

The Art and Technique of Freestyle Skydiving

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1 Part One: First Freestyle Flights

1.1 Introduction

1.1.1 Altitude Awareness and Limits

You will find it exciting and stimulating to face the challenges of learning new activities in the air, but you must not let your concentration on those challenges replace your concentration on basic safety procedures. First and foremost in importance is altitude awareness. At first, certain freestyle moves may lead to disorientation or may put you in positions where you're not looking directly at the ground. For this reason, you need to increase your margins of safety when performing freestyle. Set a minimum altitude for stopping all freestyle maneuvers which is at least 500 feet higher than your usual breakoff altitude. This gives you time to recover your stability and orientation, and it also gives you time to locate your camera flyer in case you lost track of him/her. If you're already stable, then use these few extra seconds to look around and enjoy the scenery, or to fly in to geek the camera. Then you can attend to the business of breaking off and pulling without feeling rushed.

During the skydive itself, before you start each freestyle move or sequence, get in the habit of taking a quick look at the ground. Build it into your dirt dive and make it a regular procedure. Don't simply skydive until your Dytter goes off or groundrush captures your attention. Once you're in the air, use your ground check to make a quick assessment of whether you have enough altitude to complete your next intended move. If you do have the altitude, then you can return your concentration fully to your next freestyle move, knowing that you have the time to comfortably finish it. If you don't have the altitude, then don't even start the next move since you won't be able to concentrate fully if you know you'll have to stop part way through. And if you're rushing through a move to get it finished before your Dytter goes off, you'll get sloppy and perform poorly. This will undo the good you've done during your earlier, more careful practice since the sloppy performance will be the one your motor memory will be left with for the entire time until you make another skydive.

So, be a fanatic about altitude awareness and altitude limits from the very beginning. It will pay off in your knowledge and comfort with where you are in the air and in your ability to concentrate and get the most out of your freestyle practice time.

1.1.2 Gear Maintenance

In addition to the usual maintenance and safety checks for your gear, there are certain aspects of your equipment you should pay close attention to when starting to perform freestyle. Because of the higher airspeeds and varying angles at which the air will be hitting your rig, loose flaps are more likely to come open and exposed risers and bridles are more likely to be caught and extracted by the wind than when you remain flat and level. So take a good look at your rig before you make any freestyle jumps.

Make sure that all flaps will stay securely closed. The risers should be stowed as tightly and deeply into the main container as possible. If you have velcro on your bridle, be sure the velcro is fresh and holds the bridle tightly against your container and be sure that no excess bridle is exposed. Many freestylists now favor having the pilot chute placed on the bottom of the container because no velcro is required on the bridle and there's no exposed bridle.

Your throw-out pilot chute should also be securely stowed, with the handle extending no further than absolutely necessary beyond the edge of its pouch. Make sure the pouch holds the pilot chute securely — a firm tug should be required to extract it. If it slides out with an easy pull, it could accidentally deploy itself in the air, and this could be dangerous if you're performing freestyle moves.

1.2 Basic Equipment

1.2.1 Jumpsuit

In freestyle, the arms and legs play different roles during your moves. The legs are generally used to display a pose or the desired body position in a move, while the arms are used for balance and control of the move. The arms have to counteract any de-stabilizing effect the legs may have when holding unstable positions. In skydiving, the more drag you have on a particular body part, the more control effect you can gain from it, and therefore the best design for a freestyle jumpsuit is one that minimizes the drag on the legs while increasing the drag on the arms. This means skin-tight fabric over the legs and a looser fit with higher-drag fabric on the arms would work the best.

Your freestyle jumpsuit can range from a casual combination of jeans and a sweatshirt to the custom-tailored spandex body suits with the special double-sided freestyle winglets on the sleeves. For starters, it's important that your outfit fits closely around your legs without restricting your range of motion, and that it fits more loosely over your arms. Spandex pants and a small sweatshirt can work well. Be careful that the sweatshirt is not too baggy — with excess fabric under your arms and around your torso — or you'll have too much extra drag on your

upper body. And if you do wear a separate sweatshirt, be sure the bottom edge is tucked into your pants or under your leg straps so it can't fold up over your emergency handles.

1.2.2 Rig

Because of the wide range of motion which your arms and legs go through when performing freestyle moves, the sizing and fit of your rig is very important. You want your harness to fit snugly and your rig to stay tight against your back when you're moving around in the air. You can check on the ground to see if your rig fits you well by tightening all the straps and seeing how much your rig can still move from side to side at the hips when you keep your body still. If your rig moves more than a couple of inches from side to side, or if your shoulder straps can come down over your shoulder, you should have your harness adjusted by a rigger or the manufacturer. Otherwise your rig will tend to slide over to the side of your body when you're performing freestyle moves in the air.

In order to keep the leg strap from sliding down when one leg is pointed away from the wind, you can place a small elastic or bungee strap between the leg straps to hold them together. The leg straps themselves do not need to be tight since the bungee will bring them back into place if they slide around at all.

1.3 Basic Freestyle Moves

The following moves are starting points for learning freestyle. The full descriptions are contained in the Freestyle Database listing.

1.3.1 Flying Stag

1.3.2 Tee

1.3.3 V-Seat

1.3.4 Back Layout Loop

1.3.5 Front Straddle Pike Loop

1.3.6 Pinwheel

1.4 Terms & Fundamentals

1.4.1 Basic Terms

Several basic terms have to be defined in order to describe freestyle activities in

more detail.

1.4.1.1 Heading

A heading is the direction (a point on the horizon) towards which your head or upper torso is facing.

1.4.1.2 Move

A move is the basic component of freestyle maneuvers. A move has a defined starting point and an ending point and consists of: a change in body position, and/or a rotation of the body about one or more axes, or simply balancing in a static position (a pose).

1.4.1.3 Pose

A pose is a move in which a static body position is held without changing the orientation of the body with respect to the ground. A pose may change heading to become a turning pose.

1.4.1.4 Sequence

A sequence is two or more moves performed in succession.

1.4.1.5 Routine

A routine is a sequence of freestyle moves performed during the working time for a skydive.

1.4.2 Relative Wind and Ground References

The primary forces that act on us while in freefall come from the airflow caused by falling through the air at high speed. This airflow creates drag forces on our bodies, and in skydiving, we use these drag forces to control our bodies and perform the desired maneuvers. The drag forces always act parallel to the airflow, and therefore the direction of the airflow, or relative wind, is the most important reference direction to use in skydiving. Usually we speak in terms of the direction “into the relative wind” as the primary reference direction.

After you have left the airplane and you’ve reached terminal velocity and are falling straight down, the relative wind is pointing directly up from the ground. The direction “towards the ground” can then be used interchangeably with “into the relative wind” and is sometimes easier and more natural to use.

There is one short interval when the relative wind does not come from the

direction of the ground. Right upon exit from the airplane, we're initially travelling horizontally through the air because of the horizontal motion of the airplane, and the relative wind is therefore initially horizontal. But because of the air resistance, this horizontal motion rapidly diminishes, and within a few seconds the horizontal motion is insignificant compared to our downward motion. Even though we continue to accelerate downwards and it takes about ten seconds to reach terminal velocity, the relative wind has rotated to where it is coming from the direction of the ground within about three seconds from exit.

1.4.3 Orientations

There are five different basic orientations which your body can have relative to the wind (or ground). These define which way your torso is oriented, and the orientation is the first way to categorize the numerous freestyle poses.

1.4.3.1 Flat

In the flat orientation, the torso is horizontal, on its front, facing towards the ground.

1.4.3.2 Inverted

In the inverted orientation, the torso is horizontal, on its back, facing upwards towards the sky.

1.4.3.3 Sideways

In the sideways orientation, the torso is horizontal, on its side, with either side facing towards the ground. The chest is facing towards the horizon.

1.4.3.4 Upright

In the upright orientation, the torso is vertical with the head up, towards the sky.

1.4.3.5 Head-Down

In the head-down orientation, the torso is vertical with the head down, towards the ground.

1.4.4 Body Positions

The body positions define the positioning of the body relative to itself. For freestyle, this includes the placement of the legs relative to the torso and the amount of bend at the hips and waist. The arms are left free to control the move.

1.4.4.1 Layout

In the layout position the torso is straight, with no bend in the waist (a slight arch is possible.) The legs are straight and together.

1.4.4.2 Stag

In the stag position the torso is straight, and one leg is straight and in line with the torso. The other leg is bent forward at the hip and the knee is bent back to place the toe beside the knee of the straight leg. The bent leg is bent at least 90° at the knee. There are several variations possible for the stag position.

Note that an Open vs. Closed Stag depends on the amount of bend in the knee, while a Parallel vs. Turned-out Stag depends on the direction in which the thigh is pointing relative to the torso. A Close Stag could therefore be either parallel or turned-out, and likewise, an Open Stag could be either parallel or turned-out.

If no further description is given, the stag position implies a parallel closed stag position.

1.4.4.2.1 Closed Stag

In the closed stag position the toe of the bent leg touches the knee of the straight leg to form a closed triangle.

1.4.4.2.2 Open Stag

In the open stag position the toe of the bent leg is forward of the straight leg such that no closed shape is formed. The knee of the bent leg is brought upward toward the chest slightly such that it remains bent at least 90° at the knee.

