to a 7-cell beginner to intermediate cross braced canopy. At the time of this writing, with zero manufacturer bias, we found VK-90 to be the most reliable canopy for MVP training.

For safety, it's obvious why we recommend upsizing. A hidden perk is that bigger canopies can take heavily abusive inputs and operator error. This tolerance is nearly halved on HK2 60s. The MVP harness provides a buffer of tension but aggressive piloting can still fold the pair and that's why level 2 exists - to safely find that edge.

Every jump with this harness design should be considered a training jump for the person operating the release handle. Because there are two independently moving 3 ring systems, an improper release can result in a side by side and canopy wrap. When operators are drilling the range of motion, you should never rotate the wrist, instead perform a strong full arm extension lifting above the ribs.

On the Mr. Silky, RDS is commonly impractical but it could be used for a purpose. In MVP, it's a drop of juice that is simply not worth the squeeze. While moving at three times your normal solo speed, the drag on the lanyard could cut the pilots risers, hands, or neck. The bottom pilots housekeeping to controlled full flight timing has to be less than ten seconds on a normal 14,000 ft jump to achieve a dock in later training.

If the top pilot is mismatched with a RDS, they'll have to add rear input induced drag to compensate. There are also no tools available to reference where true vertical is, creating a slight drag flight. The best practice to achieve a dock is full symmetry in every way. This allows both pilots to use the least amount of input to fly true static. When using this logic later on with the proper tools, the freefall overlap is easy.

At this level, matching a hybrid with a non-hybrid on the same platform isn't terrible. It's more about perfect practice. When you're at the point where you're fighting to raise your vertical speeds by a mile per hour, pilots matching exact weight for true vertical pitch, identical low drag risers, PD main slinks on fronts, and PD reserve slinks on rears will be a standard. After that it's all technique and mass tweaking.

Level 2 – MVP 84/96 sqft – 2nd Canopy

Before your first *2nd Canopy* deployment, find a comfortable way to address the leg traffic. You'll want the smallest body surface area possible to maximize clean air for extraction. Bottom pilot should lift both arms and perform three AFF styled main handle touches. At this time they will be able to sense the airspeed. When pitching the pilot chute, the bottom pilot should casually raise it above their head, stream it for just long enough to feel the drag, and release to a poised position.

As the deployment happens, the top pilots only job is to hold heading for the pair by using the rear risers. The top pilot will feel the harness bobble and flex backwards three or so times and should bend their knees and stay loose. This will be a clear indicator to the top pilot on what's happening down there before pitching forward.

Once again, the safest way to execute this extraction is by rushing through it. No matter how tight your body profile is, you're going to create a burble. The 36" pilot chute is perfect because you can release, slow fall, and pitch without a hard top skin attachment opening but still remove the canopy from its tray at lower speeds. We also preferred using semi stowless double stowed d-bags for these extractions.

The *2nd Canopy* isn't supporting the jumper, it's being towed / dragged through the deployment. Because the extraction starts below the formation, the canopy will always remain in clean air as it transitions. If the canopy is less than 360° off heading after coming out of the bag, the drag on the slider pulls the line groups taught and forces the nose to search within a 180° radius (90° left and right). As the cells inflate the radius for searching narrows down to on heading by 1:1.

The moment the slider is down, it's game on for the bottom pilot. Slide the rings down past the brakes, pop the breaks, and handle the removable. The wing is now a figure eight infinity symbol mirroring all inputs. Flying without input leads the base to violent trembling from input latency. If the top pilot holds heading, once the bottom pilot grabs their risers, the base calms down and can now be backed off of input. This is the best practice for static and dynamic.

Level 2 – MVP 84/96 sqft – Full Flight

On your first dive flow, both pilots should plan the simplest jump. The hardest part when you first start, is learning to stop flying your parachute. Your mind is wired but you'll have to force yourself to sit back mentally as you lay face first diving endlessly towards the ground in fully taught webbing. Planning to take your hands out of the toggles and just hold your mud flaps for stability is an easy way to accomplish this.

Before exit, the pilots should decide who is operating the handle. If the spot is good, at 4,000 ft, we would orient the heading of the base for safety and separate our legs as to not heel kick each others calves while releasing. The pilot not operating the handle holds heading. In the event of half release, your partner will naturally reflex to fly the canopies apart. The handle operator should follow through.

