



# SAFETY MANAGEMENT SYSTEM (SMS)

## *Summary Analysis Report 2023*

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## **ACKNOWLEDGEMENTS**

The CSPA Technical and Safety Committee has prepared this report under the authority granted to it by the CSPA Board of Directors.

## **1 - INTRODUCTION**

The Canadian Sport Parachuting Association (CSPA) integrated the Safety Management System (SMS) into the existing Accident/Incident/Malfunction (AIM) system back in 2014. Since then, the yearly SMS report has provided general statistics gathered from submitted AIM reports with a breakdown into four (4) categories within the skydiving industry:

- Tandem Skydives,
- Student Skydives,
- Experienced Skydives, and
- Aircraft.

The CSPA Technical & Safety Committee (T&SC) concluded in 2019 that there were areas of opportunity for a more in-depth SMS Summary Analysis Report provided to the skydiving community each year. The primary goals of the SMS Summary Analysis Report are:

- To assess areas of opportunity gathered from AIM reports that pose potential risk in skydiving;
- Minimize recurrence through education and awareness;
- and utilize trending analysis to modify and/or implement skill development material as needed.

With these goals in mind, the T&SC is hopeful that the skydiving community has another tool in the toolbox to support their long-term development in our sport.

## **2 – ACCIDENT/INCIDENT/MALFUNCTION (AIM) REPORTING**

### **2.1. Purpose**

An AIM report is a formal recording of the facts related to an accident, incident, and/or a malfunction. The report usually relates to an accident (any occurrence resulting in injury requiring medical attention or a fatality), or incident (any occurrence which could have resulted in a situation leading to injury or fatality) that has occurred. It also pertains to any unusual occurrences where a partial or complete malfunction of the equipment may have led to the initiation of emergency procedures. The sole purpose of the AIM report is to enhance safety and assess preventative measures.

### **2.2. Gathering of Information**

Any incident that involves skydiver, staff, and/or customer safety should be recorded, no matter how insignificant it may seem. An investigation of what happened should be undertaken as soon as possible after the incident occurs and after any injured person(s) have been taken care of. The report that is generated as a result should provide a full account of what took place.

Following an occurrence, it is strongly recommended to submit an [AIM report](#) to CSPA's National Office. The CSPA Registered Participant involved, CSPA Coach, Instructors, Riggers, or other qualified personnel should submit the report directly to CSPA National Office, and we strongly recommend a copy be given to the involved dropzone for their records. In the event of an accident, injury, fatality and/or 3rd party loss, CSPA requires immediate notification and AIM reports must be filed within ten (10) working days of the occurrence.

### **2.3. How the AIM is used for analysis**

All AIM reports received by the CSPA National Office, are reviewed for completion. Any AIM reports not completed properly will be returned with a request for proper completion. Gathered from the AIM reports are key areas of interest to assist in the SMS analysis, including but not limited to, type of occurrence, total jump numbers, and description of the occurrence. Details pertaining to participant(s) and location are kept confidential and not used for the SMS analysis.

Once AIM report data is entered into the SMS report data, the occurrence is categorized into four (4) categories within the skydiving industry:

- (1) Tandem Skydives,
- (2) Student Skydives,
- (3) Experienced Skydives, and
- (4) Aircraft

For each occurrence, the detailed description of the event and the recommendations of the Dropzone Safety Officer (DZSO) are carefully reviewed. A further breakdown of occurrence type and/or trend is applied. This includes such categories as Exit, Deployment, Freefall, Canopy, or Landing and is a general categorization of the main event described. CSPA SMS data is also compared to CSPA historical results, and the International Skydiving Committee (ISC) Safety Survey Report to help identify any common trending and/or unique occurrences.

Upon entry and categorization of information of all AIM reports, the designated SMS Analyst, in collaboration with T&SC Chair, begin to compile the qualitative data to identify trending and areas of opportunity for the skydiving community. As occurrences are identified, proposed action plans are provided. The goal of the

proposed action plan(s) is to provide the skydiving community references for prevention, education, and coaching. Reference material often refers to areas within the CSPA Parachute Information Manuals (PIMs), manufacturers guidelines, and other CSPA source documents. Furthermore, each occurrence identifies who the proposed action plan is best suited for, such as but not limited to, the jumper, packer(s), coach(s), and/or instructor(s).

Upon completion of the SMS, the detailed AIM data report and statistics are posted to the CSPA website for reference, including the [historical comparisons](#) for the benefit of the skydiving community.

