

FINAL INVESTIGATION REPORT



**INCIDENT OF TRAFFIC COLLISION AVOIDANCE SYSTEM –
RESOLUTION ADVISORY (TCAS – RA) REPORTED BY M/S SAUDI
ARABIAN AIRLINE FLIGHT SVA 734 B772 REG NO HZ-AKW
JEDDAH – LAHORE (OEJN – OPLA) ON 05-02-2018**

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INCIDENT OF TRAFFIC COLLISION AVOIDANCE SYSTEM – RESOLUTION ADVISORY (TCAS – RA) REPORTED BY M/S SAUDI ARABIAN AIRLINE FLIGHT SVA734 B772 REG NO HZ-AKW JEDDAH – LAHORE (OEJN – OPLA) ON 05-02-2018

Synopsis

On 5 February 2018, SVA734 B772 Reg No HZAKW operating from Jeddah to Lahore (OEJN–OPLA) FL370 on route G214 was cleared to descent FL330 and later on re-cleared FL350 encountered TCAS-RA due to the reciprocal aircraft, PIA203 A320 Reg No AP-BLS operating from Lahore to Dubai (OPLA–OMDB) maintaining FL340 on route G214.

This incident of Traffic Collision Avoidance System – Resolution Advisory (TCAS–RA) reported in daily IOUDO Report for the period 050500LT to 060500LT February 2018 (**Appendix ‘A’**) and a Flight Safety Report submitted by the operator M/s Saudi Arabian Airline (**Appendix ‘B’**). Memorandum was issued vide letter No HQCAA/1904/40/118/SIB/089 dated 16 February 2018 (**Appendix ‘C1 & C2’**). All available evidences have been analyzed by the Safety Investigation Board (SIB). Findings and safety recommendations of SIB are as under:-

1. FACTUAL INFORMATION

- 1.1 **History of Flights.** SVA734 B772 Reg No HZAKW a scheduled flight from Jeddah to Lahore (OEJN – OPLA), was maintaining FL370 on route G214. ACC Lahore, upon its first contact, cleared SVA734 on Standard Terminal Arrival Route (STAR), “LAMOM 2 ALPHA” for ILS APPROACH RWY 36R and cleared to descent FL330. Reciprocal traffic, PIA203 A320 Reg No AP-BLS a scheduled flight from Lahore to Dubai (OPLA – OMDB), on route G214, maintaining FL340 was changed over to ACC Karachi at position MOLTA. No sooner had SVA734 left FL370 for FL330 Lahore ACC re-cleared SVA734 to stop descent at FL350. SVA734 acknowledged and did level change in the FMC, instantaneously which was evident in the mode “S” information on the Radar screen in ACC Lahore. SVA734 was observed climbing to FL355 after reaching FL351. Later on, SVA734 reported that she received Traffic Alert (TCAS–TA) followed by Resolution Advisory (TCAS–RA) due to reciprocal traffic.
- 1.2 **Injuries to person(s).** No injury was reported to anyone on board in both the aircraft.
- 1.3 **Damage to Aircraft.** No damage occurred due to this incident to any of the aircraft.
- 1.4 **Personnel Information.** Not applicable.

1.5 Aircraft Information.

- 1.5.1. M/s Saudi Arabian Airlines (**SVA734**)
- | | | |
|-----------------------|---|-----------------------------|
| Aircraft Make | : | Boeing |
| Type of Aircraft | : | B772 |
| Aircraft Registration | : | HZ-AKW |
| Sector | : | Jeddah – Lahore (OEJN-OPLA) |
| Flight Conditions | : | IMC / Descending Phase |
| Altitude | : | FL351 (FL370 ↓ FL350) |
- 1.5.2. M/s Pakistan International Airlines (**PIA203**)
- | | | |
|-----------------------|---|----------------------------|
| Aircraft Make | : | Airbus |
| Type of Aircraft | : | A320 |
| Aircraft Registration | : | AP-BLS |
| Sector | : | Lahore – Dubai (OPLA-OMDB) |
| Flight Conditions | : | IMC / Cruising |
| Altitude | : | FL340 |

- 1.6 **Meteorological Information.** No significant weather was reported at operating altitude at the time of occurrence of this incident of TCAS–RA.
- 1.7 **ATC Record Tape Extracts.** Audio tape extracts and video records (Radar Tracings/Screenshots) were obtained for detailed analysis (**Appendix ‘D’ & ‘E’**).
- 1.8 **Resumption of Navigation by Aircraft.** Post occurrence, both aircraft continued for their respective destinations.

