REPORT OF THE SEVENTEENTH MEETING OF THE ICAO REDUCED VERTICAL SEPARATION MINIMUM IMPLEMENTATION TASK FORCE (RVSM/TF/17)

BANGKOK, THAILAND

20 - 24 JANUARY 2003

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

Published by the ICAO Asia and Pacific Office, Bangkok

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1. Introduction

1.1 The Seventeenth Meeting of the Reduced Vertical Separation Minimum Implementation Task Force (RVSM/TF/17) was hosted by the ICAO Asia and Pacific Regional Office in Bangkok, Thailand from 20 – 24 January 2003.

1.2 The Terms of Reference for the Task Force are contained in **Appendix A** and for the RVSM TF Work Groups at **Appendix B** to this Report.

2. Attendance

2.1 The meeting was attended by 46 participants from Australia, Bhutan, India, Indonesia, Malaysia, Maldives, Nepal, Pakistan, Republic of Korea, Singapore, Sri Lanka, Thailand, the United States, IATA, IFATCA and IFALPA. A complete list of participants is at **Appendix C**.

3. Officers and Secretariat

3.1 Mr. Sydney Maniam, Head (Standards), from the Civil Aviation Authority of Singapore (CAAS), continued as the Chairman of the Task Force. Mr. David Moores, Regional Officer, Air Traffic Management (ATM) from the ICAO Asia and Pacific Office, served as the Secretary for the meeting, assisted by Mr. John Richardson, Regional Officer, ATM from the ICAO Asia and Pacific Office.

3.2 Mr. Yusfandri Gona, Head of Performance & Flight Test Section, Directorate General Air Communication (DGAC) Indonesia, Mr. Greg Hood, Operations Manager, Airservices Australia and Mr. Nopadol Sangngurn, Vice-President, Business Development Bureau, AEROTHAI undertook the duties of Chairman of the Aircraft Operations & Airworthiness Work Group (OPS/AIR/WG), ATC Operations Work Group (ATC/WG) and Safety & Airspace Monitoring Work Group (SAM/WG) respectively.

4. Opening of the Meeting

4.1 Mr. Sydney Maniam opened the meeting and welcomed all participants. He highlighted the success of the implementation of RVSM in the Western Pacific/South China Sea area on 21 February and 31 October 2002. In particular, there had been a significant reduction in ground delays at major airports and an overall improvement in the management of air traffic in the area. He stressed that the operational plan for the extension of RVSM over the Bay of Bengal and beyond should, as far as possible, be in line with that of the Western Pacific/South China Sea area. In this context, priority should be accorded to traffic flows on major ATS routes and the assignment of levels should meet the operational requirements of RVSM-approved aircraft operating on these routes. He outlined the key issues that had to be addressed in order to meet the target date of implementation on 27 November 2003. This included the finalization of the operational plan for the application of RVSM, as well as a review of the readiness of operator and related safety assessments. He urged all States concerned to work closely and harmonize their implementation plans so that end-to-end seamless RVSM operations for traffic flows between Asia and Europe through the Middle East could be achieved.

4.2 Mr. David Moores on behalf of Mr. Lalit Shah, Regional Director of the ICAO Asia and Pacific Office, welcomed the participants. He commented that with the successful implementation of the Revised ATS Routes Asia to Middle East/Europe South of the Himalayas (EMARSSH) on 28 November 2002, the implementation of RVSM on this route system on

27 November 2003 would complete one of the most significant airspace improvements that has been undertaken by ICAO. Further, this would see the completion of the Asia Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) plan for implementation of RVSM in oceanic airspace in the Asia/Pacific Region. This would be a major accomplishment, as it would link up with the Middle East implementation on the same date and provide continuous RVSM from the west coast of the United States through the Pacific and Asia Regions to the Middle East to Europe and across the North Atlantic Region to the east coast of the United States. The work of the RVSM Task Force to date has been outstanding and members of the Task Force were commended for their efforts.

5. **Documentation and Working Language**

5.1 The working language of the meeting as well as all documentation was in English.

5.2 Ten Working Papers and four Information Papers were presented to the meeting. A list of papers is included at **Appendix D**.

Agenda Item 1: Adoption of Agenda

1.1 The meeting reviewed the provisional agenda presented by the Chairperson and adopted it as the agenda for the meeting. This agenda is at **Appendix E** to the Report.

Agenda Item 2: Operational Considerations

Operational Implementation Plan – 27 November 2003

2.1 The meeting sought an RVSM implementation plan update from all States in the Bay of Bengal and Beyond (within the ICAO Asia Pacific Region). Planning details (operational readiness reports) were received from India, Indonesia, Malaysia, Maldives, Pakistan, Nepal, Sri Lanka, and Thailand for RVSM implementation on 27 November 2003. The Secretary will liaise with Bangladesh and Myanmar who were not present at the meeting to obtain their reports. The States updated the meeting as described below.

2.2 India reported that planning had commenced for implementation of RVSM in the Chennai, Delhi, Kolkata and Mumbai FIRs on 27 November 2003. India advised that they currently plan to implement RVSM in the height band from FL 330 to FL 410. In this regard, they plan to introduce RVSM utilizing the single alternate flight level orientation scheme (FLOS) in its four FIRs, and to implement exclusive RVSM airspace in oceanic areas, and non-exclusive RVSM airspace in territorial areas. India further advised the meeting that there was a large number of aircraft in its domestic fleet and their operators may not be RVSM compliant by 27 November 2003. A member commented that consideration should be given to a cut-off date for operators to obtain RVSM approval. This would ensure appropriate priority was given by operators to complete the approval process and not prolong the mixed environment, which had safety implications.

2.3 The meeting noted the problems faced by India and the unique characteristics of its airspace in regard to the domestic traffic flow, which is predominately north/south and the international trunk routes east/west. By making the continental airspace non-exclusive, this would minimise penalties to domestic traffic. However, the meeting commented that priority should be given to implementing the full RVSM envelope between FL 290–FL 410. In this regard, the meeting specifically discussed problems with the westbound night-time international traffic flow departing from the airports at Bangkok, Kuala Lumpur and Singapore which were experiencing delays due to a shortage of flight levels, and restricting RVSM to above FL 330 in the Bay of Bengal would provide no benefit to operators. The meeting noted that most aircraft departing from the airports at Bangkok, Kuala Lumpur and Singapore would not be able to climb above FL 310 (a non-standard RVSM level) until over India. Also, crossing traffic on international routes would not be able to obtain optimum levels due to the shortage of available levels and the restriction to operate at or below FL 260 or at or above FL 410. The meeting noted that there were problems associated with eastbound traffic flow where restricting RVSM to FL 330 and above would also have a negative impact.

2.4 In light of the above, the meeting was of the view that there was an urgent need to implement the full band of RVSM levels, which would provide ATC with greater flexibility in accommodating crossing traffic, as well as enhancing safety and improving efficiency of the airspace and enabling more aircraft to operate at optimum levels. In this regard, because the westbound traffic flow in the Bay of Bengal is at night after domestic traffic in India had stopped flying, the meeting suggested that it should be possible to implement RVSM between FL 290 to FL 410 within a timeframe of 1600–2200 UTC and not conflict with domestic operations. Further, it would be preferable to apply RVSM between FL 290–FL 410 as exclusive airspace on a 24 hour basis, as this also would harmonize procedures for all FIRs concerned and eliminate transition areas for the FIRs to the east of the Bay of Bengal. The meeting recalled that this was one of the primary goals of the

RVSM implementation plan. The meeting recognized the complexity of Indian airspace and the large number of domestic aircraft that required RVSM approval. In this regard, India advised that this issue would be addressed in its domestic RVSM implementation. India further advised the meeting that they would provide a comprehensive solution to all the problems raised at this meeting during the forthcoming RVSM TF/19 meeting in May 2003. In the meantime, India would work closely with ICAO to examine all options, bearing in mind the expectations of international operators. The meeting expressed its appreciation to India for its effort to date and willingness to resolve remaining difficulties as soon as practicable.

2.5 Indonesia advised that they will be expanding the use of RVSM in the Jakarta FIR by increasing the height band between Jakarta and Australian FIRs to FL 290–FL 410, and between Jakarta and Singapore FIRs to FL 310–FL 410. The Jakarta FIR RVSM expansion will be implemented on 17 April 2003. Indonesia further advised that preparations for the introduction of RVSM for traffic departing the Jakarta FIR to the west on 27 November 2003 were progressing well. In addition, the use of RVSM in the Bay of Bengal and Beyond would include the height band from FL 310 to FL 410, utilizing the single alternate FLOS in exclusive airspace.

2.6 Malaysia reported that Phase 2 of RVSM implementation on 31 October 2002 was achieved successfully, and planning had commenced for the expansion of RVSM to the Bay of Bengal and Beyond in the Kuala Lumpur FIR on 27 November 2003. Malaysia would utilize the single alternate FLOS in exclusive airspace for traffic proceeding to and from the Bay of Bengal and Beyond from FL 290 to FL 410.

2.7 Pakistan reported that planning had commenced for the implementation of RVSM in the Karachi and Lahore FIRs on 27 November 2003. Pakistan planned to implement RVSM from FL 290 to FL 410 in exclusive airspace utilizing a single alternate FLOS. Pakistan indicated that their implementation plan took into account the current status of the Afghanistan airspace, wherein a limited number of routes with flight level restrictions were permitted by the Coalition Forces through the Kabul FIR. Pakistan recognized its role for the transition airspace for the Kabul FIR and planned to change the level assignment of westbound traffic from RVSM levels to CVSM between FL 310–FL 390 prior to the Kabul FIR. Traffic proceeding on other routes into the I.R. of Iran airspace would continue at RVSM levels. The meeting was advised that ICAO had requested that three additional routes (V390, V848 and V878) and two additional levels (FL 280 and FL 290) be reinstated by the Coalition Forces for international over flying civil operations.

2.8 Maldives reported that planning had commenced for the implementation of RVSM in the Male FIR on 27 November 2003. Maldives planned to implement RVSM from FL 290 to FL 410 in exclusive airspace utilizing a single alternate FLOS.

2.9 Nepal reported that planning had commenced for the implementation of RVSM in the Kathmandu FIR on 27 November 2003. Nepal planned to implement RVSM from FL 330 to FL 410 in exclusive airspace utilizing a single alternate FLOS.

2.10 Sri Lanka reported that planning had commenced for the implementation of RVSM in the Colombo FIR on 27 November 2003. Sri Lanka would implement RVSM in the height band from FL 290 to FL 410 in exclusive airspace utilizing a single alternate FLOS.

2.11 Singapore advised the meeting that use of RVSM would be expanded between Jakarta and Singapore FIRs from FL 310 to FL 410. This expansion of RVSM will be implemented on 17 April 2003.

2.12 Thailand reported that their first phase of RVSM implementation on 21 February 2002 was achieved successfully, and that planning had commenced for the second phase. The second phase would involve the expansion of RVSM to the Bay of Bengal and Beyond area in the Bangkok FIR on 27 November 2003. Also, Thailand planned to implement RVSM in the full flight level band from FL 290 to FL 410, and would utilize the single alternate FLOS in exclusive airspace for traffic proceeding to and from the Bay of Bengal and Beyond.

2.13 The meeting agreed to the need for harmonization of RVSM implementation between States such that aircraft transiting through the airspace associated with the Bay of Bengal and Beyond, would receive standardized, seamless air traffic services.

2.14 The meeting agreed to the Operational Plan for the implementation of RVSM in the Bay of Bengal and Beyond (within the ICAO Asia Region), as shown in **Appendix F** to this Report.

Harmonization of RVSM Implementation with the ICAO Middle East Region

2.4 The meeting was advised that a Joint ICAO Middle East/Asia Pacific RVSM Task Force meeting (JCM) was held in Abu Dhabi and was attended by participants from States (Australia, Bahrain, Egypt, I.R. Iran, Maldives, Oman, Pakistan, Singapore, United Arab Emirates and Yemen), IATA and IFALPA. The JCM agreed that implementation of RVSM in the Bay of Bengal and Beyond (within the ICAO Asia Region) should be harmonized with the ICAO Middle East Region RVSM implementation, also scheduled for 27 November 2003.

