

DRAFT

***[Insert Name of State]* Safety  
Plan For the Implementation of  
RVSM**

### DOCUMENT APPROVAL

The following table identifies all management Authorities that have successively approved the present issue of this document.

AUTHORITY <sup>1</sup>	NAME AND SIGNATURE	DATE
RVSM Safety Manager		
RVSM Programme Manager		
Head of Operations in ACC		
Approval Authority		

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<sup>1</sup>The signatories here are illustrative. The National Programme Manager should be a signatory. The approval authority there is a separate body for civil aviation safety regulation. In which case there should be a safety regulatory approval process for safety plans. The signatures here should reflect that process. However it is also possible, in the absence of safety regulation, that the responsibility for RVSM has been fully delegated to the National Programme Manager who may sign it on behalf of the responsible authority.

### DOCUMENT CHANGE RECORD

<b>Edition</b>	<b>Date</b>	<b>Reason for Change<sup>2</sup></b>	<b>Sections/pages affected</b>
0.1	Dec 2002	First Draft	All
0.2	Jan 2003	Update for inclusio preparedness in RVSM safety case	To Be Done
1.0	April 2003	Final Issue of safety plan prior to Go Ahead Decision	To Be Done

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<sup>2</sup> In order to produce a reasonable safety case for the Middle East Central Monitoring Agency (MECMA) preparedness. This can be accomplished only if each State provides MECMA with an up-to-date version of the State Safety Plan in January 2003.

A first draft (in December 2002) of the State Safety Plan would provide an early indication of problem areas. This would allow time to consider possible solutions to these problems and to seek further support.

The first issue of the State Safety Plan should be planned for November 2002. This first issue will provide a timely update to MECMA and could, if desired, provide the safety focus for the Director CAA.

## TABLE OF CONTENTS

DOCUMENT APPROVAL .....	i
DOCUMENT CHANGE RECORD.....	ii
TABLE OF CONTENTS .....	iii
NOTES ON STRUCTURE OF THIS EXAMPLE PLAN .....	iv
1 INTRODUCTION .....	5
2 AIRCRAFT AND OPERATOR APPROVALS.....	9
3 ATS TRAINING.....	13
4 ATS EQUIPMENT.....	17
5 ATS PROCEDURES.....	21
6 AIRSPACE DESIGN .....	25
7 RVSM SWITCHOVER .....	28
8 RVSM OPERATIONAL SAFETY MONITORING AND REVIEW .....	31
9 REFERENCES .....	<b>Error! Bookmark not defined.</b>

### NOTES ON STRUCTURE OF THIS EXAMPLE PLAN

- This example plan is based upon the one produced by Eurocontrol for use by the 41 States that implemented RVSM in January 2002.
- This example plan is written to provide a template for use by individual States.
- Safety Plans.
- Where additional text is required to be inserted by the State, this is indicated in the text in *Italics* within brackets, for example [*insert Name of responsible authority here*].
- Some of the text is illustrative. In such circumstances a State may need to develop text appropriate to its circumstances, which reflects its local environment and activities etc. The illustrative text does, however, broadly represent best practice and may be used by States for their planning. States should note that there may be more than one way to achieve best practice and the text in this example plan only reflects one of these possibilities.
- This example plan does not try to take into account all the specifics of safety planning in use in the States. Each State needs to identify those aspects of their safety planning that are not included in this example plan. States should include, as appropriate, such aspects within their State Safety Plan.
- Additional guidance material has been placed in shaded boxes (like this one) and footnotes at the bottom of pages<sup>3</sup>.

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<sup>3</sup>

such notes will need to be deleted.

# 1 INTRODUCTION

## 1.1 Objective of Safety Plan

The objective of this Safety Plan for [Name of State] is to set out those National activities that are required to support the RVSM Safety Case. The plan also addresses safety requirements identified b<sup>4</sup> [Insert Name of regulatory authority]. Each of the National activities required for the implementation of RVSM by [Name of State] is described in some detail. The descriptions address:

- The role of the activity in support of the safe implementation and operation of RVSM in [Name of State],
- The standards to be applied to the conduct of the activity,
- The additional supporting activities that will provide confidence that the identified National activities will lead to the successful implementation of RVSM within [Name of State]. These supporting activities include:
  - Those that help achieve quality,
  - Those that help manage identified risks.

The purpose in showing this level of information is to provide early assurance that [Name of State] has addressed its safety responsibilities and developed a plan to achieve the safe implementation of RVSM.

This safety plan has also been produced to help those within [Name of State] who have responsibility for the provision and regulation of the Stat [insert Name of ATS Provider]. It helps them understand the safety aspects of the managing these aspects.

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<sup>4</sup> Director General State CAA) should be included in this safety plan. Illustrative text on this has not been provided. Safety Requirements may be generic or specific to RVSM. If there are no requirements then mined any requirement additional to those specified in

## 1.2 Approach

The Example Safety Plan provided by MECMA has been used as a template for [Insert Name of State]<sup>5</sup>. This National safety plan is divided into sections that consider the National activities for RVSM as follows:

- Chapter 2. Aircraft and Operator Approvals for RVSM
- Chapter 3. ATS Training for RVSM
- Chapter 4. Changes to ATS Equipment
- Chapter 5. Changes to ATS Procedures
- Chapter 6. Changes to Airspace Design
- Chapter 7. Switchover to RVSM
- Chapter 8. Operational Monitoring of RVSM

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<sup>5</sup> The text provided in this section assumes that State Authorities have not specified any safety requirements (neither generic nor specific to RVSM). If there are such requirements then these need to be clearly defined. It may be that such requirements require a different structure for the safety plan. In which case, the text and guidance provided in this example plan should only be used with care.

**RVSM Safety Plan** [State]

Within each chapter the plan<sup>6</sup>:

1. Describes those activities that are necessary to provide an appropriate ATS<sup>7</sup> following the implementation of RVSM in the MID region,
2. Identifies the appropriate responsible Authorities<sup>8</sup>, together with a description as to how these Authorities discharge their responsibilities,
3. Describes the detailed activities and checks that underpin the achievement of quality of the activities<sup>9</sup> described in item 1, above,
4. RVSM Programme will be addressed as appropriate by the State.

The State Authorities have no specific requirements concerning these safety activities and the safety plan.

