



*International Civil Aviation Organization*

**Fourteenth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/14)**

Bangkok, Thailand, 4 to 8 August 2003

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**Agenda Item 2.1:      ATS/AIS/SAR Matters**

**THE ASIA PACIFIC AIRSPACE SAFETY MONITORING TASK FORCE DEVELOPMENT  
OF A REGIONAL AIRSPACE SAFETY MONITORING ADVISORY SUB-GROUP**

(Presented by the Secretariat)

**SUMMARY**

This paper presents an update on progress by the APASM Task Force to establish a regional airspace safety monitoring organization and funding arrangements as requested by APANPIRG.

**1.      INTRODUCTION**

Report of the Asia/Pacific Airspace Safety Monitoring Task Force (APASM/TF)

1.1            The APANPIRG/12 (Conclusion 12/44) established the APASM/TF to develop an airspace safety system performance monitoring structure for the Asia/Pacific Region. APANPIRG/13 (Conclusion 13/45 refers) reviewed progress by the APASM/TF and agreed to continue the work of the Task Force, with its final report and recommendations to be presented to APANPIRG/14 in August 2003.

1.2            The Task Force met four times since its activities were reported to ATS/ASI/SAR/SG/12 (June 2002):

TF/3    22 – 24 July 2002, Bangkok, Thailand

TF/4    9 – 12 December 2002, Bangkok, Thailand

TF/5    24 – 26 February 2003, Bangkok, Thailand

TF/6    5 – 7 May 2003, Honolulu, Hawaii, U.S.A.

**2.      DISCUSSION**

Organizational arrangements

2.1            The Task Force initially developed a plan to establish a Regional Airspace Safety Monitoring Agency (RASMA), which would operate as a business entity fully funded by user

**PLAN FOR THE  
REGIONAL AIRSPACE SAFETY MONITORING ADVISORY  
SUB-GROUP (RASMA/SG)**

**Prepared  
by the  
APASM Task Force**

7 May 2003

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## **1. INTRODUCTION**

1.1 The concept of establishing a regional airspace safety monitoring agency was first addressed at the Eighth Meeting of the Asia Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) Communications, Navigation, Surveillance and Air Traffic Management Implementation Co-ordination Sub-Group (CNS/ATM/IC/SG/8), held in Bangkok, Thailand, 30 July to 3 August 2001. The Twelfth Meeting of the APANPIRG, held in Bangkok, Thailand, 20 – 24 August 2001 discussed the arrangements necessary to meet the safety requirements for future regional airspace planning, implementation and operation of reduced separation minima, communications, navigation, surveillance and air traffic management (CNS/ATM) systems and related airspace changes.

1.2 Many States and organizations have been undertaking airspace safety monitoring activities in the Asia Pacific (APAC) Region, resulting in a technological and geographical diversity of the necessary safety monitoring organizational scenarios. APANPIRG recognized that it was necessary to give priority to examining in detail the necessary arrangements to establish an appropriate regional airspace safety monitoring structure and funding mechanism to centralize and harmonize the various monitoring activities. To undertake this work, APANPIRG/12, under Conclusion 12/44, established the Asia Pacific Airspace Safety Monitoring Task Force (APASM/TF).

1.3 The APASM/TF considered various arrangements to establish a regional airspace safety monitoring structure and to centralize monitoring activities. The Task Force recognized that States are responsible for the safety of the airspace under their responsibility, and in accordance with the provisions of Annex 11, States are required to provide the necessary safety services including monitoring of the airspace. Within the APAC Region, airspace safety monitoring requirements and the establishment of airspace safety monitoring organizations are provided for under the APANPIRG implementation plans for application of reduced vertical separation minimum (RVSM) and ATS data link services. Accordingly, various States responsible for the international airspace in the APAC Region provide airspace safety monitoring services. It was further recognized that in the future, States would establish the necessary airspace safety monitoring services required for implementation of new separation standards and technologies.

1.4 The APASM/TF agreed that these State operated monitoring services required centralized coordination and harmonization. In order to ensure that agreed regional safety levels are being met on an ongoing basis, it was desirable to establish a body that could review and assess the results of the various airspace safety monitoring agencies and report this information to ICAO.

1.5 Without the cost-effective availability of airspace safety monitoring and evaluation services, the region may be unable to sustain the current pace of development of airspace efficiencies and communications services. These services form an essential part of the international airspace operational management and require adequate operational funding.

