INTERNATIONAL CIVIL AVIATION ORGANIZATION

RVSM/RNAV/RNP TF/9 MEETING REPORT

(NAIROBI 19 – 20 APRIL 2006)

Prepared by the APIRG RVSM/RNAV/RNP TASK FORCE

The RVSM/RNAV/RNP Task Force is a Task Force of the AFI Planning and Implementation Regional Group (APIRG).

Its Reports are therefore submitted to APIRG through the ATS/AIS/SAR Sub-Group for review and action.

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Appendices:

PART I - HISTORY OF THE MEETING

1. Introduction

1.1 The Ninth meeting of the RVSM/RNAV/RNP Task Force (RVSM/RNAV/RNP/TF/9) 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 **19 to 21 April 2006**.

1.2 The reduced vertical separation minima Task Force 9 meeting was opened by Mr. Lot Mollel, Regional Director, ICAO ESAF. He recalled that the Task Force Eight Meeting updated the AFI RVSM Strategy/Action Plan which was subsequently circulated to States for their action. He informed the meeting that it would be fully appraised on the action taken on the conclusions of the Eighth Meeting. He further recalled that as a pre-requisite to the implementation of RVSM, the ANC demanded a safety assessment to be conducted. He retaliated that the main elements of the safety assessment are: the Collision Risk Assessment (CRA); the Functional Hazard Analysis and the National Safety Plans. He stated that three deliverables will be required by the ALTRAN Technology to assist them in the preparation of the AFI RVSM Pre-implementation Safety Case (PISC). Furthermore, he noted that it had been decided to set up a NSP Validation Panel (NSPVP) comprised of ICAO Headquarters, ASECNA, IATA, ATNS, ARMA and RO/ATMs Dakar and Nairobi. This Panel which is required to validate all NSPs, met in Johannesburg from 12 to 23 September 2005 and developed Recommendation s which were subsequently adopted by APIRG/15. The NSP Validation Panel held its Second meeting in Johannesburg from 21 to 24 March 2006. He reminded the participants that the details the contentious issues that need to be addressed by the Task Force would require them to make appropriate recommendations in relation to the programme of RVSM implementation in the AFI Region and subsequently update the AFI/RVSM Strategy/Action Plan.

2. Officers and Secretariat

2.1 The meeting nominated **Mr. MANGA FOUDA Fidèle** from Cameroon Civil Aviation Authority as its moderator.

2.2 Mr. Apolo KHARUGA, Regional Officer, Air Traffic Management from the ICAO ESAF Office, Nairobi, was the Secretary of the meeting. He was assisted by Mr. Ibrahim Usman AUYO, Regional Officer ATM, WACAF Office, Dakar, Mr. KONAN Brou, Regional Officer ATM, ESAF Office and Mr. Kevin EWELS, Manager of the AFI RVSM Monitoring Agency (ARMA.

3. Attendance

3.1 The meeting/seminar was attended by **43** participants from **17** States and **4** International Organizations namely ARMA, IATA, IFALPA and IFATCA. The list of participants is given at **Appendix A** to this report.

4. Working Language

4.1 The meeting was conducted in the English language.

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5. AGENDA

5.1 The following Agenda was adopted :

Agenda Item 1

Review and follow-up action of conclusions of Eighth meeting of RVSM/RNAV/RNP Task Force, ATSG/8 and APIRG/15.

Agenda Item 2

Review of major activities of the RVSM Task Force

2.1 RVSM State Readiness Survey.
2.2 Fourth Aircraft Readiness Survey.
2.3 Consideration of the Report of the NSP Validation Panel.
2.4 Progress reports on the PISC and CRA.
2.5 Review of ATS Letters of Agreement/Procedure (LOA/LOP).
2.6 Review of amendment proposal to Doc.7030.
2.7 Update of AFI RVSM Safety Policy document.
2.8 AFI RMA Manual.
2.9 AFI Switch Over Plan from CVSM to RVSM.
2.10 Status of RMA.
2.11 CRA – TLS.

Agenda Item 3

Review and update the RVSM Strategy/Action Plan.

Agenda Item 4

Any Other Business

4.1 Annex 10 - Aircraft addresses.
4.2 Consideration of AFI RVSM ATS Operational Manual.
4.3 AFI GMU Height Monitoring Service.
4.4 Operations in RVSM airspace.
4.5 ATS routes in AORRA
4.6 Funding ARMA.

List of Conclusions

Number	Title
Conclusion 9/1:	**Safety assessment data, remedial actions and target date for AFI RVSM Implementation** **That:** a) States pursue stringent incident reporting measures and take appropriate remedial actions as required by the CRA report in order to contribute to a positive total TLS; b) States intensify their efforts in reducing the incident rates to support a positive CRA results. c) States provide refresher training to Controllers and ensure that proficiency checks for ATCOs are done; d) States continue to provide the required safety assessment data to ARMA on monthly basis using Forms 1, 2, 3 and the revised Form 4; e) The actual date/time of implementation of RVSM will be determined taking into account: i) the completion of the activities in the AFI Strategy/Action Plan; ii) The development of an acceptable PISC and its subsequent approval by the ANC; iii) The approval by ICAO ANC of AFI RVSM Regional SUPPs (Doc.7030/4) relating to RVSM; and f) The target date for implementation of RVSM in the AFI Region will be AIRAC date **28 September 2006**.
Conclusion 9/2:	**Civil/Military Coordination** That, in order to ensure the safe and coordinated implementation of RVSM in the AFI Region, States ensure that the military aviation authorities are fully involved in the planning and the implementation process.
Conclusion 9/3:	**Nomination of a National RVSM programme manager** That which have not done so, as a matter of urgency, nominate, a National RVSM Programme Manager who will be responsible for ensuring that the proper mechanisms are put in place for the safe implementation of the RVSM Programme and will also act as the State's focal point or contact person. Additionally NPMs keep this information up to date.

Number	Title
Conclusion 9/4:	**Reporting of data for monitoring and/or carrying out safety assessment** That: a) All States institute the procedures for reporting of data, incidents and conditions necessary for performing the collision risk calculations prerequisite for RVSM implementation to the AFI Regional monitoring agency (ARMA). The data will include, but not necessarily be limited to: (i) Height deviations of 300 ft or more; (ii) Total number of IFR movements for each month; (iii) The average time per movement spent in the level band FL 290 to FL 410; (iv) ATC coordination failures; (v) Turbulence; (vi) Traffic data; and b) GPS Monitoring Unit (GMU) will be used for height monitoring where appropriate in AFI Region, which will be coordinated by the ARMA. c) ARMA compile a list of non contributing States, regarding traffic flow data, and submit to TF10 for consideration and remedial action.
Conclusion 9/5:	**Implementation of RVSM in the AFI Region** That: a) All RVSM implementation preparation works (safety, assessment, training) be done taking into consideration the FL 290 and FL 410 inclusive, being the AFI RVSM airspace; and **b)** Implementation of RVSM in the AFI Region be harmonized and coordinated within the AFI Region as well as with the adjacent Regions.
Conclusion 9/6:	**Training of all personnel involved with the implementation of RVSM in the AFI Region** That: a) Seminars continue to be organized in the Region for training all personnel involved in the implementation of RVSM; b) States having difficulties in implementing RVSM implementation programme, may either individually or in group explore the possibility of seeking outside expertise; c) On site training courses be conducted to expedite the training process; and d) In order to ensure uniformity in the training, States shall use the AFI RVSM training material.

Number	Title
Conclusion 9/7:	**Guidance material for Airworthiness and Operational Approval** That, States in the AFI Region be urged to include in their national legislation and regulations the Airworthiness and Operational Approval process for aircraft and operators intending to operate within the RVSM airspace based on provisions of ICAO Annex 6 Part 1 Chapter 15 paragraph 15.2.3 and the guidance material contained in JAA Temporary Guidance Leaflet (TGL) N°6.
Conclusion 9/8:	**RVSM enforcement in national legislation** That States which have not done so, take the appropriate measures in order: a) to publish as a matter of urgency, an AIC informing the users of their intention to implement RVSM; and b) to include the necessary provisions in their national legislation.
Conclusion 9/9:	**Funding of the RVSM implementation programme** That, National Governments, Regulatory bodies, operators, service providers and other stakeholders be granted budgetary allocations for acquisitions and other activities necessary for ensuring that all the requirements are met in a timely manner in order to safely implement RVSM in the AFI Region.
Conclusion 9/10:	**Monitoring of Height Deviations** That: a) States which have radar established at the ACC a unit to conduct monitoring of aircraft height deviations, Assigned Altitude Deviations (AAD) in the AFI RVSM airspace; and b) The data collected in a) above be forwarded to ARMA for action.
Conclusion 9/11:	**Revised AFI RVSM Safety Policy** That States expedite the publication of the revised version of the AFI RVSM Safety Policy in an AIC as amended at the Task Force 9 meeting at **Appendix B**.
Conclusion 9/12:	**National Safety Plan (NSP)** That: a) the States of Burundi, Djibouti, Libyan Arab Jamahiriya, Sudan and Swaziland submit to ARPO their National Safety Plans as soon as possible but not later than **30 April 2006**; and

