

Oman Transport Safety Bureau (OTSB)

- Final Report -

OTSB Case File No: AIFN/001/03/2025

TCAS Resolution Advisory between Fly Vaayu - Airbus 320-232 and Qatar Airways - Airbus A330-302 in the Muscat FIR

Operator: Fly Vaayu

Make and Model: Airbus 320-232 (P2F)

Nationality and Registration Marks: United Arab Emirates, A6 - MVA

Operator: Qatar Airways

Make and Model: Airbus A330-302

Nationality and Registration Marks: Qatar, A7- AEJ

Location of the Occurrence: Muscat FIR, 23°10'16.30"N062°46'09.65E

State of Occurrence: Sultanate of Oman

Date of Occurrence: 24th March 2025, 16:47 UTC

Date of Publication: 30th October 2025

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Purpose of the Investigation

The investigation was conducted by the Air Accident Investigation Section of the Oman Transport Safety Bureau (OTSB) pursuant to Civil Aviation Law 76/2019 Chapter 10, and in compliance with the Civil Aviation Regulation CAR-13.011 - Aircraft Accident and Incident Investigation and Reporting Procedures. The investigation was in conformance with the Standards and Recommended Practices (SARPs) in Annex 13 - Aircraft Accident and Incident Investigation to the Convention on International Civil Aviation Organization (ICAO).

The sole objective of the investigation of an accident and incident is to prevent future aircraft accidents and incidents and not to apportion blame or liability.

Oman Transport Safety Bureau issues the Final Report in accordance with the national and international standards, and industry best practices, therefore, concerned parties are invited to review this report and provide their significant and substantiated comments.

The Final Report will be publicly available at:

<http://www.mtcit.gov.om>

Oman Transport Safety Bureau

Ministry of Transport, Communications and Information Technology

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Abbreviation	Description
°	Degrees
AAI	Air Accident Investigations
AAIS	Air Accident Investigation Section
ABC	Alpha and Bravo ATC Sectors Combined
ACC	Area Control Centre
ADC	Aerodrome Control
AND	Air Navigation Department
AFL	Actual Flight Level
ALT	Altitude
AMSL	Above Mean Sea level
ANSIC	Air Navigation Service Incident Coordination
ATC	Air Traffic Control
ATS	Air Traffic Services
ATCO	Air Traffic Control Officer
AWY	Airway
BEA	Bureau d'enquêtes et d'analyses pour la sécurité de l'aviation civile
C	Celsius
CA	Conflict alert
CAA	Civil Aviation Authority
CAL	Civil Aviation Law
CAVOK	Cloud and Visibility are OK
CDIS	The Current Distance
CFL	Cleared Flight Level
CLAM	Cleared Level Adherence Monitoring
CR	Central Radar
CRM	Crew Resource Management
CSN	Cycles Since New
CVR	Cockpit Voice Recorder
DGMET	Directorate General of Meteorology
ELP	English Language Proficiency
FDA	Flight Data Analysis
FIR	Flight information Region
FL	Flight level
FMA	Flight Mode Annunciator
FMS	Flight Management System
FO	First Officer
FPL	Flight Plan

FPM	Feet Per Minute
FT	Feet
IAS	Indicated Air Speed
ICAO	International Civil Aviation Organization
IIC	Investigator-in-Charge
KT	Knots
LPC	License Proficiency Check
MATSOP	Manual of Air Traffic Standard Operating Procedures
METAR	Meteorological Routine Aerodrome Report
MCT	Muscat
MDIS	Minimum Predicted Distance
ND	Navigation Display
NM	Nautical Mile
NOTAM	Notice to Airmen
OOMS	Muscat International Airport
OPC	Operator Proficiency Check
OTSB	Oman Transport Safety Bureau
PANS	Procedures for Air Navigation Services
PF	Pilot Flying
PFD	Primary Flight Display
PM	Pilot Monitoring
RA	Resolution Advisory
RDR	Radar
ROC	Rate of climb
ROD	Rate of descent
RTF	Radiotelephony
RVSM	Reduced Vertical Separation Minima
RWY	Runway
SARPS	Standard and Recommended Practices
SDD	Surveillance Data Display
SEP	Separation
SIC	Specific regular medical examination(s)
SOP	Standard Operating Procedures
SRV	Surveillance
SSR	Secondary Surveillance Radar

STCA	Short Term Conflict Alert
SQK	Squawk
TA	Traffic Advisory
TAF	Terminal Aerodrome Forecast
TAU	Time to go to closest point of approach, or estimated time to collision
TCAS	Traffic Collision Avoidance system
TMA	Terminal Control Area
TWR	Control Tower
UAE	United Arab Emirates
VDL	Correction for defective distant vision and carry a spare set of spectacles
VIS	Visibility
VNL	Correction for defective near vision and carry a spare set of Spectacle
VMC	Visual Meteorological Condition
VOR	Very High Frequency Omni-directional Range
WPT	Waypoint

Indra System Safety net Alert Abbreviation		
STCA	Short Term Conflict Alert	"Yellow" Prediction "Red" Violation
AW	Minimum Safe Altitude Warning (MSAW)	
W	RVSM	
LB	Level Burst	"Yellow" CFL not matching AFL "Red" CFL not matching Mode-S flight level
HG	Heading conformance	
MC	Medium Term Conflict Detection	
RO	Route off	
SQ	SSR Code Conformance alert	

Synopsis

Oman Transport Safety Bureau (OTSB) was notified of the occurrence by the Sultanate of Oman Civil Aviation Authority (CAA) -Directorate General of Air Navigation (DGAN) Air Navigation Service Incident Coordinator (ANSIC) through OTSB email on 25th March 2025 at 08:23 Local Time. OTSB received Air Safety Report (ASR) of aircraft VYU122 TCAS RA occurrence over Muscat Flight Information Region (MCT FIR) from United Arab Emirates (UAE) – General Civil Aviation Authority – Air Accidents Investigation (GCAA-AAI) on 26th March 2025. The serious incident occurred on 24th March 2025 at 16:47 UTC.

The serious incident involved Fly Vaayu aircraft VYU122 with registration marks A6-MVA, Airbus 320-232 (P2F) and Qatar Airways aircraft QTR4Y with registration marks A7-AEJ, Airbus A330-302. Aircraft VYU122 entered MCT FIR via RASKI maintaining FL340 destination Ras Al Khaimah International Airport (OMRK), United Arab Emirates, while aircraft QTR4Y was flying on the same Airway (AWY) L301 bidirectional route and maintaining Flight Level (FL) 350 destination Hazrat Shahjalal International Airport (VGHS), Bangladesh.

At the time 16:37:45, before waypoint RASKI, Air Traffic Control Officer (ATCO) radar identified aircraft VYU122 and asked the flight crew of VYU122 to maintain FL 340 and to continue as per the Flight Plan (FPL) route to Ras Al Khaimah. The ATCO asked the flight crew of VYU122 if they are able to climb FL360. The flight crew of VYU122 read back clarifying the flight level by stating “Say again level”. ATCO replied “360” which the flight crew of VYU122 acknowledged. The flight crew of VYU122 can’t remember what was the acknowledgment phrase used as they stated in the interview. From audio playback recordings, it was confirmed that the acknowledgment from the flight crew of VYU122 was” Standing by”.

Shortly, on the radar Level Burst (LB) warning was activated on the target for aircraft VYU122 indicating LB. The LB was immediately noticed by the ATCO and no action was taken since the label of aircraft VYU122 was still indicating maintaining FL340. Soon, Radar displayed aircraft VYU122 leaving FL340, climbing through FL341 at a Rate of Climb (ROC) of 600 Feet Per Minute (FPM) while opposite direction traffic, aircraft QTR4Y, was flying on the same AWY, maintaining FL350. The Pilot Flying (PF) of VYU122 misinterpreted and initiated a climb to FL360 causing a radar loss of separation. This loss of separation occurred between aircraft VYU122 and aircraft QTR4Y, as both aircraft were flying in opposite direction along the same AWY L301. Traffic Collision Avoidance System (TCAS) resolution advisory (RA) was reported by aircraft QTR4Y.

Following the review of the occurrence, the OTSB classified the occurrence as a Serious Incident requiring investigation and the Director of OTSB appointed an investigator in charge (IIC) and investigation team to institute and conduct investigation. The following parties were notified:

- ❖ State of Operator and Registry UAE General Civil Aviation Authority- Air Accident Investigations (GCAA-AAI).
- ❖ State of Operator and Registry Qatar Air Accident Investigation (QAAI).
- ❖ State of Design and Manufacturer of Airbus A321-253N France-Bureau d'enquêtes et d'analyses pour la sécurité de l'aviation civile (BEA), French Safety Investigation Authority.
- ❖ International Civil Aviation Organization (ICAO).
- ❖ Sultanate of Oman Civil Aviation Authority (CAA).

An investigation team was formed and an investigation was conducted in conformance with the ICAO Annex13, CAR 13 and OTSB Investigation procedures. The Sultanate of Oman is the State of Occurrence. The following parties are involved in the investigation through their appointed accredited representatives and advisors:

- ❖ State of Operator and Registry UAE - General Civil Aviation Authority- Air Accident Investigations (GCAA-AAI).
- ❖ State of Operator and Registry State of Qatar- Air Accident Investigation (QAAI).
- ❖ State of Design and Manufacturer of Airbus A321-253N France-Bureau d'enquêtes et d'analyses pour la sécurité de l'aviation civile (BEA), French Safety Investigation Authority .

The Final Report is issued on 30th October 2025 and it will be made public at the below link:

www.mtcit.gov.om

Unless otherwise mentioned, all times in this report are UTC. Local Time in The Sultanate of Oman is UTC plus +4 hours. Photos and figures used in this report were obtained from DGAN, Operator Fly Vaayu and DGMET and adjusted from the original for the sole purpose of improving the clarity of the report. Modifications to images used in this Report are limited to cropping, magnification, file compression, or enhancement of colour and brightness.

