भारतीय विमानपत्तन प्राधिकरण
AIRPORTS AUTHORITY OF INDIA

DIRECTORATE OF AIRSPACE MANAGEMENT
AAI CHQ, NEW DELHI-110003
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ATMC

AIR TRAFFIC MANAGEMENT CIRCULAR NO. 06 of 2025

Data Collection for Airspace Safety Monitoring

1. Introduction

1.1 India introduced Reduced Vertical Separation Minimum (RVSM) between FL 290 and FL410, both levels inclusive, on 27th November 2003. Reduced Horizontal Separation (RHS) of 50 NM longitudinal was introduced in Phase 1 on 30th June 2011 and Phase 2 on 15th December 2011, along major international RNP10 routes in the Bay of Bengal, Arabian Sea and Indian Ocean (BOBASIO) airspace.

1.2 Safety Management provisions of ICAO Annex 11 requires that:

"Any significant safety-related change to the ATS system, including the implementation of a reduced separation minimum or a new procedure, shall only be effected after a safety assessment has demonstrated that an acceptable level of safety will be met and users have been consulted. When appropriate, the responsible authority shall ensure that adequate provision is made for post-implementation monitoring to verify that the defined level of safety continues to be met".

1.3 System performance monitoring is thus a mandatory requirement to ensure that the implementation and continued operation of both RVSM and RHS meet the safety objectives.

2. Purpose

Purpose of the ATMC is to emphasise the importance of data collection, reporting of occurrences of LHD, LLD & LLE for conducting system performance monitoring by both the Regional Monitoring Agency (RMA) & En-route Monitoring Agency (EMA) and also to ensure that occurrence reporting becomes a natural component of the safety culture of Air Traffic Management.

3. Scope

This ATMC is applicable to all Air Traffic Controllers working at various AAI ATC centres / ATC units.

4. Safety Monitoring Agencies- RMA/EMA

4.1 A Regional Monitoring Agency (RMA) supports the implementation and continued safe use of Reduced Vertical Separation (RVSM) and an En-route Monitoring Agency (EMA), the implementation and continued safe use of Reduced Horizontal Separation (RHS). Both RMA and EMA conduct pre-implementation and periodic post-implementation system performance monitoring. In all regions where RVSM and/or RHS have been implemented, Regional Monitoring Agencies (RMAs) and En-route Monitoring Agencies have been established, by ICAO.

4.2 The responsible RMA for the Indian FIRs is the Monitoring Agency for Asia Region (MAAR) and the responsible EMA is the Bay of Bengal Arabian Sea Indian Ocean Safety Monitoring Agency (BOBASMA).

4.3 MAAR was established by Aeronautical Radio of Thailand Ltd. (AEROTHAI) under the approval of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) to assume the duties and responsibilities of the Regional Monitoring Agency (RMA) for the Asia Region. The principal role of the MAAR is to assist the International Civil Aviation Organization (ICAO) in the continuation of the safety assessment program for the implementation of Reduced Vertical Separation Minimum (RVSM) and other monitoring requirements as determined by the APANPIRG.

4.4 BOBASMA was established by Airports Authority of India to provide monitoring services in the Oceanic airspace of the Bay of Bengal Arabian Sea Indian Ocean (BOBASIO) region and to conduct safety assessments to support the implementation and continued safe use of Reduced Horizontal Separation. BOBASMA was endorsed as a competent Safety Monitoring Agency by the APANPIRG in September 2011.

4.5 The duties and responsibilities of an RMA/EMA include, inter alia:

4.5.1 Establishment and maintenance of an RVSM/RNP/Data Link approvals database.
4.5.2 Monitoring and reporting aircraft height-keeping performance / horizontal-plane navigational performance.
4.5.3 Monitoring the occurrence of large height deviations & large horizontal–plane deviations.
4.5.4 Conducting periodic safety assessments in the light of agreed regional safety goals and reporting results to the appropriate ICAO regional group.
4.5.5 Monitoring operator compliance with State approval requirements after implementation of RVSM/RHS.
4.5.6 Remedial actions.

4.5.7 Additionally, for the assessment of risk levels, an EMA may find it necessary to use data link performance data.

5. Monitoring the occurrence of Large Deviations (LHD/LLD/LLE)

5.1 Experience has shown that large height deviations (LHD), large lateral deviations (LLD) and large longitudinal errors (LLE) have significant influence on the outcome of safety assessments before and after implementation of RVSM/ RHS. RMAs and EMAs play a key role in the collection and processing of reports of such occurrences.

