INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE FIRST MEETING OF THE ASIA/PACIFIC AIRSPACE SAFETY MONITORING TASK FORCE (APASM TF/1)

BANGKOK, THAILAND, 12 – 14 DECEMBER 2001

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

Adopted by the Task Force
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PART I – HISTORY OF THE MEETING

1. Introduction

1.1 The First Meeting of the Asia/Pacific Airspace Safety Monitoring (APASM) Task Force was held in Bangkok from 12 to 14 December 2001 at the ICAO Asia/Pacific Office.

1.2 The Task Force was established by the twelfth meeting of the Asia/Pacific Planning and Implementation Regional Group (APANPIRG/12) held from 20 to 24 August 2001 at Bangkok to develop an airspace safety system performance monitoring structure and funding mechanism for the Asia/Pacific Region in accordance with ICAO provisions.

2. Attendance

2.1. The meeting was attended by 23 experts from 7 States and 3 International Organizations. A list of participants is at Appendix A to this report.

3. Officers & Secretariat

3.1. Ms. Leslie McCormick, Acting Deputy Manager ATS International Staff, Federal Aviation Administration of the United States acted as Chairperson and presided over the meeting throughout its duration.

3.2. Mr. David J. Moores, Regional Officer ATM, was the Secretary for the meeting. They were assisted by Regional Officers ATM Messrs. John Richardson and Hiroshi Inoguchi, and Regional Officer Flight Safety Captain Roger Mulberge.

4. Opening of the Meeting

4.1. The meeting was opened by Mr. David J. Moores on behalf of Mr. Lalit Shah, Regional Director of the Asia/Pacific Regional Office, who welcomed the participants to Bangkok. Mr. Moores highlighted that APANPIRG/12 had given priority to examining an appropriate regional safety structure and funding mechanism. In view of the schedule for implementation of reduced separation minima and airspace changes in the Asia/Pacific Region, he emphasized that it was highly important that the Task Force completed its work in a timely manner in order to make recommendations to the APANPIRG/13 meeting to be held in September 2002. He looked forwarded to a constructive meeting.

5. Language and Documentation

5.1. All discussions were conducted in English. Documentation was issued in English. A total of 14 Working Papers and 2 Information Papers were considered by the meeting. A list of the Working and Information Papers is at Appendix B.

PART II - REPORT ON AGENDA ITEMS

Agenda Item 1: Adoption of Agenda

1.1 The meeting considered the provisional agenda and included one additional item on financial arrangements. The meeting was of the view that this subject would be a significant part of the Task Force's work and should be dealt with as a separate item. The meeting agreed to the following revised agenda for the meeting:

Agenda Item 1:	Adoption of Agenda
Agenda Item 2:	Review of Terms of Reference and Guiding Principles
Agenda Item 3:	Consider regional airspace safety oversight and system performance monitoring requirements
Agenda Item 4:	Identify the functions of the monitoring services necessary to meet safety goals
Agenda Item 5:	Financial arrangements
Agenda Item 6:	Develop an action plan
Agenda Item 7:	Future Work – Meeting Schedule
Agenda Item 8:	Other Business

Agenda Item 2: Review of Terms of Reference and Guiding Principles

2.1 The APANPIRG/12 meeting under Agenda Item 3 (paragraph 3.76) considered the issues presented to the meeting regarding the Federal Aviation Administration (FAA) of the United States intending to reduce its level of support to the Asia Region for monitoring services carried out by the Asia/Pacific Approvals Registry and Monitoring Organization (APARMO) following the implementation of the reduced vertical separation minimum (RVSM) on the revised South China Sea (SCS) ATS route system scheduled on 21 February 2002. The FAA assured APANPIRG/12 that it would continue to support monitoring activities in the Asia Region until such time as another organization was established and in a position to take over the monitoring responsibilities from the FAA. Also, the FAA would provide support in terms of transfer of knowledge, data, training and any other requirements as resources would allow.

2.2 In light of the foregoing, APANPIRG/12 formulated the following Decision:

Decision 12/44 – Establishment of a Task Force to Develop an Airspace Safety System Performance Monitoring Structure for the Asia/Pacific Region

That, a Task Force be established reporting to APANPIRG to develop an airspace safety system performance monitoring structure and funding mechanism for the Asia/Pacific Region in accordance with ICAO provisions. The composition, guiding principles and Terms of Reference of the Task Force are as shown in the Appendix B to the Report on Agenda Item 3.

2.3 The meeting reviewed the draft Terms of Reference (TOR) and guiding principles established by APANPIRG/12 for the Task Force. In regard to TOR a), the view was expressed that the organization and structure to be developed by the Task Force should have airspace safety as the primary focus. This would be in line with the provisions on ATS safety management in Annex 11, Chapter 2. These provisions require States to establish ATS safety management programmes, which included providing continuous monitoring and regular safety assessment. It was noted that the original wording of the TOR limited the Task Force to establishing a "system performance monitoring organization ". It was suggested that the Task Force should address establishing a "safety monitoring organization" which had a more focused application, and this would better reflect the work of a regional safety monitoring agency. In light of the foregoing, the meeting changed TOR a) and adopted the following TOR:

a) To develop an airspace safety monitoring organization and structure for the Asia/Pacific Region, and to coordinate with other regional monitoring organizations to ensure inter-regional harmonization;

b) To examine requirements of regulatory bodies, operators and service providers;

c) To determine the size and functions of the monitoring services to meet safety goals;

d) To identify the cost of operating monitoring services and requirements for its funding;

e) To address any other matters as appropriate and relevant to establishing an appropriate monitoring system;

f) The Task Force will include participation from all parties concerned; and

g) The Task Force will report to the APANPIRG.

2.4 Additionally, to assist the APASM/TF establish and carry out its work programme, APANPIRG/12 provided the following guiding principles:

a) airspace safety oversight and system performance monitoring requirements to be established in accordance with ICAO provisions;

b) all regional monitoring activities to be integrated in a regional monitoring structure under APANPIRG;

c) a single monitoring agency to be established for an airspace or major traffic flow;

d) States willing to undertake the management of a regional monitoring agency to be capable of providing appropriate support and expertise;

e) the cost of providing monitoring services to be recovered from route charges and used in accordance with ICAO's policies on route charges; and

f) States with the expertise and appropriate resources to be encouraged to provide support and assistance to the regional safety programme.

