

澳門特別行政區
REGIÃO ADMINISTRATIVA ESPECIAL DE MACAU



民航局

AUTORIDADE DE AVIAÇÃO CIVIL
CIVIL AVIATION AUTHORITY

Aviation Occurrence Investigation Preliminary Report

INCID/01/2022

In-flight Turn Back Caused by Engine Failure

LLC AeroStan Air Company

Flight BSC4053

Boeing 747-222B, EX-47001

Macau International Airport

23 November 2022

10 January 2023

Foreword

The report is based on the investigation carried out by the Civil Aviation Authority, Macao, China (AACM) in accordance with Law no. 2/2013 *Civil Aviation Accident and Incident Investigation and Aviation Safety Information Protection Law*, the *Air Navigation Regulation of Macao* approved by Executive Order 43/2021, and Aeronautical Circular AC/GEN/003 *Mandatory Occurrence Reporting Scheme*.

The sole objective of the investigation of an aviation occurrence is the prevention of accidents and incidents. It is not the purpose of these activities to apportion blame or liability.

Sequence of events

On 23 November, 2022, a Boeing 747-222B aircraft, registered EX-47001, departed from Macau International Airport (VMMC) in Macao, China to Manas International Airport (UCFM) in Bishkek Kyrgyzstan, operated by LLC AeroStan Air Company (AeroStan) as a non-scheduled cargo flight, BSC4053.

At around 01:45 (UTC), Macau International Airport ground service provider Menzies staff found fuel leak on the aircraft Engine No.2 and reported to the captain. On-board engineers checked the engine and tried to fix the engine. At 02:05 (UTC), the captain performed aircraft Engine No.2 wet motor but was stopped by Menzies since the AeroStan did not get the approval from the tower. At 02:25 (UTC), the captain performed Engine No.2 motor again without approval and was stopped by Menzies again. After that, no more engine run was performed.

At 05:02 (UTC), the AeroStan flight BSC4053 was approved for departure and started pushback. During pushback, Menzies did not observe fuel leak on Engine No.2 and the aircraft took-off at 05:15 (UTC). At 05:25 (UTC) during climb, the fire alarm on Engine No.2 was activated. Flight crews immediately followed Quick Reference Handbook (QRH) procedures to shut down Engine No.2.

At the same time, flight crews declared “Mayday” and requested in-flight turn back to Macau International Airport (VMMC). “Full Emergency” of Airport Emergency Plan was then activated at once. Flight crews reported no actual fire had been seen but only the fire alarm indication. In the Macau International Airport (VMMC), fire vehicles were standby near the end of Runway 34 while tow truck was standby at the apron.

After fuel dumping for around 10 minutes, at 05:59 (UTC) the aircraft landed on Runway 34 then vacated via taxiway G and was holding on taxiway H. The Fire Services Bureau Airport Division (DBA) observed fire and smoke on Engine No.2 and standby for fire extinguishing. At 06:10 (UTC), fire extinguish was requested by flight crews after the on-board engineers finishing checking. At 06:21 (UTC), DBA reported that no more fire nor smoke on engine No.2 was observed. The aircraft was then towed to the parking stand B7 after getting DBA agreement. At 06:36 (UTC), runway was clear and resumed operation. At 07:27 (UTC), the taxiway H resumed operation.

Injuries to persons

There were total 9 persons on board, consisting of the 5 flight crews and 4 on-board engineers.

No fatal, serious or minor injury was reported as a result of this occurrence.

Aircraft and engine information

Table 1: Aircraft and engine information

Aircraft manufacturer	Boeing
Aircraft type	747-222B
Aircraft serial number	23737
Operator	LLC AeroStan Air Company
Total hour	84,887:12
Total cycle	12,063
Year of manufacture	1987
Date of issue of certificate of registration	21 October 2020
Date of issue of certificate of airworthiness	17 October 2022
Maximum certificated take-off weight	377,842 kg
Actual take-off weight	341,201 kg
Maximum certificated landing weight	285,763 kg
Actual landing weight	284,000 kg
Engine manufacturer	Pratt & Whitney
Engine type	JT9D-7Q

Damage to aircraft

Engine No.2

1. Burn marks on aft core cowl
2. Burned wires, ducts and pipes inside the engine
3. Some detached melted metals were found loose inside the fan cowl behind the fan blade.

Right Wing

1. Damage on the Krueger Flaps.

Weather and environment information

According to METAR published from 05:00 to 06:00 (UTC), the weather for the Macau International Airport included 8 to 9 knots of wind in direction 360 and the visibility was 9 km. Few (1 - 2 oktas) clouds at a height of 400 feet and scattered (3 - 4 oktas) clouds at a height of 1,800 feet. Light shower rain started from 05:30 (UTC). The temperature was 24 °C and dew point temperature was 23°C. The pressure was between 1012 and 1013 hPa.

Recorded Flight Data

The aircraft was fitted with a cockpit voice recorder (Honeywell CVR, PN 980-6022-001), flight data recorder (Honeywell solid State FDR, PN 980-4700-003) and a mini quick access recorder (PN 804-0005), which recorded the flight data associated with the occurrence.

The flight data recorder was decoded and provided in AeroStan's preliminary investigation report, but the recorded parameters were limited to general information such as airspeed, heading, altitude, landing gear status and engine data that limited the root cause analysis for engine failure.

Continuing investigation

The investigation is continuing and will consider the followings:

- Maintenance history of the aircraft
- Pre-flight preparation for the aircraft
- Repairing details for the fuel leakage on Engine No.2
- ATC procedures & communications
- Crew training and qualifications
- Environment influences due to COVID-19