5.2 The primary source for reports of large deviations (LHD/LLD/LLE) is the ATC units providing air traffic control services in the airspace where reduced separation is applied. The information available to these units, in the form of voice reports, datalink (ADS-C, CPDLC) reports and through the use of ATS surveillance systems such as radar, Automatic Dependent Surveillance – Broadcast (ADS-B) or multi-lateration (MLAT), provides the basis for identifying large deviations. The ATC units need to gather information and report any deviation **irrespective of whether the deviation causes an incident or not.** This information will contribute to the assessment of the level of overall risk in the system.

5.3 The first step in any safety enhancement program is to identify the Safety Risk. For this, the controllers on duty need to report all observed LHD/LLD/LLE occurrences to the concerned authorities. The duty controller shall immediately make an entry in the unit log book and inform WSO.

5.4 Whenever an LHD/LLD/LLE occurs due to coordination error, the WSO shall investigate the occurrence by telephonically contacting the Supervisor of the transferring ATS unit and submitting a report on the occurrence to JGM (SQMS). The report could be in the form of an e-mail to JGM (SQMS) with copy marked to GM (ATM).

5.5 WSO shall also make a log entry about LHD/LLD/LLE in the WSO log book.

5.6 JGM (SQMS) shall forward Deviation Report to BOBASMA in the form of an e-mail.

5.7 ATS-in-charges shall ensure that the controllers report all occurrences of LHD, LLD & LLE without fail.

6. Data collection

An organization providing airspace safety assessment and monitoring services requires different types of data to discharge its duties and responsibilities. The data that needs to be collected by ATS units are:

a) Traffic Sample data (TSD)
b) Data on Large Height Deviation (LHD)
c) Gross Navigation (horizontal– plane deviations) Error data (GNE)
- Large Lateral Deviation (LLD)
- Large Longitudinal Error (LLE)

d) ADS-C/CPDLC data-link data

7. Traffic Sample Data (TSD)

7.1 For the Asia region, ATS provider States are required to collect and submit (electronically) the TSD for the month of December every year using the provided TSD Template (Annexure -A), according to *ICAO APANPIRG Conclusion 16/4*.

Conclusion 16/4 – Traffic Sample Data Collection *That, States be advised by the Regional Office that December every year has been adopted for the routine collection of 30 days of traffic sample data to satisfy airspace safety monitoring requirements.*

7.2 All four Indian FIR (Chennai, Delhi, Kolkata and Mumbai) are required to collect TSD in the format of TSD Template (See Annexure -A) for the month of December every year and forward to CHQ/BOBASMA on daily basis. For example, December 1st data shall be sent on December 2nd, December 2nd data shell be sent on December 3rd and so on. This procedure helps to avoid data loss and enables FIRs to retrieve data from automation systems.

7.3 All Indian FIRs shall check and correct any discrepancy in the TSD before sending to CHQ/BOBASMA.

7.4 Any FIR facing temporary difficulty in sending TSD may send daily movement log recorded in the automation system instead of TSD.

7.5 When any discrepancy/error/clarification in the TSD is notified by BOBASMA, the concerned FIR shall respond quickly and resend the corrected data as soon as possible.

7.6 The TSDs are to be submitted to ICAO/APAC office/meetings by India within the stipulated time. All Indian FIRs shall give due attention to collection and submission of data.

7.7 For any clarification during collection and submission of TSD, the FIR shall contact BOBASMA.

7.8 The concerned ATS-in-charge shall ensure the smooth function of collection and submission of TSD.

7.9 In addition to the TSD collection in the month of December, the DMS units of all stations where an ATM automation system is in place shall forward traffic data or daily movement log obtained from the ATM automation system on a monthly basis to BOBASMA electronically before the 7th of the following month.

8. Large Height Deviation (LHD)

8.1 A RVSM large height deviation (LHD) is defined as any vertical deviation of 90 meters/300 feet or more from the flight level expected to be occupied by the flight.

8.2 The LHD category codes (see Annexure B) are mainly for the use of RMAs. However, reporters may use this categorization as a reference for common causes of LHDs.

8.3 JGM (SQMS) shall send the completed LHD report form (Annexure B), Form A LHD Analysis (Annexure C) and Form B LHD Preventive/Mitigation measures (Annexure D), within 7 days of occurrence, to BOBASMA through e-mail for filing of LHD in MAAR LHD Report webpage.