Number	Title
	b) States which have submitted their NSPs to the NSPVP 2 send to ARPO their revised NSPs for validation, taking into consideration the comments from the NSPVP 2, as soon as possible but not later than **26 May 2006**.
Conclusion 9/13:	**State RVSM Readiness Assessment** That ICAO urge the States which have not competed their State RVSM readiness assessment to do so and forward to ARPO, as soon as possible however not later than **26 May 2006**, using the questionnaire at **Appendix C**.
Conclusion 9/14:	**Pre-Implementation Safety Case (PISC)** That the AFI RVSM Task Force will determine the date of submission of PISC to the ANC.
Conclusion 9/15:	**AFI RVSM Core Airspace** **a)** That for Req_{core}_12 (refer AFI FHA report at the ICAO website: www.icao.int/ESAF/RVSM) "Air/Ground Communication system shall be designed to ensure a total coverage of the RVSM Airspace with a minimum MTBF (Mean Time Between Failure) of two months for a given FIR"; and b) That for Req_{core}_88 (refer to FHA report at theICAO website: www.icao.int/ESAF/RVSM) "Aircraft shall be equipped with ACAS II version 7".
Conclusion 9/16:	**AFI RVSM Switch-Over Period** a) That for $_{swit}\_24$ (refer AFI FHA report at the ICAO website: www.icao.int/ESAF/RVSM) "Use of Eastbound RVSM FL (FL310, FL350 and FL390) shall be suspended for a period of Two (2) hours after the Time Zero (To)"; b) That for $_{swit}\_40$ (refer AFI FHA report at theICAO website: www.icao.int/ESAF/RVSM). "Traffic density shall be limited during switch-over period as appropriate"; **c)** A Trigger NOTAM shall be published Two (2) weeks before Time Zero (To) notifying the implementation of RVSM and relevant procedures to be applied; d) That for $_{swit}\_25$ (refer AFI FHA report at the ICAO website: www.icao.int/ESAF/RVSM) "A NOTAM shall be published to suspend FL310, FL350 and FL390 for RVSM operations after ToS during a period of Two hours"; e) That for $_{swit}\_35$ (refer AFI FHA report at the ICAO website: www.icao.int/ESAF/RVSM) "Transit of non-RVSM civil aircraft shall be suspended for a period of Two hours after Time Zero (To)"; and

Number	Title
	f) That for $_{swit}$_36 (refer AFI FHA report at the ICAO website: www.icao.int/ESAF/RVSM) "Operation above FL410 shall be suspended for non-RVSM aircraft for a period of Two (2) hours after Time Zero (To)".
Conclusion 9/17:	**Regional Airworthiness Certification and Certification Agency for RVSM Operation** That: a) States having difficulties with the implementation of operational airworthiness certification on the RVSM implementation should seek assistance from other States having this expertise; b) Seminars/Workshops be conducted for airworthiness/operations personnel on issues relating to RVSM certification; and c) Studies be conducted by IATA in cooperation with ICAO relating to the establishment of RVSM Certification Agencies for the AFI Region and results forwarded to the Task Force for their consideration.
Conclusion 9/18:	**AFI RVSM Implementation – Cost recovery** That: a) IATA airlines continue to financially support the RVSM implementation effort in order to improve safety and economy of Air Traffic across Africa; b) IATA has put in place a RVSM cost recovery scheme based on a charge imposed on all international jet flights in Africa operated by its member airlines, which will end in June 2006; and c) Sufficient funds should be available to complete the project d) IATA to report to RVSM Task Force with the results of the study.
Conclusion 9/19:	**RVSM Optimal Switch Over Time** That: **a)** The TF Secretariat Support Team composed of Nigeria, South Africa, Tanzania, ASECNA and IATA coordinate and research all the associated elements, including weather and human factors, that will have an effect on the switch over; and **b)** Considering the switch-over period remains one of the most critical in the management of the implementation of RVSM, RVSM Task Force consider the switch-over Plan at **Appendix D** be amended by the Task Force and distributed to States.

Number	Title
Conclusion 9/20:	**The National Safety Plan Validation Panel (NSPVP2) comments and Guidance material** That, the comments of the National Safety Plan Validation Panel 2 (NSPVP/2) and Guidance material at **Appendix E** be used by States to update their National Safety Plans also taking into account the FHA report.
Conclusion 9/21:	**ATS Letters of Procedure/Agreement** That the template ATS Letter of Procedure/Agreement at **Appendix F** be used by States to update their current letter of Procedure/Agreement to incorporate RVSM procedures.
Conclusion 9/22:	**Amendment to the Regional Supplementary Procedures – Doc 7030/4** That the revised version of the amendment to the Regional Supplementary Procedures-Doc 7030/4 at **Appendix G** be processed by the secretariat in accordance with the established practice.
Conclusion 9/23:	**Uncoordinated Military Operations in the Indian Ocean Region** That ICAO liaise with FAA and other concerned CAAs concerning the extensive military activities in the Indian Ocean in view of RVSM implementation in AFI Region. The target date for a solution to the safety in the Indian Ocean region and report back to the Task Force will be TF10.
Conclusion 9/24:	**Campaign to enhance RVSM Implementation** That, sensitization of Civil Aviation CEO/DGs by Regional Directors of ICAO and IATA on importance of RVSM and the need for its early implementation in the AFI Region be accorded priority during ICAO and IATA missions to States.
Conclusion 9/25:	**AFI RVSM Strategy/Action Plan** That the updated AFI RVSM Strategy/Action Plan at **Appendix H** be circulated to States for action.
Conclusion 9/26:	**Annex 10 - State Aircraft Addresses** That States establish and maintain their Mode S registers for inclusion in the RMA F2 form relevant to RVSM operations.

Number	Title
Conclusion 9/27:	**AFI RVSM ATS OPS Manual** That the sample AFI RVSM ATS OPS Manual at **Appendix I** be circulated to States to assist them to update their procedures where appropriate.
Conclusion 9/28:	**AFI RVSM Safety Assessment** That: a) ICAO consider an alternate safety assessment methodology in terms of the ICAO Doc 4444 Chapter 2.6.1; and/or b) review the TLS for AFI in view of the safety performance reported from other RVSM regions; and c) Report the outcome to RVSM Task Force 10.
Conclusion 9/29:	**Retention of ATS Routes in AORRA** That the routes that are currently in the AORRA be suspended however not withdrawn from the ANP to take care of contingencies in (Atlantic Ocean Random Routing Area) AORRA airspace.
Conclusion 9/30	**AFI GMU Height Monitoring** That ARMA compile a sample AIC for distribution to States when the date for the availability of the service becomes available.
Decision 9/1:	**Aircraft/Operators readiness survey** That, the results of ICAO/ARMA surveys be updated and presented at the RVSM TF meetings for consideration.
Decision 9/2:	**Operations in RVSM Airspace (Oceanic)** a) The Task Force accepted the actions and mandated the SAT South African representative to the SAT 13 meeting to present a paper covering the following items: b) MASPS failure during flight and the requirement to exit RVSM airspace taking fuel management into consideration.

PART II: REPORT ON AGENDA ITEMS

Report on Agenda Item 1

1. Review and follow-up of action of conclusions of Eighth meeting of RVSM/RNAV/RNP Task Force (RVSM TF/8), the ATS/SG/8 meeting and APIRG/15 meeting

1.1 Under this Agenda Item the meeting reviewed and noted the action taken on the conclusions of the eighth meeting of the RVSM/RNAV/RNP Task Force, the ATS/SG/8 meeting and APIRG/15 meeting. It reinstated conclusions which were still in force and proposed the action to be taken before the next Task Force meeting planned for second quarter of 2006. The Task Force included the conclusions adopted by APIRG/15 and included them in the Task Force for programme follow-up action. These conclusions appear in Part 1 of this report.

Report on Agenda Item 2

Review of the major activities of the RVSM Task Force

2.1 The meeting was presented with several working papers relating to AFI RVSM covering the following:

a) RVSM State Readiness Survey;
b) Fourth Aircraft Readiness Survey;
c) Consideration of the report of the RVSM National Safety Plan Validation Panel (NSPVP);
d) Progress reports on the PISC and CRA;
e) Review of ATS Letters of Agreement/Procedures;
f) Review of amendment proposal to Doc.7030;
g) Update of AFI RVSM Safety Policy Document;
h) AFI RMA Manual;
i) AFI switch-over plan from CVSM to RVSM;
j) Status of RMA;
k) CRA - TLS

2.2 RVSM State Readiness Survey

2.2.1 The meeting recalled that in order for the consultants for RVSM to complete the pre-implementation safety case (PISC) in a timely manner there were certain elements which needed to be in place namely, the ALTRAN Consultant-Functional Hazard Analysis, the Collision Risk Assessment and the National Safety Plans, in order to prepare the PISC. Other elements of concern was the publication of AIC, the revised Letters of Procedure/Agreement (LOPs/LOAs), the publication of AFI Safety Policy on RVSM the development and approval of the National Safety Plans.

2.2.2 The meeting noted in particular the previous State readiness survey and decided there was need to conduct another survey before the implementation of RVSM.

2.3 ARMA Aircraft Readiness Survey

2.3.1 In considering the aircraft readiness for RVSM, the AFI RMA reported that 51% of AFI aircraft are RVSM approved. It was recalled that the requirement of the AFI RVSM Safety Policy advocates a 90% target of RVSM approved aircraft operating in the AFI region. The traffic sample revealed that 94% of aircraft operating within the AFI RVSM airspace are RVSM approved (previously 91%) along with 94% of airline operators which is an improvement from the previous of 90% . A sixth readiness survey will be compiled for Task Force 10 meeting in the second quarter of 2006.

