

## FINAL INVESTIGATION REPORT



**SERIOUS INCIDENT (TCAS – RA) BETWEEN PIAC FLIGHT PIA352, A320-214 AIRCRAFT, REG. NO. AP-BLC (OPQT-OPIS) & PIAC FLIGHT PIA785, B777-240(ER) AIRCRAFT, REG. NO. AP-BGK (OPIS-EGLL) ON 18-03-2020**

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## **SCOPE**

At Bureau of Aircraft Safety Investigation, Pakistan investigations are conducted in accordance with Annex-13 to the International Civil Aviation Organization (ICAO) Convention on International Civil Aviation and Civil Aviation Rules 1994 (CARs 94).

The sole objective of the investigation and the final report of an accident or incident under above stated regulations is the prevention of future accidents and incidents of similar nature. It is not the purpose of such an investigation to apportion blame or liability. Accordingly, it is inappropriate to use BASI Pakistan investigation reports to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

This report contains facts, which have been determined up to the time of publication. Such information is published to inform the aviation industry and the public about the general circumstances of civil aviation accidents and incidents.

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## ABBREVIATIONS

<b>AAIB</b>	Aircraft Accident Investigation Board
<b>ACAS</b>	Airborne Collision Avoidance System
<b>AOR</b>	Area Of Responsibility
<b>ATC</b>	Air Traffic Control
<b>ATS</b>	Air Traffic Service
<b>BASI</b>	Bureau of Aircraft Safety Investigation
<b>BEA</b>	Bureau of Enquiry and Analysis
<b>CARs</b>	Civil Aviation Rules
<b>CPA</b>	Closest Point of Approach
<b>EGLL</b>	Heathrow Airport
<b>FL</b>	Flight Level
<b>ft</b>	Feet
<b>h</b>	Hour
<b>hPa</b>	Hectopascals
<b>ICAO</b>	International Civil Aviation Organization
<b>IOU</b>	Incident Occurrence and Unserviceability Report
<b>kts</b>	Knots
<b>MAC</b>	Mid-Air Collision
<b>METAR</b>	Metrological Aerodrome Report
<b>NM</b>	Nautical Mile
<b>NTSB</b>	National Transportation Safety Board
<b>OPIS</b>	Islamabad International Airport
<b>OPQT</b>	Quetta International Airport
<b>PCAA</b>	Pakistan Civil Aviation Authority
<b>RA</b>	Resolution Advisory
<b>ROC</b>	Rate of Climb
<b>ROD</b>	Rate of Descent
<b>s</b>	Seconds
<b>SDD</b>	Situation Data Display
<b>SL</b>	Sensitivity Level
<b>SLs</b>	Sensitivity Levels
<b>STCA</b>	Short Term Conflict Alert
<b>TA</b>	Traffic Advisory
<b>TA</b>	Traffic Advisory
<b>TCAS</b>	Traffic Collision and Avoidance System
<b>UK</b>	United Kingdom
<b>UTC</b>	Universal Time Coordinated

## **INTRODUCTION**

The serious incident was reported to Bureau of Aircraft Safety Investigation (BASI), Pakistan previously known as Aircraft Accident Investigation Board (AAIB), Pakistan, by Pakistan Civil Aviation Authority (PCAA) vide Incident Occurrence and Unserviceability Report (IOU)<sup>1</sup>. Ministry of Aviation, Government of Pakistan issued Memorandum and Corrigendum<sup>2</sup> issued by BASI, Pakistan to investigate the serious incident. This serious incident was notified<sup>3</sup> to ICAO, National Transportation Safety Board (NTSB), United States of America (USA) and Bureau of Enquiry and Analysis (BEA), France in line with ICAO Annex-13. The investigation has been conducted by BASI, Pakistan.

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<sup>1</sup> PCAA IOU Report dated 19<sup>th</sup> March, 2020

<sup>2</sup> Ministry of Aviation Memorandum No. HQCAA/1904/40-141/AAIB/165 dated 20<sup>th</sup> March, 2020 & BASI Corrigendum No. BASI/1902/006/TCAS/Inv/

<sup>3</sup> ICAO Initial Notification dated 06<sup>th</sup> December, 2021

## SYNOPSIS

On 18<sup>th</sup> March, 2020, Pakistan International Airlines (PIA) flight PIA785 B777-240(ER) aircraft Reg. No. AP-BGK was a scheduled passenger flight from Islamabad International Airport (OPIS), Islamabad, Pakistan to Heathrow Airport (EGLL), London, United Kingdom (UK) on Air Traffic Service (ATS) route via ISLAMABAD – KALMI – HANGU – LAJAK climbing FL340. Simultaneously, the reciprocal PIA flight PIA352, A320-214 aircraft Reg. No. AP-BLC was also a scheduled passenger flight operating from Quetta International Airport (OPQT), Quetta, Pakistan to OPIS, Islamabad, Pakistan on ATS route HANGU – J139 – KALMI – ISLAMABAD and was descending to FL150.