9. Gross Navigation Error (GNE)

9.1 Gross Navigation Error can be either a Large Lateral Deviation (LLD) or a Large Longitudinal Error (LLE).

9.2 Criteria for reporting of LLDs and LLEs are as defined below.

Type of Error	Category of Error	Criterion/Criteria for Reporting
Lateral deviation	Individual-aircraft error	(1) 10NM or greater magnitude if lateral separation minima is 50NM or greater (2) 5NM or greater magnitude if lateral separation minima is less than 50NM
Longitudinal deviation	Aircraft-pair (Time-based separation applied)	Infringement of longitudinal separation standard based on routine position reports
Longitudinal deviation	Aircraft-pair (Time-based separation applied)	Expected time between two aircraft varies by 3 minutes or more based on routine position reports
Longitudinal deviation	Individual-aircraft (Time-based separation applied)	Pilot estimate varies by 3 minutes or more from that advised in a routine position report
Longitudinal deviation	Aircraft-pair (Distance-based separation applied)	Infringement of longitudinal separation standard, based on ADS-C, radar measurement or special request for RNAV position report
Longitudinal deviation	Aircraft-pair (Distance-based separation applied)	Expected distance between an aircraft pair varies by 10NM or more, even if separation standard is not infringed, based on ADS-C, radar measurement or special request for RNAV position report

9.3 The causes of these large deviations, given in Annexure-B & C, are crucial for the monitoring agencies (RMA/EMA) to determine the remedial actions required to ensure continuous safety of the airspace.

9.4 Controllers observing the occurrence(s) of an LLD or LLE shall make appropriate entries in the unit log book, inform shift WSO and fill up the "Navigation Error Investigation Form" given in Annexure-E.

9.5 JGM (SQMS) of the respective ATS unit shall, on a monthly basis, compile all the filled-up Navigation Error Investigation Forms and forward the same to the En-

route Monitoring Agency, BOBASMA along with the filled up *"Summary of Navigation Error Report"*, given in Annexure-E.

10. ADS-C/CPDLC data link data

BOBASMA has been mandated to conduct the Monthly/Annually End-to-end Safety and Performance Monitoring of ATS Data link systems in India. ATS units equipped with ATS Data link ground systems shall forward the following data to BOBASMA by the 7th of the following month:

- FANS/1A performance data
- Problem report forms (Annexure F)
- CPDLC and ADS-C availability report (Annexure F)

[***Note:*** *Appendix-D of Doc 9869 PBCS Manual specifies the method of collection of the performance data, problem reports and availability report. Same may be perused while forwarding required data.*]

11. Summary of Data to be collected and submitted

A summary of the data that needs to be sent by the Area Control Centres to BOBASMA is given below:

S. No	Type of Data	Periodicity	Date of submission
1.	Traffic Sample Data (TSD)	December	By 7th of next month
2.	Large Height Deviation (LHD)	Monthly	By 7th of next month
3.	Large Lateral Deviation (LLD)	Monthly	By 7th of next month
4.	Large Longitudinal Error (LLE)	Monthly	By 7th of next month
5.	ADS/CPDLC Data Link data	Monthly	By 7th of next month
6.	ADS/CPDLC Problem Reports	Monthly	By 7th of next month
7.	Other relevant data, when requested by BOBASMA	As and when required	As per BOBASMA's request and in the format sent.

12. Activities / Events affecting data retrieval

Upgradation, software enhancement, change in Automation system and any other related activities may cause data loss or improper data format recording of ADS-C/CPDLC/Daily movement log. Since data is to be submitted to ICAO/APAC meetings (APANPIRG, RASMAG, FIT-ASIA etc.) by India within the stipulated time, the DMS units of all stations where an ATM automation system is in place shall report any such activities / events to ED (ASM) at edasm@aai.aero and send a copy to BOBASMA.

13. Agency where data/reports to be sent:

All data/ reports mentioned above should be forwarded to BOBASMA on the following address:

Bay Of Bengal Arabian Sea Indian Ocean Safety Monitoring Agency (BOBASMA)
Airports Authority of India
New ATS Complex
Chennai – 600 027.
E-mail: bobasma@aai.aero

14. Validity:

This ATMC will remain in force until further notice and ATMC 5 of 2013 is hereby cancelled.

15. Queries

Any queries or further guidance required on the contents of this ATMC should be addressed to:

Executive Director (ASM)
Airports Authority of India
Airspace Management Directorate
Safdarjung Airport
New Delhi-110003.
E-mail: edasm@aai.aero

26/12/25

(Moosa T.F.)
Executive Director (ASM)
Airports Authority of India
Date: 26.12.2025

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Annexure-A

Traffic Sample Data Requirement

According to Conclusion 16/4 of APANPIRG/16 – Traffic Sample Data Collection

That, States be advised by the Regional Office that December every year had been adopted for the routine collection of 30 days of traffic sample data to satisfy airspace safety monitoring requirements.

Please read the following guidelines carefully before filling in the data.

1. The sample data should include all air traffic movements between FL290 and FL410 in your FIR during the month of December each year.
2. Fill in the data in the 'FORM' sheet OR submit your data file that matches the fields in the 'FORM' sheet. Please note that preference is to have all flight records in one sheet, not in separate sheets.
3. The data can also be submitted in ASCII text format, as long as the fields are delimited and conform to the fields specified in this spreadsheet.
4. You can read the full description of each field in 'FIELD DESCRIPTIONS' sheet. Some fields are marked as 'Necessary'.
5. Please make sure that you include the FIR's name in the file's name.

