

INTERNATIONAL CIVIL
AVIATION ORGANIZATION

ORGANIZACIÓN DE AVIACIÓN
CIVIL INTERNACIONAL



ORGANISATION DE L'AVIATION
CIVILE INTERNATIONALE

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1 August 2005

Subject: Summary of AFI RVSM Seminar/Workshop (Nairobi, 18 – 22 July 2005)

Sir/Madam,

I have the honour to forward herewith the summary of the AFI RVSM Seminar/Workshop which was held in Nairobi from 18 to 22 July 2005. I have enclosed **Appendix A** (List of Participants) and **Appendix B** (Revised AFI RVSM National Safety Plan (NSP)). The other Appendices can be downloaded from the full summary at the ICAO website: icao.int/regional/offices/nairobi/RVSM programme.

I would like to take this opportunity to thank you for the active participation of your representative(s) at the seminar.

I would be grateful if you could take remedial actions on the areas that concern your Administration.

Accept, Sir/Madam, the assurances of my highest consideration.


Lot Mollé
Regional Director

Attachments:
Summary of the Seminar/Workshop
Appendix A - List of Participants
Appendix B - Revised AFI RVSM NSP

INTERNATIONAL CIVIL AVIATION ORGANIZATION



AFI RVSM NATIONAL SAFETY PLAN (NSP) SEMINAR/WORKSHOP SUMMARY

(NAIROBI, 18 – 22 JULY 2005)

Prepared by the ICAO ESAF OFFICE, NAIROBI

This Summary constitutes what the Seminar/Workshop considered and decided on the next course of action on the Findings/Outcomes.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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Presentation by ICAO

- Overview of Reduced Vertical Separation (RVSM) Implementation

Presentations by ALTRAN Technologies

- Safety Assessment principles
- Risk Assessment and Mitigation in ATM
- AFI RVSM Safety Assessment Process
- AFI RVSM National Safety Plans: Objectives and Structure
- AFI RVSM National Safety Plan (NSP): How Functional Hazard Assessment (FHA) Results are to be worked

APPENDICES

- Appendix A:** List of Participants.
- Appendix B:** Revised AFI RVSM National Safety Plan (NSP).
- Appendix C:** ICAO Presentation on Overview of Reduced Vertical Separation (RVSM) Implementation.
- Appendix D:** ALTRAN Technologies Presentation on Risk Assessment Principles.
- Appendix E:** ALTRAN Technologies Presentation on Risk Assessment and Mitigation in ATM.
- Appendix F:** ALTRAN Technologies Presentation on AFI RVSM Safety Assessment Process.
- Appendix G:** ALTRAN Technologies Presentation on AFI RVSM National Safety Plans: Objectives and Structure.
- Appendix H:** ALTRAN Technologies Presentation on AFI RVSM NSP: How FHA Results are to be worked.

Note: *The Appendices can be downloaded at the ICAO website: icao.int/regional/offices/nairobi/RVSM/programme A CD was provided to the participants containing all the documents on the seminar/workshop.*

PART I - HISTORY OF THE NATIONAL SAFETY PLAN (NSP) SEMINAR/ WORKSHOP

1. Introduction

1.1 The RVSM Seminar/Workshop was convened pursuant to AFI/7 RAN Meeting Recommendations 5/7, 5/17 and APIRG/13 Decision 13/58 by the International Civil Aviation Organization in Nairobi from 18 to 22 July 2005.

1.2 The Seminar/Workshop was opened by Mr. Lot Mollel, ICAO ESAF Regional Director. He recalled that the Six meetings the Task Force has held so far, continued to update the AFI/RVSM Strategy/Action Plan and that the States continue to take their relevant remedial actions. The results of these consultations have been incorporated in the current Strategy/Action Plan. In order to foster early implementation of RVSM in the Region an AFI RVSM Programme Office was established in this Office. The RVSM activities are being carried out by the two Secretariats of Dakar and Nairobi and coordinated by the Task Force Secretary, RO/ATM at the ESAF Office. He noted that the AFI RVSM Regional Monitoring Agency was established in South Africa. Furthermore due to inadequate action by States the Stakeholders meeting (Dakar, 18 – 19 November 2004) agreed on the TF/5 (Dakar, 16 – 17 November 2004) (conclusions 5/5(b) to postpone by one year the RVSM implementation date to 19 January 2006.