Both aircraft encountered Traffic Collision Avoidance System (TCAS) – Resolution Advisory (RA) approximately 55 Nautical Mile (NM) West of Islamabad within Cherat Approach South Area of Responsibility (AOR) and maintaining their frequency.

At the time of incident, there was 900 feet (ft) vertical and 6.6 NM lateral separation between the two aircraft. Pilots of both aircraft followed the TCAS-RA and resolved the situation as per Resolution Advisory protocols. Later, both aircraft continued to their destination without further incident.

The incident was observed by Islamabad Approach Controller on his Situation Data Display (SDD). All corresponding timings are mentioned in Universal Time Coordinated (UTC).

## **SECTION 1 - FACTUAL INFORMATION**

### 1.1. History of the Flight

1.1.1. On 18<sup>th</sup> March, 2020 PIA flight PIA785, Boeing 777-240(ER) aircraft Reg. No. AP-BGK was a scheduled passenger flight which operated from OPIS, Islamabad, Pakistan to EGLL, London, UK on ATS route ISLAMABAD – KALMI – HANGU – LAJAK climbing FL340.

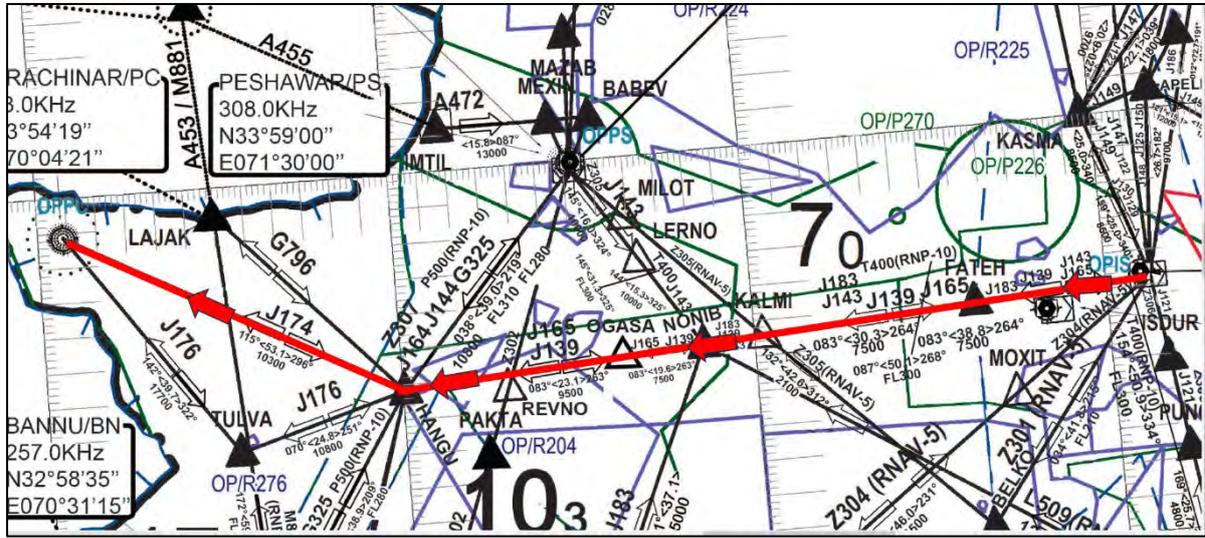


Figure 1 Route Plan PIA785

1.1.2. PIA flight PIA352, Airbus 320-214 aircraft Reg. No. AP-BLC was also a scheduled passenger flight operating from OPQT, Quetta, Pakistan to OPIS, Islamabad, Pakistan on ATS route HANGU – J139 – KALMI – ISLAMABAD and was descending to FL150.