There are only three ways to fly on the roll axis.

Stationary

Rotate Left

Rotate Right

There are only three directions you can fly vertically.

Pure Static

Drag Flight

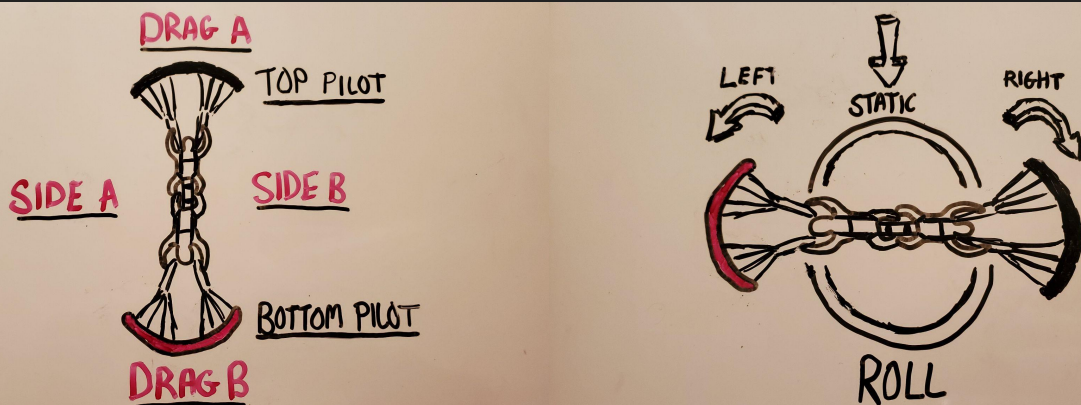
Side Body Flight



These two axes can be mixed at any time. Fundamental work and artistry over this concept is what will eventually evolve dynamics.

Level 2 – MVP 84/96 sqft – Proficiency

When first learning, we need a curriculum and clear expectations on how to move as a pair. Before attempting each new input, the pilots should physically mirror each other on the ground and agree on how much input to give and how much to add in increments. A big chunk of flowing together is learning to communicate clearly with minimal words. In pure static, the idea is that all four risers are lightly and equally trimmed. Everything else can be explained using this lingo.



All these maneuvers should be performed by one pilot, then the other, then together. When it's your turn to wait, keep your hands on the controls.