1.3 He emphasized that the objective of the Seminar/Workshop was to assist AFI States in the development of their National Safety Plans taking into account the AFI RVSM Safety Policy. He stated that a Workshop similar to this one will take place in Dakar under the auspices of the ICAO Western and Central African (WACAF) Office. The National Safety Plans, when completed, will be subjected to a National Safety Plan Validation Panel (NSPVP) to be organized in mid-September 2005 in Johannesburg. The findings of the Panel will be presented to APIRG/15 meeting in late September 2005 in Nairobi. In order to enhance the implementation, Mr. Mollel remarked, the National Programme Managers whom he believed were the vital organs to the early implementation of RVSM were invited to work together in the workshop to ensure ways of meeting the target date of implementation. He recalled that as a pre-requisite to the implementation of RVSM, the ANC requested a Safety Assessment should be conducted. The main elements of the Safety Assessment are the Collision Risk Assessment (CRA) being done by the Netherlands Research Laboratories (NLR), the Functional Hazard Analysis (FHA), conducted by ALTRAN Technologies of France and the National Safety Plan (NSP) to be developed by States. He advised that these three deliverables will be required to develop the AFI RVSM Pre-implementation Safety Case (PISC).

1.4 The Director reminded the participants that the activities required by each State are clearly spelt out in the AFI RVSM Strategy/Action Plan of which each item shall be addressed and acted upon in order to determine the actual date for the implementation of RVSM. He wished the members fruitful deliberations with a view to further enhance the safety of air navigation in the Region.

2. Officers and Secretariat

2.1 Mr. Apolo KHARUGA, Regional Officer, Air Traffic Management/Secretary of APIRG RVSM Task Force, of the ICAO ESAF Office, acted as the Moderator of the Seminar/Workshop. He was assisted by Mr. BROU Konan, Regional Officer/ATM, ESAF Office and Mr. Kevin EWELS, Manager, AFI Regional Monitoring Agency (ARMA). Messrs. Julien LAPIE, CNS/ATM Safety Expert, ALTRAN Technologies, Harry ROBERTS, National Program Manager, South Africa, Gaoussou KONATE, Regional Manager, IATA SO & I Africa and Craig PARTRIDGE, Manager, SO & I, Africa facilitated and conducted the seminar/workshop.

3. Attendance

3.1 The meeting was attended by Seventy One (71) participants from Twenty One (21) States and Three (3) International Organizations namely AFRAA, KALPA and IFATCA. The list of participants is given at **Appendix A** (copy attached) to this summary.

4. Working Language

4.1 The meeting was conducted in the English language only.

5. Programme

5.1 The following Programme was adopted by the Seminar/Workshop:

PROGRAMME

Monday, 18 July 2005		
0830-1000	Registration	
1000-1030	Opening Ceremony	
1030-1100	Overview of the AFI RVSM Implementation Programme: <ul style="list-style-type: none"> - APIRG Task Force - AFI RVSM Strategy/Action Plan - ANC and Council - RVSM Implementation Date 	ICAO
1100-1130	Coffee/Tea Break	
1130-1230	RVSM Safety Assurance <ul style="list-style-type: none"> - AFI RVSM Safety Policy - RVSM Safety Policy Deliverables <ul style="list-style-type: none"> •Functional Hazard Analysis •Collision Risk Assessment •National Safety Plans - Pre-Implementation Safety Case (PISC) - Post-Implementation Safety Case (POSC) 	ALTRAN TECHNOLOGIES
1230-1300	Lunch	
1300 - 1500	RVSM Safety Assurance (Cont.)	ARMA ALTRAN TECHNOLOGIES ICAO
1500 - 1530	Coffee/Tea Break	
1530 - 1615	RVSM Safety Assurance (Cont.)	ALTRAN TECHNOLOGIES

Tuesday, 19 July 2005		
0900 - 1100	Development of National Safety Plans	ALTRAN TECHNOLOGIES
1100-1130	Coffee/Tea Break	
1130-1230	Development of National Safety Plans (Cont.)	ALTRAN TECHNOLOGIES
1230-1300	Lunch	
1300 - 1500	Development of National Safety Plans (Cont.)	ALTRAN TECHNOLOGIES
1500 - 1530	Coffee/Tea Break	
1530 - 1615	Development of National Safety Plans (Cont.)	ALTRAN TECHNOLOGIES

Wednesday, 20 July 2005		
0900 - 1100	Development of National Safety Plans	ALTRAN TECHNOLOGIES
1100-1130	Coffee/Tea Break	
1130-1230	Development of National Safety Plans (Cont.)	ALTRAN TECHNOLOGIES
1230-1300	Lunch	
1300 - 1500	Development of National Safety Plans (Cont.)	ALTRAN TECHNOLOGIES
1500 - 1530	Coffee/Tea Break	
1530 - 1615	Development of National Safety Plans (Cont.)	ALTRAN TECHNOLOGIES

