



Oman Transport Safety Bureau

Preliminary Report

OTSB Case File No: AIFN-001/10/2023

Oman Air B787 severe turbulence with minor injuries to some of the cabin crew



Photo of A4O-SH - Boeing 787-9 Dreamliner - Oman Air

Operator: Oman Air

Make and Model: Boeing 787-900

Nationality and Registration Marks: Omani, A4O-SH

Location of the Occurrence: Muscat FIR, Radial 278, 77.5 nm from MCT

State of Occurrence: Sultanate of Oman

Date and Time of Occurrence: 18th October 2023, 10:37 UTC

Date of Publication: 17 November 2023



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Purpose of the Investigation

The investigation was conducted by the Air Accident Investigation Section of Oman Transport Safety Bureau pursuant to Civil Aviation Law 76/2019 Chapter 10, and in compliance with the Civil Aviation Regulation CAR-13 -, Sub Part CAR 13.070: Instituting and Conducting of Investigations as State of Occurrence, Accidents or Incidents in the Sultanate of Oman.

The sole objective of the investigation is to prevent future aircraft accidents and incidents and not to apportion blame or liability. Oman Transport Safety Bureau issued this preliminary Report in accordance with the National and International standards, and Industry best practice.

Unless otherwise mentioned, all times in this Report are UTC time. Local Time in The Sultanate of Oman is UTC plus (+) 4 hours. Photos and figures used in this report were taken from different sources and adjusted from the original for the sole purpose of improving clarity of the report.

This Report will be publicly available at: -<http://www.mtcit.gov.om>



Abbreviations

AAIS	Air Accident Investigation Section
AFL	Actual Flight Level
AIP	Aeronautical Information Publication
APW	Area Proximity Warning
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ASST	Assistant
CAA	Civil Aviation Authority
CFL	Cleared Flight Level
CR	Central radar
CVR	Cockpit Voice Recorder
FL	Flight level
FMS	Flight Management System
FPL	Flight Plan
FPM	Feet Per Minute
ICAO	International Civil Aviation Organization
IIC	Investigator-in-charge
MATSOP	Manual of Air Traffic Services Operational Procedures
MCT	Muscat
NM	Nautical Mile
NTSB	National Transportation Safety Board
OOMS	Muscat International Airport



OTSB	Oman Transport Safety Bureau
PF	Pilot Flying
PM	Pilot Monitoring
RA	Resolution Advisory
RDR	Radar
ROC	Rate of climb
ROD	Rate of descent
RVSM	Reduced Vertical Separation Minima
RPA	Radioactive Protection Advisor
SEP	Separation
SOP	Standard Operating Procedures
TCAS	Traffic Collision Avoidance System
TOD	Top of Descent
UTC	Universal Time Coordinated
WY	Oman Air
VOR	Omnidirectional Range Navigational aid (VOR)
VHF	Very High Frequency



Synopsis

Oman Transport Safety Bureau (OTSB) was notified of the occurrence by Oman Air through OTSB email on 23th of October 2023 at 07:07 UTC. The OTSB instituted an investigation and classified the occurrence as an Incident requiring investigation. The following parties were notified: -

- State of Operator, and Registry (Oman CAA)
- State of Design and Manufacturer United States (NTSB)
- ICAO

In line with OTSB Investigation procedures, the Director of OTSB appointed an Investigator-In-Charge (IIC) and investigation team to assist the IIC with the investigation. The following parties are involved in the investigation by appointing accredited representative and advisor to the investigation: -

- National Transportation Safety Board (NTSB) of United State of America
- Boeing: Organization responsible for type design and final assembly of the aircraft.

After the investigation is completed, OTSB will release and publish the final report, the Final Report will be made public at the below link: <http://www.mtcit.gov.om>.

The incident involved Oman Air aircraft with registration marks A4OSH, Boeing 787-900 that departed at 10:20 from Muscat International Airport (OOMS) on an international scheduled flight WY131 with 2 flight deck crew, 9 cabin crew and 150 passengers to Paris Charles de Gaulle Airport (LFPG). The aircraft took off from runway 08L and routed to point IVETO, LOPIL and thereafter point ITRAX during its climb to the cruising level. The aircraft encountered turbulence during climb and some of the cabin crew got injured during the turbulence and glasses and plates fell down and broke. The aircraft cleared turbulence and continued with the flight and landed safely at destination airport Paris Charles de Gaulle.