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<sup>6</sup> The example plan provides text for all four items. We remind States that:

- It is **HIGHLY RECOMMENDED** that the summary of the activities and approval of the outcomes of those activities are described in the safety plan (Items 1 and 2 in the list),
- Quality achievement activities **SHOULD** be described in the safety plan (item 3),
- And that risk management activities **MAY** be described in the safety plan (item 4).

The rationale behind these four items is that the State is responsible for the provision of an appropriate ATS (from ICAO Annex 11). Thus:

- In the first instance, a State should be able to show that it has an appropriate ATS (for RVSM, it has an appropriate programme of changes that are required to implement RVSM).
- Secondly the State accepts responsibility for this ATS.
- Thirdly the State can provide evidence of the achievement of quality in the ATS (for RVSM at this stage in the programme the evidence is primarily in the form of a commitment to a series of quality assurance activities).
- Fourthly the State can provide evidence that the risks associated with the ATS are acceptably low.

<sup>7</sup> The provision of an appropriate ATS comes from ICAO Annex 11. The Annex requires States to take responsibility for the provision of an appropriate ATS. The Annex describes the objectives for such an ATS, which are primarily concerned with safety (prevention of collisions etc). Thus ATS may be described as a safety service and it is appropriate to substantiate that such an appropriate ATS is provided. This forms the conceptual basis of the Example Safety Plan.

<sup>8</sup> All States should be able to provide evidence of the State acceptance of its responsibility for the provision of an ATS. In practical terms this may be shown either through state regulation of the ATS, approval processes, delegation of responsibility, or a combination of the three.

<sup>9</sup> It is implicit in Annex 11 that the ATS provided may be shown to achieve the stated objectives. Thus it should be possible to provide evidence of quality achievement, particularly against these overall objectives.



### 1.3 Organisation

The Organisation for the RVSM safety plan and associated activities is as follows<sup>10</sup>.

- [Insert Name] has been appointed as the Safety Manager for RVSM and is responsible for the production of this plan.
- The National Programme Manager [insert Name] has responsibility for the National RVSM programme. He approves the safety plan and is responsible for obtaining the further approvals that are described below. In approving the plan the National Programme Manager is confirming that in his view the plan is acceptable, and accurately describes the activities that are required to show that the stated safety requirements will be achieved.
- The Head of ATS Operations [insert Name] has overall responsibility for the ATS operations. In approving the plan the Head of Operations is confirming that from a safety perspective all necessary actions have been or will be undertaken by the ATS provider to ensure that RVSM can be safely implemented and operated within [Name of State].
- The Director General of the CAA [insert Name] is the designated State Authority and is responsible for the provision of an appropriate Air Traffic Service within the State. In approving the plan the DG is confirming that he is satisfied that responsibility for the safe implementation of RVSM has been properly delegated; that the staff delegated<sup>11</sup> have been duly authorised to act on his behalf; and that they are competent to act on his behalf.

In addition to the above, specific approvals for individual activities are also required. These are indicated in the relevant chapters of this safety plan (see sections 2.4, 3.4 through to 8.4)<sup>12</sup>.

The above organisation applies during the pre-implementation phase of RVSM. There are activities (in particular safety monitoring activities) that take place post-implementation. The responsibility for post-implementation safety activities rests with responsible staff in the State and the ATS provider [insert Names, if determined, otherwise state that the post-implementation safety organisation and responsibilities are not yet determined].

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<sup>10</sup> The text in this section is illustrative only. States should reflect their local organisation and approval arrangements. Include staff in the approvals chain if specific criteria are established for such approval. The illustrative text provided here indicates an example of such approvals criteria. If a State has a safety regulatory process this should be reflected in the approvals process described here.

The plan should document the organisation for the approval of RVSM operations in that State. It should state who is approving RVSM operations. Who is presenting the case for approval? What authorities (approvals and acceptance of elements) underpin the case for approval? It should show who is responsible for the production and maintenance for the Safety Plan and the safety case, if one is to be produced. And who is responsible for approving these documents. It should show the relationship between these identified organisations and people. It should cover all phases of the RVSM Programme.

<sup>11</sup> The staff may be the Head of the ATS Provider and the Head of Safety Regulation or may be at a less senior level (eg Head of ATS operations).

<sup>12</sup> If there are no detailed approvals then the overall approval process should be described in terms of the approval of the CAA (or State Ministry of Transport) to Implement RVSM. This should in any case be provided in the January 2003 issue of the State Safety Plan, when more information on the Go Ahead decision process is available.

## 2 AIRCRAFT AND OPERATOR APPROVALS

### 2.1 Introduction

This chapter is concerned with Aircraft and operator approvals that are needed for aircraft to be permitted to fly within the MID RVSM region<sup>13,14</sup>. It describes the approvals programme within the State.

### 2.2 Safety Requirement

The safety requirement is to show that all Operators based in *[Name of State]* are aware of the RVSM implementation and have obtained RVSM approval for themselves and their aircraft as appropriate. Both the aircraft and the Operator require approval if they are to operate in RVSM airspace. It is the responsibility of the *[Name of State]* to provide the necessary proof

### 2.3 Standards Applied

*[Name of State]*

FAA 91-RVSM to conduct the approval for civil aircraft and operators for RVSM operations.

### 2.4 Planned Aircraft and Operator Approvals Activities

An approvals programme has been developed to support the implementation of RVSM<sup>15</sup>. The details of the programme are found in *[Name of State]* RVSM Master Plan (ref 3). The programme subdivides into two main activities:

#### 1. Awareness Activities

Operators and Authorities for State aircraft have already been informed about RVSM approval and monitoring requirements through:

- AICs *[supply details of AICs issued and planned for issue]*.
- RVSM workshops *[Supply details of workshops already run and planned to be run]*

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<sup>13</sup> The safety requirement for aircraft and operators approvals is of a different nature to those for the ATS. A State is responsible for the certification and approval of aircraft registered in that State and for operators based in that State. A State however under ICAO Annex 11 is responsible for the provision of an appropriate ATS. This is reflected in the safety requirements in this example plan.

<sup>14</sup> This and the next two sections (2.2 and 2.3) have been written to be generic. States may if appropriate use this text directly in their National Safety Plan.

<sup>15</sup>

Plan. We have suggested some generic text that summarises the activities to which the State is committed. States may, if they consider it to be appropriate, use (and modify) this text directly in their National Safety Plan.

- Direct approach to operators likely to need RVSM approvals<sup>16</sup>.
- A working group has been set up with the Authorities for State aircraft and State Operators to discuss RVSM implementation. [*supply details of working group*]

2. Approval Activities

These are described in 2.5 below.