Thursday, 21 July 2005		
0900 - 1100	Development of National Safety Plans	ALTRAN TECHNOLOGIES
1100-1130	Coffee/Tea Break	
1130-1230	Development of National Safety Plans (Cont.)	ALTRAN TECHNOLOGIES
1230-1300	Lunch	
1330 - 1500	Development of National Safety Plans (Cont.)	ALTRAN TECHNOLOGIES
1500 - 1530	Coffee/Tea Break	
1530 - 1615	Development of National Safety Plans (Cont.)	ALTRAN TECHNOLOGIES

Friday, 22 July 2005		
0830 - 1100	Development of National Safety Plans	ALTRAN TECHNOLOGIES
1100 - 1230	Overview of Seminar and way forward.	ALTRAN TECHNOLOGIES ICAO
1230-1300	CLOSING	

6. Outcomes

6.1 Outcomes of the NSP Seminar/Workshop

Number	Title
Outcome 1/1:	That States complete/update their National Safety Plan based on the revised NSP template at Appendix B.
Outcome 1/2:	That States submit to ICAO ARPO first draft of NSP by 31 July 2005.
Outcome 1/3:	That States submit to ICAO the final NSP by 31 August 2005 in order to be considered by NSP Validation Panel.
Outcome 1/4:	That the RVSM TF/7 be advised of the revised NSP template for application in the AFI Region.
Outcome 1/5:	That the revised NSP template be submitted to the ATS/SG/8 for their information.

PART II REPORT ON THE NSP SEMINAR/WORKSHOP

1. NSP Seminar/Workshop Process

- a) The Seminar/Workshop was provided with a short overview of where the NSP fitted into the RVSM process. The importance of the NSP was emphasized. The Seminar/Workshop was then guided through the process of compiling the hazard Appendix table. Thereafter the draft NSP was worked through paragraph by paragraph.
- b) The Seminar/Workshop delegates were afforded the opportunity during the process to ask questions while compiling the first draft which has to be submitted to the ARPO by 31 July 2005 and further advised that the final NSP be submitted to ARPO by 31 August 2005.
- c) At the end of the Seminar/Workshop States were equipped with the required knowledge to complete the NSP in their respective countries. Those States that came equipped with computers were able to bring their NSPs up to a status of near completion.
- d) **Presentation by RO/ATM Mr. A. Kharuga**

The Regional Officer ATM made a presentation on the overview of the AFI RVSM.

The scope of the presentation was:

- (i) Historical background of the RVSM and status of implementation globally.
- (ii) The APIRG RVSM Task Force and Terms of Reference.
- (iii) The summary and conclusions of the Six meetings of the Task Force.
- (iv) The contents of the AFI Strategy/Action Plan namely:
 - Programme Management.
 - Aircraft OPS and Airworthiness.
 - Air Traffic Management.
 - RVSM Safety Assurance.
 - Monitoring Functions.
 - Safety Assessment.
 - Functional Hazard Analysis.
 - Collision Risk Analysis.
 - Pre-Implementation Case.
- (v) The process of implementation from Task Force, the ATS/SG and APIRG was explained.
- (vi) The ICAO presentation formed **Appendix C** (not attached) to this summary but can be downloaded at the ICAO website.

2. Presentations by Mr. Julien Lapie, ALTRAN Technologies Consultant

The ALTRAN Technologies Consultant Mr. Julien Lapie presented in details the following:

Module 1

- a) The objective of Module 1 was to provide background information and to present how the NSP should be developed based on the NSP template developed by the AFI RVSM Task Force:
- The Risk Assessment principles
 - The Risk Assessment and mitigation in ATM.
 - AFI RVSM Safety Assessment process and deliverables.
 - NSP: objectives, scope and structure.
 - Working of Functional Hazard Analysis (FHA) results within NSP.

Module 2

- b) The objective of module 2 was to:
- Develop State NSP based on the AFI RVSM NSP template.
 - Develop State NSP based on the RVSM FHA on the information provided in Module 1.
- c) The ALTRAN TECHNOLOGIES presentations formed **Appendices D – H** to this summary (not enclosed) but can be downloaded at the ICAO website.

Conclusion

The Seminar/Workshop proved to be successful in providing the guidance that States required to complete the NSP's for validation. Seminar/Workshop delegates were able to return home with definite guidelines and examples as well as an amended template from which to work with.

The Outcomes of this Seminar/Workshop are at Part I paragraph 6 of this summary. The States are requested to take their relevant appropriate action to these outcomes.

