COPY 1 OF 3

PAKISTAN CIVIL AVIATION AUTHORITY

(SAFETY INVESTIGATION BOARD)

FINAL REPORT

ACCIDENT OF ULTRALIGHT "FLIGHT STAR-II" AIRCRAFT REG: AP-ZAK, OF M/S ULTRA LIGHT AND SPORTS FLYING CLUB (USFC) PAKISTAN, ON 05TH JULY 2012, AT WALTON AERODROME, LAHORE

INVESTIGATION REPORT

SERIOUS INCIDENT OF M/S ULTRALIGHT AND SPORTS FLYING CLUB "FLIGHT STAR – II" AIRCRAFT, REG. # AP-ZAK AT WALTON AERODROME, LAHORE ON 05TH JULY, 2012

Synopsis

On 05th July 2012, M/s Ultra Light and Sports Flying Club (USFC) of Pakistan Walton, Lahore Pakistan an Ultra light Aircraft "Flight Star-II SL", Registration No AP-ZAK was scheduled to fly a Solo Check Training Flight followed by a Solo Flight of the Lady Student Pilot (SP) at Walton aerodrome. At the time of serious incident runway 14 was in use. The mishap aircraft got airborne from Walton Aerodrome at time 1807LT for a training flight within the circuit of Walton and after making two touch and go landings made a full stop landing at time 1822LT. During the Solo Check Training Flight, SP met the minimum acceptable level of flying skill and Instructor Pilot (IP) cleared the SP for Solo Flight. The IP got out of the aircraft close to the runway and mishap aircraft again got airborne at 1825LT for SOLO flight. The Solo Flight profile included take off, a fly through circuit pattern followed by a full stop landing. The SP followed the Solo Flight profile successfully and safely, however during the landing roll SP experienced aircraft sudden drifting to the left. SP tried to control the drift by applying control input however she could not salvage the situation and decided to advance throttle for getting airborne. As the SP advanced throttle setting, the mishap aircraft (MA) got airborne while still turning left. Aircraft hopped over perimeter wall to the left of runway and crash landed in nose down attitude at 1838LT in Falcon Complex Lahore area. The SP survived with no apparent injuries. However aircraft was badly damaged with nose wheel broken, skin of nose and right wing tip of the aircraft were ruptured, whereas, top mounted propeller blades were observed severely damaged. There were no evidences observed regarding fire or fuel / oil leakages on the aircraft as a result of this occurrence.

Investigation Authority

DG CAA issued notification vide Letter No HQCAA/1910/352/SIB dated 06th July, 2012 & 11th February, 2013 and authorised Safety & Investigation Board, PCAA to investigate the serious incident attached as Appendix "A". No state was requested to appoint accredited representative.

1. FACTUAL INFORMATION

1.1 **History of the Flight:** The ultra light aircraft "Flight Star – II" AP-ZAK had flown a circuit and landing training flight on the day of occurrence prior to the mishap flight at Walton Aerodrome, Lahore.

1.2 **Injuries to Persons:** SP did not receive any minor / major injury.

1.3 **Damage to Aircraft:** Aircraft received apparent severe structural damages on fuselage, nose landing gear, main landing gears, engine propeller, left and right wing.

1.4 **Flight Crew Information:** The under training lady student pilot was the captain of aircraft at the time of occurrence. The detailed data of Cockpit Crew is as under:

• Syeda Fakhar un Nisa	:	Under Training Student Pilot
• Date of Birth	:	15th May, 1979
• Medical Validity Date	:	31 August, 2013
• Total Flying Experience	:	18:00 Hrs on Ultra Light Aircraft
• SPL No	:	3785

1.5 **Aircraft Information:** The mishap aircraft was an Ultra light & Sports category aircraft. The detailed aircraft and engine related data is appended below:

• Aircraft Type	:	Two seated Ultra Light "Flight Star - II SL"
• State of Manufacture	:	USA
• Engine	:	Rotex 503, two Cylinder, two stroke
• Propeller	:	Ground Adjustable Pitch
• Year of construction	:	1996
• Empty / All up Weight	:	440 Lbs / 920 Lbs
• Max Fuel Capacity	:	40 Litres (with 16 ltrs/hr consumption)
• Stalling Speed	:	39 MPH
• Cruise Speed	:	60 MPH
• Take off distance	:	400 ft
• Cross wind limits	:	17 MPH

1.6 **Meteorological information:** In the morning hours on the day of serious incident gusty winds were reported. However, the weather at the time of occurrence (between 1600-1900 hrs PST) was fit for training flight. The weather reported by local Met Office at 1800LT was as follows:

• Surface wind	:	East to SE, 7-8 kts
• Visibility	:	6 km
• Clouds	:	Few at 10,000 ft
• Temp/Dew point Temp	:	35° / 26° C
• QNH	:	29.36 inches of Hg

1.7 **Navigation Aids Availability:** The mishap aircraft was not equipped with any navigational aid for the conduct of its training flight.

1.8 **Communication Aids Availability:** The mishap aircraft was equipped with VHF radio for its two way radio contact with all concerned and relevant agencies during the conduct of flying operations.

1.9 **Aerodrome Information**

1.9.1 As per the history, the flying activities started in 1930 at Walton aerodrome. An enthusiast group of aviators founded the Punjab Flying Club in 1930, and later in 1932 it was renamed as Northern Indian Flying Club. Firstly flying operation at Walton got started on a grassy strip, later on it was converted to a concrete runway surface.

1.9.2 At Walton, the dimensions of the Runway 32/14 are 6200 feet x 150 feet but only 4200 feet length of the runway is useable. There are three taxi ways at the aerodrome named as A, B and Departure. Apron with dimension of 350 feet x 400 feet exists at the aerodrome. Runway 32/14 is marked with the runway markings.

1.9.3 The circuit pattern for Walton runway 14 and 32 are right and left hand respectively, whereas there are two local flying areas available to aircraft flying Walton.

1.9.4 General Aviation activities continue throughout the day (dawn to dusk) of following aviators / flying clubs:-

a) Lahore Flying Club.
b) Hybrid Aviation.
c) Ultra light Sports & Flying Club.
d) Flying Fleet of Plant Protection Govt. of Pakistan.

1.9.5 The above flying groups have approximately 40-50 aircraft of various sizes / capacities parked at Walton Aerodrome. In addition to above listed companies operating at the moment, M/s. Phoenix Aviation, M/s. JDW Aviation, M/s Wings Aviation, M/s Javed Aviation, WAPDA Aviation, M/s. Royal Airlines, M/s LUSA and M/s Pakistan Aviator & Aviation (Pvt) Ltd (PAAL) had been running their operations and aviation business at Walton Aerodrome for a long time in the past. M/s Phoenix Aviation and M/s JDW Aviation had shifted their operation from Walton Aerodrome to Allama Iqbal International Airport, Lahore with effect from 31st December 2009 and 28th February 2009 respectively. Various concessionaries having contracts / lease are running their business at various places of Walton Aerodrome.

1.9.6 Following groups are manufacturing small size of aircraft at Walton Aerodrome:-

a) M/s. Scaled Aviation.
b) M/s. Sheharyar Hamid.

1.9.7 Number of residential set ups and colonies, buildings and flats structures exist within close vicinity of Walton violating airfield clearance policy. There is no effective fencing and monitoring of the apron and the runway. Wild animals and pedestrians are not being controlled beyond the operational areas.

1.10 **Flight Register:** The solo circuit and landing training flight of SP was duly recorded and authorized by Ultra light and Sports Flying Club.

1.11 **Impact Information:** The mishap aircraft after hopping over the boundary wall / fence of Walton Aerodrome impacted ground in Falcon Complex area in a shallow nose down attitude in almost wings level state. The aircraft suffered severe structural damages along with ruptured nose, broken landing gears and engine propeller. The photographs depicting various serious damages on mishap aircraft are appended below:

1.12 **Other Damages:** No other apparent damages were observed to the property on ground, operating surface / services.

