International Civil Aviation Organization

MIDANPIRG Air Traffic Management Sub-Group

Third Meeting (ATM SG/3)
(Cairo, Egypt, 22 – 25 May 2017)

Agenda Item 4: MID Region ATS Route Network

OUTCOME OF THE AAMA SCM

(Presented by the Secretariat)

SUMMARY

This paper presents the outcome of the African Region (AFI)-Asia/Pacific Region (APAC)-Middle East Region (MID) Air Traffic Management (ATM) Special Coordination Meeting (AAMA/SCM) for the meeting appropriate action.

Action by the meeting is at paragraph 3.

REFERENCES

- AAMA SCM Report

1. INTRODUCTION

1.1 The African Region (AFI)-Asia/Pacific Region (APAC)-Middle East Region (MID) Air Traffic Management (ATM) Special Coordination Meeting (AAMA/SCM) was kindly hosted by the Airports Authority of India at Mumbai, India from 19 to 20 January 2017.

1.2 The meeting was attended by forty five (45) participants from four (4) States and three (3) International Organizations, including India, Kenya, Somalia, Seychelles, IATA, ICCAIA and ICAO.

2. DISCUSSIONS

2.1 The objective of the AAMA SCM was to provide a forum to discuss the ATM safety-related concerns at the AFI-APAC-MID interface (with a focus on the Mogadishu Flight Information Region (FIR), and any ATM systems, standards and procedures that may be improved to address the safety concerns. In addition, ATM contingency planning was discussed and the meeting provided opportunity to update the Air Traffic Services (ATS) Letters of Agreements (LoAs) between Mumbai and Seychelles and Mogadishu and Mumbai ACCs.

2.2 The AAMA SCM addressed the safety issues in the Arabian Sea and raised concern related to the high level of LHD reports.

2.3 The meeting agreed that ICAO follow-up the implementation of AIDC between Mumbai and Muscat ACC.

2.4 The meeting reviewed the proposal for amendment related to ATS routes presented by India, which would affect the traffic operations between AFI, APAC and MID Regions. It was agreed that each ICAO Office to follow-up the subject with its relevant concerned States.

2.5 The meeting addressed the contingency arrangements related to Mogadishu FIR and agreed to a Simplified Route Scheme associated with FLAS (SRS/FLAS). Coordination is in ongoing between Oman and Yemen to ensure safe and efficient implementation of the SRS/FLAS, which would require the amendment of ATS routes UB403 and B404.

2.6 The report of the AAMA SCM is at **Appendix A**.

3. ACTION BY THE MEETING

3.1 The meeting is invited to review the report of the AAMA SCM is at **Appendix A** and take appropriate actions.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE AFRICAN REGION (AFI)-ASIA/PACIFIC REGION (APAC)-MIDDLE EAST REGION (MID) AIR TRAFFIC MANAGEMENT (ATM) SPECIAL COORDINATION MEETING (AAMA/SCM)

MUMBAI, INDIA, 19 – 20 JANUARY 2017

The views expressed in this Report should be taken as those of the Meeting and not the Organization

Approved by the Meeting and published by the
ICAO Asia and Pacific Office, Bangkok,
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ICAO Eastern and Southern African Office, Nairobi

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INTRODUCTION

Meeting

1.1 The African Region (AFI)-Asia/Pacific Region (APAC)-Middle East Region (MID) Air Traffic Management (ATM) Special Coordination Meeting (AAMA/SCM) was kindly hosted by the Airports Authority of India at Mumbai, India from 19 to 20 January 2017.

Attendance

2.1 The meeting was attended by 45 participants from four States and three International Organizations, including India, Kenya, Somalia, Seychelles, IATA, ICCAIA and ICAO. A list of participants is provided at **Appendix A** to this Report.

Officers and Secretariat

3.1 Mr. Len Wicks, Regional Officer Air Traffic Management (ATM), ICAO Asia and Pacific (APAC) Office, Mr. Elie El Khoury, Regional Officer ATM, ICAO Middle East (MID) Office, and Mr. Seboseso Machobane, Regional Officer ATM and Search and Rescue (SAR), ICAO Eastern and Southern African Office moderated the meeting. They were supported by Mr. Mike Boyd, ICAO Technical Officer, ICAO HQ (ANB/AMO).

Language and Documentation

4.1 The working language of the meeting was English for all documentation and this Report.

4.2 A total of nine working papers (WP) and four information papers (IP) and two presentations were considered by the meeting. The list of working and information papers is attached at **Appendix B** to this report (IP01).

Opening of the Meeting

Opening Address

5.1 The Chairman of the Airports Authority of India (AAI) and Member Air Navigation Services (ANS) AAI informed delegates about India's future plans to upgrade the ANS systems such as High Frequency (HF) systems, ATM automations systems, surveillance systems etc.

5.2 The moderators welcomed participants to the meeting, and thanked the AAI for hosting the meeting. They outlined the general objectives of the AAMA/SCM, stressing that, due to the serious ATM safety issues outlined in the papers related to the Mogadishu Flight Information Region (FIR), the SCM needed to come up with a firm action plan to address the problems, so the status quo was not an option.

5.3 The meeting noted that there appeared to be only three options in the near future: either (1) improve the capability of Somalia, or (2) delegate the upper airspace to an Air Traffic Services (ATS) unit which could provide the services in compliance with ICAO Standards; or (3) impose restrictions for flight operations within the Mogadishu FIR that restored an appropriate level of safety. In this regard, ICAO recalled that the meeting was not dealing with a classic case of contingency planning whereby services might degrade from a class A ATC service, as Mogadishu was already operating as only a class F [uncontrolled] advisory service (although the airspace was currently classified as class 'G' (uncontrolled).

REPORT ON AGENDA ITEMS

Agenda Item 1: Welcome and Adoption of Provisional Agenda

1.1 The provisional agenda (WP01) was adopted by the meeting, noting IP01 (Tentative List of Working and Information Papers).

Agenda Item 2: Review of AFI-APAC-MID Large Height Deviations (LHD) and other interface safety concerns

RASMAG Safety Concerns (WP02)

2.1 The ICAO APAC Office presented relevant information from the Twenty-First Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/21, Bangkok, Thailand, 14-17 June 2016), which is the Asia/Pacific's airspace safety monitoring body under the Asia Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG).

2.2 RASMAG/21 had noted that a new hot spot had emerged during 2015 along the western boundary of the Mumbai FIR, which interfaced with the Mogadishu, Sana'a, and Muscat FIRs. The surge in long duration Large Height Deviations (LHDs) in March and April 2015 coincided with the temporary closure of Sana'a FIR and redirected contingency traffic through the Mogadishu FIR However, even though the spike in LHDs had abated since the mid-2015 reopening of the Sana'a FIR, reports still indicated a continued poor safety performance on both FIR boundaries.

2.3 **Figure 1** provides the Reduced Vertical Separation Minimum (RVSM) Airspace Risk Estimate Trends for 2015 of South Asia/Indian Ocean Airspace affected by these safety incidents.