2.4 Consideration of the report of the 2nd National Safety Plan Validation Panel (NSPVP), (Johannesburg, 21-24 March 2006)

2.4.1 The meeting recalled the implementation of Reduced Vertical Separation Minima (RVSM) in the African (AFI) Region has been in the Planning process for the last 7 years. APIRG/13 meeting under Decision 13/58 established the RVSM RNAV/RNP Task force to plan and foster the implementation of RVSM in the AFI Region. The Task Force has so far held nine meetings and has Planned several others. At its second meeting, the Task Force developed the AFI RVSM strategy/action Plan which is being updated periodically. Various problems have prevented early implementation of the new standard causing proposed implementation dates to slip several times.

2.4.2 In reviewing previous APIRG reports and more specifically the AFI Region RVSM implementation efforts, the Air Navigation Commission requested that the AFI Region conduct a Pre-Implementation Safety Case (PISC) analysis as a pre-requirement to RVSM implementation. In that context, the Panel noted that the initial results of the Collision Risk Assessment (CRA) had shown that although the technical Target Level of Safety (TLS) (2.5×10^{-9} per flight hour) has been met, the overall TLS of 5×10^{-9} per flight hour, has not been met. Once the risk assessment meets the TLS and the PISC analysis is positive, those results will need to be forwarded to the Air Navigation Commission (ANC) for review. The Panel was of the opinion that States would have to expedite their implementation activities in order to complete the PISC in a timely manner.

2.4.3 The three deliverables that are required by the PISC to provide a valid opinion are the Functional Hazard Assessment (FHA), the Collision Risk Assessment (CRA) and the National Safety Plans (NSP). The Task Force identified the need to establish the NSPVP. The purpose of the NSP Validation Panel (NSPVP) is to examine, provide feedback to States and eventually validate NSPs. When those Plans meet the basic NSP requirements and are fully compliant with mitigations identified in the FHA tables then it is expected that the PISC can conclude with positive results. In that regard, it should be recognized that IATA member airlines have been instrumental in making these activities a reality by funding the safety assessment conducted by ALTRAN Technologies and National Research Laboratories (NLR).

2.4.4 In order to carry out its task of conducting a preliminary review and validation of the proposed National Safety Plans, the NSPVP meeting was convened under the auspices of ICAO and support from IATA from 12 to 23 September, 2005 at the IATA offices in Johannesburg. The NSPVP was composed of Mr. Kevin Ewels Manager of the African Regional Monitoring Authority (ARMA), Mr. Martin Sacramento Safety Assessment Manager, ASECNA Directorate of Operations, Mr. Harry Roberts, Manager Operational

Planning Services, Air Traffic and Navigation Services (ATNS), Mr. Apolo Kharuga, Regional Officer/ATM, ICAO Regional Office, Nairobi, Mr. Ibrahim U. Auyo, Regional/ATM Officer, ICAO Regional Office, Dakar, and Mr. Craig Partridge, Manager S.O. & I. IATA. The meeting was chaired by Mr. Drazen Gardilcic, Technical Officer/ATM, Air Navigation Bureau, ICAO Montreal. Technical support was provided by two ATM Safety experts from ALTRAN Technologies, Mr. Julien Lapie and Mr. Richard Beaulieu. This same Team met in Johannesburg from 21 to 24 March for the second validation of NSPs.

2.4.5 The Second meeting of the AFI RVSM National Safety Plan Review Panel convened in Johannesburg, South Africa from 21 to 24 of March, 2006.

Details of the meeting are as follows:

- A total of 27 National Safety Plans from States and 1 from ASECNA were submitted and reviewed.

- Out of that total the Panel found that to date:

  - There are 14 States whose plans are nearly complete, risk assessment is acceptable and are just lacking a signature and minor changes/additions to be valid.

  - Ten States whose plans do not adequately address all elements of the Safety Plan and require some amendments and significant additional work in the Risk Management area.

  - Four States that require special attention. All the elements of the plan are not filled in and issues of risk assessment as well as quality assurance are not fully addressed.

  - One State that used an incorrect template and/or did not fill in all the elements.

  - 20 States have not submitted a plan. However, out of those, 14 have their airspace delegated to ASECNA and 2 others have delegated to other States. The four States that have not submitted a plan at all, are Djibouti, Libya, Swaziland, Canaries FIR (Spain) and Sudan. However, are already conducting RVSM operations, consequently it is possible those States are of the opinion they need not submit a plan.

  - In relation to the 14 ASECNA States the Panel was cognizant of the fact that as the regulator, the State need only comply with only two elements of the National Safety Plan: "Introduction" and "Aircraft and Operator Approval". In that regard, it was the Panel's opinion that a State's non submission of these two elements would not prevent RVSM implementation in that State's airspace as all the other 5 NSP elements are directly related to ATS and Airspace and adequately addressed by the ASECNA plan.

- Only Djibouti, Libya, Sudan and Swaziland are the countries that have no mitigating circumstances. That is, they have neither delegated their airspace to another State/entity nor are they conducting RVSM operations. It was the Panel's suggestion that an ICAO mission if possible be carried out to these States. Should that not be possible, a personal call or letter from the Nairobi ICAO Regional Director might be helpful.

2.4.6 The RVSM NSP Review Panel concluded that it will provide feedback to all the States in the form of a State letter to be sent by the ICAO regional offices. The letters will urge States to take specific and appropriate action in relation to the plans as identified during the Panel's review. In conclusion the Panel was satisfied that a large number of AFI States were engaged in activities aimed at completing work to make RVSM implementation a reality for the Region. It was the group's consensus that these Plans were an excellent systemic improvement tool whether related or not to RVSM implementation. For example, the Plans required that States address issues such as Risk Management, Quality Assurance and generally, improvements in the provision of air navigation services in that State. In that regard, the Panel was of the opinion that regardless of the PISC assessment results, the quality of the provision of air navigation services in the Region is already showing a vast improvement.

2.4.7 In order to assess and evaluate the amended and new Plans, the NSPVP recommends that a third meeting of the Panel be convened at an appropriate time to be determined by the Task Force Core Team.

2.4.8 In view of the foregoing, the panel adopted conclusions 9/12 and 9/20.

Conclusion 9/12: National Safety Plan (NSP)

That:

a) the States of Burundi, Djibouti, Libyan Arab Jamahiriya, Sudan and Swaziland submit to ARPO their National Safety Plans as soon as possible but not later than 30 April 2006; and

b) States which have submitted their NSPs to the NSPVP 2 send to ARPO their revised NSPs for validation, taking into consideration the comments from the NSPVP 2, as soon as possible but not later than 26 May 2006.

Conclusion 9/20: The National Safety Plan Validation Panel (NSPVP2) comments and Guidance material

That, the comments of the National Safety Plan Validation Panel *2* (NSPVP/2) and Guidance material at Appendix E be used by States to update their National Safety Plans also taking into account the FHA report.

2.5 Revision of the ATS Letters of Procedure/Agreement (LOP/LOA) Template

2.5.1 The Task Force revised the current template on the Letters of Procedure/Agreement in order to include RVSM procedures. The revised template will be circulated to States for their use in amending their relevant LOAs/LOPs.

2.6 Amendment to the AFI Regional Supplementary Procedures – Documents 7030/4

2.6.1 The Task Force revised the text relating to RVSM on the AFI Regional Supplement Procedures – Doc-7030/4. The revised version was adopted by the TF/9 and ICAO was requested to process the proposal in accordance with the established practice.

In view of the discussions under Agenda Item 2 the following conclusions were retained or amended to reflect the current status.

Conclusion 9/1: Safety assessment data, remedial actions and target date for AFI RVSM Implementation

That:

a) States pursue stringent incident reporting measures and take appropriate remedial actions as required by the CRA report in order to contribute to a positive total TLS;

b) States intensify their efforts in reducing the incident rates to support a positive CRA results.

c) States provide refresher training to Controllers and ensure that proficiency checks for ATCOs are done;

d) States continue to provide the required safety assessment data to ARMA on monthly basis using Forms 1, 2, 3 and the revised Form 4;

e) The actual date/time of implementation of RVSM will be determined taking into account:

- **(i) the completion of the activities in the AFI Strategy/Action Plan;**
- **(ii) The development of an acceptable PISC and its subsequent approval by the ANC;**
- **(iii) The approval by ICAO ANC of AFI RVSM Regional SUPPs (Doc.7030/4) relating to RVSM; and**

f) The target date for implementation of RVSM in the AFI Region will be AIRAC date 28 September 2006.

Conclusion 9/2: Civil/Military Coordination

That, in order to ensure the safe and coordinated implementation of RVSM in the AFI Region, States ensure that the military aviation authorities are fully involved in the planning and the implementation process.

Conclusion 9/3: Nomination of a National RVSM programme manager

That which have not done so, as a matter of urgency, nominate, a National RVSM Programme Manager who will be responsible for ensuring that the proper mechanisms are put in place for the safe implementation of the RVSM Programme and will also act as the State's focal point or contact person. Additionally NPMs keep this information up to date.