1. FACTUAL INFORMATION

1.1. History of Flight

- 1.1.1 On the 24th of March 2025, Fly Vaayu aircraft VYU122 with registration marks A6-MVA, an Airbus 320-232 (P2F) departed from Nashik International Airport (VAOZ), India on an international scheduled cargo flight with intended destination Ras Al Khaimah International Airport (OMRK). While Qatar Airways aircraft QTR4Y with registration marks A7- AEJ an Airbus 330-302 on the same day departed from Hamad International Airport (OTTH), Qatar on an international scheduled passenger flight with intended destination Hazrat Shahjalal International Airport (VGHS), Bangladesh.
- 1.1.2 Both aircraft had a flight plan to fly over Muscat FIR on a bidirectional airway (AWY) L301, Alpha and Bravo Sectors (ABC) which were combined and Air Traffic Control Officer (ATCO) was busy handling more than 25 aircraft in both Sectors combined. Aircraft were clearly displayed on the Surveillance Data Display (SDD) with no label overlapping. The Radar (RDR) and communication Radiotelephony (R/T) was in normal operation.
- 1.1.3 At the time 16:35:20, the flight crew of VYU122 contacted MCT control advising that aircraft VYU122 will be over waypoint (WPT) RASKI at time 16:39 and the ATCO acknowledged.
- 1.1.4 At the time 16:36:08, the flight crew of VYU122 was instructed by the ATCO to Squawk (SQK) 4062 and the flight crew of aircraft VYU122 readback the Squawk (SQK). At 16:37:51, the aircraft was radar identified at WPT RASKI by the ATCO and instructed the crew of aircraft VYU122 to maintain FL340 as per the Flight Plan (FPL) route to OMRK.
- 1.1.5 At the time 16:38:00, the flight crew of VYU122 readback by stating “VYU122 maintaining 340 as per the FPL route to RAS ALKAHIMA”
- 1.1.6 At the time 16:38:48, aircraft VYU122 entered MCT FIR at RASKI maintaining FL340 west-bound direction to exit WPT MENSA.
- 1.1.7 At the time 16:46:35, ATCO called the flight crew of VYU122 and asked them if they are able to climb to FL360, by stating “Are you able to climb 360”. The flight crew of VYU122 responded “Say again level”. ATCO replied “360”. Then the flight crew of VYU122 readback by stating “Affirm VYU122”.
- 1.1.8 At the time of 16:46:49, the ATCO responded “Roger call you back shortly”. (At 16:46:53 as per the audio playback, the PM of VYU122 readback was not very clear due to unclear transmission, however the PM could be heard saying (“standing by”). During the interview the flight crew of VYU122 stated that their call was to acknowledge Air Traffic Control (ATC) clearance “Roger call you back shortly”, but can’t remember what was the acknowledgment phrase used.
- 1.1.9 At the time 16:46:54, although the radar display screen was indicating aircraft VYU122 maintaining FL340 but the “Level Burst (LB) radar warning (indicating a level bust) was activated on aircraft VYU122”, as shown below in figure 1.



Figure. 1 ATC radar indicating LB activated without any indication of ROC and FL340 on aircraft VYU122 (Source: DGAN)

- 1.1.10 At the time 16:46:56, it was observed on radar the ATCO pointing the cursor on VYU122 label with the LB warning, but since aircraft VYU122 was still maintaining FL340, the ATCO did not take any action.
- 1.1.11 At the time 16:47:06, aircraft VYU122 was observed on the RDR display leaving FL340, climbing at a rate of 600 Feet Per Minute (FPM), while opposite direction traffic, aircraft QTR4Y, was flying on the same route (L301) and maintaining FL350.



Figure. 2 ATC RDR indicating aircraft VYU122 climbing through FL341 at a ROC of 600FPM (Source: DGAN)

- 1.1.12 At the time 16:47:08 ATCO instructed the flight crew of VYU122 to maintain FL340 by stating "VYU122 maintain 340" and the flight crew of VYU122 readback accordingly. At the time ATCO asked the crew of aircraft VYU122 "Why are you climbing I told you call you back for higher".

- 1.1.13 At the time 16:47:18, the Red Short-Term Conflict Alert (STCA) warning was triggered between aircraft VYU122 on climb passing through FL343, ROC 900FPM and an opposite direction aircraft QTR4Y maintaining FL350 with a separation distance of 4.66 NM closing between the two aircraft as shown in figure 3.

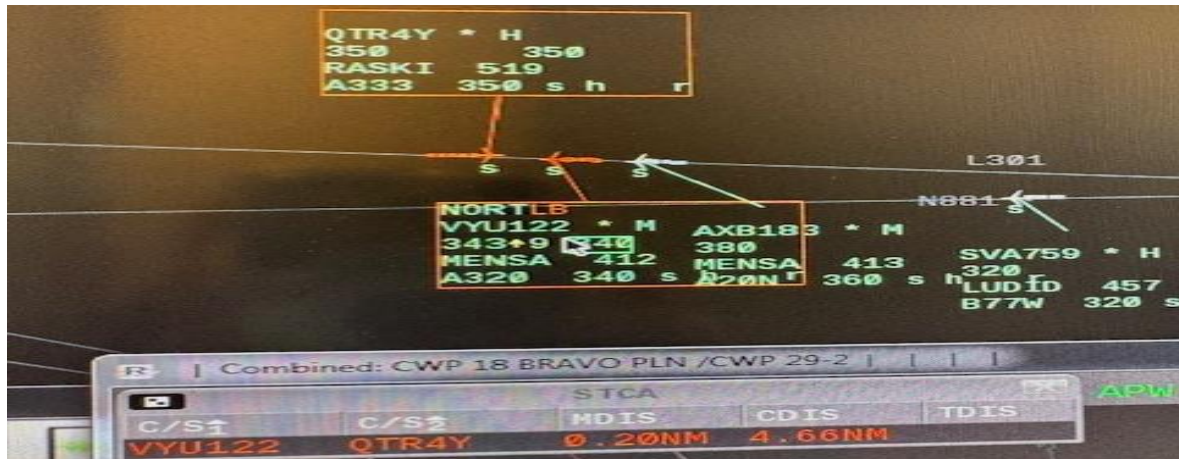


Figure. 3 ATC RDR indicating Red STCA warning between aircraft VYU122 climbing through FL343, ROC of 900FPM and an opposite direction aircraft QTR4Y maintaining FL350 with a distance of 4.66NM closing between the two aircraft (Source: DGAN)

- 1.1.14 At the time 16:47:19 The flight crew of VYU122 apologized by stating “Sorry for that VYU122”. At the time 16:47:24, ATCO informed the flight crew of QTR4Y “the traffic is descending now”. At the time 16:47:27, the flight crew of QTR4Y reported “QTR4Y TCAS RA” however the flight crew of VYU122 did not report TCAS RA.
- 1.1.15 At the time 16:47:31, during radar playback aircraft VYU122 was observed on climb passing through FL343, ROC of 500FPM and aircraft QTR4Y was observed on opposite direction maintaining FL350 with a separation distance of 1.53 NM between the two aircraft as shown in figure 4.

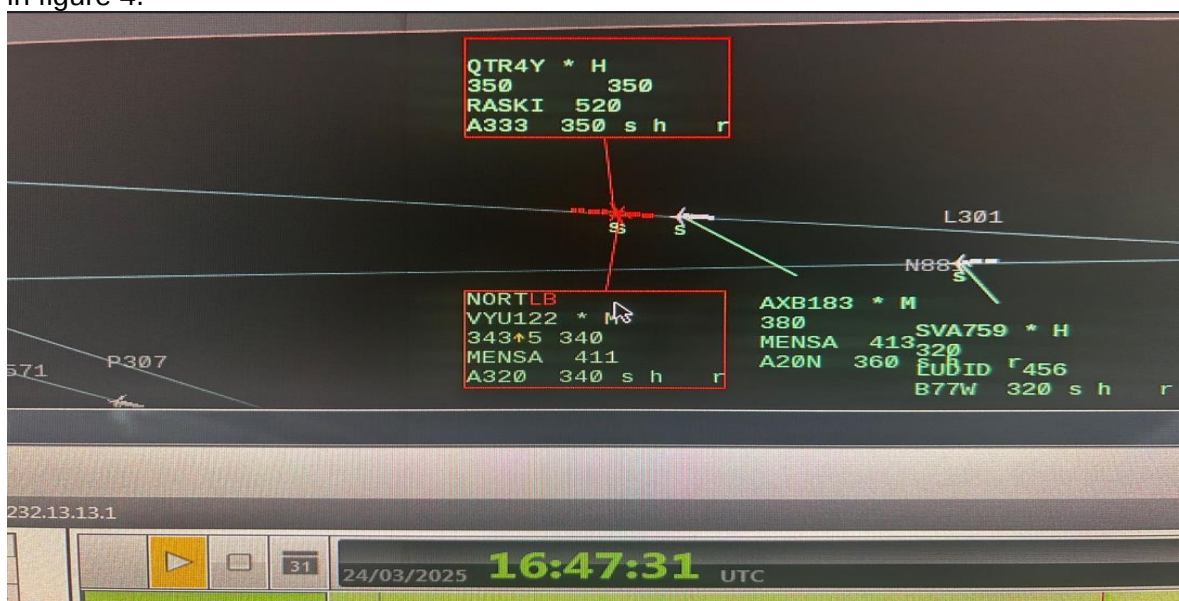


Figure. 4 Aircraft VYU122 observed on ATC RDR on climb passing through FL343 ROC of 500FPM and aircraft QTR4Y on opposite direction maintaining FL350 with a separation distance of 1.53 NM between the two aircraft (Source: DGAN)

- 1.1.16 At the time 16:47:34, RDR showed aircraft QTR4Y leaving FL350 climbing through FL351 at a ROC of 700FPM, while the opposite direction aircraft VYU122 was maintaining FL343. The distance between the two aircraft was 0.39 NM as shown in figure 5.