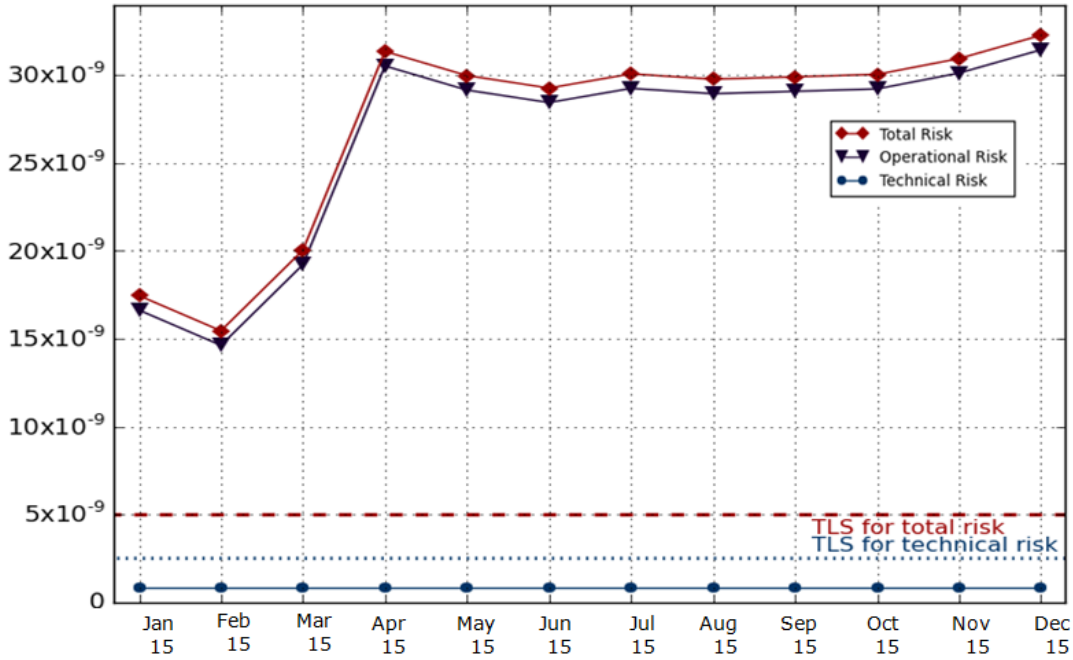

Figure 1: RVSM Airspace Risk Estimate Trends

2.4 The Monitoring Agency for the Asian Region (MAAR) had noted that all the long duration LHDs in the western portion of the Mumbai FIR had been as a result of ATC breakdowns in coordination between Mogadishu and Mumbai, or Muscat and Mumbai. Moreover, they stated that the absence of a transfer message together with the lack of ATS surveillance and poor communication service resulted in some aircraft traversing the whole Mumbai FIR without Mumbai Area Control's Centre (ACC's) knowledge.

2.5 India had noted at RASMAG/21 that there could be more LHDs in the area concerned that might not have been reported. India stated that ATS Inter-facility Datalink Communications (AIDC) implementation could not be construed as the only solution for mitigation of LHD hotspots and that States need to look into other possible mitigation measures as well.

2.6 ICAO had noted that Mogadishu had limited capacity, which was understood to be a procedural system with constrained communications capability, but that neighboring ACCs in Kenya (which used to service Mogadishu airspace) and the Seychelles were implementing AIDC and modern ATM systems. Therefore, RASMAG/21 noted that if the hot spot remained, it was possible that APANPIRG would recommend consideration of a delegation of upper airspace management to more capable ACCs in future, to reduce the unacceptable risk within the Asia/Pacific Region.

2.7 Apart from the safety concerns related to LHDs, RASMAG/21 discussed the consequential problems caused by the Sana'a FIR's contingency operation in terms of air safety incidents. It was noted by India that ad hoc contingency bypass arrangements and the lack of ATC capability within the Mogadishu FIR had been a factor in reported serious air safety incidents within the Mumbai FIR and in proximity to the Mumbai FIR boundary.

2.8 RASMAG/21 emphasised that the interface with the Mogadishu FIR was not the only area where the MAAR had noted a large number of LHDs occurring in the Mumbai FIR also being caused near the interface with the Muscat FIR. They noted that the number of LHDs involving breakdown in coordination from the Muscat FIR had grown considerably, and many of these LHDs had a very long duration, so they had contributed greatly to the risk in the Mumbai FIR.

2.9 India had informed the APAC Regional Office that the Airports Authority of India had installed a dedicated telephone line for outgoing calls to facilitate coordination with Seychelles and Mogadishu (+91 22 26819565), but this was not always being used effectively between the respective units. The AAMA/SCM noted the APAC position that as the level of safety risk between the Muscat, Sana'a, Mogadishu and Mumbai FIRs was well above acceptable levels, so there needed to be a priority focus on improved infrastructure and Air Traffic Control (ATC) performance by all parties.

2.10 Airspace users recalled that there had been a period in which, for security reasons, some airlines were not approved to fly via the Mogadishu FIR, which had caused a significant economic pressure on airlines (however, operations in the FIR were recently approved). Accordingly, while fully endorsing implementation of measures to ensure safety, the users requested that restrictions should be kept to a minimum. Somalia also shared information on their latest security situation.

2.11 Following a proposal from AAI, it was agreed that India could, through an AIP publication indicate a recommendation for flights to log on to Mumbai by Controller Pilot Datalink Communications (CPDLC) 30 minutes or more before crossing the FIR boundary. However, ICAO noted that there was a risk in such arrangement, of controllers assuming that being in contact also gave them control authority before the aircraft crossed into their area of jurisdiction. Appropriate measures were to be taken to minimize the risk, including an update of ATS Letters of Agreement (LoAs).

2.12 The ICCAIA indicated that as part of the aviation industry, they offered to assist. Aireon offered to provide a proposal on a trial basis for consideration by States (such as a trial of the early operational capability of Automatic Dependent Surveillance – Broadcast (ADS-B)).

Safety Risks in the Arabian Sea Airspace (WP03)

2.13 India (Bay of Bengal Arabian Sea Safety Monitoring Agency, BOBASMA) provided WP03, which highlighted the risk of inter-unit coordination errors as a result of human factors issues, reported by Mumbai ACC. WP03 requested urgent action to mitigate the effect of these errors by utilizing the latest communication and surveillance technology, which would enhance the traffic situational awareness and thus reduce safety risks.

2.14 BOBASMA emphasised that whenever HF communication was poor, which was a regular phenomenon over the Arabian Sea, aircraft without ADS-C/CPDLC were unable to establish contact with Mumbai ATC and come in contact only when within the VHF range of either Mumbai ACC or Chennai ACC at the boundary between Mumbai and Chennai FIRs. The meeting noted that for any flight to fly on these routes without the knowledge of Mumbai Air Traffic Control (ATC) for long durations was a serious safety risk. However, BOBASMA indicated that the use of Flight Level Allocation Schemes (FLAS) had to a great extent helped in avoiding any untoward incidents so far.