The following is a list of ICAO Documents which were provided to the participants at the Seminar/Workshop

RVSM DOCUMENTS

	Document
1.	Specimen ATC Operations Manual for Implementation of RVSM.
2.	AFI ATS RVSM Training Guidance Material.
3.	ICAO Doc.7030 amendment on RVSM.
4.	Guidance material for Airworthiness and Operational Approval (TGL 6).
5.	Specimen AIC on RVSM.
6.	Specimen NOTAM on RVSM.
7.	AFI RVSM Implementation Strategy/Action Plan.
8.	AFI RVSM Safety Policy.
9.	National Safety Plan.
10.	Sample letter of Agreement incorporating RVSM.
11.	ARMA Deviation Forms.
12.	PISC Schedule for RVSM Pre-Implementation Safety Case.
13.	RVSM Implementation Readiness Assessment Survey Forms.
14.	RVSM Readiness Survey Data.
15.	Functional Hazard Analysis Report.
16.	Presentations from ALTRAN Technologies and ICAO.
17.	CD containing NSP Workshop material.

Note: This summary of the Seminar/Workshop and Documentation and presentations can be downloaded at the ICAO website ie. icao.int/regional/offices/nairobi/RVSM_programme



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
EASTERN AND SOUTHERN AFRICAN OFFICE**

**AFI RVSM SEMINAR/WORKSHOP
(NAIROBI, 18 – 22 JULY 2005)**

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

DOCUMENT APPROVAL

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

AUTHORITY	NAME	SIGNATURE	DATE
National RVSM Safety Manager			
National RVSM Program Manager			
Head of Operations in National ATS Provider			
Approval Authority			

NOTES

- This draft plan is written to provide a template for use by individual States
- Where possible the text is written to be suitable for direct inclusion in State's 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 draft plan only reflects one of these possibilities.
- This draft 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 draft plan. States should include, as appropriate, such aspects within their State Safety Plan

DOCUMENT CHANGE RECORD

The following table records the complete history of the successive editions of the present document.

EDITION	DATE	REASON FOR CHANGE	SECTIONS PAGES AFFECTED

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1 INTRODUCTION

1.1 Safety Plan Objective

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 by the State's Regulator *[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]* takes its safety responsibilities seriously and has 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 State's Air Traffic Service *[insert Name of ATS Provider]*. It helps them understand the safety aspects of the State's RVSM activities and shows how the National Program Manager is managing these aspects.

1.2 Approach

This National safety plan is divided into sections that consider the National activities for RVSM as follows:

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

Within each section the plan:

- (a) Describes those activities that are necessary to provide an appropriate ATS following the implementation of RVSM in the AFI region;
- (b) Identifies the appropriate responsible Authorities, together with a description as to how these Authorities discharge their responsibility;
- (c) Describes the detailed activities and checks that underpin the achievement of quality of the activities described in item (a) above;
- (d) Shows how the hazard and risk information that will be produced by AFI's RVSM Program will be addressed as appropriate by the State.

1.3 Organisation

The Organisation for the RVSM safety plan and associated activities is as follows.

- (a) *[Insert Name]* has been appointed as the Safety Manager for RVSM and is responsible for the production of this plan;
- (b) The National Program Manager *[insert Name]* has responsibility for the National RVSM program. He approves the safety plan and is responsible for obtaining the further approvals that are described below. In approving the plan the National Program 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;
- (c) 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]*;
- (d) The CAA/ATS provider company *[insert Name]* is the designated 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 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 (see sections 2.4, 3.4 through to 8.4).

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, otherwise state that the post-implementation safety organisation and responsibilities are not yet determined*].

2 AIRCRAFT AND OPERATOR APPROVALS

2.1 Introduction

This section deals with Aircraft/operator approval requirements for aircraft to operate within the AFI RVSM region and describes the approval program 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 State's CAA to describe their regulatory activities that will lead to documentary proof of the State's CAA diligence with respect to these approvals.

2.3 Standards Applied

[*Name of State*] will use TGL6 revision 1 to conduct the approval for civil aircraft and operators for RVSM operations.

2.4 Planned Aircraft/Operator Activities

An approval program has been developed to support the implementation of RVSM. The details of the program are found in [*Name of State*] National RVSM Plan. The program subdivides into two main activities:

- (a) Awareness Activities
Operators and State aircraft authorities have already been informed about RVSM approval and monitoring requirements through:
 - AICs [*supply details of AICs issued and planned for issue*].
 - RVSM Seminars/workshops [*Supply details of seminars/workshops already run and planned to be run*]
 - A working group has been set up with the Operators and State aircraft Authorities to discuss RVSM implementation. [*supply details of working group*]
- (b) 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:

(a) Operator Approval

Those Operators that are based in *[Name of State]*, and wish to operate within the AFI RVSM Airspace, will apply to the State CAA to obtain operational approval (in line with TGL 6). 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]*.

(b) Aircraft Certification and Approval

Operators (or owners) of aircraft registered within *[Name of State]* will apply to the State CAA for certification and approval (in line with TGL 6). 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]*.

In addition military Authorities have elected to submit identified military transport aircraft 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. The responsible officer for giving such approvals is *[insert title and name of current jobholder]*. His approval is based on *[insert approval criteria]*.