1.6 The APASM/TF initially developed a plan to establish a Regional Airspace Safety Monitoring Agency (RASMA), which would operate as a business entity fully funded by user charges, and under the authority of States, who would enter into a multi-national agreement to make use of RASMA services.

1.7 The APANPIRG/13 meeting in August 2002 reviewed progress to establish the RASMA. The meeting sought clarification on the role of RASMA in providing safety monitoring services vis a vis State responsibility for the airspace under its authority. It was emphasized that States using RASMA services would retain the authority over the airspace and decide whether or not they want to enter an arrangement with RASMA for airspace safety data collection and/or provision of assessment services. The meeting agreed to continue the work of the Task Force, who would make its

recommendations for the establishment of a regional airspace safety monitoring organization and funding arrangement to APANPIR/14 in August 2003.

1.8 During the course of its work, the APASM/TF considered that the institutional difficulties to form the RASMA as a business entity were too complex, and a number of States, for legal reasons, would have difficulty in making use of RASMA services. Further, existing airspace safety monitoring arrangements put in place by States in support of airspace implementation planning, were operating satisfactorily, and there was no need to incorporate these activities in RASMA. However, there was a need to coordinate and harmonize airspace safety monitoring activities on a regional and inter-regional basis, as well as to provide a common means of funding. Accordingly, a permanent body of experts to periodically review and evaluate the results of airspace safety monitoring would significantly enhance the airspace safety monitoring process.

1.9 The APASM/TF considered that a change was needed in the structure of the body from a business entity to a Sub-group of APANPIRG. As a Sub-group operating within the ICAO system, this would facilitate State participation and contribute to improving the SARPs, PANS and ICAO guidance material on operational safety matters. It was further considered that it was highly desirable to have expertise readily available to States to assist them meet their Annex 11 safety obligations. This body would be structured as an APANPIRG sub-group in accordance with the *APANPIRG Procedural Handbook*, and would be known as the Regional Airspace Safety Monitoring Advisory Sub-Group (RASMA/SG).

1.10 Under the APANPIRG RVSM implementation programme, aircraft height-keeping performance monitoring services have been established on a “user pays” basis. In addition, airspace data collection, analysis and safety risk assessments have been carried out for the region using human and technical resources provided by some States and organizations at no cost to the user. In the future, some of these States and organizations would continue to provide the resources to meet airspace safety monitoring and assessment obligations. However, in some cases, these services would be supported through a user charges levy based on a unit cost per flight. Funding arrangements making use of the established IATA collection system have already been successfully used to fund RVSM monitoring activities in the region. This approach is recommended as it could readily be expanded to meet other monitoring requirements and provide an effective means to directly fund the monitoring agencies.

1.11 The establishment of the RASMA/SG will ensure that a group of multi-disciplinary experts will be permanently available to advise APANPIRG and States on airspace safety matters. The provision of funding arrangements is expected to meet the APANPIRG requirements, and for the foreseeable future will ensure that the Asia Pacific Region has in place a robust and cost effective means to meet the ICAO airspace safety monitoring requirements.

## 2. EXISTING MONITORING SERVICES

2.1 Within the Asia Pacific Region action has been taken under various ICAO Task Forces to oversee airspace operations and safety. With respect to the implementation of reduced horizontal and vertical separation minima, the monitoring requirements are been carried out by several different organizations. The United States Federal Aviation Administration (FAA) currently performs the functions of the Asia Pacific Approvals Registry and Monitoring Organization (APARMO) established for RVSM implementation in the Pacific Region. In addition, the FAA has provided airspace safety assessments and oversight for the implementation of both vertical and lateral separation minima in various parts of the region. Airservices Australia provides safety assessment services to States and ATS providers through agreements between States, such as the Informal South Pacific ATS Co-ordinating Group (ISPACG), and in support of airspace changes in the South China

Sea and the Bay of Bengal. The Civil Aviation Authority of Singapore provides monitoring services for required navigation performance (RNP) operations on the South China Sea ATS route structure. AEROTHAI of Thailand has established the Monitoring Agency for the Asia Region (MAAR) as agreed by APANPIRG to take over responsibility of RVSM monitoring in the Asia Region from the APARMO. Other States, such as India and Japan are establishing national monitoring programmes and indicated their willingness to provide regional or sub-regional airspace safety monitoring services.