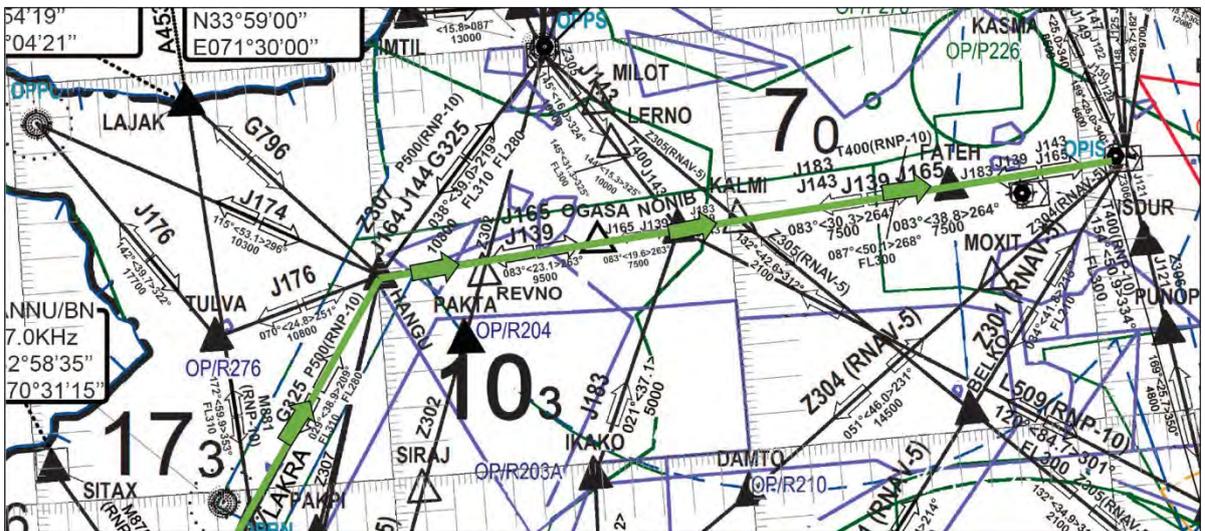


Figure 2 Route Plan PIA352

1.1.3. Both aircraft encountered TCAS-RA approximately 55 NM West of Islamabad within Cherat Approach South AOR and maintaining Cherat frequency.

1.1.4. At 08:30:55 hours (h), PIA785 came in contact with Cherat Approach South climbing out of 8,500 ft for FL160. After identification with Cherat Approach, PIA785 was given further climb to FL280.

1.1.5. At 08:32:45 h, on query by Cherat Approach, PIA785 informed its final flight level is FL340 which was then cleared to FL340.

1.1.6. Cherat Controller inquired PIA785 if it is able to climb FL340 before LAJAK then proceed direct to position LAJAK. Pilot of PIA785 replied that he would like to follow the flight plan route to reach FL340 before LAJAK, which was approved by Cherat Approach.

1.1.7. At 08:35:23 h, Cherat Approach cleared PIA352 direct to position ISBAX, when it was crossing FL220 for FL150 and passed the traffic information of PIA785, which was at 18 NM on reciprocal track climbing out of FL190 for FL340. Traffic information was acknowledged by PIA352 but no flight level restrictions were imposed on both the aircraft.

1.1.8. At 08:36:00 h, Cherat gave PIA352 further right heading 180°.

1.1.9. At 08:36:30 h, PIA785 was given right heading 330°.

1.1.10. At time 08:36:27, TCAS-RA alert on both aircraft was activated.



Figure 3 Activation of TCAS – RA

1.1.11. At 08:36:50 h, PIA352 and PIA785 reported TCAS-RA.

1.1.12. Pilots of both the aircraft followed the TCAS-RA and resolved the situation as per Resolution Advisory protocols.

1.1.13. PIA352 reported maintaining Rate of Descent (ROD) 800 ft while PIA785 reported maintaining Rate of Climb (ROC) 900 ft at the time of RA.

1.1.14. As per radar screenshot PIA352 was maintaining ROD 900 ft whereas PIA785 was maintaining ROC 1,500 ft<sup>4</sup>.

1.1.15. At 08:37:50 h, the incident resolved with both aircraft clearing the conflict and resuming their respective routes.

1.1.16. At the time of incident, 900 ft vertical and 6.6 NM lateral separation existed between the two aircraft (as per radar screenshot).