2. ANALYSIS

- 2.1. At 0515:20, ATC Karachi (ACC–North) lost “Radar Track” of SVA734 and informed/requested her “RADAR CONTACT LOST RE-CYCLE SQUAWK CODE”. Since then onward ATC Karachi (ACC–North) kept working on Synthetic Track of SVA734.
- 2.2. At 0519:52, PIA203 checked position MOLTA, maintaining FL340. Lahore ATC (ACC–East) advised PIA203 to change over to Karachi ATC (ACC–North) on frequency 123.15 MHz.
- 2.3. At 0522:52, SVA734, maintaining FL370, operating in Karachi FIR (Flight Information Region) requested descend from ACC Karachi (North).
- 2.4. At 0522:56, ACC Karachi (North) advised SVA734 to contact Lahore ATC (ACC–East) on frequency 127.50 MHz for descend coordination. SVA734 switched over to Lahore ATC.

- 2.5. At 0523:09, SVA734 established two-way communication with Lahore ATC (ACC-East) on frequency 127.5 MHz, position 40 NM Southwest of MOLTA (approximately).
- 2.6. At 0523:33, Lahore ATC (ACC Procedure Controller-East) cleared SVA734 for carrying out on Standard Terminal Arrival Route (STAR), "LAMOM 2 ALPHA" for ILS APPROACH RWY 36R including descent clearance for FL330.
- 2.7. At 0523:43, SVA734 commenced descent from FL370 for FL330.
- 2.8. At 0524:17, Lahore ATC (ACC Radar) re-cleared SVA734 to stop descent at FL350, while she was passing FL367 for FL330. SVA734 acknowledged ATC clearance for "STOP DESCENT FL350", instantaneously. Cockpit crew of SVA734 fed level change (from FL330 to FL350) in their FMC and the change observed on ATC Radar in mode S information window at time 0524:28 UTC (Appendix 'E'). ← Reciprocal traffic PIA203 was 18NM maintaining FL340.
- 2.9. At 0524:53, SVA734 was passing FL351 for FL350.
- 2.10. At 0524:57, SVA734 stopped descent at FL352 whereas mode "S" information window showing Inertial Vertical Rate positive which was climb indication.
- 2.11. At time 0525:06, SVA734 maintained FL355. Reciprocal traffic, PIA203 was just passing from the opposite side maintaining FL340.
- 2.12. At 0531:18, SVA734 reported that she encountered Traffic Advisory (TCAS-TA) followed by Resolution Advisory (TCAS-RA) during the initial descend phase. PIA203 did not report any TCAS activity to any of the ATC Unit and no level change observed on Radar.
- 2.13. At 0535:49, SVA734 changed over to Lahore Approach frequency 121.3 MHz for further maneuver associated with approach to land procedures.
- 2.14. The Area Radar Controller (East) was performing duties as On the Job Training Instructor as well as ATC Team Leader.

3. CONCLUSIONS

3.1 Findings

- 3.1.1. PIA203 A320 Reg No AP-BLS a scheduled flight from Lahore to Dubai (OPLA-OMDB), maintaining FL340, operating on Route G214, checked position MOLTA (Transfer of Control Point between Lahore ATC and Karachi ATC) at 0519:52 UTC. Lahore ATC advised PIA203 to change over to Karachi ATC (ACC-North) on frequency 123.15 MHz.