2.4.1 The meeting discussed the RVSM strategy as detailed in the JCM Report. The meeting was advised that following discussions at the JCM, a single alternate FLOS would be utilized in the Bay of Bengal and Beyond and Middle East RVSM implementations.

2.4.2 States agreed that that a transition time suitable to States within the Asia Pacific Region was 0200–0230 UTC on 27 November 2003. The Task Force Chairman undertook to advise the Middle East RVSM Task Force Chairman of this preference. The meeting was further advised that the ICAO Middle East Task Force reports had been posted on the FAA RVSM website (http://www.faa.gov/ats/ato/rvsm1.htm) and that a direct link exists to the FAA site from the ICAO Asia/Pacific Regional Office website (http://www.icao.int/apac/).

Flight Level Orientation Scheme (FLOS)

2.5 The meeting agreed that the single alternate FLOS would be utilized for the application of RVSM in the Bay of Bengal and Beyond. This was to ensure that the assignment of RVSM levels would be consistent with the operational plan for the Middle East and thus obviate the need for transition areas.

Reports on Large Height Deviations (LHD)

2.6 The meeting reiterated that the reporting of LHDs and operational errors involving level assignment was critical to the determination of the safety assessments for RVSM implementation. All States involved in the Bay of Bengal and Beyond (within the ICAO Asia Region) were therefore requested to provide monthly reports on LHDs for the period August 2002 to August 2003. These reports should be sent to the Asia Pacific Approvals Registry and Monitoring Organization (APARMO) using the form attached at **Appendix G**. A "Nil report" (where applicable) was necessary to ensure the completeness of the safety assessments relating to RVSM operations.

Traffic Movement Data

2.7 The meeting noted that traffic movement data in the airspace where RVSM would be implemented was necessary for a comprehensive assessment of operator readiness and safety evaluation. As agreed at RVSM/TF/15, States involved were required to provide the APARMO with traffic movement data for a period of 2 months from **15 December 2002 to 15 February 2003**. The data collection template to be used is attached at **Appendix H**.

Publication of AIC

2.8 The meeting noted that some States had not published the AIC or NOTAM in November 2002 to provide the aviation industry with advance notification of RVSM implementation. The meeting reminded States of the importance of keeping to the timescale established by the Task Force for publication of documentation concerning the implementation process. The States concerned were requested to publish the AIC or NOTAM **by 31 January 2003**. A draft sample AIC on RVSM implementation is shown at **Appendix I** to the Report.

Draft Sample AIP Supplement

2.9 The meeting reviewed the draft sample AIP Supplement on RVSM operations as shown in **Appendix J**. The meeting recognized that information on contingency arrangements contained in the Supplement should be reviewed and placed in the appropriate ICAO document, e.g. the *Procedures for Air Navigation Services ? Air Traffic Management* (PANS-ATM, Doc 4444) or the *Regional Supplementary Procedures* (SUPPs, Doc 7030). In this regard, the Chairman of the ATC/WG and the Secretary would undertake to review the material. The meeting agreed that States' AIP Supplements should be published **no later than 12 June 2003** to ensure that operators are provided with at least 6 months advance notice of the RVSM implementation date 27 November 2003.

Weather Phenomena

2.10 The meeting reviewed a preliminary study carried out by Pakistan on the impact of mountain wave activity (orographic flow) on the height-keeping capability of aircraft in RVSM airspace. The meeting agreed that more information is required on meteorological studies conducted to assess the impact of mountain wave activity on RVSM operations. In this regard, the Secretary would coordinate with the ICAO Meteorological Section to obtain the latest information on this subject and report to the next meeting.

2.11 The meeting agreed that operators should be reminded to note the location of mountain wave activity experienced and report this activity to the RVSM Task Force through IATA. The meeting was informed by IATA that Northwest Airlines in the United States had developed a model for forecasting mountain waves, and that information was available from New Zealand. The meeting suggested that the OPS/AIR/WG should consider obtaining information from these and other relevant sources. Also, States that have orographic flow effect in their airspace were encouraged to continue to study this problem and make the information available to the Task Force. The meeting expressed its appreciation to Pakistan for the assistance it was providing to understand this important subject in greater detail.

ICAO Regional Supplementary Procedures (Doc 7030)

2.12 The meeting noted a draft proposal to amend the SUPPs (Do 7030) to include FIRs where RVSM may be applied, and highlighted the need for a cost/benefit analysis of RVSM implementation for the Bay of Bengal and Beyond. The meeting agreed that the requirement for this

cost/benefit analysis should be reviewed when the operational concept plan was finalized. The draft amendment proposal of Doc 7030 is at **Appendix K** to the Report.

Agenda Item 3: Issues Relating to Airworthiness and Operation of Aircraft

Assessment of Operator Readiness

3.1 The meeting reviewed the readiness of aircraft and airlines for RVSM operations on international routes in Bay of Bengal and Beyond. To date, about 70% of operators were RVSM-approved. Some domestic and regional airlines were in the process of obtaining RVSM approval. In respect to international operations, it was noted that reaching the target number of 90% approvals should be readily achieved.

Monitoring Program for Height-Keeping Performance

3.2 The meeting reviewed the monitoring program for the height-keeping performance of aircraft and corresponding large height deviations. The meeting noted the following:

a) data on height-keeping performance and large height deviations would continue to be sent to the APARMO; and

b) the meeting adopted the criteria for the calculation of the duration of large height deviations as shown in **Appendix L** to the Report.

Operator and Aircraft Approval Process and Documentation

3.3 The meeting reviewed the existing Operator and Aircraft Approval Process and Documentation for RVSM operations. The meeting adopted the guidelines and procedures in the Asia-Pacific RVSM programme for the Bay of Bengal and Beyond.

3.4. The meeting agreed that data obtained in conjunction with RVSM monitoring programmes from other regions could be used to meet the monitoring requirements for the Bay of Bengal and Beyond.

Draft Sample AIP Supplement

3.5 The meeting reviewed the draft sample AIP Supplement as shown in Appendix J for the implementation of RVSM in the Bay of Bengal and Beyond. The meeting agreed that the in-flight contingency procedures in the final AIP Supplement should be in line with existing ICAO, State and airline procedures.

Mountain Wave Activity (Orographic Flow)

3.6 The WG noted the study carried out by Pakistan on the effects of Mountain Wave Activity (orographic flow) as mentioned above. The effects of orographic flow would impact on aircraft operating procedures, and this would need to be taken into account by the WG when considering the approval process for aircraft operating procedures for RVSM. The issue would be further discussed at the next Task Force Meeting.

Implementation of ACAS II

3.7 The meeting recognized that Annex 6 requires from 1 January 2003 all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers to be equipped with ACAS II. In this regard, the meeting noted that TCAS Version 7.0 meets the ACAS II requirements. Further, TCAS V.7.0 reduces the frequency of nuisance TCAS alerts being experienced in RVSM airspace by aircraft equipped with TCAS V6.04A. The meeting further noted that carriage of ACAS II was not a specific requirement for RVSM implementation. However, in view of the safety implications of using TCAS V6.04A in RVSM airspace, RVSM-approved operators should be urged to install ACAS II in order to improve operational and safety levels. Also, States should take appropriate action to comply with Annex 6. The Table 1 below shows a comparison of altitude thresholds between TCAS V6.04 A and V7.0, which was presented by Boeing to the RVSM Seminar held at Bangkok on 15-17 January 2003.

TCAS Advisory	Altitude Threshold Version 6.04A	Altitude Threshold Version 7.0
Traffic Advisory		
FL200 – FL300	850 ft	850 ft
FL300 – FL420	1200 ft	850 ft
Corrective RA		
FL200 – FL300	600 ft	600 ft
FL300 – FL420	700 ft	600 ft
Preventive RA		
FL200 – FL300	700 ft	700 ft
FL300 – FL420	800 ft	700 ft

Table 1.? Comparison of Altitude thresholds between TCAS V6.04A and V7.0

Agenda Item 4: Safety and Airspace Monitoring Considerations

Readiness Assessment for the Implementation of RVSM in the Bay of Bengal and Beyond (within ICAO Asia Region)

4.1 The meeting reviewed WP/7: *Request of a Traffic Movement Sample and Large Height Deviation Report from Bay of Bengal Airspace Reflecting the New EMARSSH Route Structure*. The meeting recalled that at RVSM/TF/15, it was agreed that traffic samples of aircraft operating on the EMARSSH routes would be collected from **15 December 2002 to 15 February 2003**. This was to facilitate the completion of the safety assessments for the airspace where RVSM would be implemented. The period identified would capture the higher traffic movements that were expected during the Hajj and Lunar New Year. In addition, it would allow sufficient time for the preparation of the readiness and safety assessments for RVSM/TF/19.

4.2 The meeting reviewed WP/3: *Summary of the Bay of Bengal Area Large Height Deviation (LHD) Reports*. States were reminded of the importance of submitting the LHD reports, in order for the safety assessments for RVSM implementation to be completed by the APARMO. In addition, the APARMO required the LHD reports for a period of at least 12 months prior to implementation. The meeting noted a lack of reporting by some States as shown in Table 2 below.

All States involved in the Bay of Bengal area[1] were therefore requested to provide the LHD reports for the period **August 2002 to August 2003**. The reports should be sent to the APARMO by the first week of the following month.

4.3 The meeting reviewed IP/4: *Preliminary Assessment of the Readiness of Operators and Aircraft Types for the RVSM Implementation in the Bay of Bengal Airspace*. Based on the traffic samples collected between 1 February and 31 March 2002, about 70.34% of operations in the Bay of Bengal area had been conducted by State approved operators and aircraft. APARMO would provide an update on the readiness assessment at the next Task Force Meeting.

STATE	BANGLADESH	INDIA				INDONESIA	MALAYSIA	MALDIVES
FIR	*Dhaka*	*Calcutta*	*Chennai (Madras)*	*Delhi*	*Mumbai (Bombay)*	*Jakarta*	*Kuala Lumpur*	*Male*
Jan-02						X	X	
Feb-02						X	X	
Mar-02						X	X	
Apr-02						X	X	
May-02						X	X	
Jun-02						X	X	
Jul-02						X	X	
Aug-02						X	X	
Sep-02							X	
Oct-02							X	
Nov-02							X	
Dec-02 *								

STATE	MYANMAR	NEPAL	PAKISTAN		SINGAPORE	SRI LANKA	THAILAND
FIR	*Yangon*	*Kathmandu*	*Karachi*	*Lahore*	*Singapore*	*Colombo*	*Bangkok*
Jan-02					X		X
Feb-02					X		X
Mar-02					X		X
Apr-02					X		X
May-02					X		X
Jun-02					X	X	X
Jul-02					X	X	X
Aug-02					X	X	X
Sep-02					X	X	X
Oct-02					X	X	X
Nov-02					X	X	X
Dec-02 *						X	

Table 2? Large Height Deviation reports received by the APARMO for the Bay of Bengal Area

Note.? *X = Large Height Deviation report has been received for the specified month (including reports indicating "NIL" events)*
**December 2002 Large Height Deviation reports are due by 31 January 2003*

[1] Dhaka, Kolkata, Chennai, Delhi, Mumbai, Jakarta, Kuala Lumpur, Male, Yangon, Kathmandu, Karachi, Lahore, Singapore, Colombo, and Bangkok FIRs

Progress Report on AEROTHAI's Preparation to Become the Regional Monitoring Agency for RVSM Operations in the Asia Region

4.4 The meeting noted the progress of the transfer of responsibility for the monitoring of the RVSM airspace in the Asia Region from the FAA William J Hughes Technical Center, which operates the APARMO to AEROTHAI. The status of the infrastructure is as follows:

Work Items	Status
Point of Contact Database	In place
Approval Database	In place
Safety Assessment	In place (required new traffic data)
Monitoring Services	In place
Website – General information – RMA work process – Forms to download – Related documents – Points of contact	Up and running
Point of Contact (Email, phone, and fax)	In place

4.5 The meeting considered WP/8: *Adoption of Names for the Monitoring Agency for Asia Region.* The working paper proposed the names of " Pacific Approvals Registry and Monitoring Organization (PARMO) " and "Monitoring Agency for the Asia Region (MAAR)" to be used by the regional monitoring agencies for the Pacific and Asia Region, respectively. In addition, the proposal would require minimum modifications to existing documents referring to the APARMO, in particular, the *Guidance Material on the Implementation of a 300 m (1 000 ft) Vertical Separation Minimum (VSM) Between FL 290 and FL 410 Inclusive for Application in the Airspace of the Asia Pacific Region*.

