



**Seventh ATS Coordination Meeting of Bay of Bengal, Arabian Sea
and Indian Ocean Region (BOBASIO/7)
New Delhi, India, 18 – 19 September 2017**

AGENDA ITEM 5: Airspace Safety

ANALYSIS OF LARGE HEIGHT DEVIATIONS IN BOBASIO AIRSPACE

(Presented by BOBASMA)

SUMMARY

This paper presents an analysis of the Large Height Deviation reports filed by Chennai, Delhi, Kolkata and Mumbai FIRs during the period January to June 2017. The paper also presents the initiatives taken by BOBASMA/AAI to reduce the occurrence of LHDs due to errors in coordination between ATC Units.

1. INTRODUCTION

1.1 The Bay of Bengal Arabian Sea Indian Ocean Safety Monitoring Agency, BOBASMA established as an En-route Monitoring Agency to support the implementation and continued safe use of Reduced Horizontal Separation, has since 2013 been actively supporting the Regional Monitoring Agency (RMA) in the Safety Oversight of RVSM operations in the BOBASIO airspace.

1.2 Table 1 gives a summary of the BOBASIO airspace RVSM collision risk estimates reported by the RMA, MAAR (Monitoring Agency for Asia Region), in its annual Safety Reports presented to the Regional Airspace Safety Monitoring Advisory Group (RASMAG).

S. No	RASMAG Meeting	Technical Risk (2.5×10^{-9})	Operational Risk	Total Risk (5×10^{-9})
01	RASMAG/18 (April 2013)	0.42×10^{-9}	1.54×10^{-9}	1.96×10^{-9}
02	RASMAG/19 (April 2014)	0.65×10^{-9}	12.82×10^{-9}	13.47×10^{-9}
03	RASMAG/20 (May 2015)	0.95×10^{-9}	17.78×10^{-9}	18.73×10^{-9}
04	RASMAG/21 (June 2016)	0.83×10^{-9}	31.4×10^{-9}	32.27×10^{-9}
05	RASMAG/22 (July 2017)	0.87×10^{-9}	26.88×10^{-9}	27.75×10^{-9}

Table 1: Summary of BOBASIO RVSM Airspace Risk Estimates.

2. DISCUSSION

2.1 BOBASMA being the nodal point for collection and submission of LHD reports from the Indian ACCs/OCCs had collected and submitted 176 reports of Large Height Deviation that occurred during the period January to June 2017. Table 2 is a summary of the LHDs reported by the four Indian FIRs during the six month period. There was 175 Cat – E LHDs and one Cat – B LHD. The Cat – B LHD occurred

when an aircraft which was given descend to FL340 descended to FL320 resulting in traffic conflict with the aircraft on FL330.

S. No	Area Control Centre	Number of LHD Reports	LHD Categories	
			B	E
1	Chennai	47		47
2	Delhi	1	1	0
3	Kolkata	20		20
4	Mumbai	108		108
Total		176	1	175

Table 2: Summary of LHD reports filed by Indian FIRs

2.2 BOBASMA being the LHD Point of Contact (PoC) for India receives immediate notification from the RMA On-line LHD Reporting system when a Cat –E LHD report is filed by an adjacent FIR, in which the transferring unit is an Indian FIR. Table 3 is a summary of the LHD reports filed by adjacent FIRs in which the transferring unit happens to be one of the four Indian FIR.

S. No	Area Control Centre	Number of LHD Reports	LHD Categories	
			B	E
1	Kuala Lumpur ACC	42		42
2	Yangon ACC	54		54
3	Lahore	13		13
4	Muscat	7		7
Total		116		116

Table 3: Summary of LHD reports filed by adjoining FIRs

2.3 Table 4 provides the explanation of the different Category of LHDs that occurred in the airspace of the four Indian FIRs along with the number of reports in the respective category.