Conclusion 9/4: Reporting of data for monitoring and/or carrying out safety assessment

That:

a) All States institute the procedures for reporting of data, incidents and conditions necessary for performing the collision risk calculations prerequisite for RVSM implementation to the AFI Regional monitoring agency (ARMA). The data will include, but not necessarily be limited to:

- **(i) Height deviations of 300 ft or more;**
- **(ii) Total number of IFR movements for each month;**
- **(iii) The average time per movement spent in the level band FL 290 to FL 410;**
- **(iv) ATC coordination failures;**
- **(v) Turbulence;**
- **(vi) Traffic data; and**

b) GPS Monitoring Unit (GMU) will be used for height monitoring where appropriate in AFI Region, which will be coordinated by the ARMA.

c) ARMA compile a list of non contributing States, regarding traffic flow data, and submit to TF10 for consideration and remedial action.

Conclusion 9/5: Implementation of RVSM in the AFI Region

That:

a) All RVSM implementation preparation works (safety, assessment, training) be done taking into consideration FL 290 and FL 410 inclusive, being the AFI RVSM airspace; and

b) Implementation of RVSM in the AFI Region be harmonized and coordinated within the AFI Region as well as with the adjacent Regions.

Conclusion 9/6: Training of all personnel involved with the implementation of RVSM in the AFI Region

That:

a) Seminars continue to be organized in the Region for training all personnel involved in the implementation of RVSM;
b) States having difficulties in implementing RVSM implementation programme, may either individually or in group explore the possibility of seeking outside expertise;
c) On site training courses be conducted to expedite the training process; and
d) In order to ensure uniformity in the training, States shall use the AFI RVSM training material.

Conclusion 9/7: Guidance material for Airworthiness and Operational Approval

That, States in the AFI Region be urged to include in their national legislation and regulations the Airworthiness and Operational Approval process for aircraft and operators intending to operate within the RVSM airspace based on provisions of ICAO Annex 6 Part 1 Chapter 15 paragraph 15.2.3 and the guidance material contained in JAA Temporary Guidance Leaflet (TGL) N°6.

Conclusion 9/8: RVSM enforcement in national legislation

That States which have not done so, take the appropriate measures in order:

a) to publish as a matter of urgency, an AIC informing the users of their intention to implement RVSM; and
b) to include the necessary provisions in their national legislation.

Conclusion 9/9: Funding of the RVSM implementation programme

That, National Governments, Regulatory bodies, operators, service providers and other stakeholders be granted budgetary allocations for acquisitions and other activities necessary for ensuring that all the requirements are met in a timely manner in order to safely implement RVSM in the AFI Region.

Conclusion 9/10: Monitoring of Height Deviations

That:

a) States which have radar established at the ACC a unit to conduct monitoring of aircraft height deviations, Assigned Altitude Deviations (AAD) in the AFI RVSM airspace; and
b) The data collected in a) above be forwarded to ARMA for action.

Conclusion 9/13: State RVSM Readiness Assessment

That ICAO urge the States which have not competed their State RVSM readiness assessment to do so and forward to ARPO, as soon as possible however not later than 26 May 2006, using the questionnaire at Appendix B.

Conclusion 9/14: Pre-Implementation Safety Case (PISC)

That the AFI RVSM Task Force will determine the date of submission of PISC to the ANC.

Conclusion 9/15: AFI RVSM Core Airspace

a) That for Req_{core}_12 (refer AFI FHA report at the ICAO website: www.icao.int/ESAF/RVSM "Air/Ground Communication system shall be designed to ensure a total coverage of the RVSM Airspace with a minimum MTBF (Mean Time Between Failure) of two months for a given FIR"; and

b) That for Req_{core}_88 (refer to FHA report at the ICAO website: www.icao.int/ESAF/RVSM "Aircraft shall be equipped with ACAS II version 7".

Conclusion 9/16: AFI RVSM Switch-Over Period

a) **That for $_{swit}$_24 (refer AFI FHA report at the ICAO website: www.icao.int/ESAF/RVSM "Use of Eastbound RVSM FL (FL310, FL350 and FL390) shall be suspended for a period of Two (2) hours after the Time Zero (To)";**

b) **That for $_{swit}$_40 (refer AFI FHA report at the ICAO website: www.icao.int/ESAF/RVSM "Traffic density shall be limited during switch-over period as appropriate";**

c) **A Trigger NOTAM shall be published Two (2) weeks before Time Zero (To) notifying the implementation of RVSM and relevant procedures to be applied;**

d) **That for $_{swit}$_25 (refer AFI FHA report at theICAO website: www.icao.int/ESAF/RVSM "A NOTAM shall be published to suspend FL310, FL350 and FL390 for RVSM operations after ToS during a period of Two hours";**

e) **That for $_{swit}$_35 (refer AFI FHA report at the ICAO website: www.icao.int/ESAF/RVSM "Transit of non-RVSM civil aircraft shall be suspended for a period of Two hours after Time Zero (To)"; and**

f) **That for $_{swit}$_36 (refer AFI FHA report at the ICAO website: www.icao.int/ESAF/RVSM "Operation above FL410 shall be suspended for non-RVSM aircraft for a period of Two (2) hours after Time Zero (To)".**

Conclusion 9/17: Regional Airworthiness Certification and Certification Agency for RVSM Operation

That:

a) States having difficulties with the implementation of operational airworthiness certification on the RVSM implementation should seek assistance from other States having this expertise;
b) Seminars/Workshops be conducted for airworthiness/operations personnel on issues relating to RVSM certification; and
c) Studies be conducted by IATA in cooperation with ICAO relating to the establishment of RVSM Certification Agencies for the AFI Region and results forwarded to the Task Force for their consideration.

Conclusion 9/18: AFI RVSM Implementation – Cost recovery

That:

a) IATA airlines continue to financially support the RVSM implementation effort in order to improve safety and economy of Air Traffic across Africa;
b) IATA has put in place a RVSM cost recovery scheme based on a charge imposed on all international jet flights in Africa operated by its member airlines, which will end in June 2006; and
c) Sufficient funds should be available to complete the project
d) IATA to report to RVSM Task Force with the results of the study.

Conclusion 9/21: ATS Letters of Procedure/Agreement

That the template ATS Letter of Procedure/Agreement at Appendix F be used by States to update their current letter of Procedure/Agreement to incorporate RVSM procedures.

Conclusion 9/22: Amendment to the Regional Supplementary Procedures – Doc 7030/4

That the revised version of the amendment to the Regional Supplementary Procedures-Doc 7030/4 at Appendix G be processed by the secretariat in accordance with the established practice.

Conclusion 9/23: Uncoordinated Military Operations in the Indian Ocean Region

That ICAO liaise with FAA and other concerned CAAs concerning the extensive military activities in the Indian Ocean in view of RVSM implementation in AFI Region. The target date for a solution to the safety in the Indian Ocean region and report back to the Task Force will be TF/10.

Conclusion 9/24: Campaign to enhance RVSM Implementation

That, sensitization of Civil Aviation CEO/DGs by Regional Directors of ICAO and IATA on importance of RVSM and the need for its early implementation in the AFI Region be accorded priority during ICAO and IATA missions to States.

2.7 AFI RVSM Safety Policy Document

2.7.1 The task force in carrying its mandate as directed by APIRG developed a draft AFI RVSM Safety Policy Document which was adopted by APRIG. In adopting the Document APIRG requested the Secretariat to circulate it to States for its publication through the most appropriate AIS means. The document is at **Appendix B** to this report. In view of the foregoing, conclusion 9/11 was formulated.

Conclusion 9/11: Revised AFI RVSM Safety Policy

That States expedite the publication of the revised version of the AFI RVSM Safety Policy in an AIC as amended at the Task Force 9 meeting at Appendix B.

2.8 AFI Switchover Plan

2.8.1 The meeting was presented by the RVSM Core Team the AFI RVSM Switchover Plan. It was noted that the AFI RVSM Switchover Plan had been compiled with reference to the approved AFI Functional Hazard Assessment. It was pointed out that the Switchover Plan only addresses that period twenty-four hours before until twenty four hours after Switchover. It was noted that the AFI Switchover Plan has been submitted to ALTRAN Technologies for inclusion into the AFI RVSM Pre-Implementation Safety Case. The meeting adopted the plan and requested States to refer to the AFI Functional Hazard Assessment in order to compile their own detailed switchover plan. In view of the discussions, conclusion 9/19 was formulated.

Conclusion 9/19: RVSM Optimal Switch Over Time

That:

a) **The TF Secretariat Support Team composed of Nigeria, South Africa, Tanzania, ASECNA and IATA coordinate and research all the associated elements, including weather and human factors, that will have an effect on the switch over; and**

b) **Considering the switch-over period remains one of the most critical in the management of the implementation of RVSM, RVSM Task Force consider the switch-over Plan at Appendix D be amended by the Task Force and distributed to States.**

Report on Agenda Item 3

Review and update the AFI RVSM Strategy/Action Plan.

3.1 The meeting recalled that in noting the APIRG/14 Conclusion 14/21 (implementation of RVSM in the AFI Region) the ANC had expressed its concern that RVSM required a sophisticated implementation process and requested the States to monitor preparations and assist, to the extent possible, as an acceptable level of safety should be achieved and maintained.

3.2 The meeting noted that the ANC emphasized the provision of ATC and the required CNS facilities and services as a pre-requisite to the RVSM implementation. The ANC further requires the Pre-Implementation Safety Case to be presented for approval.

3.3 The meeting re-affirmed its earlier conclusion that there was an urgent need for campaign on the implementation of RVSM at the highest level in the Aviation Administration of each State.

3.4 Furthermore, the meeting agreed that the revised AFI RVSM strategy/action plan at **Appendix H** be circulated to States for action.