1.4.4.2.3 Parallel Stag

In the parallel stag position the thigh of the bent leg is in front of the torso, with the knee facing directly forward of the torso.

1.4.4.2.4 Turn-Out Stag

In the turned-out stag position the thigh of the bent leg is turned out to the side, such that the bent leg remains in nearly the same plane as the hips and torso, and the knee is pointing outward to the side.

1.4.4.3 Straddle

In the straddle position the legs are straight and split apart, from side to side, with at least a 90° angle between them. The torso is kept straight, unless otherwise

stated. A full straddle, if flexibility permits, has the legs 180° apart.

1.4.4.4 Pike

In the pike position the torso is bent forward at the waist such that the angle between the torso and thighs is less than 90°. The legs are kept straight and unless otherwise stated, the legs are also kept together. There are several variations possible for the pike position:

1.4.4.4.1 Open Pike

In the open pike position the arms are extended outward to the sides, away from the legs.

1.4.4.4.2 Closed Pike

In the closed pike position the arms or hands are placed around the legs, touching them, to hold the legs close to the torso.

1.4.4.4.3 Jackknife

In the jackknife position the arms are straight and the hands are extended towards the toes, touching the toes with the fingertips.

1.4.4.4.4 Straddle Pike

In the straddle pike position the legs are straddled apart and the waist is piked (bent) at the same time.

1.4.4.5 Split

In the split position the legs are straight and split apart from front to back, with at least a 90° angle between them. The full splits, if flexibility permits, have the legs 180° apart.

1.4.4.6 Tuck

In the tuck position the torso is bent forward at the waist and the legs are together and bent at the knees. There are several possible variations on the tuck position:

1.4.4.6.1 Medium Tuck

In the medium tuck position the angle between the torso and thighs is less than 90°, and the angle between the upper and lower leg is less than 90°. The knees are not necessarily all the way up against the chest. The medium tuck position is implied when referring to tuck position, unless otherwise stated.

1.4.4.6.2 Tight Tuck

In the tight tuck position the legs are bent towards the torso as much as possible such that the thighs are touching the chest, and the heels are touching the seat.

1.4.4.6.3 Loose Tuck (Puck)

In the loose tuck, or puck position the body is less bent than in a medium tuck such that the angles between the torso and thighs and between the upper and lower legs are greater than 90°.

1.4.5 Rotation Axes

Most moves in freestyle involve some sort of rotational motion of the body. The visual appearance of these rotations is very different depending on which axis the body is rotating around, and which way that axis is oriented relative to the ground.

1.4.5.1 Earth/Wind Axes

There are two different axes which stay fixed with respect to the relative wind or ground (after exit)

1.4.5.1.1 Vertical Axis

The vertical axis remains parallel to the relative wind, pointing from the sky to the ground.

1.4.5.1.2 Horizontal Axis

The horizontal axis is any axis perpendicular (90°) to the relative wind, pointing to the horizon. It may have any heading (pointing towards any desired point on the horizon).

1.4.5.2 Body Axes

There are three body axes which stay fixed with respect to the freestylist's body.

1.4.5.2.1 Body Head-Toe (Long) Axis

The body head-toe, or long axis is oriented lengthwise through the freestylist's torso, pointing from head to toe.

1.4.5.2.2 Body Front-Back Axis

The body front-back axis is oriented forwards and backwards through the

freestylist's belly, pointing from front to back.

1.4.5.2.3 Body Left-Right Axis

The body left-right axis is oriented sideways through the freestylist's hips, pointing from left to right.

1.4.6 Basic Rotational Actions

There are four basic rotational actions which form the basis for most freestyle moves.

1.4.6.1 Turns

Turns in general involve a rotation about the vertical axis such that the heading is changing. The body can be in any orientation while performing a turn, and certain orientations have additional descriptive terms for turns associated with that orientation.

1.4.6.1.1 Pirouette

A pirouette is a turn performed while the torso is upright.

1.4.6.1.2 Flat Turn

A flat turn is a turn performed while the torso is flat, on its belly.

1.4.6.1.3 Inverted Turn

An inverted turn is a turn performed while the torso is inverted, on its back.

1.4.6.1.4 Sideways Turn

A sideways turn is a turn performed while the torso is sideways, on its side.

1.4.6.2 Roll

A roll is a rotation about the body head-toe axis when that axis is aligned with the horizontal axis.

1.4.6.3 Loop

A loop is a head-over-heels rotation around the horizontal axis, initiated about either the body left-right axis or the body front-back axis when either of these axes are aligned with the horizontal axis. The body goes through an upright position and a head-down position during the course of the loop. A loop is considered

complete when the head has travelled 360° around the horizontal axis from the point at which it started. A loop need not start in an exact upright or flat position. There are three possible types of loops. Note that loops are referred to by the direction in which the loop is initiated, since in the case of twisting loops, the direction in which the loop completes may be different from the direction at the start.

1.4.6.3.1 Back Loop

A back loop is a loop where the rotation is initiated about the body left-right axis with the torso rotating backwards.

1.4.6.3.2 Front Loop

A front loop is a loop where the rotation is initiated about the body left-right axis with the torso rotating forwards.

1.4.6.3.3 Side Loop

A side loop is a loop where the rotation is initiated about the body front-back axis with the torso rotating sideways.

1.4.6.4 Twist

A twist is a rotation about the body head-toe axis when combined with a loop. A single, or full twist is defined to be a 360° rotation about the body head-toe axis.

The amount of twist contained within a loop is the amount of twisting rotation completed after a 360° looping rotation has been performed, when measured from the point in the loop at which the twist was first initiated. Twists may be initiated at any position in the loop.

1.5 Jumping with a Camera Flyer — Basic Concepts

Jumping with a camera flyer and obtaining video footage of your skydive can be of tremendous benefit to freestylers at all levels. It provides a permanent, objective record of your performance which is invaluable for analyzing what you're doing in the air and for learning how to improve your freestyle. It helps you check and improve the accuracy of your memory of your jump, and ultimately it provides you with a way to show your freestyle performances to your audiences.

The more of the skydive you plan in advance with your camera flyer, the better chance you'll have of obtaining good results. Both of you are equally responsible for the quality of the results on the video. If you have the attitude that you can go

out and just perform your freestyle without regard for the video, and you believe it's your camera flyer's job to chase you around, then you'll both be disappointed with the poor results. In addition, you'll be creating a danger to both of you since there may be times when your camera flyer is tracking towards you, trying to close the distance between you, but then you unexpectedly change direction and your camera flyer finds he/she cannot put on the brakes fast enough to avoid colliding with you.

If you perform your freestyle with the attitude of performing for the video and you work with your camera flyer on the ground and in the air, then you can both achieve dramatically better, and safer results. You'll benefit directly because you'll have better video with which to analyze your moves, and your camera flyer will be happier for being able to do better. So it pays off to learn to work well with a camera flyer from the very beginning.

Overall, coordination with your camera flyer is important both for safety and for the quality of the video. Start by discussing your entire skydive with your camera flyer on the ground. Describe to him/her what kinds of moves you intend to perform, and what he/she might be able to expect in the way of fall rate changes or sliding motions, if you know already. Also, start teaching your camera flyer the vocabulary of freestyle, and encourage him/her to learn the names for your moves. This will make your communication easier and more precise.

1.5.1 Exit

For the exit, you are responsible for giving a clear exit count that will signal to your camera flyer exactly when you'll leave the airplane. Since many freestyle exits involve energetic launches from the airplane, separation can develop very quickly if you both don't leave together. Your exit count may be verbal, but it should always include a clear body rock or head movement. Choose a motion to initiate the count that is unambiguous, and cannot be confused with other motions associated with climbing out of the airplane. Establishing eye contact with your camera flyer, and then remaining motionless for a second before initiating the count is a good way to make sure your camera flyer is ready and to indicate you're about to give the count. Rehearse the count with your camera flyer on the ground, using the same motions and rhythm as you will in the air, and you'll have the best chance of starting your skydive together.

1.5.2 Coordination in the Air

Your responsibilities for coordinating with your camera flyer don't end with the exit count. Instead, they continue through the duration of the skydive.

1.5.2.1 Establishing on the Sunline

Once you're in the air together, the first task for your camera flyer is to move around to the sunline. Unless you're lucky enough to have had the sun over the tail of the airplane on jump run, your camera flyer may have to move up to 180° around you to put the sun on your face. You can help by holding a pose that does not fall too fast, and that you know will fall straight down. You can perform a turn with, or counter to that of your camera flyer. You'll know when your camera flyer has arrived on the sunline because you'll see the sun over his/her head (unless it's high noon in the summer time when the sun may be directly overhead). This entire maneuver shouldn't take more than a couple of seconds, and it's worth getting into the habit of doing it since you'll get much brighter colors and much more detail on the video as a result.

In between moves, your camera flyer should always attempt to return to the sunline. Once you can both control the angles and remain on the sunline when you want to, then you can experiment with deliberate sidelighting or backlighting for different effects. When it's not done deliberately, however, losing the sunline can detract from the quality of the video.

1.5.2.2 Basic Setup Position

Once your camera flyer has found the sunline, he/she will need to select the best vertical angle from which to film you. In most cases, the easiest position to film freestyle is at, or slightly below the level of the freestylist. This puts the camera flyer's head pointing slightly upward, which helps in maintaining a faster fall rate than with the head pointing downward. This position also allows the camera flyer to quickly detect the fall rate changes you're certain to have, and to react before the angle changes too much. Since most freestyle moves will tend to increase the fall rate over whatever pose you're holding during the setups, filming from slightly below and placing the freestylist just above the horizon in the frame gives the camera flyer a tiny bit of time to react to a fall rate increase before the freestylist drops below the horizon.