1. Factual Information.

1.1. History of the Flight.

- 1.1.1. On the 18th October 2023 Oman Air aircraft with registration marks A4OSH, Boeing 787-900 took off from Muscat International Airport (OOMS) on an international scheduled flight WY131 with intended destination airport Charles de Gaulle Airport (LFPG).
- 1.1.2. The aircraft took off from Runway 08L of OOMS with 2 cockpit crew, 9 cabin crew-members and 150 passengers. The Pilot In Command (PIC) was the pilot flying and the First Officer (FO) was the pilot monitoring.
- 1.1.3. The flight crew flight plan was filed to fly the route MCT, Q978 (which includes IVETO, LOPIL and ITRAX).
- 1.1.4. ATC instructed the flight crew of Oman Air aircraft A4OSH, to route to IVETO.
- 1.1.5. The take-off was uneventful with the seat belt sign switched "ON". During climbing after passing altitude 10, 000 ft, the crew switched "OFF" the seat belts signs consistent with the operator's Standard Operating Procedures (SOP). Following the seat belt signs switched "OFF", the cabin crew begin with beverage service to the passengers.
- 1.1.6. There were some convective clouds (towering cumulus) ahead of the aircraft A4OSH.
- 1.1.7. The flight crew switched on the seat belt sign "ON" at altitude 12800 ft while continuing to climb. The cabin crew continued with beverage service as there was no PA announcement from the cockpit following the seat belt sign on, neither was any PA announcement from Cabin Director regarding the seat belt sign on.
- 1.1.8. The ATC instructed the flight crew to route to LOPIL at FL 194.
- 1.1.9. At 10:35:54 while climbing through FL246, aircraft encountered light turbulence. The Rate of Climb (ROC) was 3100 Feet Per Minute (FPM). This information was taken from the ATC radar.
- 1.1.10. Approximately 1 minute 29 seconds, the aircraft encountered another turbulence at 10:37:23, passing through FL278, the ROC was 3764 FPM This information was taken from Flight Data Monitoring (FDM).
- 1.1.11. At 10:37:50, while passing FL286, the aircraft recovered from the turbulence. The ROC dropped to 851 FPM with a vertical acceleration of 0.96g.
- 1.1.12. At the time the aircraft encountered turbulence, R3 cabin crew was serving the second row of the economy cabin section. R3 lost balance during the turbulence and fell down. R3 cabin crew was assisted by a passenger to stand up and R3 secured herself on an empty passenger seat and fastened the seat belt.
- 1.1.13. R4 cabin crew was standing in the galley when the light turbulence started. R4 cabin crew secured the galley and moved to stand next to L4 headset waiting for a call from the Cabin Director (CD) to advise whether the passenger service should stop or continue. Approximately 1 minute and 29 seconds later, another



turbulence occurred resulting in R4 cabin crew falling down. Along the same corridor, L3 cabin crew lost her service cart from her hand and the cart came moving towards R4 cabin crew who stopped it by her leg while she was still on the floor. The cart then fell down beside the galley. Few seconds later R4 cabin crew moved to her jump seat and made a quick PA announcement saying ‘Take your seats’ referring to the passengers.

- 1.1.14. The CD was preparing the beverage for the business passengers’ section when the aircraft encountered turbulence. Although the CD stayed in balance during the turbulence, CD witnessed one of the colleague falling down and further observed some glasses fell down and broke.
- 1.1.15. Another cabin crew who was serving in the business cabin, lost balance during turbulence and hurt her arm.
- 1.1.16. Following the crew clearing the turbulence, the Captain called CD and the CD went to the cockpit and informed the flight crew that they are fine and few glasses got broken.
- 1.1.17. The aircraft continued to climb and cruised at FL340. The flight landed safely at its destination airport with no further reported abnormal events.
- 1.1.18. According to the route track of Flight WY131, OTSB Investigation team noticed that there were two aircraft observed on the same track as Flight WY131, one aircraft ahead of Flight WY131 and the other aircraft behind Flight WY131, both aircraft diverted on their route track due to the weather on track and turned right to heading 300 and 280 degrees respectively.