Table 1 provides an overview of the RVSM Safety Risk Estimates from 2013 until 2016.

Meeting	**Technical Risk**	**Operational Risk**	**Total Risk**
RASMAG/18 (April 2013)	0.42×10^{-9}	1.54×10^{-9}	1.96×10^{-9}
RASMAG/19 (April 2014)	0.65×10^{-9}	12.82×10^{-9}	13.47×10^{-9}
RASMAG/20 (May 2015)	0.95×10^{-9}	17.78×10^{-9}	18.73×10^{-9}
RASMAG/21 (June 2016)	0.83×10^{-9}	31.44×10^{-9}	32.27×10^{-9}
MAWG/4 (Dec 2016)	0.83×10^{-9}	25.47×10^{-9}	26.30×10^{-9}

Table 1: RVSM Safety Risk Estimates from 2013 until 2016

2.15 **Table 2** provides a comparison of coordination errors reported by Mumbai.

Month	**Mogadishu**	**Muscat**	**Sana'a**	**Seychelles**	**Total**	**Duration**
January 2015	--	--	--	--	--	--
February 2015	--	--	--	--	--	--
March 2015	--	3	--	--	3	302
April 2015	16	--	--	--	16	619
May 2015	1	1	--	--	2	0
June 2015	4	--	--	--	4	0
July 2015	7	--	--	--	7	0
August 2015	2	1	--	--	3	9
September 2015	--	--	1	--	1	20
October 2015	1	--	--	--	1	0
November 2015	--	1	--	1	2	60
December 2015	1	2	--	1	4	16
January 2016	2	1	1	--	5	172
February 2016	--	--	3	--	4	0
March 2016	2	1	2	1	6	0
April 2016	2	2	--	--	4	4
May 2016	--	2	--	--	2	33
June 2016	2	4	--	--	6	67
July 2016	2	2	--	--	4	17
August 2016	2	8	1	--	14	354
September 2016	1	17	1	--	19	218
October 2016	4	9	--	--	13	6
Total	49	54	9	3	120	1,897

Table 2: Inter-Unit Coordination Errors Reported by Mumbai ACC

2.16 IATA requested further information on the actual airframes involved so they could assist in identifying specific LHD root causes.

2.17 India provided an analysis (**Table 3**) that indicated the carriage of Automatic Dependent Surveillance – Contract (ADS-C) and CPDLC for all routes in the concerned interface area averaged 59.6% in December 2015, with the high density route from Mogadishu (G450) indicating 70.6% equipage. India noted that emerging surveillance technologies such as space-based ADS-B may be able to greatly improve surveillance of oceanic airspace. Therefore, India stressed the need for:

- improved inter-unit communication such as direct speech circuits and AIDC;
- the mandating of ADS-C/CPDLC carriage; and
- researching the possibility of space-based ADS-B implementation.

Transferring Unit	Route	Movements (December 2015)	ADS/CPDLC Equipped	%	Long Duration LHDs (January 2015-October 2016)
Muscat	L301	6055	4252	70.2	1
	N571	3609	2435	67.5	-
	P574	3369	1539	45.6	1
	N563	477	201	42.1	2
	M300	4229	1730	40.9	7
	P570	1638	950	57.9	-
	L894	962	848	88.1	2
	L516	81	71	87.6	-
Sana'a	UL425	455	274	60.2	-
	P751	113	80	70.7	-
Mogadishu	G450	531	375	70.6	8
Seychelles	G424	28	24	85.7	-
	B459	30	7	23.3	-
	G465	110	62	56.3	-
	L875	134	124	92.5	-
Mauritius	A474	50	37	74	-
Karachi	M638	24	20	83.3	-
	P518	100	94	94	-
Totals		**21995**	**13123**	**59.6**	**21**

Table 4: ADS/CPDLC Equipage.

2.18 India stressed the need to coordinate with airline operators regarding specific incidents of aircraft not contacting ATC. Aircraft unable to contact ATC through normal channels needed to use all available means including use of SATCOM, aircraft operator channels or through other aircraft to relay their position to ATC.

2.19 The meeting noted that the Mogadishu FIR operating environment was not a typical contingency planning situation, as the safety analysis indicated that ATS had been in a degraded state well below acceptable levels of safety for some time – thus the meeting needed to focus on immediate measures to restore a reasonable level of safety. BOBASMA informed the meeting that states should consider using generic e-mail IDs as Points of Contacts (POCs) as India was doing, so that e-mail correspondence was addressed to the right person who dealt with the subject matter at the other end.

2.20 The importance of uploading LHDs for analysis as soon as possible in order to enable adjacent FIRs to investigate and take corrective action was emphasised, as was improved coordination between the AFI, MID and APAC RMAs. The meeting agreed that ICAO MID should follow-up with Oman and Yemen and the MIDRMA to improve coordination with India related to the reported LHDs, and take measures to solve the issues at the interface.

2.21 It was highlighted that the use of the MIDRMA LHD Online Reporting tool could enhance the reporting and coordination of LHDs.

2.22 Kenya stated that human factors and ergonomics needed to be considered when analysing the causes of LHDs. An example of this was the position of communication systems in relation to the ATS workstation.

2.23 The meeting discussed the contributing factors to the LHDs, which included communications failures between the Mogadishu ATS unit and aircraft, and between ATS adjacent to the Mogadishu FIR. Somalia informed the meeting that sometimes coordination was a lengthy process and that Mumbai controllers sometimes varied in their coordination responses. The moderator to the meeting requested Somalia to raise the matter in a proposed side meeting. After the side meeting, it was informed that though India differed in the observation made by Somalia, it would consider a specific instance if brought to notice by Somalia.

2.24 The ICAO Technical Cooperation Bureau (TCB) shared information on the Somalia project for provision of ANS in Mogadishu FIR through the Flight Information Service for Somalia (FISS) Project. This included planned ATM and Communications, Navigation and Surveillance (CNS) improvements, support for the establishment of a Somalian ANS regulatory capacity and a transition process to the Somalia government. In terms of CNS, the meeting was informed that the following key improvements were planned:

- replacement of the HF installation (to be completed Q2 2017);
- implementation of CPDLC (tentatively planned for Q2 2017);
- improvement of ground to ground communication with Mumbai through connection with existing NAFISAT link. (tentatively planned for Q2 2017);
- implementation of Enhanced Very High Frequency (VHF) systems (Q3 2018);
- establishment of an Area Control Centre (ACC) in Mogadishu including VSAT, CPDLC/ADS-C, NAFISAT, Voice Communications Control System (VCCS) and integration with ADS-B surveillance (Q3 2018).

2.25 Somalia acknowledged that there had been delays in the delivery of the project. Nevertheless, the Government of Somalia remained confident that TCB would achieve the agreed goals. However, Somalia stated that the government was prepared to engage a private ANSP in order to discharge its responsibilities as a State.

2.26 While noting the measures to address the deficiencies and shortcomings, the meeting highlighted the need to find solutions to dramatically reduce the current high volumes of airspace safety occurrences. Somalia informed the meeting that the recruitment of controllers had already started and INMARSAT telephones were installed.