4.6 In regard to the naming of the monitoring agency for the Asia Region, the meeting recalled that the fourth meeting of the Asia Pacific Airspace Safety Monitoring Task Force (APASM/TF/4) held from 9 to 12 December 2002 had raised the question of a suitable name for the agency and referred the matter to RVSM/TF/17. The meeting agreed that the name MAAR was a suitable name as it was a clear distinction from the APARMO and there would be no confusion as to what agency and geographical area was involved. The final decision on the name would be taken by APANPIRG/14.

4.7 The meeting acknowledged the preparations done by AEROTHAI to assume full RVSM responsibilities for the Asia Region. The meeting agreed that the FAA and AEROTHAI should finalize the transition plan with regard to the exact date for the transfer of responsibilities, as well as define the area of responsibility for each agency. The transition plan should be presented for approval by APANPIRG through the APANPIRG ATS/AIS /SAR Sub-Group.

4.8 In preparation for taking over responsibility for RVSM monitoring in the Asia Region, MAAR prepared a set of forms based on the AP ARMO forms, as indicated below, to be used when MAAR comes into operation. Examples of these forms are contained in **Appendix L**.

a) MAAR Form F1 ? Contact /Change of Contact Details for Matters Relating to Asia Region Approvals;

b) MAAR Form F2 ? Record of Approval to Operate in Asia Region RVSM Airspace;

c) MAAR Form F3 ? Withdrawal Of Approval to Operate in Asia Region RVSM Airspace; and

d) Report of Large Altitude Deviation.

Agenda Item 5: Implementation Management Considerations

Task Force Work Groups

5.1 The meeting endorsed its decision that in order to accomplish the tasks in the action plan, the Task Force should be divided into smaller Work Groups. The following Work Groups continued their work:

a) Safety & Airspace Monitoring;

b) ATC Operations; and

c) Aircraft Operations & Airworthiness.

5.2 The terms of reference of the Work Groups were reviewed and the discussions from these Groups are contained under Agenda Items 2, 3 and 4.

Review of the Preparations for RVSM Implementation

5.3 The meeting reviewed and updated the operational plans of States for the implementation of RVSM in the Bay of Bengal and Beyond as shown in Table 2.2 of Appendix F.

EMARSSH Implementation

5.4 The meeting was provided with a comprehensive briefing on the implementation of the EMARSSH route structure on 28 November 2002. The meeting recognized that the new route structure would provide the framework for the introduction of RVSM in the Bay of Bengal and Arabian Sea areas. The meeting noted that, with the increase in available levels as a result of RVSM implementation, the present restrictions on ATS routes crossing the parallel EMARSSH route structure should be relieved. This would allow aircraft using these crossing routes a greater choice of economical flight levels. A chart of the EMARSSH route structure is contained in **Appendix M**.

Joint Interface Meeting with the Middle East RVSM Task Force

5.5 The meeting noted that a joint interface meeting between the ICAO RVSM Task Forces of the Asia and Pacific Region and the Middle East Region was held from 19–20 October 2002 in Abu Dhabi. The respective Chairpersons of the Task Forces and the ATC Operations Work Group, Maldives, Pakistan, Iran, Oman, UAE and Yemen, as well as IATA and IFALPA attended the meeting. The joint interface meeting reviewed and harmonized the RVSM operational plans for the two regions. The meeting agreed that the single alternate flight level orientation scheme would be used for traffic flows between the two regions and there would be no requirement for transition areas,

except for the Kabul FIR. It was also considered necessary to hold a second joint interface meeting in early June 2003, to review the progress of RVSM implementation and address operational issues that could affect the implementation plan. The ICAO Asia and Pacific Office would liaise with the Middle East Office on the date (tentatively 10–11 June 2003) for the second joint interface meeting, which would be held at the Bangkok Office. Concurrently, the Chairpersons of both Task Forces would co-ordinate on the appropriate agenda for discussion.

Attendance of all States – Bay of Bengal and Beyond (within the ICAO Asia Region)

5.6 The meeting expressed concern that some States involved in the implementation of RVSM were not present to discuss important operational issues. As a result, the Task Force was not able to finalize the operational plan for the Bay of Bengal and Beyond area. ICAO would liaise with the States concerned on the progress of their implementation plans, as well as urge them to attend future meetings of the Task Force.

RVSM Program Managers

5.7 The meeting updated the list of RVSM Managers for each State as shown in **Appendix N** to the Report. Those listed would serve as the focal point of contact for matters relating to RVSM implementation and operations in the region.

Agenda Item 6: Review of Action Items

6.1 The meeting reviewed the specific tasks that had to be completed in order for RVSM to be implemented in the Bay of Bengal and Beyond on 27 November 2003. The updated RVSM Implementation Plan Task List is at **Appendix O** to the Report.

Agenda Item 7: Future Work – Meeting Schedule

7.1 The meeting agreed on the future work of the Task Force as follows:

RVSM/TF/18:	26-28 March 2003 in Hanoi, Viet Nam (90-day and 1-year follow up review on Western Pacific/South China Sea focus)
RVSM/TF/19:	26-30 May 2003 (Location TBD) (Bay of Bengal and Beyond focus)
2nd Joint Interface Meeting	10-11 June 2003 (tentatively) in Bangkok (Bay of Bengal and Beyond focus)
RVSM/TF/20:	5 days October 2003 (Location TBD (Bay of Bengal and Beyond focus)

(Target Implementation Bay of Bengal Area and Beyond AIRAC date 27 November 2003)

RVSM/TF/21:	3 days February 2004 (Location TBD (90-day follow up review on Bay of Bengal and Beyond focus)

RVSM/TF/22:	3 days November 2004 (Location TBD (1-year follow up review on Bay of Bengal and Beyond focus)

7.2 The meeting noted with appreciation the offer by Australia to host the 19th RVSM Task Force Meeting. Considering the additional travel arrangements for most participants, the meeting decided that it would be more convenient to hold the Task Force Meeting in a State that was closer to the Bay of Bengal area.

RVSM Implementation Status

7.3 The meeting updated the status of RVSM implementation in the Asia and Pacific Region as shown in **Appendix P**.

Agenda Item 8: Other Business

8.1 The meeting noted that late submission of Working/Information Papers to ICAO had caused some difficulties for the Secretariat to prepare meeting documents in a timely manner for discussion. In this context, the meeting urged participants to forward all meeting documents to the Secretariat, in electronic form, not later than 10 days prior to any future meeting of the Task Force.

8.2 Members were urged to prepare and submit an update of their readiness to implement the operational plan. This update should be in the format of a working paper prepared and submitted to the ICAO Secretariat at least 10 days prior to the next Task Force Meeting (RVSM/TF/19).

8.3 With the introduction of RVSM, the available flight levels are significantly increased and where pre-departure clearance procedures are in force, theses should be reviewed and replaced with no-pre-departure procedures where appropriate. Accordingly, States concerned should review their LOAs and make the necessary changes.

8.4 In regard to training of personnel involved with RVSM especially air traffic controllers and pilots, States were reminded of the importance of ensuring that training is carried out in accordance with the guidelines provided well in advance of the implementation date of 27 November 2003. Further, it was emphasized that a key to successful implementation and ongoing operations of RVSM was the training and preparation of operational personnel and equipment.

8.5 The meeting also recognized that in order to progress the various activities relating to the implementation process, States and operators involved should strive to send the same personnel to attend future meetings. This would ensure continuity in the work of the Task Force and facilitate the introduction of RVSM as planned.

9. Closing of the Meeting

9.1 On behalf of the meeting, Mr. Sydney Maniam expressed his sincere appreciation to Mr. Lalit Shah and the staff of the ICAO Asia and Pacific Office for the warm hospitality and professional support that contributed significantly to the successful completion of the meeting. He also thanked all participants for their commitment toward the implementation of RVSM in the region. In particular, he commended the Chairpersons of the Work Groups for their leadership and untiring efforts in overseeing and coordinating the activities relating to the implementation process.

TERMS OF REFERENCE OF THE RVSM IMPLEMENTATION TASK FORCE

1) To develop strategic, benefits-driven implementation plans (based on cost benefit studies), in concert with airspace users, for RVSM operations within selected areas and airspace of the Asia/Pacific Region, ensuring inter-regional harmonization;

2) To consider any amendments to RVSM guidance material that may be proposed by States and international organizations;

3) To address any other matters as appropriate and relevant to the implementation of RVSM;

4) The Task Force will include participation from States and International Organizations that are considering or involved with the implementation of RVSM; and

5) The Task Force will report to the ATS/AIS/SAR Sub-Group.

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TERMS OF REFERENCE OF THE RVSM

IMPLEMENTATION TASK FORCE WORK GROUPS:

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 Asia/Pacific Region RVSM and other tasks as agreed with the RVSM Task Force. The main tasks of the SAM/WG are:

- To develop a monitoring program to ensure that the quantity and quality of data are collected to allow an assessment of vertical collision risk;
- To review existing mathematical and statistical techniques to assure their appropriateness for Asia/Pacific Region RVSM;
- To ensure the transferability of aircraft data collected from other airspace regions;
- 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 altitude deviation incidents and altitude monitoring data to determine whether the TLS is being met;
- 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 identify those elements which are critical in the assessment of collision risk and suggest areas where improvements might be effective in reducing risk;
- To establish a policy for investigating those errors that may jeopardize satisfaction of the Target Level of Safety (TLS);
- To estimate periodically the vertical occupancies (traffic densities, passing frequencies, etc.) in the Asia/Pacific Region; and
- 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.

ATC Operations Work Group (ATC/WG)

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;
- To consider workload issues and identify the need for controller simulations;
- To provide the RVSM monitoring organization with traffic movement data as required; and
- To report large height deviations and operational errors involving level assignment to the RVSM monitoring organization on a monthly basis.

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

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 co-ordinate 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 navigational 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.