The horizontal separation between the freestylist and camera flyer, for starters, should be the distance which makes the freestylist fill about three-quarters of the video frame. This will place the camera flyer about six to eight feet away from you. Much farther away than that, and your image becomes smaller on the video and it's more difficult to see what you're doing. Any closer, and you risk losing framing, at best, and possible collisions, at worst, when you make abrupt change in body position as you go through your moves. When your camera flyer learns to anticipate your moves, and you can perform them in place, without sliding, then you can safely experiment with closer shots.

Now that you know the ideal position for your camera flyer to be in, you'll also be able to recognize when your camera flyer is out of position. A moderate amount of change in position is natural, but if your camera flyer is clearly way out of position and struggling to recover, it's in your best interest to help him/her return to position. You can help your camera flyer recover by stopping whatever you were doing that caused the separation in the first place, and returning to a neutral pose that you can comfortably hold without sliding. Choose one with a fall rate that will help correct for any vertical separation you may have — a slower falling pose if your camera flyer is above you, or a faster falling one if your camera flyer has sunk below you. Once your camera flyer returns to position, you can resume your freestyle moves.

If you've been paying attention to your camera flyer throughout the skydive, you should never have the chance to develop an excessive amount of separation, and it should never take longer than a few seconds to return to the setup position when it becomes necessary. Making it a habit to observe and assist your camera flyer in maintaining a good setup will pay off in higher-quality video from the very beginning, so make it part of your skydive every time you jump with a camera flyer.

1.5.2.3 Setup Angles

While you and your camera flyer are jointly responsible for your relative positions in the air, it's you who's responsible for presenting your moves at the desired angle to the camera. Once you're in position with your camera flyer, you perform the turn to whatever angle you've chosen for showing your move to the camera. While planning your skydive on the ground, make a deliberate choice of what angles to use for presenting your moves, and then make the turn to set up at that angle part of your mental rehearsal of your skydive.

1.5.3 Breakoff

Your breakoff procedure is something else you should discuss with your camera flyer before you jump. Let your camera flyer know at what altitude you will stop performing any freestyle (remember your 500 foot cushion), and then at what altitude you'll start to track or pull. If you agree to both track, then be sure you do so. If you agree that you will pull in place, then do so without hesitation so your camera flyer has plenty of altitude to track and pull after you. Whatever your agreement, stick to it religiously. There's nothing that destroys trust faster in skydiving than not carrying out the agree-upon plan at pull time. So, plan the details of your breakoff in advance with your camera flyer, and then carry them out in the air.

1.6 Jump Planning and Execution

1.6.1 Planning the Skydive

1.6.1.1 Selecting One or Two Moves to Practice at a Time

In order to gain the most benefit from each skydive and master freestyle moves in the shortest amount of time, it's best to limit yourself to practicing only one or two different moves at a time on a jump. There are several reasons why this will benefit you in learning freestyle.

First of all, limiting the number of different moves you attempt on one jump gives you a chance to perform the move(s) several times on the same jump. Each time you repeat the move, you can observe whether you are performing it correctly, make changes to your technique and immediately try something different to try to make the move work better. Allowing yourself to correct your performance right away keeps you from repeating the same mistakes and forming bad habits. If you try too many different moves on one skydive, you won't have a chance to correct your mistakes for each move, and you'll most likely practice the same mistakes the next time you try that move on another skydive.

Another reason for focusing on no more than one or two moves per skydive is that for each move you need to remember at least three or four key points for proper execution of that move. If you don't remember the key points, you'll have more trouble performing the move correctly, and you'll more easily develop bad habits. The human brain can readily retain only up to seven separate "chunks" of information in short term memory at one time, and that task is not made easier by the stress of high-speed action on a skydive! So, you can certainly remember the key points for one move, you might possibly remember the key points for two different moves, but you'll probably not remember all the key points for three or more moves at one time on a skydive. If learning is your goal, then give yourself a chance to learn the best way that you can, and plan your skydive with only one or two moves to practice at a time.

1.6.1.2 Placing Moves into a Practice Sequence

Once you've selected a central move you want to practice on a skydive, work it into a sequence that will let you easily get into and out of that move and return to a neutral position so you can get ready to repeat the cycle again. There are common elements to all sequences you will use to practice freestyle moves, and there are elements unique for the different classes of moves and for the central move itself. The basic practice sequence consists of a neutral position for setting up in, the setting up itself, a starting move for the action sequence, the central move you are practicing, and a finishing move for returning you to the neutral

position. You then repeat this sequence as many times as altitude allows on a skydive.

1.6.1.2.1 The Neutral Position

Choose, as your neutral position, a pose which you can hold steady with minimal effort, even if you are looking around with your head, and in which you can perform turns in either direction. For beginners, this should be a flat and level position. For intermediate and advanced freestylers, this could be a tee, a daffy, a compass, or another such pose. The idea is to use this neutral position for setting up in before you start the action sequence and then to return to this neutral position after the action sequence to take a moment to think about what you just did.

1.6.1.2.2 Establishing Position with the Camera Flyer

While in your neutral position, the first step to starting the practice sequence is to set up in the desired position with your camera flyer, if you have one. After exit or after already having performed the sequence, you may have some separation with your camera flyer, so this is the time to look around and find him/her, and let him/her close the distance between you. Don't forget to take a look at the ground at this point in the sequence and decide whether you have enough altitude to complete the full sequence.

1.6.1.2.3 Establishing Your Angle to the Camera

Once you're in position with your camera flyer, you should turn to the heading that presents the action sequence at the best angle to the camera. If you don't have a camera flyer, you should pick the sun as a heading reference (since a good camera flyer will usually try to stay on the sunline), or if the sun is too high overhead, you can pick a prominent feature on the ground. The idea is to present your body to the camera at the angle that will reveal as much information as possible about the move you are practicing. Later, when you are comfortable with the move, you can experiment with a variety of camera angles, but initially you will improve the fastest and gain the most from your jumps if the video reveals clearly what you are doing.

1.6.1.2.4 The Starting Move

The starting move initiates the action in your sequence and takes you from your neutral position into the central move you are practicing. Your starting move may be a simple transition or a full-fledged move in itself. If your central move is a simple pose, the starting move may simply be a shift in body position to establish your balance or alignment for getting into the pose. If you wish to practice an inverted tee, for example and you're using a flat and level position as your neutral

position, your starting move may be a half roll in order to place you on your back. If your central move is a dynamic move like a twisting loop, then your starting move may be a simple back loop to start the looping momentum. Your starting move should be a move that you can perform easily, without distracting your concentration from the central move that you want to practice. There may be several good starting moves for each central move, so be willing to experiment and find the ones that you can perform smoothly and easily.

1.6.1.2.5 The Central Move

Now you come to the central move in your sequence. Your concentration should be at its peak and you should be commanding your body to execute the key points that you've been focusing on for this move.

1.6.1.2.6 The Finishing Move

The finishing move in your practice sequence takes you out of your central move and back into your neutral position. Like the starting move, it may be a simple transition or a complete move, and it should be something you can perform easily. It should flow smoothly from the central move and let you regain your balance for returning to your neutral position. If your central move was a dynamic move such as a spin or a loop, for example, then your finishing move should be chosen such that you can taper off the momentum and come to a stop. If your central move was a pose, then your finishing move may simply be the reverse of your starting move to transition you back into your neutral position.

1.6.1.2.7 The Return to the Neutral Position

Now you're back in your neutral position, the same as when you started. Use this position now to regain your balance, regain your setup with your camera flyer, and pause for a moment to analyze and correct what happened during your action sequence before you repeat it again. Remember to check your altitude at this point every time you go through the cycle.

1.6.2 Learning in the Air: The Self-Correction Process and Cycle

Even though each skydive lasts only about 50 seconds, there is a tremendous amount of learning you can accomplish during the skydive itself. If you follow a cycle of observing yourself perform, analyzing your performance, making corrections and trying it again, you will learn your moves much faster than if you blindly repeat your moves using one fixed technique the entire skydive.

1.6.2.1 Recording Your Performance

While you are executing your action sequence in the air, closely observe what

your body is doing in response, and run your mental recorder so you can assess what happened immediately afterwards. You can record the visual information such as your heading as you go into the move and then when you come out of it, as well as your orientation relative to the ground or the windline. You can record the tactile information such as the pressure of the wind on your limbs and different sides of your body and face. And you can record the kinesthetic information such as the positions of your arms and legs, and the bend at your hips and waist. It may be difficult at first to record more than the most basic elements, but by making it a part of the practice process from the very beginning, you'll find your ability to recall what happened during a move will improve dramatically. And the more you can immediately recall about what you just did during a move, the more easily you can correct your mistakes right away in the air and learn the move correctly in the fewest number of jumps.