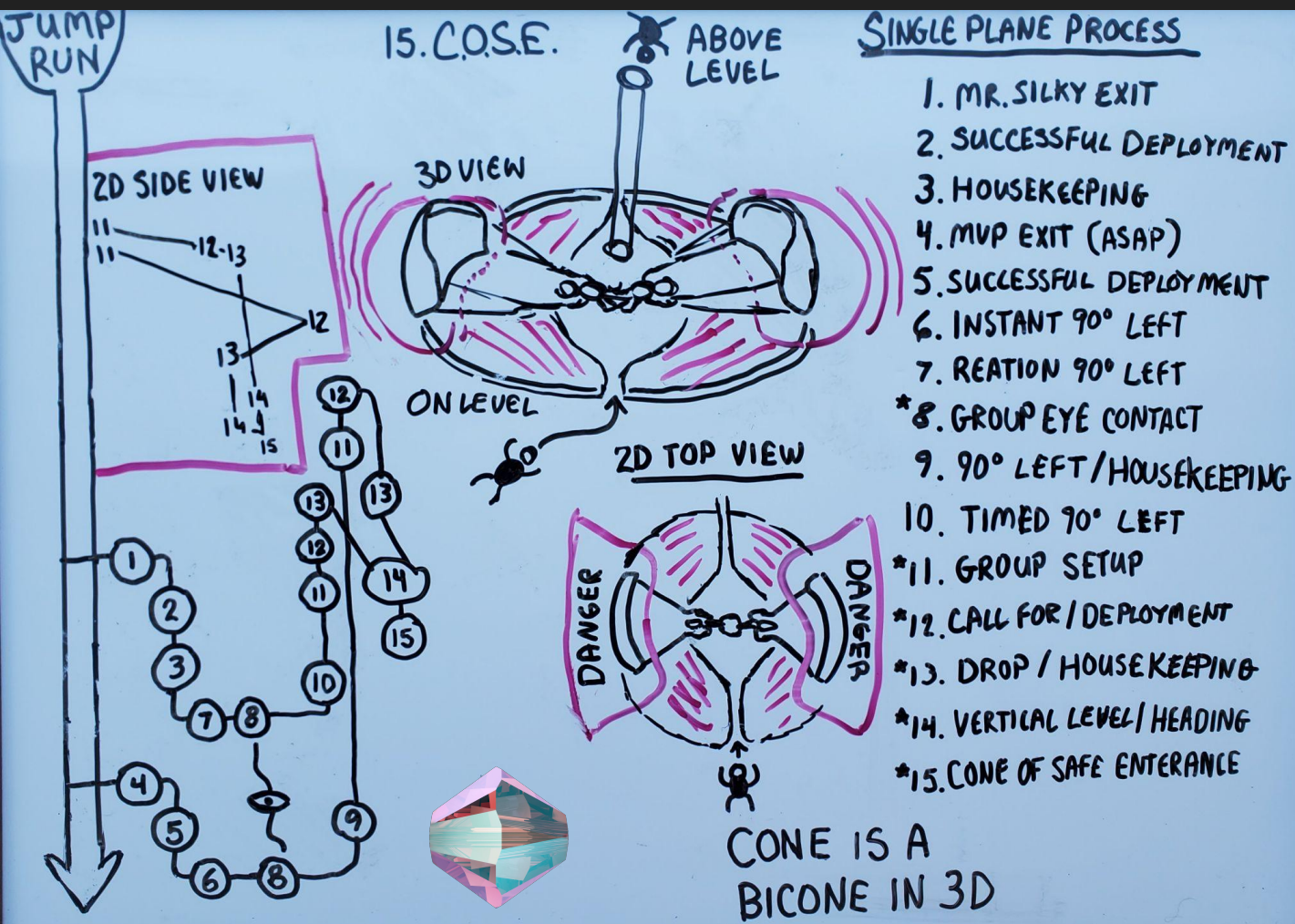
- Alternate roll axis with only hip input
- Alternate using single rear risers
- Trim both rear risers
- Alternate using fronts
- Trim both fronts
- Alternate using toggle
- Controlled Level flair and release

Next we have to work on side body flight as a group. You can use gentle toe taps to achieve non verbal comms. Having a declared heading gives a clear expectation.

- Rear riser drag flight
- Toggle drag flight

Once you can say you've exhausted all the ways to add input and you feel satisfied with your understanding of the systems tolerance to flex, It's fair to say you're ready.