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LIST OF WORKING PAPERS (WPs) AND INFORMATION PAPERS (IPs)

NUMBER	AGENDA	WORKING PAPERS	PRESENTED BY
WP/1	1	Provisional Agenda	Chairperson/ Secretariat
WP/2	2	Implementation of the Reduced Vertical Separation Minimum (RVSM) in the Bay of Bengal Area	Secretariat
WP/3	2	Summary of the Bay of Bengal Area Large Height Deviation Reports	Secretariat
WP/4	5	JCM – RVSM MID/ASIA/1 Report Abu Dhabi, United Arab Emirates 19 – 20 October 2002	Secretariat
WP/5	2	Proposed Agenda for the ATC Operations Work Group	Chairperson
WP/6	2	Draft AIP Supplement	Secretariat
WP/7	4	Request for a Traffic Movement Sample and Large Height Deviation Report from Bay of Bengal Airspace Reflecting the New EMARSSH Route Structure	Thailand
WP/8	4	Adoption of Name for the Monitoring Agency for the Asia Region	Thailand
WP/9	4	Proposed Agenda for the Safety and Airspace Monitoring Group (SAM/WG)	Chairman
WP/10	3	Proposed Agenda for the Operations Airworthiness Working Group (OPSAIR/WG)	Chairman

NUMBER	AGENDA	INFORMATION PAPERS	PRESENTED BY
IP/1	3	Mountain Wave Activity (Orographic Flow)	Pakistan
IP/2	7	Eighteenth Meeting of the ICAO RVSM Implementation Task Force	Vietnam
IP/3	4	AEROTHAI Supporting the RVSM Implementation in Asia Region	Thailand
IP/4	4	Preliminary Assessment of the Readiness of Operators and Aircraft Types for the RVSM Implementation in the Bay of Bengal Airspace.	Thailand

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AGENDA

Agenda Item 1: Adoption of Agenda

Agenda Item 2: Operational Considerations

Agenda Item 3: Issue Relating to Airworthiness and Approval of Aircraft

Agenda Item 4: Safety and Airspace Monitoring Considerations

Agenda Item 5: Implementation Management Considerations

Agenda Item 6: Review of Action Items

Agenda Item 7: Future Work – Meeting Schedule

Agenda Item 8: Other Business

PROPOSED OPERATIONAL PLAN FOR THE IMPLEMENTATION OF RVSM IN THE ASIA REGION

Flight Information Region/Area of Responsibility	Flight Levels	Flight Level Orientation Scheme (FLOS)	Exclusive Airspace * *Note 1*	Initial Implementation	Remarks
Bangkok (South China Sea)	290–410	Single Alternate	Yes	21 Feb 2002 (Phase 1)	G474 R468(BKK-BOKAK) R588(KAKET-SOPOL) R334 N891(BKK-XONAN)
Bangkok (Bay of Bengal and Beyond)	290–410	Single Alternate	Yes	27 Nov 2003 (Phase 2)	Domestic and International routes in the entire BKK FIR
Chennai	330–410	Single Alternate	Exclusive over Oceanic airspace and non-exclusive over territorial airspace	27 Nov 2003	P570 M300 N563 P762. FL 290–FL 410 on L645 request prior coordination levels
Colombo Delhi	290–410 330–410	Single Alternate Single Alternate	Yes Exclusive over Oceanic airspace and non-exclusive over territorial airspace	27 Nov 2003 27 Nov 2003	Levels to be reserved for crossing routes P762, L645 and A327
Dhaka	TBD	Single Alternate	Yes	27 Nov 2003	To be coordinated by ICAO
Jakarta (South China Sea)	350–390 (phase 1)	Single Alternate	Yes	31 Oct 2002	Phase 1: N646, N752, L764, L895, L511, B592, G464, A464, A576, G462, A585, G220
Jakarta (South China Sea)	290–410 (phase 2)	Single Alternate	Yes	17 April 2003	Jakarta – Australia FL 290–FL410 and Jakarta – Singapore FL 310–FL 410 on existing routes where RVSM is currently being applied.
Jakarta (South China Sea)	290–410 (phase 3)	Single Alternate	Yes	AIRAC Feb 2004	
Jakarta (Bay of Bengal)	310–410	Single Alternate	Yes	27 Nov 2003	EMARSSH routes and R461, B344, A585, A576, B335, G468, B466, A327, R469, A330
Karachi	290–410	Single Alternate	Yes	27 Nov 2003	Subject to coordination with adjacent FIRs. Implementation on a route specific basis. Transition issues (including Afghanistan) being examined.

Flight Information Region/Area of Responsibility	Flight Levels	Flight Level Orientation Scheme (FLOS)	Exclusive Airspace ** Note 1*	Initial Implementation	Remarks
Kathmandu	330–410	Single Alternate	Yes	27 Nov 2003	Subject to coordination with adjacent FIRs.
Kolkata	330–410	Single Alternate	Exclusive over Oceanic airspace and non-exclusive over territorial airspace	27 Nov 2003	L301 FL 290–FL 410 (subject to prior coordination)
Kuala Lumpur (South China Sea)	290–410 (Phase 2)	Single Alternate/ Modified Single Alternate	Yes	31 Oct 2002	
Kuala Lumpur (Bay of Bengal)	290–410	Single Alternate	Yes	27 Nov 2003	Subject to coordination with adjacent FIRs.
Lahore	290–410	Single Alternate	Yes	27 Nov 2003	Subject to coordination with adjacent FIRs. Implementation on a route specific basis. Transition issues (including Afghanistan) being examined.
Male	290–410	Single Alternate	Yes	27 Nov 2003	
Mumbai	290–410	Single Alternate	Exclusive over Oceanic airspace and non-exclusive over territorial airspace	27 Nov 2003	Routes passing through Calcutta will be FL 330–FL 410. A451, G450, B459, A474 FL 290–FL 410 with level reservations
Singapore (South China Sea)	310–410	Modified Single Alternate **Note 2*	Yes	21 Feb 2002	
Singapore (Phase 2)	290–410	Modified Single Alternate **Note 2*	Yes	31 Oct 2002	Routes from Singapore to Jakarta FIR FL 350–FL 390
Singapore (Phase 3)	290–410	Modified Single Alternate **Note 2*	Yes	17 April 2003	Routes from Singapore to Jakarta FIRs will expand to FL310–FL410
Yangon	TBD	TBD	TBD	27 November 2003	To be coordinated by ICAO

Table 2.1 – RVSM Implementation Bay of Bengal and Beyond (within the ICAO Asia Region)

Note 1.– "Exclusive" means non-RVSM approved aircraft may NOT flight plan into airspace where RVSM may be applied. Aircraft that have not received State RVSM approval may be cleared to operate in airspace where RVSM may be applied in accordance with policy and procedures established by the ATS Provider States provided that 2,000ft vertical separation is applied. Some States may choose to allow non-RVSM State aircraft to flight plan into RVSM airspace.

Note 2.? "Single Alternate" indicates an assignment of levels that complies with the RVSM Table of Cruising Levels. "Modified Single Alternate" means the RVSM levels for the six major RNAV routes (L642, M771, N892, L625, N884 and M767) in the South China Sea Region i.e. FL 320, FL 340, FL 360, FL 380 and FL 400. RVSM approved aircraft operating on routes that cross the six one-way tracks would be assigned the eastbound levels FL 330, FL 370 and FL 410 or westbound levels FL 310, FL 350 and FL 390 accordingly. Individual State AIPs describe the details.

Note 3.? This Draft Operational Implementation Plan has been developed as an indication of States' current implementation plans – elements of this plan are subject to review by States.

ASIA PACIFIC APPROVALS REGISTRY AND MONITORING ORGANIZATION (APARMO)

REVISED FORMAT FOR REPORT OF LARGE ALTITUDE DEVIATION

Report to the Asia Pacific Approvals Registry and Monitoring Organization (APARMO) of an altitude deviation of 300ft or more, including those due to TCAS, turbulence and contingency events.

Name of FIR/AOR:_____

Please complete Section I or II as appropriate

SECTION I:

There were no reports of large altitude deviation for the month of _____

SECTION II:

There was/were _____ report(s) of an altitude deviation of 300 ft or more between FL290 and FL410. Details of the altitude deviation are attached (Form A).

(Please use a separate form for each report of altitude deviation).

SECTION III:
When complete please forward the report(s) to:

William J Hughes Technical Center (WJHTC)
Asia-Pacific Approvals Registry and Monitoring Organization (ACB-310)
Atlantic City International Airport
Atlantic City, New Jersey 08405
USA
Telephone: +1 609-485-5678
Fax: +1 609-485-5078
E-Mail: 9-ACT-PARMO@faa.gov

REVISED FORMAT FOR REPORT OF LARGE HEIGHT DEVIATION

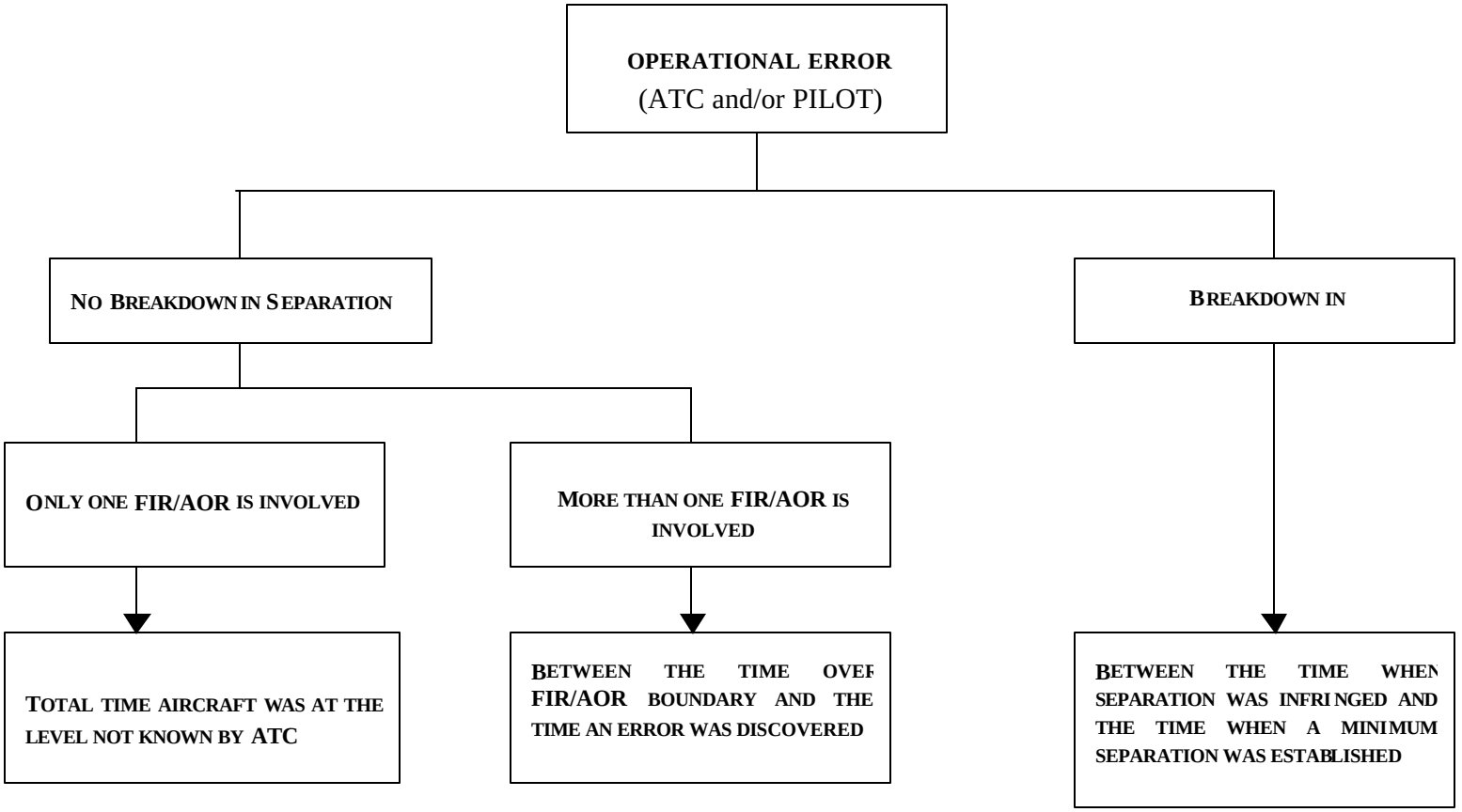
FORM A

REPORT OF AN ALTITUDE DEVIATION OF 300 FT OR MORE BETWEEN FL290 AND FL410

(1) Reporting agency
(2) Location of deviation
(3) Date of occurrence (UTC)
(4) NOPAC/CENPAC/CEP/SOPAC/Japan-Hawaii/South China Sea/Other
(5) Flight identification and type
(6) Flight level assigned
(7) Observed/reported final level Mode C/Pilot report
(8) Duration at flight level
(9) Cause of deviation
(10) Other traffic
(11) Crew comments, if any, when noted
(12) Remarks

REPORT OF LARGE HEIGHT DEVIATION

CRITERIA FOR CALCULATION OF DURATION OF LARGE HEIGHT DEVIATION AS A RESULT OF OPERATIONAL ERRORS



DATA COLLECTION TEMPLATE

DATE (DD/MM/YY)	AIRCRAFT CALLSIGN	AIRCRAFT REGISTRATION	US EQUIPMENT SUFFIX	ICAO EQUIPMENT CODE	AIRCRAFT TYPE	ORIGIN AERODROME	DESTINATION AERODROME	ENTRY FIX INTO RVSM AIRSPACE	TIME AT ENTRY FIX (HHMM OR HHMM)	CLEARED FLIGHT LEVEL AT ENTRY	EXIT FIX FROM RVSM AIRSPACE	TIME AT EXIT AT FIX (HHMM OR HHMM)	CLEARED FLIGHT LEVEL AT EXIT	ROUTING AND TIMES IN RVSM AIRSPACE				
														FIX 1 OR AIRWAY 1	TIME AT FIX 1 (HHMM OR HHMM)	CLEARED FLIGHT LEVEL	FIX 2 OR AIRWAY 2	TIME AT FIX 2 (HHMM OR HHMM)
NECESSARY	NECESSARY	NECESSARY	(OPTIONAL)	(OPTIONAL)	(NECESSARY,	(NECESSARY)	(NECESSARY)	NECESSARY	NECESSARY	NECESSARY	NECESSARY	NECESSARY	NECESSARY	OPTIONAL	OPTIONAL	(OPTIONAL)	OPTIONAL	OPTIONAL

DRAFT

AERONAUTICAL INFORMATION CIRCULAR

RECOMMENDATION: ATS Service Providers planning to implement RVSM on 27 November 2003 should have published an advance RVSM implementation NOTAM or AIC based on the example below by **28 November 2002.** States that have not yet published this AIC or NOTAM should do so no later than the **end of January 2003.**

ADVANCE NOTAM OR AIC TO BE PUBLISHED 28 November 2002.