2.3 Additionally, considerable experience has been gained in the system performance monitoring and enhancement of ATS data link equipment and procedures used to provide communications for air traffic control services and aircraft operators. The States that are signatories to ISPACG and the Informal Pacific ATC Co-ordination Group (IPACG) have carried out this function co-operatively by their respective central reporting agencies (CRAs) and FANS Interoperability Teams (FITs). In addition, the FANS Action Team – Bay of Bengal (FATBOB), has been established by ICAO for the Bay of Bengal area, and a similar arrangement is under consideration for the South China Sea area.

### 3. SAFETY FOCUS

3.1 Provision for the establishment of ATS safety management programmes is mandated by ICAO Annex 11 to the Convention on International Civil Aviation. As stated in Annex 11, Section 2.26 – ATS Safety Management: *States shall implement systematic and appropriate safety management programmes to ensure that safety is maintained in the provision of ATS within airspace and at aerodromes.* Further, Annex 11 requires that, *as of 27 November 2003, the acceptable level of safety and safety objectives applicable to the provisions of ATS within airspace and at aerodromes shall be established by the State or States concerned.* When applicable, safety levels and safety objectives should be established on the basis of regional air navigation agreements. Procedures for ATS safety management are contained in the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444, Chapter 2).

#### Safety Goals

3.2 Information on establishing a target level of safety (TLS) of  $5 \times 10^{-9}$  fatal accidents per flight hour per dimension for en-route systems is contained in Annex 11, Attachment B-2. The APANPIRG/12 meeting (Conclusion 12/41) established this TLS for en-route systems in the Asia Pacific Region where a TLS is required for implementation of separation minima. The RASMA/SG would, as one of its primary objectives, examine the results of the monitoring activities in the Asia Pacific Region to ensure that the established safety goal for the airspace is being achieved.

#### Methodology for Assessing Risk

3.3 It is the responsibility of States to ensure that established safety levels are being met on a continuing basis in accordance with ICAO provisions. To assist in achieving this, it is necessary to estimate risk and then compare it to the applicable safety goal. It is proposed that the RASMA/SG could assist States in achieving this objective. Because the safety assessment methodology will be applied to separation reduction implementations, CNS/ATM applications and other programs that have global application, it is necessary to use an established method to assess risk in a manner consistent with other ICAO regions. Hence, the risk assessment must be carried out using an ICAO accepted methodology.

### 4. ESTABLISHMENT OF A SUB GROUP TO APANPIRG

4.1 The RASMA/SG will be formed as a Sub Group of APANPIRG in accordance with the *APANPIRG Procedural Handbook*. The RASMA/SG would obtain and exchange information

from States, ATS providers, regulatory authorities, aircraft operators, and monitoring agencies in other ICAO regions.

## **5. TERMS OF REFERENCE**

5.1 The Terms of Reference of the RASMA/SG are contained in Appendix x.

## **6. MEMBERSHIP OF RASMA/SG**

6.1 It is envisaged that in order to provide an effective role, the membership to the RASMA/SG would be for a fixed term from those States that have extensive experience in conducting airspace safety monitoring and safety analysis.

## **7. DESCRIPTION OF THE RASMA/SG PROCESS**

7.1 A functional description of the RASMA/SG process showing the structure and linkages is attached as Appendix xx.

## **8. FINANCING**

8.1 The region has, on a collective basis, already been successful in establishing aircraft height-keeping performance monitoring services on a “user pays” basis. In addition, airspace data collection, analysis and safety risk assessments have been carried out for the region using human and technical resources provided by some States and organizations at no cost to the user. These donated resources will continue to be used to the extent that they are available.

### **Financial Arrangements**

8.2 Operating charges to airlines will be based on each aircraft movement originating from/within the APAC Region. Liaison will also be necessary with those States outside the APAC Region where flights terminate to avoid multiple charging, particularly for long-haul flights. The provision of safety monitoring services will need to be cost effective to the industry as a whole.

### **Funding Resources**

8.3 It is recognized that the cost of many of these safety monitoring and assessment services will need to be recovered either directly or indirectly from the users of the airspace in accordance with ICAO provisions. The necessary resources to fund State safety monitoring obligations may be provided in the following ways:

- a) Direct payment: Funds from State civil aviation authorities, air navigation service providers, air transport operators, air-to-ground communications service providers, aircraft manufacturers; and
- b) Indirect payment: Provision of technical services and human resources provided in-kind by any entity.

8.4 Where funds are provided by direct payment, the preferred collection mechanism would be through a direct levy on the airlines.