## 2.5 Approval Activities

There are two areas for which [*Name of State*] has an established approval/regulatory process:

1. Approval of Operators

Those Operators that are based in [*Name of State*], and wish to operate within the RVSM MID Airspace, will apply to the State CAA to obtain operational approval (in line with TGL 6 or 91-RVSM) [*You may usefully provide a list of these Operators, it is however not essential*]. The responsible officer for giving such approvals is [*insert title and name of current jobholder*]. His approval is based on [*insert approval criteria this should be based on establishing compliance with the relevant aspects of TGL 6 or 91-RVSM*].

2. Certification and Approval of Aircraft

Operators (or owners) of aircraft registered within [*Name of State*] (or operated by aircraft based in [*Name of State*]) will apply to the State CAA for certification and approval (in line with TGL 6 or 91-RVSM) [*You may usefully provide information on numbers of aircraft applying, it is however not essential*]. The responsible officer for giving such approvals is [*insert title and name of current jobholder*]. His approval is based on [*insert approval criteria this should be based on establishing compliance with the relevant aspects of TGL 6 or 91-RVSM*].

In addition military Authorities have elected to submit all of its military transport fleet for RVSM certification and approval. The responsibility for this rests with [*Name of State*] Ministry of Defence. It has elected to implement the principles embodied in TGL 6 Issue 1 or 91-RVSM. The responsible officer for giving such approvals is [*insert title and name of current jobholder*]. His approval is based on [*insert approval criteria*].

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<sup>16</sup> This methodology may be most appropriate for States with few operators.

## 2.6 Achievement of Quality of Approval Activities

It is important to ensure that the approval activities are effective and lead to RVSM approved aircraft that are capable of meeting the more stringent height keeping requirements within the MID RVSM airspace and air crew that are familiar with RVSM rules and procedures<sup>17</sup>. There are several elements that provide confidence in this capability. These elements are:

*[Insert text here. What is provided below is illustrative of the elements that could be considered. Where the illustrative element is appropriate to the State then the State may consider using this text directly in its safety plan.]*

### 1. Monitoring of Aircraft Technical Height Keeping Performance

Eurocontrol has established a Height Monitoring Infrastructure consisting of three Height Monitoring Units (HMUs) that already has, and until further will continue to, provide monitoring of a substantial proportion of the aircraft fleet operating within the MID RVSM region. Additionally, a number of operators have had their fleets monitored by approved providers of GPS Monitoring Unit (GMU) services. Aircraft that are not within the specified standards will be reported to the appropriate State Authorities that approved the aircraft for RVSM operations. Furthermore, they will be reported to MECMA. The Operator of the non-compliant aircraft will also be contacted. *[Insert Name of State Authority]* will follow up all such reports with the Operators concerned. This review will take place within the normal framework of aircraft certification and operator licensing.

### 2. Monitoring Operational Errors

MECMA has an established and ongoing programme of operational error data collection and assessment. Information is obtained from ACCs and States on operational altitude deviations of 300 ft or greater. MECMA will use the data as part of the RVSM Safety Analysis. MECMA is continuously monitoring data for trends or clusters of events associated with a specific operator or region of airspace and is notifying States, both directly and through the Middle East RVSM Task Force.

In addition to the above, *[insert Name of State Authority]* monitors and reviews aircraft airworthiness and Operator Licenses both on a regular basis and in response to identified concerns or trends.

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<sup>17</sup> The examples shown in this section on quality achievement focus on the operational monitoring of aircraft and operational performance. We recommend that the quality of aircraft and operator approvals is best shown by monitoring the results in terms of aircraft and Operator performance. States may additionally wish to put forward evidence in terms of the competence and diligence of the approval authorities. However this is not essential. The text provided describes the MECMA monitoring activities and shows how the State authorities are involved in any follow-up to identified trends and occurrences.

## 2.7 The Management of Risk Associated with Aircraft and Operators

Hazards associated with regulatory or approval processes are not normally covered within a functional hazard assessment (FHA). It is however appropriate to review those hazards in the Eurocontrol FHA that are associated with aircraft, aircrew and Operator hazards. [An updated version of the Eurocontrol FHA may be provided as an appendix to this working paper and furthermore made available to the States on the MECMA website ([mecma.com](http://mecma.com))]. [Name of State] will review the hazards and risks that will have been identified by the FHA. The purpose of the review is to identify those aspects where the local circumstances are different from those assumed within the EUR Region. Any additional activities, required as a result of this review, will be listed as actions in future updates to this safety plan.

## 3 ATS TRAINING

### 3.1 Introduction

This chapter is concerned with [Name of State] ATS training activities that are needed to ensure that operational staff is familiar with RVSM procedures<sup>18</sup>. The training programme that has been established is described. Additionally further details are provided to show how this training programme supports and underpins the safe implementation of RVSM.

The training syllabus and associated material is closely aligned with that developed by Eurocontrol for the RVSM implementation in 41 States in Europe and North Africa in January 2002.

### 3.2 Safety Requirement

The safety requirement associated with the ATS training is to show that all relevant staff have been appropriately trained in RVSM procedures and are competent to operate within an RVSM environment.

### 3.3 Standards Applied

There are no standards. The training material supplied by Eurocontrol has been used as reference guidance for the development of [Name of State]

It should be noted that the European syllabus was designed to cover the full range of situations encountered by its States. As this syllabus is wider in scope that required for [State] the syllabus and material are subsets of those developed by Eurocontrol.

### 3.4 Planned ATS Training Activities for RVSM

An ATS training programme has been developed to support the implementation of RVSM<sup>19</sup>. The details of the programme are found in [insert reference to State RVSM Master Plan or other appropriate documents]. The detailed programme shows that it is the intent to train all controllers licensed in sectors in RVSM airspace prior to RVSM implementation on 27 November 2003. The programme subdivides into four main activities:

1. Establishing Training Roles and Responsibilities

Staff have been identified to lead, prepare and deliver RVSM training to ACC Staff. [Names, staff positions and RVSM training roles may be usefully provided here].

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<sup>18</sup> This and the next two sections (3.2 and 3.3) have been written to be generic. States may if appropriate use this text directly in their National Safety Plan.

<sup>19</sup> This section should reflect the activities already committed to as part of the RVSM Master Plan. We have suggested some generic text that summarises the activities to which the State is committed. States may, if they consider it to be appropriate, use (and modify) this text directly in their National Safety Plan.