As of [date], [number] civil aircraft and [number] operators have been approved for RVSM operations . This leaves an anticipated [number] aircraft and [number] operators that will require RVSM approval. [State] anticipates that these approvals will be in place by [date]. In addition, as of [date], State Authorities have approved [number] State aircraft for RVSM operations. This leaves an anticipated [number] aircraft that will require RVSM approval. [State] anticipates that these approvals will be in place by [date].

2.6 Quality Assurance of 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 AFI RVSM airspace and air crew that are familiar with RVSM rules and procedures. There are several elements that provide confidence in this capability.

2.6.1 Aircraft Technical Height Keeping Performance Monitoring

The ARMA has established a Height Monitoring Infrastructure that will provide ongoing monitoring of a substantial proportion of the aircraft fleet operating within the AFI RVSM region.

Aircraft that are not within the specified standards will be reported to the appropriate State Authorities that approved the aircraft for RVSM operations. 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.

2.6.2 Operational Error Monitoring

The AFI Regional Monitoring Agency (ARMA) has an established and ongoing program of operational error data collection and assessment. Information is obtained from ACCs and States on operational altitude deviations of 300 ft or greater. ARMA will use the data as part of the RVSM Safety Case. At present mechanisms have not been developed to inform the appropriate States of clusters of events associated with a specific operator or region of airspace. These will be established prior to the implementation of RVSM.

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.

2.7 Aircraft and Operator Risk Management

[State] has reviewed the AFI RVSM hazard log of the AFI RVSM Functional Hazard Assessment [provide reference] and has made the adaptation provided in Appendix XX.

[State] has reviewed the FHA-proposed mitigation strategy related to the aircraft and operator element of its RVSM System, as follows:

Mitigation	Actions / Activities	Hazard ID

All of these mitigations will be in place by [date].

3 ATS TRAINING

3.1 Introduction

This section focuses on [*Name of State*] ATS training activities that are needed to ensure that operational staff is familiar with RVSM procedures. Additionally further details are provided to show how this training program supports and underpins the safe implementation of RVSM.

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

The AFI RVSM training guidance material, approved by the AFI RVSM Task Force for application within the AFI Region, is used for the development of [*Name of State*]'s training material.

3.4 Planned ATS Training Activities

An ATS training program has been developed to support the implementation of RVSM. The details of the program are found in [*insert reference to appropriate documents*]. The detailed program subdivides into four main activities and shows that it is the intent to train all controllers licensed in RVSM airspace sectors prior to RVSM Implementation on 19 January 2006.

3.4.1 Training Roles and Responsibilities

Staff has been identified to lead, prepare and deliver RVSM training to ACC Staff. [*Include Names, staff positions and RVSM training roles*].

3.4.2 Training Material

The AFI RVSM training guidance material supplied by ARPO will be used as the basis for the State training material. This will be supplemented by locally developed material. All the designated instructors will become familiar with the material.

3.4.3 Training Program

A program of courses will be established at each ACC [*Names of the ACCs and summary of each training program to be included*]. The program will be developed in close co-operation with managers at each ACC. All controllers who will have operational responsibility in the AFI RVSM region (ie above FL 290) will receive this training. Other controllers and staff within the Air Traffic Provider will as a minimum be familiarise with RVSM operations and how it affects them in their duties. As far as is practical all controllers at an ACC will receive the full RVSM training.

As of [date], the following ATS training sessions have been run:

Date	Training module	ACC	Number of staff attending

The following ATS training sessions are planned:

Date	Training module	ACC	Number of staff attending

3.4.4 ACC Training Program

Courses will be run at each ACC as required. Follow-up and refresher training will be provided as needed.

3.5 RVSM Training Program Approval

There are two aspects of these training activities for which [*Name of State*] has established an approval process. These two aspects are:

3.5.1 Training Material Approval

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 for the approval of the training material is [*insert title and name of current jobholder*]. His approval is based on [*insert approval criteria*].

The training material will be approved for use by the above named responsible officer by [date]. Evidence for this approval will be found in [provide reference to the document that gives this approval].

3.5.2 Controller Competence in RVSM Operations

The change to RVSM does not require changes to the controller's ATC license (or certificate of competence). However the ATS provider does accept the responsibility to ensure that controllers are capable of RVSM operations. To discharge this responsibility the manager of that ACC approves the RVSM training program for each ACC. Approval of the program represents a commitment from each ACC to ensure that all appropriate staff receives RVSM training and that this training makes full use of the approved training material.

3.6 RVSM Training Quality Assurance

It is important to ensure that the ATS training in RVSM operations is effective and understood by controllers. There are several elements that provide confidence in this effectiveness.