<sup>4</sup> Refer Figure 3

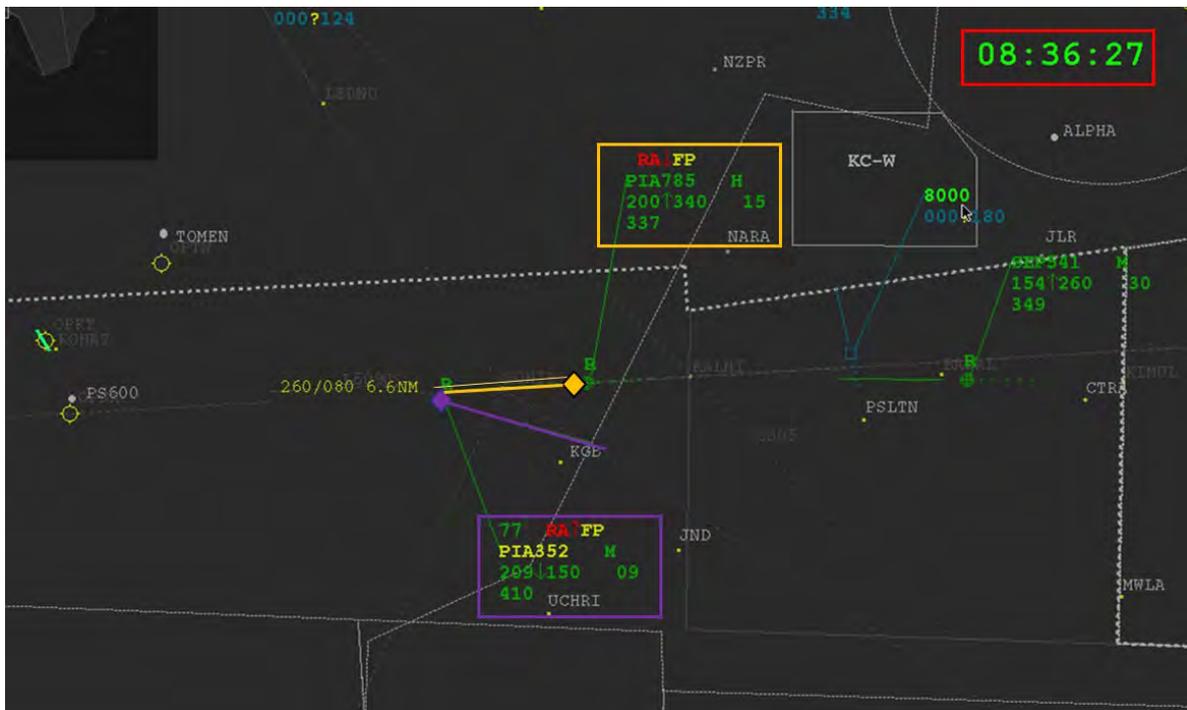


Figure 4 Minimum Vertical Separation

1.1.17. The incident was observed by Islamabad Approach Controller on his SDD.

**1.2. Injuries to Person(s)**

1.2.1. No injury was reported to any person on board the aircraft.

**1.3. Damage to Aircraft**

1.3.1. No damage was reported due to this incident to any of the aircraft.

**1.4. Other Damage**

1.4.1. Not Applicable.

**1.5. Personnel Information**

1.5.1. Not Applicable.

**1.6. Aircraft Information**

PIA785	
Aircraft Make & Model	Boeing 777-240(ER)
Registration Marking	AP-BGK
Manufacturer Serial No.	33776
Operator	Pakistan International Airlines
Sector	OPIS – EGLL

Table 1 Aircraft # 1 Information

PIA352	
Aircraft Make & Model	Airbus 320-214
Registration Marking	AP-BLC
Manufacturer Serial No.	2212
Operator	Pakistan International Airlines
Sector	OPQT - OPIS

Table 2 Aircraft # 2 Information

### 1.7. Meteorological Information

1.7.1. No significant weather was reported at OPIS, Islamabad at the time of the incident.

Meteorological Aerodrome Report (METAR) OPIS, Islamabad
OPIS 180825Z 27008KT 6000 FEW040 26/12 Q1015 NOSIG

Table 3 METAR details OPIS, Islamabad

METAR OPIS, Islamabad	
180825Z	<b>(Date &amp; Time)</b> Date 18, Time: 0825 UTC
27008KT	<b>Wind Direction &amp; Speed-</b> Wind Direction: 270°, Speed: 08 knots (kts)
6000	<b>Visibility-</b> 6,000 meters (m).
FEW040	<b>Clouds-</b> Few at 4,000ft
26/12	<b>Temperature:</b> 26°C, <b>Dewpoint:</b> 12°C
Q1015	<b>Altimeter setting-</b> Air pressure 1015 Hectopascals (hPa)
NOSIG	<b>No significant change</b> is expected to the reported conditions

Table 4 METAR description at time 0825 UTC

## 1.8. Aids to Navigation

1.8.1. Navigational aids for OPIS, Islamabad are provided below: -

TYPE OF AID	ID	Frequency	Hours of operation	Site of transmitting antenna coordinates	Elevation of DME transmitting antenna	Remarks
1	2	3	4	5	6	7
ILS/LOC CAT I 28R	IBIP	110.7 MHz	H24	333312.69N 0724812.32E	530.960000 M	-
ILS/LOC CAT III 28L	IBBA	103.1 MHz	H24	333306.01N 0724810.82E	535.390000 M	-
ILS/LOC CAT I 10R	IBAP	111.3 MHz	H24	333240.69N 0725052.37E	535.920000 M	-
DVOR/DME (2/2017)	BTR	114.6 MHz CH93X	H24	333239.54N 0725121.84E	535.11M	Coverage 200 NM
GP/TDME 10R	DOTS/DASHES	332.3 MHz CH50X	H24	333306.34N 0724834.23E	545.95M	-
GP/TDME 28R	DOTS/DASHES	330.2 MHz CH44X	H24	333254.84N 0725031.54E	549.50M	-
GP/TDME 28L	DOTS/DASHES	334.7 MHz CH18X	H24	333240.29N 0725029.68E	546.89M	-