- 3.1.2. SVA734 B772 Reg No HZ-AKW a scheduled flight from Jeddah to Lahore (OEJN-OPLA), maintaining FL370, operating on Route G214. Karachi ATC (ACC-North) lost Radar Track of SVA734 at time 0515:20 and was working on Synthetic Track i.e. track generated by the ATM System (Computer) on the basis of last position and available data in the ATM System. However, **Radar Services of SVA734 were not terminated.**
- 3.1.3. Since SVA734 was operating in Karachi FIR (Flight Information Region), between position MURLI and MOLTA, requested Karachi ATC (ACC-North) for descend at time 0522:51 UTC. Karachi ATC directed SVA734 to change over to Lahore ATC (ACC-East) on frequency 127.50 MHz for "DESCEND COORDINATION". SVA734 acknowledged and switched over to Lahore ATC, instantaneously.
- 3.1.4. Karachi ATC (ACC-North) **did not provide information about the traffic operating in Karachi FIR (on route G214 in Karachi FIR)** which could constitute potential conflict for her early descend.
- 3.1.5. Karachi ATC (ACC-North) **did not inform Lahore ATC (ACC-East) about the loss of Radar Contact with SVA734 and even did not make any coordination for her early descend** in their area of jurisdiction (area of responsibility) i.e. prior crossing position MOLTA.
- 3.1.6. SVA734 established two-way communication with Lahore ATC (ACC-East) on frequency 127.5 MHz at time 0523:09 UTC and her position was 40 NM (approx.) Southwest of MOLTA.
- 3.1.7. Lahore ATC (ACC Procedure Controller-East), at time 0523:33, cleared SVA734 for carrying out Standard Terminal Arrival Route (STAR), "LAMOM 2 ALPHA for ILS APPROACH RWY 36R" including the descent clearance for FL330.
- 3.1.8. ACC Procedure Controller (East), Lahore **did not coordinate with adjacent ATS Unit, Karachi ATC (ACC-North), prior issuing descent clearance to SVA734.** Moreover, he **did not realize the prevailing traffic and forgot to consider reciprocal traffic PIA203**, maintaining FL340 and cleared SVA734 to descent through the level of reciprocal traffic.
- 3.1.9. ACC Procedure Controller (East), Lahore declared "Radar Contact" with SVA734. Whereas, he, being an Area Procedure Controller, is not authorized to provide Radar Services to a controlled flight operating in Class "A" airspace.
- 3.1.10. At time 0523:43, SVA734 commenced descent from FL370 for FL330.
- 3.1.11. At 0524:17, Lahore ATC (APP Radar Controller) intervened and **re-cleared SVA734 to stop descent at FL350**, while she was passing FL367 for FL330. SVA734 acknowledged ATC clearance for "STOP DESCENT FL350", instantaneously. Cockpit crew of SVA734 administered / fed level change (from FL330 to FL350) in their FMC and the changes observed on ATC Radar in mode S information window at time 0524:28 UTC (**Appendix 'E'**). Reciprocal traffic PIA203 ←

was 18NM maintaining FL340. However, the rate of descend observed increasing from 1500fpm to 3168fpm (Appendix 'E').

- 3.1.12. At 0524:57, SVA734 stopped descent at FL352 whereas mode "S" information window showing Inertial Vertical Rate positive which indicates climb. Whereas, at time 0524:53, mode "C" information showing SVA734 passing FL351 for FL350. At time 0525:06, SVA734 observed maintained FL355. Reciprocal traffic, PIA203, maintaining FL340, was just **passing from the opposite side (reciprocal) with 1,000Ft. Standard Vertical Separation.**
- 3.1.13. At 0531:18, SVA734 reported that she encountered Traffic Advisory (TCAS-TA) followed by Resolution Advisory (TCAS-RA) during the initial descend phase. PIA203 did not report any such event to any of the ATC Unit.
- 3.1.14. At 0535:49, SVA734 changed over to Lahore Approach frequency 121.3 MHz for further maneuver associated with approach to land procedures.
- 3.1.15. Area Radar Controller (East), Lahore was the On Job Training Instructor (OJTI) and was performing functions as ATC Team Leader.
- 3.1.16. Area Radar Controller (East), Lahore while restricting descent to FL 350 did not pass traffic information to SVA734 about reciprocal traffic, PIA203.
- 3.1.17. No TCAS (TA / RA) activity was reported by PIA203 to any of the ATS Unit (Karachi / Lahore). No level change was observed on Radar at any of the ATS Unit.
- 3.1.18. ICAO Doc 8168 (Aircraft Operations) para 3.3 states, "Pilots should use appropriate procedures by which an aeroplane climbing or descending to an assigned altitude or flight level, especially with an autopilot engaged, may do so at a rate less than 8 m/s (or 1 500 ft/min) throughout the last 300 m (or 1 000 ft) of climb or descent to the assigned altitude or flight level **when the pilot is made aware of another aircraft at or approaching an adjacent altitude or flight level, unless otherwise instructed by ATC**".
- 3.1.19. Radar Data in the coverage area of Rojhan SSR (Secondary Surveillance Radar) was lost.
- 3.1.20. Standard Vertical Separation, 300 m (or 1,000 ft) in RVS airspace was not infringed.

3.2 Cause(s) of Occurrence

- 3.2.1. This incident occurred due to the excessive rate of descent by SVA734 during the last 300m (or 1,000 ft) of descent to the assigned altitude (i.e. FL350). However, this could not solely be attributed to cockpit crew of SVA734. It could have been easily avoided if the traffic information about the reciprocal traffic, PIA203 at FL340, was passed to SVA734.

