INTERNATIONAL CIVIL AVIATION ORGANIZATION

MIDDLE EAST OFFICE

REPORT OF THE FOURTH MEETING OF MIDANPIRG RVSM TASK FORCE (MID RVSM TF/4)

(*Abu Dhabi, 03 06 March 2002)*

The views expressed in this Report should be taken as those of the RVSM Task Force and not the Organization. This Report will, however, be submitted to the MIDANPIRG and any formal action taken will be published in due course as a Supplement to the Report.

Approved by the Meeting
And published by authority of the Secretary General

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PART I HISTORY OF THE MEETING

1. PLACE AND DURATION

1.1 The Fourth Meeting of MIDANPIRG Reduced Vertical Separation Minimum Task Force (RVSM TF/4) was held at the conference room of the Beach Rotana Hotel, Abu Dhabi, United Arab Emirates (UAE), from 03 06 March 2002.

2. OPENING

2.1 The meeting was officially opened by Mr. Khalifa Abu Jamhoor, Director, Administration and Finance from the UAE General Civil Aviation Authority (GCAA) on behalf of the Director General of the GCAA. Mr. Abu Jamhoor welcomed the delegates to Abu Dhabi and wished them a successful and fruitful meeting. He pointed out that since our previous meeting 41 States in Europe and North Africa successfully introduced RVSM on 24 January 2002. The implementation has been a monumental achievement. The effort by the States, the operators and Eurocontrol, who managed the programme, has been enormous and is a credit to the spirit of cooperation and commitment. He also indicated that as far as the MID Region is concerned, the seventh meeting of MIDANPIRG in January 2002 confirmed the conclusions reached during our three task force meetings. This endorsement included the Middle East RVSM implementation date of 27 November 2003. He highlighted that the success stories of civil aviation in the Middle East are not the result of sitting on the fence. They spring from initiative and determined effort from all parties concerned.

2.2 Mr. M R. Khonji, the Deputy Regional Director of the ICAO Middle East Office also welcomed the delegates to the meeting and thanked the GCAA of UAE for hosting this Task Force Meeting and the excellent cooperation and support which has always prevailed between the UAE and the ICAO MID Regional Office. Furthermore, he mentioned that the ICAO MID Office in Cairo in conjunction with the Bangkok and Paris Offices plan to conduct interface meetings between the MID/APAC and MID/EUR Regions with a view to harmonize procedures. He also emphasized the need and importance for the active participation and involvement of the Military Authorities at this phase of the planning process.

3. ATTENDANCE

3.1 The meeting was attended by a total of thirty-one participants from ten States (Bahrain, Egypt, Iran, Jordan, Kuwait, Lebanon, Oman, Saudi Arabia, United Arab Emirates and the United States) and three Organizations (ARINC, IATA and IFALPA). The list of participants is at **Appendix G.**

4. OFFICERS AND SECRETARIAT

4.1 The meeting was Chaired by Mr. Sabri Said Al-Busaidy of Oman. Mr. D.Ramdoyal, Regional Officer, Air Traffic Management from the ICAO Middle East Office was Secretary of the meeting assisted by the Rapporteurs of the three work groups; Mr. Riis Johansen of the UAE (SAM/WG), Mr. Saleem M. Hassan Ali of Bahrain (ATC/WG) and Mr. Ibrahim Negm of Egypt (OPS/AIR/WG). Mr. M. R. Khonji, Deputy Regional Director, ICAO Middle East Office supported the meeting.

5. LANGUAGE

5.1 The discussions were conducted in English. Documentation was issued in English.

6. AGENDA

6.1 The following Agenda was adopted:

1) Review Status of Conclusions and Decisions from MIDANPIRG/7 meeting relating to RVSM.

2) Safety and Airspace Monitoring aspects (SAM/WG)

3) ATC operations aspects (ATC/WG)

4) Aircraft Operations and Airworthiness aspects (OPS/AIR/WG)

5) Any other business

7. CONCLUSIONS AND DECISIONS - DEFINITION

7.1 All MIDANPIRG Sub-Groups and Task Forces record their actions in the form of Conclusions and Decisions with the following significance:

a) **Conclusions**
terms of reference, merit directly the attention of States on which further action will be initiated by ICAO in accordance with established procedures; and

b) **Decisions** deal with matters of concern only to the MIDANPIRG and its contributory bodies

8. LIST OF CONCLUSIONS AND DECISIONS

CONCLUSION 4/1: REQUIREMENTS FOR MONITORING

That,

a) Operators having met the monitoring requirements for a given fleet/type of aircraft as indicated at **Appendix 2C** will be accepted as having satisfied the requirements for the Middle East Region;

b) For Middle East operators, documentation for monitoring shall be provided to MECMA; and

c) MECMA will update the table in the light of data and experience gained in other Regions.

CONCLUSION 4/2: RNP ROUTES

That:

Two ATM/RNP measures will be required in support of the RVSM implementation:

a) Replacement of present bi-directional trunk routes with dual one-way tracks, thereby eliminating reciprocal traffic altogether on a given ATS route; and

b) Off-set navigation, or establishment of closely off-set tracks within the lateral limits of a bi-directional trunk route.
c) The measures listed under a) and b) may be needed separately, or in combination.

CONCLUSION 4/3: PASSING FREQUENCY

That,

With a view to ensure that TLS will continue to be met until the end of the decade:

a) The overall passing rate shall not exceed 1.25 aircraft passings per flight hour within an appropriate evaluation area;

b) While averaging of passing rates within evaluation areas may be done, States should take action to reduce passing rates at points or segments, where rates are found to be well beyond the agreed limit; and

c) Measures to reduce passing rates should increase capacity rather than limit flow through restrictions.

CONCLUSION 4/4: AAD REPORTING AND INVESTIGATION

That,

a) All States institute revised procedures for reporting of assigned altitude deviations (AAD) of 300 ft or more with effect from 01 April 2002;

b) Reports be structured as shown in **Appendix 2F** to the report and forwarded to the Middle East Central Monitoring Agency (MECMA);

c) An Air Traffic Incident Report Form (type: procedure) be completed and processed in accordance with Appendix 4 to ICAO PANS-ATM, Doc 4444, and attached to the AAD report to MECMA.

d) Reports total number of IFR movements in the level band FL290 - FL410 for each month to MECMA, and

e) MECMA ensures further processing of this data in accordance with its terms of reference.

CONCLUSION 4/5: MONITORING OF THE STATUS OF PREPAREDNESS FOR RVSM IMPLEMENTATION

That,

a) States send the RVSM evaluation forms to MECMA on a quarterly basis, with a copy to the ICAO MID Regional Office indicating the status of preparedness in the SAM,ATC and OPS/AIR fields as indicated in the evaluation forms at Appendix C (C1-C3) to the report;

b) States send to the Rapporteur of the OPS/AIR Work Group before 1 May 2002 a copy of the evaluation form C-3 at Appendix C to the Report, and thereafter on a quarterly basis, with a view to follow-up on the status of implementation of all requirements in the OPS/AIR fields necessary for ensuring the safe implementation of RVSM.

DECISION 4/6: INCLUSION OF PROCEDURES FOR IN-FLIGHT CONTINGENCIES AND COMMUNICATION FAILURES IN DOC 7030

That:

a) The OPS/AIR Work Group studies the proposal by the UAE for inclusion of procedures for in-flight contingencies in the Regional Supplementary Procedures Doc.7030;

b) The Secretariat develops radio communications failure procedures for inclusion in Doc 7030 and ensures that the procedures are aligned with both the EUR and APAC regions.

DECISION 4/7: ORGANIZATION OF INTERFACE MEETINGS

That, with a view to harmonize RVSM procedures and implementation timeframes, the ICAO MID Regional Office, in consultation with the ICAO Regional Offices for AFI, Asia/Pacific, European Regions organize joint interface meetings as soon as possible, and preferably before the end of Year 2002.

PART II REPORT ON AGENDA ITEMS

REPORT ON AGENDA ITEM 1: REVIEW STATUS OF CONCLUSIONS AND DECISIONS FROM MIDANPIRG/7 MEETING RELATING TO RVSM.

1.1 Under this agenda item the meeting reviewed the conclusions and decisions emanating from the MIDANPIRG/7 meeting and the subsequent follow-up actions which have been taken. The list of conclusions/decisions are indicated at **Appendix 1A** to the report on Agenda Item 1.

1.2 The meeting also agreed that with a view to facilitate informal contacts/consultations with the RVSM Programme Managers in the MID Region, the updated list be indicated in the report on this Task Force meeting (See **Appendix 1B** to the report on Agenda Item 1).

MID RVSM TF/4
Appendix 1A to the Report on Agenda Item 1

STATUS OF CONCLUSIONS AND DECISIONS RELATING TO THE IMPLEMENTATION OF RVSM IN THE MID REGION AS ENDORSED BY MIDANPIRG/7 MEETING (CAIRO, 21 -25 January 2002)		
CONCLUSION/DECISION	**STATUS**	**REMARKS**
Conclusion 7/9: Establishment of a Regional Safety and Monitoring Agency That: a) the task of monitoring safety in conjunction with implementation of RVSM in the Middle East Regions be assigned to a Central Monitoring Agency; b) the monitoring agency, referred to as the Middle East Central Monitoring Agency (MECMA), will be established and s General Civil Aviation Authority (UAE - GCAA) based at the Head Office in Abu Dhabi; and c) the Terms of Reference of the MECMA is at **Appendix 5C** to the report on Agenda Item 5	Action taken	
Conclusion 7/10: Safety Analysis That, The safety analysis required for RVSM implementation in the Middle East Region be carried out by MECMA under the auspices of the UAE General Civil Aviation Authority initially based on information from, or in cooperation with one or more suitably qualified regional organizations.	ongoing	

Conclusion 7/11: Reporting of data for carrying out safety assessment That: a) all States institute procedures for reporting of data, incidents and conditions necessary for performing the collision risk calculations prerequisite for RVSM implementation to MECMA. The data will include, but not necessarily be limited to: **i) Height deviations of 300 ft or more and use the Altitude Deviation Form developed within the frame work of the RVSM Task Force for the reporting of the data to MECMA ;** ii) total number of IFR movements for each month to MECMA; iii) the average time per movement spent in the level band FL290 FL410 and report the value to MECMA along with the basis of the calculation; iv) ATC/ATC coordination failures; v) Turbulence; and vi) Traffic data. b) MECMA shall ensure that further processing and evaluation of this data within its Terms of Reference and identify or develop methodologies for assessing risk associated with traffic and conditions prevailing within the MID Region.	ongoing	
Conclusion 7/12: Monitoring Requirements That, a) Operators having met the monitoring requirements indicated at **Appendix 5D** to the report on Agenda Item 5 for a given fleet/type of aircraft, will be accepted as having satisfied the RVSM monitoring requirements for the Middle East Region. For Middle East operators, documentation for monitoring shall be provided to MECMA; and	ongoing	

b) MECMA will update the table in the light of data and experience gained in other Regions.		
Conclusion 7/13: Civil/Military Coordination That, In order to ensure the safe and coordinated implementation of RVSM in the MID Region, States should ensure that the Military Authorities are fully involved in the planning and implementation process and give due regard to LIM MID (COM/MET/RAC) RAN Meeting 1996, Recommendations 2/9 to 2/14.	ongoing	
Conclusion 7/14: Creation of Non Exclusion Areas Within RVSM Airspace That, With a view to facilitate the integration of earlier generation aircraft not approved for RVSM operations, intending to operate on domestic networks within RVSM airspace, non exclusion areas be created in order to accommodate these operations.	ongoing	
Conclusion 7/15: Nomination of an RVSM Programme Manager That, States/service providers nominate an RVSM Programme Manager who will be responsible for ensuring that the proper mechanism be put in place for the safe implementation of RVSM and will also act as the focal point contact person.	Action taken	

Conclusion 7/16: Implementation of RVSM in the MID Region That, a) RVSM will be implemented in the MID Region between FL 290 and FL 410 inclusive on 27 November 2003 b) States in the MID Region ensure that all requirements be met with a view to safely implement RVSM on the AIRAC date of 27 November 2003. c) Implementation of RVSM in the MID Region be harmonized and coordinated with the implementation timeframes adopted within the ASIA/PAC Region for States South of the Himalayas. *Note: States which do not fulfill their requirements regarding the implementation milestones for the implementation of RVSM within their respective FIRs, will be initially excluded from the MID RVSM area.*	ongoing	
Conclusion 7/17: Training of all personnel involved with the implementation of RVSM in the MID Region That, a) ICAO explores the possibility of assisting States of the MID Region through a Special Implementation Project (SIP) for training of personnel involved with the implementation of RVSM in the MID Region; b) Seminars/Workshops be organized in the Region for training of air traffic services personnel in the RVSM field; c) States be invited to approach training institutions for the development of a training module in the RVSM field representative of the MID Region. d) States having difficulties in implementing RVSM implementation	Ongoing - - 	Office has initiated action (subject to funds being available) Seminar planned in October 2002 (12 13 October 2002)

programme, may either individually or ingroup explore the possibility of seeking outside expertise.		
Conclusion 7/18: Guidance Material for Airworthiness and Operational Approval That, States in the MID Region adopt the guidance material contained in both FAA Interim Guidance 91-RVSM and JAA Temporary Guidance Leaflet TGL No. 6 as amended for issuing Airworthiness and Operational Approval for aircraft and operators intending to operate within a designed RVSM airspace.	ongoing	Confirmation from States required
Conclusion 7/19: RVSM Legislation That, The MID Region States are invited to examine their legislations and regulations to identify any changes required for RVSM to confirm its compliance as indicated in ICAO ANNEX 6 Part 1 Chapter 7 Para. 7.2.3.	ongoing	Confirmation from States required
Decision 7/20: Participation of Representatives of States Involved in RVSM Approval Process That, representatives of States involved in the RVSM approval process of aircraft and operators, be invited to attend the future meetings of the Middle East RVSM Task Force.	ongoing	States should indicate whether action has been taken
Conclusion 7/21: Funding of the RVSM Implementation Programme	ongoing	States should indicate status of implementation

That, Regulatory bodies, operators, service providers, and other stakeholders be granted budgetary allocations during fiscal year 2002 and 2003 for acquisitions and other activities necessary for ensuring that all the requirements be met in a timely manner in order to safely implement RVSM in the MID Region on 27 November 2003.		

MID RVSM TF/4
Appendix 1B to the Report on Agenda Item 1

RVSM PROGRAMME MANAGERS

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YEMEN:	

MID RVSM TF/4
Report on Agenda Item 2

REPORT ON AGENDA ITEM 2: SAFETY AND AIRSPACE MONITORING ASPECTS (SAM/WG)

2.1 TERMS OF REFERENCE AND WORK PROGRAMME

2.1.1 Under this agenda item the Work Group reviewed its terms of reference and noted in particular the requirement to:

- itable methodologies for incorporating the effects of projected traffic increases and system changes on occupancy and collision risk in the future

- sugg

Appendix 2A.

2.1.2 The normal working arrangements, whereby the Task Force Chairman, Work Group Rapporteurs and the ICAO Secretariat, to the widest possible extent, undertake co-ordination with other Work Groups and with the Task Force as a whole, were also noted. For issues requiring wider discussion, joint sessions of two WGs or plenary sessions of the TF were held. While, such sessions were kept to a minimum, it was agreed that the SAM/WG has now reached the stage where information about results need to be brought to the attention of the ATC Operations Work Group (ATC/WG).

2.2 THE MIDDLE EAST CENTRAL MONITORING AGENCY (MECMA)

2.2.1 The duties and responsibilities of the MECMA were also reviewed. The working group noted the delineation in responsibilities between itself and the MECMA. The latter is responsible for the day-to-day and time-consuming tasks, such as establishing and maintaining

duties and responsibilities are as stated in **Appendix 2B**.

2.2.2

Middle East Central Monitoring Agency (MECMA)
P.O. Box 666
Abu Dhabi
United Arab Emirates

Telephone:	+971 2 405 4339	
Fax:	+971 2 405 4316	(new number)
Email:	traffic@mecma.com	(for forwarding of traffic samples)
Website:	www.mecma.com	

2.2.3 -constructed with information about the Agency and certain forms for reporting of traffic data and monitoring.

2.3 ORGANIZATION OF MONITORING

2.3.1 The meeting finalized the Task Force evaluation of organizational options for height monitoring with GMU technology.

2.3.2 The criteria for technical acceptance by MECMA are:

- the measuring methodology and results are accepted by another regional monitoring agency such as APARMO or Eurocontrol; and
- the service is available on equal terms to all users of MID airspace.

Note: ARINC/Aerodata and CSSI meet the technical criteria for acceptance of results by MECMA.

2.3.3 IATA had completed its evaluation of proposals from ARINC/Aerodata and CSSI and decided to offer a monitoring service to its member with CSSI as the preferred service provider. Payment arrangements for such services have not been finalized, but are expected to be organized within the IATA clearance system.

2.3.4 While arrangements as described above are established to facilitate the arrangements for monitoring by a group of operators, Middle East airspace users are free to choose between the two approved service providers and MECMA will establish links from its website to those of ARINC/Aerodata and CSSI with a view to assist the users in their search for a solution to the monitoring issue.