Level 3 - MVP 60 sqft - Preflight

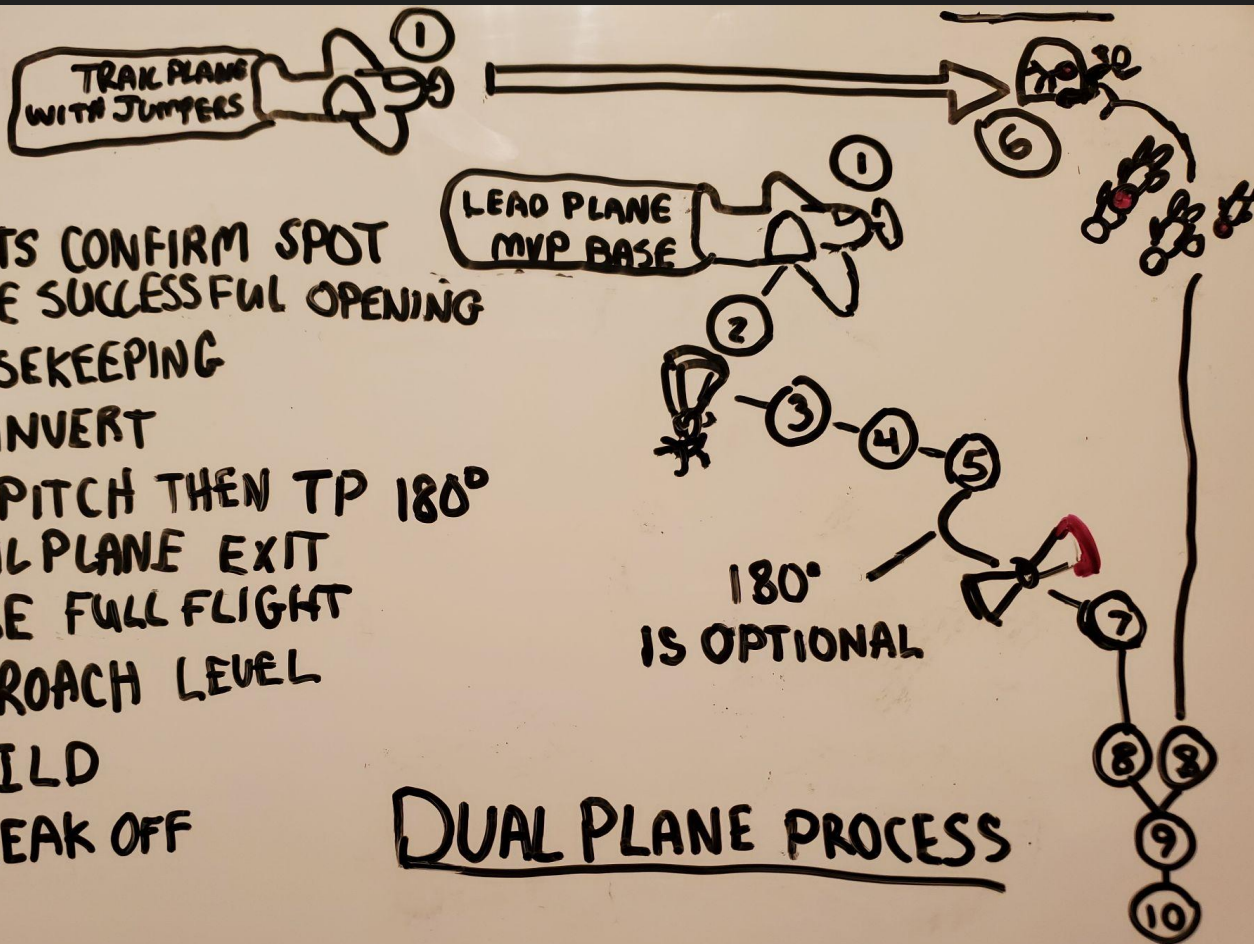


Before an MVP attempt is made, every jumper involved with this dive flow must be flawless at their role as an individual. It requires everyone to be watching and waiting for their turn to solve the puzzle as fast as possible for a maximum flight time.

As base canopy pilots, your goal is to get your vertical speed as high as possible before adding a Mr. Silky into the flow. Having even the slightest difference in the system will turn into horizontal speed and that will lower the potential vertical terminal velocity.

After pushing the MVP harness to its limits in the previous level, the progression in level three starts with flying both canopies as calm and static as possible. Flysight graph data should be deeply analyzed to rate the base pilots trajectory precision. The same is true for achieving an average horizontal speed under 4 miles per hour. The time spent troubleshooting is necessary to provide the maximum vertical speed flight overlap.

Level 3 - MVP 60 sqft - Devotion



1. PILOTS CONFIRM SPOT
2. BASE SUCCESSFUL OPENING
3. HOUSEKEEPING
4. BP INVERT
5. BP PITCH THEN TP 180°
6. TRAIL PLANE EXIT
7. BASE FULL FLIGHT
8. APPROACH LEVEL
9. BUILD
10. BREAK OFF