RVSM Safety Plan [State]

2. Development of Training Material  
The training material supplied by Eurocontrol will be used as the basis for the State training material. This will be supplemented by locally developed material. All the designated trainers will become familiar with the material.
3. Development of Training Programme  
A programme of courses will be established at the [Name] ACC. The programme will be developed in close co-operation with the ACC Chief. All controllers who will have operational responsibility in the [Name] FIR (ie above FL 285) will receive this training. Other controllers and staff within the Air Traffic Provider will, as a minimum, be informed of RVSM and how it affects them in their duties. As far as is practical, all controllers at the ACC will receive the full RVSM training. This is subject to operational and staffing constraints.
4. Implementing the Training Programme in Each ACC  
Courses will be run at the ACC as required. Follow-up and refresher training will be provided as needed.

### 3.5 Approval of Activities Associated with the RVSM Training Programme

There are two aspects of these training activities for which [Name of State] has established an approval process<sup>20</sup>. These two aspects are:

1. Approval of the Training Material  
All ATS training material is subject to strict control and changes must be approved prior to first use. The RVSM training material is subject to this process. The responsible officer<sup>21</sup> for the approval of the training material is [insert title and name of current jobholder]. His approval is based on [insert approval criteria or ].
2. Acceptance of Controller Competence in RVSM Operations  
  
(or certificate of competence). However, the ATS provider *does* accept the responsibility to ensure that controllers are capable of RVSM operations. To

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<sup>20</sup> This section should reflect the approvals/regulatory processes already in place. The text provided is illustrative only. There are two questions that should be addressed here:  
Who accepts responsibility for (or approves for use) the training material and training programme? and  
Who accepts responsibility for RVSM-trained controllers in their operational performance after RVSM Implementation by the State?  
Where an approval is identified the criteria used, as the basis for approval, should be stated in this section. If approvals are not required, [Name of State] does not require training materials and programmes to be approved. The provision of such training for RVSM is however part of the overall approval for RVSM implementation by [name of State]  
It is acknowledged that some States may have problems with identifying criteria. They may at present not be explicitly stated. States should make best endeavours to formally document criteria. States are welcome to use the illustrative quality achievement features as the basis for the approvals criteria.

<sup>21</sup> The responsible officer may be a safety regulator, if the State has a separate regulatory authority and this authority requires approval at this level of detail. Otherwise the responsible officer is likely to be a senior official within the ATS provider (eg Head of Training or Head of Operations).

discharge this responsibility, the manager of the ACC approves the RVSM training programme for his unit. Approval of the programme represents a commitment from the ACC to ensure that all appropriate staff receive RVSM training and that this training makes full use of the approved training material.

### 3.6 Achievement of Quality of RVSM Training Activities

It is essential to ensure that the ATS training in RVSM operations is effective and understood by controllers<sup>22</sup>. There are several elements that provide confidence in this effectiveness. These elements are:

*[Insert text here. What is provided below is illustrative of the elements that could be considered. Where the illustrative element is appropriate to the State then the State may consider using this text directly in its safety plan.]*

#### 1. Use of the Eurocontrol Material as Guidance

The Eurocontrol material has been developed by the Institute of Air Navigation Services (IANS) and has been subject to extensive review within the RVSM Programme. This material forms the core of the training material developed for the State RVSM training programme.

#### 2. Experienced Trainers Used

The responsibility for the development and delivery of the training rests with *[insert Name(s) and roles]*. They are experienced training instructors and are licensed as On-the-Job Training (OJT) Instructors. *[Further evidence of their experience may be usefully provided here]*. They are familiar with RVSM procedures. *[Insert Name(s)]* has attended *[insert details]* workshops on the RVSM Training material *[insert dates]*. He/they in turn will ensure that all the other designated trainers become familiar with, and understand, the material.

#### 3. Training Material is Subject to Review

Operational and management staff at each ACC will review the material prior to first use. The review comments will be documented and the material will be amended as appropriate.

#### 4. Timely Training Programme

The ATS provider recognizes its responsibility for the competence of controllers in operating within the MID RVSM region. It will therefore ensure that:

- The training programme allows controllers sufficient time from their operational duties to attend one of the courses,
- That accurate course attendance records are kept (including time spent on training simulators), and
- Controllers are encouraged to seek clarification, and further training if necessary, on those aspects they did not fully understand.

<sup>22</sup> The examples shown in this section on quality achievement are illustrative only. Each State should reflect on those features of the training programme and development process that answers the question *What quality achievement activities that it does not already have in place. MECAM recommends that you answer the question in terms of what you are already doing. What may be additional is the requirement to document these quality achievement activities. For example operational staff may be involved in reviewing the material, but at present this is done informally through discussion. We would suggest you document the outcomes of these discussions, or in some other way formalise the review process.*



5. Training Programme is Interactive

Specifically interaction will be encouraged through a course feedback questionnaire. The questionnaire will seek attendee views on the quality and ease of understanding of the course. This will be fed back to the trainers and developers and used to further refine the course. Secondly the material will be presented in an interactive manner and interaction with attendees will be encouraged. Areas of difficulty in assimilating/understanding the material will be sought from attendees and will be addressed on an individual or group basis through further explanation and training if necessary.

6. Refresher Training is Provided as Necessary

RVSM training may, through operational and staffing constraints, be provided to a controller more than three months in advance of RVSM. In such circumstances in the weeks prior to implementation, refresher training will be provided, so that what was learnt on the course is refreshed in the mind. *[Details of the provisions at each ACC for such refresher and follow-up training may usefully be provided, it is however not essential].*

### **3.7 The Management of Risk Associated with ATS Training Activities**

A key part of the management of safety is that the safety risks associated with poor or inadequate training are identified and, as appropriate, shown to be acceptably low. *[Name of State]* will review the hazards and risks identified by the Eurocontrol FHA. The purpose of the review is to identify those aspects where the local circumstances are different from those assumed within the FHA. Any additional activities, required as a result of this review, will be listed as actions in future updates to this safety plan.

## 4 ATS EQUIPMENT

### 4.1 Introduction

This chapter is concerned with those changes to ATS equipment that are needed for RVSM Operations<sup>23</sup>. The chapter describes the programme of activities that has been established to make the required changes to ATS equipment. Additionally further details are provided to show that these changes will be completed successfully and will underpin the safe implementation of RVSM.

### 4.2 Safety Requirement

The safety requirement is to show that the changes to the ATS equipment have been made successfully and approved for operational use.