1.6.2.2 Pausing Between Sequences to Analyze What You Did

During a skydive, once you've completed one cycle through your practice sequence and you've mentally recorded as much as you can about what happened during the action sequence, pause before starting the cycle again. Take the time, while you're in your neutral position, to immediately play back the events of the previous sequence and attempt to analyze what just happened. You may not have complete recall of what you did, but use whatever information you can recall to assess whether you performed the move correctly or not. If nothing else, examine the body position you were in when you completed the central move, and compare it to the position you know you should have been in. By training yourself to immediately think about what just happened, you will increase your awareness of what you're doing in the air as you're doing it, and you'll improve your ability to immediately assess how well you're performing a move. Both of these abilities will help you learn freestyle moves faster.

1.6.2.3 Making Corrections Before Repeating the Sequence

If the move did not go successfully, then pick out the element which stood out as the clearest symptom of the problem and choose a correction — just one single correction — that would address that symptom. For example, if your move came out off heading, you might choose to focus on keeping your body more symmetrical, or keeping your torso straighter, or something else that would be appropriate for the particular move you are practicing.

It's important to focus on a correction right away, because if you simply repeat the move in the exact same way you did at first, and the move is not going successfully, then you are simply reinforcing the incorrect way to execute the move and you'll develop bad habits. So, to get the most out of every skydive, take a couple of seconds before you repeat a sequence to recall what you did, analyze

what happened and whether it was correct or not, and to choose a simple correction to focus on when attempting the move again. This process of immediate self-correction will speed up your learning tremendously and will serve you well for anything you want to learn in freestyle skydiving.

1.6.3 Mental Rehearsals

1.6.3.1 Concentrating on the Key Elements and Forming the Command Script

When you choose a central move to practice, pick out the three or four key elements that are crucial for correct execution of the move. You can select these elements from the descriptions in this video/book about how to learn and perform the moves, or you can formulate them yourself after seeing a move demonstrated or described. For a layout back loop, for example, these key elements may be something like “legs together,” “straighten body,” “push with arms,” “hold body straight.” When put together, these key elements can form a script of commands that you can say to yourself to get your body to execute the move correctly. You can abbreviate each element to a single word so that you can say the command script in real time with the move. For the back loop, for example, the command script might become “together, straight, push, hold.” You should memorize this script for a move when you choose to practice it, and rehearse it until it comes easily. Under the high-speed action of a skydive, you’ll want to have this command script come to you automatically when you start the action in the move.

1.6.3.2 Accurately Visualizing the Desired Results

It’s a well-known fact in athletic pursuits that what you mentally visualize yourself performing is what you will perform physically. The process of visualizing yourself executing the move builds a mental “program” that your body will follow when it comes time to physically execute the move. Building a vivid, accurate mental image of a successful execution of a freestyle move is therefore essential to learning to perform the move in the air. Your mental image of the move should be as detailed as possible, and should contain as many as possible of the actions that your body will perform when carrying out the move.

To build a mental image of your move, be sure you completely understand the dynamics of the move and you know the motions that your body, legs and arms will go through. As you visualize the move, include the key elements that you need to remember to execute it properly. Visualize yourself following your command script and properly responding with the correct execution of the move. Visualize the entire move repeatedly until all parts of it come easily and without hesitation.

Once you've formed a detailed picture of the correct performance of the central move you want to practice, expand the picture to include the complete skydive. Start from the count for the exit, and include your setups with your camera flyer or ground features, include your altitude check, your full practice sequence, your pause and self-assessment and self-correction interval, and then include another corrected execution of the sequence. Include additional repetitions of the sequence as you think they'll fit on the real skydive. Work to maintain full concentration on your visual images for the full duration of your mental skydive. Repeat the visualization of your entire skydive at least five times on the ground before you jump, and then at two different occasions, at least three times through each time on your way up to altitude in the airplane.

1.7 Building on the Basics — More Beginner Freestyle Moves

The following moves expand on the basic moves for learning freestyle. The full descriptions are contained in the Freestyle Database listing.

1.7.1 Flat Poses

1.7.1.1 Swan

1.7.2 Inverted Poses

1.7.2.1 Inverted Stag

1.7.2.2 Inverted Tee

1.7.3 Side Poses

1.7.3.1 Side Stag Pose

1.7.4 Seated Poses

1.7.4.1 Straddle Seat

1.7.4.2 Stag V-Seat

1.7.4.3 Half Indian Seat

1.7.4.4 Indian Seat

1.7.4.5 Toe-Down V-Seat

1.7.4.6 Windmill

1.7.5 Upright Poses

1.7.5.1 Daffy

1.7.5.2 Knee Standup

1.7.5.3 Straddle Knee Standup

1.7.6 Simple Rolls

1.7.6.1 Stag Roll

1.7.6.2 Stag Switch Roll

1.7.7 Simple Turns

1.7.7.1 Stag Pinwheel

1.7.7.2 Double Stag Pinwheel

1.7.7.3 Beacon

1.7.8 Tee Moves

1.7.8.1 Tee Switch

1.7.8.2 Tee Roll

1.7.8.3 Sitback

1.7.9 Compound Turns/Rolls

1.7.9.1 Flip-Through

1.7.10 Back Loops

1.7.10.1 Back Tuck Loop

1.7.10.2 Backover

1.7.10.3 Back Split Loop

1.7.10.4 Back Stag Loop

1.7.11 Front Loops

1.7.11.1 Front Pike Loop

1.7.11.2 Front Split Loop

1.7.11.3 Front Layout

1.7.12 Loop Reverses

1.7.12.1 Kickback

1.7.12.2 Kickover

1.7.13 Side Moves

1.7.13.1 Cartwheel

2 Part Two: Intermediate Freestyle and Flying Fun

2.1 Introduction

2.2 Safety

2.2.1 Backsliding and Other Groups in the Air

As you learn new freestyle moves, it's inevitable that you'll spend a lot of time in not-so-perfect positions with your torso tilted somewhere between the vertical and horizontal points. In this tilted position, the airflow is striking your chest at an angle and being deflected forwards, thus pushing your body backwards. Welcome to the backslide. You'll become good friends with it before you master freestyle, so it's time to examine the possible hazards associated with it.

If you're by yourself in the air, without a camera flyer, you'll probably never know you're backsliding even if you're screaming across the sky. Even if you have a camera flyer with you and you know you're backsliding, there are precautions you should take to prevent it from causing a hazardous situation.

If there were any groups that exited the airplane before or after you, you know that they could be in a column of air that could be as little as 800 feet away from yours (6 seconds separation from an airplane travelling at 80 knots true airspeed). In freestyle poses, you could sometimes backslide as fast as 30 to 50 knots, which will put you in your neighbor's territory in 10 to 15 seconds if you are lined up along the jump run while holding the sliding pose. At pull time, this creates an obvious danger of a collision between you and the other group. In case it needs to be explained, if you are directly under the other group and you pull at, say, 2600 feet, and they remain in freefall, not intending to pull until 2400 feet, they could collide with you while you are under canopy and they are still in freefall.

There are two things you should do to prevent this, if you are holding any freestyle pose for longer than a few seconds. First, if you know in which direction the airplane was flying jump run, pick a heading for practicing your pose which is 90° to the jump run direction. In other words, face across the jump run direction, perpendicular to the direction the airplane was flying, and not in line with it. Secondly, whether or not you know in which direction the plane was flying, do not hold any pose on the same heading for more than about five seconds. Make a slow 360° turn, or turn 180° and face the opposite heading for another five seconds before turning again if you want to practice holding one heading for a while. This will keep you within your own private territory in the sky and no one will surprise you by dropping in through your canopy.

If you've been working with a camera flyer and you know for certain that a pose you want to perform does not backslide, then you can take more liberty in choosing the heading for performing the pose (such as facing the sun, or putting an attractive ground feature behind you). But until you are certain that your moves do not backslide, you should practice them with the turns for safety's sake. (It also keeps you from messing up your spot, since you could end up covering over half a mile if you slide in one direction for the entire skydive!)

2.2.2 Keeping Sight of Your Camera Flyer

When you first try new freestyle moves, neither you nor your camera flyer will know exactly how fast they will fall, or how much they will slide. As you attempt a new move, you'll most likely be focusing most of your concentration on performing the move, and not on where your camera flyer is in the air. This makes it very easy to create rapid separation with your camera flyer, and you could easily lose sight of him/her, without even knowing whether he/she is above or below you. This creates a hazard for several reasons.

If you went into a fast-falling move, and your camera flyer is now above you, and you then quickly come out of your move back into a slow-falling position (such as flat and level) without knowing where your camera flyer is, you just created a collision hazard. You may slide directly underneath your camera flyer and could cause a collision as you pop back up, or your camera flyer may get caught in your burble and fall on top of you if you slide underneath him/her. This hazard is magnified if you are close to pull time. If you don't have sight of your camera flyer, you could end up possibly pulling directly underneath him/her. Even if you track before you pull, you may be tracking back underneath your camera flyer, since you may have slid away as well as dropping below him/her.

However unlikely it may sound, this scenario is not impossible, and you can take measures to prevent it. First of all, try not to lose sight of your camera flyer in the first place. If you do lose sight of your camera flyer, then stop what you are doing and carefully go into a pose that does not change your fall rate too abruptly. Start turning quickly in place and first look upward in a sweeping 360° circle to see if your camera flyer is above you. Include the area directly above your back. If you don't see him/her above you, then look below you. If your camera flyer is below you, he/she will also probably be a little distance away, since as they look upwards to try to keep filming you, they are also likely to backslide a bit before committing to a full de-arched position to try to stay up with you. If you still cannot find your camera flyer, then return to flat and level and continue your 360° scans, while watching your altitude, and continue looking for him/her. You may not find your camera flyer at first if he/she is too close to the sun, but you must keep looking.