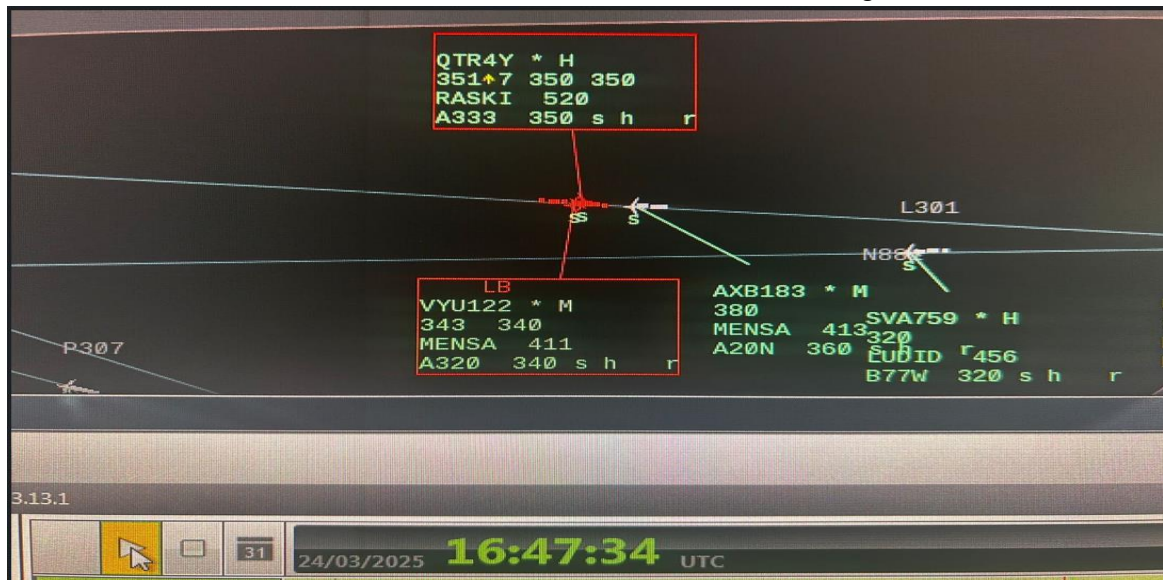


Figure.5 ATC RDR indicating aircraft QTR4Y on climb passing through FL351 at ROC of 700FPM and opposite direction aircraft VYU122 was maintaining FL343 (Source: DGAN)

- 1.1.17 At the time 16:47:39, a 1,000 feet (FT) separation was attained between aircraft VYU122 and aircraft QTR4Y whilst aircraft QTR4Y was on climb passing through FL353 at ROC of 1700FPM, and aircraft VYU122 on descent passing through FL343 ROD of 400FPM. The distance between the two aircraft was 0.66 NM as shown in figure 6.

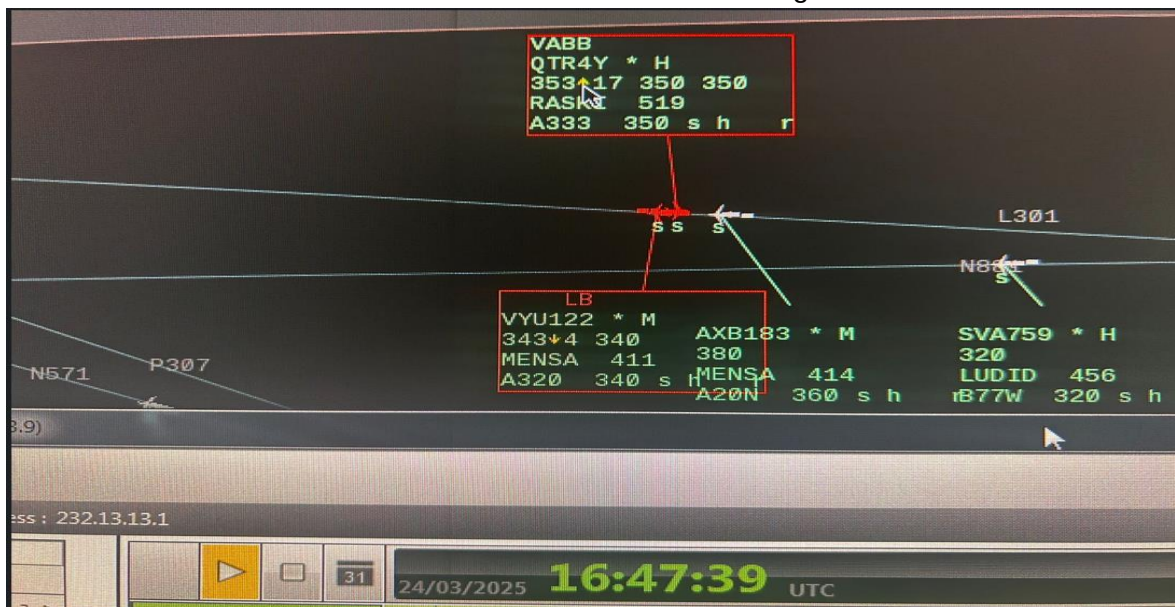


Figure.6 ATC RDR indicating aircraft QTR4Y climbing through FL353 at ROC of 1700FPM and opposite direction aircraft VYU122 was on descent passing through FL343, ROD of 400FPM the distance between was 0.66 NM (Source: DGAN)

- 1.1.18 At the time 16:47:46, the red STCA on the radar screen was deactivated between aircraft VYU122 while maintaining FL343 and opposite traffic aircraft QTR4Y climbing through FL354 with ROC of 800FPM. The distance between both traffic after passing each other was 1.67 NM as shown in figure 7.

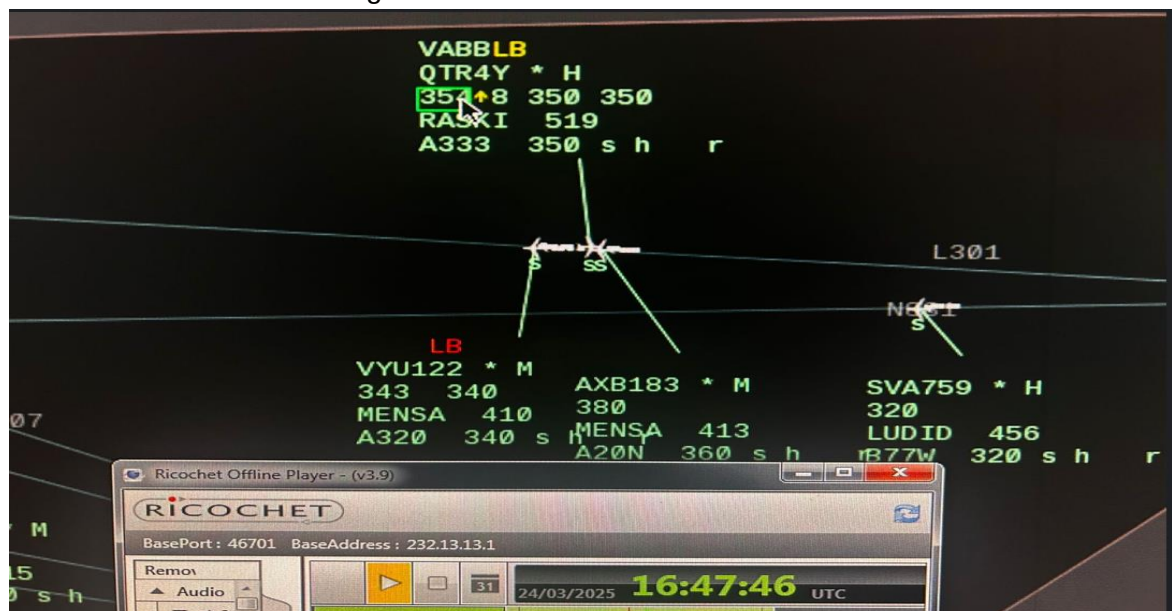


Figure.7 RDR Indicating red STCA deactivated between aircraft VYU122 still maintaining FL343 and aircraft QTR4Y climbing through FL354, ROC of 800FPM (Source: DGAN)

- 1.1.19 At the time 16:48:03, the flight crew of QTR4Y reported clear of the conflict by stating "QTR4Y is clear of conflict. We are at FL353 now we are descending back to FL350". ATCO replied by stating "QTR4Y roger will file a report". At the time 16:48:17, the flight crew of QTR4Y thanked the ATCO and stated that they will do one as well. TCAS RA was not reported by the flight crew of VYU122.
- 1.1.20 At the time 16:48:18, aircraft VYU122 was observed leaving FL343 on descend. Aircraft QTR4Y was descending through FL351 with a ROD of 600FPM.
- 1.1.21 At the time 16:48:21, ATCO informed the flight crew of VYU122 that the ATCO will file a report as no clearance by the ATCO was issued to them for the climb. The flight crew of VYU122 responded "Apologies for the same VYU122 we will be filing a report on landing".
- 1.1.22 According to the Flight Data Analysis (FDA), at the time 16:46:53, aircraft VYU122 left FL340 and reached 34292FT and at the time 16:48:30 aircraft VYU122 was back to FL340 as per figure 8 below:

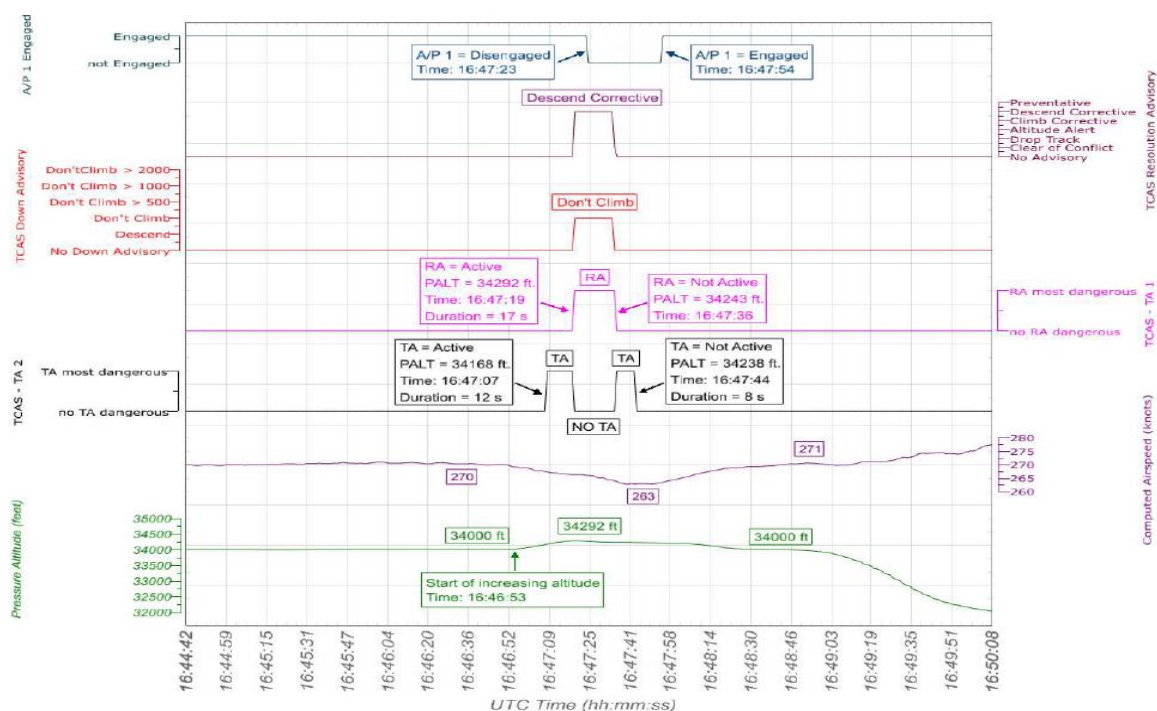


Figure. 8 shows all TCAS Advisory parameters including TCAS RA duration which lasted for 17 seconds for flight VYU122 (Source: Fly Vaayu – Flight Data Analysis - FDA)