Agenda Item 3: Consider regional airspace safety oversight and system performance monitoring requirements

3.1 The meeting was presented with information (WP/3) on the ICAO regulatory background to the establishment of safety management programmes for Air Traffic Services. These were provided under the Convention on International Civil Aviation, and in the Standards and Recommended Practices (SARPs) for the provision of Air Traffic Services as specified in Annex 11 to the Convention.

3.2 In regard to Annex 11, the meeting noted that Amendment 40, applicable on 1 November 2001, included provisions on ATS safety management. In Annex 11, Section 2.26, States are required to implement systematic and appropriate safety management programmes to ensure that safety is maintained in the provision of ATS. Further, Annex 11 requires that, as of 27 November 2003, the acceptable level of safety and safety objectives applicable to the provision of ATS shall be established by the State or States concerned. In regard to ATS safety management programmes, these include providing for continuous monitoring and regular assessment of the safety level achieved. The meeting noted that detailed procedures on ATS safety management are contained in the *Procedures for Air Navigation Services — Air Traffic Management*, Part II (PANS-ATM, Doc 4444).

3.3 In light of the above, the meeting noted that Contracting States are required to regulate and manage airspace in a manner consistent with the requirements of the Convention and SARPs. In regard to the establishment of an acceptable level of safety, the meeting recalled that APANPIRG/12 Conclusion 12/41 established a target level of safety (TLS) of 5×10^{-9} fatal accidents per flight hour per dimension for en-route systems in the Asia/Pacific Region, which was in accordance with Annex 11, Attachment B. The meeting emphasized the importance for States who intended to implement reduced separation minima, ensuring that their national regulatory requirements and ATS safety management system met the Annex 11 requirements.

3.4 The meeting was presented with information (WP/5) on the implementation planning schedule (Appendix C refers) of APANPIRG concerning airspace changes requiring airspace system performance monitoring, and organizations responsible for the monitoring agencies. In developing the monitoring structure for the Asia/Pacific Region, the meeting recognized the importance for the Task Force to complete its work in a timely manner to ensure that the implementation programmes for the Asia Region remain on schedule. In particular, the meeting noted that the implementation of RVSM on the revised SCS ATS route system was scheduled on 21 February 2002, and the second phase of the revised ATS route structure Asia to/from Europe, Middle East South of the Himalayas (EMARSSH) was scheduled on 28 November 2002. In view of the information provided to APANPIRG/12 by the FAA that it would continue to support the Asia Region implementation of RVSM until such time as APANPIRG established an alternative monitoring organization, the meeting was assured that there would be no disruption to the implementation planning schedule agreed by APANPIRG.

3.5 The meeting considered (WP/7) regarding a need to identify appropriate States and organizations that would be willing to provide airspace safety monitoring services, and could play a role in the monitoring activities for the Asia Region. It was recalled that at APANPIRG/12, the Aeronautical Radio of Thailand (AEROTHAI) on behalf of the Department of Aviation (DOA) of Thailand, informed the meeting it was willing to assist ICAO with the safety assessment programme for RVSM and other monitoring services as determined by APANPIRG/12. Further, the meeting noted that the following States and organizations were providing monitoring services in the Asia/Pacific Region:

- Pacific and South Pacific, reduced horizontal and vertical separation:

  Australia, Japan, United States, and CSSI Inc (operation of the GPS Monitoring System for RVSM),

- North, Central and South Pacific, FANS Interoperability Team (FIT) (ADS/CPDLC):

  Boeing, Japan, United States

- Asia, reduced horizontal and vertical separation:

  Australia, Singapore, United States

3.6 The meeting was informed that following APANPIRG/12, apart from AEROTHAI and those States and organizations listed above, the Asia/Pacific Regional Office had not received any formal notification from any other State or organization of their interest to undertake airspace safety monitoring services for the Asia Region. A view was expressed that taking into account the diverse geographical nature of the Asia Region and the various implementation projects related to geographical areas, for which a number of States provide air traffic services, the meeting should consider whether other States/organizations may be candidates to play a role in the various monitoring activities. In view of the scheduled implementation of Phase 2 of the EMARSSH project on 28 November 2002, which extends from southeast Asia through west Asia to Europe and the Middle East, India expressed willingness to take responsibility for monitoring services for the Indian FIRs. The meeting agreed that this would be taken into account in the development of the monitoring structure. The meeting expressed its appreciation to India for their interest to participate in a regional airspace safety monitoring organization. Further, the member from Singapore confirmed that the Civil Aviation Authority of Singapore (CAAS) would continue to provide monitoring services including RVSM to the South China Sea area until a decision on the final organizational structure was decided.

3.7 The meeting was informed (WP/10 and WP/11) of the steps taken by AEROTHAI following APANPIRG/12 to develop its airspace safety monitoring organization, which would include providing system performance monitoring for the implementation of RVSM in the Bangkok FIR. The operating expenses to establish the monitoring activities would be funded by AEROTHAI. Also, information was provided on the intended organizational structure, staffing arrangements, training and proposed funding arrangements. In the event that APANPIRG accepted AEROTHAI's offer to provide regional monitoring services, these activities would be incorporated into the existing management structure.

3.8 In terms of staffing arrangement, AEROTHAI had identified the number of staff to support the activities of the APARMO. It is anticipated that a total of 10 staff with computer science, engineering and mathematics background would be able to perform all the operations in areas of safety case assessment and analysis, maintenance of database operation and other administrative functions. However, in the area of airspace safety work, training would be required. AEROTHAI intended to seek training and transfer of technical know-how from the FAA once the decision was taken by the Task Force to identify the role AEROTHAI could undertake in the monitoring structure. The meeting commended AEROTHAI on the initiative they had taken to put a safety management structure in place, and for their willingness to support the regional monitoring activities. The meeting considered that, as this was the first meeting, and a recommendation on the structure and organization for a regional monitoring agency was required for APANPIRG/13 in September 2001, it was too soon to decide on what States and/or organizations should be assigned the various roles. However, in view of the time required for AEROTHAI to complete its preparation and train its personnel, the meeting, in principle, considered that AEROTHAI would likely be given a role in the proposed regional structure, and should continue to put in place the necessary arrangements.