3.6.1 Use of the AFI RVSM training guidance material

The AFI material has been developed by the AFI RVSM Task Force and has been subject to extensive review within the RVSM Program. This material forms the core of the training material developed for the State RVSM training program.

3.6.2 ATC Instructors

The responsibility for the delivery of the training programme 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 the AFI Training Course on the RVSM Training material *[insert dates]*. They in turn will ensure that all the other designated instructors become familiar with, and understand, the material.

3.6.3 Training Material 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.

Or

Operational and management staff at each ACC have reviewed the training material. Their review comments and response to those comments are documented in *[provide reference]*.

3.6.4 Timely Training Program

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

- The training program 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.

3.6.5 Interactive Training Program

Specific 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 instructors and course 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.

Or

A course feedback form has been given to all those that have attended the course offered to date. Thus far the comments made have been mainly positive and have not resulted in any changes to the course material.

3.6.6 Refresher Training

RVSM training may, through operational and staffing constraints, be provided to a controller more than 6 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. *[Provide details of the provisions at each ACC for such refresher and follow-up training].*

3.7 ATS Training Risk Management

[State] has reviewed the AFI RVSM hazard log of the AFI RVSM Functional Hazard Assessment [provide reference] and has made the adaptation provided in Appendix XX.

[State] has reviewed the FHA-proposed mitigation strategy related to the ATS Training element of its RVSM System, as follows:

Mitigation	Actions / Activities	Hazard ID

All of these mitigations will be in place by [date].

4 ATS EQUIPMENT

4.1 Introduction

This section addresses those to ATS equipment required for RVSM Operations and describes the program of activities that has been established to make the required changes to ATS equipment. Additionally further details are provided to show that these equipment will be completed successfully and will underpin the safe implementation of RVSM.

4.2 Safety Requirement

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

4.3 Standards Applied

ICAO Technical Document 7030/4 (*Include as Appendix E*) provides the standards for procedures. ARPO has developed an AFI 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 AFI RVSM Region.

4.4 Planned ATS Equipment Changes

[Name of State] has developed a program for changes to ATS equipment to support the implementation of RVSM. The details of the program are found in [*insert reference to the National RVSM Plan*]. This detailed program shows that it is the intent to complete the ATS equipment changes well before the implementation of RVSM on 19 January 2006. [*Dates to be inserted and tight timescales requires each the State to summarize 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, flightstrip, Short Term Conflict Alert (STCA), Medium Term Conflict Detection (MTCD) and On-Line Data Interchange (OLDI) systems. Software Modifications are required to all 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 an external supplier who will make the necessary changes to the above systems. The contractor will make the changes to the systems, and test them. Following on from the successful conclusion of these tests, the ATS provider will accept the changed 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.

4.5.1 Modified ATS Equipment

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 – ATS engineering function]*. He will approve the changes to ATS equipment prior to installation. His approval is based on *[insert approval criteria]*.

The ATS equipment will be approved by the above named responsible officer by *[date]*. Evidence of this approval will be found in *[provide reference to the document that gives that approval]*.

4.5.2 Modified ATS Equipment for Operational Use at ACCs.

The 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 – ATS operational function]*. He will approve the equipment at each ACC prior to operational use. His approval is based on *[insert approval criteria or responsible officer's terms of reference, where available and appropriate]*.

The to ATS equipment will be approved by the above named responsible officer by *[date]*. Evidence of this approval will be found in *[provide reference to the document that gives that approval]*.

4.6 Quality assurance of ATS Equipment Changes

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 each ACC. There are several elements that provide confidence in the successful change to the ATS equipment:

4.6.1 Functional Requirements

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.

4.6.2 Software Development

Contractors have development processes for software modifications needed for RVSM operations. These are internal contractor procedures and have been established for some time [*supply ref to these procedures*].

4.6.3 Developed Software

Developed software will go through a series of tests and user trials prior to acceptance. Each of the identified functional requirements will be formally tested against agreed acceptance criteria [*ref on acceptance criteria to be supplied here*].

4.6.4 The Human Machine Interface

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.

Or

HMI has been evaluated by controllers as part of the RVSM training. Feedback has been sought on all the courses run to date. Thus far no significant HMI issue has arisen.

4.7 Risk Management of ATS Equipment Changes

[State] has reviewed the AFI RVSM hazard log of the AFI RVSM Functional Hazard Assessment [provide reference] and has made the adaptation provided in appendix XX.

[State] has reviewed the FHA-proposed mitigation strategy related to the ATS Equipment element of its RVSM System, as follows:

Mitigation	Actions / Activities	Hazard ID

All of these mitigations will be in place by [date].