This (NOTAM or AIC) serves as Notice of Intent to implement RVSM in the _____ FIR on 27 November 2003.

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

Starting 27 November 2003, only RVSM compliant aircraft will be cleared to operate in the _____FIR between FLs 290 and 410 (inclusive). Aircraft that are not RVSM compliant (e.g., ferry and maintenance flights) will only be cleared to operate in the _____ FIR between FLs 290 and 410 (inclusive) after prior coordination with the appropriate Center. 2,000 ft vertical separation will be applied to such aircraft. _____ Center contacts will be published on web sites and in follow-up NOTAMS.

RVSM will be implemented in the _____ FIR in accordance with ICAO regional agreements. ICAO recommends that State authorities and operators use FAA Interim Guidance 91-RVSM (as amended), Joint Airworthiness Authorities Temporary Guidance Leaflet 6 or equivalent State documents as the basis for approving aircraft and operator programs for RVSM. Current information and RVSM approval documents, including revisions, can be found on the web site maintained by the FAA on behalf of the ICAO Asia/Pacific RVSM Implementation Group and on individual State web sites. To access the FAA RVSM web site, type:

http:/www.faa.gov/ats/ato/rvsm1.htm

The RVSM Documentation section of the FAA website contains 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:

ICAO:
David Moores: Ph 66-2-537-8189; fax 66-2-537-8199; dmoores@bangkok.icao..int

IATA Singapore
Dave Behrens: Ph 65-239-7267 fax 65-536-6267; behrensd@iata.org
Neil Jonasson: Ph 65-239-7262 fax: same as above; jonassonn@iata.org

DRAFT AIP SUPPLEMENT

AIRAC

RVSM Policy and Procedures in the xxxx FIR

1.0 Introduction

1.1 The International Civil Aviation Organization (ICAO) Third Asia/Pacific Regional Air Navigation Meeting recommended that Reduced Vertical Separation Minimum (RVSM) should be introduced in the Pacific region after successful implementation in the North Atlantic region. The Pacific and South China Sea RVSM implementations are complete, and application of RVSM will expand west to the Bay of Bengal States and adjacent FIRs. Aircraft operators and air traffic services (ATS) providers may gain significant benefits. 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 ASIA/PACIFIC 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 in Oceanic Airspace

7.0 In-flight Contingency Procedures for Subsonic Aircraft Requiring Rapid Descent, Turn-back or Diversion in Oceanic Airspace

8.0 Weather Deviation Procedures

9.0 Special Procedures to Mitigate Wake Turbulence Encounters and Distracting Aircraft System Alerts in the Oceanic Airspace

10.0 Transition Areas

11.0 Flight Planning Requirements

12.0 Procedures for Operation of Non-RVSM Compliant Aircraft in RVSM Airspace

13.0 Delivery Flights for Aircraft that are RVSM Compliant on Delivery

14.0 Procedures for Suspension of RVSM

15.0 Guidance for Pilot and Controller for Actions in Event of Aircraft System Malfunction or Turbulence Greater than Moderate

16.0 Procedures for Air-Ground Communication Failure

2.0 **Identification of RVSM airspace**

2.1 BAY OF BENGAL AND ADJACENT FIRs. Effective 27 November 2003 at 0200 UTC, RVSM airspace is prescribed within the Bangkok, Chennai, Colombo, Delhi, Dhaka, Jakarta, Karachi, Kathmandu, Kolkata (Calcutta), Kuala Lumpur, Lahore, Male, Mumbai and Yangon FIR's within controlled airspace between FL ____ and FL ____ (inclusive). RVSM levels will be progressively assigned on prescribed routes such that by 0230 UTC, the transition will be complete.

2.2 The States of the ICAO Middle East Region will also implement RVSM on 27 November 2003 at 0200 UTC, such that aircraft transiting from Asia to Europe can expect to be assigned RVSM levels subject to traffic, by 0230 UTC.

3.0 **Airworthiness and operational approval and monitoring**

3.1 APPROVAL DATE. Operator/aircraft approval by 1 October 2003 will enable air traffic service providers to plan for orderly RVSM implementation.

3.2 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 Pacific ATS providers, the FAA is maintaining a website containing documents and policy for RVSM approval. The Internet address is: **http://www.faa.gov/ats/ato/rvsm1.htm.** In the "RVSM Documentation" section, under "Documents Applicable to All RVSM Approvals", the "Aircraft/Operator Approval Events Outlines" for US and Non-US Operators provides an outline of approval process tasks with references to related documents.

3.3 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 Asia Pacific Approvals Registry and Monitoring Organization (APARMO) will process the results of monitoring. For further information on RVSM monitoring, the APARMO website can be accessed by:

(a) Accessing the "RVSM Documentation" section of the FAA RVSM website and clicking on the link to the APARMO website or…

(b) Using this Internet address:
http://www.tc.faa.gov/niaab/act500/rvsm/aparmo_intro.html

3.3.1 Monitoring accomplished for other regions can be used to fulfill the monitoring requirements for the Asia/Pacific region. The APARMO will coordinate with other monitoring agencies to access this information. There are several organizations world-wide who may be able to perform monitoring services in the Asia/Pacific region. Operators should contact the APARMO for confirmation that a monitoring contractor is acceptable for the submission of monitoring data.

3.3.2 An additional source that provides information on the monitoring requirements and monitoring services is the Monitoring Agency for Asia Region (MAAR) website and the information can be accessed by:

(a) Accessing the "Monitoring Program" section of the MAAR website.

(b) The Internet address for MAAR is: **http://www.aerothai.or.th/maar**

4.0 ACAS II and transponder equipage

4.1 The ICAO Asia/Pacific RVSM Implementation Task Force recommends that those aircraft equipped with ACAS and operated in RVSM airspace 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 APANPIRG 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 should have been 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;

(d) *one altitude operating transponder (if required for operation in that specific RVSM airspace).*

5.2 See Attachment A 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 TRANSITION BETWEEN FL's. (Source Document: 91-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 and 9.0 below contain procedures for in-flight contingencies that have been updated for RVSM operations. The contingency procedures in paragraphs 6.0-7.0 and the offset procedures in paragraph 9.0 should be applied in Oceanic operations. The weather deviation procedures in paragraph 8.0 may be applied in all airspace in the region.

6.0 Special Procedures for In-flight Contingencies in Oceanic Airspace in the ____FIR (Source Document: State AIP Supplement)

General procedures

6.1 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.

6.2 The procedures are applicable primarily when rapid descent and/or turn-back or diversion to an alternate airport is required. **The pilot's judgment shall determine the sequence of actions to be taken, taking into account specific circumstances.**

6.3 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.

6.4 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 MHz);

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

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

7.0 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

7.1 If unable to comply with the provisions of paragraph 6.3 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

7. 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).

7.3 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.

7.4 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.

7.5 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.

8.0 Weather Deviation Procedures in the ____FIR.
(Source Document: State AIP Supplement)

General procedures

8.1 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.

8.2 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 8.9 below.

8.3 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.

8.4 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.

8.5 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.

8.6 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) request pilot's intentions

SAMPLE PHRASEOLOGY:
"Unable (requested deviation), traffic is (call sign, position, altitude, direction), advise intentions."

8.7 The pilot will take the following actions:

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

(b) Comply with air traffic control clearance issued or…

(c) Execute the procedures detailed in 8.9 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

8.8 The pilot shall take the actions listed 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.

8.9 ***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 MHz).

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

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

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

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

Route center line track	Deviations >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***

Note.? 8.9 (b) and (c) above calls for the pilot to: broadcast aircraft position and pilot's intentions, identify 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 10NM of center line.

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

9.1 The following special procedures are applicable to mitigate wake turbulence or distracting aircraft system alerts (e.g., ACAS, Ground Proximity Warning System (GPWS)) in Asia and Pacific 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.

9.2 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 to the right of 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)*.

10.0 **Transition Areas (Source Document: State AIP Supplement)**

10.1 Transition areas and procedures for transition from RVSM to non-RVSM airspace within the _____FIR's are identified in_____.

11.0 Flight Planning Requirements (Source Document: State AIP Supplement)

11.1 Unless special arrangement is made as detailed below, RVSM approval is required for operators and aircraft to operate within designated RVSM airspace. The operator must determine that the appropriate State authority has granted them RVSM operational approval and they will meet the RVSM requirements for the filed route of flight and any planned alternate routes. The letter "W" shall be inserted in item 10 (Equipment) of the ICAO standard flight plan to indicate that both the aircraft and operator are RVSM approved.

11.2 All operators filing Repetitive Flight Plans (RPLs) shall include the letter "W" in Item Q of the RPL to indicate RVSM approval status and include all equipment and capability in conformity with Item 10 of the ICAO Flight Plan.

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

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

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

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

12.4 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.

12.5 SPECIAL COORDINATION PROCEDURES FOR CRUISE OPERATION OF NON-RVSM COMPLIANT AIRCRAFT IN RVSM AIRSPACE (Source: State AIP Supplement). Non-RVSM compliant aircraft may not flight plan between FL ____ and FL____ inclusive within RVSM airspace, except for the following situations:

(a) The aircraft is being initially delivered to the State of Registry or Operator (see Paragraph 13.0 for additional details and information); or

(b) The aircraft was 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) The aircraft is transporting a spare engine mounted under the wing; or

(d) The aircraft 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.? The procedures are intended exclusively for the purposes indicated and not as a means to circumvent the normal RVSM approval process.

12.5.1 The assignment of cruising levels to non-RVSM compliant aircraft listed in paragraph 12.5 (a) to (e) shall be subject to an ATC clearance. Aircraft operators shall include the "STS/ Category of operations (i.e. FERRY/HUMANITARIAN/MILITARY/CUSTOMS/POLICE)/NON-RVSM COMPLIANT" in Field 18 of the ICAO Flight Plan.

12.5.2 Where necessary, the Air Traffic Control Centre may be contacted as follows:

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

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

13.1 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 APARMO 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 ____. AFTN?

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

14.1 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.

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

15.1 See Attachment A for guidance in these circumstances.

16.0 Procedures for Air-Ground Communication Failure (Source Document: State AIP Supplement)

16.1 The air-ground communication failure procedures specified in ICAO PANS-ATM Doc 4444 should be applied, in conjunction with AIP (XXXX).