2.3.5 ARINC confirmed they will offer monitoring services to any operator. This service will be available on an individual basis i.e. for any number of aircraft, including single aircraft that the operator may need monitored for height-keeping performance. ARINC has permanent representation in the MID Region and have already performed monitoring for a number of MID air carriers.

2.4 INITIAL MONITORING REQUIREMENTS

2.4.1 The terms of reference of the SAM Working Group include development of a monitoring programme to ensure that the quantity and quality of collected data allow an assessment of vertical collision risk. Similar decisions have been made for other Regions: North Atlantic (NAT), Pacific (PAC) and European (EUR) where different requirements have been determined. ***The requirements set out below are minimum requirements and address only pre-implementation monitoring***.

*Note:-1 For the Asia/Pacific area, APARMO monitoring requirements are directly tied to the airworthiness approval and essentially based on the characteristics of GMU technology. Monitoring must take place **after** airworthiness approval by the State of Registry and is required for two (2) aircraft per group type per operator for operators **with** previous RVSM experience while three (3) aircraft per group type per operator need to be monitored for operators **without** previous RVSM experience.*

Note:-2 For the European RVSM area, monitoring requirements are implicitly tied to the airworthiness approval and to a considerable degree based on the large amount of data being generated by the three HMUs.

2.4.2 Initial monitoring is required for all operators that operate or intend to operate in the airspace were MID-RVSM is applied and require to participate in the monitoring programme.

2.4.3 The initial monitoring requirements that were enforced for the pre-implementation phase for aircraft condition when subjected to EUR monitoring within the EUR RVSM area are as follows:

For a measurement to be used, the data must meet the following requirements:

i) Be positively identified and linked to an individual airframe that has been confirmed as participating in the RVSM-EUR programme
Note:-This is achieved by matching the Mode S code record by the measurement system to that notified by the operator. In the case of aircraft not fitted with a Mode S transponder the Mode A code record shall be compared to that noted by the operator on the flight.

ii) All engineering/modification and maintenance work required to achieve RVSM airworthiness approval must be completed.
Note:-The date of the measurement shall be compared to the date that the operator stated the aircraft had been modified in accordance with the RVSM airworthiness requirements. Only measurements on or post this date are classed as valid. Operational approval was not a required during the pre-implication phase as the measurements were used to determine the aircraft performance only

ii) The data had been recorded correctly and passed through quality control checks.

2.4.4 Requirements for the North Atlantic area, where RVSM was pioneered are akin to those of the Pacific area. Both HMU and GMU facilities were available and used for the monitoring task.

2.4.5 RVSM implementation in the MID Region will be different from the other Regions in some respects:

- As opposed from NAT and EUR, in-region HMUs will not be available.
- The majority of operators and airframes will have extra-regional RVSM experience prior to MID implementation in November 2003.
- Unlike the lead region, the MID Region needs to address harmonization issues i.e. minimize differences with other regions, in particular adjacent regions.
- A large amount of monitoring data is available early in the implementation programme.
- The aircraft population is different particularly with respect to non-group aircraft.

2.4.6 European monitoring results, gained through the HMUs, had shown significant variations in height-keeping performance, not only within groups, but also for individual aircraft types. Furthermore, inadequate performance has been observed for a number of types or groups of airframes within a given type. This has been the case for Avro RJ, AN72, AN124, E135, E145, FA50 and IL86.

2.4.7 For the most commonly used type in the MID Region, the A320, European results have shown that height-keeping performance was well within the parameters for most operators, while the A320 fleet of one particular operator showed marginal performance.

2.4.8 Given the lack of monitoring assets within the MID Region, it was considered essential that maximum benefit be gained from the knowledge about height-keeping performance gained through the European monitoring programme. Given the variability mentioned in paragraph 2.4.5, above, MECMA had revised the table in accordance with its terms of reference to take into account the experience gained in the EUR Region. The revised table includes the percentage rules (10%, 30%, 60%) used in Europe as well as re-grouping of aircraft types, and the updating brings the table in line with that used for EUR pre-implementation monitoring.

2.4.9 The Task Force agreed to revise the general monitoring requirements for the MID Region as follows:

i) MID and non-MID operators having met the monitoring requirements for EUR, PAC or NAT for given fleet/type of aircraft will be accepted as having satisfied the monitoring requirements for the MID Region. For MID operators, documentation for monitoring shall be provided to MECMA.

ii) Operators that have not met the monitoring requirements detailed under sub para (i) above, the minimum monitoring requirements are set out in detail in **Appendix 2C**

2.4.10 Based on the foregoing, the meeting accordingly framed the following conclusion:

CONCLUSION 4/1: REQUIREMENTS FOR MONITORING

That,

a) Operators having met the monitoring requirements for a given fleet/type of aircraft as indicated at **Appendix 2C** will be accepted as having satisfied the requirements for the Middle East Region;

b) For Middle East operators, documentation for monitoring shall be provided to MECMA; and

c) MECMA will update the table in the light of data and experience gained in other Regions.

2.5 AIRCRAFT PASSING FREQUENCIES

2.5.1 The Group recalled that the Reich collision risk model is based on a number of parameters that must be established for the airspace being assessed. The formulation of the model depends on the structure and traffic pattern of the ATS route system at hand. For a single route, the aircraft passing frequency is an important parameter in calculation of risk. A closely related

avigating along the same track, and at adjacent levels, pass one another either in the same direction

2.5.2 Two formulations have been established**:**

- Passing Frequency
- Occupancy

Note:-1 The two formulations are interrelated and conversion can readily be made from one to the other.

Note:-2

continental airspace, while the formulation Occupancy is more appropriate to oceanic, in particular North Atlantic, airspace where all levels are used in a given direction.

2.5.3 -
clearances in parts of the MID region where radar control/separation is being applied, the feasibility of using radar data for estimating the frequency of passing events involving horizontal overlap is being examined. This methodology was used in the European region where the airspace is predominantly controlled by radar. The basic principle remains as with the use of flight progress strips, i.e. calculating the total number of passing events
radar data analysis and subsequently converting this value into an overlap probability.

2.5.4 MECMA presented the results of preliminary calculations of passing frequencies. The value
where procedural separation standards are applied.

2.5.5 The global system performance specification delineates a set of conditions under which RVSM may be implemented safely (ICAO, Doc 9574-AN/934, *Manual on Implementation of a 300m (1000 ft) Vertical Separation Minimum Between FL290 and FL410 Inclusive*, Chapter 2). This system performance specification gave rise to the global height-keeping performance requirements, which, in turn, were part of the basis for the State RVSM approval process and related regulatory material i.e. JAA Temporary Guidance Leaflet No. 6 and FAA Advisory Circular 91-RVSM. One of the assumptions underlying the development of the global system performance specification and, hence, the State RVSM approval process concerns the maximum relative traffic density and configuration for the airspace for which the specification is applicable. This relative traffic density is expressed as the average number of aircraft operating at adjacent RVSM flight levels which will be passed by a typical aircraft during one hour of flying, where it is assumed that aircraft will alternate direction of operation by flight level. Thus, the unit for this relative traffic
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2.5.6 ICAO Doc 9574 presents a five-step process to guide RVSM implementation. The second step calls for a preliminary safety assessment prior to engaging the implementation process fully. During this step, those planning the airspace change are reminded to check that the safety-related assumptions underlying the global system performance specification, global-height keeping specification and associated State RVSM approval process are satisfied. One such assumption is that the opposite-direction passing frequency in the airspace does not exceed 2.5 per aircraft flying hour. The document provides the mathematical means of expressing same-direction passing frequencies in terms of equivalent opposite-direction values so that a single numerical check can be made. For the MID Region, where levels are allocated according to the semi-circular rule, same-direction passings are relatively rare as opposed to the North Atlantic track system where all levels are used in a given direction due to traffic flow patterns.

2.5.7 The meeting noted that the risk of en-route collisions between aircraft in an ATS route system depends on both the population of aircraft flying in the system and the route system characteristics. The Reich model takes into account both level allocation that is, the semi-circular rule and the possibility that all available levels may be used in one direction. In schematic form, same-direction passing can be described as shown in Figure 1, while opposite-direction passing is shown in Figure 2.

Figure 1. Same-Direction Passing

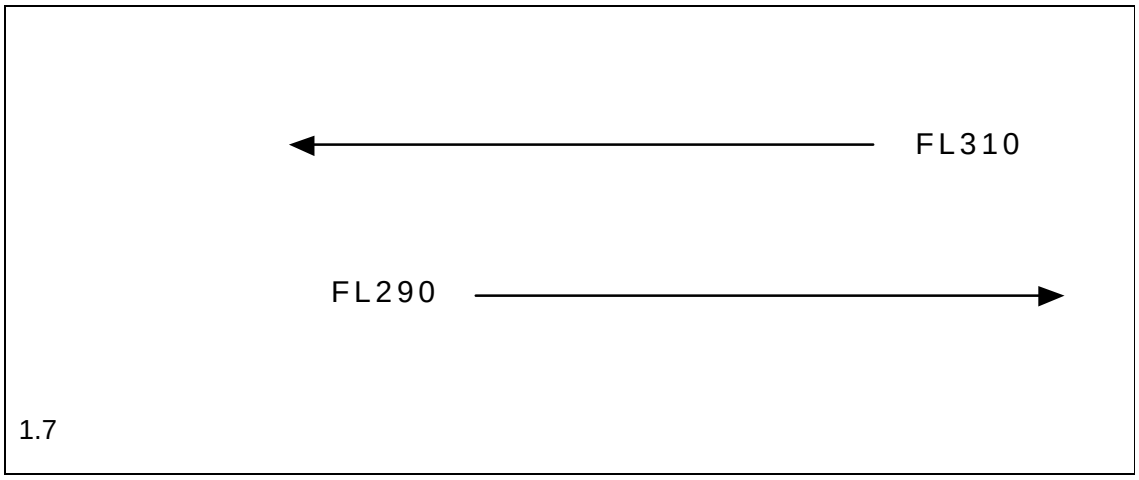

Figure 2. Opposite-Direction Passing

2.5.8 It was noted that same-direction passings occur only occasionally in continental airspace where the semi-circular rule is being applied and this will in most cases take place on tactical basis at levels below FL290 where speed differentials are larger than at jet cruising altitudes. Therefore, opposite-direction passings are the major contributor in the level band FL290 - FL410.

2.5.9 ICAO guidance material specifies that all ATS routes within three adjacent ACCs should be examined on an individual basis when estimating aircraft passing frequencies or occupancy. If this is not practical, care should be taken that the routes analysed provide representative estimates. Each route should be divided into segments, for example, by reporting points or navigation aid locations. The traffic movement data, organized by flight level on each segment, must then be examined either manually or automatically to determine the number of pairs of aircraft at adjacent flight levels that pass each other in the same or in opposite directions. The number of same and opposite-direction aircraft passings should then be combined with similar counts from all other route segments analysed. The sum of the overall same and opposite-direction aircraft passings should then be multiplied by 2 and divided by the total number of flight hours above FL 290 in straight and level flight on the segments during the periods analysed, giving the

same and opposite-direction aircraft passing frequency estimates. If occupancy analysis is deemed appropriate, vertical occupancies can be estimated in a manner analogous to that for estimating lateral occupancies shown in ICAO Doc 9426, Air Traffic Services Planning Manual.

2.5.10 However, taking into account the MID Region conditions, where there are three very large FIRs and a number of small/medium size FIRs, it was agreed to expand the general criterion for three adjacent ACCs. Procedural separation minima are applied on long, homogeneous tracts of airspace, such as UR219, while radar separation is applied in other areas. Therefore, the MID safety analysis will consider five separate areas:

Bahrain/Emirates/Muscat FIRs
Amman/Beirut/Damascus FIRs
R219 between MITEX (now ULOVO) and Turaif (TRF)
Tehran FIR
Cairo FIR

BAHRAIN/EMIRATES/MUSCAT FIRS

2.5.11 From a procedural perspective, adequate data had been provided to conclude that passing frequencies are sufficiently low to permit RVSM implementation in Bahrain/Emirates/Muscat FIRs. However, unidirectional ATS route structures should be introduced to replace the few remaining bi-directional trunk routes.

AMMAN/BEIRUT/DAMASCUS FIRS

2.5.12 Data for Amman FIR is adequate to conclude that the bottleneck area north of TRF will require re-structuring to permit implementation of RVSM. Certain aspects of the traffic data for Beirut FIR will need clarification, while independent data for Damascus FIR does not permit calculation of passing frequencies.

R219 BETWEEN MITEX (NOW ULOVO) AND TURAIF (TRF)

2.5.13 While the traffic data provided by Saudi Arabia had been valuable in the readiness assessment, it was not formatted as agreed at TF/1 and did not permit calculation of passing frequencies. Radar separation is applied in much of Jeddah FIR, in particular in the busy areas around Jeddah and Riyadh, and radar data analysis will be more appropriate in these areas. However, the R219 tract, where procedural separation standards are applied, should be evaluated on the basis of flight data and, although this data is not yet available, the data provided by Bahrain and Jordan for the two extremities of R219, indicate that implementation of a dual route structure will be required to meet the TLS.

TEHRAN FIR

2.5.14 Tehran FIR is large and diverse. Traffic data had been provided indicated a passing frequency in excess of the acceptable limit between Sharjah and Tabriz(TBZ). It was found that data would be required for the TBZ area, which is the confluence of ATS routes in the northern part of the FIR. However, based on available data it was considered likely that the present single trunk route would need to be replaced by a structure of two uni-directional routes.

CAIRO FIR

2.5.15 The traffic data provided by Egypt met the requirements for the readiness assessment. However, additional flight data in the format agreed at TF/1, or a radar data analysis, would be required to address the lateral aspects of the collision risk modelling.

2.5.16 The Tables (1-5) of passing frequency estimates as indicated at **Appendix 2D** were presented by MECMA. The data represented one month of flight operations in the respective MID Region FIRs: *Note:- The principal ATS routes/points had been identified and anomalies removed from the data set. Random routes were not considered.*

2.5.17 Passing frequencies were noted to be well beyond the acceptable limit and need to be considered on conjunction with the data for MITEX (see Table 4). TRF represents a bottleneck through which most of the traffic from or via the Arabian Peninsula to European destinations must pass. The higher passing frequencies at TURAIF and ZELAF reflect the fact that departures from Saudi Arabiaairports join the stream from Bahrain FIR, yielding an increase in traffic density on the northern part of the route. The meeting concluded that the present single, bi-directional route will need to be replaced by, at least, a pair of uni-directional routes. However, the meeting was cognizant of the situation that, even with additional levels in an RVSM environment, this solution may be not be adequate even in the medium term and it was agreed to ask the RNP/RNAV Task Force to identify a suitable solution.

2.5.18 The data set was examined to determine number of aircraft that passed each other on adjacent flight levels, from FL270 through FL450, as those aircraft traversed the principal routes in the applicable FIRs. In keeping with risk analytical practice, the passings were segregated into same and opposite direction values. It was noted that the current airspace design and resulting procedures favour passings on adjacent levels in the opposite direction.

2.5.19 The methodology which was used for estimating aircraft passing frequencies for aircraft on same- and opposite-direction ATS routes in procedurally controlled airspace is at **Appendix 2E.**

RADAR DATA ANALYSIS

2.5.20 In (busy) continental airspace, flights are generally under radar surveillance and subject to tactical control by ATC. This leads to highly complex and frequently very variable traffic patterns with the actual tracks flown often deviating from the published ATS routes and crossing at a variety of angles. As a result, it is not possible to accurately estimate a frequency of passing events just based on information of traffic flows on the ATS routes.

2.5.21 A realistic picture of the actual traffic patterns can be obtained from radar data. Which it can be determined first of all whether a pair of aircraft passes within a specified volume of airspace. If this is the case, it contributes to the frequency of such passing events in the airspace considered. The actual relative velocity can also be estimated from the radar data. This information can then be processed in a way similar to that for airspace with crossing routes.

CROSSING TRAFFIC

2.5.22 Analysis of risk associated with crossing routes had not been carried out. This task requires traffic data for applicable intersections and the only intersections for which data has been provided is MAGALA (transfer point between Bahrain and Jeddah ACCs).

2.5.23 After identifying crossing ATS routes within the three adjacent ACCs, aircraft passing frequencies at all the crossing points should be estimated. If this is not practical, care should be taken that the crossings analysed provide representative estimates. The number of aircraft pairs involving horizontal overlap at crossing points should be counted, multiplied by 2 and divided by the total flight time in the sampled RVSM airspace to produce an estimate of the crossing passing frequency.

2.5.24 Aircraft passing involving horizontal overlap at route crossing points are rare events and their frequency is difficult to measure. Nonetheless, it is possible to estimate this

frequency; traffic flows representative of crossing routes may be used in a model similar to that, which is presented in the Air Traffic Services Planning Manual (ICAO Doc 9426).

LATERAL PATH-KEEPING

2.5.25 The Global Specification for lateral path-keeping error is a standard deviation value of 0.3 NM (1 SD). However, the Task force accepted that, with rapid upgrading of fleets with FMS with GPS navigational input, the path-keeping performance is improving beyond the global system performance specification, which, in this context, increases the risk.