5 ATS PROCEDURES

5.1 Introduction

This section identifies changes required to ATS Procedures for implementation of RVSM in the AFI region and to 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; do not cause excessive controller and aircrew workloads; and have been co-ordinated with other organisations.

5.3 Standards Applied

ICAO Document 7030/4 provides the standards. AFI has developed an ATC manual that is consistent with ICAO Document 7030/4 and provides further amplification of its implementation in the AFI region.

5.4 ATS RVSM Procedures

A program of activities has been established to develop and co-ordinate the changes to the ATS procedures. The details of the program are found in [Name of State] National RVSM Plan. The program subdivides into the following main activities:

5.4.1 State Aircraft Authorities Co-ordination

State aircraft in [Name of State] have no restriction on operating between flight levels FL290 and FL410 and do not require special procedures or co-

ordination. State aircraft will operate within a policy of the flexible use of airspace and in co-operation with the Civil Authorities. The implementation of RVSM potentially imposes additional requirements on both State and Civil Authorities. A co-ordinating committee [*insert Name*] has been formed with these State-aircraft Authorities to ensure that satisfactory procedures are developed and that the high standards of co-operation and co-ordination continue following the Implementation of RVSM.

5.4.2 Adjacent ACC Co-ordination

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

5.4.3 ATSU Operations Manual Changes

Each ACC will need to change its ATSU 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 State aircraft.

National Program 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 ATS Procedures Changes

There are two aspects of these changes to procedure activities for which [*Name of State*] has established an approval process.

5.5.1 ATSU Operations Manual Approval

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 [*insert approval criteria*].

5.5.2 Acceptance of ACC Amended Agreements (LoA/Ps)

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

In addition within [*Name of State*] it is policy for to require additional, more senior signatures where the Adjacent or subjacent ACC is in another State. In

[Name of State] the [insert title and name of the officer responsible for LoA/Ps signature] of the CAA signs. His approval is based on [insert approval criteria or responsible officer's terms of reference, where appropriate].

5.6 ATS Procedures Changes Quality assurance

It is important to ensure that the changes to ATS procedures are appropriate and have been conducted in a professional manner. There are several elements that provide confidence in this.

5.6.1 ICAO and AFI Material

ICAO Documents 7030/4, 9574 and the AFI ATC Manual for RVSM have been subject to extensive review and development and provide a definitive basis for these changes.

5.6.2 Operational Staff Review

Operational staff at each ATSU will review the ATSU Operations Manuals. The review comments will be documented and where appropriate the manual will be modified.

Or

The changes to the Unit Operations Manual have been reviewed by [list names and staff positions]. Their review comments have been discussed and changes to the manual have been agreed as appropriate. These have been documented in [either reference a report, letter or memo giving comments and response to those comments, or reference the review meeting minutes that provide the agreed response to the comments made].

5.6.3 LoA/P Control Process

All LoA/Ps within [Name of State] are subject to extensive review. Within [Name of State] this includes the Airspace policy staff, and ACC operational staff.

Or

The proposed LoA/P with [name of ACC] has been reviewed by [list names and staff positions]. Their review comments have been discussed and changes to the LoA/P have been agreed where appropriate. These have been documented in [provide reference].

5.6.4 Procedure and Airspace Design Change Simulation

[Name of State] has a computer based simulation capability. 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. [Insert *simulation dates, constraints and objectives*].

[or refer to desktop exercises run to explore throughout the likely effects of RVSM operations]

5.7 ATS Procedure Risk Management

[State] has reviewed the AFI RVSM hazard log of the AFI RVSM Functional Hazard Assessment [provide reference] and has made the adaptation provided in appendix X.

[State] has reviewed the FHA-proposed mitigation strategy related to the ATS Procedures element of its RVSM System, as follows:

Mitigation	Actions / Activities	Hazard ID

All of these mitigations will be in place by [date].

6 AIRSPACE DESIGN

6.1 Introduction

This section addresses airspace design activities needed to ensure safe and effective RVSM operations. Additionally further details are provided to show how these airspace changes underpin the 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 AFI 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 Airspace Design Changes

A program for airspace design changes has been developed to support the implementation of RVSM. The details of the program are found in [*Name of State*] National RVSM Plan. There are several changes to the design of airspace that have been proposed to support the effective implementation of RVSM. These include:

- (a) Changes to entry, reporting and exit points to minimise possible congestion at these points;
- (b) A new flight level allocation scheme;
- (c) Re-sectorisation of the upper airspace to allow the capacity in the upper airspace to increase to take advantage of the new RVSM levels;
- (d) Some modifications to allow more direct routings.

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

6.5 Approval of Airspace Design Changes

There are two aspects of these airspace design activities for which [*Name of State*] accepts responsibility and has established an approval process.