3.9 The meeting considered various scenarios to organize the Asia/Pacific monitoring structure: geographical, major traffic flows, route systems, specialized by function (RVSM, automatic dependent surveillance (ADS)/controller-pilot data link communications (CPDLC), horizontal separation minima, etc). Also, the meeting considered various options on how to establish a managerial hierarchy for

the airspace safety monitoring organization. In this regard, the meeting formed a drafting group to develop a detailed description of the monitoring functions to be carried out. The group developed a matrix (Appendix D refers) of the systems requiring monitoring as listed below, and this could be used to define the monitoring functions to be carried out by the Asia/Pacific Regional Monitoring Agency (RMA). Members were requested to further define and develop this matrix for discussion at the next meeting. The meeting noted that the systems listed below were not all inclusive but reflected those systems currently implemented at this stage of CNS/ATM systems implementation. The matrix would need to be updated as new systems were implemented.

Systems requiring monitoring:

- separation: RVSM and RNP
- ADS-B and ADS-C
- CPDLC
- weather

3.10 The meeting considered that, while it was not possible at this stage to describe the structure of the monitoring organization in detail, examples of possible structures were developed (Appendix F refers). There was consensus that a core management team should be established to oversee regional monitoring. The meeting envisaged that this core management team could fulfill some of the duties of a RMA.

3.11 The meeting was informed by the member from Fiji that following the civil aviation restructuring (1999), Airports Fiji Limited had implemented a safety management system with the assistance of Australia for its oceanic EUROCAT 2000X system that will be commissioned at the end of December 2001. It has developed a safety case, safety management plan (data and software) and a safety plan. It was suggested that the Fiji experience could provide a useful example for other States intending to carry out a similar exercise. Details of the process followed by Fiji could be made available at the next meeting if required. The member from India also advised the meeting that Airports Authority of India had put in place an ATS safety management programme, which had been operating for the last 3 years.

3.12 The meeting considered (WP/14) the process that had been employed to provide RVSM aircraft height-keeping performance monitoring services in three ICAO regions, the North Atlantic, Asia/Pacific and Europe. In order to implement RVSM in the Asia/Pacific Region, a process was developed to provide the required aircraft height-keeping performance monitoring necessary for safety assessment and safety oversight. As there was no existing regional financing mechanism to provide monitoring services to operators, the International Air Transport Association (IATA) offered to assist with the financing arrangements. IATA developed the fee for service concept of cost recovery of monitoring services. This process was later employed in both the North Atlantic and Middle East to provide monitoring services for RVSM implementation in these regions.

3.13 The process that had been used to provide monitoring services in the three regions can be described in the following six steps:

a) the Regional Planning Group or RVSM Task Force determined the need for regional aircraft height-keeping performance monitoring;

b) the Regional Planning Group or RVSM Task Force identified and obtained the use of monitoring assets;

c) the Regional Planning Group or RVSM Task Force engaged IATA to assist in the provision of monitoring services;

d) IATA received tenders or proposals from organizations capable of providing services for the technical and logistics support of the GMS manager, the FAATC;

e) the airlines, through the IATA Regional Coordinating Group (RCG) selected monitoring service providers; and

f) IATA assisted the monitoring service provider with billing and collection services.

3.14 The meeting was invited to consider this process for applicability to other safety management requirements. The meeting noted the information, and this would be taken into account in the development of an airspace safety monitoring structure and organization for the Asia/Pacific Region.

3.15 The meeting was informed (IP/1) of the means by which the FAA Technical Center discharged the duties and responsibilities (Appendix G refers) of the APARMO, the APANPIRG-endorsed safety oversight function carried out in connection with introduction and continued safe use of RVSM. The meeting noted that the list of APARMO duties and responsibilities included requirements to assemble and archive State RVSM approvals for operators and aircraft using RVSM airspace within the Asia Pacific Region, administer the Regional height-keeping performance monitoring system, collect and archive reports of any 300-ft or greater magnitude errors along with the results of investigating the causes of such errors, exchange approvals data with other regional monitoring agencies, inspect the State approval status of aircraft and operators using Asia Pacific region airspace where the RVSM is applied, update and communicate to operators and States any changes in monitoring requirements, and provide appropriate analyses to Asia Pacific Region decision makers. Detailed information was provided on the functions carried out at the FAA Technical Center in order to meet these requirements and provided associated staffing levels. The meeting noted this information and agreed that it should be taken into account in Task Force deliberations.

3.16 The meeting was informed (IP/2) that the FANS Interoperability Team (FIT) was formed in July 1997 as a sub-group of the Informal South Pacific ATS Coordinating Group (ISPACG) to oversee the problem reporting and end-to-end system performance monitoring processes for CPDLC. These processes were designed to ensure that the FANS-1/A system in the South Pacific met its performance and interoperability requirements and to confirm that operations and procedures worked as planned. The FIT has the following monitoring responsibilities:

Problem Identification and Resolution

a) Reviewing problem reports, and determining appropriate resolution;

b) Identifying trends;

c) Developing interim operational procedures to mitigate the effects of problems until such time as they are resolved.

d) Monitoring the progress of problem resolution; and

e) Preparing summaries of problems encountered and their operational implications.

System Performance Validation

a) Determining and validating system performance requirements;

b) Assessing system performance based on information in monthly reports provided by the Central Reporting Agency (CRA);

c) Authorizing and coordinating system testing;

d) Identifying accountability for each system element. Developing, documenting and implementing a quality assurance plan that will provide a path to a more stable system; and

e) Identifying configurations of the end-to-end system that provide acceptable data link performance, and ensuring that such configurations are maintained by all stakeholders.

Reporting

a) Providing annual summary reports to and soliciting feedback from ISPACG; and

b) Forwarding reports to other interested industry teams.

3.17 In order to perform the daily monitoring, coordination, testing, and problem research tasks, the FIT enlisted the help of a dedicated sub-team, called the Central Reporting Agency (CRA).