2.5.26 Therefore, the meeting asked MECMA to carry out a survey with the objective of establishing the proportion of aircraft navigating on GPS input within the MID region to obtain improved an improved estimate for $P_Y(0)$. Furthermore, to ensure robustness of the safety analysis, a prognosis for fleet upgrading during the decade must be included in the basis for further calculations. From this estimation, the need for additional procedures related to lateral navigational performance can be evaluated.

2.5.27 Additionally, some form of off-set tracks may be required on ATS routes, where a sufficient number of laterally separated one-way routes cannot be accommodated.

2.5.28 Although collision risk modelling is still in a preliminary stage, it was clear from the available traffic (flight) data, that passing frequencies on main bi-directional trunk routes do not meet the global specification. Furthermore, it was considered unlikely that a trade-off against other parameters can be justified.

2.5.29 The Task Force accordingly framed the following conclusion:

CONCLUSION 4/2: RNP ROUTES

That:

Two ATM/RNP measures will be required in support of the RVSM implementation:

a) Replacement of present bi-directional trunk routes with dual one-way tracks, thereby eliminating reciprocal traffic altogether on a given ATS route; and

b) Off-set navigation, or establishment of closely off-set tracks within the lateral limits of a bi-directional trunk route.

c) The measures listed under a) and b) may be needed separately, or in combination.

2.5.30 The Task Force agreed to ask the RNP/RNAV Task Force to identify a suitable solution accordingly.

i) The RVSM Task Force is required to devise suitable methodologies for incorporating the effects of projected traffic increases and system changes on occupancy and collision risk in the future environment. To ensure that TLS will continue to be met, a doubling of the number of flights should be accounted for in the safety analysis. This will allow for an annual compound growth of 6% for a period of 12 years (less the age of the traffic data) and provide the required validity over time. Consequently, it was agreed that, for the pre-implementation safety analysis, passing frequencies should not exceed 1.25 (equivalent) passings per flight hour.

ii) If the values are above 1.25, a trade-off between the parameters of the global system performance specification may be possible as introduced by ICAO in the 2nd (draft) edition of Doc 9574. However, such a trade-off would require that either the standard deviation of lateral path-keeping error is *higher* than the Global

Specification value of 0.3 NM (1 SD), or that the height-keeping performance is better than the global system performance specification value of 1.7×10^{-8}. If the trade-off is not feasible, then aircraft passing frequencies in the airspace are too high to meet the technical safety objectives.

iii) Since the passing-frequency check is done while the vertical separation standard is still at 2000 ft, it is not possible to determine what the passing frequency will be with the RVSM applied. However, as the distribution of allocated levels in the traffic samples is considerably wider that the range of economical cruising levels for the aircraft types, MECMA concludes that aircraft are spread out due to lack of available levels in airspace where procedural separation standards are applied. With six additional levels becoming available on the economically attractive level band 290 - 410, logic indicates that flights currently operating below this level band will move up to accommodate the additional levels. Consequently, there is no basis for assuming that change from CVSM to RVSM will result in a significant reduction in passing frequencies.

iv) From Table 4 it may be seen that while the overall passing rate is well within the limit of 1.25 (to permit traffic growth), values for individual points on traditional bi-directional are high. Therefore, the overall result is only achieved through implementation of one-way route structures at the majority of the transfer points.

2.5.31 Based on the foregoing the meeting concluded that to ensure that TLS will continue to be met until the end of the decade,

CONCLUSION 4/3: PASSING FREQUENCY

That,

With a view to ensure that TLS will continue to be met until the end of the decade:

a) The overall passing rate shall not exceed 1.25 aircraft passings per flight hour within an appropriate evaluation area;

b) While averaging of passing rates within evaluation areas may be done, States should take action to reduce passing rates at points or segments, where rates are found to be well beyond the agreed limit; and

c) Measures to reduce passing rates should increase capacity rather than limit flow through restrictions.

2.6 ASSIGNED ALTITUDE DEVIATIONS (AAD)

2.6.1 Reporting of assigned altitude deviations (AAD) was introduced with effect from 01 July 2001. Consequently, the Middle East Central Monitoring Agency (MECMA) started to receive data in early August.

2.6.2 Up to the end of February 2002, MECMA had received and investigated a total of 16 AAD reports from one State. Negative AAD reports had been received from two States, covering a total of more than 100,000 flights in the level band FL290 - FL410.

2.6.3 For the month of November 2001, 14 AADs ranging from 300 ft to 1,500 ft were reported. These deviations are summarized in Table 1.

2.6.4 For the month of January 2002, two AADs ranging from 300 ft to 500 ft were reported by the Saudi Arabian PCA. These are shown in Table 2, below.

DATE	TIME	C/S	TYPE	FROM	TO	Route	POSN	CFL	AFL	AAD
02 Nov 01	00:40	GFA023	B763	OBBI	LIMC	UR219	ULOVO	390	379	-1,100 ft
02 Nov 01	02:22	EVA68	B747	EGLL	VTBD	UR219	PAXAN	330	339	+900 ft
05 Nov 01	14:46	SVA1057	B777	OERK	OEJN	G782	RAMIN	390	393	+300 ft
05 Nov 01	14:58	SWAP61	L101	LCLK	OEPS	A145	GAS	330	337	+700 ft
05 Nov 01	23:49	SIA319	B744	EGLL	WSSS	UR219	TOTAD	330	345	+1500 ft
07 Nov 01	00:22	SVA3940	B742	OEDF	EBBR	T503	GOLBI	310	317	+700 ft
09 Nov 01	07:59	SYR517	B722	OSDI	OMAA	UR219	KMC	330	335	+500 ft
12 Nov 01	20:15	AZA748	MD11	LIMC	OMDB	T503	TOTAD	330	334	+400 ft
15 Nov 01	01:44	MSR664	B743	OEJN	HECA	A411	YEN	430	444	+1400 ft
16 Nov 01	19:46	UAE02	B773	EGLL	OMDB	UR219	ULOVO	370	365	-500 ft
16 Nov 01	20:09	RCH500	DC86	LIPA	OKBK	A145	GIRSA	290	300	+1000 ft
24 Nov 01	04:57	CLX799	B744	OMAA	ELLX	UR219	ULOVO	310	307	-300 ft
27 Nov 01	01:00	UAE05	A330	OMDB	EGLL	UR219	KMC	390	394	+400 ft
30 Nov 01	15:46	MEA368	B742	OEJN	OLBA	B544	TRF	390	383	-700 ft

Table 1 - November 2001

DATE	TIME	C/S	TYPE	FROM	TO	Route	POSN	CFL	AFL	AAD
09 Jan 02	14:17	SVA1740	B732	OEBH	OERK	V33	UMRAN	290	293	+300 ft
20 Jan 02	18:44	UAE402	B772	HECA	OMDB	A145	ALNAT	330	335	+500 ft

Table 2 January 2002

2.6.5 The number and magnitude of the reported AADs, in particular for the month of November 2001, are extraordinary compared to European data (See Tables 3 and 4) as well as reports from other MID States. Also items from 7 to 11 of the report form had been omitted. Consequently, MECMA had taken the following actions:

a) Requested additional information from the reporting State

- What were the durations of the reported AADs?
- Were the pilots of the flights informed by ATC?
- Has the reporting State asked the concerned operators to explain/investigate the reported deviations?
- Has the ATC equipment been examined for correct calibration?

Additional information had not yet been received from the reporting State.

b) Additionally, MECMA had requested corroboration from adjacent ATC units within radar range and from some of the concerned operators.

Detailed replies had been received for 12 of the 16 flights and were based on:

- radar data recordings from ATC units;
- flight data records from ATC units
- operational records from airlines; and
- downloaded files from flight data recorders

The replies are summarized below:

- One aircraft is being phased out. The AAD was 300 ft and no further investigation was carried out.

- Based on flight data from adjacent ACCs and from the operators, three flights appeared not to have operated on the days indicated in the AAD reports.

- Six flights had been monitored by radars at adjacent ACC and were observed to be at their assigned level in five cases, and 100 ft above assigned level in one case.

- Flight data recordings had been submitted for two flights. One was maintaining FL370 while the AAD indicated FL335. The other was maintaining the correct level.

2.6.6 Due to the extraordinary nature of the AADs, in particular for the month of November 2001, a comparison has been made against European data:

2.6.7 Typical altitude deviations are defined as being not greater than 300 ft in magnitude. A total of 361,167 observations have been made by the HMUs and the results are addressed in the European Pre-Implementation Safety Case (PISC) as shown in Table 3, below:

Magnitude of Deviation in ft	Observed Number of Deviations	Observed Proportion
300	7	1.93.E-05
200	66	1.82.E-04
100	6,253	1.73.E-02
0	349,258	9.65.E-01
-100	6,002	1.66.E-02
-200	151	4.17.E-04
-300	30	8.29.E-05

Table 3 Typical AADs in EUR

It is noted that the total number of deviations of 300 ft in magnitude is 37 out of 361,167 observations or approximately 0.01% of the flights in the level band FL290 FL410.

A typical altitude deviations are defined as being greater than 300 ft in magnitude. A total of 70 were reported and addressed in the EUR PISC as shown in Table 4, below:

Type of Event	Number of occurrences
Errors in transponded altitude	8
TCAS nuisance or false events	40
TCAS real, ie actual collision avoidance event	5
Altitude deviations due to other technical error, eg autopilot failure	2
Altitude deviations due to other operational error, eg pilot error	15
Total number of atypical errors	70

Table 4 A typical AADs in EUR

For level traffic, the PISC only states one value for traffic within the discussed level band ie 4.7 x 10^{-8} in the RVSM environment for 400 ft deviations.

2.6.8 Considering the data discussed above, the meeting drew the following conclusions:

- Complete reporting of each Assigned Altitude Deviation (AAD) is essential for correct evaluation of associated risk.

- The present reporting system for AADs needs to be augmented by investigation of each occurrence by both the ATS service provider and the operator concerned.

- The reported errors must, until supported by more complete documentation / evidence, be considered as the result of other conditions, possibly equipment aberrations.

Consequently, the meeting drew the following conclusion:

CONCLUSION 4/4: AAD REPORTING AND INVESTIGATION

That,

a) All States institute revised procedures for reporting of assigned altitude deviations (AAD) of 300 ft or more with effect from 01 April 2002;

b) Reports be structured as shown in **Appendix 2F** to the report and forwarded to the Middle East Central Monitoring Agency (MECMA);

c) An Air Traffic Incident Report Form (type: procedure) be completed and processed in accordance with Appendix 4 to ICAO PANS-ATM, Doc 4444, and attached to the AAD report to MECMA.

d) Reports total number of IFR movements in the level band FL290 - FL410 for each month to MECMA, and

e) MECMA ensures further processing of this data in accordance with its terms of reference.

MID RVSM TF/4
Appendix 2A to the Report on Agenda Item 2

TERMS OF REFERENCE

SAFETY & AIRSPACE MONITORING WORK GROUP (SAM/WG)

The SAM/WG is responsible for mathematical and statistical analysis to assist with the maintenance and on-going monitoring of safety through the assessment of collision risk for Middle East Region RVSM and other tasks as agreed with the RVSM Task Force.

The main tasks of the SAM/WG are:

i) To develop a monitoring program to ensure that the quantity and quality of data are collected to allow an assessment of vertical collision risk;

ii) To review existing mathematical and statistical techniques to assure their appropriateness for MID Region RVSM;

iii) To ensure the transferability of aircraft data collected from other airspace regions;

iv) To support the assessment of the safety of RVSM prior to and during the Verification and Operational Trials by the production of collision risk assessments based on height deviation incidents and height monitoring data to determine whether the TLS is being met;

v) To devise suitable methodologies for incorporating the effects of projected traffic increases and system changes on occupancy and collision risk in the future environment;

vi) To identify those elements which are critical in the assessment of collision risk and suggest areas where improvements might be effective in reducing risk;

vii) To establish a policy for investigating those errors that may jeopardise satisfaction of the Target Level of Safety (TLS);

viii) To estimate periodically the vertical occupancies (traffic densities, passing frequencies, etc.) in the MID Region; and

ix) To perform periodically other data collections (e.g. ASE stability) in order to ensure that the parameter values used in the mathematical collision risk models remain current.

MID RVSM TF/4
Appendix 2B to the Report on Agenda Item 2

DUTIES AND RESPONSIBILITIES OF THE MECMA

The Middle East Central Monitoring Agency (MECMA) for RVSM implementation has the following duties and responsibilities:

a) to establish and maintain a central registry of State RVSM approvals of operators and aircraft using the Middle East Region airspace where RVSM will be applied;

b) to facilitate the transfer of approval data to and from other RVSM regional monitoring agencies;

c) to establish and maintain a data base containing the results of height-keeping performance monitoring and all altitude deviations of 300 ft or more within Middle East Region airspace, and to include in the database the results of MECMA requests to operators and States for information explaining the causes of observed large height deviations;

d) provide timely information on changes of monitoring status of aircraft type classifications to State authorities and operators;

e) to assume overall responsibility for:

   i) coordination of the Global Positioning System Monitoring System (GMS); and

   ii) assessing compliance of operators in conjunction with RVSM introduction in the Middle East Region and aircraft with RVSM height-keeping performance requirements;

f) to provide the means for identifying non-RVSM approved operators using Middle East airspace where RVSM is applied; and notifying the appropriate State approval authority; and

g) to conduct readiness assessments and safety assessments as an aid for the Middle East RVSM Task Force for decision making in preparation for RVSM implementation on a specified date.

MID RVSM TF/4
Appendix 2C to the Report on Agenda Item 2

1. MIDDLE EAST RVSM MINIMUM MONITORING REQUIREMENTS

2. as of

3. 06 March 2002

INITIAL MONITORING All Middle East operators that operate or intend to operate in airspace where RVSM is applied are required to participate in the RVSM monitoring program. The table of monitoring requirements shown below establishes requirements initial monitoring associated with Middle East RVSM implementation. In their application to the appropriate State authority for RVSM approval, operators must show a plan for meeting the applicable initial monitoring requirements.

AIRCRAFT STATUS FOR MONITORING Aircraft engineering work required for the aircraft to receive RVSM airworthiness approval must be completed prior to the aircraft being monitored. Any exception to this rule will be coordinated with the State authority.

FOLLOW-ON MONITORING Monitoring is an on-going program that will continue after the initial RVSM approval process. A follow-on sampling program for additional operator aircraft will be coordinated by the Middle East RVSM Task Force.

MONITORING OF AIRFRAMES THAT ARE RVSM COMPLIANT ON DELIVERY If an operator adds new RVSM compliant airframes of a type for which it already has RVSM operational approval and has completed monitoring requirements for the type in accordance with the table below, the new airframes are not required to be monitored except as targeted at a later date in the follow-on monitoring program. If an operator adds new RVSM compliant airframes of an aircraft type for which it has **NOT** previously received RVSM operational approval, then the operator should complete monitoring in accordance with the table below.

APPLICABILITY OF EUROPEAN, NORTH ATLANTIC AND ASIA/PACIFIC MONITORING Monitoring data obtained in conjunction with RVSM monitoring programmes from other regions can be used to meet Middle East monitoring requirements. The Middle East Central Monitoring Agency (MECMA), which is responsible for administering the Middle East monitoring programme, will get access to monitoring data from other regions and will coordinate with States and operators to inform them on the status of individual operator monitoring requirements.

UPDATE OF MONITORING REQUIREMENTS TABLE AND WEBSITE As significant data is obtained, monitoring requirements for specific aircraft types may change. When the table is updated, States and operators will be informed. The updated table will be posted on the MECMA website being maintained by the UAE GCAA.

The website address is: www.mecma.com

Type	Classification	Aircraft Group	Initial Monitoring Requirement
1	Aircraft for which there is sufficient data/confidence available	The following aircraft from a manufacturer with a demonstrable track record of production of MASPS compliant aircraft A310-200(GE), A319, B733, B734, B737, B738, B752, CARJ, CL601	10% or 2 of the aircraft fleet to be monitored as soon as possible prior to the implementation of MID - RVSM
2	Aircraft for which there is sufficient data and a reduced confidence available	The following aircraft from a manufacturer with a demonstrable track record of production of MASPS compliant aircraft A306, A320, B735, B772, A310-300(PW), B736, CL600, MD80	30% or 2 of the aircraft from each operators fleet to be monitored as soon as possible prior to the implementation of MID - RVSM
3	Aircraft for which there is sufficient data and insufficient confidence available	New aircraft from a manufacturer with a demonstrable track record of production of MASPS compliant aircraft or A30B, A310-200(PW), A310-300(GE), A321, A330, A340, B712, B739, B741, B742, B743, B744, B74R, B74S, B753, B762, B763, B764, B773, GLEX, CL604, F100, F70, F2TH, F900, F900EX, GLF4, GLF5, L101, DC10, MD11, MD90, H25B, H25C, LJ60	60% of the aircraft from each operators fleet to be monitored as soon as possible prior to the implementation of MID - RVSM
4	Aircraft for which there is insufficient data available	Other group or non group aircraft other than those listed above including A124, AN70, AN72, ASTR, B701, B703, B720, B721, B722, B731, B732, B462, B463, C500, C501, C525, C550, C551, C560, C56X, C650, C750, DC85, DC86, DC87, DC9, E135, E145, F200,FA10, FA20, FA50, F28, GLF2, GLF3, H25A IL62, IL76, IL86, IL96, J328, L29A, L29B, LJ23, LJ24, LJ25, LJ31, LJ35, LJ36, LJ45, LJ55, RJ1H, RJ70, RJ85, T135, T154, T204, T334, YK42	100% of the aircraft from each operators fleet to be monitored as soon as possible prior to the implementation of MID - RVSM

TABLE 2. PRE MID-RVSM IMPLEMENTATION MONITORING REQUIREMENTS

In order to achieve the operator-monitoring requirement, monitoring results from other regions will be used. An individual aircraft that has been monitored in another region will not require re-monitoring as part of the MID-RVSM pre-implementation programme.

