الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY

United Arab Emirates

Air Accident Investigation Sector

Safety Occurrence

- Final Report -

AAIS Case N^{o}: AIFN/0005/2015

Fatal Parachute Accident

Owner/Operator: Skydive Dubai
Make and model: Private Skydiver
Aircraft nationality and registration: Dubai, DU-SD3
Place of occurrence: Skydive Dubai Desert Campus
State of Occurrence: The United Arab Emirates
Date of occurrence: 30 April 2015

Air Accident Investigation Sector
General Civil Aviation Authority
The United Arab Emirates

Investigation Objective

This Investigation was a non-*Annex 13* Investigation. However, the Investigation was performed pursuant to the United Arab Emirates *Federal Act No. 20* of 1991, promulgating the *Civil Aviation Law, Chapter VII- Aircraft Accidents*, *Article 48*. It is done based on the protocols established with the United Arab Emirates *Civil Aviation Regulations, Part VI, chapter 3*.

The sole objective of this Investigation is to prevent aerosport accidents and incidents. It is not the purpose of this activity to apportion blame or liability.

Investigation Process

This safety occurrence involved a private Skydiver whose fatal fall to the ground was uncontrolled after exiting from a Skydive Dubai aircraft. The Duty Investigator (DI) of the Air Accident Investigation Sector (AAIS) of the United Arab Emirates was informed about the Accident via Hotline Number +971 50 641 4667.

This Final Report is an adaptation of the *Annex 13* Final Report Format, and is prepared according to the AAIS *Report Writing Style*.

This Final Report will be made public at the below link:

https://www.gcaa.gov.ae/en/epublication/pages/investigationreport.aspx

Notes:

1 Whenever the following words are mentioned in this Report with the first letter Capitalized, it shall mean:

- (Accident) - this investigated safety occurrence
- (Investigation) - the investigation into this Accident
- (Incident) - this investigated Accident
- (Report) - this Accident Investigation Final Report.
- (Skydiver) - the skydiver who sustained the fatal injury in this accident

2 Unless otherwise mentioned, all times in this Report are Coordinated Universal Time (UTC), (UAE Local Time minus 4).

3 Photos used in the text of this Report are taken from different sources and are adjusted from the original for the sole purpose to improve clarity of the Report. Modifications to images used in this Report are limited to cropping, magnification, file compression, or enhancement of color, brightness, contrast or insertion of text boxes, arrows or lines.

Synopsis

The fatal parachute Accident mentioned within this Report, occurred on 30 April 2015 at Skydive Dubai Desert Campus drop zone.

Preparations for the planned skydive were normal and the weather conditions were not significant for the day time flight.

The Skydiver was experienced with over 500 jumps. He held a class D license issued by the United States Parachute Association and was an experienced wingsuit jumper; familiar with the drop zone; recent with his jumps, and was not known to have any medical condition.

Exit from the aircraft was at 13000 feet and the initial two minutes of the jump was executed normally up until the main canopy was deployed. Thereafter, the Skydiver lost control and entered a spiral descent. The Skydiver did not cut away the main canopy and the reserve canopy was not deployed, most probably, due to the loss of situational awareness. It is possible that he may have been affected by increasing centrifugal forces due to the spinning descent.

A video recording of the Skydiver's fatal uncontrolled decent to the ground was retrieved from another parachute jumper and contained valuable information.

The Air Accident Investigation Sector determines that the cause of the fatal Accident was, most probably, the loss of situational awareness and the inappropriate use of the breaks.

There are no safety recommendations issued for this Accident. However, reference is made to six safety recommendations in this Report based on a Safety Study, SS/0001/2015, performed by the UAE Air Accident Investigation Sector, AAIS, on Light Sports Aviation in the UAE.

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1. Factual Information

1.1 The Occurrence

On 30 April 2015, at approximately 0830 local time of the United Arab Emirates (LT), a Skydiver, after an uneventful exit from the aircraft at 13,000 feet, had a normal free flight through the air. However, shortly after the parachute main canopy deployment, the Skydiver's descent to the ground became uncontrolled leading to impact with the ground and the Skydiver's death.

The Skydiver was an experienced parachute jumper who held a class D licence, issued by the United States Parachute Association (USPA).

This jump was performed using a wingsuit, which was his own equipment.

As per Skydive Dubai (SD), the preparation for the jump was normal, and all skydivers had performed the required safety checks on their individual parachutes and helmets before boarding the flight. At approximately 0815 LT, a total of 19 jumpers boarded a Twin Otter aircraft, registration DU-SD3, which was configured for jumping.

