International Civil Aviation Organization

Fifteenth Meeting of the APANPIRG ATM/AIS/SAR Sub-Group (ATM/AIS/SAR/SG/15)

Bangkok, Thailand, 25 – 29 July 2005

Agenda Item 3: Review and progress the tasks assigned to the ATM/AIS/SAR/SG by APANPIRG

IMPLEMENTATION OF RVSM IN THE ASIA PACIFIC REGION

(Presented by the Secretariat)

SUMMARY

This paper presents an update on the implementation of RVSM in the Asia Pacific Region since the ATM/AIS/SAR/SG/14 meeting.

1. INTRODUCTION

1.1 The RVSM Task Force continued its work programme established by APANPIRG to implement RVSM in the Incheon, Naha and Tokyo FIRs and to follow-up on implementation of RVSM in the Western Pacific/South China Sea (WPAC/SCS) and the Bay of Bengal and Beyond areas. Mr. Sydney Maniam, Head (Air Traffic Services), Civil Aviation Authority of Singapore (CAAS) continued as the Chairman the Task Force.

1.2 This paper reviews tasks assigned by APANPIRG, the activities of the RVSM Task Force and other activities associated with regional RVSM operations.

2. DISCUSSION

2.1 After the ATM/AIS/SAR/SG/14 meeting, the Task Force met six times (including one special coordination meeting), a RVSM Seminar was conducted and a special coordination meeting between China and Myanmar in regard to RVSM procedures issues was held - as shown below:

Special ATS Coordination Meeting: 5 - 7 July 2004, Bangkok, Thailand
(RVSM Implementation in the Incheon, Naha and Tokyo FIRs)

RVSM/TF/22: 20 - 24 September 2004, Bangkok, Thailand
(Review of flight level orientation schemes)

RVSM/TF/23: 18 - 22 October 2004, Bangkok. Thailand
(RVSM Implementation in the Incheon, Naha and Tokyo FIRs)

RVSM/TF/24: 8 - 12 November 2004, Bangkok. Thailand
(One-year Review of Bay of Bengal and Beyond Implementation)

Sixth RVSM Seminar: 21 - 22 March 2005, Incheon, Republic of Korea

RVSM/TF/25: 23 - 25 March 2005, Incheon, Republic of Korea
(RVSM Implementation in the Incheon, Naha and Tokyo FIRs)

Special ATS Coordination Meeting: 29 – 30 May 2005, Kunming, China
(RVSM procedures between China and Myanmar)

RVSM/TF/26: 4 - 8 July 2005, Tokyo, Japan
(Go/No-go Decision Making for the Incheon, Naha and Tokyo FIRs)

2.2 The Task Force meetings included a wide representation from States and international organizations. In order to accomplish its work program, the Task Force has been divided into three Work Groups to focus on the following:

a) Safety and Airspace Monitoring;
b) ATC Operations; and
c) Aircraft Operations and Airworthiness

Special ATS Coordination Meeting (SCM) – Japan/Republic of Korea

2.3 The SCM was convened to assist Japan and Republic of Korea (ROK) in RVSM implementation planning for the Incheon FIR and the domestic airspace of the Naha and Tokyo FIRs. The SCM was updated on progress with the implementation and planning process, and considered the impact of RVSM implementation on the broader issue of air traffic management and the traffic flow in the adjacent FIRs.

2.4 The SCM reminded the States concerned that before commencing the verification phase, it was essential that a high proportion of the anticipated aircraft population met RVSM requirements. Also, at the beginning of the operational application of RVSM, a comprehensive evaluation of all elements of RVSM operations should be carried out.

2.5 The SCM was advised that flight level arrangements and transition procedures on A593 between the Incheon, Shanghai and Tokyo FIRs, known as Akara-Fukue Corridor would be subject to further discussions by China, Japan and the ROK.

2.6 The SCM reviewed the provisional Operational Plan for the FIRs concerned. RVSM would be applied from FL 290 to FL 410 inclusive in the Incheon, Naha and Tokyo FIRs, using the single alternate Flight Level Orientation Scheme (FLOS). The airspaces where RVSM would be introduced would be exclusive for RVSM approved aircraft, except for specific areas which would be defined by the States concerned. In addition, the transition areas and corresponding transition procedures would be developed by the States involved. The SCM was informed that the target date of implementation would be 9 June 2005.

2.7 Hong Kong, China reported that it was anticipated that upon the implementation of RVSM in the above airspace in 2005, a change to the RVSM FLOS between Hong Kong and Taipei ATC may be required. The results of the study to assess the impact on the planned RVSM implementation in the Incheon FIR and the domestic airspace of the Naha and Tokyo FIRs done by Hong Kong, China indicated that a more homogeneous FLOS environment would facilitate a safe and efficient operation through a reduction in level transition activities. The study showed that it would be most desirable if the single alternate FLOS could be applied uniformly throughout all FIRs and the Area of Responsibility (AOR) concerned. Apart from avoiding a high level of flight level transition operations, the single alternate FLOS could allow operators to be assigned all the flight levels within the entire RVSM stratum in these FIRs.