- 1.1.23 At the time 16:48:38, ATCO cleared the flight crew of VYU122 to descend to FL320. At the time 16:48:45, the flight crew of VYU122 readback by stating “Copied descend level 320 leaving 340”.
- 1.1.24 During the interview the ATCO (alpha and bravo sectors controller) reported that he was working on two frequencies (135.6 and 126.55) from 1600 - 1700 UTC. The ATCO was well rested and not fatigued on the day of the serious incident. The work schedule involved a planner who was available to assist ATCO. The ATCO considered the operation was moderate with 25 aircraft under the ATCO's control.
- 1.1.25 During the interview, ATCO stated that aircraft VYU122 was noticed on the radar screen with a red LB, but ATCO did not expect the flight crew of VYU122 to climb. ATCO first thought it was the Flight Management System (FMS) of the aircraft VYU122 showing a future climb instruction, without execution. As ATCO continued working on other situations, ATCO observed the flight crew of VYU122 climbing and immediately instructed them to maintain FL340. Then the flight crew of QTR4Y transmitted on 135.6 “TCAS RA”. ATCO stated that he did not see or had enough time or distance to take an action and to turn both planes as they were travelling rapidly on opposite direction.
- 1.1.26 During the interview, the ATCO further stated that initially when VYU122 A320 checked in via point RASKI on AWY L301 maintaining FL340 exiting MENSA, VYU122 was conflicting with checked in via point PARAR (CHZ1256) maintaining FL340 also exiting MENSA and the ATCO planned to change the level for VYU122 to climb to FL360. Also at the same time there was SVA759 B77W FL320 faster following traffic behind VYU122 that checked in via point RASKI exiting LUDID which then followed AWY N881 which is not conflicting with VYU122.

1.1.27 The ATCO also stated that at waypoint RASKI in the radar is not that accurate on aircraft location due to the empty radar hole.

1.1.28 During the interview, the PF of VYU122 stated that when the ATCO asked the flight crew of VYU122 if they can climb FL360, the PF understood the call is for climb, misinterpretation of phraseology. The PM of VYU122 stated that the PM replied “able climb FL360”. The flight crew of VYU122 both cross checked the cruise performance data. PF set Flight Control Unit (FCU) Altitude (ALT) to FL360 and called out the Flight Mode Annunciator (FMA) and initiated the climb to FL360. The PM stated that the climb set by the PF was missed as the PM was occupied with ATC communication and subsequently got back to flight related paperwork which the PM was doing before the call “VYU122 Can you climb FL360”. The PM stated that the FMA call out by the PF was not heard. The flight crew of VYU122 further stated that TCAS-RA was triggered.

1.2. Injuries to Persons

1.2.1 No injuries were reported.

Injuries to Persons (A6-MVA-VYU122):

Injuries	Pilot	Cabin Crew	Passenger	Total on Board	Other
Fatal	-	-	-	-	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
No Injuries	3	-	1	4	-
Total	3	-	1	4	-

Note: Other, means people on ground

Injuries to Persons (A7-AEJ- QTR4Y):

Injuries	Pilot	Cabin Crew	Passengers	Total on Board	Other
Fatal	-	-	-	-	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
No Injuries	2	10	279	291	-
Total	2	10	279	291	-

Note: Other, means people on the ground

1.3. Damage to Aircraft

1.3.1 No damage to aircraft was reported.

1.4. Other Damage

1.4.1 No other damages were reported.

1.5. Personnel Information

1.5.1 Captain (PIC) (A6-MVA-VYU122) Pilot Flying (PF)

Nationality	Malaysian		
Medical validity	28 th OCT 2025	Licence type	Airline Transport Pilot Licence
Licence validity	20 th FEB 2033	Type endorsed	Yes
Ratings	Instrument Rating, Multi-Engine, A320		
English Language Proficiency	Level 4 Exp: 18 th February 2028		
Latest LPC Issue date	06 th MAR 2025	Latest OPC Issue date	16 th FEB 2025
Latest LPC Expiry date	06 th SEPT 2025	Latest OPC Expiry date	31 st AUG 2025
Restrictions	SIC, VML		
Previous Incidents/Accidents	NIL		

Flying experience:

Total hours	15600
Total Flying Hours on Type	4565
Last 24 hrs	5:09
Last 7 days	27:18
Last 30 days	60:23
Last 90 days	60:23

1.5.1.1 The Captain was issued with an Airline Transport Pilot license (ATPL) by the United Arab Emirates DGCAA and rated for A320. The license was valid at the time of the serious incident with an expiry date of 20th February 2033. The Captain is holding level 4 English Language proficiency with an expiry date of 18th February 2028.

1.5.1.2 The Captain was issued with a Class (one) 1 medical certificate with an expiry date of 28th October 2025. The last medical assessment date was conducted with Specific medical examination (SIC) limitation and Valid only with correction for defective distant, intermediate a near vision (VML) limitations.

1.5.2 First Officer (FO) (A6-MVA-VYU122) - Pilot Monitoring (PM)

Nationality	Indian		
Medical valid	22 nd OCT 2025	Licence type	ATPL - A
Licence valid	20 th MAR 2033	Type endorsed	Yes
Ratings	Instrument Rating, MPA, A320		
English Language Proficiency	Level 4 Expiry: 17 th March 2028		
Latest LPC Issue Date	16 th FEB 2025	Latest OPC Issue Date	16 th FEB 2025
Latest LPC Expiry Date	28 th FEB 2026	Latest OPC Expiry Date	31 st AUG 2025
Restrictions	Nil		
Previous Incidents/Accidents	Nil		

The Line Proficiency Checks (LPC) validity is 12 months

Flying experience:

Total hours	9177
Total Flying Hours on Type	8859
Last 24 hrs	Nil
Last 7 days	22:20
Last 30 days	59:03
Last 90 days	161:25

1.5.2.1 The FO is holding an ATPL - A issued by U.A.E - GCAA and rated A320. The Licence was valid at the time of the serious incident with an expiry date of 20th March 2033. The FO has level 4 English Language proficiency with an expiry date of 17th March 2028.

1.5.2.2 The FO was issued with a Class (one) 1 medical certificate with no limitations and with expiry date of 22nd October 2025.

1.5.3 Captain (PIC) – (A7-AEJ- QTR4Y) Pilot Flying (PF):

Nationality	Canadian		
Medical validity	30 th NOV 2025	Licence type	Airline Transport Pilot Aeroplane (ATPL (A))
Licence validity	Life time as per medical certificate	Type endorsed	A 330/350
Ratings	Instrument Rating, Multi-Engine (ME), A330/350		
English Language Proficiency	Level 5. Expiry date: 05 th April 2029		
Latest LPC Issue Date	20 th OCT 2024	Latest OPC Issue Date	20 th OCT 2024
Latest LPC Expiry Date	20 th APR 2025	Latest OPC Expiry Date	20 th APR 2025
Restrictions	VLD		
Previous Incidents/Accidents	Nil		

The Line Proficiency Checks (LPC) validity is 12 months

Flying experience:

Total hours	15198:22
Total Flying Hours on Type	667:41
Last 24 hrs	04:53
Last 7 days	22:06
Last 30 days	94:37
Last 90 days	232:09

1.5.3.1 The Captain is holding an Airline Transport Pilot license (ATPL) issued by Qatar CAA 16th February 2025 and rated for A330 and A350. The license was valid at the time of the serious incident. The privileges of the license shall be exercised only if the holder has valid medical certificate.

1.5.3.2 The Captain was issued a Class (one) 1 medical certificate with an expiry date of 30th November 2025. The last medical assessment was conducted with Validation only with correction for defective distant vision (VLD) limitations, must carry spare set of spectacles.

1.5.4 First Officer (FO) - (A7-AEJ- QTR4Y) Pilot Monitoring (PM):

Nationality	British		
Medical validity	24 th SEPT 2025	Licence type	Airline Transport Pilot Aeroplane (ATPL - A)
Licence validity	as per medical certificate	Type endorsed	A330/350
Ratings	Instrument Rating (IR), Multi-Engine (ME), A330/350		
English Language Proficiency	Level 4. Expiry date: 15 th May 2026		
Latest LPC Issue Date	18 th DEC 2024	Latest OPC Issue Date	18 th DEC 2024
Latest LPC Expiry Date	18 th JUN 2025	Latest OPC Expiry Date	18 th JUN 2025
Restrictions	Nil		
Previous Incidents/Accidents	Nil		

The Line Proficiency Checks (LPC) validity is 12 months

Flying experience:

Total hours	6723:33
Total Flying Hours on Type	6723:33
Last 24 hrs	04:53
Last 7 days	19:00
Last 30 days	93:03
Last 90 days	241:50

1.5.4.1 The FO is holding an Airline Transport Pilot license (ATPL- A) issued by Qatar CAA on 16th February 2025 and rated for A330 and A350. The license was valid at the time of the serious incident.

1.5.4.2 The FO is issued with a Class 1 medical certificate with no limitations and expiry date of 24th September 2025.

1.5.5 Air Traffic Controller:

Nationality	Panamanian		
Medical valid	10 th Jun 2025	Licence type	ATCO-Area
Licence valid	30 th Jun 2026	Type endorsed	YES
Ratings	ACC - ACC RDR	Language Proficiency Requirements (LPR)	Level 6
Restrictions	VML		
Previous Incidents/Accidents	Nil		

1.5.5.1 The ATCO license was issued on 28th June 2010 with an expiry date of 30th June 2026. The License Proficiency Check was conducted on 12th November 2024 with an expiry date of 11th November 2025.