## 3 – 2023 AIM RESULTS

### 3.1. Overall AIM Submissions Statistics

We know that all occurrences are not reported through an AIM report for a variety of reasons. Most noted from past years, is the lack of AIM reports when an occurrence is not considered significant and/or did not result in an immediate injury. It is our hope that the AIM report is utilized more frequently even in occurrences that may seem less significant such as a low-speed malfunction resulting in emergency procedures being implemented and a successful landing in the designated landing area. Although it may appear it was a non-event because no one was injured, the occurrence itself can be useful in identifying trends and opportunities for further education.

Although we can conclude that not all occurrences may have been reported, we still believe it is important to analyze the data we are supplied with for potential areas of opportunity and preventative action plans to reduce the occurrence rates year after year. It is however observed that AIM reports are more likely to be completed for occurrences with Tandem Skydives, therefore providing us a more accurate reflection of the historical rate of occurrence in this area.

In 2023, a total of seventy-nine (79) AIM reports were submitted. This is a decrease of 15.05% over a submission of ninety-three (93) AIM reports in 2022 (*Table 1: Total AIMS Reported*). Looking at the overall breakdown, Student occurrences saw the largest decrease in 2023 compared to 2022 (34.78% decrease), while Tandem occurrences saw a decrease of 5.88% and Experienced occurrences recorded a 9.43% decrease (*Table 1: Total AIMS Reported*).

Analysis of trending indicated the following:

(1) Combined Overall Occurrence Trending:

- 4.44% decrease over a 3-year trend
- 0.77% increase over a 5-year trend
- 4.39% decrease over an 8-year trend

(2) Tandem Occurrence Trending:

- 17.24% decrease over a 3-year trend
- 24.53% decrease over a 5-year trend
- 26.44% decrease over an 8-year trend

(3) Student Occurrence Trending:

- 18.18% decrease over a 3-year trend
- No indicated change over a 5-year trend
- 20% decrease over an 8-year trend

(4) Experience Occurrence Trending:

- 6.67% increase over a 3-year trend
- 13.74% increase over a 5-year trend
- 16.36% increase over an 8-year trend

More in-depth review by occurrence categories will be discussed later in this report.

**TABLE 1: Total AIMs Reported**

	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Tandem	16	17	25	27	21	20	28	20	1	10
Student	15	23	17	12	8	36	18	21	7	9
Experience	48	53	34	43	33	36	46	37	15	30
Aircraft	0	0	0	0	0	1	2	4	0	1
<b>Total</b>	<b>79</b>	<b>93</b>	<b>76</b>	<b>82</b>	<b>62</b>	<b>93</b>	<b>94</b>	<b>82</b>	<b>23</b>	<b>50</b>

Reviewing the breakdown of total occurrence types, data indicated that most of the overall increase was seen in reported Incidents with an increase of 29.41% in 2023 compared to 2022. In reviewing the trending analysis specific to Incidents, we can also see an increase of 77.42% increase over a 5-year trend, and a 70.87% increase over an 8-year trend (*Table 2: Total AIMs Reported by Type*). This can be accounted for as we look closer at the occurrence types within each category. We can see an overall decrease of 28.3% in Landing occurrences in 2023 compared to 2022, with a 5-year trending decrease of 4.52% (*Table 3: Total AIMs Reported by Category: Combined*).

It was noted in 2022 that concern was raised with freefall occurrences for both Student and Experienced categories. We did not see any reported occurrences in freefall for Students, however data indicates an increase of 150% in the Experienced category in 2023. Of greatest concern is that four (4) freefall occurrences were a result of high-speed mid-air collisions. This finding will be further discussed in the Experienced AIM Statistics. It is encouraging to see a decreasing trend in accidents in 2023 compared to 2022 of 13.95% with a 5-year trending decrease of 7.04%. Malfunctions has seen a 28.57% decrease in 2023 compared to 2022 while trending over 5 years indicates a 1% decrease.