1.2. Injuries to Persons.

Injuries	Pilot	Cabin Crew	Passengers	Total on Board	Other
Fatal	-	-	-	-	-
Serious	-	-	-	-	-
Minor	-	3	-	3	-
No Injuries	2	6	150	158	-
Total	2	9	150	161	-

Note: Other, means people on ground.

1.3. Damage to Aircraft.

No damages were reported.



1.4. Other Damage.

No other damages were reported

1.5. Personnel Information:

1.5.1. Pilot-in-command (Pilot Flying)

Nationality	Omani	Gender	Male	Age	49
Medical validity	Expiry: 26/07/2024	Licence type	Airline Transport		
Licence validity	Expiry: 30/09/2025	Type endorsed	Yes		
Ratings	Instrument rating, Multi-Engine				
Latest LPC	24/06/2023	Latest OPC	26/12/2022		

Flying experience:

Total hours	15701:19
Last 24 hrs	
Last 7 days	
Last 90 days	

1.5.2. First officer (Pilot Monitoring)

Nationality	Omani	Gender	Male	Age	32
Medical valid	Expiry: 19/12/2023	Licence type		Airline Transport	
Licence valid	Expiry: 31/01/2027	Type endorsed		Yes	
Ratings	Instrument rating, Multi-Engine				
Latest LPC	27/07/2023	Latest OPC		27/02/2023	

Flying experience:

Total hours	2516:57
Last 24 hrs	
Last 7 days	



Last 90 days	
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1.5.3. Cabin Crew Director

Nationality	Omani	Gender	Male	Age	TBA
Medical valid	Expiry: 03/07/2026	Licence type	Cabin crew		
Licence valid	Expiry: 31/12/2024	Type endorsed	Yes		
Ratings	CRM, First Aid, Security, Safety Emergency Procedures, Dangerous Goods				

1.5.4. Cabin Crew R3 - Injured

Nationality	South Korean	Gender	Female	Age	TBA
Medical valid	Expiry: 28/05/2028	Licence type	Cabin crew		
Licence valid	Expiry: 30/06/2026	Type endorsed	Yes		
Ratings	CRM, First Aid, Security, Safety Emergency Procedures, Dangerous Goods				

1.5.5. Cabin Crew R4 – Injured

Nationality	Iranian	Gender	Female	Age	TBA
Medical valid	Expiry: TBA	Licence type	Cabin crew		
Licence valid	Expiry: TBA	Type endorsed	Yes		
Ratings	CRM, First Aid, Security, Safety Emergency Procedures, Dangerous Goods				

1.5.6. Cabin Crew L2 – Injured

Nationality	Tunisia	Gender	Female	Age	TBA
Medical valid	Expiry: 07/09/2026	Licence type	Cabin crew		
Licence valid	Expiry: 30/09/2026	Type endorsed	Yes		
Ratings	CRM, First Aid, Security, Safety Emergency Procedures, Dangerous Goods				



1.6. Aircraft Information:

1.6.1. General Data:

Boeing-787-900-Omani-A4OSH

Serial Number 38894

1.7. Meteorological Information:

1.7.1. Clouds:

The Satellite image of time of the occurrence, shown below, reveals some convective clouds (towering cumulus) but still not CB clouds existed nearby the location of the occurrence. The TAF for Muscat Airport, issued on the 18th at 0500 UTC and valid from the 18th at 06:00 UTC to the 19th at 12:00 UTC, indicated the forecast of CB (Cumulonimbus) clouds between 10:00 UTC and 14:00 UTC. No Sigmet was issued.