2.8 The SCM agreed that an RVSM seminar should be held as part of the implementation effort. It was felt that in particular, as the ROK had not previously experienced RVSM implementation, that this would be extremely helpful for the ATS provider, regulatory authority, and operators. The SCM agreed that this seminar should focus on updating on RVSM issues such as the global implementation and safety assessment status; new requirements for airworthiness and operational approval and monitoring; Minimum Monitoring Requirements (MMR); height-keeping performance and monitoring programme; new version of the GPS Monitoring Unit (GMU); follow-on monitoring and continuous airworthiness programme; training programme (Pilot-Dispatcher-Maintenance); in-flight contingency procedures; large height deviation reports, as well as lessons learnt from the WPAC/SCS and Bay of Bengal implementations.

2.9 The SCM noted that the monitoring functions of the airspace planned for RVSM implementation in the Japan and Republic of Korea FIRs were under the responsibility of the Pacific Aircraft Registry and Monitoring Organization (PARMO). As an interim measure, in view of the urgency to progress the readiness and safety assessment for the Incheon FIR, the SCM requested MAAR to undertake the readiness and safety assessment work involved. In this regard, MAAR agreed that they were willing to provide the necessary monitoring services.

RVSM/TF/22 – Review of the FLOS for the West Pacific/South China Sea area

2.10 The RVSM/TF/22 meeting recalled that following the implementation of RVSM in the Bay of Bengal and Beyond area on 27 November 2003 where the single alternate FLOS was adopted, and the planned implementation of RVSM by Japan and the Republic of Korea in 2005 where the single alternate FLOS would also be adopted, it had been decided by the RVSM/TF/18 meeting (June-July 2003) to review the application of the modified single alternate FLOS. This would include the necessary safety assessments relating to changing the FLOS. Until the studies were completed, RVSM/TF/18 decided to continue with the modified single alternate FLOS.

2.11 The RVSM/TF/22 meeting was of the opinion that the selection of the modified single alternate FLOS had provided for the optimum arrangement of flight levels for the SCS uni-directional parallel route structure, which has a number of crossing bi-directional routes, with the crossing routes using a combination of ODD flight levels, vertically separated from the parallel routes using EVEN levels. This arrangement had been compatible at the time with the CVSM being used in adjacent non-RVSM airspace. Transition areas had been established to change between the FLOS.

2.12 Subsequently, the RVSM/TF/20 meeting (October 2003), which made the decision to go ahead with RVSM implementation in the Bay of Bengal and Beyond area on 27 November 2003, proposed to hold the RVSM/TF/22 meeting to review the RVSM FLOS for the WPAC/SCS area.

2.13 The States present provided an update on current RVSM operations in the WPAC/SCS area, using the modified single alternate FLOS, as described below.

a) Indonesia reported that the single alternate FLOS was utilized for RVSM operations in the Jakarta and Ujung Pandang FIRs. Indonesia proposed to continue with the existing FLOS until any regional change to the FLOS was agreed. In this regard, Indonesia urged that any change in FLOS should be reviewed in conjunction with the new routes, M772 and L644 to be established between Jakarta and Hong Kong.

b) Thailand highlighted difficulties faced by controllers with regard to the transition of aircraft from one FLOS to the other. Thailand supported the use of the single alternate FLOS for the WPAC/SCS area, in order to achieve seamless flow of traffic across the Asia Pacific Region and consequently reduce controller workload.

c) On behalf of the Philippines, the Secretariat presented information they provided, which outlined proposed changes to the FLOS for the WPAC/SCS area.

d) IFATCA proposed that the single alternate FLOS be adopted for the WPAC/SCS area to ensure uniform application with traffic that would operate in Northeast Asia with the implementation of RVSM in Japan and the Republic of Korea.

2.14 Singapore reminded the RVSM/TF/22 meeting that at the RVSM/TF/18 meeting, the States concerned noted that there was a significant improvement in the management of traffic due to the availability of additional cruising flight levels and the corresponding No Pre-Departure Clearance (No-PDC) arrangements. The safety level of operations had improved with the modified single alternate FLOS.

2.15 IFATCA informed the RVSM/TF/22 meeting of the outcomes of the Eighth North East Asia Traffic Meeting (NEAT/8) on 13-14 September 2004 convened to discuss the FLOS and flight level allocation schemes used in the WPAC/SCS area with representatives from Hong Kong China, Japan and Taibei Air Traffic Controllers' Associations. NEAT/8 agreed that in order to harmonize with the FLOS in the Incheon, Naha and Tokyo FIRs, the single alternate FLOS should be adopted in the Hong Kong, Manila and Taibei FIRs.

2.16 MAAR reminded the RVSM/TF/22 meeting that one of the requirements for safety monitoring for RVSM implementation in the Asia Region was for States to submit monthly large height deviation (LHD) reports to MAAR. The LHD reports were used to estimate risks of technical and operational errors, which would facilitate the completion of the safety oversight for the Asia airspace where RVSM was implemented.