The Accident flight, operated by Skydive Dubai, departed from the SD Desert Campus facility was the sixth flight of the day flown by the same pilot. The jump flight was conducted in daylight with clear skies and a wind speed of less than 15 knots.

As per a pre-set plan, the Skydiver together with another skydiver, were the last two to jump from the aircraft. By this time, the other 17 skydivers had already jumped from the aircraft and eventually landed safely at the designated drop-zone at SD Desert. The skydiver who jumped with the Accident Skydiver also landed safely.

Because the Skydiver was unconscious upon impact, the first responders had to cut the wingsuit to release his body, and his jumping gear was taken by the local Police for their judicial investigation.

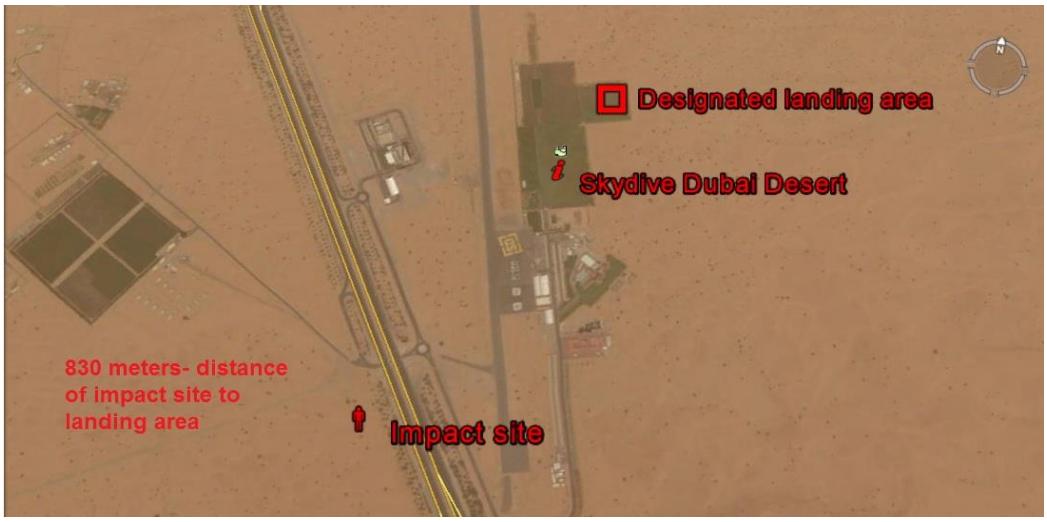

Figure 1. Aerial overview of the drop zone

Figure 2. The Skydiver and landing site

A month after the Accident, the parachute equipment and the helmet were handed over to the Investigation by the Police, The GoPro camera fitted to the helmet and the Skydiver's personal log were not available for review by the Investigation.

A memory card, supposedly removed from the GoPro camera, was provided to the Investigation by an eyewitness who was the first to reach the Skydiver. Playback of the videos on the memory card did not contain recordings of the fatal jump.

Video recording from the accompanying skydiver was made available to the Investigation a short time after the occurrence, and contained approximately four minutes of recording. The recording included 20 seconds on the aircraft, the skydive duration, main canopy deployment and recordings of the Accident Skydiver (section 1.2 of this Report).

1.2 Sequence of events based on video playback

The following sequence of events is based on the video recording presented to the Investigation by the accompanying skydiver's GoPro camera. As there was no time log, the

sequence is presented by elapsed time beginning from the start of the recording until the camera switch-off:

- At 0 time- Aircraft at 13,000 feet, both skydivers had a brief conversation which appeared normal,
- 11 seconds- Exit from the aircraft was normal for both skydivers. The Skydiver exited the aircraft first followed soon by the accompanying skydiver,
- 40 to 80 seconds- The Skydiver is clearly visible. Both skydivers were in close proximity to each other without impeding each other.
- 90 seconds- The Skydiver gave a signal, using his fingers, to the accompanying skydiver to move away. From this point until the final moment of the recording, the Skydiver was at a good distance from to the accompanying skydiver, thus the Skydiver's image became smaller as he moved away from the accompanying skydiver.
- 110 to 121 seconds- Figure 3- The accompanying skydiver's main canopy is seen to open normally.