2.27 ICAO mentioned that the safety occurrence reports emanating from the Mogadishu FIR were likely to be only a small fraction of the actual occurrences, noting that the level of reporting in the FIR was low. IATA and its members were encouraged by the meeting to continue reporting.

2.28 The meeting discussed the issue of airlines instructing their aircrews to not act upon instructions for level change in the Mogadishu airspace in accordance to Airline Operations Manual Part C for class G airspace. It was noted that this practice could result in degradation (not improvement of safety) if the instruction had originated from an adjacent ACC. Somalia was urged to ensure that proper radio phraseologies were used when relaying ATC clearances from adjacent FIRs, and flight crews were urged to challenge clearances which are not prefixed accordingly, instead of simply ignoring them. Airlines were also to take steps to improve use of the IATA In-flight Broadcast Procedure (IFBP).

2.29 In a presentation to the meeting, the ICAO TCB detailed the following risk mitigation measures that were in place (in addition to the urgent CNS facility upgrades):

- revision of the ATS Standard Operating Procedures to ensure personnel were using correct procedures and radiotelephony phraseologies, and enhanced coordination procedures between Mogadishu FIC with adjacent FIRs were applied;
- implementation of Strategic Lateral Offset Procedures (SLOPs) for the entire Mogadishu FIR in accordance with APIRG Conclusion 17/43 – as updated by Conclusion 20/19;
- encouraging the use of SATCOM by all aircraft transiting the Mogadishu FIR with the capability of satellite communication as promulgated through NOTAM A0029/16, for portions of the airspace where communication was unavailable or too poor to support effective ATS;
- publication of NOTAM A0055/16 recognizing the fact that Mogadishu FIR is class G airspace where only Flight Information Services (FIS) is provided, and pilots are to maintain a high level of alertness when transiting through the Mogadishu FIR RVSM airspace and take appropriate action to ensure safety of flight by maintaining continuous listening watch on VHF emergency frequency 121.5 MHz and IFBP frequency 126.9 MHz at all times;
- prompt investigation of reported Unsatisfactory Condition Reports (UCRs) in order to progress the investigation of air safety incidents and make further improvements;
- enhancement of Safety Management System (SMS) measures, Aeronautical Information Management (AIM) and training with the appointments of SMS, AIM and Training Managers; and
- New staff being recruited for ATM and CNS supervision and quality assurance.

2.30 Detailed TCB project milestones including the date of expected implementation were requested by the meeting.

Agenda Item 3: ATM system enhancements at the AFI-APAC-MID interface (taking into account the Asia/Pacific Seamless ATM Plan)

ATM System Interface Enhancements (WP05)

3.1 India provided information about the progress made by AAI towards modernised ATM systems for coordination with neighbouring FIRs, and future plans for implementation of the Seamless ATM Plan.

3.2 India advised the AAMA/SCM about plans for AIDC and upgraded communications between various ATS units.

- Chennai and Mumbai implementation had been successful.
- Mumbai had conducted AIDC tests with Male in August 2016 (exchange of FPL, ABI, EST, TOC, and AOC messages was successful; further tests were proposed).
- Mumbai has been ready for AIDC trials with Muscat since April 2016, but on 01 May 2016, Muscat advised that they would need more time to commence trials.
- Mumbai tested with Karachi in December 2015 – messages originating from Mumbai were sent successfully but were not received at Karachi; results were compiled and sent to Karachi but no feedback received from Karachi so far.
- implementation of exclusive Direct Speech Circuit (DSC) between Mogadishu and Mumbai was proposed by Somalia in 2015.

3.3 Air Traffic Flow Management (ATFM) operational trials within Indian FIRs was scheduled from 19 January 2017. India was planning to link the AAI ATFM with Muscat in near future to support cross-border ATFM.

3.4 India noted that the Mumbai ACC was capable of processing surveillance data from multiple sensors, and AAI was ready to discuss surveillance data sharing with neighbouring FIRs.

3.5 The meeting noted that an ICAO MID ATFM Task Force will be established under the framework of MIDANPIRG to develop a MID ATFM Concept of Operations towards the implementation of an ATFM regional system. India was invited to be part of the Task Force and support its work to ensure proper coordination and harmonization at the interface between the ICAO APAC and MID Regions.

3.6 IATA was concerned that the Muscat – Mumbai FIR crossing issue had imposed delays, and re-routes on Middle East to India, and South Asia departures. The ICAO Mid office agreed to schedule a meeting with Oman and neighbouring ANSPs by May 2017 to address this issue.

3.7 Information was provided on ATC infrastructure improvements in the Muscat FIR, including a new ACC, which was commissioned in December 2016. These were expected to contribute to a reduction of LHDs. However Oman would be urged by the ICAO MID Office to implement AIDC as soon as practical. The meeting noted that Mumbai ACC was ready to commence AIDC trials at any time, which would improve the LHD situation.

3.8 The meeting was informed that with regard to enhanced communications between ATS units, India has been requested to consider the installation of a NAFISAT terminal at Mumbai and it was expecting ATNS, the South African Air Navigation Service Provider (ANSP), would submit a detailed proposal to India. The meeting was informed that this would enable Mumbai ACC to communicate with the AFI FIRs in which NAFISAT terminals were installed (Seychelles, Mauritius, FISS Nairobi (Mogadishu FIR) etc., and another NAFISAT terminal was to be installed in Mogadishu).

Indian Ocean ATM System Modernisation (WP07)

3.9 The ICAO APAC Office presented information about the Asia/Pacific Seamless ATM Plan, which emphasised human performance in several areas relevant to the provision of safe and efficient services within the inter-regional airspace between the AFI, APAC, and MID areas. Of relevance to the AAMA/SCM, the meeting recognized that enhanced capacity was important to minimize the consequences of any contingency or degradation in services.

3.10 ICAO emphasized the Asia/Pacific Seamless ATM Plan's expectation for the application of horizontal separation minima stated in ICAO Doc 4444 (PANS ATM), or as close to the separation minima as practicable to this standard.

3.11 Moreover, there was a performance expectation that FLAS other than Organised Track Systems (OTS) should only be utilised for safety and efficiency reasons within Category R (remote) airspace with the agreement of all Air Navigation Service Providers (ANSPs) that provide services:

- within the airspace concerned; and
- within adjacent airspace which is affected by the FLAS.

3.12 ICAO recalled that there had been numerous complaints from African carriers and ANSPs about aircraft from African airspace being kept well below optimum operational flight levels due to the procedural FLAS requirements imposed by India. It was noted that the removal of this FLAS was connected to an assurance of appropriate communication with adjacent ATS units, and the availability of datalink services so Mumbai ATC could utilize 50NM and 30NM separation standards.