1.13 **Aircrew Medical Examination:** Following the incident on 05th July, 2012 at Walton Lahore, Blood and Urine samples of SP were collected which did not reveal any abnormality.

1.14 **Fire:** No pre / post occurrence air / ground fire indications by Captain of aircraft and evidences by Investigation Team were observed.

1.15 **ATC Tape Extract:** ATC Tape Extracts were retrieved for detailed analysis.

1.16 **CVR / FDR:** The mishap aircraft was not equipped with onboard CVR / FDR.

1.17 **Crew Resource Management (CRM):** At the time of occurrence Student Pilot was flying solo while undertaking a circuit and landing training flight.

1.18 **Retrieval of Aircraft:** After recording all the post incident photographic evidences, the aircraft was removed from the occurrence site and placed at a secure location at Walton Aerodrome.

1.19 **Damage Assessment / Repair Scheme:** Detailed Damage Assessment / Repair scheme was not developed and worked out by USFC Engineering Management in coordination with Directorate of Airworthiness (PCAA). However, the damage details forwarded by the operator after the recovery of aircraft without the prior permission of Safety Investigation Board and Directorate of Airworthiness CAA Pakistan is attached as Exhibit "B".

1.20 **Organizational and Management Information:**

1.20.1 The USFC was set up in 1997 under the patronage of Pakistan Air Force with the primary objective of promoting flying sport in Pakistan through a membership network in all major cities of the country. USFC is the pioneer and the only training school for sport flying in Pakistan. USFC follows a CAA approved Instructor's Training Program in order to maintain required skill / competence level of training at USFC.

1.20.2 **Airworthiness Programme**. USFC has a self regulated airworthiness program. The USFC has set up an engine and a precision parts overhaul workshop facility at Walton Aerodrome, Lahore. This shop is equipped with state-of-the-art tooling and maintenance equipment. It was observed that two senior personnel from USFC received special training in 2004 at the Rotax Engine Repair Facility at Dubai.

1.21 **Useful Investigation Techniques:** Various investigation techniques and procedures were employed to ascertain the flight profile and events leading to the accident and their analysis.

2. **Analysis**

2.1 **Operational Analysis**

2.1.1 The SP's performance during ground schooling and flying training was found satisfactory at USFC.

2.1.2 On the day of occurrence, no significant weather was prevailing at and around Walton Aerodrome. Between 1800LT and 1900LT, weather remained fair with surface wind East South Easterly 08 knots, cloud few 10000 feet and visibility 6km, temperature 35/26 °C, QNH 29.36 inches.

2.1.3 The weather conditions were well within the parameters to undertake the mishap training flight.

2.1.4 SP had a total of 18 hrs flying experience on the type of aircraft.

2.1.5 A formal thorough mission brief was conducted for the dual as well as solo training flight by the IP covering handling of all abnormal situations / conditions during critical phases of flight.

2.1.6 The mishap aircraft got airborne for Solo Check Training Flight from Walton Aerodrome at time 1807LT for a training flight within the circuit pattern.

2.1.7 As per IP input, after making two touch and go along with a full landing SP met the required skill / competence level for a safe solo training flight and was cleared accordingly.

2.1.8 SP got airborne at 1825LT from Ruwnay-14 for solo training flight.

2.1.9 IP maintained two way R/T contact with SP through hand held radio set.

2.1.10 As per the briefing by IP, after flying first circuit pattern SP executed a fly through and made a full stop landing after flying second circuit pattern.

2.1.11 As per IP input, the final approach and full stop landing of mishap aircraft were normal and no anomaly was observed.

2.1.12 The initial deceleration of aircraft was also observed normal by IP. However, during subsequent landing roll, the mishap aircraft started to drift towards left side.

