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Chapter 1 Aerodynamics:

Since the beginning of time, the idea of human flight has captivated many of the world's greatest minds. Even today, man still gazes skyward in fascination of all things capable of flight. While man may never fly completely on his own unassisted, we have learned the principals and physics behind flight. Understanding how these physics influence flight has given way to modern skydiving and more importantly, human flight.

In order to understand how to fly the wing suit, we must first understand *why* the wing suit flies. Once we gain an understanding of this, the concept of flying ones body efficiently will be that much easier. As a skydiver, you may have gained a basic knowledge of flight whether you realize it or not. Many of the principals of canopy flight can be directly correlated to how a wing suit flies and how ones body influences that flight.

Flight is a combination of many variables; and is truly a complex system. First, we must understand these variables and how when combined with one another, allow us to achieve flight. The principals most relevant to wing suit flight are glide ratio, air speed, lift and angle of attack.

Chapter 2 The Wingsuit:

The wing suit has seen many changes in design and materials since it was first conceived. However, the desire to fly has remained unchanged. It is because of that desire we find ourselves in an era where wing suits have taken advantage of modern technology and are much safer than their predecessors.

Like all innovations, eventually there is more than one variant and more than one manufacturer. This holds true in the realm of wing suits as well. While several manufacturers have all set out to accomplish the same goal, not all have taken the same path and hence there are variants in wing suits. Today's modern wing suit comes in two different configurations, the mono wing and the tri-wing. The characteristics of each of these types of wing suits will be discussed to better give one an understanding of how they are both alike but also very different from one another.

Chapter 4 Body Position:

One of the most overlooked aspects of wing suiting is proper body position. Body position usually isn't even a consideration when one is trying to figure out why their numbers aren't higher or why they cannot keep up with others in a flock. The suit often gets the blame. The simple answer to these questions is knowing what the correct body position is and applying it to ones flight, which will make all the difference in the world and make for successful wing suit flights.

While most experienced wing suit pilots can tell you what the ideal body position should be, many of them don't actually fly that way. Part of the reason is feedback. For some wing suit pilots, they may be the only one on their DZ that flies a wing suit, so getting feedback on ones body position while in flight is impossible. This can often lead to disappointment when the chance to fly with others arises and one gets left in the dust. Knowing and applying the proper body position and flying with others are how one will become a better wing suit pilot. If you are a person that only does solos to collect flight data to measure your performance, you are hurting your chances at progressing and learning additional skills that can make you a better wing suit pilot by not flying with others.

Chapter 7 Flocking and Safety:

One of the nicer aspects of enjoying actual human flight is being able to do it with others. Unlike RW or free flying, new wing suit pilots can flock with others in a relatively short period of time. However, just like an RW or free fly big way, there are certain aspects of safety that need to be covered on the ground in order to be safe in the sky. For those already experienced in flight, but unfamiliar with bigger flocks, there exists certain flock etiquette that not only ensures safety but also makes it possible for all to have fun.

Flying relative to another wing suit is a lot of fun and can be as challenging for experienced skydivers as it is for novice skydivers to fly relative to someone the first time. While the amount of fun and challenge of flying relative can be a motivator in it

self to get better, there are also some dangers one must be aware of. There are also precautions that must be followed to ensure safe flocking even between as little as two people. Like any other group skydive, everyone involved should plan the dive and dive the plan. A good dirt dive on any flock, especially where there are varying skill levels or unfamiliar faces, is a must. Not only does this ensure everyone is aware of the safety aspects of the flock but also ensures that everyone knows what the plan is and where other wing suits will be in relation to them. Because wing suits can build formations in three dimensions both in depth and width, it is always a good idea, even with experienced pilots, to dirt dive the flight. Often this can start with a drawing on a dry erase board and move to a walk through rehearsal from the exit to the break off. Even if the flock is not slot specific, a full walk through rehearsal is a good idea. For those who have jumped on big ways, the process is the same, albeit less complicated.....

Chapter 8 Acrobatics:

For many, the thought of flying flat and level is only one aspect of wing suiting. While seeing how far one can go or how long one can stay aloft is a goal of some, others want to see how far they can push the edge in terms of acrobatic flight. This chapter is aimed at those who are less concerned about distance and time and more with pushing the limits of maneuverability.