Traffic Sample Date Template:

DATE	CALL SIGN	AIRCRAFT REGISTRATION	ITEM 10 OF THE FLIGHT PLAN	SUR/ TAG IN ITEM 18 OF THE FLIGHT PLAN	AIRCRAFT TYPE	ORIGIN AERODROME

DESTINATION AERODROME	ENTRY FIX	TIME (UTC) AT ENTRY FIX	FL AT ENTRY FIX	ROUTE AFTER ENTRY FIX	EXIT FIX	TIME (UTC) AT EXIT FIX	FL AT EXIT FIX	ROUTE BEFORE EXIT FIX

FIX 1	TIME (UTC) AT FIX 1	FL AT FIX 1	ROUTE AFTER FIX 1	FIX 2	TIME (UTC) AT FIX 2	FL AT FIX 2	ROUTE AFTER FIX 2	FIX N	TIME (UTC) AT FIX N

FL AT FIX N	ROUTE AFTER FIX N	Complete these "FIX/TIME/FL/ROUTE" fields for every flight level and route changes

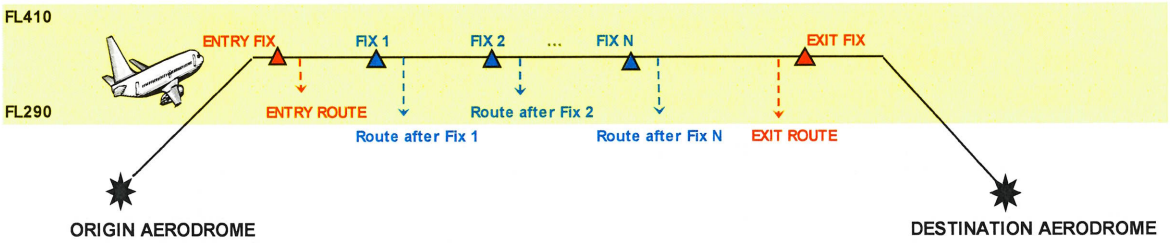
FIELD DESCRIPTIONS			
Field	**Instruction**	**Examples**	**Necessary or optional**
DATE	Enter only numeric characters in the format dd/mm/yyyy	for February 01, 2004 enter 01/02/2004.	Necessary
CALL SIGN	Enter a maximum of seven alphanumeric characters, with no blank spaces or hyphens	BAW10, QFA08, SIA123	Necessary
AIRCRAFT REGISTRATION	The nationality or common mark and registration mark of the aircraft	HSAAA, 9MABC, BLDA	Necessary
ITEM 10 OF THE FLIGHT PLAN	"W" indicates that the operator and aircraft are RVSM approved. An appropriate "P" code indicates approval for a specific RCP, e.g., "P2" indicates approvals for RCP240	SDE1E2E3FGHIJ4P2RWY /LB1D1	Necessary
SUR/ TAG IN ITEM 18 OF THE FLIGHT PLAN	"SUR/*" within item 18 may include indication that the operator and aircraft are approved for a specific RSP, e.g. "SUR/RSP180" indicates approvals for RSP180 (this	SUR/RSP180	Necessary

	code will vary by Region). The RSP may be included with other surveillance capabilities in varying order within this field.		
AIRCRAFT TYPE	Use ICAO designators contained in Doc. 8643	for Airbus A320-211 enter A320; for Boeing B747-438 enter B744	Necessary
ORIGIN AERODROME	Use ICAO 4-letter location indicators listed in Doc. 7910	VIDP, VOMM, VTBD	Necessary
DESTINATION AERODROME	Use ICAO 4-letter location indicators listed in Doc. 7910	WSSS, WMKK, WIII	Necessary
ENTRY FIX INTO RVSM AIRSPACE	The name of the fix/waypoint of entry into the RVSM airspace, a maximum of 5 alphabets	IGOGU, VVZ, POMAN	Necessary
TIME (UTC) AT ENTRY FIX	Time in UTC, use numeric characters in the format hh:mm	for 01 hour and 09 minutes enter 01:09; for 12 hours and 23 minutes enter 12:23	Necessary
FL AT ENTRY FIX	Flight level at entry fix in hundred feet	for FL290 enter 290; for FL310 enter 310	Necessary
ROUTE AFTER ENTRY FIX	The name of the route 'leaving' the entry fix	N571, M300, L645	Necessary
EXIT FIX FROM RVSM AIRSPACE	The name of the fix/waypoint of exit from the RVSM airspace, a maximum of 5 alphabets	IDASO, ADKIT, LOTOV	Necessary
TIME (UTC) AT EXIT FIX	Time in UTC, use numeric characters in the format hh:mm	for 08 hours and 07 minutes enter 08:07; for 00 hour and 48 minutes enter 00:48	Necessary
FL AT EXIT FIX	Flight level at entry fix in hundred feet	for FL330 enter 330; for FL350 enter 350	Necessary
ROUTE BEFORE EXIT FIX	The name of the route 'going into' the exit fix	L301, M300, P574	Necessary
If there are fixes along the path between the entry and exit fixes where **flight level and/or route changes** have been made, then complete the following **"FIX/TIME/FL/ROUTE"** fields for every change that occurred.			Optional
FIX 1, 2, ..., N	The name of the fix where flight level and/or route changes have been made, a maximum of 5 alphabets	same as above	Optional