### 4.3 Standards Applied

Based upon the European ATC manual, the Middle East RVSM Task Force has developed an ATC manual that is consistent with ICAO Document 7030/4 and provides further information. This latter document provides the basis for the changes to ATS equipment that are required for the MID RVSM Region.

### 4.4 Planned ATS Equipment Changes

[Name of State] has developed a programme for changes to ATS equipment to support the implementation of RVSM<sup>24</sup>. The details of the programme are found in [insert reference to State RVSM Master Plan or another suitable document]. This detailed programme shows that it is the intent to complete the ATS equipment changes well before the implementation of RVSM on 27 November 2003. [Dates may be usefully inserted here. If the timescale is tight the State should also summarise the contingency plans that have been developed to mitigate the risk of slippage in the dates].

In [Name of State] changes are required to the Flight Data Processing (FDP), Radar Data Processing (RDP), Display and flight strip systems<sup>25</sup>. Software Modifications are

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<sup>23</sup> This section and sections 4.2 and 4.3 have been written to be generic. States may if appropriate use this text directly in their National Safety Plan.

<sup>24</sup> This section should reflect the activities already committed to as part of the National RVSM Master Plan. We have suggested some generic text that summarises the activities to which your State is committed. States may, if they consider it to be appropriate, use (and modify) this text directly in their National Safety Plan.

<sup>25</sup> Delete non-applicable items.

Additionally changes may be required to Short Term Conflict Alert (STCA), if it is currently part of the systems in use within the ACCs. Note that some States are also coincidentally upgrading systems at their ACCs. In such circumstances it would be advisable to reflect this in the text and show that how the RVSM changes have been integrated into this larger change.

required to these systems to ensure that they are compatible with the ATC Manual for RVSM.

The State ATS Provider [*insert Name of ATS Provider*] is in contract with [*name of external supplier*] who will make the necessary changes to the above systems<sup>26</sup>. The contractor will make the changes to the systems, and test them. Following the successful conclusion of these tests, the ATS provider will accept the modified software and apply to the [State CAA] for approval to operate with the changed software.

#### 4.5 Approval of Activities

There are two aspects of these ATS equipment changes for which [*Name of State*] has established an approval process<sup>27</sup>. These two aspects are:

1. Approval of the Modified ATS Equipment  
All changes to ATS equipment are to strict control. With the exception of minor updates to software, all changes require approval from the [State CAA] prior to their installation at ACCs. The responsible officer is [*insert title and name*]. He will approve the changes to ATS equipment prior to installation. His approval is based on [*where available and appropriate*].
2. Acceptance of the Modified ATS Equipment for Operational Use at Each ACC  
The changes to ATS equipment need to be installed satisfactorily at each ACC. The acceptance of the installed changes is required at each ACC by the [State CAA]. The responsible officer is [*insert title and name*]. He will approve the equipment at each ACC prior to operational use. His approval is based on [*insert appropriate*].

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<sup>26</sup> Contractors normally provide software changes. If States use in-house expertise to make the changes, the text should be changed to reflect this.

<sup>27</sup> This section should reflect the approvals/regulatory processes already in place. The text provided is illustrative only. The key question that should be addressed here is:

Who accepts responsibility for (or approves for use) the changes to the ATS equipment and the subsequent use of this equipment?

Where an approval is identified, then the criteria used (as the basis for approval) should be stated in this section. If approvals are not required at this detailed level then simply state this. (We suggest [*Name of State*] does not require changes to ATS equipment to be approved. The provision of such changes for RVSM is however part of the overall approval for RVSM implementation by [*name of State*]

We acknowledge that some States may have problems with identifying criteria. They may at present be implicit and not explicit. States should make best endeavours to formally document criteria. States are welcome to use the illustrative quality achievement features as the basis for the approvals criteria.

## 4.6 The Achievement of Quality in the Changes to the ATS Equipment

It is important to ensure that the changes are successful, in that they fully implement the agreed requirements and are fully compatible with the systems and practises at the ACC<sup>28</sup>. There are several elements that provide confidence in the successful change to the ATS equipment:

*[Insert text here. What is provided below is illustrative of the elements that could be considered. Where the illustrative element is appropriate to the State then the State may consider using this text directly in its safety plan.]*

1. Functional Requirements have been Established

Functional Requirements for the change have been established [*reference to be supplied by State*] and the delivered changes will be judged against these requirements. These functional requirements were an integral part of the specification agreed with the contractor.

2. There are Appropriate Software Development Processes

The contractor has software development processes that it is applying to the software modifications required for RVSM. These are internal contractor procedures and have been established for some time [*supply ref to these procedures*].

3. The Developed Software will be Tested

The developed software will go through a series of tests and user trials prior to acceptance. Each of the identified functional requirements<sup>29</sup> will be formally tested against agreed acceptance criteria [*ref on acceptance criteria should be supplied here*].

4. The Human Machine Interface will be Evaluated

Controllers, as part of the RVSM training, will evaluate the Human-Machine Interface (HMI). Feedback will be sought from those attending courses on the usability and clarity of the HMI.

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<sup>28</sup> The examples shown in this section on quality achievement are illustrative only. Each State should reflect on those features of the required ATS changes and development process that answers the questions: Has the modified software (and equipment if changed) met the specified requirements? Will the modified software (and equipment if changed), when used operationally, disrupt other aspects of the provision of ATC? Is the HMI acceptable to controllers? It is not the intent to require a State to adopt quality achievement activities that it does not already have in place. We recommend you answer the questions posed above in terms of what you are already doing. An additional requirement may be to document these quality achievement activities. For example operational staff may be involved in reviewing the HMI, but at present this is done informally through discussion. We would suggest you document the outcomes of these discussions, or in some other way formalise the review process.

<sup>29</sup> If functional requirements have not been identified, then the tests and trials should be evaluated against the high level requirements in ATC Manual. Acceptance criteria for these may still be usefully provided.

#### 4.7 The Management of Risk Associated with the Changes to ATS Equipment

A key part of the management of safety is that the safety risks associated with poor or inadequate ATS equipment are identified and, as appropriate, shown to be acceptably low<sup>30</sup>. It is appropriate to review those hazards with reference to the updated Functional Hazard Assessment associated with the European RVSM programme. [Name of State] will review the hazards and risks that will have been identified by the European FHA. The purpose of the review is to identify those aspects where the local circumstances are different from those assumed within the Eurocontrol FHA. Any additional activities, required as a result of this review, will be listed as actions in future updates to this safety plan.