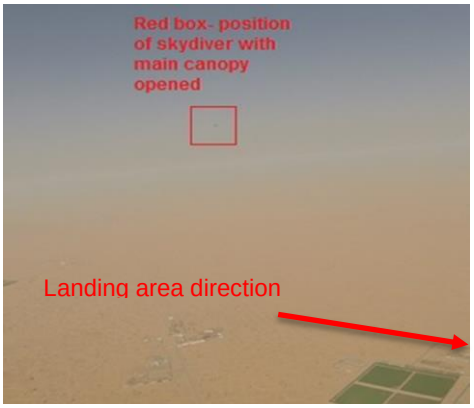

Figure 3. Skydiver main canopy open

- 135 seconds- The accompanying skydiver's camera showed the Skydiver to the left of the designated landing area. The recording shows that the main canopy was deployed,
- 140 to 155 seconds- The Skydiver was recorded entering into an anti-clockwise spiral dive lasted for about 13 seconds approximately,
- 175 seconds- The Skydiver spiral dive stopped and the Skydiver appeared diving towards the landing area,
- 201 seconds- The Skydiver made a sharp right turn,
- 202 seconds- The Skydiver entered into a violent anti-clockwise spin directing towards the sand,
- 220 seconds- Figure 4 - The Skydiver impacted the sand,
- 250 seconds- The accompanying skydiver landed in close proximity to the impact site.
- 260 seconds- The accompanying camera was turned off. This was the end of the recording.

Figure 4. Impact position

1.3 Post-Occurrence Inspection of the Skydiver's equipment

The following Skydiver's equipment was handed over to the Investigation by the local Police:

- Parachute assembly
- Wingsuit
- Helmet
- Altimeter sensing device worn on the wrist

The Inspection of the parachute assembly confirmed that the main canopy was in good condition. No tears or broken parts were found on the main material and the attaching straps. The canopy suspension lines were intact.

The reserve static line (RSL), occasionally called a Stevens Lanyard, is a device that automatically opens the reserve parachute container when the main parachute is cut-away. The RSL pull handle was found not disturbed as well as the release lanyard connecting to the main parachute riser.

The reserve canopy was folded and not deployed indicating that it was not used. The reserve canopy pull handle was intact and the metal rings were still engaged.

Fitted to the parachute was an expert Cybernetic Parachute Release System (CYPRES), an automatic activation device (AAD) which is a mandatory requirement to jump at SD. It was tested by using the devise on/off switch and found to be in working condition. 155 jumps was recorded on the AAD and the unit was still within the validity period.

The altitude sensing device which was fitted inside the helmet and next to the position of the ear padding was tested and all the altitude warnings sounded at the pre-assigned decision heights.

The wrist held altitude monitor was not working when handed over to the Investigation. The exterior of the devise was not damaged as a result of the impact.

The Investigation could not determine the last person in SD who had packed the main canopy of the parachute, but it was normal practice for experienced skydivers to pack their own canopies.

The reserve canopy, which was packed by a qualified rigger, was appropriately certified and was valid at the time of the occurrence.

1.4 The Skydiver Information

The Skydiver's first dive in SD was in September 2012, and a total of 340 jumps were performed with SD and the majority were made at the SD Desert Campus.

As per SD policy, the Skydiver was considered an expert skydiver as he had over 500 jumps. However, the Investigation could not determine the total jumps performed by the Skydiver since the personal log was not provided to the Investigation.

The Skydiver was licensed under class A, B, C and D issued by the United States Parachute Association (USPA)[1].

The SD instructors who knew the Skydiver stated that he was a role model and maintained a high level of safety. SD stated that there were no known medical deficiencies that may have adversely affected the performance of the Skydiver.

The autopsy report provided by the Police indicated that there were no traces of psychoactive material found in the blood sample taken during the Skydiver's postmortem.

The Accident Skydiver's jump at SD on 30 April 2015 was the only one he undertook during that month. Prior to this he had performed five jumps on 28 March 2015.

From the records at SD, for 2015, 11 jumps were performed by the Skydiver prior to the Accident, and all jumps were with the use of a wingsuit. The Accident jump was performed using his personal gear which included the wingsuit, parachute, helmet, and altitude monitor.

1.5 The Skydiver Parachute Gear

Table 1. The Skydiver parachute equipment

Equipment	Manufacturer	Model	Serial number	Date of manufacture
Parachute container	Airtec	ICON	1X-13-12740	June 2013
Reserve Canopy	Aerodyne	Smart 135	12875	July 2013
Automatic Activation Device (ADD)	Airtec	Expert	86522	May 2013

[1] The United States Parachute Association (USPA) is a voluntary non-profit membership organization of individuals who enjoy and support the sport of skydiving. The association is incorporated in New York and follows the by-laws contained in the USPA Governance Manual. USPA supports and promotes skydiving competitions and skydiving records. USPA-issued skydiving licenses are recognized internationally through the International Parachuting Commission of the Federation Aeronautique Internationale, which oversees all air sports

2. Analysis

2.1 The Skydiver

The Skydiver held class A, B, C and D license for freefall skydiving issued by the United States Parachute Association (USPA). Because this license is also recognized internationally, he had the privilege of jumping at Skydive Dubai (SD) with no requirement for validating his license.