1.5.5.2 The ATCO was issued with English language proficiency rating LEVEL 6 and renewed on 09th March 2025.

1.5.5.3 The ATCO medical was assessed on 30th May 2024 and issued a Class one (1) medical certificate with expiry date of 10th June 2025 with "Valid only with correction for defective distant, intermediate a near vision (VML)" limitation.

1.6. Aircraft Information

1.6.1 The Airbus A320-232 is a specific variant of the A320 family, known for its fuel efficiency and passenger capacity. It is a short-to-medium range, narrow-body, commercial passenger twin-engine jet airliner. The A320-232 is a popular choice for airlines due to its versatility and efficiency.

Airframe Information (A6-MVA – VYU122)

Manufacturer/Model	Airbus / (A320-232 P2F)	
Serial Number	2164	
Year of Manufacture	2004	
Total Airframe Hours (At Time of Incident)	46642:36	
Last Inspection (Date & Hours): TSN	10 th January 2025	46547:56
Last Inspection Airframe Cycles (CSN)	29814	
Hours Since Last Inspection	105:15	
Type of inspection performed	6 Years Check	
CRS Issue Date	10 th January 2025	
C of A (First/initial Issue Date)	01 st March 2025	
C of A (Expiry Date)	28 th February 2026 (ARC EXPIRY DATE)	
C of R (Issue Date) (Present Owner)	26 th February 2025 (BANK OF UTAH)	
Type of Fuel Used	Jet A1	
Operating Category	Transport cargo	
Previous Accidents	Nil	

Engine 1:

Manufacturer/Model	IAE International Aero Engines AG (IAE V2500)	
Serial Number	V11621	
Part Number	V2527-A5	
Hours Since New	43026:32	
Hours Since Overhaul	Not Applicable	
Hours since last shop visit	137:32	
Cycles Available Before Next Shop Visit	2406	
Oil type	Eastman Turbo oil 2197	

Engine 2:

Manufacturer/Model	IAE International Aero Engines AG (IAE V2500)	
Serial Number	V11610	
Part Number	V2527-A5	
Hours Since New	47953:10	
Hours Since Overhaul	Not Applicable	
Hours since last shop visit	157:10	
Cycles Available Before Next Shop Visit	2228	
Oil type	Eastman Turbo oil 2197	

1.6.2 Aircraft Information (A7-AEJ- QTR4Y)

Manufacturer/Model	AIRBUS - A330-300	
Serial Number	826	
Year of Manufacture	2007	
Total Airframe Hours (At Time of Serious Incident)	81051	
Last Inspection (Date & Hours (TSN))	11 th February 2025	81051
Last Inspection Airframe Cycles (CSN)	16901	
Hours Since Last Inspection	80533	
Type of inspection preformed	A- Check	
C of A (First/initial Issue Date)	22 nd March 2007	
C of A (Expiry Date)	Last ARC inspection 26 th February 2025	
C of R (Issue Date) (Present Owner)	08th March 2019 (JPA No.144., Ltd).	
Type of Fuel Used	Jet A1	
Operating Category	Transport Passenger	
Previous Serious Incident	Nil	

Engine 1:

Manufacturer/Model	GE Aerospace
Serial Number	811272
Part Number	CF6-80E1A4B
Hours Since New	68563:7
Hours Since Overhaul	724:14
Hours since last shop visit	724:14
Cycles Available Before Next Shop Visit	2406
Oil type	Eastman Turbo oil 2197

Engine 2:

Manufacturer/Model	GE Aerospace
Serial Number	811418
Part Number	CF6-80E1A4B
Hours Since New	50467:57
Hours Since Overhaul	3028:36
Hours since last shop visit	3028:36
Cycles Available Before Next Shop Visit	2228
Oil type	Eastman Turbo oil 2197

1.7 Meteorological Information:

- 1.7.1 According to Oman Directorate General of Meteorology (DGMET) office, satellite image was observed with no Significant weather condition over Muscat FIR. A medium and high clouds was observed during the time (1645UTC), close to the time of the serious incident as shown in figure (8) below. Also, strong wind was expected southwest to west (25055kt

to 27065kt) from FL320 to FL360 in the upper air, maybe Jetstream was associated as it indicated in Figure (10). Also, forecasting, no weather condition as shown in the Muscat TAF and no pilot reports were received. Therefore, no warning was issued over the area of the serious incident. The weather information below is from the Meteorological Routine Aerodrome Report (METAR):

Wind Direction	250°	Wind Speed	Less than 10 KT	Visibility	CAVOK
Temperature	29°C	Cloud Cover	No significant cloud	Cloud Base	No significant cloud
Dew Point	10°C	QNH	1013 HPA		

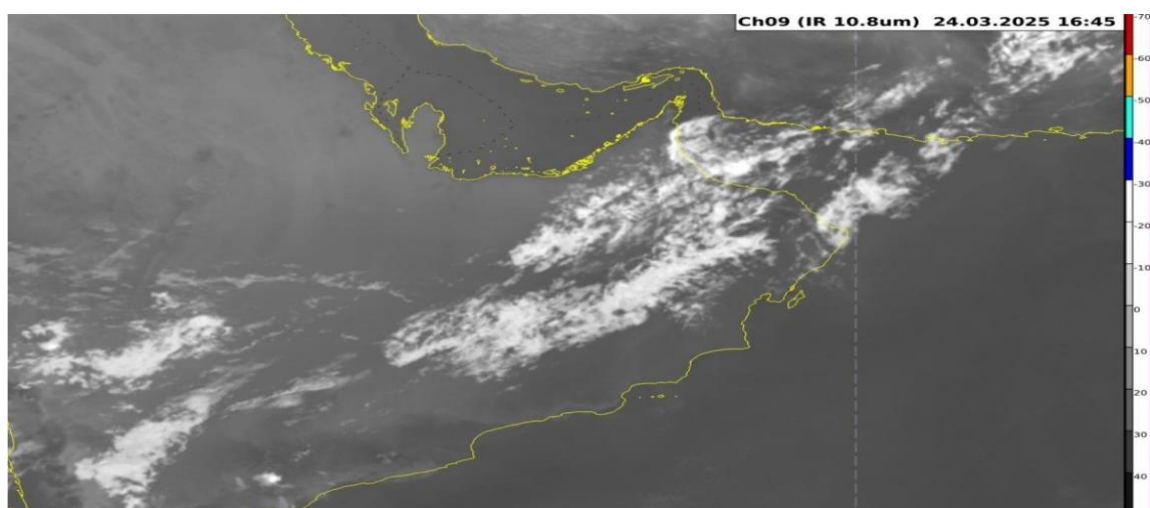


Figure. 9 Showing cloud conditions at the time and date of the serious incident (Source: DGMET)

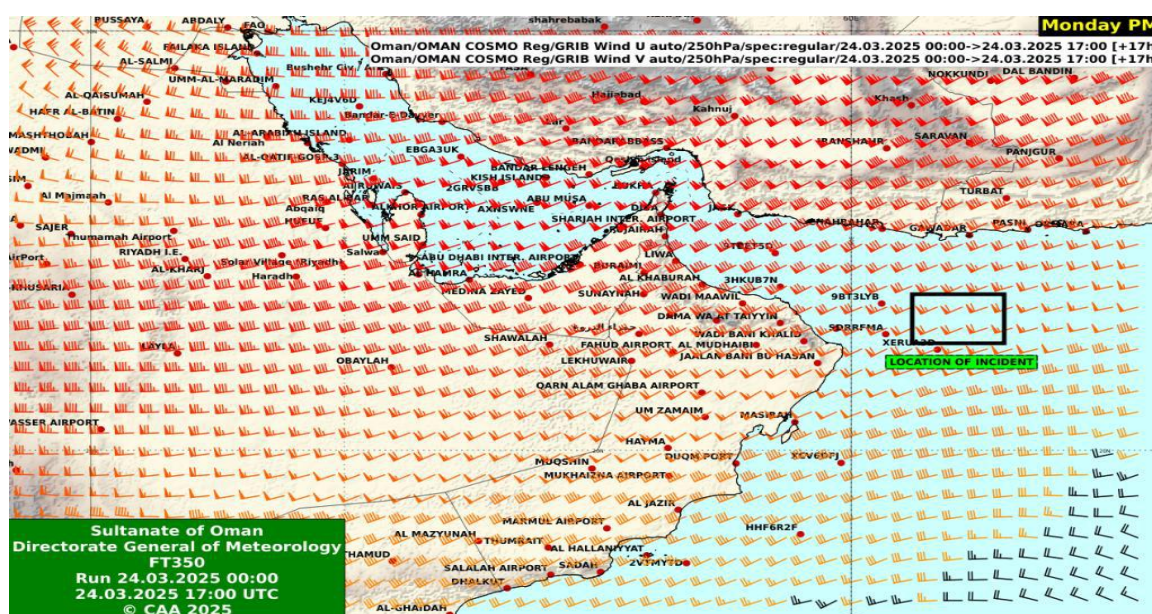


Figure. 10 showing the weather conditions at the time and date of the serious incident (Source: DGMET)



1.8 Aids to Navigation.

- 1.8.1 Both aircraft were equipped with a standard navigational equipment and systems approved by the UAE GCAA and Qatar CAA. There were no records or defects indicating that the navigation system was unserviceable prior to the serious incident flight.

1.9 Communications.

- 1.9.1 Both aircraft were equipped with standard communication equipment and systems approved by the U.A.E GCAA and Qatar CAA. There were no records or defects indicating that the communication system was unserviceable prior to the serious incident flight.