Most people are familiar with doing acrobatics while skydiving and the skills involved with flying in three dimensions. Skills learned while flying on ones belly or head down can all be applied to acrobatics in the wing suit. It is only limited to ones imagination what can be done. Before attempting acrobatic flight it is essential that one know the basic position of how to recover from instability as some maneuvers could potentially put one into a flat spin or tumble. Being able to do many of the moves described here before attempting to try them in a wing suit is a good idea, as it will save you some frustration. Besides being fun to do, acrobatics builds flying skills essential in dealing with instability issues that could potentially arise on exit or while flying with others. While it is possible to free fly in a wing suit, it is not recommended as it puts an extreme amount of stress on the suits seams and can cause irreparable damage.....

Chapter 9 Camera and Photo:

Wingsuit camera is a very useful tool for training, debriefing purposes and a fantastic way for remembering those special moments. It is also a powerful tool for promoting wing suiting to the parachuting and general public. Just as in choosing the right canopy for the job, it is imperative to choose the correct camera for the job. Having the right tools for the job is not only important, it is essential.

However, there are a few things one needs to consider in order to become a competent and safe wing suit camera person. The following information is provided as a guideline to help you on your way down the path of aerial photography. It is designed to show you the thought process and safety measures one must consider when the decision to add a camera to you helmet is made. Specific makes, models and or settings won't be discussed here as there are volumes of information out there that cover those subjects in greater detail than can be done here. The following will discuss certain criteria and characteristics that one's camera set up should entail for successful and safe wing suiting....

Chapter 10 GPS and Performance Tracking:

Advances in technology have allowed the wing suit to evolve from what Leo Valentin developed to where it is today. With the ability to fly, man has sought how to quantify and visualize his flight, if not for the advancement in technology, then for personal edification. The means and the devices to accomplish this have evolved over the years to present day. While the mathematics and physics have not changed, the devices used to calculate those functions and record them have continued to evolve, all for the benefit of the modern wing suit pilot.

Today's wing suit pilot has on his person at any one time more technology than ever before in the history of skydiving. From the materials the wing suit is made of to the

microprocessor data loggers inside one's helmet to the life saving device packed in the reserve tray. Technology has not only made the sport safer, it has made it more convenient. What was once either too big or only available to research and government agencies, is now available to anyone who wishes to purchase them. What started out as a small device that beeped has evolved into a device capable of calculating and logging information from one's skydives.

For some wing suit pilots the need to know how far, how fast and how long, are questions they would like to know with out having to work the math out after the fact. After all, we currently have devices that are capable of logging that information; we should have a way to analyze it as well right? This chapter will focus on the current and evolving technologies available to the wing suit pilot. For those who like to work it out themselves, the formulas to do so will likewise be provided later in the chapter.....

Chapter 11 Wingsuit BASE :

If you have spent even a short amount of time in the sport of skydiving you have seen pictures or may have even witnessed people participating in BASE jumping. For those who BASE jump, the wing suit opens up the door for further exploring the envelope of the sport. In this chapter we will discuss some of the basic fundamentals needed to safely jump the wing suit in a BASE environment.....

.....While the wing suit allows for incredible delays and drastic increases in horizontal distances covered, it also poses some added dangers. In fact, it can be even more dangerous than a regular BASE jump if one is not adequately trained and prepared....

..... Some of the added dangers in BASE jumping a wing suit are directly related to the wing suit itself. One's range of motion is shortened by the addition of the wings as is ones ability to safely move to the exit point if it involves any last minute climbing....

.... Knowing how to launch in to a proper body position and how to recover from a poor launch is extremely important.....

Chapter 12 Wingsuit PT:

With the joys of flight comes the agony of newfound muscles letting you know they exist. It is not uncommon to hear people talk about their arms or other parts of their bodies getting tired while flying the wing suit. Even if you don't find yourself experiencing muscle fatigue during your flights, the following workout only takes a few minutes a day and will strengthen the muscle groups most often used while flying the wing suit.

Instead of laying out a laundry list of exercises and muscle groups that most are already familiar with, this section will give you a means to work out without having to spend hours in the gym. While most only feel their arms getting tired while flying, there are actually more muscle groups at work than one realizes. The following exercises are aimed at an often-overlooked part of the human body, that being the human core.

Chapter 13 Becoming an Instructor:

The BirdMan Instructor (BMI) course will teach current birdmen how to conduct a First Flight Course (FFC) and conduct a first flight with a potential student. It will cover aspects of flight and teaching techniques not found anywhere else in a standardized format. Each BMI candidate will be required to successfully give the FFC and conduct an in air evaluation that will be graded by a Birdman Chief Instructor. Prior teaching skills are highly recommended as the course has similarities to the AFF method of instruction and student interaction. BMI Candidates must have demonstratable air skills and be able to fly in close proximity to other Birdmen regardless of their fall rate. This is a pass/fail type of course.

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