**TABLE 2: Total AIMs Reported by Type**

	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Accident	37	43	38	45	36	57	54	36	2	19
Incident	22	17	12	6	5	15	10	16	2	10
Malfunction	20	28	24	29	19	20	26	25	18	17
Fatality	0	5	3	2	2	0	2	1	1	3
<b>Total</b>	<b>79</b>	<b>93</b>	<b>76</b>	<b>82</b>	<b>62</b>	<b>92</b>	<b>92</b>	<b>78</b>	<b>23</b>	<b>49</b>

\*Aircraft occurrences are not reflected in this chart

\*Tandem Double Fatality is only counted as one (1) AIM Type



TABLE 3: Total AIM Reported By Category: Combined

	Combined 2023	Combined 2022	Combined 2021	Combined 2020	Combined 2019	Combined 2018	Combined 2017	Combined 2016	Combined 2015	Combined 2014
Exit	4	4	4	4	2	9	3	3	0	4
FreeFall	6	6	3	1	0	0	0	0	0	0
Deployment	21	30	34	33	22	26	25	14	3	4
Canopy	5	1	0	2	0	1	2	6	9	4
Landing	38	53	35	37	36	56	42	38	21	13
Other	4	0	0	5	0	0	0	0	0	3

Total AIM Reported By Category: Tandem

	Tandem 2023	Tandem 2022	Tandem 2021	Tandem 2020	Tandem 2019	Tandem 2018	Tandem 2017	Tandem 2016	Tandem 2015	Tandem 2014
Exit	0	1	2	2	2	1	1	1	0	0
FreeFall	1	1	2	0	0	0	0	0	0	0
Deployment	1	5	10	8	5	8	9	8	1	2
Canopy	1	0	0	0	0	1	2	2	1	2
Landing	11	10	11	15	14	10	16	10	3	5
Other	1	0	0	2	0	0	0	0	0	1

Total AIM Reported By Category: Student

	Student 2023	Student 2022	Student 2021	Student 2020	Student 2019	Student 2018	Student 2017	Student 2016	Student 2015	Student 2014
Exit	1	2	2	2	0	4	1	1	0	2
FreeFall	0	3	1	0	0	0	0	0	0	0
Deployment	1	5	6	1	3	9	8	3	1	1
Canopy	3	0	0	1	0	0	0	2	4	1
Landing	10	13	8	7	5	23	13	14	9	4
Other	0	0	0	1	0	0	0	0	0	1

Total AIM Reported By Category: Experience

	Experience 2023	Experience 2022	Experience 2021	Experience 2020	Experience 2019	Experience 2018	Experience 2017	Experience 2016	Experience 2015	Experience 2014
Exit	3	1	0	0	0	4	1	1	0	2
FreeFall	5	2	0	1	0	0	0	0	0	0
Deployment	19	19	18	24	14	9	8	3	1	1
Canopy	1	1	0	1	0	0	0	2	4	1
Landing	17	30	16	15	17	23	13	14	9	4
Other	3	0	0	2	0	0	0	0	0	1

### **3.2. Tandem Skydive AIM Statistics**

Based on the total submitted Tandem AIM reports for 2023, accidents accounted for 75%, with minimal change from 2022 of the Tandem categories, while trending over 5 years shows a decrease of 7.04% specific to accidents reported (*Table 4: Total AIMs Reported for Tandem Occurrences*). Incidents account for 18.75% of all Tandem AIM reports. Incident occurrences have seen a 200% increase in 2023 compared to 2022, with a 5-year decrease trend of 50%. Malfunctions continue the decrease trending (77.27% over 5 years).

We have seen an overall decrease in Tandem AIM reports by 5.88% compared to 2022, with a 3-year decreased trending of 18.64%. The average age of a Tandem passenger in the 2023 reported AIMs data was 38.6 years old.

**Table 4: Total AIMs Reported for Tandem Occurrences**

	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Accident	12	12	14	20	14	13	22	12	0	5
Incident	3	1	3	1	2	1	2	3	0	1
Malfunction	1	4	7	6	4	6	4	5	1	4
Fatality	0	0	2	0	1	0	0	0	0	0
<b>Total</b>	<b>16</b>	<b>17</b>	<b>25</b>	<b>27</b>	<b>21</b>	<b>20</b>	<b>28</b>	<b>20</b>	<b>1</b>	<b>10</b>

\*Tandem Double Fatality is only counted as one (1) AIM Type

Landing occurrences account for 68.75% of all 2023 AIM report submissions for the Tandem category (*Table 3: Total AIMs Reported by Category: Tandem*). This indicates a 5-year trending decrease of 9.84%, however a 10% increase compared to 2022. Looking at all factors that were described in the AIM reports for each occurrence relating to landing, the following information was gathered:

- 45% was related to customers not lifting their legs upon landing,
- 18% was related to wind conditions such a turbulence and wind gusts at landing,
- 18% was related to landing complications with physically compromised passengers
- 18% was related to Tandem Instructors having a landing injury whereby the passenger was not injured

Although only one (1) Tandem Malfunction was reported, it is important to understand that data surrounding the equipment is tracked and allows us the opportunity to identify potential root cause analysis and risk mitigation in equipment malfunctions. The data provides us with additional tools when working with manufacturers and Tandem Instructor educators.