2.17 MAAR provided the RVSM/TF/22 meeting with an update of reported LHD occurrences in the RVSM airspaces submitted by the concerned States in both the WPAC/SCS and Bay of Bengal and Beyond areas. The information provided summarized the number of LHD occurrences and LHD duration experienced between January 2003 and July 2004. Based on this information, it was found that the LHD occurrences were more significant in the WPAC/SCS. The majority of the LHD causes in the Asia Region, especially in the WPAC/SCS airspace, were the "Error in ATC-unit to ATC-unit transition message (category M)", followed by the "Negative transfer received from transitioning ATC-unit (category N)".

2.18 Japan informed the RVSM/TF/22 meeting that the implementation of RVSM in Japan and the ROK could be delayed for 3 to 4 months from the original date of 9 June 2005. Japan would coordinate with the ROK and confirm the revised implementation date.

2.19 Philippines, who could not attend the RVSM/TF/22 meeting, had submitted a detailed proposal on changes to the flight level assignment in the WPAC/SCS area. For the purpose of the Philippine study and presentation of the proposal, the ATS routes for the WPAC/SCS area were categorized as follows:

Class I – Parallel routes (uni-directional)

Class II – Routes crossing Parallels (bi-directional)

Class III – Routes not crossing Parallels but crossing class II routes (bi-directional)

Class IV – Routes not crossing Parallels or Class II routes (bi-directional)

2.20 The RVSM/TF/22 meeting reviewed the Philippine and Thailand proposals for flight level assignment in detail, taking into account the comments of the States and international organizations present as summarized above. Recognizing the need to maintain safety, efficiency and regularity of operations in the WPAC/SCS area, the RVSM/TF/22 meeting developed a provisional revised plan for the assignment of levels and corresponding No-PDC procedures. The proposed flight allocation and No-PDC levels for each route category as agreed to by the RVSM/TF/22 meeting were as follows:

Class I – Both ways: FL 310, FL 320, FL 350, FL 360, FL 390, FL 400

Class II – Eastbound: FL 290, FL 330, FL 370, FL 410
Westbound: FL 280, FL 300, FL 340, FL 380

Class III – Eastbound: FL 310, FL 350, FL 390
Westbound: FL 320, FL 360, FL 400

Class IV – All flight levels in the RVSM flight level band subject to bilateral agreement between FIRs

2.21 It was emphasized that in accordance with ICAO's safety management provisions in Annex 11 – *Air Traffic Services*, detailed safety assessments would need to be carried out by the States concerned. Also, MAAR would be required to undertake a safety assessment of the proposed FLOS for RVSM operations. In this regard, the traffic sample data previously collected for July 2004 in connection with the updating of the overall safety assessment for RVSM operations in the WPAC/SCS area, as agreed at RVSM/TF/18, would be used.

2.22 The RVSM/TF/22 meeting agreed to a follow up meeting to be held in April/May 2005 when the results of the safety assessment to be conducted by MAAR and the detailed examination of operational factors to be carried out by all parties concurred would be evaluated. Unfortunately, the non-provision of safety related data to MAAR by some States meant that MAAR was unable to complete the safety assessment. Therefore, the FLOS review meeting could not be held and has been tentatively rescheduled in January/February 2006.

RVSM/TF/23 – Japan/Republic of Korea

2.23 The RVSM/TF/23 meeting noted that the ROK proposed to allocate RVSM flight levels based on the single alternate FLOS on A593 and B576 as follows:

a) Assignment of levels for A593 (FL 300 and FL 380 not available)

- Westbound: All RVSM even levels except FL 300 and FL 380

Incheon ACC: FL 320, FL 340 and FL 360
Fukuoka ACC: FL 400

- Eastbound: All RVSM odd levels

Incheon ACC: FL 310, FL 330, FL 350 and FL 370
Fukuoka ACC: FL 290, FL 390 and FL 410

b) Assignment of levels for B576 (FL 300 and FL 380 not available)

- Northbound: FL 310, FL 330, FL 350 and FL 370

- Southbound: FL 320, FL 340 and FL 360

2.24 The RVSM/TF/23 meeting noted that the current arrangements for flight levels assignment for traffic operating on A593 would result in a situation where Fukuoka ACC controlled six levels and Incheon ACC controlled other levels at NIRAT.

2.25 The RVSM/TF23 recognized that transition areas may have to be identified to facilitate the safe and efficient transition of aircraft from other adjacent FIRs. The corresponding transition procedures would also have to be developed. In this regard, Japan and the ROK agreed to review the provisional RVSM operational plan and incorporate the necessary transition areas. In addition, Japan and the ROK would coordinate with the adjacent FIRs to carry out the transition procedures.

2.26 The RVSM/TF/23 meeting recognized the need for Japan and the ROK to coordinate with adjacent ACCs to implement the relevant procedures for RVSM operations. These procedures should be incorporated in the LOAs with the ACCs concerned, in order to facilitate the implementation of RVSM.