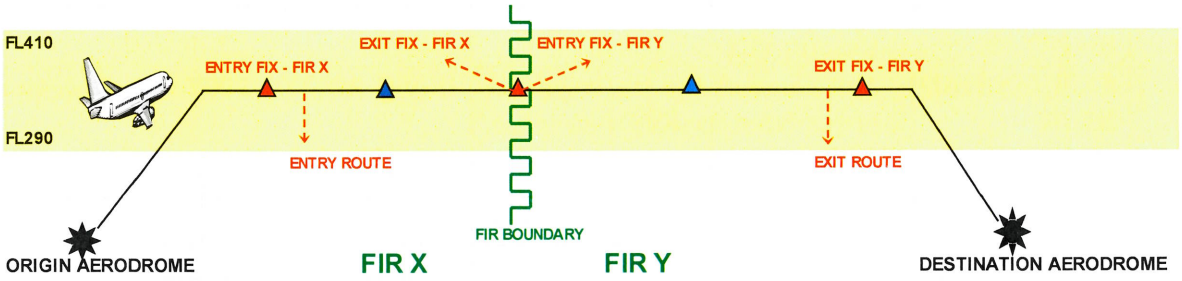
TIME (UTC) AT FIX 1, 2, ..., N	Time at FIX 1, 2, ..., N in UTC, use numeric characters in the format hh:mm	same as above	Optional
FL AT FIX 1, 2, ..., N	Flight level at FIX 1 in hundred feet	same as above	Optional
ROUTE AFTER FIX 1, 2, ..., N	The name of the route 'leaving' FIX 1, 2, ... N	same as above	Optional

ILLUSTRATIONS

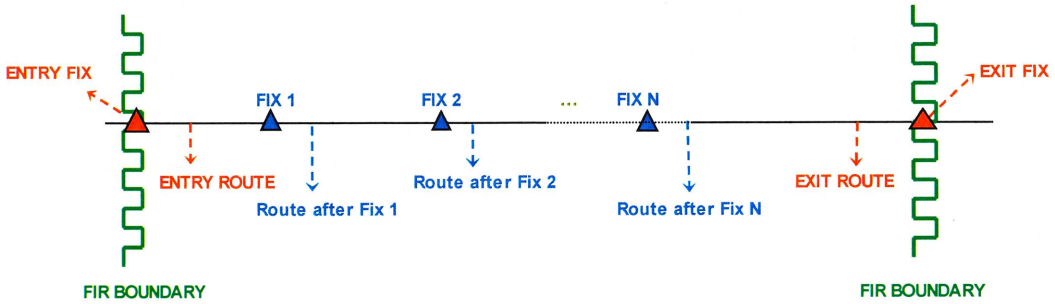
1) **Domestic Flight (origin and destination in the same FIR)**