3.13 India also referred to paragraph 4.1 of the Report of Second Meeting of the Joint Coordination Meeting of the ICAO Reduced Vertical Separation Minimum (RVSM) Implementation Task Forces of the Middle East and Asia Regions (JCM-RVSM MID/ASIA/2, Abu Dhabi, United Arab Emirates 27 to 28 August 2003). The application of FLAS in Arabian Sea airspace was in accordance with the decision of JCM-RVSM MID/ASIA/2 – 2003, so the meeting noted that the FLAS was not imposed by India unilaterally. As a result of improved coordination and cooperation among Mumbai and Seychelles/Mauritius/Mogadishu FIRs, the FLAS had been amended since November 2016 as described in this Report. The upgrading of the HF system planned by India would further improve communication between flight crew and Mumbai ATC.

3.14 Kenya stated that the FLAS had resulted in an increase of workload for the Nairobi FIR, such as when pilots queried an instruction by Mumbai to change levels within the Mogadishu FIR back to the Nairobi ACC.

3.15 India stated that FLAS on ATS route A474 was being cancelled. Qatar Airways responded by thanking India, as 1,500 kg of fuel per flight could be achieved if FLAS was suspended. Ethiopian Airlines stated that they lose 1million kg of fuel annually due to the FLAS.

3.16 The ICAO APAC Office informed the meeting about the use of RNP 2 Performance-based Navigation (PBN), as this was the preferred specification for future en-route systems in the Asia/Pacific, allowing close spacing and enhanced capacity. The meeting was informed that APANPIRG had endorsed a transitional equivalence to RNP 2 for aircraft that were approved for RNAV 2, RNP 1 and Global Navigation Satellite Systems (GNSS).

Agenda Item 4: Airspace Organisation and Management (AOM) and ATC separation standards

Application of Appropriate Oceanic ATC Separation Standards (WP04)

4.1 The ICAO APAC Office discussed the need for capacity building in preparation for any contingency operation, in terms of human performance.

4.2 ICAO noted that the Asia/Pacific Seamless ATM Plan clearly expected the use of tactical ATC service using tools such as ADS-C, instead of procedural structures. The use of electronic flight progress strips and ATS surveillance systems support this. The Plan's expected separation standards within the Mumbai FIR between datalink equipped aircraft were 30NM and 50NM. In addition, the flight tracking requirement under the Global Aeronautical Distress and Safety System (GADSS) normally relied on the provision of ADS-C in remote airspace until the advent of space-based ADS-B.

4.3 The meeting noted that the removal of the procedural FLAS restrictions were connected to an assurance of appropriate communication with adjacent ATS units and availability of datalink services, so Mumbai ATC could utilize the 50NM and 30NM separation standards. India informed the meeting that 30 NM separation on RNP 4 routes and 50 NM separations on other routes were used on opportunity basis between pair of aircraft with appropriate capabilities.

4.4 The meeting discussed the application by India of a 15 minute separation on routes from AFI that crossed the major traffic flow across the Indian Ocean. India stated that the 15 minutes separation was applied at those reporting points where navigation aids did not permit frequent determination of position and speed as per provision of PANS ATM DOC 4444. ICAO stated that this was unnecessarily conservative as RNAV aircraft could determine their position accurately and frequently; thus allowing the use of 10 minute separation without even considering the aircraft's PBN status. India informed the meeting that the possibility of reducing separation to 10 minutes would be considered after an improvement in HF performance within oceanic airspace.

4.5 India agreed to review the use of the 10 minute standard in order to minimise conflicts and workload. In addition, India was requested by IATA to provide more analysis of the actual rate of conflicts on AFI routes that crossed the major traffic flow.

Economic Impact of FLAS within the Mumbai FIR (WP06)

4.6 Air Mauritius presented an analysis of the issues faced by the airline within the Mumbai FIR due to the existence of the FLAS, which had been established in 2003 by an ICAO meeting to reduce risk. Flights were required to plan at non-optimum levels and consequently the airline incurred a substantial fuel penalty.

4.7 Due to the FLAS, northbound flights from Mauritius were restricted to Flight Level (FL) 330 prior to entering Mumbai FIR and southbound flights are allocated FL320 (changed from FL 300 to FL320 since mid-November 2016). Air Mauritius stated that this represented a total fuel penalty of 825,000 Kg annually and a CO_2 emission of some 2,600 tonnes, with a financial burden calculated to be USD 500,000 annually.

4.8 Air Mauritius observed that their December 2016 analysis indicated that ATC had no apparent difficulty in allocating FL380 within the Mumbai FIR for flights departing from Delhi, and that there was no definite advantage whether the aircraft was CPDLC equipped or not. The analysis also indicated that a total of 53% of flights were not granted optimum cruising levels. The main cause for this was climb performance, poor ATC communication or the optimum level not being available.

4.9 India restated to the meeting that with appropriate amendments to ATS LOA for coordination with the Mauritius ANSP that it was ready to cancel the FLAS on ATS route A474.

4.10 Air Mauritius stated that there was poor quality HF communications within the Mumbai FIR, which was a problem for their non-CPDLC equipped legacy aircraft.

4.11 The meeting was informed that the HF communications system within the Mogadishu FIR was also poor, and that there were locations where communications were not possible. An En-route Chart with current HF Coverage of the Mogadishu FIR is provided at **Appendix C**.

4.12 Ethiopian Airlines, Qatar Airways and Kenya Airways also highlighted operational penalties due to the FLAS. IATA noted that the FLAS compounded the economic impact on their operations as both Kenya Airways and Ethiopian Airlines operated from high altitude airports and already left some cargo and passengers behind; thus they supported measures to ease the economic pressure due to FLAS. The airlines offered to consider reducing peak demand by aligning their schedules by a few minutes if they were able to know what times created the most conflicts.

Flight Level Allocation Scheme over the Arabian Sea (WP08)

4.13 India reviewed the FLAS applicable within the Mumbai FIR and the efforts of AAI in improving procedures and also improving the probability of allocation of optimum flight levels to all flights.

4.14 India stated that the FLAS provided one flight level for east bound flights (FL330) and one flight level for westbound flights (FL320), which were blocked for flights on other major traffic flow ATS routes.

4.15 In acknowledging the restrictive nature of the FLAS, the AAI stated that they had implemented the following measures that would increase the availability of optimum of levels:

a) 50NM was introduced on all RNP 10 routes for suitably equipped aircraft;

b) a User Preferred Rote (UPR) had been established within the Indian Ocean;

c) the FLAS is suspended for periods of less dense traffic (0530 to 0930 UTC);

d) 30 NM longitudinal separation had been introduced on four ATS routes (N571, P574, M300 and P570) between suitably equipped aircraft from 13 September 2014;

e) The FLAS has been cancelled for all flights on routes G424, B459, G465, N628 and for ADS-C/CPDLC capable aircraft on ATS routes L875, L756 w.e.f 25/09/2015 (refer NOTAM G475/15, G0502/15, G0503/15) – an ATS LOA had been signed with Seychelles during BOBASIO/5;

f) AAI has proposed two RNP10 routes, one each from Mogadishu and Seychelles FIR. The upper portion of ATS route G450 from Fl280 to FL460 is also proposed to be converted to RNP10. The proposal has been submitted to BANP in December 2015. One RNP10 route is also planned originating from RASKI; and

g) The level reserved for westbound flights on ATS routes P751, G450, B459, A474& G424 had been revised to FL320 from FL300.