2.1.13 SP applied the recovery action but could not control direction of aircraft and reached edge of runway. The probable reason for this could be the high speed taxiing back to parking area on runway.

2.1.14 After reaching close to the edge of runway, SP decided to execute a go around and advanced throttle to get airborne.

2.1.15 The mishap aircraft got airborne prematurely at too low speed with too high nose attitude.

2.1.16 IP was observed shouting on R/T set to lower the nose of aircraft.

2.1.17 Immediately the situation got out of control of SP and aircraft stalled with drop of left wing.

2.1.18 The mishap aircraft after stalling almost executed a U turn towards left hand side.

2.1.19 SP tried to recover the aircraft from stalled conditions by relaxing the back pressure on control column and lowering the nose of aircraft.

2.1.20 The mishap aircraft went into a shallow dive and after crossing the boundary wall along the runway force landed in Falcon Complex area at 1838LT.

2.1.21 It is a considered opinion of the investigation team members that SP was taxiing back at a much higher speed than normal recommended taxi speed, however fast taxi speed was not concurred by the SP and no witness / evidence was available to confirm the factual information.

2.1.22 SP after landing, drifted to the edge of runway and subsequently did not follow the correct procedure and recommended speed during execution of go around and takeoff.

2.1.23 The probability of high speed taxi is also substantiated by the fact that USFC is housed on the end of runway 14, SP is likely to maintain high taxiing speed to reduce the taxiing time.

2.1.24 At the time of occurrence, Cessna (AP-BDN) of Hybrid aviation was also flying in the vicinity of Walton which transmitted the location of mishap aircraft to

crash tender striker. The information of aircraft forced landing was acknowledged by the crash tender.

2.1.25 SP followed the correct emergency egress procedure and remained unhurt as a result of forced landing.

2.1.26 GM Walton initiated rescue efforts and immediately deployed the fire vehicles, however no pre / post occurrence in-flight / ground fire was observed at site.

2.1.27 After collection of all available evidences at force landing site, the operator was tasked to shift the wreckage to a secure location at Walton Aerodrome premises on 06th July 2012.

2.1.28 GM GA (North) was tasked to visit USFC and scrutinize the relevant documents pertaining to flying training (refer Appendix "C"). The salient observations are appended below:

- The lesson plan for ground schooling be formulated in the light of ANO 90.0010 (para 11) and all the subjects be covered adequately.
- ANO 90.0010 and 91.0021 shall be complied in its entirety.
- Folders for all pilots be made which shall contain all the essential documents. Complete training record for respective student pilot shall be placed in the folder.
- Every training flight must be evaluated, documented and graded on the ultralight student pilot flight training form given in the manual. For the Check Flight, the Check Report CAAF-643 in ANO 90.0010 (page 104) be used.
- The flight training and check flight instructor must not be the same.
- All the student pilots must be well familiarized with ANO 90.0010 and 91.0021. the student pilots must also go through the ANO pertaining to Ultralight Operations.

2.1.29 The check flight after recovery of aircraft was flown on 02nd February, 2013 without any approval / authorization by CAA Pakistan. (Refer operator e mails placed as Appendix "D").

2.1.30 One time waiver was granted by DG CAA for violation of CAA procedures prior to ascertaining the technical health of mishap aircraft and resumption of flying operations (Refer Appendix "E").

2.2 Technical Analysis

2.2.1 The mishap aircraft was serviceable prior to the conduct of solo check training flight on the day of occurrence.

2.2.2 No malfunction / anomaly related to any aircraft and engine systems / sub-systems was observed and reported by the cockpit crew during mishap training flight.

2.2.3 No deficiency / discrepancy was found in daily Inspection Check and other maintenance records of mishap aircraft.

2.2.4 The mishap aircraft "Permit to Fly" was valid till 26th March, 2013.

2.2.5 The details of damages recorded on forced landing site included broken propeller blades, nose landing gear fork leg, right main landing gear bungee cord for suspension and ruptured aircraft skin from two places / locations (Refer Appendix "F").