2) **International Flight (inbound or outbound flight from a neighboring FIR)**



3) **Overflying Flight**



Annexure-B

LHD CATEGORIES & LHD REPORT FORM

Code	RVSM Operations LHD Categorisation
Operational Errors	
A	Flight crew failing to climb/descend the aircraft as cleared Example: Aircraft A was at FL300 and assigned FL360. A CLAM alert was seen as the aircraft passed FL364. The Mode C level reached FL365 before descending back to FL360.
B	Flight crew climbing/descending without ATC Clearance
C	Incorrect flight level provided due to incorrect operation or interpretation of airborne equipment (e.g. incorrect operation of fully functional FMS, incorrect transcription of ATC clearance or re-clearance in FMS, flight plan followed rather than ATC clearance, original clearance followed instead of re-clearance etc.) Example: The aircraft was maintaining a flight level below the assigned altitude. The altimeters had not been reset at transition. The FL assigned was 350. The aircraft was maintaining FL346 for in excess of 4 minutes.
D	ATC system loop error; (e.g., ATC issues incorrect flight level clearance or flight crew misunderstands flight level clearance message.) Example: All communications between ATC and aircraft are by HF third party voice relay. Aircraft 1 was maintaining FL360 and requested FL380. A clearance to FL370 was issued, with an expectation for higher levels at a later point. A clearance was then issued to Aircraft 2 to climb to FL390, this was correctly read back by the HF operator, but was issued to Aircraft 1. The error was detected when Aircraft 1 reported maintaining FL390.
E	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of human factors (e.g., late or non-existent coordination of flight level) The Asia Pacific Monitoring Agencies decided to apply the following E sub-categories starting from RASMAG/30: a) E-NT: No Transfer or Negative Transfer; b) E-LT: Late Transfer; c) E-RI: No or Late Revision of Transfer Information; and d) E-OT: Any Other Types. Example 1: Sector A coordinated Aircraft 1 to Sector B at FL380. The aircraft was actually at FL400. Example 2: The Sector A controller received coordination on Aircraft 1 for Waypoint X at FL370 from Sector B. At 0504 Aircraft 1 was at Waypoint X at FL350 requesting FL370.
F	Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of equipment outage or technical issues (e.g., late or non-existent coordination of flight level) Example: Controller in FIR A attempted to send AIDC message to coordinate transfer of aircraft at FL320. Messaging was unsuccessful to

	contact adjacent FIR by telephone fail. Aircraft contacted adjacent FIR without coordination being completed.
Aircraft Contingency Events	
G	Aircraft contingency event leading to sudden inability to maintain assigned flight level (e.g., pressurization failure, engine failure) Example: Aircraft 1 descended from F400 to F300 with a pressurisation issue.
H	Airborne equipment failure leading to unintentional or undetected change of flight level Example: Aircraft 1 cruising at FL380. ATC receives alert indicating aircraft climbing through FL383. Flight crew advises attempting to regain cleared level with autopilot and navigation system failure.
Deviation due to Meteorological Condition	
I	Turbulence or other weather-related causes leading to unintentional or undetected change of flight level Example: During the cruise at F400, the aircraft encountered severe turbulence, resulting the aircraft descending 1000 ft without a clearance.
Deviation due to TCAS RA	
J	TCAS resolution advisory, flight crew correctly climb or descend following the resolution advisory Example: Aircraft 1 was cruising at FL350. Flight crew received "Traffic Alert" from TCAS and almost immediately after an "RA Climb" instruction. Flight crew responded and climbed Aircraft 1 to approx. FL353 to comply with TCAS instruction. TCAS display indicated that opposite direction Aircraft 2 descended to approx. FL345 and passed below Aircraft 1.
K	TCAS resolution advisory, flight crew incorrectly climb or descend following the resolution advisory
Others	
L	An aircraft being provided with RVSM separation is not RVSM approved (e.g., flight plan indicating RVSM approval but aircraft not approved, ATC misinterpretation of flight plan) Example 1: Original flight plan details submitted by FIR A for outbound leg showed Aircraft 1 as negative RVSM. Subsequent flight plan submitted by FIR B showed Aircraft 1 as RVSM approved. FIR A controller checked with aircraft shortly after entering FIR A and pilot confirmed negative RVSM. Example 2: Aircraft 2 cruising FL310 was handed off to the Sector X controller who noticed the label of Aircraft 2 indicated RVSM approval. The Sector X controller had controlled the aircraft the day before. It was then a non-RVSM aircraft. The controller queried the status of Aircraft 2 with the pilot who advised the aircraft was negative RVSM.
M	Others

GNSS RFI led to LHD	
R	GNSS RFI caused the aircraft to deviate by 300 feet or more from the assigned flight level or unintentionally cross over another flight level. This scenario should be reported as LHD.

Form for LHD Report between FL 290 and FL 410

1.	**Reporting Agency**	**AIRPORTS AUTHORITY OF INDIA**
2.	Location of Deviation (Fix/Airway/Latitude- Longitude)	
3.	Date of Occurrence (UTC)	
4.	Airspace (BOB/Other)	
5.	Flight Identification and Type	
6.	Assigned/Expected Flight Level	
7.	Observed/Reported Final Level Mode C/Pilot Report	
8.	Duration at the Incorrect Flight Level	
9.	Cause of Deviation	
9.(a)	If Cause of Deviation is due to coordination errors in the ATC-to-ATC transfer of control responsibility as a result of human factors issues (Category E), was an automated capability (e.g., AIDC) used for the coordination of the flight?	
9.(b)	If applicable, Were the Supervisors of the affected ACCs advised of this LHD	
10.	Other Traffic	
11.	Crew Comments (if any, when noted)	
12.	Remarks	