### **3.3. Student Skydive AIM Statistics**

Based on the total submitted AIM reports for 2023, incidents accounted for 53.33%, with an increase of 60% over 2022 in the student category and an increase of 50% over the 3-year trending, and 122.22% increase over a 5-year trend. However, we can see a decrease in accident occurrences for Students of 54.55% in 2023 compared to 2022, with over a 5 year trend at a decrease of 37.50% (*Table 5: Total AIMs Reported for Student Occurrences*). This change in trending may lend to a conclusion that with continual focus on the safety of students, we can see a direct shift in occurrences resulting in an incident rather than an accident. This potential correlation will be monitored over the next few years and further analysis completed. In review of the data, it was indicated that 4.87 was the average jump number and 39.9 was the average age for Students who presented an occurrence.

**Table 5: Total AIMs Report for Student Occurrences**

	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Accident	5	11	10	9	5	27	13	16	1	5
Incident	8	5	3	1	1	7	1	2	1	1
Malfunction	2	6	4	2	2	2	3	3	5	3
Fatality	0	1	0	0	0	0	1	0	0	0
<b>Total</b>	<b>15</b>	<b>23</b>	<b>17</b>	<b>12</b>	<b>8</b>	<b>36</b>	<b>18</b>	<b>21</b>	<b>7</b>	<b>9</b>

Data indicated a decrease of 23.08% in landing occurrences within the student category in 2023 compared to 2022, with a 3-year trending decrease of 3.23% and a 5-year trending increase of 16.28% (*Table 3: Total AIMs Reported by Category: Student*). Looking at all factors that were described in the AIM reports for each occurrence relating to landing, the following information was gathered:

- 40% was related to flaring technique,
- 30% was related to lack of response to the Ground Control Instructor (GCI),
- 30% indicated no attempt at Parachute Landing Fall (PLF), resulting in injury due to the student falling over after an adequate flare;
- 20% was related to wind conditions on landing specifically no wind/slight downwind landings

\*Some occurrences had multiple contributing factors and therefore were included in multiple allocations

It is very important to note that two (2) students (different occurrences) were reported to have lost consciousness while under canopy. Further investigation indicated that lack of hydration and proper nourishment (intermittent fasting), as well as properly fitting leg straps. It should be advised to all Instructors and Dropzone Operators to review their Standard Operating Procedures to mitigate this risk factor.

Additionally, we saw two (2) canopy malfunctions with Students who successfully followed Emergency Procedures.

### **3.4. Experienced Skydive AIM Statistics**

Based on the total submitted AIM reports for 2023, Accidents accounted for 41.67%, with minimal change compared to 2022 for the Experience category and a 5-year trending increase of 14.94%. Malfunctions accounted for 35.42%, with a decrease of 5.56% over 2022 and a 5-year trending increase of 3.66% (*Table 6: Total AIMs Reported for Experience Occurrences*).

Although Incidents only accounted for 22.92% of the 2023 AIM reports for the Experienced category, we are seeing an increasing trending pattern with 17.86% increase over 3 years and 61.76% increase over 5 years. In review of the data, it was indicated that 1039.4 was the average jump number and 42.1 was the average age for the Experienced category who presented an occurrence. Looking at only the reported accidents, the average jump number was 914.68 while further breakdown of reported Landing occurrences indicated an average jump number of 711.94. Further analysis indicates that Novice jumpers (sub 100 jumps) accounted for 32.6% of all Experience category occurrences, while jumpers with 500-999 jumps accounted for 23.9%. This leads to a conclusion that continued focus on safety with Novice jumpers is the greatest area of continual focus for improvement.

**Table 6: Total AIMs Report for Experience Occurrences**

	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Accident	20	20	14	16	17	17	19	8	1	9
Incident	11	11	6	4	2	7	7	11	1	8
Malfunction	17	18	13	21	13	12	19	17	12	10
Fatality	0	4	1	2	1	0	1	1	1	3
<b>Total</b>	<b>48</b>	<b>53</b>	<b>34</b>	<b>43</b>	<b>33</b>	<b>36</b>	<b>46</b>	<b>37</b>	<b>15</b>	<b>30</b>

A closer analysis of the Experience category AIM reports indicated that deployment occurrences accounted for 39.58% of the total 2023 submissions (*Table 3: Total AIMs Reported by Category: Experience*) Looking at the 3-year trending, we can see an increase of 1.79%, however minimal change compared to 2022. In the deployment occurrences, 88.24% initiated Emergency Procedures. Looking at all factors that were described in the AIM reports for each occurrence relating to deployment, the following information was gathered:

- 57.89% was related to line twists,
- 15.79% was related to issues during pull time - 66.7% of these issues were identified as total malfunctions,
- 15.79% was related to broken lines of which all reported hard openings
- 10.53% was related to tension knots,

In reviewing all the AIM reports submitted for the Experienced category, it was noted that Landing occurrences accounted for 35.42% of reported overall occurrences in 2023 (*Table 3: Total AIMs Reported by Category: Experience*). Landing occurrences accounted for 80% of all reported accidents in the Experience category. Looking at all factors that were described in the AIM reports for each occurrence relating to landing, the following information was gathered:

- 41% was related to flare technique
    - Low flare accounted for 28%
    - Incomplete flare accounted for 28%
    - No flare accounted for 28%
    - High flare accounted for 14%
  - 29% was related to landing area hazards,
    - Common issues with feet getting caught on landing either due to ground hazards, or improper placement of feet on landing
  - 24% was related to low turns in the landing patterns
- \*Some occurrences had multiple contributing factors and therefor were included in multiple allocations

Additional observations important to note:

- In 2023 we saw two (2) separate accidents related to in-air collisions. The first was during a 23 way formation wingsuit jump at which two (2) jumpers collided prior to deployment as they lost sight of each other. The jumpers did not appear to follow the jump plan resulting in both jumpers being rendered unconscious resulting in AAD fires. One jumper did regain consciousness and pulled their main at the same time as the AAD fired. The other accident involved two (2) jumpers colliding in freefall during a 7 way angle skydive, whereby one jumper was rendered unconscious activating the AAD and landing unconscious. It is imperative that jumpers recognize their personal limitations especially when engaging in larger formation skydives. Further analysis of both accidents is being reviewed by CSPA for opportunities of safety improvements. The primary take away at this time is that AADs truly do save lives!

- It was identified that a few incidents occurred during exit (all of which were in Cessna 182 and 206 aircraft). These included individuals gear getting caught on a component of the aircraft, jumpers injuring themselves on the step, and other such events. It is important for everyone to be mindful of moving around and exiting an aircraft especially when conducting a 4 Way exit from such aircrafts (refer to CSPA PIM 2B Section 4.9 “Learning Tight Exits”)

### **3.5. Aircraft AIM Statistics**

There were no recorded occurrences for Aircraft in 2023. It should be noted that there were three (3) occurrences in which a jumper had reported issues exiting the aircraft. Two(2) of these occurrences the jumper has contact with the aircraft due resulting in issues with the gear, while one (1) occurrence a jumper made contact with the step resulting in injury.

### **3.6. Fatality AIM Statistics**

There were no reported fatalities in 2023.

## 4 – CONCLUSIONS

### 4.1. General Recommendations

Although it is important for case-by-case occurrences to be reviewed, there are some key common occurrences across both Students, Experience Skydivers, and Coaches that can be addressed. Reviewing existing educational tools can benefit the skydiving community.

- **Intentional and unintentional low turns can result in serious injury or death.** It is important to recognize your limitations, including but not limited to, currency, skill level, external inputs, and personal inputs. Review of CSPA PIM2B; Section 6.3.1 *Factors Affecting Human Performance*, will assist in recognizing performance inhibiting factors.
- Altitude Awareness is our #1 survival skill. "The minimum altitudes (AGL) at which the main parachute must be activated are:
  - 4500' for all Tandem jumps
  - 3000' for all students, Solo & A CoP holders
  - 2500' for B, C, and D CoP holders" (CSPA PIM1; Section 2.5 *Basic Safety Rules - General*)
- Reviewing malfunctions often will help jumpers deal with most situations that can occur at opening (PIM2B; Section 6.1.1 *Canopy Malfunctions Review*)
- Review and practice of Emergency Procedures should be conducted regularly (CSPA PIM2A-2009; Section 3.3 *Activation of Reserve (Emergency Procedures)*).
- Review educational material on *Landing Techniques* (CSPA PIM2A-2009; Section 6.7), *Landing Pattern* (CSPA PIM2A-2009; Section 6.9), and *Landing Problems and Solutions* (CSPA PIM2A-2009; Section 6.17.5);
- Review educational material on *Hazards Near the Ground* (CSPA PIM2A-2009; Section 6.17.4)
- Review and practice the Parachute Landing Fall (PLF) (*SSI Reference Manual, Appendix - Skydiving Technical Knowledge PLF Landing*).
- Review the [CSPA Sport Canopy Endorsements](#) document and practice appropriate canopy skill(s) related to areas of performance opportunity
- Review proper body position during deployment, (CSPA PIM2A-2009; Section 5.4 *Activation*)
- "Footwear should give adequate protection to the foot and ankle. Running shoes are good for this purpose. If you have weak ankles then high-top running shoes or hiking boots may be a good investment. Footwear must not have any hooks or buckles that could snag. Proper footwear is a TSR (Technical Safety Recommendation §3.5), although you will see skydivers wearing sandals or bare feet, they do not really offer a great deal of protection especially on aircraft exits, landings, and obstacle landings." - PIM 2B - Section 3