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<sup>30</sup> States may as appropriate use this text directly in their safety plan. The review of the FHA (and identification of State actions) will need to be included in a future update of the State safety plan. Further advice on this local adaptation of the FHA will be provided in advance of the State review of the FHA.

## 5 ATS PROCEDURES

### 5.1 Introduction

This chapter is concerned with those changes that are required to ATS Procedures by the implementation of RVSM in the MID region<sup>31</sup>. This chapter describes the activities that have been established to develop and implement new ATS procedures within each ACC. Additionally, further details are provided to show how these activities underpin the safe implementation of RVSM.

### 5.2 Safety Requirement

The safety requirement is to show that the changes to the ATS procedures have been approved for use. Assurance is required to show that the new procedures are appropriate, that they do not cause excessive controller and aircrew workloads, and have been co-ordinated with other agencies.

### 5.3 Standards Applied

ICAO Doc 7030/4 provides the regional supplementary procedures. The Middle East RVSM Task Force has developed an ATC manual that is consistent with ICAO Document 7030/4 and provides further amplification of its implementation in the MID Region.

### 5.4 Planned Activities for the Development of ATS Procedures for RVSM

A programme of activities has been established to develop and co-ordinate the changes to the ATS procedures<sup>32</sup>. The details of the programme are found in [*Name of State*] RVSM Master Plan. The programme subdivides into the following main activities:

1. Co-ordination with Military Authorities

Military aircraft<sup>33</sup> in [*Name of State*] have no restriction<sup>34</sup> on operating between flight levels FL290 and FL410. The implementation of RVSM potentially imposes additional requirements on both Military and Civil Authorities. A co-ordinating committee [*insert Name*] has been formed with these State-aircraft Authorities to

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<sup>31</sup> This and the next two sections have been written to be generic. States may if appropriate use this text directly in their National Safety Plan.

<sup>32</sup> This section should reflect the activities already committed to as part of the RVSM Master Plan. We have suggested some generic text that summarises the activities to which the State is committed. States may, if they consider it to be appropriate, use (and modify) this text directly in their National Safety Plan.

<sup>3333</sup> Only military aircraft are exempt from RVSM within the Middle East Region. Other State aircraft, e.g. VIP flights, adhere to normal RVSM requirements.

<sup>34</sup> Review this text carefully. Some States may have to impose restrictions on State aircraft in the level band FL290/FL410. Furthermore, application of the concept of GAT/OAT needs to be assessed.

ensure that satisfactory procedures are developed and that the high standards of co-operation and co-ordination continue following the Implementation of RVSM.

2. Co-ordination with Adjacent and Subjacent ACCs

The changes to procedures required for RVSM at the [insert Name] ACC will need to be co-ordinated with adjacent ACCs. New (or amended) letters of agreement (LoAs) are required. The Head of the ATS Provider is responsible for making the necessary agreements.

3. Changes to Unit Operations Manual

The [insert Name] ACC will need to change its Unit Operations Manual to include the changes as a result of RVSM. This is the responsibility of ACC management. The changes will include these appropriate changes due to the new LoAs, and any new agreements with the State Authorities concerning the use of RVSM airspace by Military aircraft.

National Programme activities recognise the links between the changes to airspace, which must precede the changes to procedures, and the development of RVSM ATC training which can only be fully completed when the new procedures are available.

## 5.5 Approval of Activities Associated with the Changes to ATS Procedures

There are two aspects of these changes to procedure activities for which [Name of State] has established an approval process<sup>35</sup>. These two aspects are:

1. Approval of the Unit Operations Manual

Any change to an ACC Operations Manual is subject to strict control. All changes must be approved prior to use. The responsible officer is [insert title and name of current jobholder]. He will approve the changes to the manual for use. His approval is based on [reference, where appropriate].

2. The Acceptance of Amended Agreements (LoAs) between ACCs

Changes to LoAs are approved (signed) by ACC managers of both centers. For ACCs within [Name of State] approval is based on [insert approval criteria or ].

<sup>35</sup> This section should reflect the approvals processes already in place. The text provided is illustrative only. There are two questions that should be addressed here:

Who accepts responsibility for (or approves for use) the Unit (ACC) operations manuals? and

Who accepts responsibility for preparing and signing Letters of Agreement between ACCs?

Where an approval is identified the criteria used, as the basis for approval should be stated in this section. If approvals are not required at this detailed level th *Name of State* does not require changes to Unit Operations manuals to be approved. The provision of such changes for RVSM is however part of the overall approval for RVSM implementation by [name of State]

MECMA is cognisant that States may have problems with identifying criteria. They may at present be implicit and not explicit. States should make best endeavours to formally document criteria. States are welcome to use the illustrative quality achievement features in section 5.6 as the basis for the approvals criteria.

In addition within [Name of State] it is policy for to require additional, more senior signatures where the unit is in another State. In [Name of State] the Director General of the CAA signs. His approval is based on [insert approval criteria or ].

## 5.6 Achievement of Quality of Changes to ATS Procedures

It is important to ensure that the changes to ATS procedures are appropriate and have been conducted in a professional manner<sup>36</sup>. There are several elements that provide confidence in this. These elements are:

[Insert text here. What is provided below is illustrative of the elements that could be considered. Where the illustrative element is appropriate to the State then the State may consider using this text directly in its safety plan.]

1. Use of the ICAO and Middle East Material  
ICAO Documents 7030/4, 9574 and the Middle East ATC manual for RVSM have been subject to extensive review and development. They provide a definitive basis for these changes.
2. Operational Staff Review of Changes  
Operational staff at each unit will review the Unit Operations Manuals. The review comments will be documented and where appropriate the manual will be modified.
3. The Changes to LoAs Follow a Strict Control Process  
All LoAs within [Name of State] are subject to extensive review. Within [Name of State] this includes the Airspace policy staff, and ACC operational staff.
4. The Changes to the Procedures and Airspace Design Have Been Simulated  
[Name of State] has a computer based simulation capability<sup>37</sup>. The changes to airspace design and use of RVSM procedures will be subject to simulation. The simulation validates the use of the new RVSM procedures and changes to airspace policy. [Simulation dates, constraints and objectives may be usefully inserted here].

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<sup>36</sup> The examples shown in this section on quality achievement are illustrative only. Each State should changes lead to ATS procedures that are clear and unambiguous and co-ordinated with all other already have in place. MECMA recommends you answer the question in terms of what you are already doing. An additional requirement may be to document these quality achievement activities. For example, operational staff may be involved in reviewing the Unit Operations Manual, but at present this is done informally through discussion. We would suggest you document the outcomes of these discussions, or in some other way formalise the review process.