MID RVSM TF/4
Appendix 2D to the Report on Agenda Item 2

OBBB ACC	Same	Opp	Flights	Nx (same)	Nx (opp)	Nx(equiv)
MITEX	2	937	4,542	0.00	1.65	1.66
LOTOS	3	256	1,369	0.02	1.50	1.53
ETUKO	2	181	1,131	0.01	1.28	1.31
MGA	10	217	1,531	0.05	1.13	1.23
SELEG	0	66	1,008	0.00	0.52	0.52
BPN	0	74	1,198	0.00	0.49	0.49
COPPI	7	43	838	0.07	0.41	0.53
ALSER	0	12	438	0.00	0.22	0.22
JANIS	1	13	501	0.02	0.21	0.24
KANDU	0	9	501	0.00	0.14	0.14
AKRAM	0	0	1,457	0.00	0.00	0.00
GIBUS	0	0	439	0.00	0.00	0.00
TUGOS	0	0	3,534	0.00	0.00	0.00
BALUS	0	0	3,524	0.00	0.00	0.00
SISOK	0	0	995	0.00	0.00	0.00
Totals	25	1,808	23,006	0.01	0.63	0.64
c1/c2						1.81

Table 1. Passing Frequencies for Bahrain ACC

OMAE ACC	Same	Opp	Flights	Nx (same)	Nx (opp)	Nx (equiv)
PAPAR	1	700	2,750	0.00	2.04	2.04
ENADA	0	162	1,340	0.00	0.97	0.97
DARAX	0	7	207	0.00	0.27	0.27
LALDO	0	1	57	0.00	0.14	0.14
GISMO	0	0	891	0.00	0.00	0.00
DENBO	0	0	549	0.00	0.00	0.00
ITRAX	0	0	339	0.00	0.00	0.00
SODEX	0	0	305	0.00	0.00	0.00
LABRI	0	0	187	0.00	0.00	0.00
MUSAP	0	0	81	0.00	0.00	0.00
TUGOS	0	0	3,534	0.00	0.00	0.00
BALUS	0	0	3,524	0.00	0.00	0.00
SISOK	0	0	995	0.00	0.00	0.00
Totals	1	870	14,759	0.00	0.47	0.47
c1/c2						1.81

Table 2. Passing Frequencies in Emirates FIR

OOMM ACC	Same	Opp	Flights	Nx (same)	Nx (opp)	Nx(equiv)
KIBIT	1	279	918	0.01	2.43	2.45
MAROB	16	204	1,108	0.12	1.47	1.68
ALPOR	0	118	745	0.00	1.27	1.27
ETUKO	0	32	233	0.00	1.10	1.10
ENADA	0	162	1,340	0.00	0.97	0.97
MAGUT	0	49	454	0.00	0.86	0.86
KAPET	0	8	131	0.00	0.49	0.49
LALDO	0	1	57	0.00	0.14	0.14
GISMO	0	0	891	0.00	0.00	0.00
DENBO	0	0	549	0.00	0.00	0.00
ITRAX	0	0	339	0.00	0.00	0.00
SODEX	0	0	305	0.00	0.00	0.00
LABRI	0	0	187	0.00	0.00	0.00
MUSAP	0	0	81	0.00	0.00	0.00
Totals	17	853	7,338	0.02	0.93	0.96
c1/c2						1.81

Table 3. Passing Frequencies in Muscat FIR

KIBIT	1	279	918	0.01	2.43	2.45
PAPAR	1	700	2,750	0.00	2.04	2.04
MAROB	16	204	1,108	0.12	1.47	1.68
MITEX	2	937	4,542	0.00	1.65	1.66
LOTOS	3	256	1,369	0.02	1.50	1.53
ETUKO	2	181	1,131	0.01	1.28	1.31
ALPOR	0	118	745	0.00	1.27	1.27
MGA	10	217	1,531	0.05	1.13	1.23
ENADA	0	162	1,340	0.00	0.97	0.97
MAGUT	0	49	454	0.00	0.86	0.86
SELEG	0	66	1,008	0.00	0.52	0.52
BPN	0	74	1,198	0.00	0.49	0.49
KAPET	0	8	131	0.00	0.49	0.49
COPPI	7	43	838	0.07	0.41	0.53
DARAX	0	7	207	0.00	0.27	0.27
ALSER	0	12	438	0.00	0.22	0.22
JANIS	1	13	501	0.02	0.21	0.24
KANDU	0	9	501	0.00	0.14	0.14
LALDO	0	1	57	0.00	0.14	0.14
TUGOS	0	0	3,534	0.00	0.00	0.00
BALUS	0	0	3,524	0.00	0.00	0.00
AKRAM	0	0	1,457	0.00	0.00	0.00
SISOK	0	0	995	0.00	0.00	0.00
GISMO	0	0	891	0.00	0.00	0.00
DENBO	0	0	549	0.00	0.00	0.00
GIBUS	0	0	439	0.00	0.00	0.00
ITRAX	0	0	339	0.00	0.00	0.00
SODEX	0	0	305	0.00	0.00	0.00
LABRI	0	0	187	0.00	0.00	0.00
MUSAP	0	0	81	0.00	0.00	0.00
Totals	43	3,336	33,068	0.01	0.81	0.83
c1/c2						1.81

Table 4. Passing Frequencies in Bahrain / Emirates / Muscat ACCs

Note: The figures for Bahrain/Emirates/Muscat FIRs had been amalgamated and are presented in Table 4.

OJAC ACC	Same	Opp	Flights	Nx (same)	Nx (opp)	Nx(equiv)
ZELAF	50	1,976	4,050	0.10	3.90	4.08
TRF	56	1,928	4,044	0.11	3.81	4.01
Total	106	3,904	8,094	0.10	3.86	4.05
c1/c2						1.81

Table 5. Passing Frequencies in Amman ACC

Note: Passing frequencies had also been calculated on the TRF ZELAF segment in Amman ACC and are reproduced in Table 5.

MID RVSM TF/4
Appendix 2E to the Report on Agenda Item 2

METHODOLOGY USED FOR ESTIMATING AIRCRAFT PASSING FREQUENCIES FOR AIRCRAFT ON SAME- AND OPPOSITE-DIRECTION ATS ROUTES IN PROCEDURALLY CONTROLLED AIRSPACE IS AS FOLLOWS:

i) The average aircraft dimensions for the aircraft were derived from a sample of flights drawn from 20 January 20 February 2001.. Since most of the aircraft type for which data were not readily available were of the international general aviation (IGA) type, it was agreed to substitute the dimensions of a Gulfstream V in future calculations. These aircraft types represented less than 3.3% of the sample, so the substitution will have little effect on the actual values. From the sample, λ_x = 51.85 m (0.0280 NM), λ_y = 46.85 m (0.0253 NM), and λ_z = 15.56 m (0.0084 NM).

ii) The average absolute values of aircraft relative velocities were based on flight plan data and sample of flights drawn from 20 January 20 February 2001,with preference given to the most recent and applicable values for cruising speeds applied by operators. The average relative longitudinal speed of a pair of aircraft $\overline{|\Delta V|}$ was based on the same sources. It had the value of 12.8 knots. Likewise, the average true airspeed of aircraft $\overline{|V|}$ was based on flight plan data and sample of flights drawn from 20 January 20 February 2001 and was 470 knots. The average relative cross-track speed between an arbitrary pair of aircraft $\overline{|\dot{y}|}$ had been estimated and reported in Pacific RVSM studies. It was taken to be 5 knots. The average relative vertical speed of a pair of aircraft $\overline{|\dot{z}|}$ was determined to be 1.5 knots.

(iii) ATS routes within the area being considered had been examined on an individual basis when estimating aircraft passing frequency. Each route was divided into segments centred on reporting points covered by the traffic samples. The traffic movement data was then processed by the MECMA computer system to determine the number of pairs of aircraft at adjacent flight levels that pass each other in the same or opposite directions.

(iv) Separate estimates were prepared for each change-over point (COP) and by the direction of the passing events. In addition, a composite value had been compiled representing a time-weighted average of the routes. The tabulated results are ranked in order passing frequency. The sum of the overall same- and opposite-direction aircraft passings was then multiplied by 2 and divided by the total number of flight hours above FL280 on the segments during the period analysed, giving the same- and opposite-direction aircraft passing frequency estimates.

(v) However, the global system performance requires that the overall, or equivalent, passing frequency does not exceed 2.5 passings per hour. The equivalent passing frequency $N_{z(equiv)}$ was calculated as follows:

$$N_{x(equiv)} = N_{x(opp)} + N_{x(same)} \cdot \frac{c_1}{c_2}$$

where

$$c_1 = 1 + \frac{l_x}{l_y} \cdot \frac{|\dot{y}|}{|\Delta V|} + \frac{l_x}{l_z} \cdot \frac{|\dot{z}|}{|\Delta V|}$$

and

$$c_2 = 1 + \frac{l_x}{l_y} \cdot \frac{|\dot{y}|}{2|V|} + \frac{l_x}{l_z} \cdot \frac{|\dot{z}|}{2|V|}$$

With MID Region aircraft population, the parameters c_1 and c_2 have the values 1.83 and 1.01, respectively. Hence, the ratio c_1 / c_2 was 1.81, yielding the MID-specific equation:

$$N_{x(equiv)} = N_{x(opp)} + N_{x(same)} \cdot 1.81$$

Note: *The individual parameters that make up the model statement and their definition are as follows:*

CRM Parameter	Description
N_{az}	Number of fatal accidents per flight hour due to loss of vertical separation.
S_z	Vertical Separation minimum.
$P_z(S_z)$	Probability that two aircraft nominally separated by the vertical separation minimum S_z are in vertical overlap.
$P_y(0)$	Probability that two aircraft on the same track are in lateral overlap.
l_x	Average aircraft length.
l_y	Average aircraft wingspan.
l_z	Average aircraft height with undercarriage retracted.
$\hat{S}_x$	Length of longitudinal window used to calculate occupancy.
$E_z(same)$	Same direction vertical occupancy.
$E_z(opp)$	Opposite direction vertical occupancy.
$\overline{\|\Delta V\|}$	Average relative along track speed between aircraft on same direction routes.
$\overline{\|V\|}$	Average aircraft ground speed.
$\overline{\|\dot{y}\|}$	Average relative cross track speed for an aircraft pair nominally on the same track.
$\overline{\|\dot{z}\|}$	Average relative vertical speed of an aircraft pair that have lost all vertical separation

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MID RVSM TF/4
Appendix 2F to the Report on Agenda Item 2

REPORT OF AN ALTITUDE DEVIATION OF 300FT OR MORE

BETWEEN FL290 & FL410

(1) Reporting agency

(2) Location of deviation

(3) Date of occurrence (UTC)

(4) Flight identification and type

(5) Flight level assigned

(6) Observed/reported final level Mode C/Pilot report

(7) Duration at flight level

(8) Cause of deviation

(9) Other traffic

(10) Crew comments, if any, when noted

(11) Remarks

Attachments:

(A) Copy of Air Traffic Incident Report Form

(B) Copy of voice tape transcript

(C) Copy of radar tape transcript/plot

The completed reports should be forwarded to the following address:

MECMA
P.O. Box 666
Abu Dhabi
United Arab Emirates
Telephone: +971 2 4054 339
Fax: +971 2 405 4316 (new fax number)
E-Mail: aad@mecma.com

REPORT ON AGENDA ITEM 3 - ATC OPERATIONS ASPECTS (ATC/WG)

3.1 In accordance with its Terms of Reference and Work Programme ***(See* Appendix 3*A*** to the Report on Agenda Item 3*)*, the ATC/WG is responsible for addressing all matters relating to air traffic services (ATS) within the RVSM and transition airspace. The Group met in separate sessions and joint sessions were also organized with the SAM/WG and OPS/AIR/WG. The following subjects were addressed:

- Transition Areas and Procedures;
- Suspension of RVSM Operation;
- Weather deviation procedures;
- Congestion problems at crossing points;
- Training aspects;
- Review of RVSM Task List; and
- Development of an RVSM evaluation form

3.1.1 It was agreed that the methodology indicated in the ICAO Manual on Implementation of 300 m (1000FT) Vertical Separation Minimum between FL 290 and FL410 inclusive (ICAO Doc 9574) will be used for ensuring the safe implementation of RVSM in the MID Region. The Group also noted with appreciation that the MIDANPIRG/7 meeting (Cairo, 21- 25 January 2002) has endorsed all conclusions emanating from the previous Task Force meetings.

3.2 TRANSITION AREAS AND PROCEDURES

3.2.1 The ATC Operations Work Group (ATC/WG) highlighted the need for the creation of transition areas and transition procedures for ensuring the safe implementation of RVSM in the MID Region. Concerns were raised on implementation plans from some States in the Region from which no information has so far been received and are not participating in the planning process. It was agreed that the ICAO Secretariat will follow-up the matter and will keep the Task Force apprised of the readiness and implementation plans from the States concerned with a view to assist in the elaboration of transition areas and procedures. It was also agreed that the Secretariat will, in line with implementation plans and timeframes from adjacent ICAO Regions provide adequate information for the establishment of the MID RVSM airspace. The group also recalled MIDANPIRG/7 conclusion 7/16

States which do not fulfill their requirements regarding the implementation milestones for the implementation of RVSM within their respective FIRs will be initially excluded from

3.2.2 The Group recalled that transition areas for operation within an RVSM airspace should be within the RVSM airspace and not outside its confines. To this effect the meeting noted the concerns of the operators regarding RVSM transition area which has been established within Teheran FIR for the handling of traffic at RVSM levels to Ankara FIR. Although the Group noted with appreciation the leading role by Iran over the issue, it pointed out that other important elements have not been addressed and this might endanger the safety of aircraft operations transgressing to the Ankara and Tehran FIRs respectively. The meeting pointed out that Iran is within the MID RVSM Implementation area and in accordance with the MID plan implementation will be on 27 November 2003. However, it was clarified that once the results of safety assessment for RVSM operations are conclusive and the necessary infrastructure (VHF coverage, adequate ATC personnel and other

with Eurocontrol and the service providers. The Group thus requested Iran to review the Letter of Agreement with Turkey and to ensure that transition from non-RVSM to RVSM levels be carried out within the transition area within Ankara FIR.

3.3 SUSPENSION OF RVSM OPERATION.

3.3.1 The Group noted that the procedures for the suspension of RVSM operations were developed at the Third Task Force were included in the AIP Supplement and States were accordingly requested to promulgate these procedures which also included procedures for implementation of RVSM on 29 November 2001. However, the Group was of the view that the procedures have to be harmonized with those developed in adjacent ICAO Regions. It was agreed that the Secretariat will follow-up the matter in consultation with adjacent States/Regions.

3.4 DEVELOPMENT OF WEATHER DEVIATION PROCEDURES

3.4.1 The Group noted that the Secretariat had developed a draft proposal for the amendment of the Regional SUPPs for inclusion of procedures for weather deviations and other in-flight contingencies. It was however noted that these procedures address only oceanic airspaces and was still being finalized with the ICAO European and Asia Pacific Offices. The Group highlighted the need for harmonization of these procedures with the EUR and MID Regions and sort out any inconsistencies prior to submission to States/Organizations for comments **(See Appendices E and F** to the Report).

3.5 CONGESTION PROBLEMS AT CROSSING POINTS

3.5.1 The Group noted that congestion problems at crossing points may have a negative impact on the safety case and recalled the proposal made by Oman at the MIDANPIRG/7 meeting with a view to improve/reorganize the ATS route structure from to Gulf of Oman into the MID Region. It was pointed out that this issue has been the subject of many informal meetings by the parties concerned and will be further considered by the RNP/RNAV TF meeting to be held in Cairo from 2 5 April 2002 and the EMARSSH TF meeting to be held in Iran from 13 17 May 2002.

3.6 TRAINING ASPECTS

3.6.1 The Group raised concern over the timely training of all personnel in the Region with a view to meet the target date of implementation of **27 November 2003** for the implementation of RVSM. The need for the sharing of training packages was highlighted. The Group recalled that MIDANPIRG/7 meeting under conclusion 7/17 stated that:

> *i) ICAO explores the possibility of assisting States of the MID Region through a Special Implementation Project (SIP) for training of personnel involved with the implementation of RVSM in the MID Region;*
>
> *ii) Seminars/workshops be organized in the Region for training of air traffic services personnel in the RVSM field ;*
>
> *iii) States be invited to approach training institutions for the development of training module in the RVSM field representa*

3.6.2 To this effect, the Group urged the ICAO MID Office to ensure that prompt follow-up action be taken on the above conclusion with a view to expedite the process. The meeting also noted with appreciation the creation of a Human Resources Planning and Training Task Force by MIDANPIRG/7 and urged that the implementation of RVSM be also addressed within the framework of the Task Force.