Table 5 Radio Navigation & Landing Aids OPIS, Islamabad

1.8.2. There was no abnormality reported regarding Navigational Aids at OPIS, Islamabad during the time of incident.

## 1.9. Communications

1.9.1. Communication frequencies for OPIS, Islamabad are provided below: -

Bureau of Aircraft Safety Investigation Pakistan

Name Lateral limits Vertical limits Class of airspace	Unit providing service	Callsign/ Language Area and conditions of use Hours of service	Frequency/ purpose	Remarks
1	2	3	4	5
<p align="center"><b>CHERAT NORTH APPROACH</b></p> <p><i>Area bounded by lines joining points 334300N/0710259E then along the clockwise arc of a circle of 59.99NM radius centred on 335300N/0721358E to 340259N/0732506E; 340303N/0731013E; 335816N/0725200E; 334500N/0725100E; 334500N/0723609E; 334017N/0723613E; 333858N/0722459E; 333752N/0720130E; 333427N/0705640E to point of origin.</i></p> <p align="center"><u>UNL</u> GND</p> <p align="center">Class of Airspace:C Except on ATS Routes</p>	Cherat North Approach	Cherat North (English) H24	121.2 MHZ Secondary FREQ. 125.6 MHZ Primary FREQ.	
<p align="center"><b>CHERAT SOUTH APPROACH</b></p> <p><i>Area bounded by lines joining points 333427N/0705640E; 325800N/0702959E; 325300N/0703959E; 333000N/0710659E then along the counter clockwise arc of a circle of 60.21NM radius centred on 335300N/0721358E to 325741N/0714555E; 323814N/0714513E; 323731N/0722314E; 325328N/0722350E; 325529N/0723447E; 325510N/0725151E; 324259N/0731101E; 330416N/0730026E; 330840N/0725044E; 330842N/0724743E; 331816N/0724727E; 332030N/0723756E; 332049N/0722459E; 333858N/0722459E; 333752N/0720130E to point of origin.</i></p> <p align="center"><u>UNL</u> GND</p> <p align="center">Class of Airspace:C Except on ATS Routes</p>	Cherat South Approach	Cherat South (English) H24	126.25 MHZ Secondary FREQ. 127.35 MHZ Primary FREQ	Excluding Islamabad TMA West.
<p align="center"><b>ISLAMABAD TMA South</b></p> <p><i>Area bounded by lines joining points 331034N/0725040E; 330840N/0725044E; 330416N/0730026E; 324259N/0731101E; 324642N/0732151E; 331143N/0731742E to point of origin.</i></p> <p align="center"><u>FL205</u> 6500FT AMSL</p> <p align="center">Class A above FL 150 Class C at or below FL 150</p>	Islamabad APP	Islamabad APP (English) H24	121.5 MHZ Emergency FREQ 121.65 MHZ Primary FREQ 124.65 MHZ Secondary FREQ.	
<p align="center"><b>ISLAMABAD TMA West</b></p> <p><i>Area bounded by lines joining points 333556N/0720130E; 332120N/0720128E; 332049N/0722459E; 333858N/0722459E to point of origin.</i></p> <p align="center"><u>FL175</u> 9500FT AMSL</p> <p align="center">Class A at or above FL 150 Class C at or below FL 150</p>	Islamabad APP	Islamabad APP (English) H24	121.5 MHZ Emergency FREQ 121.65 MHZ Primary FREQ 124.65 MHZ Secondary FREQ.	

Table 6 Communication & Radio Navigational Aids, Cherat & OPIS, Islamabad

Service designation	Call sign	Frequency	Hours of operation	Remarks
1	2	3	4	5
Aerodrome Control Service	Islamabad Ground	124.350 MHZ	H24	Fire
Aerodrome Control Service	Islamabad Departure	118.550 MHZ	H24	Clearance Delivery
Aerodrome Control Service	GMC (N)	125.150 MHZ	H24	Secondary
Emergency Service	Islamabad	121.500 MHZ	H24	Function Emergency
Approach Control Service	Islamabad APP	124.650 MHZ	H24	Secondary
Military Frequency	Islamabad APP	241.200 MHZ	HX	Secondary
Aerodrome Control Service	GMC (N)	123.050 MHZ	H24	Primary
Aerodrome Control Service	Islamabad Tower	122.150 MHZ	H24	Primary
Approach Control Service	Islamabad APP	121.650 MHZ	H24	Primary
Aerodrome Control Service	Islamabad Ground	122.950 MHZ	H24	Secondary
Aerodrome Control Service	Islamabad Departure	119.650 MHZ	H24	Departure Frequency
Aerodrome Control Service	Islamabad Tower	123.225 MHZ	H24	Secondary
Military Frequency	Islamabad APP	240.500 MHZ	HX	Primary
Aerodrome Control Service	Islamabad Ground	121.850 MHZ	H24	Vehicle / Follow-Me
Aerodrome Control Service	Islamabad Ground	130.600 MHZ	H24	Primary
D-ATIS	D-ATIS	126.200 MHZ	H24	Weather Broadcast Service

Table 7 Communication & Radio Navigational Aids, OPIS, Islamabad

1.9.2. There was no abnormality reported regarding Communication facilities at OPIS, Islamabad during the time of incident.