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Annexure-C

FORM A - LHD Analysis

Due to the continuing prevalence of LHDs, FIRs are encouraged to conduct further investigation and provide in-depth analyses of LHDs, especially those induced by their responsible ATS units. The purpose is not to apportion blame on any organizations but to understand the underlying root causes in order to develop safety mitigations to prevent reoccurrence. In case of significant occurrences (such as long duration LHDs), FIRs are encouraged to provide an analysis for each occurrence. For other occurrences, FIRs can provide analysis of a group of similar occurrences. ***Please return the filled form to bobasma@aai.aero***

1. Organization: **2. Date of Analysis**:

3. If it is a single occurrence - Please provide occurrence date, call sign*, and location:

4. If it is a group of occurrences – Please describe the nature of occurrences:

5. Details of the analysis: Please provide detailed description of the followings

Description of Occurrence(s)	
Contributing Factors and Mitigations **-Contributing factors/causes**: Please describe ***all*** factors leading to such occurrence(s) **-Mitigations/controls/barriers**: Please describe any measure which could be used to prevent/detect LHD occurrence(s), or reduce their duration. Also, please describe existing barriers which could be improved.	
Procedures/LOAs –which could be non-existent, inappropriate, not strictly adhered to, or needed review	
Contributing factors/causes	**Mitigations/controls/barriers**
Human Factor Issues –ex. fatigue, workload, competency, English proficiency, teamwork, situational awareness	
Contributing factors/causes	**Mitigations/controls/barriers**
Systems/Equipment –ex. equipment failures, unserviceability, usability, reliability, poor design	
Contributing factors/causes	**Mitigations/controls/barriers**
Other Factors – ex. training, staffing, clearly defined roles and responsibilities, workplace condition, weather	

Contributing factors/causes	**Mitigations/controls/barriers**

Annexure-D

FORM B - LHD Preventive/Mitigation Measures

Due to the continuing prevalence of LHDs, FIRs are urged to provide a list of measures planned or taken to minimize LHDs (including detection of LHD occurrences and actions taken to reduce LHD duration). Please list all actions planned or taken by your organization, including comments on their effectiveness and ***return the completed form to bobasma@aai.aero.***

1. **Organization:**
2. **Date of analysis:**
3. **Hotspot/Area (example: eastern boundary of FIR A):**
4. **Please provide detailed description of the followings:**

No.	Preventive/ mitigation measures planned/ taken	Target/ actual effective date	Progress/ difficulties	Comments on effectiveness of mitigations
1				
2				
3				
4				
5				
6				

5. Is there anything the RMA/RASMAG/ICAO can assist with related to LHDs?

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Annexure-E

Classification of Navigation Errors (LLD/LLE), Navigation Error Investigation Form & Suggested Form for ATC Monthly Report of LLD or LLE

CLASSIFICATION OF NAVIGATION ERRORS (LLD/LLE)	
Deviation Code	**Cause of Deviation**
Operational Errors	
A	Flight crew deviate without ATC Clearance;
B	Flight crew incorrect operation or interpretation of airborne equipment (e.g. incorrect operation of fully functional FMS, incorrect transcription of ATC clearance or re-clearance, flight plan followed rather than ATC clearance, original clearance followed instead of re-clearance etc.);
C	Flight crew waypoint insertion error, due to correct entry of incorrect position or incorrect entry of correct position;
D	ATC system loop error (e.g. ATC issues incorrect clearance, Flight crew misunderstands clearance message etc.);
E	Coordination errors in the ATC-unit-to-ATC-unit transfer of control responsibility;
Deviation due to navigational errors	
F	Navigation errors, including equipment failure of which notification was not received by ATC or notified too late for action;
Deviation due to Meteorological Conditions	
G	Turbulence or other weather-related causes (other than approved);
Deviation due to GNSS RFI	
R	a) Lateral Deviation • GNSS RFI was detected, and the aircraft laterally deviated from the flight plan track by greater than a regionally agreed value relevant to the applied separation minimum. This scenario should be reported as LLD. b) Longitudinal Deviation • GNSS RFI was detected, and the aircraft's reported position or pilot estimate varies from the expected estimate, affecting the spacing with other traffic. This scenario should be reported as LLE. • In another case, the aircraft reached the transfer point earlier than expected by more than the longitudinal separation criteria. This was treated similarly to a "Negative Transfer" or a case where the transfer information was not coordinated. As a result, the aircraft may enter the adjacent FIR unexpectedly, potentially leading to both horizontal and vertical risks. Thus, this should be reported as both LLE and LHD.