3.5 The meeting agreed that the implementation of RVSM in AFI should be pursued in a pragmatic manner and in detail following the steps in the revised strategy/action plan. The meeting agreed that the strategy/action plan will be reviewed at each of the TF meetings before any decision is made to implement the RVSM. In light of the discussion, the following conclusion was formulated:-

Conclusion 9/25: **AFI RVSM Strategy/Action Plan**

That the updated AFI RVSM Strategy/Action Plan at Appendix H be circulated to States for action.

Report on Agenda Item 4: Any other Business

4.1 Under this Agenda Item the meeting discussed the following subjects:-

a) Annex 10 - Aircraft Addresses.
b) Update of AFI RVSM ATS Operational Manual
c) Operations in the AFI RVSM Airspace.
d) Retention of routes in AORRA.
e) RVSM Safety Assessment
f) Funding of the ARMA.

Annex 10 - Aircraft Addresses

4.2 The meeting recalled that it is a requirement that States record their RVSM approved aircraft operators and aircraft on the RMA F2 form for entry into the ARMA database. This request was first made at Task Force 8. The form shall include the Mode S aircraft address as requested on said form. To date various requests have been received from EUROCONTROL for the Mode S aircraft addresses for various aircraft. This in effect is essential and beneficial to AFI as the Mode S aircraft address is essential in recovering height-keeping data that can be effectively used in AFI by the ARMA after the aircraft has over flown a European HMU. HMU height keeping data can be utilized in lieu of GMU height keeping data thus a potential saving for AFI aircraft operators. During the GMU familiarization training it has also become evident that the aircraft address will also be required.

4.3 States have been requested on various occasions to maintain a register of all Mode S addresses assigned to aircraft as aircraft addresses in order to satisfy the requirements of Annex 10 (AFI/7 Conclusion 11/2). Appendix C to the Report on Agenda 11 of the AFI/7 Report (Doc 9702) contains guidance material on the establishment of a registry of aircraft addresses. This register will inter alia satisfy the ARMA requirement for Mode S aircraft addresses, which will in turn assist with the RVSM program, and the subsequent requirements thereafter.

4.4 In this regard National Program Managers should assist their States in completing the RMA 2 form correctly with the Mode S aircraft address as recorded on the applicable State registry of aircraft addresses; and that States that have not yet done so, should establish, as a matter of priority, their registry of aircraft addresses.

In view of the foregoing, conclusion 9/26 was formulated:-

Conclusion 9/26: Annex 10 - State Aircraft Addressing

That States establish and maintain their Mode S registers for inclusion in the RMA F2 form relevant to RVSM operations.

4.5.1 Consideration of the AFI ATS Operations Manual

4.5.1.1 The meeting considered the sample of the AFI RVSM ATS Operational Manual and noted that the Manual should be updated by the RVSM core Team and the final product be sent to the States for the use in developing the National RVSM ATS operational Manual. Subsequently, the core team finalized the document at **Appendix I** to this report.

In light of the above, conclusion 9/27 was adopted:-

Conclusion 9/27: AFI RVSM ATS Ops Manual

That the sample AFI RVSM ATS OPS Manual at Appendix I be circulated to States to assist them to update their procedures where appropriate.

4.5.1.2 The meeting recalled, the AFI RVSM Policy excludes non RVSM certified aircraft from operating within the RVSM flight level bands. This exclusion will effect aircraft that lose MASPS equipment due to equipment failure thus becoming 'non RVSM approved'. Flights on long over water sectors will be effected by this exclusion.

4.5.1.3 Recalling that as a result of the aircraft equipment no longer meeting RVSM MASPS (MEL), the aircraft RVSM approval status is downgraded to 'Non RVSM approved' and 2000 feet separation is to be applied between this aircraft and other flights in the vicinity .

4.5.1.4 In such a case, the ATC will clear the aircraft out of the RVSM airspace, normally to a level below the RVSM airspace. This procedure will impact on the fuel management of the flight, possibly requiring the flight to divert to an alternate field, should the fuel burn at the lower altitude indicate that the aircraft may not be able to reach its destination on the fuel remaining.

4.5.1.5 With respect to operations on long over water sectors, namely Johannesburg to Sao Paulo, such a procedure could well compromise the safety of the flight due to a possible higher fuel burn than what was flight planned for.

In view of the discussions, the meeting noted that:

a) That procedures need to be co-ordinated between those FIRS which have adjacent Oceanic sectors through Letters of Procedure, with regard to a common policy in dealing with a flight on a long over water sector; and

b) Of the proposal that in the event of such an occurrence, a 2000ft separation is established around the aircraft concerned, with the flight operating according to the filed flight plan, until the flight reaches continental airspace, where after the aircraft will be cleared out of RVSM airspace.

4.6 Retention of those sectors of the ATS routes included in the AORRA

4.6.1 The meeting recalled that the implementation of the AORRA, will result in the withdrawal of those sectors of Air Traffic Service routes which are included in the random routing area. Consideration should be given to the retention of the route sectors affected for contingency purposes.

4.6.2 Recalling ICAO requires States to develop Contingency Plans, which will support the provision of Air Traffic Services, if not by the State effected by circumstances which caused the contingency, then by its neighbors in compliance with agreements regarding the imposition of the contingency.

4.6.3 Furthermore, in order for an Air Traffic Service to provide within airspace, the contingency plan calls for at least a basic structure to be in place, which will allow operations to be provided. This structure would normally dictate those air routes which will be utilized as part of the contingency measures. This allows for aircrew and operators to plan their operations and ATC to be able to control the flow of traffic into the contingency area and also for the neighboring FIR to plan its activities around the contingency.

4.6.4 Considering the need for neighboring FIRs to provide a service into the effected airspace, if this be required, the ATC should be familiar with the airspace. In order to assist this process, ATS routes with published significant points should be utilized to assist the ATC in providing the required ATS service within the contingency airspace, which may be unfamiliar to that ATC.

4.6.5 Taking into account that the air routes which are contained within the AORRA are all published and that all the routes have published significant points at those positions which require identification, these routes may be utilized for contingency purposes within the various oceanic airspaces covered by the AORRA, should the need arise. The fact that the routes are named and the significant points appropriately identified will assist an ATC unfamiliar with the area in providing a service into that area under contingency conditions, should this be necessary.

4.6.6 In view of the discussions the meeting consider that instead of withdrawing the routes affected by the AORRA, these routes be suspended as opposed to being withdrawn, in order to assist with the implementation of contingency measures, should the need for such ever arise. The routes may then be revived in full or only in that sector of airspace which is affected by the contingency.

The meeting thus formulated Conclusion 9/29:

Conclusion 9/29: Retention of ATS Routes in AORRA

That the routes that are currently in the AORRA be suspended however not withdrawn from the ANP to take care of contingencies in (Atlantic Ocean Random Routing Area) AORRA airspace:

Collision Risk Analysis and Target Level of Safety

4.6.7 The meeting recalled that RVSM Safety Assessment, the AFI RVSM collision risk assessment (CRA) report as conducted by NLR was presented to the task force during 2005. The CRA concluded that AFI does not meet the target level of safety as required by ICAO for implementation. The study concluded that AFI exceeded the required TLS of 5x10-9 fatal accidents per flight hour by a factor of 13. IATA and the ARMA have continued to analyze data received in the subsequent period and we are of the opinion that the TLS will not be achieved for a number of years.

4.6.8 Taking into account that ICAO Doc 4444 Chapter 2, Section 2.6.1 describes the requirement for safety assessments. Section 2.6.1 furthermore specifically mentions RVSM and that " when, due to the nature of the change, the acceptable level of safety cannot be expressed in quantitative terms, the safety assessments may rely on operational judgment".

4.6.9 Noting that a number of States, ANSP's, ICAO and IATA are currently conducting a safety assessment under the auspices of Doc 4444 Chapter 2.6 for the implementation of RNAV routes between Southern Africa and Europe.

4.6.10 Furthermore, the IATA Regional Coordinating Group met in Johannesburg from 29-30 March 2006 where RVSM implementation was discussed. The RCG mandated IATA to investigate the possibility of conducting a safety assessment that does not rely on the achievement of a TLS. The RCG stated that the safety assessment should prove that the implementation of RVSM will result in an operational scenario that is 'as safe, or safer" than the current ATS environment in AFI.

4.6.11 The meeting was aware of difficulties being experienced in other Regions with regard to maintaining the TLS of 5x10-9. In particular the NAT Region has exceeded the TLS by as much as 27x10-9. This clearly indicates that ICAO is satisfied with the RVSM operations in NAT irrespective of the TLS.

4.6.12 The meeting was of the opinion that if a safety assessment in terms of ICAO Doc 4444 Chapter 2, Section 2.6.1 does not meet ICAO's requirements, then ICAO should stipulate a more realistic and revised TLS that the AFI Region should meet prior to RVSM implementation. In view of lengthy discussions on this issues the meeting formulated Conclusion 9/28:-

Conclusion 9/28: AFI RVSM Safety Assessment

That:

a) ICAO consider an alternate safety assessment methodology in terms of the ICAO Doc 4444 Chapter 2.6.1; and/or

b) review the TLS for AFI in view of the safety performance reported from other RVSM regions; and

c) Report the outcome to RVSM Task Force 10 meeting.