### 1.10. Aerodrome Information

1.10.1. Aerodrome data of OPIS, Islamabad is provided below. At the time of incident, no abnormality was reported.

Designations RWY NR	True bearing	Dimensions of RWY (M)	Strength (PCN) and surface of RWY and SWY	THR coordinates	THR elevation and highest elevation of TDZ of precision APP RWY	Slope of RWY/SWY
1	2	3	4	5	6	7
10R	100.58°	3658 x 60	110/F/C/X/T ASPH Flexible	333304.28N 0724821.81E	THR 528.06 M / 1732.49 FT	0.12% UP
28L	280.60°	3658 x 60	110/F/C/X/T ASPH Flexible	333242.42N 0725041.37E	THR 532.53 M / 1747.14 FT	0.12% DOWN
10L	100.58°	3658 x 45	110/F/C/X/T ASPH Flexible	333310.98N 0724823.30E	THR 529.03 M / 1735.67 FT	0.12% UP
28R	280.60°	3658 x 45	110/F/C/X/T ASPH Flexible	333249.12N 0725042.87E	THR 533.41 M / 1750.04 FT	0.12% DOWN

Table 8 Aerodrome Information OPIS, Islamabad

### 1.11. Flight Recorders

1.11.1. Not Applicable.

## 1.12. Wreckage and Impact Information

1.12.1. Not Applicable.

## 1.13. Medical and Pathological Information

1.13.1. Not Applicable.

## 1.14. Fire

1.14.1. Not Applicable.

## 1.15. Survival Aspects

1.15.1. Not Applicable.

## 1.16. Test and Research

1.16.1. Not Applicable.

## 1.17. Organizational and Management Information

1.17.1. Not Applicable.

## 1.18. Additional Information

1.18.1. **TCAS Working Principle** – TCAS stands for Traffic Collision Avoidance System, and its purpose is to minimize the risk of mid-air collisions between aircraft. Working independently from Air Traffic Control, TCAS uses nearby aircraft's transponder signals to alert pilots to the danger of mid-air collisions. It does so by constructing a three-dimensional map of airspace through which the aircraft is travelling. In detecting the other aircraft's transponder signals, it can foresee the potential collisions based on speeds and altitude of planes passing through the airspace in question. If TCAS detects a potential collision, it will automatically notify each of the affected aircraft. In this instance, it will automatically initiate a mutual avoidance manoeuvre. This involves the system informing the crews of the aircraft in question both audibly and visibly to either climb or descend in a manner that ensures that, when their paths cross, they do not meet.