RVSM/TF/24

2.27 India informed that RVSM had been implemented successfully on 27 November 2003. Some operational issues were experienced with respect to levels that had been reserved for aircraft on international traffic flows. As a result, level assignment for domestic traffic was slightly restricted initially, which subsequently with increased confidence of the ATC managers was resolved by application of flexible level allocation for crossing traffic on international traffic flows. India also encountered difficulties in ensuring the 10-minute longitudinal separation between pairs of aircraft operating at FL 300 – FL 320, FL 340 – FL 360 and FL 380 – FL 400. Hence, there were occasions when re-routing of aircraft was unavoidable. This, to a large extent, was due to airspace constraints in the Kabul FIR where RVSM was not implemented.

2.28 India reported that FL 280 was made available between 1930 UTC to 2230 UTC for traffic from Delhi FIR via TIGER and SAMAR from 26 March 2004. The arrangement had resulted in reduction of ground delays at Delhi Airport and significant improvements to traffic flows.

2.29 Myanmar reported that the draft transition procedures with Kunming ACC had been finalized and would be incorporated in the LOA between the two ACCs. Myanmar also reported that in consultation with ICAO and Thailand, improvements to communication and surveillance capabilities would be implemented in early 2005. This would include relocation of the ACC to a new operations building, installation of VSAT, improvement to VHF and HF radio equipment and expansion of the RCAG station network, as well as reactivation of the CPDLC and ADS trial.

2.30 Singapore informed the RVSM/TF/24 meeting that initially the implementation of RVSM did not result in significant improvement to ground delays for westbound international departures to Europe. However, with the implementation of the operational trial with Malaysia and Thailand and the use of alternate ATS routes, e.g., P628, by airlines, the average ground delays had reduced from 18% to 13%. Singapore agreed with Malaysia that arrangements for the release of FL 300 by Bangkok ACC had to be fine-tuned to further optimize the assignment of RVSM levels to westbound international flights to Europe.

2.31 Thailand reported that RVSM was introduced successfully on 27 November 2003. Overall, traffic capacity had increased and operations were progressing in a stable mode. Thailand informed that the operational trial with Malaysia and Singapore was on-going. In addition, CPDLC

and ADS trials had commenced on 5 November 2004 to enhance communication and surveillance capabilities in Bangkok FIR. Thailand proposed that existing coordination procedures with Malaysia, Myanmar and Singapore be improved to facilitate the use of all RVSM levels during peak traffic periods and further enhance the management of traffic.

2.32 The RVSM/TF/24 meeting reviewed the current operational trial that was implemented by Malaysia, Singapore and Thailand on the assignment of RVSM levels for westbound international flights. Based on the existing No-PDC procedures, FL 280, FL 320 and FL 340 were assigned to aircraft planned on the parallel routes over the Bay of Bengal, and FL 300 to aircraft on crossing routes. The RVSM/TF/24 meeting noted that there had been no significant improvement to the traffic situation as ground delays were still encountered by airlines at departure airports in the above States during the night peak period for the westbound traffic flow to Europe and the Middle East. Malaysia, Singapore and Thailand reviewed existing coordination procedures to facilitate flexible use of all levels based on traffic demand.

2.33 In regard to the minimum monitoring requirement (MMR) for the Asia Pacific Region, the ICAO RMA Handbook would provide guidance. PARMO had adopted an MMR similar to that in the RMA Handbook, and the First Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/1) agreed that the PARMO MMR should be the MMR for the region. The RVSM/TF/24 meeting agreed that the Asia Pacific RMAs should coordinate and agree on the MMR to be adopted in line with the handbook. It was pointed out that some variation in the MMR could arise regionally in respect to the aircraft types placed in the various groups. But it was not expected that there would be significant variations to the number of aircraft required to be monitored.

2.34 MAAR presented the annual report of airspace safety review of RVSM implementation and operations in the Bay of Bengal and Beyond area which involved 15 FIRs. The review was conducted based on a one month traffic sample data collected during July 2004.

2.35 The RVSM/TF/24 meeting took note of the report on the summary of the LHD occurrences in Bay of Bengal and Beyond area between January 2003 and September 2004. Based on the received LHD reports, the RVSM/TF/24 meeting reviewed the number of LHD occurrences and the associated LHD duration in minutes in the Bay of Bengal and Beyond area for each month between January 2003 and September 2004. In summary, there were 11 LHD occurrences in the Bay of Bengal and Beyond area**,** which accounted for 35 minutes of operational errors since January 2003. The RVSM/TF/24 meeting also reviewed the cause of LHD occurrences reported to MAAR. In light of the information provided, the RVSM/TF/24 meeting noted that the number of LHD occurrences and erroneous duration were considered to be relatively small.