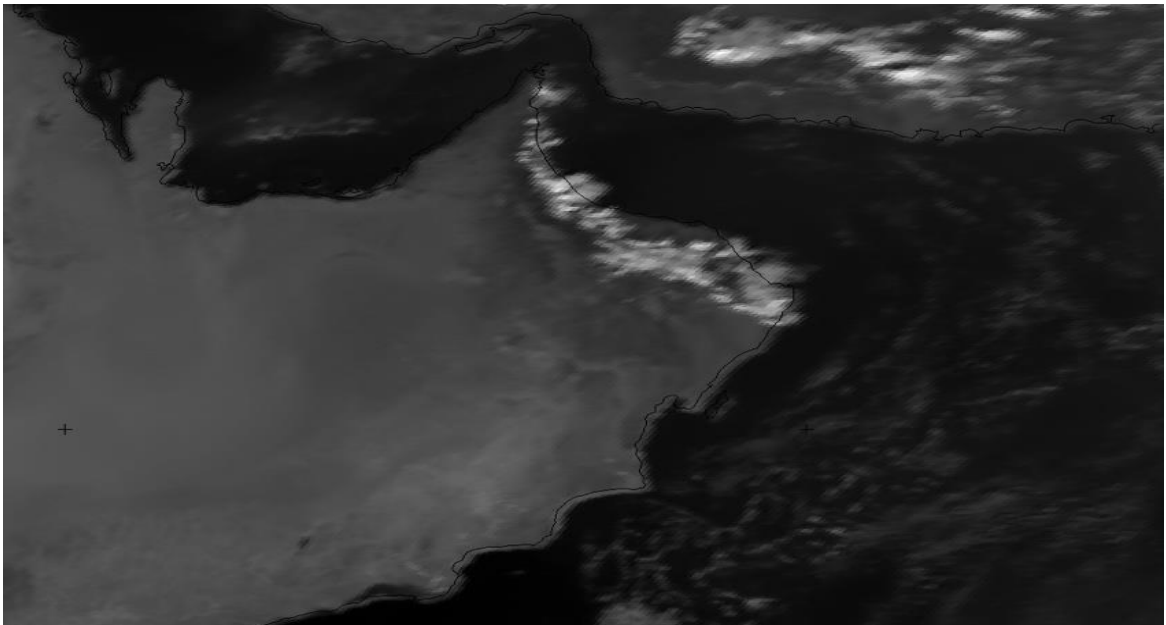


Figure 2: showing Clouds around the area where the aircraft experienced severe turbulence.