## 9. STAKEHOLDER CONSIDERATIONS

9.1 Stakeholders comprise a cross section of the aviation community from the air traffic service providers and airspace users through to the communications service providers. Their needs are diverse but all have a safety obligation to meet international standards and recommended practices. The establishment of a dedicated permanent regional airspace safety oversight body centralizes these activities.

9.2 The stakeholders are a diverse group with a common interest in the output of the airspace safety monitoring process in terms of the safety assurance. The stakeholders are:

- a) States of the APAC Region;
- b) Aircraft operators;
- c) International organizations representing their aircraft operators, flight crews and public safety, and
- d) Other service providers within the airspace, such as communications service providers and other service industry related companies, who will also be beneficiaries of the APASAG.

9.3 The stakeholders require airspace safety monitoring and safety assessment services to continue the development and improvement of the regional airspace, while providing a safe and efficient environment for aircraft operators. It is essential that the Asia Pacific Region have in place a transparent airspace safety oversight capability to which all States contribute and participate. These are best achieved for international airspace through ICAO and its contributing bodies.

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charges, and under the authority of States, who would enter into a multi-national agreement to make use of RASMA services.

2.2 During the course of its work, the Task Force considered that the institutional difficulties to form the RASMA as a business entity were too complex, and a number of States, for legal reasons, would have difficulty in making use of RASMA services. Further, existing airspace safety monitoring arrangements put in place by States in support of airspace implementation planning, were operating satisfactorily, and there was no need to incorporate these activities in RASMA. However, there was a need to coordinate and harmonize airspace safety monitoring activities on a regional and inter-regional basis, as well as to provide a common means of funding. Accordingly, establishing a permanent body of experts to periodically review and evaluate the results of airspace safety monitoring would significantly enhance the airspace safety monitoring process.

2.3 The Task Force considered that a change was needed in the structure of the body from a business entity to a Sub-Group of APANPIRG. As a Sub-Group operating within the ICAO system, this would facilitate State participation and contribute to improving the SARPs, PANS and ICAO guidance material on operational safety matters. It was further considered that it was highly desirable to have expertise readily available to States to assist them meet their Annex 11 safety obligations. This body would be structured as an APANPIRG Sub-Group in accordance with the *APANPIRG Procedural Handbook*, and named the Regional Airspace Safety Monitoring Advisory Sub-Group (RASMA/SG).

2.4 The establishment of the RASMA/SG should ensure that a group of multi-disciplinary experts will be permanently available to advise APANPIRG and States on airspace safety matters. The provision of funding arrangements is expected to meet the APANPIRG requirements, and for the foreseeable future will ensure that the Asia Pacific Region has in place a robust and cost effective means to meet the ICAO airspace safety monitoring requirements.

#### Existing monitoring services

2.5 Within the Asia Pacific Region action has been taken under various ICAO Task Forces to oversee airspace operations and safety. With respect to the implementation of reduced horizontal and vertical separation minima, the monitoring requirements are being carried out by several different organizations.

- the United States FAA currently performs the functions of the APARMO established for RVSM implementation in the Pacific Region. In addition, the FAA has provided airspace safety assessments and oversight for the implementation of both vertical and lateral separation minima in various parts of the region.
- Airservices Australia provides safety assessment services to States and ATS providers through agreements between States, such as ISPACG, and in support of airspace changes in the South China Sea and the Bay of Bengal.
- the Civil Aviation Authority of Singapore provides monitoring services for RNP operations on the South China Sea ATS route structure. A
- AEROTHAI of Thailand has established the Monitoring Agency for the Asia Region (MAAR) as agreed by APANPIRG, and expects to take over responsibility of RVSM monitoring in the Asia Region from the APARMO subject to APANPIRG/14.

- other States, e.g. India and Japan are establishing national monitoring programmes and indicated their willingness to provide regional or sub-regional airspace safety monitoring services.

2.6 Additionally, considerable experience has been gained in the system performance monitoring and enhancement of ATS data link equipment and procedures used to provide communications for air traffic control services and aircraft operators. The States that are signatories to ISPACG and IPACG have carried out this function co-operatively by their respective central reporting agencies (CRAs) and FANS Interoperability Teams (FITs). In addition, the FANS Action Team – Bay of Bengal (FAT-BOB), has been established by ICAO for the Bay of Bengal area, and a similar arrangement is under consideration for the South China Sea area under the SEACG.