- 3.2.2. The other cause is the lack of situational awareness on the part of Area Procedure Controller (East). However, his negligence was corrected immediately by the APP Radar Controller and SVA734 was re-cleared to FL350 (while she was passing FL367 for FL330). However, this action was not sufficient enough without providing traffic information about the reciprocal traffic, i.e. PIA203 at FL340, to avoid TCAS-RA.

3.3 Contributing Factors

- 3.3.1. **Procedural Violation (Karachi ATC):** Area Radar Controller (North) at Karachi though informed SVA734 about "Radar Contact Lost" but did not specifically announce "Termination of Radar Services". Moreover, despite knowing the fact that SVA734 was asking early descent (usual phenomenon for Lahore arrivals) and PIA203 reciprocal traffic at FL340 was in contact with Karachi ATC, SVA734 was asked to change over to Lahore ATC. If Karachi ATC had timely coordinated descent with ATC Lahore, this TCAS-RA could have been avoided.
- 3.3.2. **Procedural Violation (Lahore ATC):** Casual / Improper Management of Flight Progress Board/Strips, or inefficient use of planner position and affecting level change to SVA734 (in the area of jurisdiction of Karachi FIR) without following due coordination process are the procedural lapses committed by Area Procedure Controller (East), Lahore.
- 3.3.3. **Unauthorized use of Radiotelephony (R/T) Phraseologies by Area Procedure Controller (East):** Area Procedure Controller being a person not qualified to provide Radar Services should have restricted himself from providing ATC Radar Services and limited to the ATC services &/or phraseologies for which he qualifies under the circumstances i.e. procedural (Non-Radar) environment.
- 3.3.4. **Lack of Qualified & Trained Human Resource:** Either ATC Lahore does not have enough sufficiently trained / qualified Air Traffic Controller or the distribution of Trained / Qualified ATC Officers is unjustified.
- 3.3.5. **Training on ACAS Operations:** The causes of occurrence stated above at para 3.2 indicates that the knowledge on the **ACAS Operation and Training for ATC** as recommended by ICAO in Doc 9863 (Airborne Collision Avoidance System Manual) have not been incorporated in the training curriculum and emphasized upon during the OJT or is inadequate.
- 3.3.6. **Lack of Supervision / Decision Making:** The decision, under the prevailing circumstances, taken by the ATC Team Leader for leaving his own position, Area Radar Control-East, abandon or directing APP Radar Controller to maintain close watch on the traffic operating in the area of responsibility of Area Radar-East to provide a short relief to Area Radar Controller-West is not considered a wise decision at all.
- 3.3.7. **Technical Issues:** Loss of Radar Data in the coverage area of Rojhan SSR. Had the Radar data been available for ATM at Karachi, ATC might not have changed SVA734 before crossing "MOLTA" (Transfer of Control Point).

4. SAFETY RECOMMENDATIONS

- 4.1. Pakistan CAA (Operations Directorate) may issue directions to field ATC Units for providing essential traffic information, if circumstances so warrant, under the situation(s) as described in para 3.3 of ICAO Doc 8168 and to ensure compliance with ICAO Doc 4444 (PANS ATM).
- 4.2. Pakistan CAA (Operations Directorate) may issue specific directions to field ATC Units for adhering procedures in accordance with the SARPs and guidelines issued in SATIs specific to mention procedures for transfer of control, coordination with adjacent units, climb and descend around ToC (Transfer of Control Point), etc.
- 4.3. Pakistan CAA (Operations Directorate) may ensure deployment / availability of appropriately qualified and trained Human Resource in ATC field units. ATC Field Units should make optimum and judicious distribution of qualified and trained manpower in the shift duty roster.
- 4.4. Pakistan CAA (Civil Aviation Training Institute of CAA) in consultation with Operations Directorate may improve course curriculum(s) of relevant course(s) for ATCOs to include guidance material from ICAO Doc 9863 (Airborne Collision Avoidance System Manual). Specifically, relevant portion from **Chapter 3** and **Chapter 6** may appropriately be incorporated in class room and On the Job Trainings (OJT) curriculum / process in Area Procedure / Area Radar Control.
- 4.5. Pakistan CAA (CNS Engg. Directorate) may ensure availability of Radar Data for ATC in the areas notified under the Surveillance Coverage in the AIP (Aeronautical Information Publication), Pakistan.