1.10 Aerodrome/Airport Information

- 1.10.1 Departure Aerodrome (A6-MVA – VYU122):

ICAO designation	VAOZ (Nashik International Airport, India)
Aerodrome co-ordinates	N20°07'12" E073°54'48"
Aerodrome elevation	1995 FT Mean Sea Level (MSL)
Runway designations	RWY 09/27
Runway dimensions	3000m / 45m
Runway used	27
Category for Rescue Fire Fighting	9
Approach facilities	ILS RWY 27
Aerodrome status	Domestic – (Military)

- 1.10.2 Destination Aerodrome:

ICAO designation	OMRK (Ras Al-Khaimah International Airport)
Aerodrome co-ordinates	25°36'48"N 055°56'20"E
Aerodrome elevation	94 FT Mean Sea Level (MSL)
Runway designations	16/34
Runway dimensions	3760 M x 45 M
Runway used	34
Category for Rescue Fire Fighting	CAT-7 (CAT-9 available with 60minutes prior request)
Approach facilities	VOR RWY16, ILS RWY34, RNP RWY16, RNP RWY34
Aerodrome status	Licensed (Operational)

- 1.10.3 Departure Aerodrome (A7-AEJ- QTR4Y):

ICAO designation	Hamad International Airport (OTHH)	
Aerodrome Coordinates	25°16'23"N 51°36'29"E	
Aerodrome elevation	13 FT	
Runway designations	16L / 34R	16R / 34L
Runway dimensions	4850 X 60	4250 X 60
Runway used	N/A	
Category for Rescue Fire Fighting	CAT 10	
Approach facilities	ILS, RNP, GVA, Runway Lights, PAPI's	
Aerodrome status	Licensed (Operational)	

1.10.4 Destination Aerodrome:

ICAO designation	VGHS - Hazrat Shahjalal International Airport
Aerodrome co-ordinates	23°50'34"N 090°24'02"E
Aerodrome elevation	27 FT
Runway designations	14/32
Runway dimensions	3200 M x 45 M
Runway used	N/A
Category for Rescue Fire Fighting	CAT 9
Approach facilities	ILS, DVOR, NDB, Runway Lights, PAPI's
Aerodrome status	Licensed (Operational)

1.11 Flight Recorders.

1.11.1 Both aircraft were fitted with both the Digital Flight Data Recorder (DFDR) and the Cockpit Voice Recorder (CVR). While the only aircraft where the FDR was removed and analyzed was aircraft VYU122, OTSB relied on the FDR Analysis Report and flight information data such as Flight Data Management (FDM), Air Traffic Services (ATS) communication and Radar recordings to assist in the investigation.

1.12 Wreckage and Impact Information.

1.12.1 Not relevant to the serious incident.

1.13 Medical and Pathological Information.

1.13.1 Not relevant to the serious incident.

1.14 Fire.

1.14.1 Not relevant to the serious incident.

1.15 Survival Aspects.

1.15.1 Not relevant to the serious incident.

1.16 Tests and Research.

1.16.1 Not relevant to the serious incident.

1.17 Organizational and Management Information.

1.17.1 Aircraft VYU122 was scheduled as international cargo flight and aircraft QTR4Y was scheduled as international passenger flight.

1.17.2 Fly Vaayu (Air Operator):

1.17.2.1 The operator, Fly Vaayu was issued an Air Operating Certificate by the State of Registry and State of Operator, UAE-GCAA on 21st October 2024 with an expiry date of 21st October 2026. The certificate authorized the operator to perform Air cargo operations as specified in the operator's operations specifications, in accordance with the operations manual and UAE GCAA.

1.17.2.2 The operator, Fly Vaayu aircraft bearing registration A6 - MVA was operating under sub - lease agreement with Vaayu FZ LLC.

1.17.2.3 The Operator, Fly Vaayu have implemented Safety Management System (SMS), whereby occurrences are reported to the relevant authorities as and when they occur and they are reviewed, categorized, classified and investigated to identify the need for any gaps, risk assessment and management, remedial action that are required to be taken by the organization.

1.17.3 QATAR Airways (Air Operator):

1.17.3.1 The operator, QATAR Airways Group Q.C.S.C was issued an Air Operating Certificate by the State of Registry and State of Operator, Qatar - CAA on 25th December 2023 and it is valid until suspended or revoked. The certificate authorized the operator to perform commercial air operations as defined in the operations specifications, in accordance with the operations manual, Law No.15 of 2002, as amended and its ensuing Regulations.

1.17.3.2 The operator, QATAR Airways Group Q.C.S.C aircraft bearing registration A7 - AEJ was operating under lease agreement.

1.17.3.3 The Operator, QATAR Airways have implemented Safety Management System (SMS), whereby occurrences are reported to the relevant authorities as and when they occur and they are reviewed, categorized, classified and investigated to identify the need for any gaps, risk assessment and management, remedial action that are required to be taken by the organization.

1.17.4 Directorate General Air Navigation (DGAN):

1.17.4.1 The service provider, DGAN have implemented Safety Management System (SMS) which includes all its ATS units, whereby occurrences are reported to the relevant authorities as and when they occur and they are reviewed, categorized, classified and investigated to identify the need for any gaps, risk assessment and management remedial action that are required to be taken by the organization.



1.18. Additional Information

1.18.1 Fly Vaayu: A318/A319/A320/A321 Flight Crew Operating Manual, Procedures, Normal Procedures, STANDARD CALLOUTS:

 A318/A319/A320/A321 FLIGHT CREW OPERATING MANUAL	PROCEDURES NORMAL PROCEDURES STANDARD CALLOUTS
COMMUNICATIONS AND STANDARD TERMS	
Ident.: PRO-NOR-SCO-00011900.0001001 / 13 AUG 10 Applicable to: ALL	
Standard phraseology is essential to ensure effective crew communication. The phraseology should be concise and exact. The following Chapter lists the callouts that should be used as standard. They supplement the callouts identified in the SOP. These standard Airbus callouts are also designed to promote situational awareness, and to ensure crew understanding of systems and their use in line operation.	
CHECKLIST CALLOUTS	
Ident.: PRO-NOR-SCO-00011901.0001001 / 20 DEC 10 Applicable to: ALL	
- "CHECK": A command for the other pilot to check an item. - "CHECKED": A response that an item has been checked. - "CROSSCHECKED": A callout verifying information from both pilot stations. If a checklist needs to be interrupted, announce: "HOLD CHECKLIST AT_" and "RESUME CHECKLIST AT_" for the continuation. Upon completion of a checklist announce: "_CHECKLIST COMPLETE".	
ACTIONS COMMANDED BY PF	
Applicable to: ALL Ident.: PRO-NOR-SCO-A-00011902.0001001 / 13 AUG 10	
GENERAL	
The following commands do not necessarily initiate a guidance mode change, eg.: selected to managed/managed to selected. The intent is to ensure clear, consistent, standard communication between crewmembers. All actions performed on the FCU and MCDU must be checked on the PFD and ND (eg.: "FL 350 blue", "FL 200 magenta"). Ensure that the correct FCU knob is used, then verify indications on the PFD/ND.	
Ident.: PRO-NOR-SCO-A-00011904.0001001 / 09 JUN 15	
SET	
The "SET" command means using an FCU knob to set a value, but not to change a mode. SET is accomplished by only rotating the appropriate selection knob.	
VYU A318/A319/A320/A321 FLEET	FCOM

Figure. 11 showing Flight Crew Operating Manual Procedures
(Source: Operator)

VYU A318/A319/A320/A321 FLEET
FCOM A toC →

PRO-NOR-SCO P 1/10
25 NOV 24

Example:

- "SET GO AROUND ALTITUDE_FT"
- "SET HOG_"

Iden!.: PRO-NOR-SCO-A-00011905.0001001/ 20 DEC 10

The "MANAGE" command means pushing an FCU knob to engage, or arm, a managed mode or target.

The "PULL" command means pulling an FCU knob to engage a selected mode or target. Example:

- "PULL HOG 090" (HDGtTRK knob is pulled and turned).
- "MANAGE NAV" (HDGtTRK knob is pushed). (ALT knob is turned and pulled). (ALT knob is turned and pushed).
- "PULL SPEED 250 KNOTS" (SPD/MACH knob is pulled and turned).
- "MANAGE SPEED" (SPD/MACH knob is pushed).

Note: If the value was previously set, there is no requirement to repeat the figure.

Simply call e.g. PULL HOG: PULL SPEED: FL PULL.

The VS/FPA knob has no managed function. The standard callouts for the use of this knob are as follows:

V/S Plus (or Minus) 700 PULL, or

FPA Minus 3 ° PULL PUSH TO LEVEL OFF

(V/S/FPA knob is turned and pulled) (V/S/FPA knob is pushed)

Figure. 12 (cont.) showing Flight Crew Operating Manual Procedures
(Source: Operator: Fly Vaayu)



1.18.2 Fly Vaayu: Operations Manual – Part A – Revision Date: 20 April 2024, Chapter 8.3, para 6.4 (procedures) OPERATING PROCEDURES “FLIGHT PROCEDURES”, Page 71:



FLY VAAYU

"OPERATIONS MANUAL – PART A"

Issue: 01

Issue Date: 20 APR 2024

Revision: 00

Revision Date: 20 APR 2024

CHAPTER 8.3 – OPERATING PROCEDURES

"FLIGHT PROCEDURES"

PAGE : 71

8.3.6.3 Policy

- Pilots are expected to operate TCAS while in-flight in all airspace, including oceanic.
- TCAS shall be operated in the TA/RA mode. A commander may, however, operate TCAS in the TA ONLY mode during takeoff and final approach to closely spaced parallel runways, in order to avoid nuisance resolution advisories.
- In order to maintain vigilance for conflicting visual traffic, flight crew is expected to include outside view into their scan throughout the flight.
- TCAS advisories shall be responded to immediately, in accordance with the procedures prescribed in sub-paragraph 8.3.6.4.

8.3.6.4 Procedures

Condition	Pilot Flying (PF)	Pilot Monitoring (PM)
Traffic Advisory "TRAFFIC, TRAFFIC"	Automatic flight: Attempt to sight traffic visually Manual flight: Fly the airplane	Attempt to sight traffic visually
Resolution Advisory ① ②	- Push autopilot disengage button - Respond to RA immediately	- Attempt to sight traffic visually - Monitor PF actions - Inform ATC
"CLEAR OF CONFLICT"	Return to ATC clearance	- Monitor PF actions - Inform ATC

① Corrective Resolution Advisories

PF shall respond immediately to satisfy corrective Resolution Advisories, using positive control inputs, in the direction and with the magnitude TCAS advises.

For TCAS to function properly, initial vertical speed response is expected within five seconds of a Resolution Advisory with manoeuvring G forces similar to those felt when responding to an ATC clearance to climb or descent "immediately", approximately 0.25 G change in load factor.