4.6.13 The meeting noted that ARMA in fulfilling its duties as an RMA has secured the services of ARINC for the provision of a professional Height Monitoring Service within the AFI Region as is being conducted in other areas of ARINC's Height Monitoring operations.

4.6.14 The meeting further noted that ATNS has entered into a two-year contract on behalf of ARMA for the provision of the above-mentioned service by ARINC. The contract has been signed and will enter into force on 1 May 2006. The ARMA and ARINC have been working closely together in securing all the requirements to effectively get the service operational. As this is the first time that this type of service has been contemplated in AFI there has been out of necessity some development work that has taken place with regards to securing and adapting DGPS data, Meteorological data, establishing the Johannesburg Operations Base and various other software adaptations. All the aforementioned have now materialized and need to be tested and validated. During the week of 10 April 2006 ARINC was present at the Johannesburg Operations Base where GMU Specialist training was provided as well as the first Height Monitoring training and test data flights for inter alia gathering of test data for processing and evaluation. Once the integrity of this data has been proved the implementation date for the service will be decided upon and released to AFI by email and AIC and placed on Web sites. Those States that can publish an article in a prominent aviation magazine are welcome to do so based on the information contained in the AIC.

4.6.15 It was noted that AFI has access to three GMU's, which will be utilized for Height Monitoring in AFI which all carry certification papers, EASA Form 1, for operation on board aircraft either on the flight deck or within the cabin. It should be recalled that GMU Height Monitoring has been operational in other regions for some time and is thus a safe and tested method of gathering Height Monitoring Data. The certification forms are carried by the GMU Specialist for presentation to the appropriate authorities on request. Further to this ARMA will issue to the relevant members at Task Force 9 a set of the certification papers for reference purposes and if deemed necessary lodging with the Civil Aviation Authorities. The certificates are valid for a period of one year from time of issuance. Requests should be made to ARMA/ARINC for these copies either electronically or via fax if required.

4.6.16 Furthermore, matters with reference to the Height Monitoring service before and after the service has been made available for operational use should use the following points of contact in order to obtain information, secure the service and plan the event:

- Preferably direct contact with ARINC on email addressAFIRVSM@arinc.com
- If unsure of the process make contact with the ARMA on the already published contact details for ARMA.
- The Operational Base in Johannesburg will serve as the planning base for the event to which the operator will be directed.

4.6.17 In light of the discussions, the meeting adopted these preliminary procedures, contact details for dissemination to operate and CAAs in proposed Height monitoring. The meeting formulated Conclusion 9/30:-

Conclusion 9/30: AFI GMU Height Monitoring

That ARMA compile a sample AIC for distribution to States when the date for the availability of the service becomes available.

4.7 Funding of the RMA

4.7.1 The meeting was apprised on the discussions at ALLPIRG/5 relating to the Global approach to funding RMA. The meeting requested the Task Force to put in its programme all issues relating to funding of RMA and provide the update at all meetings of the Task Force.

NINTH MEETING OF THE RVSM/RNAV/RNP TASK FORCE (NAIROBI, 19 – 21 APRIL 2006)
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AFI REDUCED VERTICAL SEPARATION MINIMUM (RVSM) SAFETY POLICY

APRIL 2006

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AFI REDUCED VERTICAL SEPARATION MINIMUM (RVSM) SAFETY POLICY

1. INTRODUCTION

This document, the RVSM Safety Policy Document, sets out the Safety Policy, the Safety Objectives and describes the RVSM Safety Sub-Program tasks and actions necessary to ensure the safe implementation of RVSM in the AFI region.

The RVSM Safety Policy Document is intended to provide a framework to facilitate the safety regulation process of the AFI RVSM Program. As such, it is considered to be a formal deliverable of the RVSM Program.

The RVSM Safety Policy Document describes the deliverables of the RVSM Safety Sub-Program together with their role in the overall AFI RVSM Program and in the national safety assurance programs.

2. RVSM OPERATIONAL CONCEPT

The principal concept behind RVSM is the reduction of the vertical separation minimum between adjacent aircraft from 2000 feet to 1000 feet between the Flight Levels FL290 and FL410 inclusive. This will provide six additional cruising levels to air traffic, increase the capacity of the Air Traffic Management system and facilitate the task of Air Traffic Services in maintaining a safe, orderly and expeditious flow of traffic. It can be expected that the capacity and system benefits of RVSM will, by facilitating the Air Traffic Control function, also have the potential for possible safety benefits.

This vertical separation minimum shall be applied between RVSM approved aircraft within the airspace of the designated RVSM airspace. Therefore, all operators proposing to operate across the lateral limits of the RVSM airspace shall be required to indicate on Filed Flight Plans their RVSM status. Non-RVSM approved aircraft, other than state aircraft, shall not be permitted to operate within RVSM airspace.

There will be no RVSM Transition Airspace within the AFI Region.

The RVSM Program requires that specific training for aircrew and ATC staff shall be performed prior to the start of RVSM operations. The Program also requires ATC equipment and procedures to be modified according to specific Program requirements prior to the start of RVSM operations.

3. AFI RVSM PROGRAM SAFETY POLICY

The Safety Policy for RVSM implementation has been established to meet the requirements of ICAO Standards and Recommended Practices and guidance material on managing collision risk consequent on the implementation of RVSM.

The following statements define the Safety Policy of the RVSM Program:

(i) The AFI RVSM Program uses an explicit, pro-active approach to safety management in the development, implementation and continued operation of RVSM.

(ii) The responsibility of management for the safety performance of the RVSM Program is recognised. The RVSM Program Manager is responsible for the overall management of the Program. The RVSM Safety Program Manager is responsible to the RVSM Program Manager for ensuring the compliance of the Program with AFI Safety Policy and appropriate international standards and requirements. The RVSM Safety Program Manager is also responsible for liaison with the Regulation Authorities.

(iii) The implementation of RVSM shall be conducted in accordance with ICAO requirements and requires ninety percent RVSM approved aircraft operating within the Region;

(iv) The safety of air navigation has been given the highest priority in the development of the RVSM operational concept and the Implementation Program;

(v) The RVSM Program shall minimise the program's contribution to the serious or risk bearing incidents or aircraft accidents as far as is reasonably practicable.

4. RVSM IMPLEMENTATION SAFETY OBJECTIVES

(i) The RVSM Program shall conduct a full Functional Hazard Analysis looking at the whole system including air and ground segments and the proposed operational concept. This analysis shall adopt a total aviation system perspective and a risk based approach to the classification of hazards. The analysis shall include, but not be restricted to, those risks already identified by ICAO for RVSM implementation;

(ii) The RVSM Program shall, as its principal safety objective, minimise the program's contribution to the risk of an aircraft accident. The RVSM Program recognises the AFI Safety Objectives and Strategy, in particular the general objective to improve safety levels by ensuring that the number of ATM induced accidents and serious or risk bearing incidents do not increase and, where possible, decrease. Therefore, the implementation of RVSM shall not adversely affect the risk of en-route mid-air collision;

(iii) The RVSM Program shall establish an explicit Safety Sub-Program to ensure that Program's contribution to the risk of an aircraft accident is minimised in accordance with the principal safety objective;

(iv) In accordance with ICAO Guidance Material the management of vertical collision risk within RVSM airspace shall meet the Target Level of Safety of 5 x 10^{-9} fatal accidents per flight hour;

(v) In accordance with ICAO Guidance Material, the risk of mid-air collision in the vertical dimension within RVSM airspace, due to technical height keeping performance, shall meet a Target Level of Safety of 2.5 x 10^{-9} fatal accidents per flight hour.

(vi) Guidance shall be given to the States to explain the necessary activities to provide evidence about the safe implementation of RVSM on the national level and subsequently assure the preparedness of the States.

Safety Requirements that may arise as results from the detailed Functional Hazard Analysis that yet has to be carried out will complement these Safety Objectives.

5. RVSM IMPLEMENTATION SAFETY OBJECTIVES

As part of the RVSM Program, an RVSM Safety Sub-Program has been developed to provide evidence on the compliance of the Implementation Program with the RVSM Safety Policy and the RVSM Safety Objectives.

The work program of the RVSM Safety Program comprises the following elements:

(i) Detailed Hazard Analysis, Preliminary System Safety Assessment and System Safety Assessment of the proposed RVSM operational concept;

(ii) Assessment of operational error reports, both prior to and after implementation, to identify any additional risks and hazards associated with the proposed operational concept and to provide data for the assessment of the target levels of safety;

(iii) Establishment of formal requirements for participating states to demonstrate that all necessary national activities and actions have been undertaken prior to implementation.

(iv) Assessment of the risk of mid-air collision, using methods specified in ICAO guidance material;

(v) A major assessment of aircraft height keeping performance to monitor compliance with height keeping requirements.

Each of these elements will produce deliverables, in the form of reports, which will be formally presented to the ARTF as the Program proceeds.

6. RVSM SAFETY DELIVERABLES

In this section, the major deliverables of the RVSM Safety Sub-Program are described. Although the deliverables are in the form of formal documents, interim reports will be provided for review prior to completion of the final version of a deliverable document.

6.1 RVSM Functional Hazard Analysis

A detailed Functional Hazard Analysis (FHA) shall be carried out to provide assurance that all hazards and risks associated with RVSM have been identified and classified. The FHA shall cover (i) the situation that RVSM is operational one year after its introduction, (ii) the change-over on the day of RVSM introduction. The results of the FHA shall be documented in a detailed report and a hazard/risk matrix. It will be used as input to the Collision Risk Assessment and the National Safety Cases where appropriate. A summary of the results will constitute one chapter of the AFI RVSM Pre-Implementation Safety Case and the detailed report will appear as an Annex.