Others	
H	An aircraft without PBN approval;
I	Others (Please specify)

NAVIGATION ERROR (LLD/LLE) INVESTIGATION FORM

PART 1 - To be completed by responsible officer in the Service Provider (and aircraft owner/operator if necessary)		
ATC Unit Observing Error:		
Date/Time (UTC):		
Duration of Deviation:		
Type of Error: (tick one)	☐ LATERAL	☐ LONGITUDINAL
Details of Aircraft		
	First Aircraft	Second Aircraft (when longitudinal deviation observed)
Aircraft Identification:		
Name of owner/Operator:		
Aircraft Type:		
Departure Point:		
Destination:		
Route Segment:		
Cleared Track:		
Position where error was observed: (BRG/DIST from fixed point or LAT/LONG)		
Extent of deviation [magnitude and direction] (NM for lateral, min/NM for longitudinal)		
Flight Level:		
Approximated Duration of Deviation		
For All Errors		
Action taken by ATC:		

Crew Comments when notified of Deviation:
Other Comments:

** (Please Attach ATS Flight Plan)

Suggested Form for ATC Unit Monthly Report of LLD or LLE

Bay Of Bengal Arabian Sea Safety Monitoring Agency (BOBASMA)

Report of Large Lateral Deviation or Large Longitudinal Error

Report to **BOBASMA**, of a large lateral deviation (LLD) or a large longitudinal error (LLE), as tabulated below.

*Note: Do not include ATC-approved deviation due to weather or other contingency events, unless the deviation magnitude is greater than the approved deviation

Type of Error	**Category of Error**	**Criterion for Reporting**
Lateral deviation	Individual-aircraft error	(1) 10NM or greater magnitude if lateral separation minima is 50NM or greater (2) 5NM or greater magnitude if lateral separation minima is less than 50NM
Longitudinal deviation	Aircraft-pair (Time-based separation applied)	Infringement of longitudinal separation standard based on routine position reports
Longitudinal deviation	Aircraft-pair (Time-based separation applied)	Expected time between two aircraft varies by 3 minutes or more based on routine position reports
Longitudinal deviation	Individual-aircraft (Time-based separation applied)	Pilot estimate varies by 3 minutes or more from that advised in a routine position report
Longitudinal deviation	Aircraft-pair (Distance-based separation applied)	Infringement of longitudinal separation standard, based on ADS-C, radar measurement or special request for RNAV position report

Longitudinal deviation	Aircraft-pair (Distance-based separation applied)	Expected distance between an aircraft pair varies by 10NM or more, even if separation standard is not infringed, based on ADS-C, radar measurement or special request for RNAV position report

Name of ATC unit: _____

Please complete Section I or II as appropriate

SECTION I:

There were no reports of LLDs or LLEs for the month of _____

SECTION II:

There was/were ____ report(s) of LLD for the month of _____

There was/were ____ report(s) of LLE for the month of _____

Details of the LLDs and LLEs are attached.

(Please use a separate form for each report of lateral deviation or longitudinal error).

Annexure-F

DATALINK ADS-C / CPDLC PROBLEM REPORT

Sl. No.	Field	Example
1	**Originator's reference number**	VOMF_2025_PR001 FIR_YEAR_PROBLEM REPORT NUMBER
2	**Title**	Short title which conveys the main issue of the reported problem (e.g., CPDLC transfer failure)
3	**Date UTC**	Date in YYYYMMDD format (e.g., 20090705);
4	**Time UTC**	Time in HHMM format (e.g., 2345)
5	**Aircraft registration**	ICAO flight plan aircraft registration (e.g., VTAZK)
6	**Aircraft identification**	ICAO flight plan call sign if applicable (e.g., NZA456)
7	**Flight sector**	If applicable, the departure and destination airfield of the flight (e.g., NZAA-RJBB)
8	**Active Centre**	Transferring FIR Name (e.g., VOMF)
9	**Next Centre**	Accepting FIR Name (e.g., WMFC)
10	**Position**	Position of occurrence (e.g., 3022S16345E)
11	**Problem description**	Detailed description of title (Sl. No. 2)

DATALINK ADS-C/CPDLC AVAILABILITY REPORT

For each outage, the following information should be collected:

1	**Time of CSP outage notification**	in YYYYMMDDHHMM format or "Not Notified" if no CSP notification
2	**CSP name**	name of CSP supplying outage notification, if applicable;
3	**Type of outage**	report media affected SATCOM, VHF, HF, ALL
4	**Outage start time**	in YYYYMMDDHHMM format
5	**Outage end time**	in YYYYMMDDHHMM format
6	**Duration of outage**	in minutes

Note: As per Appendix B of PBCS Manual 9869, only outages lasting longer than 10 minutes are reported.

When complete please forward the report(s) to:

Bay of Bengal Arabian Sea Indian Ocean Safety Monitoring Agency (BOBASMA)
Airports Authority of India
New ATS Complex
Chennai-600 027
Telephone-044 22561253
E-mail: bobasma@aai.aero