2.2.6 All these apparent damages to the structure of mishap aircraft were the result of impact with boundary wall at Walton Aerodrome.

2.2.7 USFC engineering management repaired and recovered the aircraft without formal release of aircraft for recovery by Safety Investigation Board (SIB) CAA Pakistan.

2.2.8 USFC neither forwarded a formal damage assessment and repair scheme to CAA Pakistan nor involved Directorate of Airworthiness at any stage during recovery / repair maintenance activity on mishap aircraft.

3. Findings

3.1 Operational Findings

3.1.1 SP was fit to undertake the scheduled training flight.

3.1.2 The weather was fit for the conduct of solo training flight of SP on ultralight "Flight Star – II" at Walton Aerodrome.

3.1.3 The SP's performance during ground schooling and flying training was found satisfactory at USFC.

3.1.4 SP had a total of 18 hrs flying experience on the type of aircraft.

3.1.5 A formal thorough mission brief was conducted for the dual ie solo check training flight as well as solo training flight by the IP covering handling of all abnormal situations / conditions during critical phases of flight.

3.1.6 The mishap aircraft got airborne for Solo Check Training Flight from Walton Aerodrome at time 1807LT for a training flight within the circuit pattern.

3.1.7 SP got airborne at 1825LT from Ruwnay-14 for solo training flight after meeting the required skill / competence level for a safe solo training flight.

3.1.8 IP maintained two way R/T contact with SP through hand held radio set.

3.1.9 As per the briefing of IP, SP flew two circuit patterns before making a full stop landing.

3.1.10 As per the observation of IP, the final approach and full stop landing of mishap aircraft were normal and no undesired / unsafe variation was observed.

3.1.11 The initial deceleration of aircraft appeared normal to the IP. However, during subsequent landing roll, the mishap aircraft started to drift towards left side.

3.1.12 SP applied the recovery action but could not control direction of aircraft and reached edge of runway probably due to high speed taxiing on the runway.

3.1.13 After reaching close to the edge of runway, SP decided to execute a go around, advanced throttle and got airborne prematurely at too low speed with too high nose attitude.

3.1.14 IP was observed shouting on R/T set to lower the nose of aircraft.

3.1.15 Immediately the mishap aircraft experienced a stall and drop of left wing was observed by the IP.

3.1.16 The mishap aircraft after stalling almost executed a U turn towards left hand side.

3.1.17 SP tried to recover the aircraft from stalled conditions by relaxing the back pressure on control column and lowering the nose of aircraft.

3.1.18 The mishap aircraft went into a shallow dive and after crossing the boundary wall along the runway force landed in Falcon Complex area.

3.1.19 It is a considered opinion of the investigation team members that SP was taxiing back at a much higher speed than recommended taxi speed, however fast taxi speed was not concurred by the SP and no witness / evidence was available to confirm the factual information.

3.1.20 SP could neither take the recommended remedial actions to correct the drift nor followed the correct procedure and recommended speed during execution of go around and takeoff.

3.1.21 M/s Hybrid Aviation Cessna aircraft (Reg # AP-BDN) transmitted the location of mishap aircraft.

3.1.22 SP followed the correct emergency egress procedure and remained unhurt as a result of forced landing.

3.1.23 GM Walton Aerodrome initiated the rescue efforts promptly.

3.1.24 No pre / post accident in-flight / ground fire was observed at site.

3.2 Technical Findings

3.2.1 The mishap aircraft was serviceable prior to the conduct of solo check training flight on the day of occurrence.

3.2.2 No deficiency / discrepancy was found in daily Inspection Check and other maintenance records of mishap aircraft.

3.2.3 No malfunction / anomaly related to any aircraft and engine systems / sub-systems was observed and reported by the cockpit crew during mishap training flight.

3.2.4 All defects found on the inspected parts of mishap ultralight aircraft (AP-ZAK) confirmed that they had been damaged during forced landing phase.