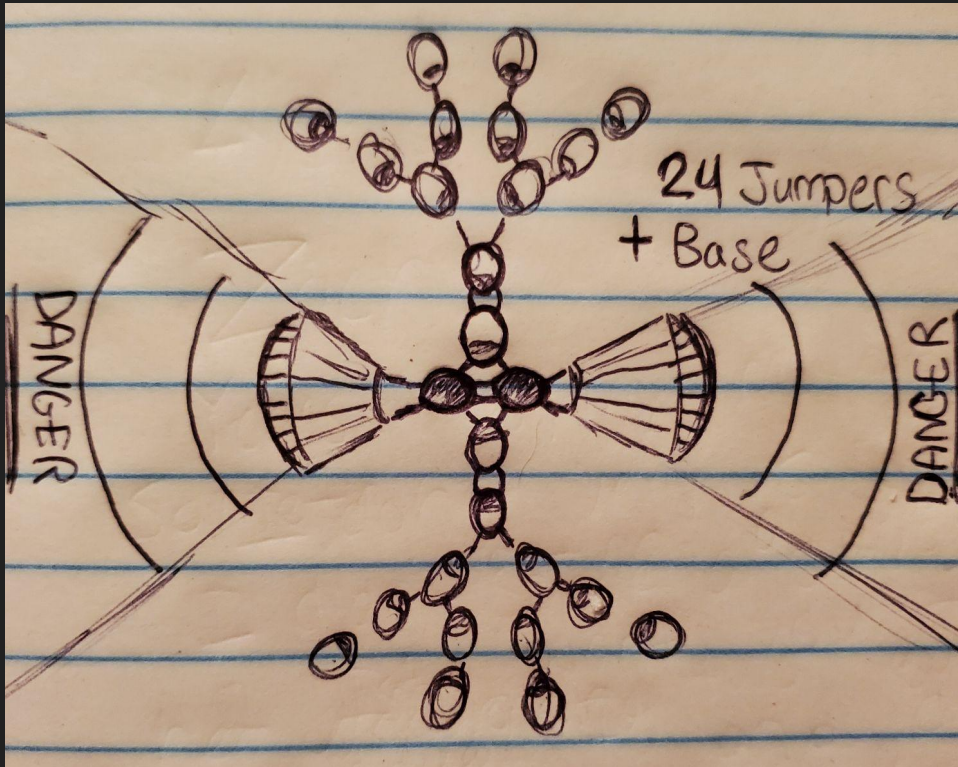
DUAL PLANE PROCESS

If it wasn't for the leading reinforcements in the cell nose holding the top and bottom skin together, the canopies would explode without a doubt. The only time we found wear on all gear inspections was inside the nose. All operators flying at this speed must confirm and monitor that they have reinforced structural integrity.

We never considered that Logan Snoddy would decide to thug it out and slap the slider under his neck to deal with after releasing from the dock. As these techniques become accessible to more creative minds, the formula will slowly be perfected until we can successfully repeat big way. Once enough trail plane experimentation has been funded, there will be repeatable timing knowledge on how to build with several aircraft configurations.

100+ down planes before high speed dynamics is really a sensible recommendation with how much content there is to unpack here and how sensitive the controls can be.

How far can this go?