Do not resume any freestyle moves until you've regained sight of your camera flyer and you've recovered your positioning. It's simply not safe to continue performing any freestyle if there's another person potentially close to you in the air, but you don't know where they are. Your camera flyer has probably not lost sight of you, and usually he/she will come sheepishly back into position if you give him/her half a chance. You will also win your camera flyer's gratitude and trust by showing that you are concerned about their safety.

2.3 Intermediate Freestyle Moves

The following moves enter into the intermediate level for freestyle. The full descriptions are contained in the Freestyle Database listing.

2.3.1 Side Poses

2.3.1.1 Eifel

2.3.1.2 Cleopatra

2.3.1.3 Pisa

2.3.2 Upright Poses

2.3.2.1 Compass

2.3.2.2 Dart Standup

2.3.2.3 Stag Standup

2.3.2.4 Straddle Standup

2.3.2.5 Y Standup

2.3.2.6 Prancer

2.3.3 Head-Down Poses

2.3.3.1 Straddle Headstand

2.3.3.2 Split Headstand

2.3.4 Simple Turns

2.3.4.1 Discus

2.3.4.2 Frisbee

2.3.4.3 Mustang

2.3.4.4 Face-up Dalí Spin

2.3.5 Tee Moves

2.3.5.1 Arabian

2.3.5.2 Semi-Arabian

2.3.5.3 Persian

2.3.6 Daffy Moves

2.3.6.1 Daffy Reverse

2.3.6.2 Daffy Switch

2.3.6.3 Daffy Swivel

2.3.6.4 Daffy Illusion

2.3.6.5 Daffy Inversion

2.3.7 Compass/Arabesque Moves

2.3.7.1 Compass Illusion

2.3.7.2 Compass Inversion

2.3.7.3 Tilt-Down

2.3.7.4 Tilt-Up

2.3.8 Compound Turns/Rolls

2.3.8.1 Thomas Flair

2.3.8.2 Thomas Spin Flair

2.3.8.3 Thomas Flair Roll-Out

2.3.8.4 Inward Tee Roll Mobius

2.3.8.5 Outward Tee Roll Mobius

2.3.8.6 Arabian Mobius

2.3.8.7 Compass Arabian Mobius

2.3.9 Standup Moves

2.3.9.1 Prancer High Step

2.3.9.2 Helix Spin

2.3.10 Back Loops

2.3.10.1 Back Pike Loop

2.3.10.2 Clover Leaf

2.3.11 Front Loops

2.3.11.1 Front Walkover

2.3.12 Twisting Back Loops

2.3.12.1 Back Half Twist

2.3.12.2 Back Split Half Twist

2.3.12.3 Back Full Twist

2.3.12.4 Solo Back Full Twist

2.3.13 Twisting Front Loops

2.3.13.1 Deanna

2.3.13.2 Inverse Deanna

2.3.13.3 Front Half Twist

2.3.13.4 Front Split Half Twist

2.3.13.5 Front Full Twist

2.3.14 Loop Reverses

2.3.14.1 Straddle Backstop

2.3.14.2 Cradle

2.3.14.3 Straddle Frontstop

2.3.14.4 Pike Backstop

2.3.14.5 Pike Frontstop

2.3.15 Side Moves

2.3.15.1 Side Layout

2.4 Working with Video to Learn the Most from Each Jump

2.4.1 Staying Aware of the Camera in the Air

There is much that you can tell about what you're doing in the air simply by watching your motion relative to your camera flyer during the skydive itself. In most cases, if your camera flyer is attempting to maintain the nominal setup, then if he/she is moving it's because you've been moving and he/she is working to keep you in frame. The things you can do to cause relative motion between you are to change fall rate abruptly, or to slide horizontally, both of which are very easy to do and will happen frequently when learning freestyle.

2.4.1.1 Noticing Fall Rate Changes During the Skydive

Fall rate changes will happen every time you change positions in the air. Whether it's transitioning from one pose to another, or initiating a dynamic move such as a loop or roll, it goes with the territory. If you remain aware of how your fall rate is changing, you'll have more success in working with your camera flyer, since you can tell him/her in advance what to expect.

Determining how your fall rate is changing in the air is straightforward. If you are performing a new move, then even as you are working to balance in it, take an occasional quick look at your camera flyer and make a note of your relative positions and his/her body position. Did he/she drop below you when you entered your move? Then your fall rate decreased in that move. Did he/she float above you at first? Then your fall rate increased. Is he/she fully spread out in a de-arched position, but still staying with you? Then you're in a very slow falling move at the lower limit of your camera flyer's fall rate range. Is he/she in a hard arch (or in a standup, as some might be able to do), but still staying with you? Then you're in a very fast falling move near the upper limit of your camera flyer's fall rate range. Is he/she fully spread out and still getting further and further below you? Then you're in an extremely slow falling move and your camera flyer can't slow down enough to stay with you, and it's time to return to a neutral pose and help your camera flyer re-establish position with you. Is he/she in a very hard arch (or in a standup) and still getting further and further above you? Then you're in an extremely fast falling move and it's time to re-establish position with

your camera flyer again.

If your camera flyer couldn't stay with you for long when you performed your move, that doesn't mean you shouldn't continue to practice it. In fact, if you attempt it again, as long as that was part of your original plan, your camera flyer will have seen what that move will do to your fall rate, and will be able to anticipate it a bit better when you start it the next time. You simply want to be careful about how long you stay in that move, and be prepared to come out of it when the separation with your camera flyer starts to increase too fast.

2.4.1.2 Noticing Horizontal Motion and Backsliding

When you are first learning freestyle poses, many of them have a horrendous tendency to backslide. Some dynamic moves will move slightly sideways or forwards for just an instant, but almost all sustained horizontal motion will be due to backsliding. This, combined with fall rate changes, can give your camera flyer a vigorous workout in the air.

There are several clues in the type of relative motion between yourself and your camera flyer that will tell you if you're sliding. If you set up on a heading with your camera flyer to one side of you when you go into a pose, and you hold the pose on the same heading relative to the ground, but your camera flyer soon appears to move around to a position in front of you and stays there, then you are backsliding and your camera flyer is chasing you. Make a note of the body position your camera flyer is in, and that will tell you how severely you're sliding. If it looks like a relatively benign arch with his/her legs slightly straightened, then you're not sliding too quickly. If it looks like an all-out track, with arms and legs straight back (and a fiercely determined look on his/her face!), then you're in a super-fast backslide, and you should watch out for the groups that left the airplane before or after you, because you're probably crossing the border into their territory!

If you set up on a heading with your side towards the camera when you enter a pose, and you keep that side towards the camera while holding the pose, and you find you have to keep turning in order to keep your side towards the camera since it appears that your camera flyer is flying in a circle around you, then you're backsliding while turning in a circle around your camera flyer, and he/she is turning in place to keep facing you.

If you're turning in your pose, and sometimes during your turn your camera flyer is near you and at other times he/she is further away from you, and it continues to vary like that as you hold your pose in a turn, then you're sliding around in a circle in front of your camera flyer.

If you're holding a pose and your camera flyer appears to be flying towards you from somewhere initially behind you, then performs a quick turn to remain facing you as he/she appears to fly past you into a position in front of you, then you've probably just backslid towards, and then past your camera flyer, and now he/she is chasing after you. If you find yourself also facing into the sun, then congratulate yourself or your camera flyer for having just performed a nifty fly-by to re-establish on the sunline!

2.4.2 Learning from the Video: The Video Correction Cycle

The video of your skydive is the most powerful tool you can use in learning freestyle. Once your skydive is finished, your learning about the moves that you performed has really just begun. With a good video of your skydive, you can see objectively what you've just done in the air — you can see patterns emerging in how you're performing your moves, you can detect the causes of any problems you're having, and you can see your progress over time in the clearest possible way.

Making effective use of the video will therefore make a significant difference in the rate of improvement of your freestyle, so it's worth your while to do a thorough video review of your skydive every time you have the opportunity.

2.4.2.1 Testing Your Memory of the Skydive

The first step to an effective video review of your skydive starts without using the video. Immediately after you've landed from your jump, and even while you're under canopy — if you can do so without being distracted from flying safely — play back through the entire skydive in your mind, recalling as many of the details as you can. Let go of the original visualization of your skydive and reconstruct what actually happened with an open mind. Try to recall as many of the actual sensations of performing your moves as you can, and then infer how your body must have been moving in order to create those sensations. Be objective and realistic about what could have happened, you're striving for accuracy and completeness in your recollection of your skydive, not for impressing yourself with how well you can imagine you did! Anchor these images of your skydive in your mind, and then start the review with the video.

Now watch the video of your skydive once, all the way through, at real speed. During this viewing, simply observe how you were really moving and what you were actually doing in the air, and compare it with your own recollection of what you did. Pay close attention to the parts where your recollection was fuzzy or incomplete.

When you've finished viewing the complete skydive, take a moment to assess

how accurate your memory was. Ask yourself: for what elements of the skydive was your memory the most accurate? For what elements was your memory the least accurate? How well did you recall what happened during the central moves you were practicing? Were you even close? Did you see anything on the video that surprised you? Were there parts that you hadn't recalled at all?

