The Islamic Republic of Iran

Civil Aviation Organization

Aircraft Accident Investigation Board

Preliminary Report #2

Issue date: January 21, 2020

Basic Information:

State File Number: A981018URPSR

Type of Occurrence: Accident

Date of Occurrence: Jan. 08. 2020

Place of Occurrence: Near Imam Khomeini INTL Airport/ the I.R of Iran

Aircraft Model: B737-800

Registration: UR-PSR

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In the name of God

Foreword

The Civil Aviation Organization, in accordance with international requirements and local regulations of the Islamic Republic of Iran, is in charge of monitoring the proper implementation of the regulations and standards of flights in the "Civil Aviation Industries" of the country. In order to identify the sources of threats to flight safety based on the Regulations on the Investigation of an Accident in Civil Aviation Accidents, adopted in 2011 by the government and the International Regulations of the International Civil Aviation Organization (ICAO) Annex 13, the Aircraft Accident Investigation Board (AAIB) institutes the Investigation of the civil aircraft Accidents/Incidents. After the determination of the Causes and the Contributing Factors, it will issue Safety Recommendations in order to prevent the same accidents or similar events in future.

According to Aircraft Accident Investigation regulation of the Islamic Republic of Iran, accident investigation shall be used for the prevention of similar occurrences and should be conducted without prejudice to any judicial or administrative action that may be taken to determine blame or liability.

Based on Annex 13 to the Convention on International Civil Aviation, Chapter 3, Paragraph 3.1, and Chapter 5, Paragraph 5.4.1, the following is stipulated and recommended:

"The sole objective of the investigation of an incident or accident shall be the prevention of incidents and accidents. It is not the purpose of this activity to apportion blame or liability."

Consequently, the use of this report for any purpose other than the prevention of future accidents could lead to erroneous interpretations.

Following the preliminary report published on January 09, 2020 on the accident involving B737-800, UR-PSR operated by Ukraine International Airlines after takeoff from Tehran Imam Khoemini Airport, further actions and investigations were carried out, which are as follows:

A) Factual Information:

1. History of Flight

On Wednesday, January 08, 2020, at 0:53 local time (21:23 UTC), the arrival flight No.AUI752 of Ukraine International, Boing 737-800, UR-PSR operated by Ukraine International Airlines from Kyiv Boryspil INTL. Airport (UKBB) to Tehran Imam Khomeini INTL. Airport (OIIE) was cleared for landing, and after four minutes just landed on Imam Khomeini Airport runway. After disembarking 58 passengers and refueling, the flight crew checked into Novotel Hotel located at Imam Khomeini Airport for resting.

From 01:20 to 01:40 local time, the aircraft was refueled with 9510 kg, equal to 11800 liters of fuel. Once the total weight of cargo received from passengers (310 pieces of baggage weighing 6794 kg) was calculated, the aircraft was declared overweight according to the allowable maximum take-off weight determined by the captain. Therefore, 82 transit pieces of baggage weighing 2094 belonging to the passengers going to Canada were not loaded by Saman Airport Ground Handling Company.

At 04:35 local time, the flight crew embarked on the aircraft, and after checking the aircraft and cabin, boarding was initiated and passengers boarded the plane. Based on the evidence available, 167 passengers proceeded to Saman Airport Services Co. check-in counter at the airport terminal, all of whom got on board. Only one passenger that had booked the boarding pass online the night before the flight did not attend the airport; therefore, he had been removed from the list of passengers issued by the Ukraine airline company just before the flight.

At 05:13 local time, the pilot made his first contact with the ground unit of Imam Khomeini Airport control tower and requested the initial clearance for flight, which was issued by the controller subsequently with related coordination.

At 05:48, all the required aircraft documents for initiating the flight operation were filled out, and all the aircraft doors were closed at 05:49.