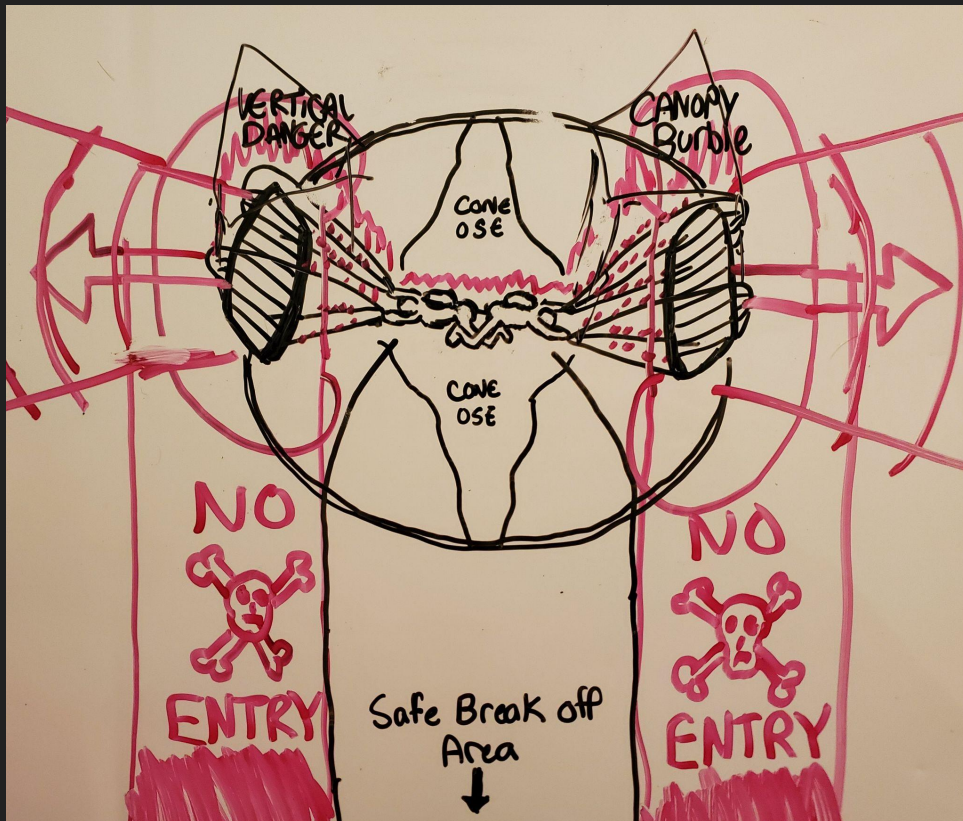


To unlock the canopies' full potential, someone with skill in computational fluid dynamics will need to analyze and publish trim variations on how to reline the canopies to fully burble themselves. With additional field data, we should be able to push parachutes to their final limit in this dimension.

Organizing two 250 lbs exit weight pilots operating the base on 60s is highest weight that should be done ethically. Without more innovation, we'll soon find our current day technologies vertical speed plateaus.

SPEED MULES are the key to accelerating the base to free fly speeds. There's an art to how much the base should weigh to accomplish it's first dock but if that docked jumper were to fly in the pilot's burble, it would combine mass without increasing drag. The same way camera fliers back fly under tandems. Sitting on top of the base can make it shake like an earthquake on the pilot's body roll axis. Hanging off the side could be used intentionally for movements with freefallers and wingsuiters. For static, it's likely that speed mules will find a logical way to fly like hybrid stingers or hang off the fronts and wrap the pilots ribs as not to hinder the operation of release handles.

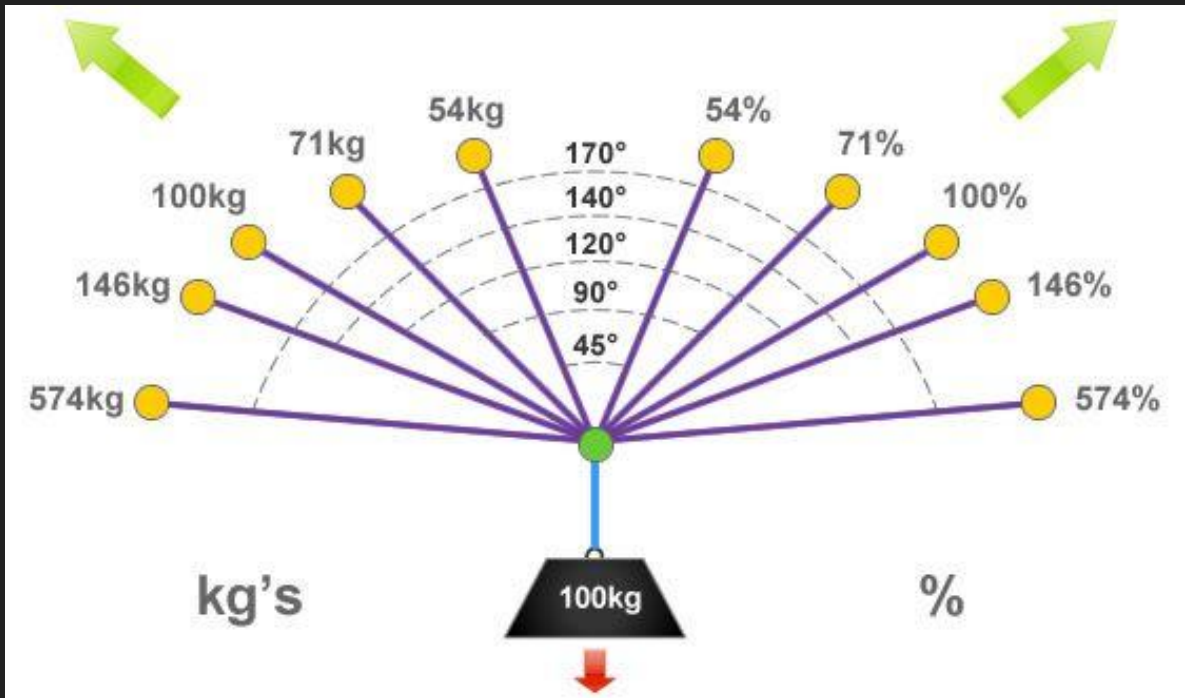
Who should freefall beside canopies?