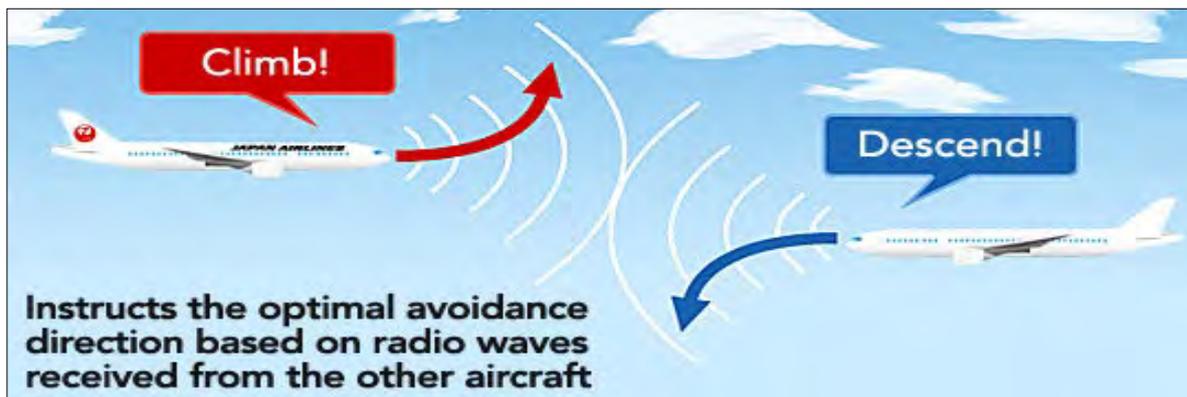


Figure 5 TCAS (TA) alert

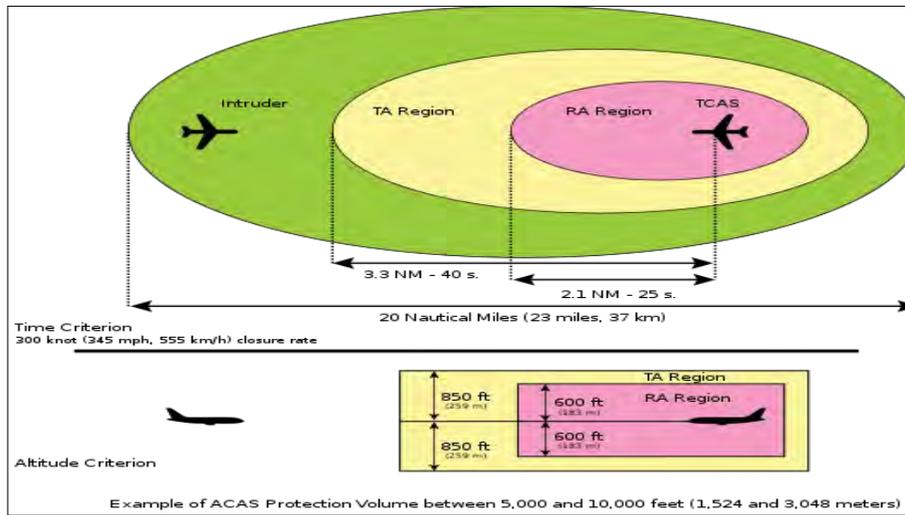


Figure 6 TCAS TA &amp; RA ranges

### 1.18.2. Airborne Collision Avoidance System (ACAS)

1.18.2.1. The objective of ACAS is to provide advice to pilots for the purpose of avoiding potential collisions. This is achieved through Resolution Advisories (RAs), which recommend actions (including manoeuvres), and through Traffic Advisories (TAs), which are intended to prompt visual acquisition and to act as a precursor to RAs.

1.18.2.2. ACAS equipment in the aircraft interrogates Mode 'A' / 'C' and Mode 'S' transponders on aircraft in its vicinity and listens for their replies. By processing these replies, ACAS determines which aircraft represent potential collision threats and provides appropriate display indications (or advisories) to the flight crew to avoid collisions.

1.18.2.3. **Traffic Advisories (TAs)** - TAs alert the flight crew to potential RAs and may indicate the range, range rate, altitude, altitude rate and bearing of the intruding aircraft relative to own aircraft. TAs without altitude information may also be provided on Mode 'C' or Mode 'S' equipped aircraft that have temporarily lost their automatic altitude-reporting capability. The information conveyed in TAs is intended to assist the flight crew in sighting nearby traffic.

1.18.2.4. **Resolution Advisories (RAs)** - If the threat detection logic in the ACAS computer determines that an encounter with a nearby aircraft could soon lead to a near-collision or collision, the computer threat resolution logic determines an appropriate vertical manoeuvre that will ensure the safe vertical separation of the two aircraft. The selected manoeuvres ensure adequate vertical separation within constraints imposed by the climb rate capability and proximity to the ground of the two aircraft.

1.18.2.5. The RAs provided to pilot can be divided into two categories: corrective advisories, which instruct pilot to deviate from the current flight path ("CLIMB" when aircraft is in level flight); and preventive advisories, which advise the pilot to maintain or avoid certain vertical speeds ("DON'T CLIMB" when aircraft is in level flight).

1.18.2.6. **Warning Times** - In any potential collision, ACAS generates an RA nominally 15 to 35 seconds (s) before the Closest Point of Approach (CPA) of the aircraft. The ACAS equipment may generate a TA up to 20 s in advance of an RA. Warning times depend on Sensitivity Levels (SLs) of RAs.

1.18.3. **Traffic Display Symbology** – On the TCAS traffic display both colour and shape are used to assist the pilot in interpreting the displayed information.

1.18.3.1. Own-aircraft is depicted as a white or yellow aircraft-like symbol. Targets are displayed by different symbols, according to their threat status

1.18.3.2. Hollow white diamond – for other traffic. (No threat).

1.18.3.3. Solid white diamond – for proximate traffic.

1.18.3.4. Solid yellow or amber circle – for intruders (i.e., aircraft which trigger a TA).

1.18.3.5. Solid red square – for threats (i.e., aircraft which trigger an RA).

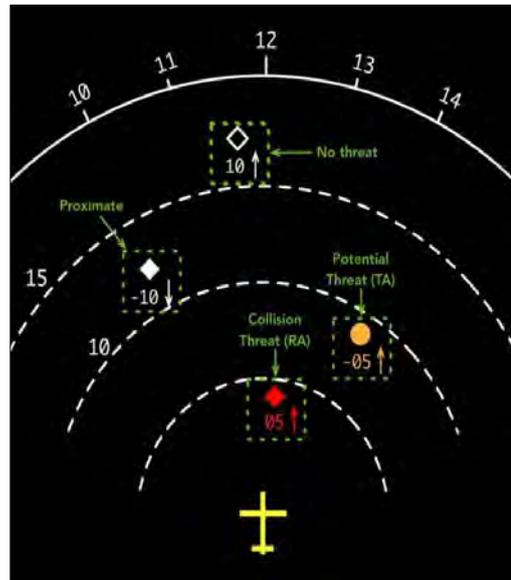


Figure 7 Traffic Display

### 1.19. Useful & Effective Investigation Techniques

1.19.1. Standard investigation procedures and techniques were used during the course of investigation.

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## **SECTION 2 – ANALYSIS**

## 2.1. General

2.1.1. On 18<sup>th</sup> March, 2020, PIA flight PIA785 was a scheduled passenger flight which operated from OPIS, Islamabad, Pakistan to EGLL, London, UK on ATS route ISLAMABAD – KALMI – HANGU – LAJAK climbing FL340. Simultaneously, the reciprocal PIA flight PIA352, was also a scheduled passenger flight operating from OPQT, Quetta, Pakistan to OPIS, Islamabad, Pakistan, on ATS route HANGU – J139 – KALMI – ISLAMABAD and was descending to FL150.