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ATTACHMENT A

CONTINGENCY SCENARIOS. 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 6.0 and 7.0 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.
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 6.0 and 7.0 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	Acknowledge the situation and continue to monitor progress

control system, notify ATC of the loss of redundancy and maintain vigilance of altitude keeping.	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 6.0 and 7.0 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 200 ft (60m)

1. **THE PILOT SHOULD**
Determine the def ective system through the normal airplane integrated comparator warning system or in the absence of such a system, establish trouble-shooting procedures comparing the primary altimeters to the standby altimeter (corrected using the correction card)
If the defective system can be determined, couple the functioning altimeter to the altitude keeping device in use
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.	
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 6.0 and 7.0 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.

ATTACHMENT B

PHRASEOLOGY RELATED TO RVSM OPERATIONS

Controller-pilot phraseology:

Message	Phraseology
For a controller to ascertain the RVSM approval status of an aircraft:	(call sign) **CONFIRM RVSM APPROVED**
For a pilot to report non-RVSM approval status: i. on the initial call on any frequency within the RVSM airspace (controllers shall provide a readback with this same phrase), and ii. in all requests for flight level changes pertaining to flight levels within the RVSM airspace; and iii. in all read-backs to flight level clearances pertaining to flight levels within the RVSM airspace. Additionally, except for State aircraft, pilots shall include this phrase to read back flight level clearances involving the vertical transit through FL 290 or FL 410. *See examples that follow.*	**NEGATIVE RVSM***
For a pilot to report RVSM approval status. For a pilot of a non-RVSM approved State aircraft to report non-RVSM approval status, in response to the phrase (call sign) **CONFIRM RVSM APPROVED.**	**AFFIRM RVSM*** **NEGATIVE RVSM STATE AIRCRAFT***
Denial of clearance into the RVSM airspace:	(call sign) **UNABLE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN** [or **DESCEND TO,** or **CLIMB TO**] **FLIGHT LEVEL** (number)
For a pilot to report when severe turbulence affects the aircraft's capability to maintain the height-keeping requirements for RVSM.	**UNABLE RVSM DUE TURBULENCE***
For a pilot to report that the aircraft's equipment has degraded enroute below that required for flight within the RVSM airspace. (See Attachment A) *(This phrase is to be used to convey both the initial indication of the non-MASPS compliance, and henceforth, on initial contact on all frequencies within the lateral limits of the RVSM airspace until such time as the problem ceases to exist, or the aircraft has exited the RVSM airspace.)*	**UNABLE RVSM DUE EQUIPMENT***

For a pilot to report the ability to resume operations within the RVSM airspace after an equipment or weather-related contingency.	**READY TO RESUME RVSM***
For a controller to confirm that an aircraft has regained its RVSM approval status, or to confirm that the pilot is ready to resume RVSM operations.	**REPORT ABLE TO RESUME RVSM**

Example 1: A non-RVSM approved aircraft, maintaining FL 260, subsequently requests a climb to FL 320.
Pilot: (call sign) REQUEST FL 320, NEGATIVE RVSM
Controller: (call sign) CLIMB TO FL 320
Pilot: (call sign) CLIMB TO FL 320, NEGATIVE RVSM

Example 2: A non-RVSM approved aircraft, maintaining FL 260, subsequently requests a climb to FL 430.
Pilot: (call sign) REQUEST FL 430, NEGATIVE RVSM
Controller: (call sign) CLIMB TO FL 430
Pilot: (call sign) CLIMB TO FL 430, NEGATIVE RVSM

Example 3: A non-RVSM approved aircraft, maintaining FL 360, subsequently requests a climb to FL 380.
Pilot: (call sign) REQUEST FL 380, NEGATIVE RVSM
Controller: (call sign) CLIMB TO FL 380
Pilot: (call sign) CLIMB TO FL 380, NEGATIVE RVSM

Example 4: A non-RVSM approved civil aircraft maintaining FL 280, subsequently requests a climb to FL 320.
Pilot: (call sign) REQUEST FL 320, NEGATIVE RVSM
Controller: (call sign) UNABLE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN FL 280

Coordination between ATS units:

Para	Message	PHRASEOLOGY
1	To verbally supplement an automated estimate message exchange which does not automatically transfer Item 18 flight plan information.	**NEGATIVE RVSM** OR **NEGATIVE RVSM STATE AIRCRAFT** [AS APPLICABLE]
2	To verbally supplement estimate messages of non-RVSM approved aircraft.	**NEGATIVE RVSM** OR **NEGATIVE RVSM STATE AIRCRAFT** [as applicable]
3	To communicate the cause of a contingency relating to an aircraft that is unable to conduct RVSM operations due to severe turbulence or other severe weather-related phenomenon [or equipment failure, as applicable].	**UNABLE RVSM DUE TURBULENCE** [or **EQUIPMENT**, as applicable]

Draft Proposal for Amendment of the
ICAO Regional Supplementary Procedures (Doc 7030/4)
(Serial No. APAC-S 02/XX - MID/ASIA/RAC)

a) **Regional Supplementary Procedures, Doc 7030/4:** MID/ASIA/RAC

b) **Proposing State(s):** Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) and
Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG)

c) **Proposed Amendment:** On page MID/ASIA/RAC-9, dated 13/2/00, *Amend* paragraph 6.5.1.1 to read:

6.5.1.1 The reduced vertical separation minimum (RVSM) shall be applied for flights within the Auckland Oceanic, Bali, Bangkok, Brisbane, Hanoi, Ho Chi Minh, Hong Kong, Honiara, Jakarta, Kota Kinabalu, Kuala Lumpur, Manila, Melbourne, Naha, Nauru, New Zealand, Phnom Penh, Port Moresby, Singapore, Taibei, Tokyo, Ujung Pandang, and Vientiane flight information regions (FIRs) ***(ADD FIRS WHERE RVSM MAY BE APPLIED).***

d) **Proposers' reasons for amendment:**

i) The vertical separation minimum currently applied in the airspace of the Pacific Ocean and South China Sea is 300 m (1 000 ft) above flight level 290. The increase in air traffic between Asia/Middle East and Europe south of the Himalayas area coupled with the application of a 600 m (2 000 ft) separation minima has led to less than optimum efficiency of operation. The further introduction of RVSM over the Bay of Bengal and Arabian Sea areas will serve to increase the availability of fuel and time efficient flight levels and tracks to users, reduce the complexity of the air traffic management task (*e.g.* enhance the capability to accommodate traffic on intersecting tracks) and enhance airspace capacity.

ii) APANPIRG determined that a target of 90% of the aircraft population planning to operate in airspace of the Bay of Bengal and beyond within the Asia Region where RVSM may be applied should be achieved in order for RVSM to be implemented in the scheduled date of 27 November 2003. A review of the aircraft fleet has been undertaken and it is anticipated that this target will be met by November 2003.

iii) ***(MIDANPIRG's decision to be added as appropriate)***

iv) An analysis of benefits versus costs for the RVSM operations in the Bay of Bengal area and beyond within the Asia Region has shown total benefits in non-discounted dollars of ***$???*** Versus projected costs in non-discounted dollars of ***$??? for the 15 year period between ???? and ????. This yields a positive benefit/cost ratio of ?.?.***

e) **Proposed implementation date of the amendment:** 27 November 2003

f) **Proposal circulated to the following Sates and International Organizations:**

Afghanistan
Argentina
Australia
Bahrain
Bangladesh
Bhutan
Brazil
Brunei Darussalam
Cambodia
Canada
Chile
China
(cc: Hong Kong, China)
(cc: Macau, China)
Cook Islands
Cyprus
Democratic People's Republic of Korea
Ecuador
Egypt
Fiji
France
Germany
India
Indonesia
Iran, Islamic Republic of
Iraq
Israel
Japan
Jordan
Kazakhstan
Kiribati
Kuwait
Kyrgyzstan
Lao People's Democratic Republic
Lebanon
Libyan Arab Jamahiriya
Luxembourg
Malaysia
Maldives
Marshall Islands
Mexico
Micronesia, Federated States of
Mongolia
Myanmar
Nauru
Nepal
Netherlands
Kingdom of the
New Zealand
Oman
Pakistan
Palau
Papua New Guinea
Peru
Philippines
Portugal
Qatar
Republic of Korea
Russian Federation
Samoa
Saudi Arabia
Singapore
Solomon Islands
Sri Lanka
Sudan
Syrian Arab Republic
Tajikistan
Thailand
Tonga
Turkmenistan
United Arab Emirates
United Kingdom
United States
Uzbekistan
Vanuatu
Viet Nam
Yemen
IATA
IFALPA
IFATCA

(ADD AS APROPRIATE)

g) **Secretariat comments:**

i) The Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) has already undertaken the task of implementing RVSM in the Pacific. The APANPIRG/9 meeting (Bangkok 24-28 August 1998) agreed (Decision 9/4) to the establishment of an ICAO RVSM Implementation Task Force to develop and co-ordinate RVSM implementation plans and programmes for the Asia/Pacific Regions as a whole and also to ensure that the requirements listed in Doc 7030 are met.

ii) ***The Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG) …….***

iii) Target implementation date was established as of 27 November 2003 in order to realize the end-to-end seamless RVSM operation between Asia/Middle East/Europe south of the Himalayas. This implementation date and necessary procedures will be notified to operators in State AIPs

and NOTAM.

iv) RVSM implementation in the North Atlantic, Pacific and South China Sea airspace has proved to be safe and successful. Major operators have indicated that benefits received from RVSM exceeded the costs of RVSM approval within one year of implementation. Major RVSM benefits experienced have included increased access to user preferred, fuel and time efficient altitudes and routes.

v) The aircraft and operator approval processes and criteria applied in the North Atlantic, Pacific and South China Sea will be applied in the Bay of Bengal and Arabian Sea area RVSM implementation. Guidance material for Asia/Pacific RVSM implementation has been adapted from guidance material developed for Pacific RVSM implementation.

vi) This amendment proposes that aircraft and operators meeting the requirements of existing Doc 7030 provisions can operate safely and efficiently in airspace where 300 m (1 000 ft) vertical separation is applied. A safety assessment for the Bay of Bengal and Arabian Sea area is being undertaken. Existing communication and surveillance systems (High Frequency radio and procedural separation practices) are adequate to support this proposal.

vii) APANPIRG has adopted a Target Level of Safety (TLS) of 5×10^{-9} fatal accidents per aircraft flight hour to assess airspace system safety. This TLS will consider both operational errors and errors related to aircraft altitude-keeping performance.

viii) Bay of Bengal and Arabian Sea area ATS provider States have stated that for RVSM implementation to proceed it must be determined that approximately 90% of operations will be conducted by RVSM approved aircraft. ATS provider States have published NOTAM and AIPs to announce RVSM implementation. In these publications it has been stated that flight of non-approved aircraft at flight levels where RVSM is applied will only be accommodated if the operator co-ordinates prior to the flight with the appropriate ATS provider in accordance with published procedures and only for special types of flights (*e.g.* State aircraft, ferry, maintenance and humanitarian flights). This policy reflects that established for RVSM operations in the North Atlantic, Pacific and South China Sea.

ix) ***(ADD AS APPROPRIATE)***

MONITORING AGENCY FOR THE ASIA REGION (MAAR)

(Note: This forms are to be used when MAAR takes over responsibility for RVSM Monitoring for the Asia Region)

MAAR FORM F1

CONTACT /CHANGE OF CONTACT DETAILS FOR MATTERS RELATING TO ASIA REGION APPROVALS

This form should be completed and returned to the address below on the first reply to the Monitoring Agency for Asia Region (MAAR) or when there is a change to any of the details requested on the form (PLEASE USE BLOCK CAPITALS).

STATE OF REGISTRY:

STATE OF REGISTRY (ICAO 2 LETTER IDENTIFIER):

Enter the 2-letter ICAO identifier as contained in ICAO Doc 7910/92. In the event that there is more than one identifier for the same State, the one that appears first in the list should be used.