After a few jumps where you go through this memory test, you'll have an idea of where your strengths and weaknesses lie with respect to recalling what you did on a skydive. Keep performing the memory test every time you have video, and you'll find your ability to recall the events on your skydive will continually improve. More importantly, it will be training you to be more aware of what you're doing while you're actually performing in the air, since you'll know you'll have to recall the events later. Developing this increased awareness while you're in the air is extremely valuable for the self-correction process that allows you to make faster progress in learning freestyle.

In general, improving your ability to recall the events that happened on a skydive will increase your awareness of everything that you do in the air, and this will benefit you in all that you do in skydiving.

2.4.2.2 Checking Your Self-Correction Process

Before your next viewing of the video, recall what corrections you made to your moves when going through the actual self-correction process in the air. Now view the video and watch how you performed each move and determine whether your quick in-air diagnosis of the problem was accurate, and whether the corrections you chose were appropriate. Watch to see whether you implemented the correction during your next attempt at the move, and whether it made a difference in how you performed the move.

If you made an accurate diagnosis of your move in the air, and you implemented a useful correction and it made a positive difference, then congratulations — you're making full use of one of the most powerful tools for learning freestyle. If you had difficulty with your in-air diagnosis of any problems you had with the move, or you didn't choose or implement a useful correction, then keep working on it — the self-correction process is a challenging tool to master, but checking your use of it with the video will always help you improve.

2.4.2.3 Making Use of the Camera's Perspective of the Skydive

Before you get immersed in reviewing the details of what you did on the skydive, watch the video all the way through in real speed once more. This time pay close attention to your relative motion to the camera. Watch for the appearance of left-right and up-down panning motion of the video frame relative to background

objects. Also pay attention to changes in angles and headings of your own body in the video image. Provided your camera flyer was trying to maintain the nominal setup, this information can reveal a lot about how you were moving around in the air. It can tell how much you were sliding, what your fall rate was doing, and what your camera flyer was doing to compensate.

In general, if your camera flyer is attempting to maintain the nominal setup and remain in a steady position, then if there is relative motion between the two of you, you are most likely the one initiating it and your camera flyer is moving in response to keep you in frame and to maintain the right distance between you. The closer your camera flyer is to you when filming you, the more dramatic the change in the angles between you will be when you slide horizontally or change fall rate vertically.

2.4.2.3.1 Detecting Fall Rate Changes From the Video

If you see sudden up or down tilting of the video frame (relative to the background) while you're performing a move, then you've just changed your fall rate. The camera had to tilt up or down to follow you before the camera flyer could change fall rate to stay with you. If your image becomes smaller on the video, then the discrepancy in fall rates between the two of you continued and the separation between you increased. If you then see a view straight down at the ground, in the case of your fall rate increasing, and the ground starts spinning in the frame, then the camera flyer resorted to a spiralling dive in order to catch you. This was a desperate measure which seldom looks good on video. If you see a view straight up at the sky, in the case of your fall rate decreasing, then a bobble, a 180° pivot of your image in the frame, and some shoelaces appearing close-up in the bottom of the frame, then your camera flyer just rolled over onto his/her back to avoid straining his/her neck from looking up at you as you float up into the wild blue yonder!

Fall rate changes that cause short-term increases in separation with your camera flyer are a normal part of freestyle, but you should help prevent excessive amounts of separation by remaining aware of your relative position with your camera flyer in the air, and pausing or returning to a neutral pose after performing any move which creates a lot of separation.

2.4.2.3.2 Detecting Sliding Motion From the Video

If you see left or right panning of the video frame (relative to the background) while you're performing a move, then you just starting sliding in that direction and the camera had to pivot left or right to keep you in frame. Backsliding is extremely common when learning freestyle moves and it usually continues for more than a few seconds as you struggle to balance a new pose, so be on the

lookout for it at all times. If you stayed facing the same heading relative to the ground while performing your backsliding move, then eventually the camera will end up facing you. It's very difficult for a camera flyer to perform a side slide as fast as you can backslide, so he/she will have pivoted to face you and will be tracking after you as you slide off into the sunset.

There are several ways to detect sliding motion just from viewing the video. If you started your move facing sideways to the camera and on the video you see a sideways shift of the background, followed by about a 90° heading shift of the camera and you end up facing the camera head-on, you've been backsliding. Also, a sudden tilt of the horizon in the video frame, caused by a tilt of the camera, can indicate that the camera flyer is in a hard side slide trying to stay with you without changing heading.

If you started your move with your back to the camera, and you suddenly get very large in the video frame, followed by a zoom past the camera with a 180° camera heading shift and you end up facing the camera head-on again, you've been backsliding.

Or, if you started your move with your face to the camera and you start becoming smaller and smaller in the frame while remaining facing the camera, you're still backsliding.

Finally, if you started performing your move sideways to the camera and you continued to keep your side to the camera while performing the move, and you're not moving in the video frame but the background is sliding past you, then you're sliding in a nice circle around your camera flyer, keeping one side towards the center of the circle, and he/she is simply turning to keep you in frame.

Sliding is bound to happen while you're learning new freestyle moves, and you have several options for how to deal with it. If your sliding rate is very fast, then your camera flyer may not be able to stay with you. In this case, if you have enough control of the move, you should perform a turn at a medium rate for as long as you hold the move. This way you will either turn in a circle in front of your camera flyer, or around your camera flyer depending on how you initiate the move and the turn. If you know in advance that your move tends to backslide, then share this with your camera flyer before you jump so he/she can be prepared for it and will know that you'll be turning to make it easier to film.

2.4.2.4 Looking for Repeated Patterns in Performing Moves

Now start looking at the details of your moves on the video. Watch the central move that you were practicing, paying close attention to what your body was doing during each part of the move. Look for the ways in which you performed it

the same each time — for actions that you repeated, whether they were right or wrong. Look at your headings when entering the move, and when finishing it. Look at any tilting or leaning you may be doing. Look at your leg motions. Look at the straightness or bending of your waist, tightness or looseness in your torso. And look at what your arms are doing throughout the move to control it. Compare all your performances of the move to one another and determine the patterns of motions that you repeat each time.

Now decide whether these patterns are helping or hurting you perform the move. If they are helping you, then place them on a list of “desirable” actions for that move and make sure that you include them in your visualization of the move when you next rehearse it mentally. The idea is to be consciously choosing and commanding yourself to perform all the desirable actions for a move, and not relying on having the right feel of the move just come to you. Whatever actions you don’t consciously anchor in a move will be vulnerable to drifting, or changing, as you continue to practice that move. So if you’re doing something right which is helping you perform a move successfully, then make note of it and deliberately continue to visualize and practice it.

If you notice patterns in your performance of the move which are not helping you perform it correctly, then determine what your correct actions should be, and in your visualization of your move, replace the incorrect actions with the correct ones. Then focus on them with added emphasis when you next rehearse the move mentally. You have to replace a bad habit with a good one, which takes extra work. You should also create a command word associated with the corrected action and put it into your command script for that move in order to help change your actions. For example, if you are bending at the waist while performing a layout back loop, then visualize yourself keeping you torso straight, and you might use the command word “straight” or “open” or “stretch” or “arch” while visualizing yourself perform the move in order to program yourself to perform it more correctly.

Initially, there may be many patterns of mistakes when you first try performing a move. Some of them will be interrelated — one mistake will be a consequence of another earlier mistake. Choose those to work on which are most closely tied to the key elements of the move. For example, you can ignore your bent legs if your shoulders are uneven and cause an undesired tilt or heading change with your torso. Or you can ignore that swing of your arm if your bent torso is causing you to fall off to one side and making you reach to recover your balance. Choose the problems that appeared earliest in the move and work to correct them first.

Overall, you want to determine the patterns that you are developing as early as possible as you learn a move so that you can reinforce the good ones, and you can eliminate and replace the bad ones before they become ingrained as habits.

2.4.2.5 Analyzing Body Position and Dynamics of Move

In order to determine the causes of problems that you might be having with a move, you now need to look at the move as closely as possible, with slow motion if you have it. Start with the beginning of the action sequence containing the move you want to examine, and watch it through in slow motion. Pay close attention to how your body is moving and how its position and orientation are changing. During this viewing, form a clear picture of exactly what's happening to your body in the air, and what the outcome of the move is. Did you go into it and come out of it on heading? Did you tilt or turn during the move? What motions did your legs go through? What actions did your arms perform? What did your torso do? Did you complete the sequence cleanly or did it look like a struggle?

Once you have a good picture of what you did, pick out the problems you might have had with the move. Now go back over the video, again in slow motion, to determine the cause of the problems. Be sure you go back far enough to catch the beginning of any problems with the move. Be on the lookout for smaller problems which then indirectly cause the larger problems. For example, a loop which lost momentum may "stall out" and hesitate just before reaching the upright position, and your body may then fall off heading into a loop in a completely different direction. The heading change itself was a consequence of the lack of momentum in the initial loop, which might have been caused by starting the loop with too much bend at your waist, and then straightening abruptly such that it killed the looping momentum. Focusing on the heading change would have caused you to miss the body bend which was the real problem.