3.18 The meeting noted that the CRA has two main components: dedicated staff and adequate tools. Staffing requirements vary depending on the amount of airspace, operating procedures, number of airlines, number of different airborne equipment variants, number of air traffic service providers, number of different ground equipment variants and number of network service providers supported by the CRA. The CRA supporting the South Pacific FANS-1/A operation averaged approximately three persons full time for the first four years. The level of support was reduced as the system stabilized. Coordination is also a major function of the CRA. In the pursuit of problem resolution, action item resolution, monitoring, and testing, issues arise which require coordination among many stakeholders. The CRA has the primary responsibility to provide this coordination function.

3.19 The CRA must be able to simulate an ATS ground station to the extent of exercising all combinations and ranges of CPDLC uplinks and ADS reports. The CRA must also have access to airborne equipment. For the airborne side, a test bench is adequate, however, engineering simulators that can be connected to either the ARINC or SITA network offer additional capability. In support of the data link audit analysis task, the CRA must have software that can decode data link service provider audit data and produce usable reports.

3.20 The meeting recognized that monitoring of CPDLC/ADS system performance was more complex than the performance monitoring required for the application of reduced separation minima. These systems require end-to-end performance monitoring of interrelated airborne and ground systems, as well as services provided for ATS and communications. The meeting recognized the importance of this work to support the implementation of these systems by ATS Providers and users to obtain benefits such as reduction of separation minima, flexible route planning, and more efficient air traffic management. The integration of these activities into an airspace safety monitoring organization and the associated costs would need to be addressed in greater detail.

Agenda Item 4: Identify the functions of the monitoring services necessary to meet safety goals

4.1 The meeting was provided with information (WP/6) on ICAO guidance and reference material related to airspace system performance monitoring, which could form part of a package of

material to be developed by the Task Force to assist States establish and operate monitoring services. The material included collision risk models developed by the Separation and Airspace Safety Panel (SASP), formerly named the Review of the General Concept of Separation Panel (RGCSP), for the derivation of ICAO 30 NM and 50 NM lateral and longitudinal separation minima. These models were approved by the Air Navigation Commission for inclusion in the *Manual on Airspace Planning Methodology for the Determination of Separation Minima* (Doc 9689). Further, these models contained the performance parameters and requirements for navigation and communication systems necessary for airspace planners to implement the separation minima. Also, the meeting was informed that the *Manual on 300 m (1 000 ft) Vertical Separation Minima Between FL 290 and FL 410 Inclusive* (Doc 9574) had been revised by RGCSP/10 (May 2000) and new material had been provided on establishing safety objectives and monitoring. The second edition of Doc 9574 had not yet been published by ICAO. The meeting noted the information and would consider the documentation that should be developed by the Task Force. However, it was felt that this was not a high priority item, although, it was recognized that collating relevant material in a document would be of assistance to States. The Secretary indicated that this task would be continued to the extent possible.

4.2 The meeting reviewed (WP/9) considerations relating to development of a policy for long-term monitoring of aircraft height-keeping performance as part of global and regional RVSM safety oversight, which were presented in WP/31 to the SASP WG/A meeting at Montreal (29 October – 9 November 2001). The SASP working paper proposed, among other items, a series of requirements, which should be satisfied by any RMA processing aircraft height-keeping performance monitoring results in connection with RVSM safety oversight. The meeting noted that these requirements addressed three areas of RMA activity: 1) technical competence in developing and using monitoring results; 2) sharing such results with other RMAs; and 3) communicating these results to bodies initiating actions in light of them. In the area of technical competence, the meeting noted that the working paper called for an RMA to be capable of identifying operators and aircraft within the Region which would require monitoring, providing an adequate monitoring system for Regional use, archiving monitoring results, and conducting analyses using such results for use within the Region. With regard to pooling monitoring results with other RMAs, it was required that an RMA be capable of exchanging results with other RMAs, accumulating results from other Regions which would be pertinent to safety oversight within the Region and using such results appropriately in Regional analyses. In third area – communicating with bodies needing monitoring results in order to initiate actions – the meeting noted that the working paper called for an RMA to be capable of forwarding monitoring results to appropriate State authorities and notifying specialist groups and aircraft manufacturers when inadequate performance was observed.

4.3 The meeting then considered information (WP/12) presented by EUROCONTROL in WP/34 to the SASP WG/A (WP/34) meeting in Montreal, which addressed the need for long-term monitoring in connection with continued safe use of the RVSM. The meeting noted that WP/34 addressed major issues regarding the performance of State RVSM-approved aircraft observed in EUROCONTROL monitoring results. These issues included the inadequate performance relative to RVSM group height-keeping performance requirements evidenced by certain aircraft types, which had received RVSM airworthiness approval from State authorities, the unexpectedly wide variation in performance of certain aircraft types from operator to operator, and the apparent wide variation in performance of individual airframes on a day-today basis. The meeting agreed that such evidence warranted continued monitoring of aircraft height-keeping performance until causes of the undesirable results could be determined. The meeting would continue to coordinate with the SASP on these and other issues related to airspace safety monitoring.

4.4 The meeting further noted (WP/8) that the SASP WG/A had agreed to a set of common principles, which should underlie the work of any RMA when administering a safety oversight program in connection with RVSM application. These principles address both the technical aspects of estimating and archiving performance-related measurers as well as establishing and using communications channels to other RMAs and other bodies. These principles are:

1) common interpretation and application of height monitoring results relative to performance requirements;

2) common procedures to be followed in approaching aircraft manufacturers, operators and State Authorities as the result of observed height-keeping performance;

3) common interpretation of the relationship between RVSM approval process and height-keeping performance monitoring requirements;

4) use of a common methodology for setting monitoring targets (for example, percentage of airframes of a given type which must be monitored so that an operator satisfies minimum monitoring requirements);

5) common set of aircraft groups as basis for application of monitoring targets;

6) maintenance of a database of relevant safety oversight information satisfying minimum content requirements;

7) periodic exchange of State approvals, height-keeping performance monitoring results and other relevant data with other RMAs;

8) notification to other RMAs of any special Regional decisions affecting administration of safety oversight (for example, broadcast of a change in Regional minimum monitoring requirements);

9) common performance specification and application of monitoring infrastructure to ensure common interpretation of monitoring results and use in safety assessments;

10) common procedures to apply to checks on approval status of operators and aircraft operating in RVSM airspace;

11) common methodology in conducting safety assessments i.e. technical risk meeting the TLS of 2.5×10^{-9}; and

12) common notification procedures for State authorities to inform RMAs about RVSM approval information.