Having notified his position at 5:51 in the parking, the pilot stated that he was fully ready to exit the parking and start the engines. Therefore, the controller asked the pilot to wait for receiving the clearances so that he could make the required coordination with other relevant units, including defense system.

At 05:52, the Imam Khomeini tower controller made the coordination with the Mehrabad Airport approach radar controller. Following that, at 05:55, the clearance for exiting the parking and starting the engine for flight AUI752 was issued and the pilot read it back.

At 05:54 local time, the Mehrabad radar controller contacted the Tehran control center and received approval for the flight AUI752 after coordination with present coordinator from defense system at Tehran ACC.

The flight separated from Jet way A1, and at approximately 05:50 was pushed backed to exit the parking stand 116R.

At 06:12, the aircraft took off from the Runway 29R of IKA Airport and was delivered to the Mehrabad approach radar unit. The pilot then contacted the approach unit, introduced himself and announced the flight plan. In the following, the Mehrabad radar controller identified the flight and asked her to climb to FL260. The controller asked the flight to climb to 6,000 feet, then turn right, and continue straight to PAROT position located 70 miles northwest of Mehrabad Airport, which was read back by the pilot.

From 06:18 onwards, upon the disappearance of the flight from the SSR scope, the controller called the flight repeatedly, but no response was received.

According to the data extracted from the radar, the aircraft climbed to an altitude of 8,100 feet; thereafter, the information on detection and aircraft altitude disappeared from the radarscope (SSR), and no radio communication indicating unusual conditions was received from the pilot.

The Secondary Surveillance Radar (SSR) and Primary Surveillance Radar (PSR) observations show that, at around 06:15, the flight disappeared from the SSR, but according to the Mehrabad PSR, the aircraft veered to the right and was probably continuing to return to the IKA airport. After about three minutes, at about 06:18, it disappeared from the PSR.

2. Damage to Aircraft

The aircraft was completely destroyed in the accident.

3. Injuries to Persons:

The aircraft was carrying 167 passengers and nine crew members, all of whom lost their lives.

Injuries	*Crew*	*Passengers*	*Others*
Fatal	9	167	
Serious	--	--	
Minor/None	--	--	

According to the report published by IKA Migration Police Department, 146 of the victims left Iran's air border with Iranian passport, ten Afghan, five Canadian, four Swede and two Ukrainian. All the nine crew members consisting of three cockpit crew and six cabin crew were Ukrainian.

- *Note: A number of victims had multiple nationalities, so other news reports might be introducing them with different nationalities than the ones in this report. The above list concerns the passport with which they left the Islamic Republic of Iran's air border.*

4. **Other Damage**:

The aircraft lost her altitude and passed by a residential area; ultimately, the aircraft's initial impact point was with a barrier in a recreational park. The aircraft fuselage, subsequently, impacted the ground, disintegrating completely after passing a football pitch, which in turn damaged the surrounding agricultural farms and gardens. Following the initial impact, other impacts were observed along the track at the accident site, wrecking the fuselage and spreading across the entire track.

5. Personnel Information:

The flight was being operated by three pilots comprising an instructor pilot, pilot-in-command and co-pilot together with six flight attendants. In fact, two cabin crew were male and four were female. According to the report provided by the Ukrainian Airline, the pilots' information was as follows:

Index	Instructor	Pilot	Copilot
License Number	TA001064	TA006783	TA11463
Total Flying Time	12000	11600	7600
Age, Gender	42,Male	50,Male	48,Male
Flying Time In Current Type	6600	5469	3642
License Validity	16/10/2020	19/02/2020	26/03/2020

6. Aircraft General Information:

Aircraft Type: Boeing B.737-8KV

Date of manufacture: 21.06.2016

Serial Number: 38124

Engine Model: CFM56-7B24E

Saman Ground Handling Co. handled the flight preparations, boarding and loading according to the information received from the pilot and prepared Trip Information, including the amount of residual fuel, the maximum takeoff weight (MTOW), the maximum landing weight (MLW), the amount

of fuel required for the accident flight, the flight time, and other information related to this aircraft defined in the Load Sheet.