2.36 The RVSM/TF/24 meeting noted that the technical and operational risks for the RVSM implementation in the Bay of Bengal and Beyond area was 5.59×10^{-10} and 1.37×10^{-9} fatal accidents per flight hour, respectively. Thus, the total risk attributed to all causes was 1.93×10^{-9}.

2.37 The RVSM/TF/24 meeting was pleased to note that the results of the risk calculations were well within the Target Level of Safety (TLS). However, there were a number of disturbing issues that had been identified by MAAR that required urgent follow up:

a) missing TSD;
b) missing LHD reports;
c) incomplete and non-reporting of State approvals registry data; and
d) incomplete information on follow-up monitoring of aircraft height-keeping performance in accordance with the MMR.

2.38 The RVSM/TF/24 meting was concerned that some States had failed to fulfill their obligations towards ICAO safety requirements for ongoing operation of RVSM. The periodic review

and updating of the safety assessments for RVSM airspaces was an essential part of RVSM operations, along with the maintenance of the regional and global records of States' aircraft and operator RVSM approvals. The provision of monthly LHD reports, including "NIL reports" where applicable, was essential for determining operational errors that impact on RVSM safety.

2.39 In light of the above, the RVSM/TF/24 agreed that, in view of the incomplete safety assessment for those FIRs concerned, it was urgent that the States involved be informed that the safety data must be submitted to MAAR as soon as possible. In this regard, the RVSM/TF/24 noted that the RASMAG/2 had requested the Regional Office to inform the States involved to submit the data to MAAR as a matter of urgency. The Secretariat confirmed that action was being taken.

2.40 The RVSM/TF/24 meeting noted that the transition procedure arrangement between Kunming and Yangon ACCs was being revised. The RVSM/TF/24 meeting recalled that the revised transition procedures had been discussed between China and Myanmar in line with a proposal presented by the RVSM Task Force since the implementation of RVSM in Bay of Bengal and Beyond area in November 2003. Following agreement between China and Myanmar representatives at the RVSM/TF/24 meeting, an LOA was signed with effect on 1601 UTC, 20 January 2005.

2.41 The RVSM/TF/24 meeting also noted that the implementation of RVSM in November 2003 had improved the availability of levels over the Bay of Bengal and Indian sub-continent, particularly the higher levels above FL 320. However, the long haul flights to Europe from Southeast Asia airports, (mainly Bangkok, Kuala Lumpur and Singapore), which were weight and performance restricted, could not operate at these higher levels. It was noted that the long haul flights operated at the lower levels, i.e., FL 280, FL 300, and FL 320, during the first 3-4 hours of the flight. As FL 300 was usually occupied by westbound flights on routes crossing P628, L750 and M770 under the No-PDC arrangement, only two levels were routinely available.

2.42 Also, the RVSM/TF/24 meeting noted that due to constraints in the Lahore FIR, which was a transition area for the non-RVSM Afghanistan airspace, this caused a "bottleneck", which had a major impact on availability of levels. IATA drew attention to the present air traffic arrangements, which in their view did not make maximum use of available capacity. In particular, as N644 and A466 diverged from Dera Ismail Khan VOR, it should be possible to accommodate more traffic than at present, whereby only three aircraft at a time were permitted subject to no more than two aircraft being on the same route.

2.43 The RVSM/TF/24 meeting reviewed the completion of tasks relating to the implementation of RVSM in the Bay of Bengal and Beyond area, based on the list that had been developed by the ICAO RVSM Implementation Task Force. All the tasks were successfully completed and closed.

2.44 Further, the RVSM/TF/24 meeting recognized the need for improvements to be made to the overall management of traffic in the Bay of Bengal and Beyond area. The RVSM/TF/24 meeting noted that the DOTS+ of the Federal Aviation Administration (FAA) or a similar system could be used to streamline the flow of traffic, alleviate congestion and consequently reduce ground delays at international airports. In addition, the RVSM/TF/24 meeting considered that an operational trial should be conducted to enable the States concerned to assess the effectiveness of the system and the corresponding ATFM plan.

2.45 The RVSM/TF/24 meeting agreed to declare full RVSM operational capability for the Bay of Bengal and Beyond area since RVSM operations were progressing well. The RVSM/TF/24 meeting also agreed that the outstanding issues relating to RVSM operations in the Bay of Bengal and Beyond area should be completed bi-laterally by the States concerned. Also, Bay of Bengal ATS Coordination Group, RASMAG and ATM/AIS/SAR/SG would continue to address relevant RVSM issues and take appropriate follow-up action.

Sixth RVSM Seminar and RVSM/TF/25

2.46 The seminar programme covered the main topics in the ICAO guidance material on RVSM implementation and operation as set out in the ICAO *Manual on Implementation of a 300 M (1000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive* (Doc 9574), and a wide range of subjects related to RVSM.

2.47 The RVSM/TF/25 meeting recognized that the ROK had agreed to implement RVSM simultaneously with Japan and the date had been revised to 29 September 2005.