4.5 The meeting noted that comprehensive information had been provided to the Task Force on the duties and responsibilities for RVSM monitoring, however, the meeting identified a need to develop similar material for monitoring of horizontal separation and other systems implemented for safety critical operations.

Agenda Item 5: Financial arrangements

5.1 The meeting was presented with information (WP/4) on ICAO policies for the recovery of costs for the provision of air navigation services contained in *ICAO's Policies on Charges for Airports and Air Navigation Services* (Doc 9082). These policies include a set of principles (Doc 9082, Part III, paragraph 41 refers) to be followed when establishing a system for charging for air navigation services. Detailed information on air navigation services economics is contained in the *Manual on Air Navigation Services Economics* (Doc 9161). In this regard, the meeting noted the information on the ICAO Denmark/Iceland agreement, which provided a means to obtain funding for the North Atlantic monitoring

programme (further information is provided in paragraph 5.3 a) below). Also, Doc 9161 provides information on the EUROCONTROL funding mechanism.

5.2 In regard to States recovering the cost of ATS safety management programmes, which include system performance monitoring, the meeting noted that this is a State regulatory requirement under Annex 11 (Chapter 2, 2.26 refers). In this regard, ICAO policies on charges for the provision of air navigation services, allows for the providers of these services to recovery their share of related cost by user charges, including the cost of ATS safety management programmes. The meeting recognized that determining an appropriate level of user charges for airspace safety monitoring was an important issue requiring more detailed examination, which could not be completed at this meeting. The member from IATA stated that they fully supported the principle of States recovering the cost of providing safety services through user charges. However, it was important that such charges were transparent and reasonable. The meeting agreed that members should look into this matter further and obtain information from their organizations on how such charges were determined. Further, the meeting noted that some States do not levy user fees and the provision of air navigation services was government funded.

5.3 The meeting was informed (WP/13) of a review of potential financing mechanisms with respect to the continuation of the FANS CRA, as presented at the 15th meeting of the Informal South Pacific ATC Coordinating Group (ISPACG/15) held at Honolulu on 2-3 February 2001. Four options had been considered as follows:

a) joint financing agreement among appropriate ATS Providers to fund the CRA and management oversight functions. This type of arrangement could be administered by ICAO, or set up as an agreement directly between two States as described in Doc 9161. The funding base for this type of arrangement could be user fee based or direct contributions from the respective ATS Providers. A similar arrangement was put in place to jointly finance North Atlantic RVSM Height Monitoring;

b) financing through stakeholders to support Boeing's FIT/CRA role. The FANS stakeholders consist of Boeing, Airbus, ARINC, SITA, and INMARSAT. Equitable contributions from each stakeholder could be pooled and supplied to Boeing through a contract. Some subset of this group may be appropriate (such as the data link communication service provider) to administer this financing mechanism;

c) financing sponsored by IATA as part of the existing ATC billing mechanism. IATA would then contract with the appropriate organization; and

d) financing through a designated ATS Provider. The designated ATS Provider would contract with the appropriate organization for FIT/CRA activities for a particular Region or area.

5.4 The meeting discussed the merits of the various options but considered that it would be necessary first to describe in greater detail the functions, as well as the duties and responsibilities of the Asia/Pacific airspace safety monitoring organization before determining an appropriate financing arrangement.

Agenda Item 6: Develop an action plan

6.1 The meeting reviewed a draft action plan (Appendix E) to progress the work of the Task Force, and agreed that a clear description of the tasks that applied to each function should be developed. The meeting appreciated the offer made by the member from IATA to prepare a draft business case. Work on developing the business case would be done by correspondence before the next meeting. In regard to

the development of documentation for the airspace safety monitoring organizations, it was not considered to be a high priority by the Task Force. However, the Secretary offered to provide this material if it is required.

Agenda Item 7: Future Work – Meeting Schedule

7.1 The Task Force considered that at least two further meetings would be required. Provisions for a fourth meeting to be convened prior to APANPIRG/13 (date to be determined) will be made to finalize any outstanding issues. The following schedule was agreed:

TF/2	5-8 March 2002 (Bangkok)
TF/3	22-24 July 2002 (Bangkok)
TF/4	August/September 2002, if required

7.2 The member nominated by the United States offered to host the TF/3 meeting in Honolulu. The meeting appreciated the offer made by the United States, however, the meeting was informed that due to budgetary considerations, not all members were able to obtain the funding to attend. The meeting agreed to hold the TF/3 meeting at the Bangkok Regional Office.

7.3 The meeting recognized that the CNS/ATM/IC/SG/9 meeting was scheduled to be held 4-8 March 2002. It was agreed that it would be beneficial to report on the progress of the Task Force to CNS/ATM/IC/SG/9. In order to accommodate both meeting schedules, the meeting recommended that the tentative date for the CNS/ATM/IC/SG/9 meeting be changed from 4-8 March to 11-15 March 2002. After co-ordination with the ICAO Regional Office, members would be informed of the meeting dates.

Agenda Item 8: Other business

8.1 The meeting voiced its appreciation and thanks to the Chairman for her efforts in leading the meeting.

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LIST OF WORKING PAPERS (WPS) and INFORMATION PAPERS (IPS)

WORKING PAPERS

WP No.	Date	Agenda Item	Presented by	Subject
1	12/12/01	1	Secretariat	Provisional Agenda
2	12/12/01	2	Secretariat	Draft Terms of Reference and Guiding Principles Provided by APANPIRG/12 for the APASM/TF
3	12/12/01	3	Secretariat	Safety Management – Regulatory and Legal Framework
4	12/12/01	3	Secretariat	Financial Arrangements for Establishing a Regional Monitoring Agency
5	12/12/01	3	Secretariat	Information on the Implementation Schedule of Airspace Changes requiring Airspace System Performance Monitoring
6	12/12/01	4	Secretariat	ICAO Guidance and Reference Material related to Airspace System Performance Monitoring
7	12/12/01	3	Secretariat	Identify States/Organizations to Undertake Airspace System Performance Monitoring Activities for the Asia Region
8	12/12/01	3	Secretariat	Excerpt from the Separation and Airspace Safety Panel (SASP) Second Meeting of Working Group A Relating to Monitoring Requirements in Support of Reduced Vertical Separation Minima
9	12/12/01	4	Secretariat	Considerations Relating to Development of a Policy for Long-term Monitoring of Aircraft Height-keeping Performance as Part of Global and Regional Reduced Vertical Separation Minimum (RVSM) Safety Oversight
10	12/12/01	3	Thailand	Proposal for Future Airspace System Performance Monitoring Arrangements for the Asia/Pacific Region
11	12/12/01	3	Thailand	Progress on the Establishment of a Regional Monitoring Agency for Asia Region
12	12/12/01	4	Secretariat	Long Term Monitoring Requirement and Organization
13	12/12/01	3	United States	Funding Issues with Respect to the FANS Central Reporting Agency
14	12/12/01	3	United States	Provision of Regional RVSM Aircraft Height-Keeping Performance Monitoring Services