ADDRESS:

CONTACT PERSON:

Full Name:

Title: Surname: Initials:

Post/Position:

Telephone #: Fax #:

E-mail:

Initial Reply*/Change of Details* (**Delete as appropriate*)

When complete, please return to the following email (most preferable), fax, or mailing address:

E-Mail: maar@aerothai.or.th
Fax: 662-287-8341

Monitoring Agency for Asia Region (MAAR)
ATS Operations Bureau, AEROTHAI
102 Ngamduplee Tungmahamek, Sathorn
Bangkok 10120 Thailand

MONITORING AGENCY FOR ASIA REGION (MAAR)

(Note: This form is to be used when MAAR takes over responsibility for RVSM Monitoring for the Asia Region)

MAAR FORM F2

RECORD OF APPROVAL TO OPERATE IN ASIA REGION RVSM AIRSPACE

1. When a State of Registry approves or amends the approval of an operator/aircraft for operations within the Asia Region airspace, details of that approval must be recorded and sent to the Monitoring Agency for Asia Region (MAAR) to reach it by the tenth day of the month following the month that the approval was issued.

2. *Before providing the information as requested below, reference should be made to the accompanying notes* **(PLEASE USE BLOCK CAPITALS)**.

2.1 State of Registry:

2.2 Name of Operator:

2.3 State of Operator:

2.4 Aircraft Type:

2.5 Aircraft Series:

2.6 Manufacturers Serial No:

2.7 Registration No:

2.8 Mode S Address Code:

2.9 Airworthiness Approval:

2.10 Date Airworthiness Approval Issued:

2.11 RVSM Approval:

2.12 Date RVSM Approval Issued:

2.13 Date of Expiry (If Applicable):

2.14: Remarks:

When complete, please return to the following email (most preferable), fax, or mailing address:

E-Mail: maar@aerothai.or.th
Fax: 662-287-8341

Monitoring Agency for Asia Region (MAAR)
ATS Operations Bureau, AEROTHAI
102 Ngamduplee Tungmahamek, Sathorn
Bangkok 10120 Thailand

MONITORING AGENCY FOR ASIA REGION (MAAR)

(Note: This form is to be used when MAAR takes over responsibility for RVSM Monitoring for the Asia Region)

MAAR FORM F3

WITHDRAWAL OF APPROVAL TO OPERATE IN ASIA REGION RVSM AIRSPACE

1. When a State of Registry has cause to withdraw the approval of an operator/aircraft for operations within the Asia Region RVSM airspace, details as requested below, must be submitted to the Monitoring Agency for Asia Region (MAAR) by the most appropriate method.

2. *Before providing the information as requested below, reference below, reference should be made to the accompanying notes* **(PLEASE USE BLOCK CAPITALS).**

2.1 State of Registry:

2.2 Name of Operator:

2.3 State of Operator:

2.4 Aircraft Type:

2.5 Aircraft Series:

2.6 Manufacturers Serial No:

2.7 Registration No.:

2.8 Aircraft Mode S Address Code:

2.9 Date of Withdrawal of RVSM Approval:

2.10 Reason of Withdrawal of RVSM Approval:

2.11 Remarks:

When complete, please return to the following email (most preferable), fax, or mailing address:

E-Mail: maar@aerothai.or.th
Fax: 662-287-8341

Monitoring Agency for Asia Region (MAAR)
ATS Operations Bureau, AEROTHAI
102 Ngamduplee Tungmahamek, Sathorn
Bangkok 10120 Thailand

MONITORING AGENCY FOR ASIA REGION (MAAR)

(Note: This form is to be used when MAAR takes over responsibility for RVSM Monitoring for the Asia Region)

REPORT OF LARGE ALTITUDE DEVIATION

Report to the Monitoring Agency for Asia Region (MAAR) of an altitude deviation of 300ft or more, including those due to TCAS, turbulence and contingency events.

Name of FIR: _____
Please complete Section I or II as appropriate

SECTION I:
There were no reports of large altitude deviation for the month of _____

SECTION II:
There was/were _____ report(s) of an altitude deviation of 300 ft or more between FL290 and FL410. Details of the altitude deviation are attached (Form A).
(Please use a separate form for each report of altitude deviation).

SECTION III:
When complete, please return to the following email (most preferable), fax, or mailing address:
E-Mail: maar@aerothai.or.th
Fax: 662-287-8155

Monitoring Agency for Asia Region (MAAR)
ATS Operations Bureau, AEROTHAI
102 Ngamduplee Tungmahamek, Sathorn
Bangkok 10120 Thailand

MONITORING AGENCY FOR ASIA REGION (MAAR)

(Note: This form is to be used when MAAR takes over responsibility for RVSM Monitoring for the Asia Region)

FORM A

REPORT OF AN ALTITUDE DEVIATION OF 300 FT OR MORE BETWEEN FL290 AND FL410

(1) Reporting agency
(2) Location of deviation
(3) Date of occurrence (UTC)
(4) NOPAC/CENPAC/CEP/SOPAC/Japan-Hawaii/South China Sea/Other
(5) Flight identification and type
(6) Flight level assigned
(7) Observed/reported final level Mode C/Pilot report
(8) Duration at flight level
(9) Cause of deviation
(10) Other traffic
(11) Crew comments, if any, when noted
(12) Remarks

CHART OF EMARSSH ROUTE STRUCTURE

Acrobat Document

LIST OF STATES' RVSM PROGRAMME MANAGERS FOR IMPLEMENTATION IN THE BAY OF BENGAL AREA AND BEYOND (WITHIN THE ASIA REGION)

STATE & NAME	TITLE/CONTACT DETAILS
BANGLADESH: Mr. M. Obaidur Rahman	Operations & Planning Civil Aviation Authority of Bangladesh Headquarters Office Kurmitola, Dhaka 1206 Bangladesh Phone: +880 (2) 891-4105; +880 (2) 891-4870 Fax: +880 (2) 891-4709 E-mail: mopscaab@accesstel.net
INDIA: Shin R. C. Khurana	General Manager (ATM) Airports Authority of India Rajiv Gandhi Bhawan, Saedarjung Airport New Delhi, 11003 India Phone: +91 (11) 2465 2648 Fax: +91 (11) 2 461 1078 E-mail: gmaraaai@vsnl.net
INDONESIA Mr. Nanang Swastya Taruf	Deputy Director System and Procedure for Air Navigation Directorate of Aviation Safety Directorate General of Air Communication (DGAC) Ministry of Communication Gedung Karya Lt. 23 Jl. Merdeka Barat No.8 Jakarta 10110 Indonesia Phone: +62 (21) 350 6451 Fax: +62 (21) 350 7569 E-mail: cns_atm@telkom.net
MALAYSIA Mr. Maniam Appadurai	Deputy Director of Air Traffic Services Department of Civil Aviation Air Traffic Control Centre (Block A) Sultan Abdul Aziz Shah Airport 47200 Subang, Selangor, Malaysia Phone: +603 7846 5233 ext 435 Fax: +603-7847 2997 E-mail: accwmfc@tm.net.my

STATE & NAME	TITLE/CONTACT DETAILS
MALDIVES Mr. Mohamed Solih	Chief, Air Traffic Services Air Traffic Management Rescue Services Section Maldives Airports Company Ltd. Male International Airport, Hulhule, Maldives Phone: +960-313308 Fax: +960-313258 E-mail: msolih@airports.com.mv
MYANMAR: Mr. Yao Shu	Deputy Director Air Traffic Services Department of Civil Aviation Headquarters Building, Yangon International Airport Mingaladon 11021 Yangon, Myanmar Phone: +95-1-665637 Fax: +95-1-665124 E-mail:
NEPAL Mr U.P.Dhatel	Director General Civil Aviation Authority of Nepal Kathmandu, Nepal Phone: +977-1-262387 Fax: +977-1-262516 E-mail:cnsatm@mos.com.np
PAKISTAN Mr. Zahid Hussain Khan	General Manager Air Traffic Services Civil Aviation Authority Jinnah International Airport – Terminal 1 Karachi 75200, Pakistan Phone: +92 (21) 921 8756 Fax: +92 (21) 921 8758 E-mail: gmats@cyber.net.pk zhkjiap@hotmail.com
SINGAPORE Mr. Rosly Saad	Deputy Chief SATCC Civil Aviation Authority of Singapore Singapore Changi Airport P. O. Box 1, Singapore 918141 Phone: +65-6541-2430 Fax: +65-6545-6252 E-mail: rosly_saad@caas.gov.sg

STATE & NAME	TITLE/CONTACT DETAILS
SRI LANKA Mr D.S.Pullaperuma	Senior Air Traffic Controller Airport and Aviation Services (SL) Ltd. Colombo Airport Ratmelana, Sri Lanka Phone: +94-1-635105 Fax: +94-1-635105 E-mail: rmsaasl@slt.lk
THAILAND Mr. Tinnagorn Choowong	Air Traffic Control Manager Bangkok Area Control Centre, AEROTHAI 102 Ngamduplee Thungmahamek Bangkok 10120, Thailand Phone: +66-2-285 9975 Fax: +66-2-285 9489 E-mail: tinnagorn.ch@aerothai.or.th
TASK FORCE CHAIRPERSON Mr. Sydney Maniam	Head (Standards) Civil Aviation Authority of Singapore Singapore Changi Airport, P.O. Box 1 Singapore 918141 Phone: +65-6541-2456 Fax: +65-6545-6516 E-mail: sydney_maniam@caas.gov.sg
ATS WORK GROUP CHAIRPERSON Mr. Greg Hood	Operations Manager, Airservices Australia Locked Bag 747, Eagle Farm 4009 Brisbane Centre, Queensland, Australia Phone: +61-7-3866 3224 Fax: +61-7-3866 3226 Mobile: +61-418-123145 E-mail: greg.hood@airservicesaustralia.com
OPS/AIR WORK GROUP CHAIRPERSON Mr. Yusfandri Gona	Performance & Flight Test Section Head DGAC of Indonesia, DEPHUB, Gedung Karya Lt. 22, Jln Medan Merdeka Barat No.8 Jakarta 10110 Indonesia Phone: +62-21-350 6664 Fax: +62-21-350 6663 E-mail: yugo_gona2001@yahoo.com

STATE & NAME	TITLE/CONTACT DETAILS
SAM WORK GROUP CHAIRPERSON Mr. Nopadol Sangngurn	Vice President, Business Development Bureau Aeronautical Radio of Thailand Ltd. (AEROTHAI) 102 Ngamduplee Thungmahamek Bangkok 10120 Thailand Phone: +66-2-285 9054 Fax: +66-2-285 9488 E-mail: nopadol@aerothai.or.th
ICAO Mr. David Moores	Regional Officer, ATM ICAO Asia and Pacific Office 252/1 Vibahvadi Rangsit Road,Ladyao, Chatuchak Bangkok 10900 Thailand Phone: +66-2-537 8189 ext 151 Fax: +66-2-537 8199 E-mail: dmoores@bangkok.icao.int

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RVSM TASK LIST FOR THE BAY OF BENGAL