② Aural increase or reversal Resolution Advisories

Initial vertical speed response to an increase or reversal Resolution Advisory is expected by TCAS within two and a half seconds of issuance of the advisory.

Use a manoeuvre force of approximately 0.35 G change in load factor.

Note:

- GO AROUND procedure must be performed when an RA "CLIMB" or "INCREASE CLIMB" is triggered on final approach
- Resolution Advisories (RA) are inhibited below 900 ft.
- When "CLEAR OF CONFLICT" is announced: Inform ATC and Adhere to the provided instructions.

Figure. 13 showing Flight Crew Operating Manual Procedures
(Source: Operator)

1.18.3 The following information was extracted from MUSCAT APP MATSOP-SOURCE (DGAN):

1.18.3.1 Communications Technique & Standard Phraseology:

1.18.3.1.1 Standard Phraseology

The need for clear and unambiguous communication between pilots and Air Traffic Control (ATC) is vital in assisting the safe and expeditious operation of aircraft. It is important, therefore, that due regard is given to the use of standard words and phrases and that all involved ensure that they maintain the highest professional standards when using RTF. This is especially important when operating within busy sectors with congested frequencies where any time wasted with verbosity and non-standard, ambiguous phrases could lead to flight safety incidents.

1.18.4 ACC MATSOP- MISCELLANEOUS OPERATING INSTRUCTIONS

1.18.4.1 Procedures in regard to aircraft equipped with airborne collision avoidance systems (ACAS)

1.18.4.2 According to the PANS-ATM, after receiving a report of an RA, the ATCO shall not attempt to modify the aircraft flight path until the pilot reports “clear of conflict”.

1.18.4.3 Once an aircraft departs from its ATC clearance or instruction in compliance with an RA, or a pilot reports an RA, the ATCO ceases to be responsible for providing separation between that aircraft and any other aircraft affected as a direct consequence of the manoeuvre induced by the RA. The ATCO shall resume responsibility for providing separation for all the affected aircraft when he acknowledges:

- a. A report from the flight crew that the aircraft has resumed the current clearance; or
- b. A report from the flight crew that the aircraft is resuming the current clearance and issues an alternative clearance which is acknowledged by the flight crew.

1.18.4.4 The phraseology regarding ACAS RAs is as follows:

- a. After a flight crew starts to deviate from any ATC clearance or instruction to comply with an ACAS resolution advisory (RA):

- Pilot: TCAS RA
- Controller: ROGER

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS:

2.1 General (Organization):

2.1.1 The two aircraft involved in a serious incident are owned Fly Vaayu and QATAR Airways and both operators were properly licensed by their respective Civil Aviation Authorities (CAA) at the time of the serious incident. Both operators have TCAS procedures in place and were executed efficiently following the TCAS alert, however Fly Vayuu flight crew of VYU122 did not report TCAS RA to the ATCO as required by the Company TCAS RA procedures in the Fly Vaayu: Operations Manual shown in para (1.18.2) above, which states when “Clear of Conflict” the PM to “Inform ATC”

2.1.2 There were no anomalies identified with the safety culture of reporting occurrences by both airlines. OTSB investigation team concluded that the organizational factor of Fly Vaayu and QATAR Airways was not a factor into this serious incident.

2.2 Flight operations:

2.2.1 Flight Crew:

2.2.1.1 The flight crew of both VYU122 and QTR4Y were properly licensed to operate the aircraft and their medical records didn’t show any significant limitations. At the time of the incident, both flight crew medical certificates were valid for the flights conducted. No issues were observed regarding the rest period of both flight crews. The flight crew were well rested prior to conducting the operation of the incident flight.

2.2.2 Operational procedures:

2.2.2.1 The flight crew of QTR4Y followed established procedures when they received TCAS RA warning, there was no deviation from laid down procedures for reacting on TCAS RA. The flight crew of VYU122 also followed the established procedures however they did not report TCAS RA as required by Fly Vaayu: Operations Manual, which requires the PM to inform the ATC when the flight crew experience TCAS RA and when they are clear of conflict.

2.2.2.2 The PM of VYU122 stated that the FMA call out by the PF was not heard, it is likely due to the PM was preoccupied with paperwork. The PF initiated the climb without confirming with the PM, neither the PM challenged the climb which resulted in loss of separation as they were not cleared by the ATCO. OTSB investigation team concluded that inadequate Crew Resource Management (CRM) was a factor to the serious incident.

2.2.3 Weather:

2.2.3.1 The flight crews of VYU122 and QTR4Y did not observe any cloud on the weather radar system, and or any deviation from flight plan. Weather was considered to be fine at the time of the serious incident and none of the flight crew reported severe weather or challenges with en-route weather, as a result, the OTSB investigation team concluded that weather was not a factor into the serious incident.

2.2.4 Air Traffic Control:

2.2.4.1 The ATCO held a valid license with Class 3 valid medical certificate at the time of the serious incident. ATCO provided pertinent information to the flight crew in relation to the flight and the track. The ATCO exercised the privileges of the ATCO's license as required by CAR.ATCO.A.015 which states that, "the exercise of the privileges granted by a license shall be dependent on the validity of the license, ratings, endorsements including English Language Proficiency (ELP) and the medical certificate".

2.2.4.2 The communication between the ATCO and the flight crew of VYU122 demonstrates a breakdown in phraseology and interpretation. The ATCO's query, "Are you able to climb 360?", was intended to confirm the flight crew's capability to climb to FL360. However, the wording closely resembled a clearance, particularly when followed by the repeated phrase "360".

2.2.4.3 The flight crew, after seeking clarification with "Say again level", interpreted the ATCO's subsequent response of "360" as an instruction to climb. Their readback "Affirm VYU122" reflected acceptance of what they believed was a clearance rather than a query. The absence of standard phraseology, such as explicitly using the term "confirm able" or "are you able to accept", contributed to the ambiguity.

2.2.4.4 This misinterpretation led to flight crew of VYU122 initiating a climb without an actual clearance, resulting in a level bust and subsequent loss of separation with aircraft QTR4Y. The occurrence highlights the critical importance of precise and standardized radiotelephony phraseology to avoid ambiguity and ensure that both ATCO and flight crews share the same understanding of intentions and clearances.

2.2.4.5 At the time 16:47:27, the flight crew of QTR4Y reported "QTR4Y TCAS RA" as per laid down procedures but the controller did not acknowledge the TCAS RA that was reported by QTR4Y.



2.2.4.6 As per the FDA, the aircraft VYU122 left FL340 at the time 16:46:53, however, according to the RDR display, at the time 16:46:54 the aircraft VYU122 was observed with Red LB maintaining FL340. In the RDR display it was observed climbing at 16:47:06. At time 16:47:08 the ATCO instructed the flight crew of VYU122 to maintain FL340, which was 2 seconds after it was observed climbing. The FDA and RDR time difference of the aircraft VYU122 leaving FL340 could be explained as a result of the RDR rotating with approximately time lag of 5-12 seconds.

2.2.4.7 The ATCO reported that aircraft VYU122, an Airbus A320, checked in via waypoint RASKI on airway L301, maintaining flight level FL340 and exiting at waypoint MENSAN. At the same time, aircraft CHZ1256, also maintaining FL340 and exiting MENSAN, checked in via waypoint PARAR, creating a potential conflict with VYU122. Simultaneously, aircraft SVA759, a Boeing 777-300ER, was at FL320 and traveling faster than aircraft VYU122. Aircraft SVA759 was following aircraft VYU122 via WPT RASKI, exiting at WPT LUDID and continuing along airway N881. Aircraft SVA759 was not in conflict with VYU122.

2.2.4.8 The ATCO had planned to instruct the flight crew of VYU122 to climb to FL360 once it was deemed safe. However, before the ATCO could issue the clearance, aircraft VYU122 began climbing without clearance. Although the ATCO did not issue a climb clearance, it was later determined that a descent to FL320 would have been a more suitable option for aircraft VYU122. Nevertheless, OTSB concluded that this was not a contributing factor to the serious incident, as the ATCO had not issued a climb instruction to aircraft VYU122. The occurrence took place while the ATCO was still evaluating the situation before deciding whether to clear aircraft VYU122 to FL360.

2.2.4.9 At the time of the serious incident, ATCO was managing two sectors Alpha and Bravo combined with a total of approximately 25 aircraft. According to the ATCO, the workload was moderate and manageable. A review of the duty roster for March 2025, including the day of the serious incident, showed that the ATCO had received adequate rest. Additionally, a planner/coordinator was scheduled on the day of the serious incident to provide assistance if needed.

2.2.4.10 The OTSB investigation team also reviewed DGAN's HDI 018-23-OPS Air Traffic Flow Measures. According to this document, the established sector capacity is 24 aircraft for Alpha sector (ATCO with a coordinator), 25 aircraft for Bravo sector (ATCO with a coordinator), and approximately 24 aircraft when both sectors are combined. Based on this information, the OTSB investigation team concluded that the number of aircraft that can safely be handled by single ATCO was exceeded by one aircraft, although sector capacity was exceeded, the ATCO did not issue an instruction to climb to aircraft VYU122, which indicates that the ATCO did not actively contribute to the serious incident. OTSB concludes that the workload or sector capacity breach was therefore not a causal factor in this particular serious incident.

2.2.5 Communications:

2.2.5.1 The Radar and Communication Radiotelephony were in normal and serviceable operation. Although radiotelephony communications were serviceable, during the audio playback the flight crew of VYU122 readback was not very clear, however OTSB investigation team was able to establish the flight crew of VYU122 readback. At the time 16:46:35, ATCO called the flight crew of VYU122 if they are able to climb to FL360, by stating "Are you able to climb to FL 360". The flight crew of VYU122 responded "Say again level". ATCO replied "360". Then the flight crew of VYU122 readback by stating "Affirm VYU122".

2.2.5.2 At the time 16:46:49, ATCO should have instructed the flight crew of VYU122 preferably by saying “Maintain FL340, until further advised” or “Maintain FL340, standby for further”; however, ATCO said, “Roger call you back shortly”. At the time 16:46:53, the flight crew of VYU122 acknowledged by saying, “standing by”, therefore OTSB investigation team established that the PM of VYU122 acknowledgment was “standing by” which was understood by the ATCO as the flight crew of VYU122 have understood the ATCO instruction.