<sup>37</sup> It may be appropriate to reference any simulation exercises that were provided by external service providers in addition to those provided by the State using its own capability. Even where it is not possible to reference a computer based simulation; there is merit in organising and referring to desktop exercises to explore, through examples, the likely effect on operations.



## 5.7 The Management of Risk Associated with Changes to ATS Procedures

A key part of the management of safety is that the safety risks associated with undesirable ATC procedures are identified and as appropriate shown to be acceptably low<sup>38</sup>. Within the Eurocontrol RVSM Programme there was a commitment to perform a Functional Hazard Assessment (FHA), identifying hazards and assessing the risk associated with such hazards. The purpose of the review is to identify those aspects where the local circumstances are different from those assumed within the Eurocontrol FHA. Any additional activities, required as a result of this review, will be listed as actions in future updates to this safety plan.

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<sup>38</sup> The review of the FHA (and identification of State actions) will be included a future update of the State safety plan.

## 6 AIRSPACE DESIGN

### 6.1 Introduction

This chapter is concerned with those airspace design activities that are needed to ensure that RVSM operations are safe and effective<sup>39</sup>. Additionally, details are provided to show how these airspace changes support safe implementation of RVSM.

### 6.2 Safety Requirement

The safety requirement associated with the changes to airspace design is to show that the changes are appropriate and are consistent with the safe operation of RVSM in the Middle East Region.

### 6.3 Standards Applied

Whilst it is best practice to simulate such changes to show both the impact on traffic flows and controller workload, there are no applicable standards for evaluating proposed changes.

### 6.4 Planned Changes to Airspace Design

A programme of changes to airspace design has been developed to support the implementation of RVSM<sup>40</sup>. The details of the programme are found in [*Name of State*] RVSM Master Plan. There are several changes to the design of airspace that have been proposed to support the effective implementation of RVSM. These include:

- Changes to entry, reporting and exit points to minimise possible congestion at these points,
- Changes to dividing flight level, if it is currently an RVSM level,
- A new flight level allocation scheme,
- Re-sectorisation of the upper airspace to allow the capacity in the upper airspace to increase to take advantage of the new RVSM levels,
- Some modifications to allow more direct routings.

Some of these changes need to be agreed with ACCs in adjoining states. Such changes are reflected in the LoA change process described in section 5.3 above.

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<sup>39</sup> This and the next two sections have been written to be generic. States may if appropriate use this text directly in their National Safety Plan.

<sup>40</sup> This section should reflect the activities already committed to as part of the National RVSM Master Plan. We have suggested some generic text that summarises the activities to which the State is committed. States may, if they consider it to be appropriate, use (and modify) this text directly in their National Safety Plan.

## 6.5 Approval of Changes to Airspace Design

There are two aspects of these airspace design activities for which [Name of State] accepts responsibility and has established an approval process<sup>41</sup>. They are:

1. Approval of the Changes  
All airspace design issues are subject to strict change control. All changes must be approved prior to first use. The responsible officer is [insert title and name of current jobholder]. He will approve the changes. His approval is based on [insert ].
2. Changes Included in the LoAs as Necessary  
This approval process is described above in section 5.5.

## 6.6 Achievement of Quality of Changes to Airspace Design

It is important to ensure that the changes to airspace design are effective<sup>42</sup>. There are several elements that provide confidence in this effectiveness. These elements are:

1. Use of Simulations  
Simulations have been performed [insert ref here]. The studies show that the airspace design changes are effective within simulations of RVSM Operations. The simulation shows that controllers can safely handle RVSM operations.
2. Changes to Airspace Receive Extensive Review  
The proposed airspace design changes receive extensive review by management staff within the ACC. The review comments will be documented and where appropriate the manual will be modified.

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<sup>41</sup> This section should reflect the approvals processes already in place. The text provided is illustrative only. There are two questions that should be addressed here:

Who accepts responsibility for (or approves for use) the changes to airspace design and

Who accepts responsibility for changes to the LoAs

Where an approval is identified the criteria used, as the basis for approval, should be stated in this section. If approvals [Name of State] does not require changes to airspace design to be approved. The provision of such changes for RVSM is however part of the overall approval for RVSM implementation by [Name of State]

It is acknowledged that some States may have problems with identifying criteria. They may at present be implicit and not explicit. States should make best endeavours to formally document criteria. States are welcome to use the illustrative quality achievement features in section 6.6 as the basis for the approvals criteria.

<sup>42</sup> The examples shown in this section on quality achievement are illustrative only. Each State should reflect on those features of the airspace design changes that ans

require a State to adopt quality achievement activities that it does not already have in place. MECMA recommends you answer the question in terms of what you are already doing. What may be additional is the additional requirement to document these quality achievement activities. For example operational staff may be involved in reviewing the changes, but at present this is done informally through discussion. We would suggest you document the outcomes of these discussions, or in some other way formalise the review process.

## 6.7 The Management of Risk Associated with Airspace Design Changes

A key part of the management of safety is that the safety risks associated with poor or inadequate changes to airspace design are identified and as appropriate shown to be acceptably low<sup>43</sup>. Within the Eurocontrol RVSM Programme there was a commitment to perform a Functional Hazard Assessment (FHA), identifying hazards and assessing the risk associated with such hazards. The purpose of the review is to identify those aspects where the local circumstances are different from those assumed within the Eurocontrol FHA. Any additional activities, required as a result of this review, will be listed as actions in future updates to this safety plan.

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<sup>43</sup> States may as appropriate use this text directly in their safety plan. The review of the FHA (and identification of State actions) will be included a future update of the State safety plan.

## 7 RVSM SWITCHOVER

### 7.1 Introduction

This chapter describes those activities that show that the operational impact of switchover to RVSM has been addressed and that contingency plans exist<sup>44</sup>. Additionally further details are provided to show how this changeover activity supports the safe implementation of RVSM. Switchover is the operational process of managing the actual conversion of ATS from a 2000-ft separation (CVSM) environment to a 1000-ft (RVSM) environment. It covers the changes in the few hours before switchover on 27 November 2003 and the first few hours after the switchover. This switchover is the key operational aspect of the countdown to the implementation of RVSM.

### 7.2 Safety Requirement

The safety requirement is to show that the special procedures for the switchover to RVSM have been approved for use. Assurance should be provided to show that procedures and reversionary modes of operation are in place.