2.7 Provision for the establishment of ATS safety management programmes is mandated by ICAO Annex 11. It is the responsibility of States to ensure that established safety levels are being met on a continuing basis in accordance with ICAO provisions. The Task Force proposes that the RASMA/SG could assist States in achieving this objective. Because the safety assessment methodology will be applied to separation reduction implementations, CNS/ATM applications and other programmes that have global application, it is necessary to use an established method to assess risk in a manner consistent with other ICAO regions.

2.8 It is envisaged that in order to provide an effective role, the membership to the RASMA/SG would be for a fixed term from those States that have extensive experience in conducting airspace safety monitoring and safety analysis.

#### Funding arrangements

2.9 In regard to funding, the region has, on a collective basis, already been successful in establishing aircraft height-keeping performance monitoring services on a “user pays” basis. In addition, airspace data collection, analysis and safety risk assessments have been carried out for the region using human and technical resources provided by some States and organizations at no cost to the user. These donated resources will continue to be used to the extent that they are available.

2.10 It is intended that operating charges to airlines will be based on each aircraft movement originating from/within the APAC Region. Liaison will also be necessary with those States outside the APAC Region where flights terminate to avoid multiple charging, particularly for long-haul flights. The provision of safety monitoring services will need to be cost effective to the industry as a whole.

#### Funding resources

2.11 It is recognized that the cost of many of these safety monitoring and assessment services will need to be recovered either directly or indirectly from the users of the airspace in accordance with ICAO provisions. The necessary resources to fund State safety monitoring obligations may be provided in the following ways:

- a) Direct payment: Funds from State civil aviation authorities, air navigation service providers, air transport operators, air-to-ground communications service providers, aircraft manufacturers; and
- b) Indirect payment: Provision of technical services and human resources provided in-kind by any entity.

2.12 Where funds are provided by direct payment, the preferred collection mechanism would be through a direct levy on the airlines to be collected by IATA.

### Stakeholder considerations

2.13 Stakeholders comprise a cross section of the aviation community from the air traffic service providers and airspace users through to the communications service providers. Their needs are diverse but all have a safety obligation to meet international standards and recommended practices. The establishment of a dedicated permanent regional airspace safety oversight body centralizes these activities.

2.14 The stakeholders are a diverse group with a common interest in the output of the airspace safety monitoring process in terms of the safety assurance. The stakeholders are:

- a) States of the APAC Region;
- b) Aircraft operators;
- c) International organizations representing their aircraft operators, flight crews and public safety, and
- d) Other service providers within the airspace, such as communications service providers and other service industry related companies, who will also be beneficiaries of the APASAG.

2.15 The stakeholders require airspace safety monitoring and safety assessment services to continue the development and improvement of the regional airspace, while providing a safe and efficient environment for aircraft operators. It is essential that the Asia Pacific Region have in place a transparent airspace safety oversight capability to which all States contribute and participate. These are best achieved for international airspace through ICAO and its contributing bodies.

### RASMA/SG Terms of Reference

2.16 The APASM/TF/6 meeting developed draft TORs, an organizational structure and work flow chart for the RASMA/SG to be presented to APANPIRG/14. A plan for the operation of RASMA/SG will be completed by correspondence and presented to APANPIRG/14.

### Future work

2.16 At the APASM/TF/6 meeting it was agreed that in view of the progress made to complete its work programme to develop an airspace safety system performance monitoring structure for the Asia Pacific Region, it was in a position to recommend to APANPIRG/14 that the RASMA/SG be established and the Task Force dissolved

2.17 In light of the above, APASM/TF/6 developed two Draft Decision to APANPIRG/14 as follows:

### **Draft Decision xx/xx – Establishment of the Regional Airspace Safety Monitoring Advisory Sub Group of APANPIRG**

That, a Regional Airspace Safety Monitoring Advisory Sub-Group (RASMA/SG) be established to report to APANPIRG. The Terms of Reference of the Sub-Group are as shown in Appendix [...] to the Report on Agenda Item x. The establishment and the work of the Sub-Group shall be governed by the considerations contained in the APANPIRG Procedural Handbook.

**Draft Decision xx/xx – To dissolve the Asia/Pacific Airspace Safety Monitoring Task Force**

That, the Asia/Pacific Airspace Safety Monitoring Task Force having completed its work programme, the Task Force be dissolved.

2.18 The APASM/TF developed a plan for the establishment of the RASMA Sub-Group, which is contained in the Appendix to this paper.

**3. ACTION BY APANPIRG/14**

3.1 The meeting is invited to note the proposal by the APASM Task Force to APANPIRG/14 to establish the RASMA Sub-Group and to dissolve the Task Force.

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