6.5.1 Approval of the Changes

All airspace design issues are subject to strict change control and must be approved prior to first use. The responsible officer [*insert title and name of current jobholder*] will approve the changes. His approval is based on [*insert approval criteria*].

6.5.2 Acceptance of Changes Included in the LoAs as Necessary

This approval process is described above in section 5.5.

6.6 Airspace Design Quality Assurance

It is important to ensure that the changes to airspace design are effective. There are several elements that provide confidence in this effectiveness.

6.6.1 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.

6.6.2 Review Airspace Changes

The proposed airspace design changes receive extensive review by management staff within each of the ACCs. The review comments will be documented and where appropriate the manual will be modified.

Or

The changes to the Airspace Design have been reviewed by [list names and staff positions]. Their review comments have been discussed and changes to the manual have been agreed as appropriate. These have been documented in [either reference a report, letter or memo giving comments and response to those comments, or reference the review meeting minutes that provide the agreed response to the comments made].

6.7 Airspace Design Change Risk Management

[State] has reviewed the AFI RVSM hazard log of the AFI RVSM Functional Hazard Assessment [provide reference] and has made the adaptation provided in Appendix XX.

[State] has reviewed the FHA-proposed mitigation strategy related to the Airspace Design element of its RVSM System, as follows:

Mitigation	Actions / Activities	Hazard ID

All of these mitigations will be in place by [date].

7 RVSM SWITCHOVER

7.1 Introduction

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 19 January 2006 and the first few hours after the switchover. This switchover is the key operational aspect of the countdown to the implementation of RVSM. This section confirms that the operational impact of switchover to RVSM has been addressed and contingency plans exist. Details are provided to show how this changeover activity supports and underpins the safe 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 Applied Standards

[Name of State] will use the AFI RVSM countdown plan as the basis for its own countdown plan. *(Include as Appendix G)*.

7.4 Planned Switchover Activities

The AFI RVSM Task Force will issue the AFI RVSM switch-over plan incorporating the results of the AFI RVSM Functional Hazard Assessment (FHA) [provide reference]. It includes appropriate consideration of the mitigation required by the FHA report.

[State] NPM has agreed to develop a national version of this plan, that will be provided in Appendix XX. This should be completed by [date].

7.5 Approval of Switchover Plans

There is one aspect of this switchover for which *[Name of State]* accepts responsibility and has established an approval process.

7.5.1 Approval of Special Procedures Developed for each 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 and the approval is based on *[insert approval criteria]*.

7.6 Switchover Quality Assurance

It is important to ensure that the planning for switchover is effective. There are several elements that provide confidence in this effectiveness.

7.6.1 AFI Countdown Material

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

7.6.2 Review of 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.

7.7 Switchover Risk Management

[State] has reviewed the AFI RVSM hazard log of the AFI RVSM Functional Hazard Assessment [provide reference] and has made the adaptation provided in Appendix XX.

[State] has reviewed the FHA-proposed mitigation strategy related to the Switch-over period, as follows:

Mitigation	Actions / Activities	Hazard ID

All of these mitigations will be in place by [date].

8 RVSM OPERATIONAL SAFETY MONITORING AND REVIEW

8.1 Introduction

This section identifies activities required for 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 Applied Standards

ICAO Annex 11 provides the standards.

8.4 Monitoring Activities

The post-implementation monitoring arrangements will continue as per current traffic data capturing procedures and will also consider the normal monitoring of safety performance by the State.

There are two key activities:

(a) ATS Performance Safety Monitoring

These arrangements will be a specific aspect of the normal monitoring of safety performance by the State.

(b) 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 Collision Risk Assessment (CRA) and the AFI Pre-Implementation Safety Case. The data supplied will be used, together with data from the other RVSM states, to assess the likely risk of collision in AFI RVSM region and to contribute to the AFI RVSM Post-Implementation Safety Case.

In addition *[Name of State]* will assess this data provided by its own ACCs and act on the evidence as appropriate.

8.5 Approvals

The approval process for establishment of such monitoring arrangements is not yet determined and will be part of the national SMS activities.

8.6 Quality Assurance

It is important to ensure that the monitoring arrangements are appropriate and will be conducted efficiently and in a professional manner.

There are several elements that provide evidence in this. They are:

[insert the elements]

8.7 Risk Management

Monitoring arrangements will help manage operational risks identified in the *[State]* national hazard log. These arrangements do not introduce additional risks.

APPENDIX : [State] RVSM hazard log

[State] has reviewed the AFI RVSM hazard log of the AFI RVSM Functional Hazard Assessment [provide reference].

With regards to its national RVSM core airspace, [State] has made the following adaptation:

Hazard ID	Hazard Description	Mitigations

With regards the Switch-Over period, [State] has made the following adaptation:

Hazard ID	Hazard Description	Mitigations