6.2 Collision Risk Assessment

A Collision Risk Assessment (CRA) shall be carried out in order to provide the evidence that the collision risk in RVSM airspace meets the Target Level of Safety required by ICAO. A summary of the results will form one chapter of the AFI RVSM Pre-Implementation Safety Case and the detailed report will appear as an Annex.

6.3 National Safety Plans

Guidance shall be given to the States to explain the necessary activities to provide evidence about the safe implementation of RVSM on the national level. Using the guidance material National Safety Plans should be produced by the States, submitted to the National Regulator as appropriate and shall be summarised by the RVSM Safety Sub-Program in to order to form one section of the AFI RVSM Pre-Implementation Safety Case.

6.4 AFI RVSM Pre-Implementation Safety Case

The AFI RVSM Pre-Implementation Safety Case shall provide the assurance that the objectives stated in the AFI RVSM Safety Policy Document are met. Evidence will be provided that (i) all identified hazards and risks are managed and mitigated, (ii) the collision risk meets the ICAO Target Level of Safety and (iii) States show they will safely implement RVSM through the development of national safety documentation.

6.5 AFI RVSM Post-Implementation Safety Case

The required contents of the Post-Implementation Safety Case will be developed as a result of the pre-implementation safety activities. However, the main objective will be to confirm assumptions and estimations being made in order to determine if in an operational RVSM environment the safety objectives can be met. It is expected that the document demonstrates *inter alia* that safety is continuously ensured, the aircraft approval process is effective, the target levels of safety are being met, operational errors do not increase and ATC procedures introduced for RVSM remain effective.

RVSM IMPLEMENTATION READINESS ASSESSMENT SURVEY: AFI REGION

State	

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
	RVSM Implementation Program					
1. RVSM Implementation Program – Target Date 28 September 2006	Is the National RVSM Implementation plan/Program harmonized with the AFI RVSM Regional Implementation Plan?					Conclusion: ARTF 4/5
	Has your administration developed an RVSM aircraft and operators approval program?					Conclusion: ARTF 4/7
	Has your Administration submitted a National RVSM Implementation plan/Program to ICAO Regional Program Office?					Conclusion: ARTF 4/11 National RVSM Plan
	Has the National RVSM Implementation plan/Program taken into account the users requirements?					Doc. 9574 Chapter 3 National RVSM Plan
	Has the administration determined the RVSM status of the national fleet?					Doc. 9574 Chap 3 Conclusion: ARTF 4/11 & ARTF 4/12
	Has your administration disseminated the National RVSM Implementation Program to all stakeholders?					Conclusion: ARTF 4/11 National RVSM Plan
	Has the administration designated the National Program Manager for the RVSM implementation program?					Conclusion: 4/3 National RVSM Plan

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
	RVSM Implementation Program					
	Has your administration designated an ATS Manger responsible for the ATM RVSM Sub-program?					National RVSM Plan
	Has your administration designated a Manager responsible for aircraft OPS/Airworthiness sub-program?					National RVSM Plan
	Has the administration designated a Manager responsible RVSM Safety Sub-Program?					Conclusion: 4/18 National RVSM Plan
	Will RVSM be implemented in the airspace on the date agreed upon by AFI?					Conclusion : ARTF 4/5
	Has your administration published the procedures to accommodate aircraft in RVSM airspace?					Conclusion: ARTF 4/11 National RVSM Plan
	Has your administration made provision to accommodate non-RVSM State aircraft in RVSM airspace?					Conclusion: ARTF 4/9 ICAO Doc 7030/4 National RVSM Plan
	Have national rules/regulations been developed/published for RVSM implementation?					Conclusion: ARTF 4/8

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
	RVSM Implementation Program					
	Has your administration assess the impact of RVSM implementation on controller automation systems and plan for upgrades/ modifications?					Conclusion: ARTF 4/11 National RVSM Plan
	Have documents related with RVSM approval of aircraft and operators of the JAA Temporary Guidance Leaflet (TGL) 6 y/o FAA Document 91 RVSM been adopted?					Conclusion: ARTF 4/7
	Has the RVSM Advisory Circular been adopted for RVSM approval of aircraft and operators?					Conclusion: ARTF 4/7
	Has your Administration established National RVSM approved Aircraft Database?					Doc. 9574 Conclusion: ARTF 4/4
	Are RVSM approvals granted to aircraft and/or operators registered in your State?					Conclusion: ARTF 4/12
	Is a letter of Authorization issued when RVSM approval to individual aircraft granted?					
	Has AFI Regional monitoring Agency (ARMA) form been completed to communicate the status of RVSM approval or withdrawal to ARMA?					Conclusion: ARTF 4/4

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
	RVSM Implementation Program					
	Has the Guidance material on the implementation of a 300 M (1000 FT) vertical separation minimum between FL290 and FL410 inclusive for application in the airspace of the AFI Region been adopted?					Conclusion: ARTF 4/4
	Has National RVSM implementation legislation been published?					Doc. 9574 Conclusion: ARTF 4/8
	Has the AIC been published in advance informing stakeholders of the date for RVSM implementation?					Conclusion: ARTF 4/11
	Is the administration disseminating RVSM legislation and documentation through adequate means?					Conclusion: ARTF 4/11
	Has the Guidance material on the implementation of a 300 M (1000 FT) vertical separation minimum between FL290 and FL410 inclusive for application in the airspace of the AFI Region been adopted?					Conclusion: ARTF 4/4
	Has your administration analysed the impact that would have in RVSM implementation if the required documentation were not taken into account?					Conclusion: ARTF 4/18

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
	Operations & Airworthiness					
2. RVSM Operations &Airworthiness	Has your administration implemented the National RVSM Operator/ Aircraft approval Program?					Doc. 9574 Chapter 4.2 Conclusion: ARTF 2/8 & ARTF 4/11
	Does the program cover aircraft airworthiness certification (approval of modifications and major repairs) and operational separately?					Doc. 9574 Chapter 4 National RVSM Plan
	Will the program be completed before the RVSM implementation date 28 September 2006?					National RVSM Plan Conclusion: APIRG 14/21
	Has your Administration adopted TGL6 Revision 1 for approval of operators/aircraft for RVSM Operations?					Doc. 9574 Chapter 4 Conclusion: ARTF 4/7
	Has your administration published the National RVSM Operator/ Aircraft approval Legislation?					Doc. 9574 Chapter 4 Conclusion: ARTF4 2/8 & ARTF 4/8
	Has your administration published the required maintenance program to ensure RVSM airworthiness?					Doc. 9574 Chapter 5 National RVSM Plan
	Has your administration developed a Database for RVSM approved aircraft?					Doc. 9574 Chapter 5 Conclusion: ARTF4 4/11 National RVSM Plan
	Has your administration completed a RVSM approved aircraft readiness assessment?					Conclusion: ARTF4 4/12

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
Operations & Airworthiness						
3. RVSM Operations & Airworthiness Training	Has an RVSM training program been prepared for OPS/Airworthiness personnel?					Doc. 9574 Chapter 4/5 Conclusion: ARTF 4/6 & ARTF 4/11
	Does the program cover aircraft airworthiness certification (approval of modifications and major repairs) and operational (procedures approval and operator training program) separately?					Doc. 9574 Chapter 4 Conclusion: ARTF 4/7
	Will the program be completed before the RVSM implementation date 28 September 2006? If such were the case, the finalization of the training program?					Conclusion: APIRG 14/21
	Does the program have the RVSM training material in OPS/ Airworthiness areas?					
	Which documentation did the administration use to prepare RVSM training material?					
	Has the training material been approved by the corresponding authority?					

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
Operations & Airworthiness						
	How many phases are envisaged for the training?					
	Has OJT been foreseen and completed before RVSM implementation date?					
	Does the administration make sure that personnel training is appropriate and carried out in a professional manner?					
	Do OPS/Airworthiness instructors have sufficient experience?					
	Are the OPS/Airworthiness instructors used for training qualified to provide on the job training (OJT)?					
	Can the administration assure that the necessary time for an appropriate training was used or will be used?					
	Does training include the establishment of adequate refresher courses, if necessary?					
	Has the administration analysed the impact that would have in RVSM implementation if the requirements for personnel training were not taken into account?					