### 7.3 Standards Applied

[Name of State] will use the Eurocontrol RVSM countdown plan as the basis for its own countdown plan.

### 7.4 Planned Switchover Activities

Activities need to be planned to enable the safe and effective switchover to RVSM<sup>45</sup>. The details of these planning activities are found in [insert ref]. The plan assumes that the Eurocontrol countdown activities will identify the optimum way to handle the switch from CVSM to RVSM. [Name of State] planning activity focuses on the establishing information and special procedures for its ACCs and establishing suitable arrangements and staffing levels for the switchover period.

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<sup>44</sup> This and the next two sections (7.2 and 7.3) have been written to be generic. States may if appropriate use this text directly in their National Safety Plan.

<sup>45</sup> This section should reflect the activities already committed to as part of the RVSM Master Plan. We have suggested some generic text that summarises the activities to which the State may be committed. States may, if they consider it to be appropriate, use (and modify) this text directly in their National Safety Plan.

## 7.5 Approval of Switchover Plans

[Name of State] accepts responsibility for the switchover and has established an approval process<sup>46</sup>. This is:

1. Approval of the Special Procedures Developed for [Name] ACC

These special ATS procedures (to cover switchover) will require approval prior to use just like any other ATS procedure. The responsible officer is [insert title and name of current jobholder]. He will approve the material for use. His approval is based on [reference, where appropriate].

## 7.6 Achievement of Quality of Switchover

It is important to ensure that the planning for switchover is effective<sup>47</sup>. There are several elements that provide confidence in this effectiveness. These elements are: [Insert text here. What is provided below is illustrative of the elements that could be considered. Where the illustrative element is appropriate to the State then the State may consider using this text directly in its safety plan.]

1. Use of the Eurocontrol Countdown Material as a Reference Standard

The Eurocontrol material on the countdown process is being developed and the switchover aspects are an identified key part of the countdown process. This Eurocontrol material has been subject to extensive review.

2. Controllers Within Each ACC Will Review Switchover Procedures

Operational and management staff at each ACC will review the material. The review comments will be documented and the material will be amended as appropriate.

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<sup>46</sup> This section should reflect the approvals/regulatory processes already in place. The text provided is illustrative only. There is one question that should be addressed here:

Who accepts responsibility for (or approves) the Switchover at each ACC and the definition of the special procedures required for such switchover?

Where an approval is identified the criteria used, as the basis for approval, should be stated in this section. If approvals are not required at this detailed level then simply state this (We suggest [State] does not require switchover activities and procedures to be approved. The switchover planning for RVSM is however part of the overall approval for RVSM implementation by [Name of State]

We acknowledge that some States may have problems with identifying criteria. They may at present be implicit and not explicit. States should make best endeavours to formally document criteria. States are welcome to use the illustrative quality achievement features in section 7.6 as the basis for the approvals criteria.

<sup>47</sup> The examples shown in this section on quality achievement are illustrative only. Each State should reflect on those features of the switchover planning that answers the quest

require a State to adopt quality achievement activities that it does not already have in place. We recommend you answer the question in terms of what you are already doing. What may be additional is the additional requirement to document these quality achievement activities. For example, operational staff may be involved in reviewing the special procedures, but at present this is done informally through discussion. We would suggest you document the outcome of these discussions, or in some other way formalise the review process.

## 7.7 The Management of Risk Associated with the Switchover to RVSM

A key part of the management of safety is that the safety risks associated with the switchover are identified and as appropriate shown to be acceptably low<sup>48</sup>. Within the Eurocontrol RVSM Programme there was a commitment to perform a Functional Hazard Assessment (FHA), identifying hazards and assessing the risk associated with such hazards. The purpose of the review is to identify those aspects where the local circumstances are different from those assumed within the Eurocontrol FHA. Any additional activities, required as a result of this review, will be listed as actions in future updates to this safety plan.

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<sup>48</sup> States may as appropriate use this text directly in their safety plan. The review of the FHA (and identification of State actions) will be included a future update of the State safety plan.

## 8 RVSM OPERATIONAL SAFETY MONITORING AND REVIEW

### 8.1 Introduction

This chapter describes those activities that are concerned with the post-implementation monitoring of the safety performance of RVSM operations by [Name of State].

### 8.2 Safety Requirement

The safety requirement is to provide appropriate monitoring of the operational safety performance of the ATS in the application of RVSM.

### 8.3 Standards Applied

There are no appropriate global standards<sup>49</sup>.

### 8.4 Monitoring Activities

The post-implementation monitoring arrangements are not yet determined. This determination is part of the establishment of post-implementation arrangements. In [Name of State] this will be considered as one aspect of the development of national countdown arrangements.

There are two key activities:

1. Safety Monitoring of State ATS Performance in MID RVSM Region  
These arrangements will be a specific aspect of the normal monitoring of safety performance by the State<sup>50</sup>.
2. Operational Error Reporting  
[Name of State] commits to providing operational error data reported by controllers in its ACCs. The State already supplies this information as part of its contribution to the MECMA Pre-Implementation Safety Case. The data supplied is used, together with data from the other RVSM states, to assess the likely risk of collision in MID RVSM region. In addition [Name of State] will assess this data provided by its own ACCs and act on the evidence as appropriate.

<sup>49</sup> There are however emerging standards. States should be aware that introduction of Safety Management Systems has been introduced as a Standard in Annex 11. For guidance, they may review the ETAMP Safety Policy and associated documents.

<sup>50</sup> It is not the intent to require States to provide monitoring arrangements for RVSM safety that are different from the arrangements normally in place to monitor ATS performance (and hence monitor safety). The European EATMP safety policy and associated documentation provides extensive guidance on this area of operational safety monitoring. States may, if they wish, consider adopting this guidance. In line with this guidance, it is considered to be good practice to have a data recording and analysis system to capture operational incidents, deviations from normal, system faults and provide an assessment the safety performance implied by such occurrences.



## 8.5 Approvals

The approval process for the establishment of such monitoring arrangements is not yet determined.

## 8.6 Achievement of Quality

*[Name of State]* will develop monitoring arrangements that achieve the safety requirement to monitor operational performance. However, as the arrangements have not yet been determined, it is not possible to say anything at present as to the aspects of these arrangements that give confidence in the achievement of quality.

## 8.7 Management of Risk

These monitoring arrangements will help manage operational risks. They do not introduce additional risks.

- End -