3.2.5 No evidence of failure or malfunction of any aircraft system / sub-system prior to encountering the landing irregularity (porpoise) has been found.

3.2.6 All the damages to the structure / engine of mishap aircraft were the result of impact with boundary wall.

3.2.7 As a result of this occurrence, the mishap aircraft suffered severe damages on structure as well as engine parts / components.

3.2.8 It was conclusively ascertained during the process of investigation that the mishap aircraft (AP-BAJ) aircraft was fully serviceable during the mishap training flight till forced landing at Falcon Complex area.

3.2.9 USFC engineering management repaired and recovered the aircraft without formal release of aircraft for recovery by Safety Investigation Board (SIB) CAA Pakistan.

3.2.10 USFC neither forwarded a formal damage assessment and repair scheme to CAA Pakistan nor involved Directorate of Airworthiness at any stage during recovery / repair maintenance activity on mishap aircraft.

4. Observations

4.1 The detailed Damage Assessment / Repair scheme was not developed and worked out by USFC Engineering Management in coordination with Directorate of Airworthiness (PCAA) for recovery of mishap aircraft.

4.2 The USFC engineering management did not forward the damage assessment and repair scheme to SIB, CAA Pakistan.

4.3 The USFC management did not take formal permission / approval of CAA Pakistan for recovery / repair of mishap aircraft before starting the recovery maintenance activity.

4.4 The check flight for ascertaining the airworthiness of mishap aircraft after recovery was undertaken without any approval / authorization by CAA Pakistan.

4.5 GM GA (North) scrutinized the relevant documents pertaining to flying training. The salient observations are appended below:

- The lesson plan for ground schooling be formulated in the light of ANO 90.0010 (para 11) and all the subjects be covered adequately.
- ANO 90.0010 and 91.0021 shall be complied in its entirety.
- Folders for all pilots be made which shall contain all the essential documents. Complete training record for respective student pilot shall be placed in the folder.
- Every training flight must be evaluated, documented and graded on the ultralight student pilot flight training form given in the manual. For the Check Flight, the Check Report CAAF-643 in ANO 90.0010 (page 104) be used.
- The flight training and check flight instructor must not be the same.
- All the student pilots must be well familiarized with ANO 90.0010 and 91.0021. the student pilots must also go through the ANO pertaining to Ultralight Operations.

5. Conclusion

5.1 SP safely flew the solo training flight till landing and after landing probably due to high speed taxi could not maintain proper directional control on aircraft and on reaching close to the edge of runway decided to execute a go around. The aircraft got prematurely airborne and stalled right after getting airborne resulting in forced landing in Falcon Complex area just after crossing the boundary wall of Walton Aerodrome.

6. Finalization

6.1 **Cause of Occurrence.** SP non adherence to normal taxi speed and subsequent incorrect remedial actions to salvage the situation aggravated the unsafe set of conditions and caused the accident.

7. Safety Recommendations

7.1 USFC is to ensure proper documentation and grading of all training flights on ultralight aircraft.

7.2 All general aviation / flying clubs are to strictly adhere to the CAA Pakistan approved procedures and ANOs.

7.3 All general aviation / flying clubs are to ensure that the student pilots are equipped with all the essential information contained in relevant ANOs / directives of CAA Pakistan.

7.4 All general aviation / flying clubs are to maintain formal training folders for all the student pilots.

7.5 All general aviation / flying clubs are to ensure that the flight training and check flight instructor must not be the same (as far as possible).

7.6 All general aviation / flying clubs are to ensure that formal damage assessment and repair scheme are submitted to SIB prior to the initiation of recovery actions on mishap aircraft.

7.7 All general aviation / flying clubs are to ensure formal approval / authorization of SIB CAA Pakistan before initiating the recovery actions for repair of mishap aircraft.

7.8 CAA Pakistan is to ensure strict compliance of above mentioned safety recommendations by all general aviation / flying clubs.