3.7 UPDATING OF THE RVSM TASK FORCE-WORK PROGRAMME (TASK LIST)

3.7.1 The Group accordingly reviewed and updated its work programme (*task list)* concerning ATC operational Work Group (ATC/WG) issues and other joint tasks to be carried out by the Operations/Airworthiness Work Group (OPS/AIR/WG) and the Safety Assessment and Monitoring Work Group (SAM/WG). The Terms of Reference of the RVSM Task Force and the Work Programme are indicated at **Appendices A and B** to the report.

3.8 DEVELOPMENT OF AN RVSM EVALUATION FORM

3.8.1 The Task Force established an RVSM Evaluation Form Checklist with a view to ensure that prompt action is being taken by States on the different actions which have been agreed upon for ensuring the safe and evolutionary implementation of RVSM in the MID Region and to have an indication on the status of preparedness of States to meet the target dates which have been set. To this effect the Group identified those elements which should be indicated in the evaluation form **(See Appendix C** *(C-1 to C-3)* to the Report).

3.9 OTHER ISSUES

3.9.1 The Group agreed that many conclusions and materials developed by the Task Force (AICs, AIP Supplements, proposals for amendment of the Regional SUPPs for in-flight contingencies

Secretariat to include these materials as an attachment to the report for reference purposes **(See Appendices D** *(Draft AIC)***, E** *(Draft AIP Supplement-RVSM implementation policy and procedures* **and F** *(Draft proposal for the inclusion of procedures for in-flight contingencies developed by the ASIA/PAC Office***).**

ATC OPERATIONS WORK GROUP (ATC/WG)

Terms of Reference

The ATC/WG is responsible for addressing all matters relating to air traffic services within the RVSM and transition airspace, to include the following:

- To identify airspace in which RVSM will be applied based on statement of application and develop a regional operational concept, ensuring inter-regional harmonization;

- to develop procedures to mitigate wake turbulence;

- to establish transition areas and develop transition procedures;

- to develop contingency procedures; and

- to consider workload issues and identify the need for controller simulations

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REPORT ON AGENDA ITEM 4: AIRCRAFT OPERATIONS AND AIRWORTHINESS ASPECTS (OPS/AIR/WG)

4.1 Under this Agenda Item the OPS/AIR Work Group reviewed the work program that had been established by the MID RVSMTF/3 within the framework of the OPS/AIR/WG and the conclusions emanating from MIDANPIRG/7 meeting. The Terms of Reference of the OPS/AIR/WG is at **Appendix 4A** to the report on Agenda Item 4.

4.2 The Group considered the following issues:

- Guidance material for airworthiness and operational approvals;
- Legislation and regulations regarding compliance with RVSM;
- Air operator and A/C approval to operate within RVSM airspace;
- Matters to be included in the RVSM status of readiness evaluation form; and
- Amendment proposal to the Regional SUPPs Doc 7030/4 for the inclusion of procedures for in-flight contingencies and the inclusion of communications failures in Doc 7030.

4.3 The Group noted with appreciation the endorsement of the conclusions regarding airworthiness and operational approvals by the MIDANPIRG/7 and pointed out that the adoption of the guidance material contained in both the FAA Interim Guidance 91-RVSM and JAA Temporary Guidance Leaflet No. 6, as amended, as guidance material for use by States and Operators for Airworthiness and Operational Approval of aircraft and operators to operate in airspace above FL290 where a 1000 foot vertical separation minimum is applied will facilitate the approval process.

4.3 The Group also agreed to invite states to examine existing legislations and regulations to identify any changes required for RVSM to confirm its compliance with ICAO ANNEX 6 Part 1 Chapter 7 Para. 7.2.3 (RVSM). Participating States confirmed that their legislation has been amended to include provisions regarding the implementation of RVSM.

4.4 The Group also agreed the evaluation form developed by the Task Force will assist in obtaining data regarding the operator approvals and identified elements to be included in the OPS/AIR section of the evaluation form on status of readiness.

4.5 The Group considered that chart amendments were outside the expertise of the OPS/AIR/WG and recommended that the ATC/WG amplify the areas of possible co-ordination at the next meeting (if applicable).

The Group reiterated that States be requested to take follow-up action on the following conclusions emanating from the MIDANPIRG/7 meeting as follows:

- ***GUIDANCE MATERIAL FOR AIRWORTHINESS AND OPERATIONAL APPROVAL***

That,

States in the MID Region adopt the guidance material contained in both FAA Interim Guidance 91-RVSM and JAA Temporary Guidance Leaflet TGL No. 6 as amended for issuing Airworthiness and Operational Approval for aircraft and operators intending to operate within th

Note; The above guidance materials also include (the amended FAA IG-91 and JAA TGL 6) procedures for non-compliant aircraft and training of pilot, flight dispatchers and maintenance staff for operation in an RVSM environment.

ONCLUSION 7/19:- RVSM LEGISLATION

That,

The MID Region States are invited to examine their legislations and regulations to identify any changes required for RVSM to confirm its compliance as indicated in ICAO ANNEX 6 Part 1 Chapter 7 P

4.6 Based on the foregoing, the Group also formulated the following Conclusions/Decisions:

CONCLUSION 4/5 MONITORING OF THE STATUS OF PREPAREDNESS FOR RVSM IMPLEMENTATION

That,

a) States send the RVSM evaluation forms to MECMA on a quarterly basis, with a copy to the ICAO MID Regional Office indicating the status of preparedness in the SAM,ATC and OPS/AIR fields as indicated in the evaluation forms at **Appendix C (C1-C3)** to the report;

b) States send to the Rapporteur of the OPS/AIR Work Group before 1 May 2002 a copy of the evaluation form C-3 at **Appendix C** to the Report, and thereafter on a quarterly basis, with a view to follow-up on the status of implementation of all requirements in the OPS/AIR fields necessary for ensuring the safe implementation of RVSM.

DECISION 4/6: INCLUSION OF PROCEDURES FOR IN-FLIGHT CONTINGENCIES AND COMMUNICATION FAILURES IN DOC 7030

That:

a) The OPS/AIR Work Group studies the proposal by the UAE for inclusion of procedures for in-flight contingencies in the Regional Supplementary Procedures Doc.7030;

b) The Secretariat develops radio communications failure procedures for inclusion in Doc 7030 and ensures that the procedures are aligned with both the EUR and APAC regions.

MID RVSM TF/4
Appendix 4A to the Report on Agenda Item 4

Aircraft Operations & Airworthiness Work Group (OPS/AIR/WG)

TERMS OF REFERENCE

The OPS/AIR/WG is responsible for addressing pilot operations, airworthiness, and aircraft approval issues, and:

- To harmonize policy on operations and airworthiness issues related to RVSM;

- To develop and harmonize guidance related to the implementation of RVSM and coordinate on issues which may arise in the application of the RVSM Minimum Aircraft System Performance Specifications (MASPS);

- To initiate necessary action to amend aeronautical charts to reflect navigation requirements related to RVSM;

- To develop policy for use of Airborne Collision Avoidance Systems (ACAS) as it relates to RVSM; and

- To review monitoring data prior to implementation and after implementation.

REPORT ON AGENDA ITEM 5 : ANY OTHER BUSINESS

5.1 Under this agenda item the meeting, taking into account the amount of work necessary for the completion of all activities prior to the Go/No-Go decision regarding the implementation of RVSM in the MID region established a tentative schedule of meetings for the MID RVSM Task Force as follows:

MID RVSM TASK FORCE TENTATIVE FUTURE SCHEDULE OF MEETINGS

Date	Meeting	Venue
YEAR 2002		
2 5 June	MID RVSM TF/5	Abu Dhabi
12 13 October	MID RVSM Seminar/2	Abu Dhabi
14 17 October	MID RVSM TF/6	Abu Dhabi
YEAR 2003		
February	MID RVSM TF/7	To be determined
May	MID RVSM TF/8	To be determined
August	MID RVSM TF/9	To be determined
YEAR 2004		
January	MID RVSM TF/10	To be determined

5.2 The meeting also noted the requirement for the organization of joint meetings between the MID Region and the adjacent AFI, APAC and EUR Regions with a view to harmonize procedures and it was agreed that the Secretariat will expedite action with a view to liaise with the Regions concerned for the organization of these RVSM interface meetings. The meeting accordingly framed the following decision:

DECISION 4/7: ORGANIZATION OF INTERFACE MEETINGS

That, with a view to harmonize RVSM procedures and implementation timeframes, the ICAO MID Regional Office, in consultation with the ICAO Regional Offices for AFI, Asia/Pacific, European Regions organize joint interface meetings as soon as possible, and preferably before the end of Year 2002.

5.3 The meeting was also apprised of the workshop on controlled Flight Into Terrain (CFIT) /Approach and Landing Accident Reduction (ALAR) being organized by the CFIT/ALAR Action Group and Flight Safety Foundation (FSF) with the assistance of Arab Air Carriers Organization (AACO) **on 26 March 2002 at the ICAO MID Regional Office, Cairo, Egypt**. This one day ALAR Tool Kit Workshop will introduce this material in the MID Region and will explain how to make maximum use of the materials which have been developed in the Kit. States are requested to

send flight operations inspectorate and air traffic control management staff to this workshop. Airline operators are also encouraged to attend by sending their training staff and pilots.

5.4 The Task Force also note with appreciation that the FAA has included in its web page a link to access the ICAO MID RVSM Programme.

TERMS OF REFERENCE FOR THE MID RVSM TASK FORCE

1. Develop a comprehensive implementation plan for RVSM in the MID Region, taking into account the requirements of the *Manual on Implementation of a 300 M (1000 ft) Vertical Separation Minimum between FL 290 and FL 410 Inclusive (Doc 9574)*, and the requirements of users.

2. Identify any areas within the MID Region where it may not be feasible to introduce RVSM in the initial implementation.

3. Determine the extent to which a cost-benefit analysis is required prior to implementation of RVSM.

4. Coordinate with the bodies responsible for the implementation of RVSM in adjacent Regions in order to harmonize implementation plans.

5. Develop guidance material for RVSM operations in the MID Region, taking into account existing guidance material which has been developed by other regions.

6. Address any other matters, as appropriate, which are relevant to the implementation of RVSM.

MID RVSM TASK FORCE - WORK PROGRAMME

ID	Description	Start	Finish	Resources
	Working Methods and Resources			
1	~~Agree on structure of TF to enable efficient handling of specialist technical tasks~~		~~5-Oct-00~~	~~RVSM TF~~ - Completed
2	Identify resources for performing specialist technical tasks	5-Oct-00	30-Apr-01	RVSM TF
3	Investigate methods of funding any outside assistance required	5-Oct-00	30-Apr-01	RVSM TF
	Cost Benefits Analysis			
4	~~Evaluate need for a cost benefit analysis~~	~~3-Oct-00~~	~~5-Oct-00~~	~~RVSM TF~~ Completed
	Safety Assessment and Monitoring			
5	Conduct preliminary data collection and readiness assessment	1-Dec-00	29-Aug-01	States, SAM/WG, ASIA/PAC RVSM TF - Completed
6	~~Evaluate options for setting up a central monitoring agency~~	~~3-Oct-00~~	~~10-Apr-01~~	~~SAM/WG~~ - Completed
7	~~Evaluate options for carrying out the safety analysis~~	~~3-Oct-00~~	~~29-Aug-01~~	~~SAM/WG~~ - Completed
8	~~Evaluate options for implementation of a height monitoring program~~	~~3-Oct-00~~	~~6-Mar-02~~	~~SAM/WG~~ Completed
9	~~Develop procedures for reporting large height deviations in existing system~~	~~1-Apr-01~~	~~29-Aug-01~~	~~SAM/WG~~ completed
10	Collect weather and turbulence data for analysis	1-Apr-01	5-Jun-02	SAM/WG
11	Develop detailed program for safety analysis	6-Mar-02	TF/6	SAM/WG
12	Establish requirements for pre and post-implementation monitoring	TBD	6-Mar-02	SAM/WG - 4th qtr. 03 for post implementation monitoring
13	Undertake initial safety analysis	TBD	4th qtr.-02	SAM/WG
14	Carry out pre-implementation safety analysis	TBD	2nd qtr.-03	SAM/WG
15	Carry out pre-implementation readiness assessmsent	TBD	2nd qtr.-03	SAM/WG
16	Carry out post-implementation safety analysis during verification phase	TBD	Mid.-04	SAM/WG
17	Review of mathematical and statistical techniques to assure their appropriateness for MID RVSM	11-Apr-01	Jan-03	SAM/WG
18	Ensure Tranferability of aircraft data from other Regions	11-Apr-01	June-02	SAM/WG- TF5
19	Devise methodologies for incorporating the effects of projected traffic growth and system changes on occupancy & collision risk in the future environment	11-Apr-01	June-02	SAM/WG- TF5
20	Perform periodically other data collections (eg. ASE stability) in order to ensure that the parameter vlaues used in the mathematical collision risk models remain current	11-Apr-01	ONGOING	SAM/WG
	ATC Operational Issues			
21	~~Dertermine the limits of RVSM airspace (geographic and vertical)~~	~~10-Apr-01~~	~~6-Mar-02~~	~~ATC/WG~~ - Completed

MID RVSM TASK FORCE - WORK PROGRAMME

ID	Description	Start	Finish	Resources
22	Develop ATC operational policy & procedures for normal RVSM operations	1-Nov-02	TBD	ATC/WG
23	Identify transition areas and transition procedures	26-Aug-01	5-Jun-02	ATC/WG-Egypt,Iran, Saudi Arabia,Oman to prepare draft
24	States assess the impact of RVSM implementation on controller automation systems and plan for upgrades/modifications	10-Apr-01	5-Jun-02	ATC/WG
25	Develop ATC procedures for non-approved State acft to transit RVSM airspace	10-Apr-01	5-Jun-02	ATC/WG-Secretary to prepare draft
26	Develop procedures for handling non-compliant civil aircraft (inc ferry & maintenance)	10-Apr-01	5-Jun-02	ATC/WG-Secretary to prepare draft
27	Develop procedures for suspension of RVSM	10-Apr-01	5-Jun-02	ATC/WG- Secretary to prepare draft
28	Evaluate the need for simulations to assess ATC workload and possible need for airspace/air route/Sector changes	2-Jun-02	2-Oct-02	ATC/WG-Outside expertise may be sought
29	Develop ATC regional training guidance material	TBD	Oct.02	ATC/WG-Bahrain to prepare draft
30	Identify issues to be adressed in Letters of Agreement	10-Apr-01	Oct.02	ATC/WG-Oman to prepare draft
31	States to conduct local RVSM training for air traffic controllers	27-Mar-03	26-Nov-03	States
	OPS/AIR Issues			
32	States to examine existing legislation and regulations to identify any changes required for RVSM	5-Oct-00	5-Jun-02	OPS/AIR/WG
33	~~Develop and promulgate information on the operational approval process~~	~~1-Apr-01~~	~~29-Aug-01~~	~~OPS/AIR/WG~~ - Completed
34	Develop procedures for aircraft found to be non-compliant through monitoring	11-Apr-01	6-Mar-02	OPS/AIR/WG
35	Evaluate the need for chart amendments related to RVSM	11-Apr-01	5-Jun-02	OPS/AIR/WG - Referred to ATC/WG
36	Develop regional guidance on pilot and dispatcher training	11-Apr-01	ONGOING	OPS/AIR/WG
37	~~Examine issues related to the use of ACAS in RVSM airspace~~	~~11-Apr-01~~	~~29-Aug-01~~	~~OPS/AIR/WG~~ - Completed
38	Monitor progress with operator approvals	11-Apr-01	ONGOING	OPS/AIR/WG
	Joint Tasks			
39	~~Review preliminary readiness assessment~~	~~1-Apr-01~~	~~29-Aug-01~~	~~RVSM TF~~ -Completed- 90% target achieved
40	Set target proportion of RVSM approved aircraft for full RVSM implementation	1-Apr-01	6-Mar-02	RVSM TF
41	Set target AIRAC implementation date(AIP Supplement to be published)	7-Apr-01	2-Oct-03	RVSM TF
42	Prepare/maintain regional status report detailing RVSM implementation plans	1-Apr-01	ONGOING	RVSM TF
43	Identify major milestone and targe dates	9-Apr-01	5-Jun-02	RVSM TF - Secretariat to prepare chart.
44	Develop a regional RVSM informational campaign	7-Apr-01	ONGOING	RVSM TF
45	Develop regional RVSM Guidance Material	1-Apr-01	5-Jun-02	RVSM TF- Draft to be prepared by Secretary