2.48 The ROK confirmed that RVSM would be implemented in all controlled airspace in the Incheon FIR between FL 290 and FL 410 inclusive except for Special Use Airspaces and the some airway segments to be used as transition areas. The transition areas would be established on ATS route segments adjoining the Pyongyang and Shanghai FIRs (non-RVSM airspaces) to facilitate the safe and efficient transition of aircraft.

2.49 The RVSM/TF/25 meeting sought more details of the flight level allocation scheme to be used on routes in the Incheon FIR in particular for A593 and crossing route B576. The RVSM/TF/25 meeting also requested the ROK to finalize details of the transition arrangements with the Shanghai and Pyongyang FIRs.

2.50 The RVSM/TF/25 meeting reiterated that RVSM implementation and ongoing operations were contingent upon RVSM airspaces in the region meeting the TLS (5×10^{-9} fatal accidents per aircraft flight hour due to all causes of risk in the vertical dimension) established by APANPIRG for the Asia Pacific Region (Doc 7030 MID/ASIA/PAC).

2.51 The flight level allocation scheme proposed by the ROK was reviewed by the RVSM/TF/25 meeting and several alternative proposals were considered. IATA also developed several alternative level schemes that would be acceptable to operators that were taken into account.

2.52 Following further discussions on the flight level allocation for A593 and B576, Japan and the ROK reached an agreement to implement RVSM on 29 September 2005 based on the current flight level allocation and RVSM levels included on A593 and B576. The scheme to be used is shown below.

A593	E (Japan)	250, 290, 410
	E (Korea)	270, 330, 370
	W (Japan)	240, 280, 390
	W (Korea)	260, 320*, 340*
B576	N (Korea)	270, 310, 330, 350, 370
	S (Korea)	260, 320, 340, 360

** FL320 and FL340 will be changed to FL310 and FL350 within the transition area.*

2.53 The RVSM/TF/25 meeting recognized that operation of A593 and B576 presented operational difficulties that could not be resolved at the meeting; however, the measures agreed to at the meeting for the flight level assignment provided a basis for implementing RVSM.

2.54 Due to the incomplete set of LHD data before July 2004, the RVSM/TF/25 meeting agreed to revise the months of data collection to start from July 2004 instead of January 2004. This would still give adequate LHD data for conducting the safety assessment for the Go/No-Go decision, which would be made at the RVSM/TF/26 meeting scheduled on 4-8 July 2005.

Special ATS Coordination Meeting – China/Myanmar

2.55 A two day Special ATS Coordination Meeting between China and Myanmar was held in Kunming, China during 30 May - 3 June, in conjunction with additional bi-lateral technical discussion and facility familiarization activities between the Myanmar delegation and representatives of the Kunming ATSC.

2.56 The SCM conducted post implementation review activities in relation to the implementation of a revised operational LOA between the Kunming ACC and Yangon ACC that had occurred on 20 January 2005. Amendments to the previous LOA had been made in order, among others, to streamline the RVSM flight level transition arrangements and remove the need for a 'double transition', thereby enabling transition directly between RVSM and China metric flight levels without an intermediate use of CVSM levels.

2.57 China briefed the SCM in respect of a number of unusual cases that had been identified during the routine ATC transfer and coordination activities undertaken between Kunming ACC and Yangon ACC. These included occasions where the transferred movement of aircraft was not in accordance with the actual movement with the time discrepancy exceeding the description in the LOA (3 minutes), where the transferred flight level was not in accordance with the actual flight level and where aircraft entered the Kunming FIR without transfer.

2.58 Whilst acknowledging the improvements in ground-ground and air-ground communications expected imminently as a result of Myanmar's equipment replacement/enhancement programme, the SCM agreed a number of additional procedures and arrangements expected to address the problems that had been identified. China and Myanmar signed a Supplement to the Operational LOA and a Memorandum of Understanding between the parties to record and implement the procedures agreed during the SCM. These included additional communications strategies to ensure accurate and timely coordination between the two centers, requirements for eastbound aircraft unable to climb from FL 410 to 12 600 m to descend to FL 370 before Lashio (LSO) and agreement that both parties would act to ensure strict adherence to the terms of the Operational LOA. The parties also agreed to continue the relationships established between delegates as a result of the SCM, with a view to holding an annual bilateral meeting to discuss ATM issues.

RVSM/TF/26

Operational Considerations

2.59 The RVSM/TF/26 meeting reviewed the readiness of Japan and the ROK to implement RVSM in domestic airspace of the Naha and Tokyo FIRs, and in the Incheon FIR, respectively. The RVSM/TF/26 meeting considered that good progress had been made in order to meet the target date of 29 September 2005.

2.60 Japan advised that transition areas would not be required at or near the FIR boundaries with Russia and China where metric system was in use. Level changes would be effected within domestic airspace making use of radar.

2.61 The ROK informed the meeting that there would be three transition areas with adjacent FIRs. Details of usable RVSM flight levels and transition areas in the Incheon FIR are shown in Paragraph 6 of AIP Republic of Korea.