4.16 India stressed that LHDs due to coordination errors committed by FIRs adjacent to the Mumbai FIR introduced an unacceptable level of risk within Indian oceanic airspace and therefore FLAS had been an important tool to maintain and improve safety. India urged the meeting to address the following improvements before the removal of FLAS:

a) Communications – enhance AIDC facilities and establish DSCs between Mumbai and neighbouring States;

b) Equipage – mandate carriage of ADS-C/CPDLC by all aircraft using Arabian Sea airspace;

c) SATCOM – consider use of SATCOM for position reporting to Mumbai ACC (Mumbai is equipped but few flights used this communication facility for position reporting); and

d) Space-based ADS-B – examine the feasibility of exploiting this technology for future seamless surveillance of the oceanic airspace.

4.17 India stated that the number of aircraft that did not report over compulsory reporting points through HF was significant. Notwithstanding this, Mumbai ATC planned to extend the period of FLAS suspension (currently, 0530-0930UTC) on a trial basis, and would eventually eliminate the FLAS if the necessary safety case was satisfactory. IATA emphasised that India needed to refine the data analysis [to identify the level of conflictions] and minimise the restrictions where appropriate.

4.18 AAI affirmed their readiness to consider a revision of levels reserved for eastbound flights from the AFI region in collaboration with stakeholders (AAI had proposed FL340/350 instead of FL330/320).

4.19 ICAO urged India to conform with the provisions of the Asia/Pacific Seamless ATM Plan in respect to the tactical use of 30NM and 50NM separation on an opportunity basis between all datalink equipped aircraft, which would allow the removal of all FLAS restrictions for these aircraft at least. India informed the meeting that the 30 NM and 50 NM separations were used on opportunity basis.

Proposal for ATS Routes in the Arabian Sea (IP03)

4.20 IP03 presented a draft Proposal for Amendment (PfA) to the Asia/Pacific Region Air Navigation Plan proposed by India for new ATS routes in the area of the Arabian Sea, which directly affected the Mogadishu, Mumbai, Sanaa and Seychelles FIRs.

4.21 The meeting noted that the northern proposed route clipped the corner of the Sana'a FIR, so a PBN route specification other than RNAV 10 was considered necessary to prevent this incursion (recommended: RNP 2, 20NM spacing, taking into account the APAC 'equivalence'). A joint proposal by the APAC ESAF, MID Offices was considered appropriate for this PfA, suitably amended after further consultation.

Agenda Item 5: ATM contingency planning

Mogadishu FIR – Contingency Routing Concept (WP09)

5.1 ICAO HQ provided WP09, which detailed considerations for a draft plan for 'contingency' routes and procedures applicable to aircraft transiting the Mogadishu (HCSM) FIR. The draft was based on Annex 11Attachment C, which emphasised the need for consideration of a simplified route network, FLAS and adjacent ACCs to establish longitudinal separation.

5.2 ICAO stated that it was important for the meeting to be clear on a way forward to provide immediate assurance that the identified significant safety issues are being addressed. The meeting discussed a proposed Decision Timeline (**Appendix D**), which was intended to provide a plan of the necessary steps and milestones to be taken in the event that restrictions were considered necessary to immediately reduce residual risk within the Mogadishu FIR, after taking into account the urgent ATM measures being put in place.

5.3 Users advised the meeting that the proposed contingency routing must be implemented within the required two Aeronautical Information Regulation and Control (AIRAC) cycle dates. This would allow airlines to process the new routes into their navigation database.

5.4 An extensive discussion developed a draft simplified routing scheme and potential application of FLAS if these measures were considered necessary to further reduce residual risk. The Potential Mogadishu FIR Contingency Routing Scheme is detailed at **Appendix E** and **Appendix F**. This scheme would also be useful for Somalia for the development of its ANS contingency plan.

5.5 A list of contingency crisis contacts for the Mogadishu FIR is at **Appendix G**.

Asia Pacific Regional ATM Contingency Planning (IP02)

5.6 The ICAO APAC Office provided information on the development of contingency plans from the Asia/Pacific Regional ATM Contingency Plan. This was developed by the Asia/Pacific Regional ATM Contingency Plan Taskforce, and approved by the Twenty-Seventh Meeting of the Asia Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/27).

5.7 ICAO recalled that the most fundamental principle ATM planners should note is that the first priority of contingency planning is to strengthen current systems – including human and non-human components – in order to minimize the necessity for contingency operations at all.

Agenda Item 6: Air Traffic Services (ATS) Letters of Agreements

6.1 The following Air Traffic Services (ATS) LOAs were updated and signed at the meeting:

- An Addendum to the LOAs of India and Somalia (this involved a trial to potentially remove the FLAS over the next two months, while Ethiopian and Kenyan Airlines were requested to keep watch on guard frequency for relays of traffic information and to maintain a log on.
- Seychelles and India (this involved routes that were not previously included in the LOA, and an amendment to the contingency route structure).

6.2 The meeting was reminded that Mauritius was invited by India to engage with India to amend the ATS LOA for the removal of FLAS on applicable routes (Air Mauritius was following this matter up).

Agenda Item 7: Any Other Business

7.1 The AAI Business Development Unit met with the Somalia delegation with a view to determining possible assistance. The meeting expressed appreciation to India for this initiative.

7.2 ICAO informed the meeting that even though a second AAMA/SCM had not been planned, it was possible that such a meeting might become necessary as a review function or at a critical milestone.

7.3 The ICAO APAC Office invited participants to consider attendance of their forthcoming South Asia Indian Ocean ATM Coordination Meeting (SAIOACG), to be held in Bangkok, Thailand from 01 to 03 March 2017. The SAIOACG could be used as a forum for discussion of the actions expected from the AAMA/SCM.

7.4 A Task List of outcomes from the AAMA/SCM is at **Appendix H**.

Closing

8.1 The moderators thanked participants for their contributions. Mr. A. K. Dutta, Member ANS AAI, closed the meeting after acknowledging the considerable progress made by the participants.