ID	Description	Start	Finish by	Present Status	Resource Names
1	**Identify Operational Need**	**18-Jan-02**	**30-Nov-02**	Completed	
2	Agree operational concept for Bay of Bengal and beyond (within ICAO Asia Region)	18-Jan-02	30-Nov-02	Completed	ATC/WG, RVSM Task Force
3	**Conduct Cost Benefits Analysis**	**18-Jan-02**	**31-Mar-03**	In progress	
4	Conduct preliminary benefit cost analysis	18-Jan-02	31-Mar-03	In progress	SAM WG
5	Finalize benefit cost analysis	18-Jan-02	31-Mar-03	In progress	SAM WG
6	**Safety Assessment**	**18-Jan-02**	**31-Oct-03**	In progress	
7	Review available summary data (non-compliant aircraft, aberrant aircraft etc)	18-Jan-02	31-Oct-03	In progress	SAM/WG, RVSM Task Force
8	Examine history of height keeping errors related to ATC clearances and assess possible RVSM impact	18-Jan-02	31-Oct-03	In progress	SAM/WG, RVSM Task Force
9	Confirm RVSM risk model assumptions/parameters are consistent with airspace where RVSM is to be applied	18-Jan-02	31-Oct-03	In progress	SAM/WG, RVSM Task Force
10	Conduct simulations to predict occupancy after RVSM implementation	18-Jan-02	31-Oct-03	In progress	SAM/WG, RVSM Task Force
11	Collect weather and turbulence data for analysis - this should include Himalayan standing wave analysis	18-Jan-02	31-Oct-03	In progress	SAM/WG, OPSAIR, RVSM Task Force
12	Report monthly large height deviations to APARMO or equivalent monitoring agency (including operational errors)	18-Jan-02	Ongoing	In progress	ATS Providers, Users
13	**Feasibility Analysis**	**18-Jan-02**	**31-Oct-03**	In progress	
14	Examine the operational factors and workload associated with implementation	18-Jan-02	31-Oct-03	In progress	ATC/WG, RVSM Task Force
15	**Determination of Requirements (airborne & ground systems)**	**18-Jan-02**	**31-Oct-03**	In progress	
16	Determine need for additional GMUs	18-Jan-02	31-Oct-03	In progress	SAM/WG, RVSM Task Force
17	States assess the impact of RVSM implementation on controller automation systems (e.g., equipment suffixes) and plan for upgrades/modifications	18-Jan-02	31-Jan-03	In progress	States

18	**Aircraft & Operator Approval Requirements**	**18-Jan-02**	**27-Nov-03**	In progress	
19	Promulgate the operational approval process	18-Jan-02	07-Jun-02	Completed	OPS/AIR/WG, RVSM Task Force
20	Notify States when significant changes occur to RVSM documentation	18-Jan-02	Ongoing	In progress	OPS/AIR/WG, RVSM Task Force
21	**Perform Rulemaking (if required)**	**18-Jan-02**	**27-Nov-03**	In progress	
22	Recommend State airspace regulatory documentation	18-Jan-02	27-Nov-03	In progress	States
23	**Perform Necessary Industry & International Co-ordination**	**18-Jan-02**	**27-Nov-03**	In progress	
24	Establish target implementation date	18-Jan-02	27-Nov-03	Completed	RVSM Task Force
25	Report to ATS/AIS/SAR/SG/13	19-May-03	23-May-03	In progress	RVSM Task Force Chairman
26	Process Doc 7030 amendment	18-Jan-02	27-Nov-03	In progress	ICAO Regional Office
27	Publish advance AIC	18-Jan-02	31-Jan-03	In progress	States
28	Publish AIP Supplement containing RVSM policy/procedures	18-Jan-02	12-Jun-03	In progress	States
29	Review inter-facility coordination procedures	18-Jan-02	31-Oct-03	In progress	States
30	Finalize changes to Letters of Agreement	18-Jan-02	31-Oct-03	In progress	States
31	Disseminate information on RVSM policy and procedures through FAA RVSM Website	07-Jun-02	Ongoing	In progress	OPS/AIR WG, RVSM Task Force
32	**Approval of Aircraft & Operators**	**18-Jan-02**	**27-Sep-03**	In progress	
33	Establish approved operations readiness targets	18-Jan-02	31-Mar-03	In progress	IATA, ATC/WG, RVSM Task Force
34	Assess readiness	18-Jan-02	27-Sep-03	In progress	IATA, OPS/AIR/WG
35	**Develop Pilot & ATC Procedures**	**18-Jan-02**	**27-Nov-03**	In progress	
36	Review application of tactical offset procedure to mitigate the effects of wake turbulence and TCAS alerts	18-Jan-02	15-May-03	In progress	RVSM Task Force
37	Review weather and contingency procedures for applicability under RVSM	18-Jan-02	15-May-03	In progress	RVSM Task Force
38	Publish appropriate Pilot/ATC policy & procedures on RVSM website	18-Jan-02	Ongoing	In progress	RVSM Task Force
39	Identify transition areas and procedures	18-Jan-02	31-Jan-03	In progress	States, ATC/WG

40	Conduct simulation modelling to assess impact of RVSM operations	18-Jan-02	15-May-03	In progress	States, ATC/WG
41	Report on simulation activity	18-Jan-02	15-May-03	In progress	ATC/WG, RVSM Task Force
42	Continue to recommend that RVSM operators adopt TCAS V.7	18-Jan-02	15-May-03	In progress	OPS/AIR/WG, RVSM Task Force
43	Develop procedures for handling non-compliant aircraft (inc ferry & mntce) in ATS documentation	18-Jan-02	15-May-03	In progress	OPS/AIR/WG, ATC/WG, RVSM Task Force
44	Develop mutually acceptable ATC procedures for non-approved State acft to transit RVSM airspace	18-Jan-02	15-May-03	In progress	ATC/WG, RVSM Task Force
45	Consider procedures for suspension of RVSM	18-Jan-02	15-May-03	In progress	ATC/WG, RVSM Task Force
46	Liaise with State defense authorities regarding "due regard" military operations	18-Jan-02	27-Nov-03	In progress	States
47	**Pilot & ATC Training**	**18-Jan-02**	**27-Nov-03**	In progress	
48	Provide Pilot/ATC training documentation based on past experience	18-Jan-02	Ongoing	In progress	IATA, RVSM Task Force
49	Conduct local RVSM training for air traffic controllers	18-Jan-02	27-Nov-03	In progress	States, ATC/WG
50	**Perform System Verification**	**18-Jan-02**	**31-Oct-03**	In progress	
51	Height keeping performance monitoring needed to undertake initial safety analysis	18-Jan-02	31-Oct-03	In progress	APARMO and SAM/WG, RVSM Task Force
52	Provide representative traffic movement data to APARMO (period 15 Jan - 15 Mar 03)	18-Jan-02	Ongoing	In progress	States
53	Undertake initial safety analysis	18-Jan-02	31-Mar-03	In progress	SAM/WG, RVSM Task Force
54	Prepare/maintain regional status report detailing RVSM implementation plans	18-Jan-02	Ongoing	In progress	RVSM Task Force
55	**Final Implementation Decision**	**18-Jan-02**	**27-Nov-03**	In progress	**RVSM Task Force**
56	Review aircraft altitude-keeping performance and operational errors	18-Jan-02	31-Oct-03	In progress	SAM/WG, OPS/AIR/WG
57	Complete ATS State documentation	18-Jan-02	27-Sep-03	In progress	States
58	Publish Trigger NOTAM	18-Jan-02	22-Nov-03	In progress	States
59	Complete readiness assessment	18-Jan-02	31-Oct-03	In progress	APARMO
60	Complete safety analysis	18-Jan-02	31-Oct-03	In progress	RVSM Task Force
61	**Declare Initial Operational Capability**	18-Jan-02	**27-Nov-03**	In progress	APARMO and SAM/WG, RVSM Task Force

62	**Monitor System Performance**	18-Jan-02	**27-Nov-04**	In progress	
63	Perform Follow-On Monitoring	18-Jan-02	Ongoing	In progress	OPS/AIR/WG, SAM/WG
64	Complete transition of monitoring functions from FAA to AEROTHAI	30-May-02	27-Sep-03	In progress	SAM/WG
65	**Declare Full Operational Capability**	18-Jan-02	**27-Nov-04**	In progress	RVSM Task **Force**
66	Task Force/15 (Bangkok)	03-Jun-02	07-Jun-02	Completed	RVSM Task Force
67	Special Coordination Meeting (Manila) - Western Pacific/South China Sea Focus	29-Jul-02	31-Jul-02	Completed	RVSM Task Force
68	Task Force/16 (Bangkok) - Western Pacific/South China Sea Focus	23-Sep-02	25-Sep-02	Completed	RVSM Task Force
69	Joint Interface Meeting with Middle East RVSM Task Force	19-Oct-02	20-Oct-02	Completed	RVSM Task Force
70	Seminar/5 (Bangkok) - 3 days	15-Jan-03	17-Jan-03	Completed	RVSM Task Force
71	Task Force/17 (Bangkok) - Bay of Bengal and beyond Focus - 5 days	20-Jan-03	24-Jan-03	Completed	RVSM Task Force
72	Task Force/18 (Hanoi) - 1 year/90 day follow up review on Western Pacific/South China Sea – 3 days	26 Mar 03	28 Mar 03		RVSM Task Force
73	Task Force/19 (Location TBD) - Bay of Bengal and beyond Focus - 5 days	26-May-03	30-May-03		RVSM Task Force
74	Second Joint Interface Meeting with Middle East RVSM Task Force (Location TBD) - 3 days	09-Jun-03	11-Jun-03		RVSM Task Force
75	Task Force/20 (Location TBD) - **Go/No-Go** for Bay of Bengal and beyond implementation – 5 Days	20-Oct-03	24-Oct-03		RVSM Task Force
76	Task Force/21 (Location TBD) - 90 day follow up review on Bay of Bengal and beyond implementation - 3 days	00 Feb 04	00 Feb 04		RVSM Task Force
77	Task Force/22 (Location TBD) - 1 year follow up Bay of Bengal and beyond implementation – 3 days	00 Nov 04	00 Nov 04		RVSM Task Force

ASIA/PACIFIC REGION RVSM IMPLEMENTATION PLANS STATUS REPORT

Note: Star indicates RVSM implementation complete

FIR/AOR	RVSM Implementation Date	Comments
Anchorage Arctic	24 Feb 2000	RVSM Transition Airspace only
Anchorage Continental	24 Feb 2000	RVSM Transition Airspace only
*Anchorage Oceanic	24 Feb 2000	
*Auckland Oceanic	24 Feb 2000	
Bali	31 Oct 2002	Phased implementation
Bangkok	21 Feb 2002	Phased implementation
Beijing		
Biak	Not applicable	Subject to Indonesia upper airspace consolidation
*Brisbane	24 Feb 2000	Oceanic East of Australia 24 Feb 2000 - Remainder of FIR 1 Nov 2001
Chennai Colombo	27 Nov 2003 27 Nov 2003	
Delhi	27 Nov 2003	
Dhaka	27 Nov 2003	
Guangzhou		
*Hanoi	31 Oct 2002	Phased Implementation
*Ho Chi Minh *Hong Kong	21 Feb 2002 31 Oct 2002	Phased Implementation
*Honiara	24 Feb 2000	
Incheon	TBD	
Jakarta	31 Oct 2002	Phased Implementation
Karachi	27 Nov 2003	
Kathmandu Kolkata	27 Nov 2003 27 Nov 2003	
Kota Kinabalu	21 Feb 2002	
Kuala Lumpur	21 Feb 2002	Phased Implementation – Bay of Bengal – 27 Nov 2003
Kunming		

FIR/AOR	RVSM Implementation Date	Comments
Lahore	27 Nov 2003	
Lanzhou		
Male *Manila	27 Nov 2003 21 Feb 2002	
*Melbourne	1 Nov 2001	
Mumbai	27 Nov 2003	
*Nadi	24 Feb 2000	
Naha	24 Feb 2000	Pacific Oceanic
*Nauru	24 Feb 2000	
*New Zealand	13 July 2000	Non-exclusive
*Oakland Oceanic	24 Feb 2000	
*Phnom Penh	21 Feb 2002	
*Port Moresby	13 Apr 2000	
Pyongyang		
Sanya AOR	31 Oct 2002	N892 within the oceanic airspace of Sanya AOR on 21 February 2002
Shanghai		
Shenyang *Singapore	 21 Feb 2002	
*Tahiti	24 Feb 2000	Non-exclusive RVSM airspace
Taibei	21 Feb 2002	
Tokyo	24 Feb 2000	Oceanic
Ujung Pandang	31 Oct 2002	Phased Implementation
Ula an Baatar Urumqi		
*Vientiane	31 Oct 2002	
Wuhan		
Yangon	27 Nov 2003	

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