INFORMATION PAPERS

IP No.	Date	Agenda Item	Presented by	Subject
1	12/12/01	3	United States	Asia/Pacific Registry and Monitoring Organization (APARMO): Description of Functions and Allocated Resources
2	12/12/01	3	United States	Terms of Reference for the FANS Interoperability Team and the Central Reporting Agency in Support of Global FANS 1/A Implementation

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SCHEDULE OF APANPIRG IMPLEMENTATION PLANNING FOR REDUCED HORIZONTAL SEPARATION MINIMA BASED ON RNP

Route System PROJECT	AREA CONCERNED	SEPARATION MINIMA/RNP	IMPLEMENTATION DATE	MONITORING ORGANIZATION
North Pacific (NOPAC)	Anchorage, Tokyo Oceanic, FIRs	50 NM/RNP 10	23 April 1998	APARMO-FAA
Tasman Sea	Brisbane, Auckland FIRs	50 NM/RNP 10	23 April 1998	Airservices Australia
Central Pacific (CENPAC)	Oakland, Tokyo Oceanic FIR	50 NM/RNP 10	3 December 1998	APARMO-FAA
Central East Pacific (CEPAC)	Oakland Oceanic FIR	50 NM/RNP 10	24 February 2000	APARMO-FAA
South China Sea (SCS) revised ATS route structure	Sanya AOR, Bangkok. Hanoi, Ho Chi Minh, Hong Kong, Jakarta, Kuala Lumpur, Manila, Singapore, Vientiane FIRs	60 NM/RNP 10	1 November 2001	Civil Aviation Authority of Singapore
EMARSSH Phase 1	Australia/New Zealand to Southeast Asia	50 NM/RNP 10	29 November 2001 (Australia) 27 December 2001 (Indonesia, Malaysia)	Airservices Australia
EMARSSH Phase 2	West Asia to MID Region	50 NM/RNP 10	28 November 2002	TBD

ASIA/PACIFIC REGION RVSM IMPLEMENTATION PLAN STATUS REPORT

Updated at RVSM/TF/12

FIR/AOR	RVSM Implementation Date	Comments
PACIFIC		
Port Moresby	13 Apr 2000	
New Zealand (Domestic)	13 July 2000	Non-exclusive
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	
Brisbane	24 Feb 2000	Oceanic East of Australia 24 Feb 2000 Remainder of FIR 1 Nov 2001
Honiara	24 Feb 2000	
Nauru	24 Feb 2000	
Nadi	24 Feb 2000	
Naha	24 Feb 2000	Pacific Oceanic (non-exclusive RVSM airspace) Further phased implementation planned
Oakland Oceanic	24 Feb 2000	
Tahiti	24 Feb 2000	Non-exclusive RVSM airspace
Tokyo	24 Feb 2000	Oceanic
Melbourne	22 Mar 2001	
ASIA		
Bali	21 Feb 2002	Phased implementation
Bangkok	21 Feb 2002	Phased implementation
Hanoi	21 Feb 2002	Phased Implementation
Ho Chi Minh	21 Feb 2002	Phased Implementation
Jakarta	21 Feb 2002	Phased implementation

FIR/AOR	RVSM Implementation Date	Comments
Kota Kinabalu	21 Feb 2002	
Kuala Lumpur	21 Feb 2002	Phased Implementation – Western part 27 Nov 2003
Manila	21 Feb 2002	
Phnom Penh	21 Feb 2002	
Singapore	21 Feb 2002	
Taegu	21 Feb 2002	
Taibei	21 Feb 2002	
Ujung Pandang	21 Feb 2002	Phased implementation
Hong Kong	31 Oct 2002	
Sanya AOR	31 Oct 2002	N892 within the oceanic airspace of Sanya AOR on 21 February 2001
Biak	Not applicable	Subject to Indonesia upper airspace consolidation
Beijing		
Guangzhou		
Kathmandu	TBD	
Kunming		
Lanzhou		
Male		
Pyongyang		
Shanghai		
Shenyang		
Ulaan baatar		
Urumqi		
Vientiane	TBD	

FIR/AOR	RVSM Implementation Date	Comments
Wuhan		
Yangon		
WEST ASIA - EMARSSH		
Calcutta	27 Nov 2003	
Chennai	27 Nov 2003	
Colombo	27 Nov 2003	
Delhi	27 Nov 2003	
Dhaka	27 Nov 2003	
Karachi	27 Nov 2003	
Lahore	27 Nov 2003	
Mumbai	27 Nov 2003	

MATRIX OF SYSTEMS TO BE MONITORED

	Separation								
	Vertical			Horizontal					
	RVSM			RNP	CPDLC	ADS-B	ADS-C		Weather
	Pac	SCS	BoB						
Management									
Registration									
Data Collection									
Collation									
Analysis									
Reporting									
Support Tasks									