Additionally, it is important to consider the following:

- Refer to the CSPA Skydiving Skills Grid on a regular basis to understand and educate yourself on progressing in the sport safely
- Review of equipment specific packing procedures should be completed and consult with a Rigger if necessary
- Assess, flag, and/or repair potential obstacles and hazard areas in landing area, such as uneven ground, animal holes, drainage, and so forth to minimize potential injury

- Anticipatory skills can be improved if you learn and practice skydiving skills in the sequence in which they occur, and mentally and physically rehearse the skydive and your emergency procedures, therefore a focused review on *Section 2 Preparation: Mental and Physical* (CSPA PIM2A-2009)
- Attend a Safety Day, either through your own Dropzone or wherever you can find one, every year so you stay updated and reminded of good skydive practices

#### **4.2. Experienced Jumpers and Coaches Additional Recommendations**

Of key importance for skydiving instructors and coaches, the following should be considered:

- "Break-off procedures are THE most important component of the freefall portion of your skydive. It is the part of your skydive where you remove yourself from the formation and assure you have the airspace to deploy your parachute safely, away from everyone else. Waving off at the correct/decided upon altitude, tracking away, scanning your airspace, waving off again to signal deployment, deploying your canopy at an altitude that is safe for you, and being ready for an emergency canopy avoidance manoeuvre (rear riser 90° turn) are all important components of a safe break-off procedure." (CSPA PIM 2B Section 5.5 Break Off Procedures)
- Jumper should perform and review procedures of full gear checks prior to boarding the aircraft (CSPA PIM2A-2009; Section 3.7.1 *Safety Check*).
- Regular inspection of equipment during packing should be completed and any identified issues addressed. Consultation with a Rigger is recommended for any equipment uncertainties.
- Never attempt anything beyond your skill level, or without first consulting a certified coach experienced in that discipline. Consultation with a CSPA Coach 3 is encouraged specific to Wingsuiting, Canopy Piloting, and Freeflying
- Review of PIM2B (2016) Section 6.5 *Assessing Terrain* is recommended to understand the effects and dangers of turbulence. Actively look at the sight picture at various altitudes during the climb to altitude, to develop visual cues.
- Jumpers should ensure a clear understanding and review of Safety for Small Group FS practices (CSPA PIM2B-2016; Section 5.6.2).
- Review educational material on *Improving Your Accuracy* (CSPA Sport Canopy Endorsement; Landing Patterns)
- Canopy control starts even prior to any skydiver getting into a plane and a lot of factors need to be considered/coached: Review of *Pre-Boarding Considerations (Canopy Information)*; CSPA Sport Canopy Endorsement

#### **4.3. Instructor (PFFI, SSI, JM, GCI) Additional Recommendations**

In further analysis of the student occurrences the T&SC, in collaboration with the CSPA Coaching Working Committee (CWC), additional key factors for Instructors were identified resulting in the following to also be considered:

- Instructor should review Module 5: Control Techniques and Unusual Situations (PFFI Reference Manual), specifically Freefall Control.
- Jump Masters (JM) should review material on Assisting the Students Exit (JM Reference Manual, Section 2.9.2), Deployment System Control (JM Reference Manual, Section 2.9.3), and Climb Out Situations (JM Reference Manual, Section 4.1.3).
- Careful evaluation of student's practice on the ground against a pre-defined standard is an essential aspect of student training. If the student is unable to perform the tasks on the ground, correctly and in

real time, they are unlikely to perform correctly in the freefall. Freefall tasks are high stress, and there must be enough repetitions and proper evaluations of the student's demonstration of the skills on the ground (min 3x correctly in real time). Instructors should clearly understand what they are teaching, why, and what the acceptable standard is for a student to be allowed to perform the skydive.