The Skydiver started freefall parachute jumps at SD in September 2012 and regularly jumped there until the Accident jump on 30 April 2015. He had successfully performed a total of 339 jumps. The Investigation could not determine where he did his initial parachute training, nor when he started using the wingsuit.

Because he was class D certified the Skydiver was considered to be an expert skydiver.

As per the requirements of the USPA C- and D-license holder, if no freefall skydive had been completed within the preceding six months, a skydiver is required to make at least one jump under the supervision of a USPA 'instructional' rating holder until the ability to safely exercise the privileges of that license has been demonstrated. This did not apply to the Skydiver as he had made five freefall skydives on 28 March 2015, one month before the Accident jump.

The instructors at SD stated that the Skydiver was professional and very cautious and conscious of safety. He clearly understood the risks of skydiving and thus always ensured that his equipment was checked and metal preparation was thoroughly reviewed before attempting any jump.

2.2 The Parachute Equipment

After the parachute equipment was returned by the Police, the expertise of a qualified parachute rigger was requested by the Investigation.

The examination of the parachute equipment, helmet, altitude monitor, certification dates did not reveal any anomalies that could have affected the performance of the Skydiver as noted:

- No cuts or tears were found to the main canopy.
- The canopy suspension lines were all connected and there were no broken lines.
- The CYPRES AAD was functional and valid.
- The reserve canopy was intact and in its folded state.
- The handle to cutaway the main canopy was connected to the reserve static line.
- The helmet worn altitude sensor was correctly set at the decision heights.
- The wrist held altitude sensor was not in working condition when it was handed over to the Investigation.

From the inspection of the parachute equipment, it was not possible to know if there was any issue with the packing of the main canopy. Also, due to the fact that the equipment was

moved from the accident site, the Investigation could not determine if there was any twisting of the suspension lines.

From the video recordings, the parachute was worn correctly by the Skydiver and both emergency pull handles were visible. The wingsuit appeared to be in good condition.

A malfunction of a parachute is considered as any failure of the system that fails to provide a normal rate of descent, and this includes loss of canopy control. Malfunctions are normally caused by one, or a combination of the following: bad packing, poor body position during canopy deployment, and/or faulty equipment.

The Investigation could not confirm if there was a malfunction with any of the equipment used by the Skydiver. From what was noted, a cutaway was probably not attempted because the emergency handle was still connected and the reserve canopy was found in its folded state.

2.3 The Fatal Skydive Jump

The feedback of the instructors and the accompanying skydiver, confirmed that the Skydiver was in normal condition with no indication of any medical deficiency appeared to affect the Skydiver on the day of the Accident.

After going through the normal formalities at SD, the Skydiver was allocated to jump at 0815 LT and was listed on the sixth manifest of the day. The weather conditions were good; the flight was in a daylight with clear skies, and a wind speed of less than 15 knots.

The Investigation believes that it is most probable that the Skydiver followed the standard parachuting procedures. The Skydiver would have checked, by touch, the parachute handles, attaching points of the leg straps, chest strap, the three ring assembly, and the reserve static line, in order to verify that they were intact.

From the video recordings, the Skydiver was heard talking briefly to the accompanying skydiver just before his preparation to jump from the aircraft. At 13,000 feet, and upon getting confirmation from the aircraft pilot, the Skydiver jumped from the aircraft and the accompanying skydiver followed shortly thereafter.

The Skydiver’s video recorded initial free flight, which lasted for about 60 seconds, was without any difficulties. Just before both skydivers separated in order to deploy their main canopies, the Skydiver was seen to signal to the accompanying skydiver with his fingers to, most probably, move away for the canopy deployment.

Thereafter, the recording of the Skydiver was not as magnified due to his distance from the accompanying skydiver.

The Investigation could not determine the exact time of the Skydiver deploying his canopy but the recording showed that his canopy had opened. When the Skydiver was next seen in the video recording, it was noted that he was in an anticlockwise spiral descent. It was estimated that he made a 360-degrees spiral descent in about 13 seconds. The probable cause for this action was that he might have lost his situational and altitude awareness as it appeared that he was far from the designated landing area.

Approximately 20 seconds after the spiral decent, the Skydiver seemed to regain control as he was noted flying towards the landing area, but he was still some distance from the designated drop zone. After another 13 seconds, the Skydiver made a sharp turn, probably due to releasing the parachute breaks.