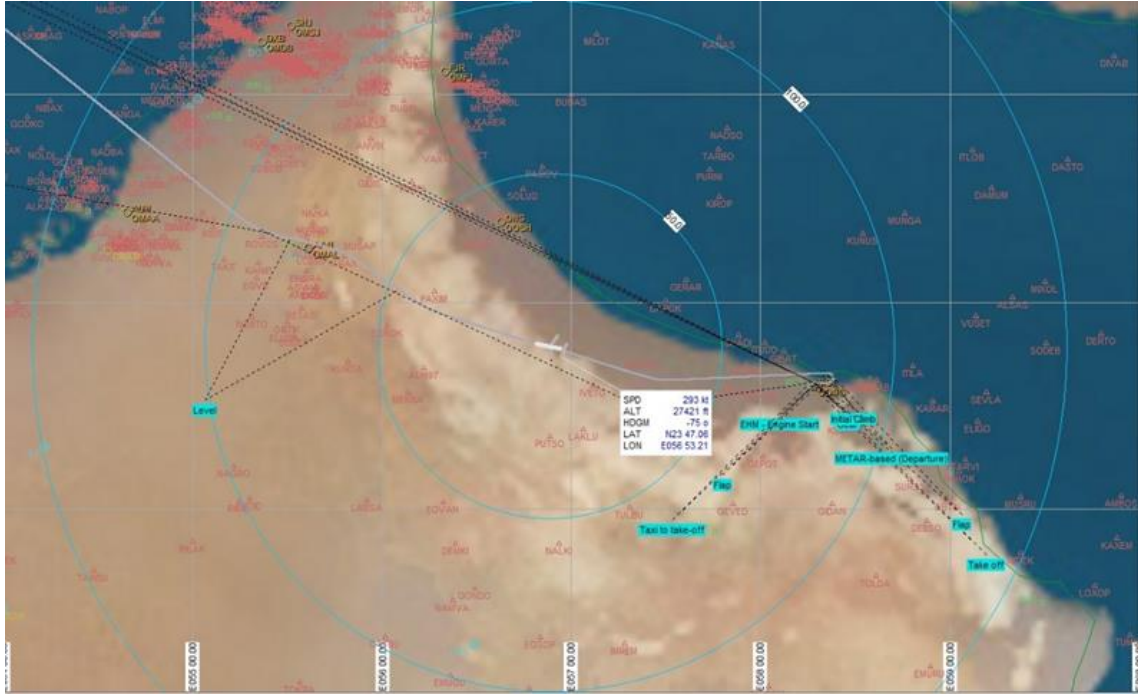


Figure 3: Satellite weather radar showing the position of the aircraft where the aircraft experience severe turbulence.

1.7.2. Upper winds and Air Temperature (TAT):

Between FL270 and FL280 where the severe turbulence occurred, the wind shifted from 084 direction (tail wind) to 128 direction. Then at FL290, it went back to 094 direction.

ALT	TAT (deg c)	W/V
FL150	19	064/05
FL160	18	068/06
FL170	18	087/08
FL180	17	091/07
FL190	16	056/11
FL200	15	049/06
FL210	13	043/06
FL220	10	023/08
FL230	12	044/12
FL240	10	077/08
FL250	9	081/16
FL260	7	081/16
FL270	3	084/15
FL280	1	128/13
FL290	0	094/15
FL300	1	109/20



FL310	0	107/19
FL320	-2	113/20
FL330	-3	092/21
FL340	-7	092/19

1.8. Aids to Navigation.

The aircraft was equipped with standard navigational equipment as approved by the Oman CAA. There were no records indicating that the navigation system was unserviceable prior to the serious incident.

1.9. Communications.

The aircraft was equipped with a standard communication system as approved by the Oman CAA. No defects that could render the communication system unserviceable were recorded before the flight.

1.10. Aerodrome Information.

1.10.1. Departure Aerodrome:

ICAO designation	OOMS (Muscat International Airport)	
Aerodrome co-ordinates	N23.60 E058.28	
Aerodrome elevation	49ft above mean sea level (AMSL)	
Runway designations	08L / 26R	08R / 26L (Closed)
Runway dimensions	4000 x 60 m	4080 x 45 m
Runway used	08L	
Category for Rescue Fire Fighting	10	
Approach facilities	ILS, VOR, RNP, PAPI's, runway lights	
Aerodrome status	Licensed Airport	

1.10.2. Destination Aerodrome:

ICAO designation	LFPG (Charles de Gaulle International Airport)	
Aerodrome co-ordinates	N49.01 E002.55	
Aerodrome elevation	392ft above mean sea level (AMSL)	
Runway designations	08L / 26R	08R / 26L
Runway dimensions	4142 x 45 m	2700 x 60 m



Category for Rescue Fire Fighting	10
Approach facilities	ILS, RNP, PAPI's, runway lights
Aerodrome status	Licensed Airport

1.11. Flight Recorders.

The aircraft was fitted with both the Flight Data Recording (FDR) and the Cockpit Voice Recording (CVR) however, since they were over-written, none was downloaded for this investigation. OTSB will be relying on other flight information data such as Flight Data Management (FDM), Air Traffic Services (ATC) communication records to assist in the investigation

1.12. Wreckage and Impact Information.

Not relevant

1.13. Medical and Pathological Information.

Not relevant

1.14. Fire.

Not relevant.

1.15. Survival Aspects.

To be discussed in the final report

1.16. Tests and Research.

To be discussed in the final report.

1.17. Organizational and Management Information.

To be discussed in the final report.

1.18. Additional Information

To be discussed in the final report.



1.19 Useful or Effective Investigation Techniques.

To be discussed in the final report.

2. Analysis

To be discussed in the final report.

3 Conclusions

3.1 General

The investigation is on-going and we will be looking into other aspects of this incident investigation which may or may not have safety implications.

3.2 Findings

To be discussed in the final report.

3.3 Causes and Contributing Factors

To be discussed in the final report.

4 Safety Recommendations

Based on the aforementioned factual information, OTSB is anticipating issuing safety recommendations in due course.