The airflow over your body is causing all of the dynamics of your moves, so to figure out why your moves are working the way they are, try to visualize how the air is applying its force over every part of your body. To help you picture the forces from the air, image long ribbons (at least five feet long) attached all along the sides of your arms and legs, and along the sides and front and back of your torso. The ribbons will always be blowing away from the relative wind (which, for most of the skydive, is away from the ground). If the ribbons are spread out from one another and are standing out away from your body, then the air will be applying a lot of force on that part of your body, and you can imagine the effect as if all those ribbons are pulling (upward) on that part of your body. For example, when your arm is extended horizontally, these ribbons will be spread out from one another along your arm, blowing upward, perpendicular to your arm, and the air will therefore be applying a lot of force to your arm. When your arm is reaching upward toward the sky, on the other hand, these ribbons will be blowing upward against your arm, parallel to it, and they will all be bunched together, and therefore the air won't be applying much force at all to that arm. The same will be true of your legs and torso.

To figure out the net effect of the airflow over your body, picture where all the ribbons on your body will be blowing, and then mentally pull, in the direction of the airflow, on the parts of your body where the ribbons are the most spread out. Your body will rotate in a certain way in response to how you are “pulling” on it. If you are visualizing it correctly, you will be able to predict what your body will actually do in the air as a result of the positions you put yourself in. You can practice this by watching video that you haven’t studied before in slow motion and trying to predict how the moves will turn out.

Now that you have a way of determining how your body will be reacting to the airflow, you can watch what your body is doing to cause the problems that you might have had.

If you have problems with moves turning when you want to hold them on heading, then look for ways in which your body is misaligned or tilted from side to side at your hips or shoulders. Also, look for whether a leg or knee which should be pointed down into the wind is actually tilted slightly to one side.

If you have trouble with loops rotating unevenly, or it’s difficult to keep them going, look for how your torso may be straightening and bending at the waist in a way that could be stopping your looping momentum. Or look for ways in which your arms may be moving such that they counteract your rotation instead of assisting it.

If you have problems with loops or vertical moves tilting or falling off heading, and not staying in a vertical plane, then look for ways in which your legs or arms may be extending unevenly out of the vertical plane. Also look for whether your shoulders or torso may be bending or twisting out of alignment with your hips, and catching air unevenly when they should be lined up cleanly with the airflow.

Developing an eye for these kinds of actions by your body can help you interpret and analyze why your body is responding the way it is in the air. Once you can analyze how the air forces are acting on your body, you will see what you are doing to cause the problems, and you can determine how to correct any problems you may be having with your moves.

For the central move that you are practicing, therefore, as you perform the detailed video review, the goal is to identify the one or two most serious problems you had with the move, identify the causes of the problems as best you can, and identify the corrections that would prevent the problems. Then you’ll have made the best possible use of the video and you’ll be ready to take the next step towards applying the corrections. Once you have the corrections in mind, formulate one or two command words, to place in your command script for that move, that will force you to visualize and implement the correct actions to perform to replace the

ones that caused the problems.

2.4.2.6 Applying the Video Analysis Results to the Video Correction Cycle

Once you've reviewed the video of your skydive and analyzed what you did, you've obtained several important pieces of information about your performance. You've identified the good patterns that you've been following when practicing that particular move and you formed a deliberate image of those actions to remind you to keep doing them. You've identified any bad patterns that you've been following and replaced them with the correct image of what to do, with a command word to help you implement it. And you've analyzed the details of your performance to determine the exact causes of any problems and the appropriate corrections to make, and you've formed one or two more command words to help you recall and implement those corrections. The corrections for the bad patterns and for the specific problems you identified may be identical, if you did indeed identify the causes of your problems as a pattern that you repeated each time you performed your move.

All together, you now have three or four key points to focus on for your central move, with associated command words based on the corrections that you need to implement. Now you should rehearse the new command script for that move, and build it into your visualization for the entire skydive again. To complete the cycle of using the video to correct and improve your performance, you should repeat the skydive and implement the corrections in the air. This way, you will gain the maximum benefit of having had the video in the first place. As long as your concentration lasts, repeating the skydive several more times — using the video analysis to make further corrections — can be very beneficial.

The video correction cycle, like the self-correction cycle you perform in the air, therefore consists of the observation and analysis of the video, the determination of the necessary corrections, the visualization of the corrected performance, and the implementation of the corrections. Effective use of this cycle can significantly speed up your learning process, and bring you quicker gratification in performing freestyle.

2.5 Intermediate Camera Flying Concepts

2.5.1 Controlling Exit Spacing

The basic exit count enables you and your camera flyer to exit the plane at the same time, but there may be situations when leaving at exactly the same time is not desirable. It may be better to have a couple of extra feet of separation between you by the time you're both in the air, depending on the configuration of the door

you're exiting from, and on the type of move you're performing right on exit.

Some aircraft doors allow you and your camera flyer to get the right distance apart before you leave the airplane. Twin Otters, for example, have wide enough doors that if you and your camera flyer are at opposite ends of it, you can easily get five to six feet of separation right away. If you're jumping from a narrow-door airplane such as a King Air, or a DC-3, or even a tailgate, you may be very close together if you leave at exactly the same time.

The type of move you perform on exit also determines what separation is desirable. If you perform a move where you extend your body fully immediately upon exit, and you want all of your body to be in frame on the video at that time, then the normal exit separation may not be enough.

So, for both these situations, you need a repeatable way to create a controllable amount of additional separation between yourself and your camera flyer right as you leave the airplane. You may think that having the camera flyer try to leave just a little bit earlier, and making him/her responsible for the separation would be the solution, but in fact, it can be very difficult for him/her to gauge the speed of your exit count and repeatably leave a set amount of time before you reach the "go." If you want five feet of separation, for example, that may translate to less than a twentieth of a second difference in exit time between the two of you (a plane flying at 80 knots is travelling 133 feet per second). It's impossible for him/her to count backwards from the "go" that you haven't given yet, and it's very difficult to count the difference between one second and nineteen-twentieths of a second from the "set," if your count is at one second intervals, for example.

A much better solution is to have you, the freestylist, control the separation by delaying your own exit by the desired fraction of a second after you give the "go" on your own exit count. This way, your camera flyer always goes on the original "go," and you can delay your exit by the extra heartbeat. If your exit count is "ready.....set.....go," then give yourself a second "go" as quickly as you can think it, and that should give you several feet of separation. Your count would then be "ready.....set.....go/go" where you leave on the second "go." If you are facing your camera flyer as you give the count, don't wait until you actually see him/her leave, since that could add up to a quarter-second delay, or 30 ft. of separation. After a few times of practicing it, you'll find you can easily control the fraction of a second delay and even fine-tune it so that you can control the separation to within a few feet of what you want.

Be sure to let your camera flyer know that you will be doing this, so he/she doesn't wait to go until you do. You want him/her to go at the exact "go" of your exit count, regardless of what you do.

2.5.2 Adjusting Framing for Different Poses

Once you've been working with a camera flyer for a while, he/she will be able to anticipate your moves, and you will be performing more in place, so you may be able to work closer together in the air. When you approach the point where your camera flyer can film you full frame — with your image extending to the edges of the video frame — then some additional considerations come into play for the camera work. You may not always want to be that close, but when you are, your camera flyer will need to pay more attention to the proper framing of your body. Close-ups look good if the framing is well executed and appropriate for the shot, but they don't look good if they crop an arm or a leg at a crucial moment, and they never look good if they crop your head when there is clearly no reason to do so.

When your image on the video fills only half to three-quarters of the frame, then placing the center of the video frame somewhere around your waist, no matter what pose you're in, is usually satisfactory. One limb may extend closer to the edge of the frame than another when you change poses, but it will most likely not be cropped off as a result.

When your image fills the entire frame, however, then it's no longer sufficient to use your waist as the center of frame all the time. For example, if you're in a Tee, with one leg extending straight downward, then the center of frame from top to bottom is halfway between the top-most and bottom-most parts of your body, which would place it halfway between your hip and your toe, or probably just above your knee — about 18 inches below your torso. If you then rolled over immediately to an Inverted Tee, the center of frame would move to a point about 18 inches above your torso, by the same analysis. In addition, if you sweep your arms back and arch slightly in your Tee, then your back may no longer be the top-most point on your body, but your hands may extend 12 to 18 inches above your back, and your camera flyer should take that into consideration if you don't want your hands cropped from the frame.

In some poses, the visual center of frame may not be a point on your body at all, but will be a point between your limbs, or offset from your torso. For example, in a simple V-Seat on your back, the center of frame will be above your waist, in the center of the "V" shape formed by your body, but not on your body itself.

If you are performing loops or rolling moves, then your camera flyer should pick the separation distance and the dynamic center of frame that keeps your limbs in frame throughout the full rotation. Usually this dynamic center of frame will be close your center of gravity — the point in your body around which you will be rotating — even if it is not the visual center of frame when your body is stationary. This way, in a loop, for example, your legs will extend the same distance above

your center of gravity (CG) when you are head-down as they will be below your CG when you are head up, and they will be in frame in both cases. In a straight-body position, your CG will be a little further up on your body, due to the weight of the rig, than your visual center of frame would be, and your camera flyer should make the adjustment in order to maintain good framing.

2.5.3 Adjusting Camera Angles for Different Poses

Just as there are different framing points for different poses and moves in freestyle, there are different camera angles that work better with different moves. After you have reached the point with your camera flyer where you can maintain the nominal setup as you perform your moves, you can have your camera flyer start moving up and down to change the vertical angle at which you display your moves. He/she can also move from left to right to create horizontal motion of the background, or to fly around your moves, but you are still responsible for turning your body to present your moves at the desired angle to the camera.