LHD Category	Definition	Number of Reports Filed		Duration at Incorrect Flight Level in Minutes
		Indian FIRs	Adjacent FIRs	
E	ATC system loop error; (e.g. ATC issues incorrect clearance or flight crew misunderstands clearance message. Includes situations where ATC delivery of operational information, including as the result of hear back and/or read back errors, is absent, delayed, incorrect or incomplete, and may result in a loss of separation).	Indian FIRs	175	472
		Adjacent FIRs	116	4
B	Flight crew climbing/descending without ATC Clearance		1	0

Table 4: Definition of LHD Categories reported by Indian FIRs

2.4 Table 5 gives the details of the Category – E LHDs reported by the different FIRs and the transferring units from where the coordination errors originated. The FIR boundaries between Mumbai/Muscat, Mumbai/Mogadishu, Mumbai/Sana and Kolkata/Yangon are the major LHD hotspots where the maximum numbers of Cat-E LHD occurrences were reported. These FIR interfaces are also regions having very poor or nil communication and Surveillance coverage. The other major LHD

hotspot, Chennai/Kuala Lumpur FIR interface has had only one long duration LHD since the area falls under the coverage of both VHF Communication and ADS-B Surveillance of Port Blair. Also most of the aircraft here log on to ADS-C and are as such observed by the controllers before entry into their airspace.

Flight Information Region	Number of Cat – E LHD Occurrence	Transferring unit	Number of Occurrences	Time Duration in Minutes
Chennai	47	Kuala Lumpur	38	26
		Yangon	6	0
		Colombo	2	0
		Jakarta	1	0
Kolkata	20	Yangon	20	47
Mumbai	108	Muscat	75	338
		Mogadishu	16	36
		Sana	7	25
		Chennai	3	0
		Male	5	0
		Karachi	1	0
Kuala Lumpur	42	Chennai	42	4
Yangon	54	Kolkata	54	0
Lahore	13	Delhi	13	0
Muscat	7	Mumbai	7	0

Table 5: Cat – E LHD Occurrences in the different FIR Interfaces.

2.5 Table 6 is a summary of the long duration LHDs with a time duration at incorrect flight level of 5 Minutes or more. The Oceanic airspace of Mumbai FIR accounts for the maximum number of long duration LHDs, mainly because in-bound flights, for which coordination had not been effected successfully with Mumbai, also not establishing contact with Mumbai ATC and transiting the entire Mumbai FIR until they are able to establish VHF contact with either Mumbai ACC or Chennai ACC. This has been a long continuing safety risk which was first identified in 2015 by BOBASMA. The LHD hotspots in the Mumbai Oceanic airspace has been a major contributing factor for the high level of safety risk in the BOBASIO airspace and as such continues to be a serious safety concern.

Summary of Long Duration LHDs (Duration ≥ 5 Mnts)						
FIR Interface	Month					
	Jan'17	Feb'17	Mar'17	Apr'17	May 17	Jun'17
Chennai/ Kuala Lumpur	--	--	1 (26)	--	--	--
Kolkata/ Yangon	--	--	2 (27,16)	--	--	--
Mumbai/ Muscat	6 (6,17,14,13,10,24)	4 (5,11,40,10)	2 (23,13)	4 (17,13,5,5)	1 (8)	3 (20+30+7)
Mumbai/ Mogadishu	1(5)	--	--	2 (11,12)	--	1 (7)
Mumbai/ Sana	--	--	2 (18,7)	--	--	--

Table 6: Summary of Long Duration LHDs.

Initiatives taken by AAI/BOBASMA in the last six months.

2.6 Recognizing the raising trend in the Safety risk in the oceanic airspace of India, Airports Authority of India and BOBASMA took various initiatives to address the immediate need to reduce the occurrence of long duration LHDs due to coordination errors.

2.6.1 Airports Authority of India in coordination with ICAO-APAC office, hosted the African, Asia/Pacific and Middle East Asia Region ATM Special Coordination Meeting (AAMA/SCM) at Mumbai, India from 19th to 20th January 2017. The meeting was attended by participants from India, Kenya, Somalia & Seychelles, ICAO, IATA and ICCAIA. The meeting was moderated by the Regional Officers of the three ICAO regions and were supported by an ICAO technical Officer from ICAO HQ (ANB/AMO).