According to the aircraft load sheet, the maximum allowable weight had been calculated 72500 Kg. Due to the limit on maximum allowable takeoff weight, Saman Company did not load 82 pieces of baggage equal to 2094 kg, causing the flight to be delayed. Ultimately, the aircraft maximum takeoff weight (MTOW) was calculated 72468 kg, which was 32 kg lower than the maximum allowable takeoff weight. After boarding and loading, the load sheet was finally approved by the pilot.

7. Witness Descriptions and Evidence at the Crash Site

According to witnesses (people on the ground as well as the crew of the arrival flights in higher altitudes observing and reporting the event), a fire appeared on the aircraft which was intensifying, and then the aircraft impacted the ground causing an explosion.

The crash site track indicates that the aircraft was continuing to the northwest to exit the airport boundary, but turned right following a problem in the aircraft, as disappearing from the radar and losing communication, and start of fire. The aircraft had a track showing it was returning to the airport probably.

Upon impact with the ground, one of the Emergency Locator Transmitters (ELT) of the aircraft had been activated; simultaneously, its satellite transmitter antenna became detached, consequently the related signal from satellite was not received.

The rescue and search operation team found the aircraft black boxes, including the Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR), which are currently held by the investigation team of Iran AAIB. Both devices have been damaged as a result of the accident and catching fire. The memory parts of both recorders are in good condition, though the physical damage to their main components is considerable.

At the request of the accident investigator and coordination with concerned authorities, a special group was formed to investigate the abnormal aeronautical issues related to this accident. The possibility of any laser attacks or electromagnetic (radioactive) rays were rejected by conducting the relevant sampling and testing at the accident site. On the day of the accident, sampling was conducted to detect any explosive materials so that the effects of explosive weapons (inside or outside of the aircraft) could be investigated at an authorized laboratory on the next working day (Saturday).

Further investigations into the aircraft wreckage by the Iran AAIB and Ukrainian go-team on Friday (Jan.10, 2020) gave rise to the suspicion that there might have been explosives on the aircraft fuselage; a matter in dire need of careful investigation.

The equipment inside the cabin and aircraft cargo demonstrates that the fire spread neither to the inside of the rear cabin nor to the cargo compartment of the aircraft, probably.

8. Flight Recorders' Specifications:

The aircraft was equipped with a Solid State Flight Data Recorder (SSFDR) with P/N 980-4750-003, which is capable of recording over 3000 digital and analog parameters as well as a Solid State Cockpit Voice Recorder (SSCVR) with P/N 980-6032-003 capable of recording the last two hours of flight conversations, and also a QAR, but only the SSFDR and SSCVR were found at the accident site. Damage to SSCVR was more serious, whose main memory (CSMU) has been detached. The condition of component indicates that the SSCVR has not been exposed to the fire on the aircraft and was detached as a result of the sever impact with the ground.

FDR P/N 980-4750-003	CVR P/N 980-6032-003
View of similar recorders in good condition	
	

On January 09, 2020, the following actions were taken regarding the CVR and FDR under the Islamic Republic of Iran CAO IRI Directive No. 6713 and 4913 in the presence of flight recorder group members:

On January 09, 2020, in the presence of representatives of Ukrainian delegation at the investigation department of Iran's CAO, the physical conditions of SSCVR and SSFDR were inspected and photographed by their representatives. Under Iran CAO Directive No. 4913, before sending SSFDR and SSCVR to a specialized laboratory, the technical specifications of the recorders related to the crash were requested from the Ukrainian investigation representative in accordance with article No. 3 & 4 stated on page 8 of Doc FS-CAD-4913-03 of the CAO IRI. The investigation was continued with attendance of senior Iranian authorities who considered whether the contents of the two components could be restored and retrieved using Iran's capacity in this area. However, they all agreed that since such devices are new generation ones in the world, they cannot be decoded in Iran without required facilities. If the essential facilities and accessories are provided, the information can be retrieved shortly. Hence, the accident investigation laboratories in France (BEA) and the U.S.A(NTSB) were requested to provide a list of equipment required to decode the black boxes, and if it would be possible to transfer it to the Iran. They, however, have not responded positively to the request as yet; nevertheless, the IRI.CAO has provided higher Iranian authorities with the mentioned list so that they could purchase them.