2.2.5.3 At the time 16:47:08, ATCO instructed the flight crew of VYU122 to maintain FL340 by stating “VYU122 maintain 340” and the flight crew of VYU122 readback stating “Maintain 340 VYU122” which was 2 seconds after VYU122 initiated the climb as at 16:47:06, aircraft VYU122 observed on the RDR display leaving FL340.

2.2.5.4 During the interview, ATCO stated that aircraft VYU122 was noticed on the radar screen with a red LB, but ATCO did not expect the flight crew of VYU122 to climb as the ATCO first thought it was the Flight Management System (FMS) of the aircraft VYU122 showing a future climb instruction, without execution. But as ATCO continued working on other situations, ATCO observed the flight crew of VYU122 climbing and immediately instructed them to maintain FL340. The ATCO should have not assumed that the altitude set on the aircraft VYU122 FMS was a future climb. ATCO should have and did not instruct the flight crew of VYU122 to maintain FL340. Although the ATCO observed a level burst for aircraft VYU122 on the radar display, no immediate verification was made with the flight crew to maintain FL340. This lack of confirmation contributed to a loss of vertical separation with aircraft QTR4Y, highlighting the importance of prompt altitude verification when radar indications suggest potential deviations.

2.2.5.5 The OTSB investigation team concluded that the communications facilities made available to the flight crew of VYU122 and Air Traffic Service facilities were not a factor to the serious incident.

2.2.6 Aids to navigation

2.2.6.1 The navigational systems onboard both the aircraft was found to be serviceable and operated as required at the time of the serious incident. Therefore, OTSB investigation team determined that the navigational aids were not a factor to the serious incident.

2.2.7 Aerodrome

2.2.7.1 The serious incident happened in cruise, therefore, OTSB investigation team determined that the aerodrome analysis is not applicable to the serious incident.

2.3 Aircraft:

2.3.1 Both aircraft VYU122 and aircraft QTR4Y were issued with valid CoA and CoR. The maintenance records of both aircraft did not reveal any abnormality in the maintenance standard requirements. Both aircraft were certified and maintained in accordance with existing regulations and approved procedures. There were no pre-existing defects or conditions that contributed to the serious incident. The OTSB investigation team concluded that both aircraft maintenance and serviceability was not considered a factor to this serious incident.

2.4 Human Factors:

- 2.4.1 The serious incident of loss of radar separation involving aircraft VYU122 and aircraft QTR4Y was influenced by several human factors affecting both the flight crew of VYU122 and the ATCO.
- 2.4.2 On the flight crew of VYU122 side, miscommunication and misinterpretation occurred when the PF interpreted the ATCO's query ("Are you able to climb FL360?") as a clearance to climb. This misunderstanding was compounded by the PM's divided attention being occupied with ATC communication and paperwork resulting in a missed FMA callout and a lack of cross-checking between flight crew members. The PM distraction and inadequate crew resource management further degraded situational awareness, leading to the unauthorized climb.
- 2.4.3 On the ATCO's side, although the Level Bust (LB) alert appeared on the radar, the ATCO delayed response, assuming it was a future FMS instruction rather than an actual climb. The delayed response and non-standard or ambiguous phraseology contributed to the loss of separation.
- 2.4.4 OTSB investigation team concluded that the event resulted from human performance limitations, including communication breakdown, assumptive reasoning, task distraction, and ineffective flight crew's coordination, leading to a loss of radar separation between aircraft VYU122 and aircraft QTR4Y.

2.5 Survivability

- 2.5.1 The OTSB investigation team concluded that the serious incident was survivable due to the fact that both aircraft were installed with TCAS system, as such the TCAS system was triggered in both aircraft VYU122 and aircraft QTR4Y and appropriate response actions were taken by both aircraft flight crews to avoid collision with each other.

3. CONCLUSION

3.1 General

From the available evidences, the following findings, causes and contributing factors are made with respect to this serious incident. These shall not be read as apportioning blame or liability to any organization or individual.

To serve the objective of this investigation, the following sections are included in the conclusion heading:

- **Findings** — are statements of all significant conditions, events, or circumstances in this incident. The findings are significant steps in this incident sequence, but they are not always causal or indicate deficiencies.

3.2 Findings

- 3.2.1 The flight crew of VYU122 were properly licensed to conduct the flight. Their licenses were valid and issued by the United Arab Emirates UAE GCAA.

- 3.2.2 The flight crew of QTR4Y were properly licensed to conduct the flight. Their licenses were valid and issued by the State of Qatar CAA.
- 3.2.3 The aircraft VYU122 was properly registered and issued with Certificate of Airworthiness by GCAA-UAE and was valid at the time of the serious incident.
- 3.2.4 The aircraft QTR4Y was properly registered and issued with Certificate of Airworthiness by Qatar CAA and was valid at the time of the serious incident.
- 3.2.5 The ATCO was issued with Air Traffic Controller license to conduct ATS responsibilities by Sultanate of Oman CAA and was valid at the time of the serious incident.
- 3.2.6 There was no evidence that incapacitation or physiological factors affected the flight crews of both aircraft VYU122 and aircraft QTR4Y and ATCOs performance.
- 3.2.7 Aircraft VYU122 entered MCT FIR over RASKI maintaining FL340 while aircraft QTR4Y was flying on the same AWY L301 bidirectional route (in the opposite direction) and maintaining FL350 to RASKI.
- 3.2.8 The ATCO used nonstandard or ambiguous phraseology when communicating with the flight crew of VYU122.
- 3.2.9 The ATCO did not confirm with the flight crew of VYU122 to maintain FL340 when the LB was activated.
- 3.2.10 As soon as the ATCO observed the flight crew of VYU122 climbing, the ATCO immediately instructed the flight crew of VYU122 to maintain FL340.
- 3.2.11 The PF of VYU122 misinterpreted the ATCO's query and initiated the climb without the actual clearance.
- 3.2.12 The PM of VYU122 was distracted and missed the PF FMA call out for the climb.
- 3.2.13 The STCA triggered a RED warning between aircraft VYU122 on climb passing through FL343, ROC 900FPM and aircraft QTR4Y maintaining FL350 with a separation distance of 4.66 NM closing between the two aircraft.
- 3.2.14 The flight crew of QTR4Y reported "QTR4Y TCAS RA" but the ATCO did not acknowledge.
- 3.2.15 The flight crew of VYU122 did not report TCAS RA as required by the company procedures.
- 3.2.16 At the time of the serious incident, the number of aircraft under the ATCO responsibility was one aircraft above the established sector capacity for a combined Alpha-Bravo sector.
- 3.2.17 The workload or sector capacity exceedance was not a contributory factor in this particular serious incident.

3.3 Cause

- 3.3.1 The OTSB investigation team concluded that the loss of separation between aircraft VYU122 and aircraft QTR4Y occurred as a result of aircraft VYU122 misinterpreting the ATCO's query "Are you able to climb 360" as an instruction to climb from FL340 to FL360, while there was another aircraft QTR4Y in the opposite direction maintaining FL350.

3.4 Contributing Factors

- 3.4.1 Ineffective Crew Resource Management (CRM) between flight crew of VYU122.
- 3.4.2 Lack of corrective action by the ATCO following the LB warning.
- 3.4.3 The non-standard or ambiguous phraseology used by the ATCO.

4 SAFETY RECOMMENDATIONS

4.1 General

The safety recommendations are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation Organization and are based on the conclusions listed in paragraph 3 of this report. The OTSB expects that all safety issues identified by the investigation team are addressed to the concerned States and Organizations/entities

4.2 Safety Recommendations and Safety Actions:

4.2.1 Operator Fly Vaayu:

4.2.1.1 Following the serious incident, the operator Fly Vaayu took the following safety actions:

4.2.1.1.1 Conducted flight crew individual and joint briefing focused on the following areas

- 4.2.1.1.1.1 Scenario of the events that led to TCAS RA serious Incident.
- 4.2.1.1.1.2 Adherence to cockpit discipline standards.
- 4.2.1.1.1.3 Recognition and mitigation of distractions.
- 4.2.1.1.1.4 Enhanced of Situational Awareness.
- 4.2.1.1.1.5 Application of Crew Resource Management (CRM) principles.
- 4.2.1.1.1.6 Task sharing especially relating to communication.

4.2.1.1.1.2 The Operator Fly Vaayu has conducted crew briefing and simulator corrective training. The briefing focused on following:

- 4.2.1.1.1.2.1 MEMORY ITEM-TCAS TA and RA.
- 4.2.1.1.1.2.2 AIRBUS Task Sharing and crew coordination.
- 4.2.1.1.1.2.3 Radio Communication procedures.

4.2.1.1.1.3 The simulator corrective training was conducted satisfactory and included the following areas:

- 4.2.1.1.1.3.1 Situational Awareness
- 4.2.1.1.1.3.2 TCAS TA and RA.
- 4.2.1.1.1.3.3 Hand over and take over techniques.
- 4.2.1.1.1.3.4 Task sharing and crew coordination.
- 4.2.1.1.1.3.5 Communications.

4.2.2 Sultanate of Oman Civil Aviation Authority, Directorate General Air Navigation (DGAN):

4.2.2.1 OTSB recommends that DGAN issues a safety notice to ATCOs regarding phraseology guidance: discourage use of ambiguous phrases such as "Call you back shortly" when the aircraft is at level and potential climbs could affect separation. Where possible, use explicit phrasing ("Maintain FL340; I will call you when higher is available").

4.2.2.2 The ATCO did observe on the radar Red LB displayed on VYU122, but the ATCO assumed that the Red LB on the aircraft VYU122 was from the FMS as a future climb and did not confirm with the flight crew of VYU122, OTSB recommends that DGAN to provide mechanism to ATCOs: **treat LB (red label) as actionable** until confirmed otherwise ask for immediate clarification (“Confirm you are climbing?”) rather than assuming FMS plan in order to achieve positive control.

4.2.2.3 OTSB recommends that DGAN establish adherence to sector capacity limits by:

- (a) Ensure that sector capacities are monitored and not exceeded, especially during periods of high traffic. Even a minor exceedance can increase the risk of degraded situational awareness.
- (b) Implement or enhance tools that alert supervisors or air traffic flow managers when sector capacity is being approached or breached, particularly during combined sector operations.

5 APPENDICES

5.1 None.

This report is issued by:

Oman Transport Safety Bureau (OTSB)
Sultanate of Oman