MID RVSM TASK FORCE - WORK PROGRAMME

ID	Description	Start	Finish	Resources
46	Review weather and contingency procedures for applicability under RVSM	10-Apr-01	5-Jun-02	Draft completed(Secretariat will harmonize with other Regions)
47	~~Develop model AICs and NOTAMs~~	~~9 Apr 01~~	~~29 Aug 01~~	Draft completed(AIC already Issued)
48	Evaluate preliminary readiness and safety assessments	20-Jan-01	4th qtr.02	RVSM TF
49	Undertake coordination and harmonization of procedures with adjacent Regions	1-Apr-01	ONGOING	RVSM TF-joint MID/ASIA,MID/EUR and MID/.AFI meetings pla
50	Evaluate the need for tactical offset procedures to mitigate the effects of turbulence and TCAS alerts	10-Apr-01	5-Jun-02	RVSM TF
51	Develop Doc 7030 amendment	10-Apr-01	ONGOING	RVSM TF- Draft prepred.Being harmonized with other Regions
52	Review aircraft altitude-keeping performance and operational errors	1-Jul-01	5-Jun-02	RVSM TF
53	Develop monitoring and evaluation program for the verification phase	TBD	TBD	RVSM TF
54	Evaluate final readiness assessment	TBD	30-Aug-03	RVSM TF
55	Evaluate final safety analysis	30-Jan-03	30-Aug-03	RVSM TF(2nd quarter 2003)
56	Go/No-Go decision	TBD	30-Aug-03	RVSM TF

EVALUATION FORM CHECKLIST
MID RVSM IMPLEMENTATION MILESTONES/REQUIRMENTS

STATE:

Form 001

FIR(s)

VERSION 001-A

EVALUATION DATE:

SAFETY AND AIRSPACE MONITORING ASPECTS

REQUIREMENTS	ACTION TAKEN		REMARKS
	YES	NO	
1.1 -To verify whether the following reports are regularly being sent to MECMA: -Assigned Altitude Deviation (AAD) forms -Total IFR movements per month -Average time spent per movement at assigned levels between FL290 and FL410 -ATC/ATC Coordination failures			
1.2 Whether any turbulence data reports have been received and sent to MECMA			
1.3 Whether traffic data has been sent			

EVALUATION FORM CHECKLIST
MID RVSM IMPLEMENTATION MILESTONES/REQUIRMENTS

STATE:

Form 001

FIR(s)

VERSION 001-A

EVALUATION DATE:

OTHER GENERAL REQUIRMENTS

(Applicable to the safety and airspace monitoring aspects, ATC operations aspects and aircraft operations and airworthiness aspects)

REQUIREMENTS	**ACTION TAKEN**		**REMARKS**
	YES	NO	
FUNDING/BUDGETARY ALLOTMENT			
TRAINING			

EVALUATION FORM CHECKLIST
MID RVSM IMPLEMENTATION MILESTONES/REQUIRMENTS

STATE:

Form 002
FIR(s) VERSION 001-A

EVALUATION DATE:

ATC OPERATIONS ASPECTS

	REQUIRMENTS	ACTION TAKEN		REMARKS
		YES	NO	
2.1	Have appropriate orders been made for purchase of equipment upgrade for ATC systems			
2.2	Documentations/procedures Have contingency plans been made in case equipment upgrade not reveived on time Have letters of agreement been signed with adjacent centres for provision of services in an RVSM environment			
2.3	Have training requirements been assessed			
2.4	Issue of aic			
2.5	Issue of AIP Supplement (15 may 2003)			
2.6	Trigger NOTAM to be issued in October 2003 for confirming implementation of RVSM			
2.7	Evaluation of the need to carry out simulations to assess ATC workload and consideration of possible requirements for airspace/route and/or sector reorganization.			
2.8	Conduct of local training for air traffic controllers			

EVALUATION FORM CHECKLIST
MID RVSM IMPLEMENTATION MILESTONES/REQUIRMENTS

STATE:

Form 002
FIR(s) VERSION 001-A

EVALUATION DATE:

2.9 Have you considered the need for changes to flight strips? (Non-RVSM, State aircraft etc..)			
2.10 Is there any need for changes to FDPS?			
2.11 Is there any need to changes in radar display systems? (*where applicable)*			
2.12 Have you considered the need for changes to Short Term Conflict Alerts(STCAs)? (*where applicable*)			
2.13 Have you considered any need for changes to Medium Term Conflict Detection (MTCD) Systems? (*where applicable)*			
2.14 Have you considered any need for changes to On-Line Data Interchange (OLDI)? (*where applicable)*			

OTHER GENERAL REQUIRMENTS

(Applicable to the safety and airspace monitoring aspects, ATC operations aspects and aircraft operations and airworthiness aspects

REQUIREMENTS	**ACTION TAKEN**		**REMARKS**
	YES	NO	
FUNDING/BUDGETARY ALLOTMENT			
TRAINING			

EVALUATION FORM CHECKLIST
MID RVSM IMPLEMENTATION MILESTONES/REQUIRMENTS

STATE:

Form 003
FIR(s) VERSION 001-A

EVALUATION DATE:

AIRCRAFT OPERATIONS AND AIRWORTHINESS ASPECTS

	REQUIREMENTS	ACTION TAKEN		REMARKS
		YES	NO	
3.1	National Regulations for RVSM Implementation			
3.2	Aircraft and Operators approval/guidance			
3.3	Procedures for non-compliant aircraft			
3.4	Development of RVSM Training Curriculum for flight crew members and dispatchers			
3.5	What is the percentage ratio of the national aircraft that received RVSM airworthiness approval			
3.6	How many national operators have full RVSM approval			
3.7	What is the percentage ratio of aircraft fleet			
3.8	Did you provide MECMA with RVSM approval documentation			
3.9	Did you nominate your State RVSM Programme Manager			
3.10	Certification			

EVALUATION FORM CHECKLIST
MID RVSM IMPLEMENTATION MILESTONES/REQUIRMENTS

STATE:

Form 003
FIR(s) VERSION 001-A

EVALUATION DATE:

OTHER GENERAL REQUIRMENTS

(Applicable to the safety and airspace monitoring aspects, ATC operations aspects and aircraft operations and airworthiness aspects)

REQUIREMENTS	ACTION TAKEN		REMARKS
	YES	NO	
FUNDING/BUDGETARY ALLOTMENT			
TRAINING			

MID RVSM TF/4
Appendix D to the Report

DRAFT AERONAUTICAL INFORMATION CIRCULAR (AIC)

IMPLEMENTATION OF REDUCED VERTICAL SEPARATION MINIMA

Effective date: 27 November 2003.
Type: Permanent.
Appendix 3 - A
This AIC serves as Notice of Intent to implem
2003.

Reduced Vertical Separation Minimum (RVSM) is vertical separation of aircraft by 1,000 ft above FL 290. By 27 September 2003, operators should have received RVSM aircraft (airworthiness) and operational approval from the appropriate State authority. Operator/aircraft approval by 27 September 2003 will enable air traffic services (ATS) to plan for orderly RVSM implementation.

Starting 27 November 2003, only RVSM compliant aircraft will be cleared
FIR between FLs 290 and 410 (inclusive). Aircraft that are not RVSM compliant (e.g., ferry and

(inclusive) after prior coordination with the appropriate Center. 2,000 ft vertical separation will be

follow-up NOTAMS.

gional agreements. ICAO recommends that State authorities and operators use FAA Interim Guidance 91-RVSM (as amended); Joint Airworthiness Authorities (JAA) Temporary Guidance Leaflet 6 (TGL 6) or equivalent State documents as the basis for approving aircraft and operator programs for RVSM.

The Middle East Region has established the Middle East Central Monitoring Agency for implementation of RVSM (MECMA), which would host the database of all information regarding the RVSM approval process. Current information and RVSM approval documents, including revisions, can be found on the website maintained by the FAA, Eurocontrol, MECMA and on individual State websites.

To access the FAA, Eurocontrol and MECMA RVSM websites, type:

http://www.faa.gov/ats/ato/rvsm1.htm
http://www.eur-rvs.com
http://www.mecma.com

The RVSM Documentation section of the FAA, Eurocontrol websites contain guidance on aircraft/operator approval. Operators must begin coordination with the appropriate State authority as soon as possible to ensure that they are approved to begin RVSM operations on 27 November 2003.

For questions on the aircraft and operator approval process, the following contacts may be used:

MECMA:
MECMA : Tel : 971-2-405-4339; fax : 971-2-449-1599; e-mail : traffic@mecma.com

CAA

AIRAC
15 MAY 2003

DRAFT AERONAUTICAL INFORMATION PUBLICATIONS (AIP) SUPPLEMENT

1.0 Introduction

1.1 The International Civil Aviation Organization (ICAO) Sixth Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG) meeting in order to contribute to the reduction of congestion in the Middle East (MID) region, agreed that Reduced Vertical Separation Minimum (RVSM) should be introduced in MID region after successful implementation in the North Atlantic, European and Asia/Pacific regions. ICAO Document 9574, *Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive*, contains an explanation of RVSM.

1.2 Benefits to be gained from RVSM include:

a) adoption of an ICAO endorsed navigation requirement;

b) improved utilization of airspace for ATC conflict resolution;

c) fuel savings of ≈ 1% for flight closer to optimum cruise altitude; and

d) reduction in ground delays.

1.3 CONTENT. The ICAO MID RVSM Task Force has harmonized the basic content of this document. The following policies are addressed in the paragraphs of this document:

2.0 Identification of RVSM airspace
3.0 Airworthiness and Operational Approval and Monitoring
4.0 ACAS II and Transponder Equipage
5.0 In-flight Procedures Within RVSM Airspace
6.0 Special procedures for in-flight contingencies within the MID Continental Airspace
7.0 Special procedures for In-flight Contingencies in Oceanic Airspace
8.0 In-flight Contingency Procedures for Subsonic Aircraft Requiring Rapid Descent, Turn-back or Diversion in Oceanic Airspace
9.0 Weather Deviation Procedures
10.0 Special Procedures to Mitigate Wake Turbulence Encounters and Distracting Aircraft System Alerts
11.0 Transition areas
12.0 Flight Planning Requirements
13.0 Procedures for Operation of non-RVSM Compliant Aircraft in RVSM Airspace
14.0 Delivery Flights for Aircraft that are RVSM Compliant on Delivery
15.0 Procedures for Suspension of RVSM
16.0 Guidance for Pilot and Controller for Actions in Event of Aircraft System Malfunction of Turbulence Greater than Moderate

2.0 Identification of RVSM airspace

2.1

(inclusive

3.0 Airworthiness and Operational Approval and Monitoring

3.1 APPROVAL PROCESS. (Source Document: FAA Interim Guidance (IG) 91-RVSM/JAA TGL #6) Operators must obtain airworthiness and operational approval from the State of Registry or State of the Operator, as appropriate, to conduct RVSM operations. On behalf of the MID Region ATS providers, the MID Region is maintaining a website containing documents and policy for RVSM approval. The Internet address is: http://www.mecma.com.

3.2 AIRCRAFT MONITORING. (Source Document: IG 91-RVSM/TGL #6, Asia/Pacific Minimum Monitoring Requirements) Operators are required to participate in the RVSM aircraft monitoring program. This is an essential element of the RVSM implementation program in that it confirms that the aircraft altitude-keeping performance standard is being met The Middle East Central Monitoring agency (MECMA) will process the results of monitoring. For further information on RVSM monitoring, the MECMA web site can be accessed by:http://wwwe.mecma.com

3.2.1 Monitoring accomplished for other regions can be used to fulfill the monitoring requirements for the Middle East Region. MECMA will coordinate with other monitoring agencies to access this information. For monitoring services in the Middle East Region, operators should contact MECMA as follows:

Phone: 971-2-405-4339
Fax: 971-2-449-1599
Email: traffic@mecma.com

4.0 ACAS II and Transponder Equipage

4.1 All civil aircraft intending to operate within the Middle East RVSM airspace shall be equipped with ACAS II. (TCAS II systems with Version 7.0 incorporated meet ICAO ACAS II standards).

4.1.1 Operators must take action to inform themselves of ACAS II equipage requirements and plan for compliance. ICAO and individual States have established policies requiring ACAS II equipage and schedules for compliance. In addition, the MIDANPIRG has endorsed early ACAS II equipage in the region.

4.2 INTERNATIONAL GENERAL AVIATION (IGA) TRANSPONDER EQUIPAGE. ICAO Annex 6, Part II, states that, starting 1 January 2000, IGA airplanes shall be equipped with a pressure altitude reporting transponder certified by the appropriate State authority as meeting the provisions of Annex 10.

5.0 In-flight procedures within RVSM airspace

5.1 Before entering RVSM airspace, the pilot should review the status of required equipment. (See Appendix 4 of FAA IG 91-RVSM for pilot RVSM procedures). The following equipment should be operating normally:

a) two primary altimetry systems;

b) one automatic altitude-keeping device; and

c) one altitude-alerting device.

5.2 See **Attachment** ____ to this AIP Supplement or Appendix 5 of FAA IG 91-RVSM for pilot and controller actions in contingencies. The pilot must notify ATC whenever the aircraft:

a) is no longer RVSM compliant due to equipment failure; or

b) experiences loss of redundancy of altimetry systems; or

c) encounters turbulence that affects the capability to maintain flight level.

5.3 -RVSM/TGL #6) During cleared transition between levels, the aircraft should not overshoot or undershoot the assigned FL by more than 150 ft (45 m).

5.4 PILOT LEVEL CALL. (Source Document: State AIP Supplement) Except in an ADS or radar environment, pilots shall report reaching any altitude assigned within RVSM airspace.

5.5 CONTINGENCY PROCEDURES. (Source Document: State AIP Supplement) Paragraphs 6.0, 7.0, 8.0, 9.0 and 10.0 below contain procedures for in-flight contingencies that have been updated for RVSM operations. The contingency procedures in paragraphs 7.0-8.0 and the off-set procedures in paragraph 10.0 should be applied in Oceanic operations. The weather deviation procedures in paragraph 9.0 will be applied in Oceanic airspace in the region.

6.0 SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES INVOLVING A LOSS OF VERTICAL NAVIGATION PERFORMANCE REQUIRED FOR FLIGHT WITHIN THE MID CONTINENTAL RVSM AIRSPACE

6.1 General

6.1.1 An in-flight contingency affecting flight in the MID RVSM airspace pertains to unforeseen circumstances that directly impact on the ability of one or more aircraft to operate in accordance with the vertical navigation performance requirements of the MID RVSM airspace. Such in-flight contingencies can result from degradation of aircraft equipment associated with height-keeping and from turbulent atmospheric conditions.

6.1.2 The pilot shall inform ATC as soon as possible of any circumstances where the vertical navigation performance requirements for the MID RVSM airspace cannot be maintained. In such cases, the pilot shall obtain a revised ATC clearance prior to initiating any deviation from the cleared route and/or flight level, whenever possible. When a revised ATC clearance could not be obtained prior to such a deviation, the pilot shall obtain a revised clearance as soon as possible.

6.1.3 ATC shall render all possible assistance to a pilot experiencing an in-flight contingency. Subsequent ATC actions will be based on the intentions of the pilot, the overall air traffic situation and the real-time dynamics of the contingency.

6.2 Degradation of aircraft equipment pilot reported

6.2.1 When informed by the pilot of an RVSM approved aircraft operating in the MID RVSM

aircraft as non-RVSM approved.

6.2.2 ATC shall take action immediately to provide a minimum vertical separation of 600 m (2000ft) or an appropriate horizontal separation from all other aircraft concerned that are operating in the MID RVSM airspace. An RVSM compliant aircraft rendered non-RVSM approved shall normally be cleared out of the MID RVSM airspace by ATC when it is possible to do so.

6.2.3 Pilots shall inform ATC, as soon as practicable, of any restoration of the proper functioning of equipment required to meet the RVSM MASPS.

6.2.4
with adjacent ACCs, as appropriate.

6.3 Severe turbulence not forecast

6.3.1 When an aircraft operating in the MID RVSM airspace encounters severe turbulence due to

cleared flight level, the pilot shall inform ATC. ATC shall establish either an appropriate horizontal separation or an increased minimum vertical separation.

6.3.2 ATC shall, to the extent possible, accommodate pilot requests for flight level and/or route changes and shall pass on traffic information as required.

6.3.3 ATC shall solicit reports from other aircraft to determine whether RVSM should be suspended entirely or within a specific flight level band and/or area.

6.3.4 The ACC suspending RVSM shall coordinate such suspension(s) and any required adjacent ACCs, as appropriate, to ensure an orderly progression to the transfer of traffic.

6.4 Severe turbulence - forecast

6.4.1 When a meteorological forecast is predicting severe turbulence with the MID RVSM airspace, ATC shall determine when RVSM should be suspended and, if so, the period of time and specific flight level(s) and/or area.

6.4.2 In cases where RVSM will be suspended, the ACC suspending RVSM shall coordinate with adjacent ACCs with regard to the flight levels appropriate for the transfer of traffic, unless a contingency flight level allocation scheme has been determined by letter of agreement. The ACC suspending RVSM shall also coordinate applicable sector capacities with adjacent ACCs as appropriate.