- "Every student shall receive a safety check by an Instructor or Coach prior to boarding the aircraft" (CSPA PIM1; *Basic Safety Rules - Students & Instructors*, Section 2.13)
- Student waivers should be reviewed, and students should be asked if any pre-existing medical conditions and/or concerns that could inhibit the ability for a safe skydive. Instructors should have the student practice with realism on the ground as this may identify any barriers to a safe skydive.
- Actively ask the student to look at the sight picture at various altitudes during the climb to altitude, to develop visual cues.
- Instructor and Student to review and practice flare technique on the ground prior to skydive, including but not limited to, the guidance from Ground Control Instructor (GCI) to students in the landing of their canopies, through use of a recognized method of signaling.
- GCI should ensure accurate coaching and currency reviewing the Ground Control Instructor Reference Manual, *Communication Rules*.
- Instructors should ensure detailed information pertaining to individual skydive performance is recorded accurately in student's logbook (CSPA PIM2A-2009; Section 2.5 *Logging*).

#### **4.4. Dropzone Safety Officer (DZSO) and Dropzone Owners (DZO) Additional Recommendations**

In further analysis of the Overall AIM occurrences the T&SC, in collaboration with the CSPA Coaching Working Committee (CWC), additional key factors for DZSOs & DZOs were identified resulting in the following to also be considered:

- DZSOs and/or DZOs should evaluate their Standard Operating Procedures as it relates to the use of AADs and evaluate (based on their set requirements for AADs) potential areas for increased education and use of AADs
- DZSOs and/or DZOs should evaluate how altitude awareness is being trained and look for any possible improvements to their existing training processes.
- Ensure skydivers have the required training before attempting any skill, or using any equipment (e.g., downsizing a canopy). Jumpers, Coaches, Instructors, and Drop Zone Safety Officers are encouraged to refer to PIM2B, Section 3.13 *Parachute Downsizing Criterion* to ensure the appropriate downsizing for an individual.
- Student waivers should be reviewed, and students should be asked if any pre-existing medical conditions and/or concerns that could inhibit the ability for a safe skydive.
- Regularly assess, flag, and/or repair potential obstacles and hazard areas in landing area, such as uneven ground, animal holes, drainage, and so forth to minimize potential injury. Understand how change in climate, such as extremely dry or wet areas, can create unusual hazards in the landing zone and surrounding areas.
- Educate packers on regular gear checks, including but not limited to, checking the condition of lines when packing parachutes. Ensure Standard Operating Procedure (SOP) in place for packers and/or riggers to report any equipment concerns.
- DZSOs are encouraged to actively promote, educate, and enforce safety at a dropzone in collaboration with the DZO for all jumpers, instructors, coaches, and staff.



- DZSO and/or DZO recommendations on the AIM reports are a crucial component in the overall understanding and analysis of occurrences. We strongly encourage all DZSOs and DZOs to record all occurrences (accident, incidents, and malfunctions) to ensure our skydiving community has an opportunity to learn and further enhance our safety tools. CSPA can assist in confidential root cause analysis surrounding any areas of concern and/or proactive preventative measures, upon request.

#### **4.5. Riggers and Packers Additional Recommendations**

Of key importance for Riggers and Packers, the following should also be considered:

- Regular inspection of equipment during packing should be completed and any identified issues addressed
- Packers should consult with a Rigger for any equipment uncertainties and/or packing procedure concerns/questions.
- Review of equipment specific packing procedures should be completed and consult with a Rigger if necessary
- Regular review of the [Equipment Technical Bulletins](#).
- Riggers should regularly review manufacturers recommendations and be careful not to become complacent in their regular rigging tasks

## 5 – SUMMARY

According to the 2022 International Skydiving Commission (ISC) Safety Survey Report, it was concluded that human error on the part of the skydiver accounted for 80% of all reported fatalities in 2022 (based on data supplied by 46 countries, a 56.5% response rate). 7.9 million skydives were made by 1.9 million jumpers worldwide with fifty-four (54) reported fatalities in 2022. The ISC Technical & Safety Committee also reported that this percentage was consistently high over many years. The report states, “Human error has always been, and continues to be, the major factor in skydiving fatalities. The attention of all personnel involved in coaching and training must be continuously focused on safety training and reinforcement. Safety is best taught at Dropzones, where students, from their first jump, and as they progress, have their attention drawn to safety issues and safe conduct.” (2022 ISC Safety Survey Report; Section 4.2)

Fatalities were broken down into the following categories:

- Students (0-25 Freefalls) 16 Total (this includes 5 Tandem Students)
- Intermediate (26-250 Freefalls) 9 Total
- Experts (251+ Freefalls) 29 Total

Canopy Handling accounted for 52% of fatalities in 2022 (20% International fast landings, 9% Tandems, and 31% Other landing issues).