With good piloting, the base canopies can hold a precise heading without variable. Both canopies fly healthy and can handle high velocity inputs from docking. Getting near the stabilizer, even on level with the tail can disrupt the drag around it and collapse the parachute. The same would happen in front of the nose but not so much the lines. Behind the lines is a bigger burble than the canopy. Falling into this could be fatal for everyone within the top skin radius. Building long sneak formations before splitting into pods could reduce risk. Only the most reliable fliers should be organized to pass the top skin radius.

In the event that a jumper gets caught in the lines without collapse, all freefallers break off immediately. The clear pilot should hold heading and wait to operate their release. The jumper should do their best to escape. By 2,500' the group has handles in hand and are prepared on comms as well. The entangled pilot cuts away and the other pilot must instantly operate their release handle to avoid knocking them out. If the canopy collapses at all, the same process should be done instantly.

Distributed Forces



Before the first test jump, we used this vector force chart to estimate maximum possible forces. The canopies mirror and amplify each others force until pulling the system so taught it accelerates. With no way to gather data on the exact pitch of these canopies, we decided to compare a gross amount of force to all the components to prove reliability.

The heaviest base exit weight at 500 lbs with a 400% increase in distributed load equals 2,000 pounds of force or 33.3 theoretical wingload on a 60 sqft. After slithering deeper down the rabbit hole, every skydiving manufacturer I asked to provide a WLL (working load limit) and MBL (minimum breaking load) didn't have the data. Even when referencing the main online gear stores hardware pages, there was a poor or non existent amount of data provided.

If we acquired a linescale to accurately read a range of force, we couldn't do anything with it because we're at a renaissance in the skydiving industry regarding this technical information because it was never needed like this.

When comparing ballpark tensile strengths known for the components only cobra clips are below 1/3 WLL if one canopy were to feel 2,000 lbs of force distributed between itself. I speculate all the lines snap around 120 wingload and anything could happen to the canopy north of 70 wing loading.

Reassurance

What people think stress and tension are like



What they're actually like

$$m_2 > m_1$$

$$T - m_1 g = m_1 a$$

$$a = \frac{T - m_1 g}{m_1} \quad (i)$$

$$m_2 g - T = m_2 a$$

$$a = \frac{m_2 g - T}{m_2} \quad (ii)$$

equating (i) and (ii)

$$\frac{T - m_1 g}{m_1} = \frac{m_2 g - T}{m_2}$$

$$m_2 T - m_1 m_2 g = m_1 m_2 g - m_1 T$$

$$m_2 T + m_1 T = m_1 m_2 g + m_1 m_2 g$$

$$T (m_2 + m_1) = 2 m_1 m_2 g$$

$$T = \frac{2 m_1 m_2 g}{(m_2 + m_1)}$$

$$\vec{\sigma} = \frac{\vec{F}}{A}$$

as \vec{F} is a vector, $\vec{\sigma}$ must also be one, and this is referred to as the Stress Vector.

Stress is measured in Pascals (Pa) ie: $\frac{\text{Force}}{\text{Area}} = \frac{\text{mass} \times \text{acceleration}}{\text{area}}$

$$= \frac{\text{kg} \cdot \frac{\text{m}}{\text{s}^2}}{\text{m}^2}$$

$$= \frac{\text{kg}}{\text{m}} \cdot \frac{1}{\text{s}^2}$$

$$= \text{Pa}$$



In the history of the piggyback systems, no webbing has ever been broken from forces on a skydive. Even in the instances where reserve trays have been severed from the harness.

Healthy canopy fabric doesn't rip when swoopers hit 110 vertical mph in comp.

During a hard opening, the first component to break is typically a line.

If a line does break during a downplane, the other canopy can maintain stability.

Note to S&TAs and Sky MGMT

Jumpers should physically practice EPs together, at least once, before each new group is cleared to go up. Even veterans, while matchmaking, should practice to assess competency and alertness of their partner.