2.1.2. No significant weather was reported at Islamabad as well as surrounding areas at the time of the incident.

2.1.3. PIA785 came in contact with Cherat Approach South climbing out of 8,500 ft for FL160. After identification by Cherat Approach, PIA785 was given further climb to FL280.

2.1.4. On query by Cherat Approach, PIA785 informed that its final flight level is FL340, which was then re-cleared to FL340.

2.1.5. Cherat Controller inquired PIA785 if it is able to climb FL340 before LAJAK then proceed direct to position LAJAK. Pilot of PIA785 replied that he would like to follow the flight plan route in order to reach FL340 before LAJAK, which was approved by Cherat Approach.

2.1.6. Cherat Approach cleared PIA352 direct to position ISBAX, when it was crossing FL220 for FL150 and passed the traffic information of PIA785, which at that time was 18 NM on reciprocal track climbing out of FL190 for FL340. Traffic information was acknowledged by PIA352.

2.1.7. At 08:36:00 h, Cherat gave PIA352 further right heading 180 degrees and PIA785 was given right heading 330°.

2.1.8. At 08:36:50 h, PIA352 and PIA785 reported TCAS-RA.

2.1.9. Pilots of both the aircraft followed the TCAS-RA and resolved the situation as per Resolution Advisory protocols.

2.1.10. PIA352 reported maintaining ROD 800 ft while PIA785 reported maintaining ROC 900 ft at the time of RA.

2.1.11. As per radar screenshot PIA352 was maintaining ROD 900 ft whereas PIA785 was maintain ROC 1,500 ft.

2.1.12. At 08:37:50 h, the incident resolved with both aircraft clearing the conflict and resuming their respective routes.

2.1.13. Both aircraft encountered TCAS-RA approximately 55 NM West of Islamabad within Cherat Approach South AOR and maintaining Cherat frequency.

2.1.14. At the time of incident, 900 ft vertical and 6.6 NM lateral separation existed between the two aircraft (as per radar screenshot).

2.1.15. The incident was observed by Islamabad Approach Controller on his SDD.

## **SECTION 3 – CONCLUSIONS**

### 3.1. Findings

3.1.1. The incident resulted from a loss of adequate vertical separation between the two aircraft in the AOR of Cherat Approach South.

3.1.2. No significant weather was reported at Islamabad as well as surrounding areas at the time of the incident.

3.1.3. Cherat Approach cleared PIA785 to climb to FL340 during departure while directing PIA352 to descend to FL150 during arrival, without imposing adequate restrictions to ensure vertical separation between both aircraft.

3.1.4. Islamabad Approach Controller on radar scope observed TCAS – RA between PIA352 and PIA785 approximately 55 NM West of Islamabad in the AOR of Cherat Approach South.

3.1.5. An attempt by Cherat Controller to provide lateral separation by clearing PIA352 direct to ISBAX while crossing FL220 for FL150 and information about the reciprocal traffic PIA785 climbing out of FL190 for FL340 at a distance of 18NM. No flight level restrictions was imposed on any of the aircraft.

3.1.6. Yet another attempt by Cherat Approach controller by giving PIA352 heading 180° and PIA785 heading 330° to establish lateral separation between both aircraft but failed due to high closing distance.

3.1.7. At the time of incident, 900 ft vertical and 6.6 NM lateral separation existed between the two aircraft. Both aircraft responded correctly to TCAS-RA, ensuring a safe resolution of the conflict.

### 3.2. Cause / Contributory Factors

#### 3.2.1. Cause

3.2.1.1. Activation of TCAS – RA (**MAC – Mid Air Collision**) due to inadequate separation management by Cherat Approach South Controller.

#### 3.2.2. Contributory Factors

3.2.2.1. Simultaneous unrestricted climb and descent instructions given to aircraft on reciprocal tracks.

*Note: Aviation Occurrence Category (ADREP Taxonomy)  
“**Mid-Air Collision (MAC)**”: Separation-related occurrences caused by either air traffic control or cockpit crew*

## **SECTION 4 – SAFETY RECOMMENDATIONS**

4.1. **Safety Recommendations**

4.1.1. Effective utilization of STCA (Short Term Conflict Alert) by the controllers would avoid such recurrences.

4.1.2. Air Headquarters to address / enhance training programme for controllers for better airspace management.