2022 marks thirty-six (36) years since the ISC began collecting skydiving data. The data has helped to identify areas of opportunity to improve safety world-wide. In recent years, information has been gathered from countries regarding the use of Automatic Activation Devices (AADs). Based on the information gathered for 2022 by the ISC, all countries that responded to the ISC survey questions (44 countries), indicated the following:

- 100% of Students use AADs
- 70% of Intermediate jumpers use AADs
- 57% of Expert jumpers use AADs
- Of the data received it is noted that eighteen (18) countries reported 100% use of AADs across all jumpers.

Furthermore, when countries were asked, “*How many times in 2022 did the use of AAD save jumpers’ lives?*”, it was reported that fifty-three (53) AAD fires directly resulted in saving a jumpers life. The ISC further states, “*While there are many varying factors in an AAD firing, the large number reported as saving lives is a cause for concern. The actual number of ‘saves’ may in fact be somewhat greater than the reported 55, as AADs can be field-serviced. The widespread use of AAD would appear to be a major factor in the reduction of skydiving fatalities.*” (2022 ISC Safety Survey Report; Section 3.3). 2023 in Canada, we can account with confirmation that three (3) experienced jumpers lives were saved as a result of their AAD firing after a high speed mid-air collision that rendered each jumper unconscious and unable to deploy their main parachute.

The reason we look to our own AIM report analysis and those at the international level, is to identify common trends and work toward preventative measures to allow for continued safety in our skydiving community. Completing AIM reports, no matter how insignificant one may feel the occurrence is, helps assist in the common goal of fatality prevention worldwide.

It is important to recognize your limitations, including but not limited to, currency, skill level, external inputs, and personal inputs. Review of CSPA PIM2B; Section 6.3.1 *Factors Affecting Human Performance* will assist in recognizing possible performance inhibiting factors. Additionally, jumpers should regularly review the [CSPA](#)

[Sport Canopy Endorsement](#) document to ensure a safe transition during training and to assist in their overall skills development and awareness. Exercising caution, common sense, self-discipline, control, alertness, and better judgment is highly recommended to help ensure continued safety. Never attempt anything beyond your skill level, or without first consulting a certified coach experienced in that discipline.

CSPA Technical & Safety Committee (T&SC), in partnership with the CSPA Governing Regulatory Committee (GRC), and legal council, have made improvements to the current Standard Operating Procedure (SOP) for AIM reporting, analysis and communication.

#### **What are the benefits to CSPA Members and Registered Participants (RPs)?**

- Improved analysis process to identify root cause(s), areas of opportunity and trending for all AIM occurrences.
- Less delay in communication of AIM trends and factual findings to CSPA Members and RPs. The goal is to have occurrence and recommendations posted to the CSPA website on a regular basis for easier access and utilization.
- Communication regarding fatality occurrences, including the occurrence factual findings and root cause analysis recommendations.
- Additional protection for CSPA, its staff, members, and RPs, regarding potential legal disputes. Completion of the AIM report is still required within ten (10) days of occurrence to obtain access to the legal defence funds as outlined in CSPA PIM 1 – Section 1.17 *Insurance Policy – On Dropzone*.
- Assistance with a more proactive approach to existing CSPA programs and areas of opportunity for improvement within these programs
- Ability to work collaboratively with other parachuting associations in the gathering of statistics and data to improve skydiving safety practices world-wide.

Please be reminded that CSPA is always willing to offer support with internal root cause analysis. If you would like to take advantage of this free service, you can contact Michelle at the CSPA office and she will direct your requests accordingly.

## **6 – REFERENCES AND RESOURCES**

- [CSPA PIM 1: Basic Safety Rules and Recommendations](#)
- [CSPA PIM 2A: Basic Skydiving Skills](#)
- [CSPA PIM 2B: Recreational Skydiving Skills](#)
- [CSPA PIM 2C: Advanced Skydiving Skills](#)
- [Long Term Development \(LTD\) Flight Plan](#)
- [Sport Canopy Endorsements](#)
- [Safety Day](#)
- [Technical Recommendations](#)
- [Equipment Technical Bulletins](#)
- [Safety Management System](#)
- [AIM Report](#)
- [JM – Reference Manual](#)
- [PFFI – Reference Manual](#)
- [GCI – Reference Manual](#)
- [SSI – Reference Manual](#)