AAI PRELIMINARY MEETING

(Mumbai, India, 18 January 2017)

AFI-APAC MID AIR TRAFFIC MANAGEMENT SPECIAL COORDINATION MEETING (AAMA/SCM)

(Mumbai, India, 19-20 January 2017)

LIST OF PARTICPANTS

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LIST OF WORKING AND INFORMATION PAPERS

(Presented by the Secretariat)

WORKING PAPERS

No.	Agenda Item	Subject	Presented by
01	1	Provisional Agenda	ICAO APAC
02	2	RASMAG Safety Concerns	ICAO APAC
03	2	Safety Risks in the Arabian Sea Airspace	India
04	4	Application of Appropriate Oceanic ATC Separation Standards	ICAO APAC
05	3	ATM System Interface Enhancements	India
06	4	Economic Impact of FLAS Within the Mumbai FIR	Air Mauritius
07	3	Indian Ocean ATM System Modernisation	ICAO APAC
08	4	Flight Level Allocation Scheme over Arabian Sea	India
09	5	Mogadishu FIR – Contingency Routing Concept	ICAO HQ

INFORMATION PAPERS

No.	Agenda Item	Subject	Presented by
01	–	Tentative List of Working and Information Papers	ICAO APAC
02	5	Asia Pacific Regional ATM Contingency Planning	ICAO APAC
03	4	Proposal for ATS Routes in the Arabian Sea	ICAO APAC

PRESENTATIONS

No.	Agenda Item	Subject	Presented by
1	2	TCB Presentation for Mumbai	ICAO TCB
2	2	ICAO HQ Presentation on the Mogadishu FIR	ICAO HQ

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EN-ROUTE CHART-MOGADISHU

Sometimes two way communication is established

Sometimes NIL communication

Sometimes poor Communication

NIL Communication most of the time

Most of the times communication is reliable

Most of the times NIL Communication

CAUTION

DUE TO LACK OF EN-ROUTE GROUND NAVIGATION AIDS , ALL ATS ROUTES WITHIN MOGADISHU FIR ARE FLOWN AS RNAV ROUTES.

AERONAUTICAL DATA CURRENT AS OF FEB 2015. CONSULT NOTAM FOR LATEST INFORMATION

LEGEND

- ATS RNAV ROUTES
- OTHER ATS ROUTES
- TMA/CTR
- UTA
- AERODROME

Decision Timeline

By 1 February 2017

- Decision by ICAO of immediate safety mitigation measures

01 February 2017 until 3Q 2017 (if a decision is made to restrict operations)

- Imposition of specific safety measures (such as FLAS, simplified routes, etc. in consultation with airspace users commensurate with the residual risk) within the Mogadishu FIR to reduce risk to an acceptable level until alternative safety measures are in place
- Promulgation of class F responsibilities (including the provision of adjacent ATC unit instructions)
- Timeline of facility and personnel improvements in Mogadishu capability (as per AAMA/SCM)
- Monitoring/Post implementation review by 2Q 2017 (by ICAO teleconference reviews, etc.)
- Mogadishu FIR ANS contingency plan being worked on in parallel with the system improvements (which provides for partial or full degradation from full class A services)
- Evaluation of the options for class A services

By 3Q 2017

- Decision by ICAO (including Council) and States concerned of intermediate service provision

Establishment of Mogadishu FIR Class A ATC Services

3Q 2017 until 2Q 2018 (AAMA/SCM + 15 months); either implementation of:

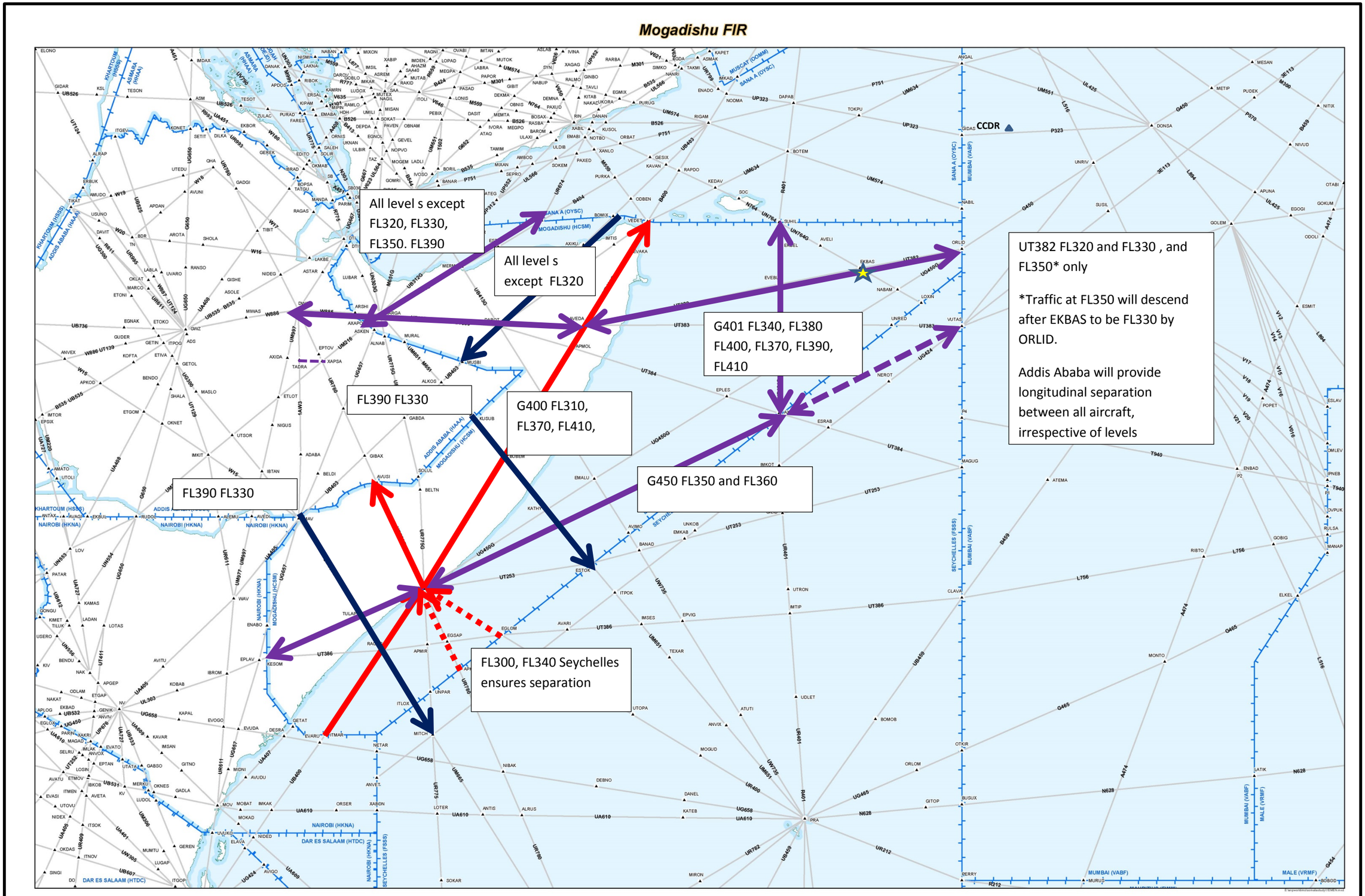
- A – a Mogadishu ANSP that is considered to have ICAO compliant capability for class A ATC services (*note: this could be a contracted ANSP by the State*); or
- B – remote provision of class F then class A ATC services by Somali ATS personnel from the Nairobi or Seychelles ACC (while Somali personnel are trained and Mogadishu services are upgraded); or
- C – delegation of the Mogadishu FIR class A ATC services to an adjacent FIR.