Much of the choice of which camera angle to use to film a move is a matter of taste, but your camera flyer can follow some basic guidelines to get started. In general, it's more pleasing to see the front of your body in the video. This means that when you are flat, facing down, your camera flyer should be slightly below you to show your face and the front of your torso. If you are inverted, on your back, then your camera flyer should be slightly above you to keep your face in view. If you are in a pose that shows full extension of your legs, then it looks nice to have the camera on the angle closest to your legs. In a Daffy, for example, your legs are fully extended and are below your torso, so it looks good to film it from slightly below.

Be willing to experiment at this point, and try different combinations of camera angles to show off your moves and make them look the best on the video. If you make it a deliberate part of your video review and jump planning with your camera flyer, you'll be adding another dimension to your freestyle performances, and you can end up with some creative and artistic results.

3 Part Three: Advanced Freestyle and Fun Flying

3.1 Introduction

Once you have mastered the basics in the previous sections, you're ready to start trying more complex moves, but even more fun is to invent your own moves! This sections lists some of the advanced level moves you may wan to learn at this stage, and also describes how you might approach the task of inventing your own moves. From now on, the possibilities are endless!

3.2 Advanced Freestyle Moves

The following moves extend into the advanced level for freestyle. The full descriptions are contained in the Freestyle Database listing.

3.2.1 Side Poses

3.2.1.1 Open Camel

3.2.2 Upright Poses

3.2.2.1 Arabesque

3.2.2.2 Stag Arabesque

3.2.2.3 Y-Scale Standup

3.2.2.4 Penché

3.2.2.5 Layback Pose

3.2.3 Head-Down Poses

3.2.3.1 Stag Headstand

3.2.3.2 Swan Headstand

3.2.4 Compass/Arabesque Moves

3.2.4.1 Compass Arabian

3.2.4.2 Compass Switch

3.2.4.3 Compass Swivel

3.2.4.4 Compass Inward Leg Roll

3.2.4.5 Compass Outward Leg Roll

3.2.4.6 Compass Inward Standup Turn

3.2.4.7 Compass Outward Standup Turn

3.2.4.8 Compass Inward Switch Roll

3.2.4.9 Compass Outward Switch Roll

3.2.4.10 Stag Kick Turn

3.2.4.11 Compass Reverse

3.2.4.12 Compass Reverse Turn

3.2.4.13 Arabesque Swing-Back

3.2.4.14 Arabesque Swing-Forward

3.2.4.15 Arabesque Illusion

3.2.4.16 Arabesque Inversion

3.2.4.17 Compass Outward Double Layout Roll

3.2.4.18 Compass Inward Double Layout Roll

3.2.5 Compound Turns/Rolls

3.2.5.1 Thomas Double Flair

3.2.5.2 Thomas Straddle Roll Flair

3.2.5.3 Thomas Back Flip Flair

3.2.5.4 Thomas Front Flip Flair

3.2.6 Standup Moves

3.2.6.1 Stag Whip Turn

3.2.6.2 Standup Whip Turn

3.2.6.3 Layback Spin

3.2.7 Back Loops

3.2.7.1 Back Swan Pop-Out Loop

3.2.7.2 Back Stag Pop-Out Loop

3.2.8 Twisting Back Loops

3.2.8.1 Standup Back Full Twist

3.2.8.2 Solo Standup Back Full Twist

3.2.8.3 Back 1-1/2 Twist

3.2.8.4 Back Double Twist

3.2.8.5 Back 2-1/2 Twist

3.2.8.6 Back Triple Twist

3.2.9 Twisting Front Loops

3.2.9.1 Front 1-1/2 Twist

3.2.9.2 Front Double Twist

3.2.10 Side Moves

3.2.10.1 Side Half Twist

3.2.10.2 Side Full Twist

3.3 Inventing Freestyle Moves

Part of the fun of freestyle is to invent new moves and try doing things that you've never seen anyone else do before. Everyone who has invented a new move has contributed something to the sport. The audiences as well as future freestylers have benefited as a result of having a broader range of moves displayed in freestyle performances, and that's how the sport has evolved and grown from its first beginnings. Creativity is important for keeping your routines interesting to watch, and you'll even find them more fun to perform when you can display your own personal moves.

There are several ways to go about inventing new moves. Some of the techniques you can pursue methodically and deliberately. With others, you have to wait until

lightning strikes and you happen upon a new move by chance. Either way, if you're on the lookout for new moves, or you're making an attempt to invent them, you're sure to come up with a good catch.

There are several criteria to use when determining whether what you're doing can be called a new move. First, it has to be truly original, meaning no one else has performed it yet. Second, you have to prove that it is indeed possible to perform, and third you should be able to perform it with some minimum degree of repeatability. A one-time accident that looked spectacular on video may be fun to show others, but you should be able to repeat it a few more times before calling it a new freestyle move.

3.3.1 Adding Variations to Existing Moves

One of the simplest ways to invent new moves is to try a variation on an existing move. You may try performing it in a different body position, or you can try changing your body position part way through the move. You can try starting it or stopping it in a different position. Either way can give it a slightly different look. There is still a vast number of unexplored combinations of body positions and dynamic moves to try, and with a little experimentation you can probably come up with something interesting.

3.3.2 Imagining Moves in Your Mind

Another direct way to invent new moves is to try one that you can picture in your mind. There's no formula for dreaming up the image of the move in the first place, but once you have a picture of what it looks like, you can attempt it in the air.

The first step to take before actually trying it in the air is to analyze what the basic motions are for your imagined move, and to picture how the air is going to act on your body as you go through that motion. Try to picture how the air is going to apply its forces on your body, and determine whether those forces are going to work with you or against you as you go through the move. That will help you figure out what to do with your arms to help you perform the move. You may have to use them to counteract undesired forces on your legs or torso, or you may need them to initiate or stop the move. Putting a little thought into this ahead of time will increase your chances of success in the air.

Next, take it to the air. If you have a camera flyer, be sure to explain that you're doing a little R&D (research and development), so that he/she will know to play it conservatively since neither of you will know what to expect. If you succeed right away in performing the move, then congratulations, you've got a new move to add to your list of things you can do.

More likely, what you end up doing won't initially match what you had envisioned. Use the video to analyze what was happening, and to determine how to change your technique to get closer to what you wanted. Then try it again. You may decide that your technique is correct, and you just need a little more practice since the move could turn out to be a difficult one to perform. After a few jumps of trying your new move, you'll probably be able to decide whether it's even possible to perform, and whether it looks interesting enough to try to master. Don't be afraid to abandon it and try something else that might work better, if it turns out to be a dead end. It would be very unlikely that every move you imagine will end up being one you can perform successfully and that will look good on the video. So don't be afraid to move on and keep experimenting with other new moves.

3.3.3 Letting Moves Evolve from Other Moves

As you try a new move in the air, you can either focus on trying to make it work exactly as you envisioned, or you can try to feel which way the air naturally wants to move you and let the air shape the way the move turns out. If you let the move evolve into something different, you could end up inventing an interesting new move that you couldn't have imagined beforehand.

In order to invent moves this way, start out with a rough idea of what you'd like your move to look like. This will give you a set of motions to start to follow and will help you repeat those motions since they'll be based on a mental image that you've formed for your move. As you go through the move in the air, focus less on controlling the move to make it work a certain way, and more on what the air is doing to your body. Notice which parts of the move flow nicely, and which parts feel more forced. As you repeat the move, relax during the parts that previously felt forced, and let your body go the way the air wants to move it. Note that this does not mean to go limp — you still need to maintain muscle tightness to keep your legs under control and your torso extended, for example.

The move may evolve quite a bit from your original picture, but if you're repeating your basic actions, and remembering and incorporating the natural changes each time you go through it, eventually, you'll fall into a pattern that will repeat itself. At this point, pay close attention to what you're telling your body to do as you go through the move. You may not yet know what it looks like, so your mental sequence of instructions is the only way you'll be able to capture this new move, and be able to perform it again on the next jump. When you view the video, then you can correlate your mental instructions with the resulting actions to form a complete image of the move.

Inventing new moves this way can be very exciting because of the unpredictable nature of this approach. You're bound to come up with something new, and it

might very well surprise you with what it ends up looking like.

3.3.4 Inventing Moves by Accident

Another unpredictable way to invent new moves is to let them happen by accident, as a result of mistakes while performing other moves. While you can't set out to deliberately discover new moves this way, you can keep your eyes open to watching what happens when you make mistakes during your moves.

When you review your video, if you make a mistake, don't always just stop the video and go back to studying what caused the mistake. Watch the outcome of the mistake at least once and decide whether it looks at all interesting. If it does look interesting, then study it to determine how you might be able to repeat it again in the air. Then try it in the air right away, while you still have an image in your mind and at least a crude feel for how to perform it. With this technique for inventing moves, you have the advantage that you already know that the move is feasible, and you know what it looks like. The challenge is just reconstructing how you did it, since it didn't start out in your plans.

Some moves which have since become very basic to freestyle were originally invented this way. The Compass, for example, started out as a mistake when coming out of a Straddle Front Loop. You might come up with something significant this way, so keep your eyes open for these chance opportunities.