During a Mr. Silky, the bottom pilot is the only jumper at risk of piloting error. When building formations in MVP, everyone inside the canopies' diameter is at a high risk.

After top pilot candidates have proven proficiency on their chosen canopy, the risk of knocking out the bottom pilot from centrifugal force is almost entirely eliminated.

When jumpers are first allowed to practice top pilot positions, It's important that ground crew spot the pair's exit and successfully completed housekeeping. After housekeeping, there is no reason beyond negligence that the pair should lose control.

In the event of a jumper noticing their partner is incapacitated before deployment, the alert jumper will grab the unconscious one, separate the harness, orient the jumper to the landing area, and deploy their reserve. This can result in an unconscious parachutist flying miles from the drop zone.

If the top pilot loses control and the pair fails to separate before sedating the bottom pilot, the bottom pilot may fall to AAD fire. The same spotting and retrieval should be planned out for this occurrence.

Any time proficient pilots attempt this type of skydive on a smaller parachute, the process should be supervised by grounds again.

Prolonged, uncontrolled spinning is fatal to the bottom pilot.

Hanging a Mr. Bill off of an MVP base, during a hard opening, could cause the floating jumper to impact with the bottom pilot, causing serious injury. Where the other risks can be evaluated and mitigated, probability is the only thing separating us from this first incident report. The creators do not endorse or intend for this move.

Campfire Trivia

*Test Jump # 1
Mr. Bill*



Originally we heavily considered building a parachute tray on the front of the MVP harness. The idea was that the bottom pilot would open the tray and toss a top skin cocooned canopy connected to tertiary rings. The pack was also reimagined, the plan was to add stow bands to the center A and D line tabs. Directly across from the slider, the line groups were to be coiled in three sections and banded in three different groups to release in sequence and guarantee the slider would stay in place.

There was no way I was going to convince someone to “hang upside down off of me, open a homemade tray, and toss a micro wing t.a.r.d. above your head while we’re traveling at a 70 to 100 miles per hour.” I knew I would have to fly that slot.

Over the next two weeks, with more research of parabolic base jumps from the 90s and 2000s, we eventually figured out the process printed above. It was a big relief. Zach Sperduti ended up organically making the systems first inverted pitch later.

The first dock was achieved on the teams 5th jump together. Griffin Kenney finished work jumping across the street and drove over before sunset load. We docked again on the next jump. The team had limited resources and money; The only drop zone that would let us do this shut down two weeks after we got it. If this year long project went on for just a dozen more days, we wouldn’t be here right now.

Final Words

In skydiving, every jump after training for your first license is a stunt. By using any of this knowledge, you agree to take sole responsibility for your actions and that no one involved with this manual is liable in any way.

Although Mr. Silky is a stepping stone in MVP progression, don't write it off as only that. Hyper relative flocking at these speeds and complexities unlocks a true paradise for any dedicated group of hedonist. The only way to fly at the highest level is by using identical equipment, mass, and body profiles. When flying Mr. Silky hyper relative work, all pilots but one bottom pilot fly silently as base. The active bottom pilot will fly their drag to make the most precise adjustments. This may take a mountain of practice to pull off but it will produce XXX dive flows and footage.

This challenge was very unique. Without a partner tolerating all the trial and error with me, none of this dual R&D would have been possible. Thank you, Zach Sperduti. When it was a sure thing, we asked dozens of pilots to come out and fly this experimental slot. So many turned it down. Only because of the bravery of Blake Smith, Griffin Kenney, and Logan Snoddy the discipline was finally unlocked.

Before proven, this was only a daydream. Zach and I spent over 100 in front of a whiteboard calculating before our first jump. We had to act as if our lives depended on it. Now that these ideas are low hanging fruit, jumpers with minimal thought towards the subject can practice. The entire purpose of this manual is to create a baseline of safety that will allow these concepts to flourish without injury or death.

Collectively over two thousand man hours were poured into project MVP. During that time Zach was knocked out cold once. We're eager to see future innovations and evolutions of these ideas but only if they're progressing forward in safety and logic.

For more air sport resources like this one

[Click Here](#)



Proper Planning and Preparation Prevents Piss Poor Performance

Skydive Lone Star
2021 - 12 - 04