APASM/TF ACTION PLAN

ID	Description	Start	Finish	Resource Names
1	Examine requirements of regulatory bodies, operators and service providers	12-Dec-01	8-Mar-02	Task Force
~~2~~	~~Review ICAO documentation on regulatory and legal framework~~	~~12-Dec-01~~	~~14-Dec-01~~	~~Task Force~~
3	Identify the duties and responsibilities of organizations currently monitoring separation and other safety critical systems	12-Dec-01	8-Mar-02	Task Force
4	Clearly describe airspace monitoring requirements in accordance with ICAO provisions	12-Dec-01	8-Mar-02	Task Force
5	Follow the development of ICAO Separation and Airspace Safety Panel guidance as it relates to regional monitoring agencies	12-Dec-01	Ongoing	Task Force
6	Develop the organization and structure of an airspace safety monitoring organization for the Asia/Pacific Region	12-Dec-01	8-Mar-02	Task Force
7	Identify States/agencies to provide monitoring services	12-Dec-01	8-Mar-02	Task Force
8	Develop system monitoring matrix to identify initial functions and tasks of airspace safety monitoring organizations	13-Dec-01	8-Mar-02	Task Force
9	Develop a business plan for the airspace safety monitoring organization	14-Dec-01	5-Mar-02	IATA, Task Force
10	Identify responsibilities for States to provide data to the airspace safety monitoring organization	14-Dec-01	8-Mar-02	Task Force
11	Establish a core management team to oversee regional airspace safety monitoring	14-Dec-01	8-Mar-02	Task Force
12	Determine the size and functions of the monitoring services to meet safety goals	12-Dec-01	24-Jul-02	Task Force
13	Obtain terms of reference, size and functions of current monitoring organizations	12-Dec-01	8-Mar-02	
14	Integrate all regional monitoring activities in a regional monitoring structure under APANPIRG	12-Dec-01	1-Sep-02	Task Force
15	Determine responsibility and coverage of monitoring agency (Regional, by State, by function, or major traffic flow)	12-Dec-01	8-Mar-02	Task Force
16	Determine appropriate support and expertise	12-Dec-01	8-Mar-02	States undertaking RMA responsibilities
17	Identify the cost of operating monitoring services and system for its funding	12-Dec-01	1-Sep-02	Task Force
18	Identify methods of collecting charges from ANS charges for providing monitoring services in accordance with ICAO policies	12-Dec-01	24-Jul-02	States undertaking RMA responsibilities
19	Obtain information on the cost of performing current monitoring services	14-Dec-01	8-Mar-02	States/organizations performing monitoring activities
20	Examine information to determine an appropriate level of user charges for airspace safety monitoring	14-Dec-01	24-Jul-02	Task Force
21	Coordinate with other regional monitoring organizations to ensure inter-regional harmonization of charges for ANS	14-Dec-01	Ongoing	ICAO, Task Force Chairperson
22	Provide support and assistance to the regional safety oversight programme	14-Dec-01	Ongoing	Australia, Japan, US, Singapore, Boeing, CSSI
23	Encourage current States/agencies providing airspace safety monitoring services to share technology and information	14-Dec-01	Ongoing	Australia, Japan, US, Singapore, Boeing, CSSI
24	Consider the need to develop documentation for airspace safety monitoring organizations (collision risk models, ICAO guidance, etc)	14-Dec-01	8-Mar-02	Australia, Japan, US, Singapore, Boeing, CSSI, ICAO

APASM/TF ACTION PLAN

ID	Description	Start	Finish	Resource Names
25	Address any other matters as appropriate and relevant to establishing an appropriate monitoring system	12-Dec-01	Ongoing	Task Force
26	Report progress to the APANPIRG	11-Mar-02	30-Sep-02	Task Force
27	Report progress to CNS/ATM/IC/SG/9	11-Mar-02	15-Mar-02	Task Force Chairperson
28	Report progress to ATS/AIS/SAR/SG/12	17-Jun-02	21-Jun-02	Task Force Chairperson
29	Report progress to CNS/MET/SG/6	15-Jul-02	19-Jul-02	Task Force Chairperson
30	Make final recommendations to APANPIRG/13	1-Sep-02	30-Sep-02	Task Force
31	APASM/TF/1 (Bangkok)	12-Dec-01	14-Dec-01	
32	APASM/TF/2 (Bangkok)	5-Mar-02	8-Mar-02	
33	APASM/TF/3 (Bangkok)	22-Jul-02	24-Jul-02	
34	Determine requirement for APASM TF/4	22-Jul-02	24-Jul-02	

DUTIES AND RESPONSIBILITIES OF APARMO

The Asia/Pacific Approvals Registry and Monitoring Organization (APARMO) has the following duties and responsibilities:

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

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

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

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

e) to assume overall responsibility for:

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

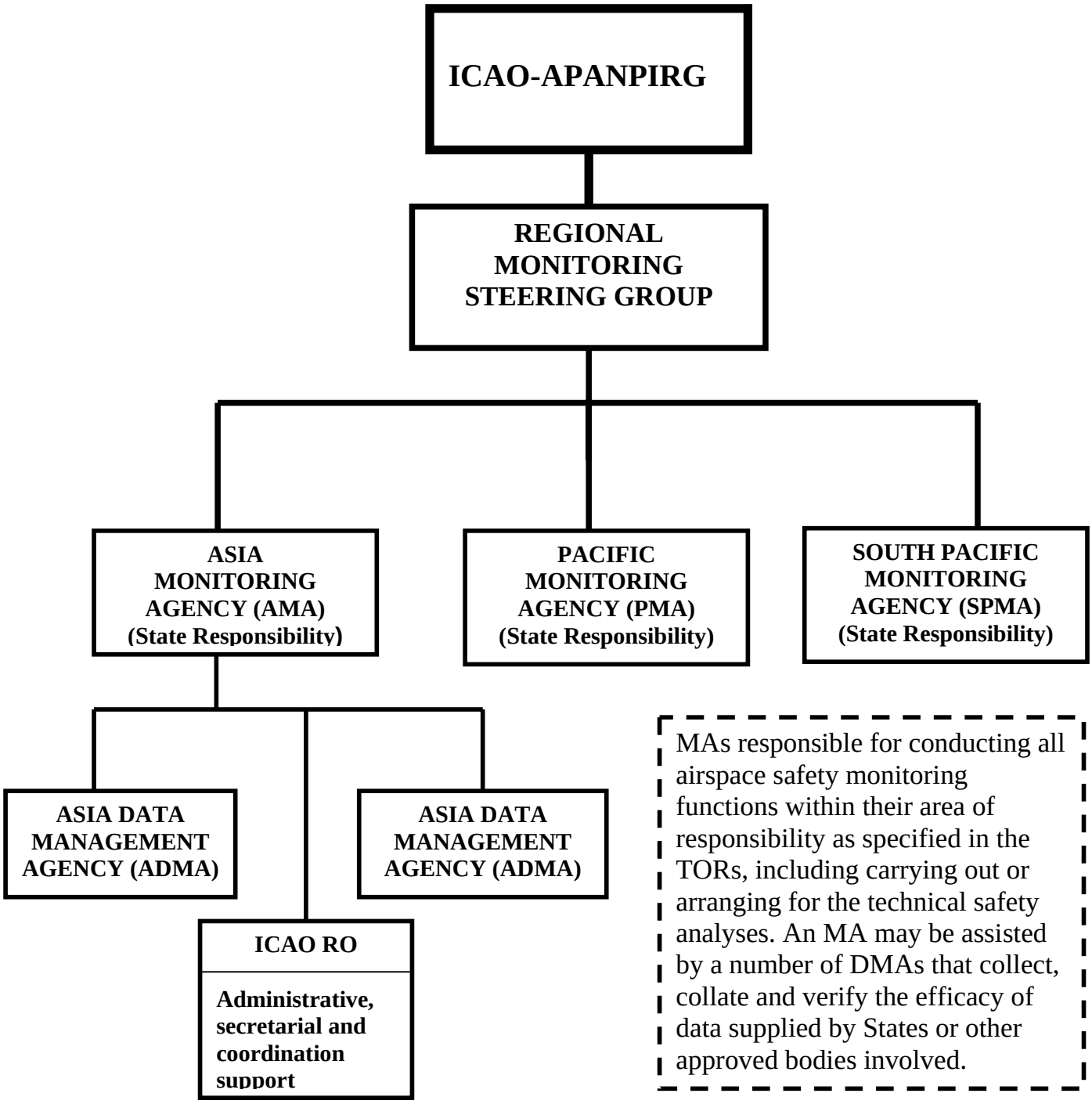
   ii) assessing compliance of operators and aircraft with RVSM height-keeping performance requirements

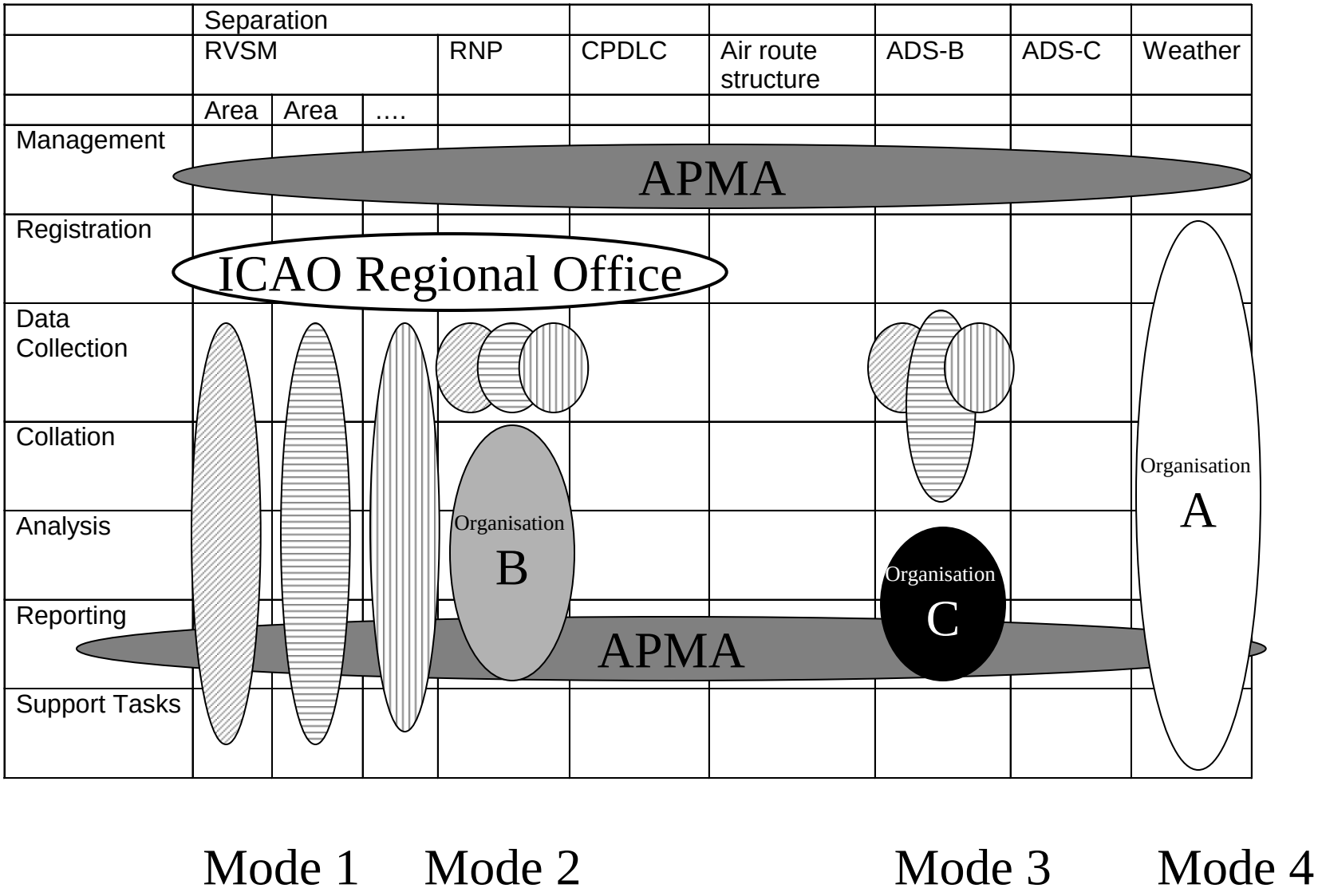
   in conjunction with RVSM introduction in the Asia/Pacific Region;

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

g) to develop the means for summarizing and communicating the content of relevant data bases to ICAO RVSM Task Force decision makers for use in agreeing on the timing and extent of RVSM application within the airspace under their administration.

ICAO PROPOSED STRUCTURE FOR AN ASIA/PACIFIC MONITORING ORGANIZATION





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