2.62 Japan reported that strategic lateral offset of 0, 1, 2 NM to the right was applicable in their oceanic airspace, but not in the domestic airspace which were fully covered by radar. In situations when pilots had to deviate from the center line of routes while under the radar control in

order to mitigate wake turbulence, such deviations would be accommodated by ATC upon request as far as traffic permitted.

2.63 The ROK agreed to review the contingency procedures that had been published in the AIP Supplement on 1 July 2005 and issue an amendment.

2.64 The RVSM/TF/26 meeting examined the traffic situation (density and complexity) based on the two switchover times, i.e. 1600 UTC and 1900 UTC, proposed by the ROK and Japan, respectively. Hong Kong, China, advised that during the proposed period, traffic flow within their airspace would be predominantly the northeast bound. Hence, Hong Kong ACC would not expect any significant difficulty to accommodate the change from the conventional vertical separation minimum (CVSM) to RVSM. The RVSM/TF/26 meeting advised that it would be desirable to have a common switchover time in order not to create any misunderstanding or confusion. Japan and the ROK agreed to switchover from CVSM to RVSM at 1900 UTC on 29 September 2005. IATA and IFALPA confirmed that the agreed time was acceptable.

2.65 The RVSM/TF/26 meeting noted that certain procedures, e.g. time and location of altitude changes and radio communication failure, should be agreed with adjacent ACCs for the switchover from CVSM to RVSM on 29 September 2005. Particular attention should be given to the use of specific levels, i.e. FL 310, FL 350 and FL 390, since these levels would be used for east bound traffic in the RVSM environment but for west bound traffic in the CVSM environment.

2.66 Japan and the ROK informed the RVSM/TF/26 meeting that a Trigger NOTAM would be issued on 22 September 2005 in accordance with the ICAO procedure in the *Aeronautical Information Manual* (Doc 8126). The text of the NOTAM would be as follows:

E) TRIGGER NOTAM – PERM AIRAC AIP (AMDT/SUP reference number) EFFECTIVE 1900 UTC 29 SEP 2005 RVSM WILL BE IMPLEMENTED IN (FIR name(s)) FIR(s)

2.67 The Representative of IFATCA reported to the RVSM/TF/26 meeting on agreements made at the IFATCA 9th North East Asia Traffic Management (NEAT/9) Meeting held in Manila on 2-3 June 2005 regarding flight level allocation scheme (FLAS) between the FIRs as well as other issues such as separation reduction proposals and consideration of new parallel route structures to enhance airspace efficiency.

2.68 The RVSM/TF/26 meeting was advised that a State Letter (Ref.: AN 13/13.1-05/37) notifying the adoption of Amendment 43 to Annex 11 was issued on 24 March 2005. The State Letter describes the nature and scope of the amendments to Annex 11. In particular, the RVSM/TF/26 meeting was informed that the Annex 11 amendment introduces a Standard that requires States to establish a monitoring programme for aircraft height-keeping performance in RVSM airspace.

2.69 The RVSM/TF/26 meeting also noted that complementary provisions had been added to Annex 6 which specifies the requirement for all aircraft to hold an approval for operations in RVSM airspace and the responsibility of the relevant State authority with regard to the issuance of these approvals. The height-keeping performance criteria on which the approvals should be based have, until now, been specified only in the *Regional Supplementary Procedures* (Doc 7030) of the regions which have implemented RVSM. For the approvals to be valid globally, it is necessary that all States apply the same criteria when issuing approvals.

Issues Relating to Airworthiness and Approval of Aircraft

2.70 The RVSM/TF/26 meeting reviewed the readiness of aircraft and operators for RVSM operations on domestic and international routes in the Incheon, Naha and Tokyo FIRs. The meeting noted that approximately 76.5% of aircraft being operated in the domestic airspace of Japan were RVSM-approved. Japan expected this figure to exceed 90% in August 2005, as other operators were in the process of obtaining RVSM approval. For Korean national carriers (i.e. Korean Air and Asiana Airlines), 100% had already obtained RVSM approval. Hence, the target of 90% operator approval for the Japan and ROK RVSM implementation would be achieved.

2.71 The RVSM/TF/26 meeting reviewed the Registry and Withdrawal Forms (MAAR Forms F2 and F3) as part of the Global RVSM Aircraft Approval Registry Database. The forms would assist States to verify the status of RVSM approval of aircraft operating in their respective areas. The meeting also highlighted the need for States to provide MAAR with updates on RVSM approvals on monthly basis, no later than the 15th day of the following month. Complete details of RVSM approval registry records were available on the MAAR website (www.aerothai.co.th/maar).

Safety and Airspace Monitoring Considerations

2.72 The RVSM/TF/26 meeting reviewed the result of readiness assessment regarding RVSM implementation in the Incheon, Naha and Tokyo FIRs, and noted that approximately 75% of the aircraft operations in the Japan and ROK airspace where RVSM would be implemented have been conducted by State approved operators and aircraft. Nonetheless, approximately 17% of aircraft operations in the collected TSD were in the process of obtaining the State RVSM approval and were expected to be completed in September 2005, before the planned RVSM implementation date. Therefore, the meeting noted that approximately 92% of aircraft operations would be RVSM-approved by 29 September 2005.