9. Investigation into the effects of missile defense operations on the accident scenario:

- Some samplings from the aircraft parts were done at the accident site in Sahedshahr in Sahriar at the request of the accident investigator in charge. As it was required to recover and reconstruct the wreckage in a safe area and investigate the traces of teardown on the aircraft fuselage caused by the strike of any Foreign Object Damage (FOD), all the debris was collected and transferred to a safe location at Imam Khomeini Airport. They were then laid down on the ground, so that the needed analysis could be performed under standard procedures.

The Ukrainian team consisted of a special committee to test the aircraft wreckage, and it was decided that the aircraft wreckage would be jointly investigated under the supervision of Iranian investigation team consisting of experts from I.R. of Iran related authorities. After the briefing session

held at Iran CAO on January 10, 2020, the process of investigation into the wreckage pieces began.

Given the public announcement made by one of the domestic entity (Aerospace Force of the Islamic Revolutionary Guard Corps) on January 11, 2020 and admitting the missile defense operations at the time of this flight, the Iranian investigator in charge was provided access to that entity's information, and it was revealed that two TOR-M1 missiles had been fired at the aircraft from the north. How the missiles contributed to the crash, and the analysis of this action are still under investigation.

10.Major Actions Taken to Investigate the Accident :

- The investigation was instituted based on Annex 13 to the ICAO Convention. Some of the initial actions taken included gathering factual information, forming a crisis management team at the accident site, dispatching related entities' agents to the crash site for search and rescue operations, obtaining the passengers' personal information from the airline involved in the accident and from other authorities, including Iranian Migration Police Office, designating the investigator in charge, and dispatching an investigation go-team to the accident site as well as Imam Khomeini Intl Airport and Mehrabad Intl Airport;
- The news and information on the accident were publicly issued;
- In accordance with Aircraft Accident Investigation Regulation adopted by Iran's council of ministers, 11 investigation groups were formed based on ICAO Doc 9756. As it was necessary to determine the cause of initiating the fire on the aircraft, a special group was added to the mentioned groups in order to investigate the issues concerning the possibility of any unlawful action or explosive materials;
- Victims' corpses and remains were detected, collected, and under the supervision of judicial authorities were transferred to Tehran Forensic Medicine for identification. Reports on the performance of Tehran Forensic Medicine will be made by their own organization; and
- An initial notification was sent to Ukraine as the State of registry and the operator, the NTSB as the State of design and manufacture, Sweden (SHK), Canada (TSB), and Afghanistan CAO as the States whose citizens suffered fatal injuries in this accident. Ukraine requested to participate in the accident investigation process and introduced a go-team to identify and transfer their nationals' corpses, and perform other responsibilities resting with the country registering and operating the aircraft in such conditions. Ukraine, the U.S., France, Sweden, England and Canada have

introduced some representatives to access the information on this investigation; Afghanistan has not introduced any representative yet. Two technical experts from TSB/Canada observed the whole investigation process in Iran.

The IR of Iran AAIB is proceeding with the investigation under Annex 13 to the Chicago Convention. The report at hand is being published upon the request of the public for their awareness, which is also aimed at preventing such traumatic accidents according to international standards. The investigation team considers coordination and accountability to related authorities in our country.

It is worth mentioning that all the investigations conducted so far are considered the initial actions, not the final results of the investigation. Collecting and investigating the information in order to analyze and make conclusions on the accident is still in progress.