Thereafter, the Skydiver entered into an anticlockwise spin at an approximate rate of one spin every three seconds. The spin lasted for about 18 seconds until the Skydiver impacted the ground. The high rate of spin would have made it difficult for the Skydiver to cut away the main canopy and deploy his reserve canopy.

The total time that the Skydiver had been airborne was approximately 3 minutes 29 seconds.

Parachute jumpers are trained to avoid getting into non-standard or emergency situations. Jumpers are also trained that in case of an emergency situation involving the main canopy, if it cannot be resolved by a certain established height, 2500 feet for SD, then the next option is to cut away the main canopy and deploy the reserve canopy.

Skydiving literature mentions that the cutaway procedure is recommended to be executed immediately under rapidly spinning malfunctions because ever-increasing centrifugal forces will make arm movement difficult, and may cause the skydiver to lose consciousness (red-out) due to the blood flow to the eyes.

As per the USPA, skydiving contains inherent risks, and investigated skydiving accidents reveal that many were caused as a result of human error. With proper preparation and good judgment, skydivers can minimize those risks, but it is possible that a skydiver can become overconfident and complacent.

3. Conclusions

3.1 Findings

3.1.1 Findings relevant to the Skydiver

(a) The Skydiver was a qualified parachute jumper with over 500 jumps.

(b) The Skydiver held a class A, B, C, D license issued by the United States Parachute Association (USPA).

(c) The Skydiver's personal log was not obtained by the Investigation.

(d) The Skydiver's instructors stated that he was a role model and that he maintained a high level of safety.

(e) The autopsy report provided by the Police indicated that there were no traces of psychoactive material found on the blood sample taken from the postmortem body.

(f) The Skydiver's first dive at SD was in September 2012

(g) The fatal jump on 30 April 2015 was the only jump performed by the Skydiver for that month. His previous skydives at SD took place on 28 March 2015, and he performed five freefall skydives on that day.

(h) For 2015, the Skydiver performed a total of 11 jumps at SD prior to the Accident jump, and all jumps were with the use of a wingsuit.

(i) The Accident jump was performed from a Twin Otter aircraft, registration DU-SD3, operated by Skydive Dubai.

(j) The Accident jump was performed using his personal equipment including the wingsuit, parachute, helmet and altitude monitor.

(k) The Skydiver GoPro camera memory card provided to the Investigation did not contain a video recording of Skydiver jump.

(l) From the accompanying skydiver recording, the Skydiver main canopy was deployed at some time, shortly thereafter the Skydiver entered into an uncontrolled spiral decent which lasted until impact.

(m) No damage to the Skydiver's parachute equipment including the reserve parachute, the AAD and the helmet warning altimeter was found. His wingsuit was in good condition.

(n) All of the equipment worn by Skydiver was within its life limits.

3.2 Cause

The Air Accident Investigation Sector determines that the cause of the Skydiver fatal Accident was, most probably, a loss of situational awareness and the inappropriate use of the parachute breaks.

3.3 Contributory Factors

The Skydiver did not cut away the main canopy and use the reserve canopy due, most probably, to a loss of situational awareness. It is possible that he may have been affected due to the spinning descent and increasing centrifugal forces, which make arm movement difficult, and may cause the skydiver to lose consciousness (red-out) due to the blood flow to the eyes.

4. Safety Recommendations

There were no Safety Recommendations issued following this Investigation. However, a safety study was conducted by the AAIS (SS/0001/2015) on Light Sports Aviation, LSA, in the UAE which contains relevant Safety Recommendations.

Listed are the Recommendations that will be addressed to the GCAA:

(a) Ensure that Skydive Dubai, and any other similar aerosport organizations, operate in compliance with an applicable air transport category approval.

(b) Assist in the establishment of an agency, accountable to the GCAA, for all aerosport activities. This agency will be responsible to maintain a high level of safety, organize, govern and further the advancement of all sporting aviation in the UAE.

(c) Ensure the registration of aerosport clubs with this approved/authorised agency.

(d) Ensure that approval/authorisation granted to such an agency is provided according to pre-set standards and internal procedures. This agency should come under the GCAA oversight program for assuring continuous compliance with GCAA requirements.

(e) Ensure that all aerodromes used for the purpose of aerosports are approved and compliant with the *Civil Aviation Regulations*.

(f) Promulgate regulations for aerosport activities including parachuting and paragliding. These regulations should cover the requirements of operations, aircraft airworthiness, and personnel licensing (pilots, maintenance personnel, instructors and riggers).

This Report is issued by:

The Air Accident Investigation Sector
General Civil Aviation Authority
The United Arab Emirates