2.73 The RVSM/TF/26 meeting noted that there had been seven LHD occurrences, accounted for the duration of 4.7 minutes from July 2004 up to May 2005. Additionally, in June 2005, there was one LHD occurrence reported by Japan due to incorrect operation associated with the aircraft altimeter system and which accounted for approximately 40 minutes. Such case would not happen in the RVSM environment since the aircraft must operated under the two independent altimetry systems with the difference being within 200 ft.

2.74 In light of the preventive actions taken by Japan and the fact that it was an isolated case, the RVSM/TF/26 meeting agreed that this LHD occurrence could be excluded in the risk calculation. As a result, both technical and total risks were as shown below.

Source of Risk	**Lower Bound Risk Estimation**	**TLS**	**Remarks**
Technical Risk	1.40×10^{-9}	2.5×10^{-9}	Below Technical TLS
Operational Risk	2.43×10^{-9}	-	-
Total Risk	3.83×10^{-9}	5.0×10^{-9}	Below Overall TLS

Risk Estimates for the RVSM Implementation in Japan/ROK Domestic Airspace

2.75 Japan reported that they also had completed pre-implementation safety assessment for the Japanese domestic airspace, based on TSD for a period from January 2003 to December 2003. Since the preliminary assessment report in March 2004 showed that the passing frequencies of some segments of ATS route G581 exceeded the criteria of the Global System Performance Specification, JCAB modified the route structure of G581 on 17 February 2005. As a result, the passing frequency on G581 decreased to at least 40% compared with the figure indicated before the route restructure.

2.76 A pre-implementation safety assessment was conducted, covering from 8 July 2004 to 30 June 2005, and assessed the technical risk and operational risk. The following Table provides estimates of technical risk, operational risk and overall risk, calculated for Japanese domestic airspace.

Source of Risk	Lower Bound Risk Estimation [accidents / flight hour]	TLS [accidents / flight hour]	Remarks
Technical Risk	1.5×10^{-9}	2.5×10^{-9}	Below Technical TLS
Operational Risk	2.6×10^{-9}	-	-
Overall Risk	4.1×10^{-9}	5.0×10^{-9}	Below Overall Risk

Risk Estimates for the RVSM Implementation in the Japan domestic airspace

2.77 MAAR presented information to update the RVSM/TF/26 meeting on the Asia RVSM MMR which had been adopted by MAAR from 1 July 2005. The MMR was identical to the one currently used by PARMO.

2.78 MAAR informed the RVSM/TF/26 meeting of its future direction to continue to provide the safety monitoring services until the 90-day review of the Japan and ROK RVSM implementation. To enable MAAR to complete this task, new TSD would have to be provided for the month of November 2005. The data should be submitted to MAAR no later than 15 December 2005.

2.79 The RASMAG/2 meeting (October 2004) prepared a draft letter highlighting the concerns about the non-submission of safety-related data and requesting the immediate submission of the safety data. Letters of this type were transmitted by the Regional Office during early December 2004 to 13 States of the Asia and Pacific Regions who were identified as not having submitted data in accordance with the requirements of approved RMAs. Whilst many States provided safety data in response to the letter, some States have still not provided suitable data to MAAR.

2.80 The RASMAG/3 meeting agreed that it would be preferable to make a strong recommendation to APANPIRG for their consideration as to the action required. To that end, RASMAG/3 drafted conclusions for presentation to APANPIRG. This statement is recorded below.

2.81 In light of the above, Japan noted at the RVSM/TF/26 meeting that the provisional total risk of 4.90×10^{-9} for the WPAC/SCS area was considered to be high. When considering that the area is vast, it was felt that the risk estimation for the entire area might not be appropriate. Japan suggested that there might be an FIR where risk estimation exceeds the TLS. When the estimated risk exceeds the TLS, remedial action should be taken. From this point, Japan suggested that the risk estimation be conducted for each FIR.

Implementation on 29 September 2005 (Go/No Go Decision)

2.82 Based on the update provided by Japan and the ROK, as well as the safety assessments completed by MAAR, the RVSM/TF/26 meeting agreed to go ahead with the implementation of RVSM in the Incheon, Naha and Tokyo FIRs on 29 September 2005.

3. ACTION BY THE MEETING

3.1 The meeting is invited to

a) note the activities of the RVSM/TF on implementation of RVSM in the Asia Pacific Region;

b) note that the RVSM/TF for the Bay of Bengal and Beyond completed its activities and full RVSM operational capability for the area was declared since RVSM operations were progressing well;

c) address relevant RVSM issues and take appropriate follow-up action;

d) consider the issues raised by the Task Force for further action; and

e) make recommendations to improve the overall management of traffic using RVSM as appropriate.