7.0 Special Procedures for In-flight Contingencies in <u>Oceanic Airspace</u> in the ____FIR (Source Document : State AIP Supplement)

General procedures

7.1 The following general procedures apply to both subsonic and supersonic aircraft and are intended as guidance only. Although all possible contingencies cannot be covered, they provide for cases of inability to maintain assigned level due to:

a) weather;

b) aircraft performance;

c) pressurization failure; and

d) problems associated with high-level supersonic flight.

7.2 The procedures are applicable primarily when rapid descent and/or turn-back or diversion to an alter
taken, taking into account specific circumstances.

7.3 If an aircraft is unable to continue flight in accordance with its air traffic control clearance, a revised clearance shall, whenever possible, be obtained prior to initiating any action, using a distress or urgency signal as appropriate.

7.4 If prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time and, until a revised clearance is received, the pilot shall:

a) if possible, deviate away from an organized track or route system;

b) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: flight identification, flight level, aircraft position, (including the ATS route designator or the track code) and intentions on the frequency in use, as well as on frequency 121.5 MHz (or, as a back-up, the VHF inter-pilot air-to-air frequency 123.45);

c) watch for conflicting traffic both visually and by reference to ACAS (if equipped); and

d) turn on all aircraft exterior lights (commensurate with appropriate operating limitations).

8.0 In-flight Contingency Procedures for Subsonic Aircraft Requiring Rapid Descent, Turn-Back or Diversion in Oceanic Airspace in the ____FIR. (Source Document: State AIP Supplement)

Initial action

8.1 If unable to comply with the provisions of paragraph 7.3 to obtain a revised ATC clearance, the aircraft should leave its assigned route or track by turning 90 degrees right or left whenever this is possible. The direction of the turn should be determined by the position of the aircraft relative to any organized route or track system (for example, whether the aircraft is outside, at the edge of, or within the system). Other factors to consider are terrain clearance and the levels allocated to adjacent routes or tracks.

Subsequent action

8. 2 AIRCRAFT ABLE TO MAINTAIN LEVEL. An aircraft able to maintain its assigned level should acquire and maintain in either direction a track laterally separated by 25 NM from its assigned route or track and once established on the offset track, climb or descend 500 ft (150 m).

8.3 AIRCRAFT UNABLE TO MAINTAIN LEVEL. An aircraft NOT able to maintain its assigned level should, whenever possible, minimize its rate of descent while turning to acquire and maintain in either direction a track laterally separated by 25 NM from its assigned route or track. For subsequent level flight, a level should be selected which differs by 500 ft (150 m) from those normally used.

8.4 DIVERSION ACROSS THE FLOW OF ADJACENT TRAFFIC. Before commencing a diversion across the flow of adjacent traffic, the aircraft should, while maintaining the 25 NM offset, expedite climb above or descent below levels where the majority of aircraft operate (*e.g., to a level above FL 400 or below FL 290*) and then maintain a level which differs by 500 ft (150 m) from those normally used. However, if the pilot is unable or unwilling to carry out a major climb or descent, the aircraft should be flown at a level 500 ft above or below levels normally used until a new ATC clearance is obtained.

8.5 ETOPS AIRCRAFT. If these contingency procedures are employed by a twin-engine aircraft as a result of an engine shutdown or a failure of an ETOPS critical system, the pilot should advise ATC as soon as practicable of the situation, reminding ATC of the type of aircraft involved and requesting expeditious handling.

9.0 Weather Deviation Procedures in the ____FIR. (Oceanic Airspace)
(Source Document: State AIP Supplement)

General procedures

9.1 The following procedures are intended to provide guidance. All possible circumstances
tions taken and
ATC shall render all possible assistance.

9.2 If the aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an air traffic control clearance shall be obtained at the earliest possible time. In the meantime, the aircraft shall follow the procedures detailed in paragraph 9.9 below.

9.3 The pilot shall advise ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to the centerline of its cleared route.

9.4 When the pilot initiates communications with ATC, rapid response may be obtained by stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response.

9.5 The pilot still retains the option of initiating the communications using the urgency call "PAN PAN" to alert all listening parties to a special handling condition, which may receive ATC priority for issuance of a clearance or assistance.

9.6 When controller-pilot communications are established, the pilot shall notify ATC and request clearance to deviate from track, advising, when possible, the extent of the deviation expected. ATC will take one of the following actions:

a) if there is no conflicting traffic in the horizontal dimension, ATC will issue clearance to deviate from track; or

b) if there is conflicting traffic in the horizontal dimension, ATC will separate aircraft by establishing vertical separation or, if unable to establish vertical separation, ATC shall:

i) advise the pilot unable to issue clearance for requested deviation
ii) advise pilot of conflicting traffic
iii)

SAMPLE PHRASEOLOGY:

9.7 The pilot will take the following actions:

(a) Advise ATC of intentions by the most expeditious means available.

(b)

(c) Execute the procedures detailed in 9.8 below. (ATC will issue essential traffic information to all affected aircraft).

(d) If necessary, establish voice communications with ATC to expedite dialogue on the situation

Actions to be taken if a revised air traffic control clearance cannot be obtained

9.8 The pilot shall take the actions listed in 9.9 below under the provision that the pilot may deviate from rules of the air (e.g., the requirement to operate on route or track center line unless otherwise directed by ATC), when it is absolutely necessary in the interests of safety to do so.

9.9 *If a revised air traffic control clearance cannot be obtained* and deviation from track is required to avoid weather, the pilot shall take the following actions:

a) if possible, deviate away from an organized track or route system;

b) establish communication with and alert nearby aircraft by broadcasting, at suitable intervals: flight identification, flight level, aircraft position (including the ATS route designator or the track code) and intentions (including the magnitude of the deviation expected) on the frequency in use, as well as on frequency 121.5 MHz (or, as a back-up, the VHF inter-pilot air-to-air frequency 123.45).

c) watch for conflicting traffic both visually and by reference to ACAS (if equipped);

d) turn on *all* aircraft exterior lights (commensurate with appropriate operating limitations);

e) for deviations of less than 19 km (10NM), aircraft should remain at the level assigned by ATC;

f) for deviations of greater than 19 km (10NM), when the aircraft is approximately 19 km (10NM) from track, initiate a level change based on the following criteria:

Route center line track	Deviations > 19 km (10 NM)	Level change
EAST 000-179 magnetic	LEFT RIGHT	*DESCEND 300 ft* *CLIMB 300 ft*
WEST 180-359 magnetic	LEFT RIGHT	*CLIMB 300 ft* *DESCEND 300 ft*

conflicting traffic and communicate air-to-air with near-by aircraft. If the pilot determines that there is another aircraft at or near the same FL with which his aircraft might conflict, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

g) if contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.

h) when returning to track, be at its assigned flight level, when the aircraft is within approximately 19 km (10NM) of center line.

10.0 Procedures to Mitigate Wake Turbulence Encounters and Distracting Aircraft System Alerts in the Oceanic Airspace of the _____ FIR. (Source Document: State AIP Supplement)

10.1 The following special procedures are applicable to mitigate wake turbulence or distracting aircraft system alerts (e.g., ACAS, Ground Proximity Warning System (GPWS Middle East Oceanic airspace where RVSM is applied:

NOTE: In the contingency circumstances below, ATC will not issue clearances for lateral offsets and will not normally respond to actions taken by the pilots.

10.2 An aircraft that encounters wake vortex turbulence or experiences distracting aircraft system alerts shall notify ATC and request a flight level, track or speed change to avoid the condition. However, in situations where such a change is not possible or practicable, the pilot may initiate the following temporary lateral offset procedure with the intention of returning to center line as soon as practicable:

a) the pilot should establish contact with other aircraft, if possible, on the appropriate VHF inter-pilot air to air frequency; 123.45 MHz, and

b) one (or both) aircraft may initiate lateral offset(s) not to exceed 2 NM from the assigned track, provided that:

i) as soon as practicable to do so, the offsetting aircraft notify ATC that *temporary* lateral offset action has been taken and specify the reason for doing so *(ATC will not normally respond)*; and

ii) the offsetting aircraft notify ATC when re-established on assigned route(s) or track(s) *(ATC will not normally respond)*.

11.0 Transition areas (Source Document: State AIP Supplement)

11.1 Transition areas and procedures for transition from RVSM to non-RVSM airspace within the

12.0 Flight planning requirements (Source Document: State AIP Supplement)

12.1 Unless special arrangement is made as detailed below, RVSM approval is required for aircraft to operate within designated RVSM airspace. The operator must determine that the appropriate State authority has approved the aircraft and will meet the RVSM requirements for the filed route of flight

ICAO standard flight plan to indicate that the aircraft is RVSM approved aircraft.

13.0 Procedures for Operation of Non-RVSM Compliant Aircraft in RVSM airspace (Source Document: State AIP Supplement)

13.1 FLIGHT PRIORITY. It should be noted that RVSM approved aircraft will be given priority for level allocation over non-RVSM approved aircraft.

13.2 VERTICAL SEPARATION APPLIED. The vertical separation minimum between non-RVSM aircraft operating in the RVSM stratum and all other aircraft is 2,000 ft.

13.3 PHRASEOLGY. Non-RVSM compliant aircraft operating in RVSM airspace should use the phraseology contained in Attachment ___.

13.4 CONTINUOUS CLIMB/DESCENT OF NON-COMPLIANT AIRCRAFT THROUGH RVSM AIRSPACE (Source Document: State AIP Supplement). Non-RVSM compliant aircraft may be cleared to climb to and operate above FL____or descend to and operate below FL____ provided that they:

a) Do not climb or descend at less than the normal rate for the aircraft and

b) Do not level off at an intermediate level while passing through the RVSM stratum.

13.5 SPECIAL COORDINATION PROCEDURES FOR CRUISE OPERATION OF NON-RVSM COMPLIANT AIRCRAFT IN RVSM AIRSPACE (Source : State AIP Supplement).

13.5.1 Non-RVSM compliant aircraft may not flight plan between FL ____ and FL____ inclusive within RVSM airspace. However, after special coordination, the following non-RVSM aircraft may flight plan at RVSM flight levels in the RVSM stratum:

a) Is being initially delivered to the State of Registry or Operator (see Paragraph 14.0 for additional details and information); or

b) was formally RVSM approved but has experienced an equipment failure and is being flown to a maintenance facility for repair in order to meet RVSM requirements and/or obtain approval; or

c) is transporting a spare engine mounted under the wing; or

d) is being utilized for mercy or humanitarian purposes; or

e) State aircraft (those aircraft used in military, custom and police services shall be deemed state aircraft)

Note:-

1)
2) Approval means able to operate in the RVSM stratum.
3) Aircraft cruising levels will be subject to air traffic control

13.5.2 Contact details for approval request are as follows:

_____ Center Telephone:
AFTN:
FAX:
E-Mail:

13.5.3 These procedures are intended exclusively for the purposes indicated above and not as a means to circumvent the normal RVSM approval process.

14.0 Delivery Flights for Aircraft that are RVSM Compliant on Delivery (Source Document: State AIP Supplement)

14.1 An aircraft that is RVSM compliant on delivery may operate in RVSM airspace provided that the crew is trained on RVSM policies and procedures applicable in the airspace and the responsible State issues the operator a letter of authorization approving the operation. State notification to the MECMA should be in the form of a letter, e-mail or fax documenting the one-time flight. The planned date of the flight, flight identification, registration number and aircraft type/series should be included. Email address is ____. Fax number is ____.

15.0 Procedures for Suspension of RVSM (Source Document: State AIP Supplement)

15.1 Air traffic services will consider suspending RVSM procedures within affected areas of the _____FIR when there are pilot reports of greater than moderate turbulence. Within areas where RVSM procedures are suspended, the vertical separation minimum between all aircraft will be 2,000 ft.

16.0 Guidance for Pilots and Controllers for Actions in the Event of Aircraft System Malfunction or Turbulence Greater than Moderate (Source Document: State AIP Supplement)

16.1 See **Attachment** _____ for guidance in these circumstances.

ATTACHMENT

CONTINGENCY SCENARIOS. 2&($1,& $,563$&(The following paragraphs summarize pilot actions to mitigate the potential for conflict with other aircraft in certain contingency situations. They should be reviewed in conjunction with the expanded contingency scenarios detailed on pages ____ which contain additional technical and operational detail.

***Scenario 1: The pilot is: 1) unsure of the vertical position of the aircraft due to the loss or degradation of all primary altimetry systems, or 2) unsure of the capability to maintain cleared flight level (CFL) due to turbulence or loss of all automatic altitude control systems**.

The Pilot should:	ATC can be expected to:
Maintain CFL while evaluating the situation;	
Watch for conflicting traffic both visually and by reference to ACAS, if equipped;	
If considered necessary, alert nearby aircraft by 1) making maximum use of exterior lights; 2) broadcasting position, FL, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency, 123.45MHz, may be used).	
Notify ATC of the situation and intended course of action. Possible courses of action include:	Obtain the pilot's intentions and pass essential traffic information.
1) maintaining the CFL and route provided that ATC can provide lateral, longitudinal or conventional vertical separation.	1) If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.
2) requesting ATC clearance to climb above or descend below RVSM airspace if the aircraft cannot maintain CFL and ATC cannot establish adequate separation from other aircraft.	2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.
3) executing the contingency maneuver shown in paragraphs 7.0 and 8.0 of this AIP Supplement to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.
	4) Notify adjoining ATC facilities/sectors of the situation.

Scenario 2: There is a failure or loss of accuracy of one primary altimetry system (e.g., greater than 200 foot difference between primary altimeters)

The Pilot should
Cross check standby altimeter, confirm the accuracy of a primary altimeter system and notify ATC of the loss of redundancy. If unable to confirm primary altimeter system accuracy, follow pilot actions listed in the preceding scenario.

EXPANDED EQUIPMENT FAILURE AND TURBULENCE ENCOUNTER SCENARIOS. 2&($1,&$,563$&(**Operators may consider this material for use in training programs.**

***Scenario 1: All automatic altitude control systems fail (e.g., Automatic Altitude Hold).**

The Pilot should	ATC can be expected to
Initially	
Maintain CFL	
Evaluate the aircraft's capability to maintain altitude through manual control.	
Subsequently	
Watch for conflicting traffic both visually and by reference to ACAS, if equipped.	
If considered necessary, alert nearby aircraft by 1) making maximum use of exterior lights; 2) broadcasting position, FL, and intentions on 121.5MHz (as a back-up, the VHF inter-pilot air-to-air frequency, 123.45MHz, may be used.)	
Notify ATC of the failure and intended course of action. Possible courses of action include:	
1) maintaining the CFL and route, provided that the aircraft can maintain level.	1) If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.
2) requesting ATC clearance to climb above or descend below RVSM airspace if the aircraft cannot maintain CFL and ATC cannot establish lateral, longitudinal or conventional vertical separation.	2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.
3) executing the contingency maneuver shown in paragraphs 7.0 and 8.0 of this AIP Supplement to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.
	4) Notify adjoining ATC facilities/ sectors of the situation.

***Scenario 2: Loss of redundancy in primary altimetry systems**

The Pilot should	ATC can be expected to
If the remaining altimetry system is functioning normally, couple that system to the automatic altitude control system, notify ATC of the loss of redundancy and maintain vigilance of altitude keeping.	Acknowledge the situation and continue to monitor progress

Scenario 3: All primary altimetry systems are considered unreliable or fail

The Pilot should	ATC can be expected to
Maintain CFL by reference to the standby altimeter (if the aircraft is so equipped).	
Alert nearby aircraft by 1) making maximum use of exterior lights; 2) broadcasting position, FL, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency, 123.45MHz, may be used).	
Consider declaring an emergency. Notify ATC of the failure and intended course of action. Possible courses of action include:	Obtain pilot's intentions, and pass essential traffic information.
1) maintaining CFL and route provided that ATC can provide lateral, longitudinal or conventional vertical separation.	1) If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.
2) requesting ATC clearance to climb above or descend below RVSM airspace if ATC cannot establish adequate separation from other aircraft.	2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.
3) executing the contingency maneuver shown in paragraphs 7.0 and 8.0 of this AIP Supplement to offset from the assigned track and FL, if ATC clearance cannot be obtained.	3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.
	4) Notify adjoining ATC facilities/sectors of the situation.

Scenario 4: The primary altimeters diverge by more than 200ft (60m)

The Pilot should
Attempt to determine the defective system through established trouble-shooting procedures and/or comparing the primary altimeter displace to the standby altimeter (as corrected by the correction cards, if required).
If the defective system can be determined, couple the functioning altimeter system to the altitude-keeping device.
If the defective system cannot be determined, follow the guidance in Scenario 3 for failure or unreliable altimeter indications of all primary altimeters.

***Scenario 5: Turbulence (greater than moderate) which the pilot believes will impact the aircraft's capability to maintain flight level.**

The Pilot should	ATC can be expected to
Watch for conflicting traffic both visually and by reference to ACAS, if equipped.	