2.6.2 BOBASMA presented a compressive analysis of the Safety Risks in the Arabian Sea Airspace (WP03), which highlighted the risk of inter-unit coordination errors as a result of human factors issues reported by Mumbai ACC. Based on the discussions it was decided that;

- a. ICAO MID Office will make Oman and Yemen aware of the trans-regional safety issues and advise them to update their LOA with Mumbai to improve on safety and efficiency in the Indian ocean airspace
- b. ICAO MID Office to urge Oman to start testing AIDC with Mumbai.
- c. ICAO Mid office to schedule a meeting with Oman and neighboring ANSPs by May 2017 to address the issues at the Muscat – Mumbai FIR interface.
- d. Implement re-organized route structure in Mogadishu and Mumbai that will de-conflict traffic flows and reduce LHDs
- e. Mogadishu, Seychelles and Mauritius FIRs to train ATS personnel to use the dedicated line to India for ATS coordination when necessary
- f. Mogadishu to amend their AIP to include a reference for pilots to contact Mumbai ATC 30 minutes before the FIR Boundary.

2.6.3 In line with decision in 2.6.2 (c) a meeting was held in ICAO MID Office, Cairo, Egypt on 21st May followed by the Third meeting of MIDANPIRG ATM Sub Group. Senior officials from Mumbai ACC participated in both the meetings. Based on the discussion both Oman and India agreed to initiate the following steps to reduce the occurrence of LHDs;

- a. Muscat ATC to create additional Sector along the Mumbai/Muscat FIR boundary and Mumbai to commence full operations on 24 hour basis, in all the four sectors under trial operations in the Mumbai Oceanic Control Centre by September 2017.
- b. Additional voice communication channel to be established between Mumbai and Muscat ATC to ease congestion on existing communication channels.
- c. Create an LHD Task Force in both Muscat and Mumbai with the objective of scrutinizing the occurrence of LHDs. The two TFs to maintain close liaison and work to reduce the occurrence of LHDs at the FIR boundary.

- d. AIDC trial operations between Mumbai and Muscat to start from July 2017.
- e. To constitute a joint ATM/CNS Task Force to initiate steps to enhance the surveillance and communication facilities at the Muscat/Mumbai FIR boundary.

2.6.4 Airports Authority of India also took the initiative of hosting the India, Indonesia and Malaysia Special Coordination Meeting (IIMSCM) at Chennai, India from 25th to 26th April 2017. Both ATM as well as technical experts from the three states participated in the two day meeting.

2.6.5 The meeting discussed in detail the occurrences of aircraft deviations due to coordination errors in the Bay of Bengal airspace and the need to expedite the implementation of AIDC between the concerned ATS Units. Technical/automation experts of Chennai and Kuala Lumpur interacted to resolve all issues related to AIDC and a detailed Standard Operating Procedure (SOP) for exchange of AIDC messages between Chennai and Kuala Lumpur was prepared to serve as a working arrangement until a Letter of Agreement is signed between the two ATS Units. The meeting adopted the SOP and the same was signed by the General Manager (ATM) Airports Authority of India, Chennai and Principal Assistant Director, Department of Civil Aviation, Malaysia. Based on the SOP, exchange of AIDC messages between Chennai and Kuala Lumpur became operational from **15th May 2017**.

2.6.6 Separate side meetings were held, between India and Malaysia and between India and Indonesia to discuss and review the Letter of Agreements and prepare draft LoAs. The Draft LoA between Chennai and Jakarta has since been signed and had become effective from 1st September 2017.

2.7 Further AAI is also planning to

- a. Provide for one more ADS-B ground station at Campbell Bay in the Nicobar Islands of the Bay of Bengal.
- b. Provide RCAG at Agatti Island to enhance VHF coverage in the Arabian Sea and an additional VHF ground station in the Andaman Nicobar islands.
- c. Provide surveillance over the remote oceanic airspace of Mumbai, Chennai and Kolkata FIRs using space based ADS-B surveillance technology.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) note the initiatives taken by AAI/BOBASMA to mitigate the safety risks;
- c) discuss any relevant matters as appropriate.

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