By 2Q 2018

- ICAO and Council review
- Decision by ICAO (including Council) and States concerned

2Q 2018 or later:

- Implementation of a Mogadishu ANSP that is considered to have ICAO compliant capability for class A ATC services (*note: this could be a contracted ANSP by the State*)


Mogadishu FIR
All level s except FL320, FL330, FL350. FL390
All level s except FL320
G401 FL340, FL380 FL400, FL370, FL390, FL410
UT382 FL320 and FL330 , and FL350* only
*Traffic at FL350 will descend after EKBAS to be FL330 by ORLID.
Addis Ababa will provide longitudinal separation between all aircraft, irrespective of levels
FL390 FL330
G400 FL310, FL370, FL410,
G450 FL350 and FL360
FL390 FL330
FL300, FL340 Seychelles ensures separation
CCDR
MOGADISHU (HCSM)
NAIROBI (HKNA)
DAR ES SALAAM (HTDC)
SEYCHELLES (FSSS)
MUMBAI (VABF)
MALE (VRMF)
KHARTOUM (HSSS)
ADDIS ABABA (HAAA)
SANA A (OYSC)
MUSCAT (OOMM)

MOGADISHU FIR (HCSM) CRs					
Present ATS Route	**Contingency Route Number**	**Contingency Routings**	**Recommended FLAS**	**Minimum Longitudinal Separation**	**FIRs Involved**
UB400	***CR1***	ITMAR-RAGGS-MOGDU -BUBEM-VEDET	Northbound Only FL310, FL370, FL410 only	15 minutes	Nairobi Sana'a
UR401	***CR2***	SUHIL-EKBEL-EVEBU-EPSIV-AMPEX-AXINA	Bi-Directional FL340, FL370, FL380, FL390, FL400, FL410 only	15 minutes	Sana'a Seychelles
UR403	***CR3***	BOMIX-AXIKU-DAROT-MUSBI	Southbound Only FL300, FL340, FL360, FL380, FL400, FL430 and above	15 minutes	Addis Ababa Sana'a
UR404	***CR4***	ARSHI-HARGA-MERMI-ESTIK-DEMGO	Bi-Directional FL300, FL310, FL340, FL360, FL370, FL380, FL400, FL410, FL430 and above	15 minutes	Addis Ababa Sana'a
UR651	***CR5***	KUSUB-BUBEM-KATHY-ESTOK	Eastbound Only FL330, FL390 only	15 minutes	Addis Ababa Seychelles
UM665	***CR6***	MANDERA-TULAP-RAGGS-ITLOX	Eastbound Only FL330, FL390 only	15 minutes	Addis Ababa Seychelles
UR400-UR780	***CR7***	EGLOM-MOGDU-AVUSI	Westbound Only FL300, FL340 only Note: Seychelles ensures separation against CR8 traffic (see below)	15 minutes	Addis Ababa Seychelles
UR780	***CR8***	APKAK-MOGDU-AVUSI	Westbound Only FL300, FL340 only Note: Seychelles ensures separation against CR7 traffic (see above)		Addis Ababa Seychelles
UW885-UT382	***CR9***	ARSHI-HARGA-DAROT-AVEDA-EVEBU-EKBAS-ORLID	Bi-Directional FL320, FL330, FL350 Note 1: Traffic at FL350 to descend after EKBAS to reach FL330 prior to ORLID. Note 2: Addis Ababa will provide longitudinal separation between all eastbound aircraft, irrespective of levels.	15 minutes	Addis Ababa Mumbai
G450 - New Contingency Route (TANGO1)	***CR10***	KESOM-TULAP-MOGDU-DCT AXINA- DCT VUTAS.	Bi-Directional FL350, FL360 only	15 minutes	Mumbai Seychelles Nairobi

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AAMA/SCM - TASK LIST

(Last amended January 2017)

ID	Task Description	Start Date	Expected Finish Date	Resource Names/Remarks
1/1	Decision to take action, if any, on the assessment of residual risk	Immediate	31 January 2017	ICAO HQ
1/2	Implementation of re-organized route structure in Mogadishu and Mumbai that will de-conflict traffic flows and reduce LHDs (if agreed by ICAO HQ and key stakeholders – item 1/1)	AIRAC cycle date 02 March 2017	27 April 2017	Required: Two (2) AIRAC cycle date to implement major change in the airspace (include time for safety assessment by ICAO TCB/FISS)
1/3	Change the Mogadishu FIR's airspace classification to recognise the correct service provision (currently class F, to be class A in due course)	Immediate	April 2017	Somalia (note: the action for Somalia may be taken by TCB on Somalia's behalf if this is appropriate)
1/4	Train ATS staff in Mogadishu, Seychelles and Mauritius FIRs to use the dedicated line to India for ATS coordination when necessary (+91 22 26819565),	Immediate	February 2017	Somalia, Seychelles, Mauritius
1/5	Amend the Mogadishu AIP to include a reference to pilots contacting India 30 minutes before the FIRB for communications only (not control unless agreed)	Immediate	February 2017	Somalia, IATA (to advise airlines)
1/6	The ICAO MID Office would make Oman and Yemen aware of the trans-regional safety issues, including LHDs, discussed at the AAMA/SCM with a view of updating their LOA with Mumbai to improve on safety and efficiency in the Indian ocean (airspace)	Immediate	February 2017	ICAO MID, Oman, Yemen
1/7	The ICAO MID Office would urge Oman to start testing AIDC with India	Immediate	April 2017	ICAO MID, Oman,
1/8	Implementation of AIDC to service the Mogadishu FIR	Immediate	July 2017	Somalia
1/9	The ICAO APAC Office to consider the possibility of a Doc 7030 (Regional Supplementary Procedure) amendment for the implementation of non-exclusive airspace providing priority for ADS-C/CPDLC aircraft within Indian Ocean remote airspace	March 2017	2019	ICAO APAC

ID	Task Description	Start Date	Expected Finish Date	Resource Names/Remarks
1/10	Implementation of or replacement of: VHF, HF, ADS-B, ADS-C/CPDLC, VCCS and NAFISAT	February 2017	July 2017	Somalia (VHF, ADS-B and VCCS are part of a the package planned for completion in Q3, 2018.
1/11	The ICAO Mid office agreed to schedule a meeting with Oman and neighbouring ANSPs by May 2017 to address the Muscat – Mumbai FIR interface, which was causing delays and re-routes	February 2017	July 2017	ICAO MID, Oman, India
1/12	Implementation of ATFM capability to support the West Indian Ocean traffic flow	TBD	TBD	India, Oman (MID ATFM Task Force)
1/13	Enhancement of capacity within the Mumbai FIR to strengthen contingency resilience	Immediate	December 2017	India to implement 10 minutes separation at crossing tracks between RNAV aircraft and to use RNP 10 based separations between suitably equipped aircraft unless within surveillance coverage as soon as HF performance improves in oceanic airspace
1/14	Mogadishu FIR ANS Contingency Plan	Immediate	July 2017	Somalia to complete the first iteration, taking into account the planning elements in IP02
1/15	FLAS removal	Immediate	ASAP	Conditional on the improvement of inter-unit communications and safety assessment, removal of the current FLAS by India

Note.

	Aireon offered to provide a proposal for consideration by States (such as a trial of the early operational capability of Automatic Dependent Surveillance – Broadcast (ADS-B)	February 2017	April 2017	Aireon

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