The Pilot should	ATC can be expected to
If considered necessary, alert nearby aircraft by: 1) making maximum use of exterior lights; 2) broadcasting position, FL, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency, 123.45MHz, may be used).	
Notify ATC of intended course of action as soon as possible. Possible courses of action include:	
1) maintaining CFL and route provided ATC can provide lateral, longitudinal or conventional vertical separation.	1) Assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.
2) requesting flight level change, if necessary.	2) If unable to provide adequate separation, advise the pilot of essential traffic information and request pilot's intentions.
3) executing the contingency maneuver shown in paragraphs 7.0 and 8.0 of this AIP Supplement to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	3) Notify other aircraft in the vicinity and monitor the situation
	4) Notify adjoining ATC facilities/ sectors of the situation.

Proposal for Amendment of
Regional Supplementary Procedures ICAO Doc 7030/4
(Serial No. APAC-S 01/3 - MID/ASIA/PAC RAC)

Regional Supplementary Procedures, Doc 7030/4:	MID/ASIA/RAC and PAC/RAC
b) **Proposing State:**	The United Arab Emirates and the United States ~~of America~~
c) **Proposed Amendment:**	Editorial note: Amendments are arranged to show deleted text using strikeout (~~text to be deleted~~), and added text with grey shading (text to be inserted).

1. a) On page MID/ASIA/RAC-3 dated 13/2/00, and

b) On page PAC/RAC-3, dated 13/2/00,

~~**Replace** Section 4 entirely with the following:~~

4.0 SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

4.1 General Procedures

4.1.1 The following general procedures apply to both subsonic and supersonic aircraft and are intended for guidance only. Although all possible contingencies cannot be covered, they provide for cases of inability to maintain assigned level due to weather, aircraft performance, pressurization failure and problems associated with high-level supersonic flight. They are applicable primarily when rapid descent and/or turn-back or diversion to an alternate airport are required. The pilot~~-~~s judgment shall determine the sequence of actions taken, taking into account specific circumstances.

4.1.2 If an aircraft is unable to continue flight in accordance with its ~~air traffic control~~ ATC clearance, a revised clearance shall, whenever possible, be obtained prior to initiating any action, using a distress or urgency signal, as appropriate.

4.1.3 If prior clearance cannot be obtained, an ~~air traffic control~~ATC

clearance shall be obtained at the earliest possible time and, until a revised clearance is received, the ~~aircraft~~ pilot shall:

~~- broadcast, at suitable intervals, its position (including the ATS route designator or the track code, as appropriate) and intentions, on the frequency in use, as well as on frequency 121.5 MHz;~~

if possible, deviate away from an organized track or route system;

establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: aircraft identification, flight level, aircraft position, (including the ATS route designator or the track code) and intentions on the frequency in use, as well as on frequency 121.5 MHz (or, as a back-up, the VHF inter-pilot air-to-air frequency 123.45 MHz);

watch for conflicting traffic both visually and by reference to ACAS (if equipped); and

turn on all aircraft exterior lights (commensurate with appropriate operating limitations).

4.2 Special Procedures for subsonic aircraft requiring rapid descent and/or turn-back or diversion to an alternate airport due to aircraft system malfunction or other contingencies

4.2.1 Initial action

4.2.1.1 If unable to comply with the provisions of 4.1.2 to obtain a revised ATC clearance, the aircraft should leave its assigned route or track by turning 90 degrees to the right or left whenever this is possible. The direction of the turn should, where possible, be determined by the position of the aircraft relative to any organized route or track system, e.g. whether the aircraft is outside, at the edge of, or within the system. Other factors to consider are the direction to the alternate airport, terrain clearance and the levels allocated to adjacent routes or tracks.

4.2.2 *Subsequent action (RVSM airspace)*

~~4.2.2.1 AIRCRAFT ABLE TO MAINTAIN LEVEL. An aircraft able to maintain its assigned level should acquire and maintain in either direction a track laterally separated by 25 NM from its assigned route or track and once established on the offset track, climb or descend 150 m (500 ft).~~

~~4.2.2.2 AIRCRAFT UNABLE TO MAINTAIN LEVEL. An aircraft NOT able to maintain its assigned level should, whenever possible, minimize its rate of descent while turning to acquire and maintain in either direction a track laterally separated by 25 NM from its assigned route or~~

~~track. For subsequent level flight, a level should be selected that differs by 150 m (500 ft) from those normally used.~~

4.2.2.1 In RVSM airspace, an aircraft able to maintain its assigned flight level should turn to acquire and maintain in either direction a track laterally separated by 46 km (25 NM) from its assigned route or track in a multi-track system spaced at 93 km (50 NM) or otherwise, at a distance which is the mid-point from the adjacent parallel route or track; and

a) if above FL 410, climb or descend 300 m (1 000 ft); or

b) if below FL 410, climb or descend 150 m (500 ft); or

c) if at FL 410, climb 300 m (1 000 ft) or descend 150 m (500 ft).

4.2.2.2 An aircraft that is unable to maintain its assigned flight level should:

a) initially minimize its rate of descent to the extent that it is operationally feasible;

b) turn while descending to acquire and maintain in either direction a track laterally separated by 46 km (25 NM) from its assigned route or track in a multi-track system spaced at 93 km (50 NM) or otherwise, at a distance which is the mid-point from the adjacent parallel route or track; and

c) for the subsequent level flight, select a level which differs from those normally used by 300 m (1 000 ft) if above FL 410, or by 150 m (500 ft) if below FL 410.

4.2.3 *Subsequent action (non-RVSM airspace)*

4.2.3.1 In non-RVSM airspace, an aircraft able to maintain its assigned flight level should turn to acquire and maintain in either direction a track laterally separated by 46 km (25 NM) from its assigned route or track in a multi-track system spaced 93 km (50 NM) or otherwise, at a distance which is the mid-point from the adjacent parallel route or track and:

a) if above FL 290, climb or descend 300 m (1 000 ft); or

b) if below FL 290, climb or descend 150 m (500 ft); or

c) if at FL 290, climb 300 m (1 000 ft) or descend 150 m (500 ft).

4.2.3.2 An aircraft unable to maintain its assigned level flight should:

a) initially minimize its rate of descent to the extent that it is

operationally feasible;

b) turn while descending to acquire and maintain in either direction a track laterally separated by 46 km (25 NM) from its assigned route or track in a multi-track system spaced at 93 km (50 NM) or otherwise, at a distance which is the mid-point from the adjacent parallel route or track; and

c) for the subsequent level flight, a level should be selected which differs from those normally used by 300 m (1 000 ft) if above FL 290 or by 150 m (500 ft) if below FL 290.

~~4.2.2.3~~4.2.4. DIVERSION ACROSS THE FLOW OF ADJACENT TRAFFIC. ~~Before commencing a diversion across the flow of adjacent traffic, the aircraft should, while maintaining the 25 NM offset, expedite climb above or descent below levels where the majority of oceanic traffic operates (e.g., to a level above FL 410 or below FL 285) and then maintain a level that differs by 150 m (500 ft) from those normally used. However, if the pilot is unable or unwilling to carry out a major climb or descent, the aircraft should be flown at a level 150 m (500 ft) above or below levels normally used until a new ATC clearance is obtained.~~Before diverting across the flow of adjacent traffic, the aircraft should climb above FL 410 or descend below FL 280 using the procedures specified in 4.2.1 or 4.2.2 or 4.2.3. However, if the pilot is unable or unwilling to carry out a major climb or descent, the aircraft should be flown at a level as defined in 4.2.2.1 or 4.2.3.1 until a revised ATC clearance is obtained.

~~4.2.2.4~~4.2.5 EXTENDED RANGE OPERATIONS BY AIRCRAFT WITH TWO-TURBINE POWER UNITS (ETOPS). If these contingency procedures are employed by a twin-engine aircraft as a result of an engine shutdown or a failure of an ETOPS critical system, the pilot should advise ATC as soon as practicable of the situation, reminding ATC of the type of aircraft involved and request expeditious handling.

4.3 Weather deviation procedures for oceanic-controlled airspace

4.3.1 General

4.3.1.1 The following procedures are intended to provide guidance. All possible circumstances cannot be covered. The pilot~~-~~s judgment shall ultimately determine the sequence of actions taken, and ATC shall render all possible assistance.

4.3.1.2 If the aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an ~~air traffic control~~ ATC clearance shall be obtained at the earliest possible time. ~~In the meantime, the aircraft shall broadcast its position (including the ATS route designator or the track code, as appropriate) and intentions, on the~~

~~frequency in use, as well as on frequency 121.5 MHz, at suitable intervals until ATC clearance is received.~~ Until an ATC clearance is received, the aircraft shall follow the procedures detailed in paragraph 4.3.4 below.

4.3.1.3 The pilot shall advise ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to the center line of its cleared route.

4.3.2 *Obtaining priority from ATC when weather deviation is required*

4.3.2.1 When the pilot initiates communications with ATC, rapid response may be obtained by stating AWEATHER DEVIATION REQUIRED@ to indicate that priority is desired on the frequency and for ATC response.

4.3.2.2 The pilot still retains the option of initiating the communications using the urgency call APAN PAN@ (preferably spoken three times) to alert all listening parties to a special handling condition which will receive ATC priority for issuance of a clearance or assistance.

4.3.3 *Actions to be taken when controller-pilot communications are established*

a) Pilot notifies ATC and requests clearance to deviate from track, advising, when possible, the extent of the deviation expected.

b) ATC takes one of the following actions:

if there is no conflicting traffic in the horizontal dimension, air traffic control will issue clearance to deviate from track; or

if there is conflicting traffic in the horizontal dimension, ATC separates aircraft by establishing vertical separation ~~600 m (2 000 ft) above FL 290, 300 m (1 000 ft) below FL 290)~~; or

if there is conflicting traffic in the horizontal dimension and ATC is unable to establish ~~vertical~~appropriate separation, ATC shall:

i) advise the pilot ~~that standard separation cannot be applied~~ of inability to issue clearance for requested deviation; and

ii) ~~provide essential traffic information for all affected aircraft~~ advise the pilot of conflicting traffic; and

~~iii) if possible, suggest a course of action. ATC may suggest that the pilot:~~

- ~~if operating in an airspace where a 600 m (2 000 ft) vertical separation minimum is applied, climb or descend 300 m (1 000 ft) from the assigned level ; or~~

- ~~if operating in an airspace where 300 m (1 000 ft) vertical separation minimum is applied, climb or descend 150 m (500 ft) from the assigned level ; or~~

- ~~if operating in an airspace where composite separation is applied, remain at the assigned level.~~

iii) request pilot's intentions.

SAMPLE PHRASEOLOGY:

~~ASStandard separation not available, deviate at pilot's discretion; suggest climb to flight level three five five; parallel traffic [Y distance Y] north at flight level three five zero; report deviation complete.@~~

AUNABLE *(requested deviation),* **TRAFFIC IS** *(call sign, position, altitude, direction),* **ADVISE INTENTIONS**.@

c) Pilot will take the following actions:

1) ~~comply with air traffic control clearance issued ; or~~ advise ATC of intentions by the most expeditious means available; and

2) ~~follow a level suggested by ATC when approximately 10 NM from track, along with the procedures detailed in 4.3.4.1 b), c) and d); or~~comply with ATC clearance issued; or

3) execute the procedures detailed in ~~4.3.4.1~~. 4.3.4 below. ~~The pilot shall immediately inform ATC of intentions and~~ (ATC will issue essential traffic information to all affected aircraft); and

4) if necessary, establish voice communications with ATC to expedite dialogue on the situation4.3.4 *Actions to be taken if ~~controller-pilot communications not established or~~ a revised ~~air traffic control~~ ATC clearance ~~not available~~ cannot be obtained*

4.3.4.1 The provisions of this section apply to situations where pilot has the need to exercise the authority of a pilot-in-command under the provisions of Annex 2 paragraph 2.3.1.

~~4.3.4.1~~4.3.4.2 If ~~contact cannot be established or~~ a revised ~~air traffic control~~ ATC clearance ~~or advisory is not available~~ cannot be obtained and deviation from track is required to avoid weather, the pilot shall take the following actions:

a) if possible, deviate away from an organized track or route system;

b) broadcast aircraft position and intentions on the frequency in use, as well as on frequency 121.5 MHz, as suitable intervals stating: flight identification (operator call sign), flight level, track code or ATS route designator, and extent of deviation expected establish communication with and alert nearby aircraft by broadcasting, at suitable intervals: aircraft identification, flight level, aircraft position (including the ATS route designator or the track code) and intentions (including the magnitude of the deviation expected) on the frequency in use, as well as on frequency 121.5 MHz (or, as a back-up, the VHF inter-pilot air-to-air frequency 123.45 MHz).

c) watch for conflicting traffic both visually and by reference to ACAS (if equipped);

*Note.**C** If, as a result of actions taken under paragraphs 4.3.4.2 b) and c) above, the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.*

d) turn on all aircraft exterior lights (commensurate with appropriate operating limitations);

e) for deviations of less than 19 km (10 NM), ~~or operations within the composite route systems,~~ aircraft should remain at the level assigned by ATC;

f) for deviations of greater than 19 km (10NM), when the aircraft is approximately 19 km (10 NM) from track, initiate a level change based on the criteria in Table 1;

g) when returning to track, be at its assigned flight level, when the aircraft is within approximately 19 km (10 NM) of centre line; and

h) if contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.

Table 1.

Route centre line Track	Deviations >19 km (10 NM)	Level change
EAST 000-179° magnetic	LEFT	DESCEND ~~150 m (500 ft)~~ 90 m (300 ft)
	RIGHT	CLIMB ~~150 m (500 ft)~~ 90 m (300 ft)
WEST 180-359° magnetic	LEFT	CLIMB ~~150 m (500 ft)~~ 90 m (300 ft)
	RIGHT	DESCEND ~~150 m (500 ft)~~ 90 m (300 ft)

Proposers' reasons for amendment:

The ICAO RVSM Implementation Task Force has reviewed special procedures for in-flight contingencies (including weather deviation procedures) following the implementation of RVSM in the Pacific in February 2000 and pending the implementation of RVSM in Asia and Middle East. This amendment updates the existing text based on operational experience following RVSM implementation in the Pacific;

Special procedures are required for aircraft requiring rapid descent and/or turn-back or diversion to an alternate airport due to aircraft system malfunction or other contingencies; and

The proposed revised weather deviation procedures for oceanic-controlled airspace include a change to the climb/descent from 150 m (500 ft) to 9091 m (300 ft) to accommodate organized track systems using different schemes and where RVSM is implemented. The introduction of 9091 m (300 ft) climb/descent will mitigate the risk associated with convective weather activity in airspace where RVSM is implemented.

Proposed implementation date of the amendment:

~~21 February 2002~~On approval by the ICAO Council

Proposal circulated to the following States and International Organizations:

fghanistan
lbania
lgeria
ngola
rgentina
rmenia
ustraliaAustria
zerbaijan
ahrain
angladesh
elarus
reece
uinea
uinea-Bissau Hungary
eland
dia
donesiaIran, Islamic Republic of
aq
eland
rael Italy
pan
upua New Guinea
eru
ilippines
oland
ortugal
atar
epublic of KoreaRepublic of Moldova
omania
ussian Federation
wanda

elgium
enin
nutan
osnia and Herzegovina
otswana
razil
runei Darussalam
ulgaria
urkina Faso
urundi
ambodia
ameroon
anada
ape Verde
entral African
Republic
had
hile
hina
c: Hong Kong, China)
c: Macao, China)
omoros
ongo
ook Islands
ote d'Ivoire
roatia
yprus
zech Republic
emocratic People's
epublic of Korea
enmark
jibouti
cuador
gypt
quatorial Guinea
ritrea
stonia
hiopia
ji
nland
ance
abon
ambia
eorgiaGermany
hana

rdan
azakhstan
enya
iribati
uwait
yrgyzstan
ao People's
emocratic Republic
atvia
ebanon
esotho
beria
byan Arab
amahiriya
thuania
uxembourg
adagascar
alawi
alaysia
aldives
ali
alta
arshall Islands
auritania
auritius
exico
icronesia,
Federated States of
onaco
ongolia
orocco
ozambique
yanmar
amibia
auru
epal
etherlands
Kingdom of the
ew Zealand
iger
igeria
orway
manPakistan
lau

moa
n Marino
o Tome and Principe
udi Arabia
negal
eychelles
erra Leone
ngapore
ovakia
ovenia
olomon Islands
omalia
outh Africa
pain
i Lanka
udan
vaziland
veden
vitzerland
yrian Arab Republic
ajikistan
hailand
ogo
onga
unisia
urkey
urkmenistan
ganda
kraine
nited Arab Emirates *
nited Kingdom
nited Republic of
Tanzania
nited States *
zbekistan
anuatu
iet Nam
emen
ambia
aire
mbabwe
ATA
ALPA
ATCA

For information only

Secretariat comments:

A review following the implementation of RVSM in the airspace of the Pacific has necessitated an amendment to the existing weather deviation procedures in the Middle East/Asia and Pacific Regions;

This amendment proposal is in line with the one being developed for the North and South Atlantic; and

This proposal will enhance harmonization of procedures, in particular relating to weather deviations, for the Middle East/Asia and Pacific Regions.

MID RVSM TF/4
Appendix G to the Report

INTERNATIONAL CIVIL AVIATION ORGANIZATION

FOURTH MEETING OF THE MIDDLE EAST RVSM TASK FORCE

(Abu Dhabi, 03-06 March 2002)

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