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
	Air Traffic Management					
4. Modification in the Airspace Structure	Has your Administration implemented your RVSM National Plan?					Conclusion: ARTF 4/3 National RVSM Plan
	Will your Administration implement RVSM in the Airspace as identified by AFI?					
	Has your administration identified new entry/exit points to RVSM airspace?					Doc. 9574 National RVSM Plan
	Has your administration identified modifications to the existing route network?					Doc. 9574 National RVSM Plan
	Has your administration designated transition airspaces between RVSM and non-RVSM airspaces?					Doc. 9574 National RVSM Plan
	Has your administration identified Modifications in airspace sectorization for RVSM purposes?					Doc. 9574 Chapter 5 Conclusion: 2/13
	If such were the case, was the airspace structure subject to simulations?					Doc. 9574 National RVSM Plan

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
Air Traffic Management						
5. ATC Procedures	Has your administration identified changes in civil/military coordination?					Doc. 9574 Chapter 5 Conclusion: ARTF 4/2
	Does you administration consider air traffic flow management for your State?					
	Has the administration adopted the Cruise Levels Table of Appendix to ICAO Annex for the assignment of cruise levels in RVSM airspace?					Annex 2 Conclusion : ARTF 2/13
	Has the administration adopted adequate national contingency procedures?					Doc. 9574 Chapter 5 ICAO Doc 7030/4 Conclusion: ARTF 4/9 National RVSM Plan
	Have the procedures been duly supervised in order not to affect the safety in air operations?					Doc. 9574 Chapter 3
	Has ICAO guidance material been used in the preparation of procedures?					Conclusion: ARTF 2/13 National RVSM Plan
	The procedures and associated phraseology been included in the operational manual of the ATS unit?					Doc. 9574 Chapter 5 Conclusion: ARTF 2/13 National RVSM Plan
	Has ATC procedures been reviewed with operational personnel from ATC units?					Doc. 9574 Chapter 5 Conclusion: ARTF 3/6 National RVSM Plan

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
Air Traffic Management						
	Have the procedures affecting adjacent ATS been duly coordinated, approved and included in the letters of operational agreement?					Doc. 9574 Chapter 5 Conclusion: ARTF 4/11 National RVSM Plan
	Have ATC procedures and associated phraseology been subject to simulations?					Doc. 9574 Chapter 5 Conclusion : ARTF 3/6 National RVSM Plan
	Are RVSM ATC procedures being disseminated by the adequate means?					Conclusion: ARTF 4/11
	Has the administration analysed the impact it would have in RVSM implementation if the changes required have not been taken into account?					Doc. 9574 Chapters 3/5. National RVSM Plan

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
Air Traffic Management						
6. ATC Equipment	Does your administration has a modification plan of ATC equipment as a result of RVSM?					Doc. 9574 Chap. 5 Conclusion: ARTF2/13 National RVSM Plan
	Has your administration ensured that modifications in ATC equipment are appropriate?					Doc. 9574 Chap. 3 Conclusion: ARTF 4/11
	Do changes circumscribe to FDPS?					Doc. 9574 Chap. 3 National RVSM Plan
	Do changes circumscribe to RDPS?					Doc. 9574 Chap. 3 National RVSM Plan
	Do changes circumscribe to visualizing?					Doc. 9574 Chap. 3 National RVSM Plan
	Do changes circumscribe to STCA?					Doc. 9574 Chap. 3 National RVSM Plan
	Do changes circumscribe to MTCA?					Doc. 9574 Chap. 3 National RVSM Plan
	Do changes circumscribe to the systems software?					Doc. 9574 Chap. 3 National RVSM Plan
	Do changes circumscribe to ATC simulators?					Doc. 9574 Chap. 3 National RVSM Plan
	Does your administration have a contingency plan in case of delays in case of suffering delays in ATC equipment updating?					Doc. 9574 Chap. 5

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
Air Traffic Management						
7. RVSM ATCO Training	Has an RVSM training program been prepared for ATCOs?					Doc. 9574 Chap. 5 Conclusion: ARTF 3/6
	Is the program addressed for all ATC personnel?					Doc. 9574 Chap. 5 Conclusion: ARTF4/11
	Shall the program be completed before the RVSM implementation dated 28 September 2006? If such were the case, indicate finalization date of training program.					Conclusion: APIRG 14/21 Doc. 9574 Chap. 5 National RVSM Plan
	Does the program contemplate aspects related with the responsibilities of ATCOs?					Doc. 9574 Chap. 5 National RVSM Plan
	Does the program have RVSM training material?					Doc. 9574 Chap. 5 Conclusion: ARTF2/13 National RVSM Plan
	Which documentation did the administration use to elaborate RVSM?					Doc. 9574 Chap. 5 National RVSM Plan
	Has the training material been prepared under strict control and approved by the Operational Unit or the corresponding training centre?					Doc. 9574 Chap. 5 Conclusion: ARTF 3/6 National RVSM Plan
	Has OJT been programmed? When will this program end?					Doc. 9574 Chap. 5 National RVSM Plan

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
	Air Traffic Management					
	Does the administration ensure that the personnel training is appropriate and is carried out professionally?					Doc. 9574 Chap. 5 National RVSM Plan
	Do instructors have training and sufficient knowledge of RVSM Operations and do/did they have experience enough?					Doc. 9574 Chap. 5 National RVSM Plan
	Are instructors used in training or were they qualified to provide OJT training?					Doc. 9574 Chap. 5 National RVSM Plan
	May the administration ensure that the necessary time is or was used for an appropriate training?					Doc. 9574 Chap. 5 National RVSM Plan
	Does your administration foresee to establish adequate refreshing courses?					Doc. 9574 Chap. 5 National RVSM Plan
	Has your administration analysed the impact it would have in RVSM implementation if no personnel training requirements were taken into account?					Doc. 9574 Chap. 5 National RVSM Plan

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
	RVSM Safety Assurance					
8. RVSM Safety Assurance from FL 290 to FL 410 inclusive	Has your Administration implemented your RVSM National Safety Plan?					Doc. 9574 Chap. 3 Conclusion: ARTF 4/18 & ARTF 4/19
	Is the National RVSM Safety plan harmonized with the AFI RVSM Safety Policy?					Conclusion: ARTF 4/11
	Has your Administration submitted a National RVSM Safety plan to ICAO Regional Program Office?					Conclusion: ARTF 4/11
	Has your Administration informed National Operators of RVSM Implementation requirements?					National RVSM Plan
	Has your Administration adopted TGL6 Revision 1 for approval of operators/aircraft for RVSM Operations?					Doc. 9574 Chapter 3 Conclusion: ARTF 4/7
	Has your administration implemented the National RVSM Operator/ Aircraft approval Program?					Doc. 9574 Chap. Conclusion: ARTF 4/12
	Has your administration disseminated the National RVSM Implementation Program to all stakeholders?					Conclusion: ARTF4/11
	Has your administration implemented the National RVSM ATS Training Program?					ICAO Doc 7030/4 Conclusion: ARTF 2/7 & ARTF 4/6 National RVSM Plan

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
RVSM Safety Assurance						
	Has your administration published guidelines for RVSM Pilot Training?					Conclusion: ARTF 4/11 National RVSM Plan
	Has your administration developed a program for changes to ATC equipment to support the implementation of RVSM?					Conclusion: ARTF 4/11 National RVSM Plan
	Has the changes to ATS Equipment satisfactorily been installed?					Conclusion: ARTF4/17 National RVSM Plan
	Has the changes to ATS Procedures been approved?					Conclusion: ARTF 4/5 & 4/17
	Has your administration published the procedures to accommodate aircraft in RVSM airspace?					Conclusion: ARTF 4/8 & 4/9 National RVSM Plan
	Has the ATC Manual been approved?					Conclusion: ARTF 2/7 & ARTF4/11 National RVSM Plan
	Is the ATC Manual consistent with ICAO Doc 7030/4?					Conclusion: ARTF 4/9
	Has your administration coordinated the procedures required for RVSM at the ACC with adjacent ACCs?					

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
RVSM Safety Assurance						
	Has your administration amended the required Letters of Agreement (LoA) with adjacent ACCs for RVSM Operations?					Conclusion: ARTF 4/11
	Has the ATSU Operations Manual been amended to include changes as a result of RVSM?					
	Has your administration approved the changes to airspace design to support the implementation of RVSM?					
	Has your administration developed special procedures to enable safe switchover to RVSM?					
	Has your administration developed a program for ATC to report operational data errors?					Conclusion: ARTF 4/4

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
	RVSM Monitoring					
9. RVSM Operations Monitoring	Has the administration established adequate measures so that there is a monitoring before, during and after RVSM implementation in order to verify that the safety level is met?					Annex 11 Para. 2.26 Conclusion: ARTF 2/1 Conclusion: ARTF 4/4 National RVSM Plan
	Does the administration demand the operators/users the presentation of a monitoring program of aircraft for its approval?					
	Has the administration implemented a data collection program of large height deviations (LHD)?					Conclusion: ARTF 4/4
	Is this information submitted to ARMA monthly basis?					Conclusion: ARTF 4/4
	Is there a database with such information?					Conclusion: ARTF 4/4 National RVSM Plan
	Has the administration implemented a monthly data collection program for errors in the ATC communications circuit?					Doc. 9574 Chapter 5 National RVSM Plan
	Does the administration have a database with such information?					Conclusion: ARTF 4/4
	Is the information submitted to ARMA on the total of IFR movements on a monthly basis?					Conclusion: ARTF 4/4

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
RVSM Monitoring						
	Is there a database with such information?					Conclusion: ARTF 4/4
	Is information related to turbulence reports submitted to ARMA?					Conclusion: ARTF 4/4
	Is there a database with such information?					Conclusion: ARTF 4/4
	Has the administration established a continuous monitoring of the system?					Annex 11 para. 2.26 Doc. 9574 Chapter 6
	Has the administration assessed the impact that the lack of a continuous monitoring program and RVSM operations monitoring would have in air safety?					National RVSM Plan

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
RVSM Switch-Over						
10. RVSM Switchover	Has your administration adopted or will it adopt the measures to ensure a safe and effective transition to RVSM?					Doc. 9574 Chapter 5 National RVSM Plan Conclusion: ARTF4/11
	Have special procedures been established for the switchover period?					Doc. 9574 Chapter 5 National RVSM Plan
	Are contingency plan adequate for the switchover period?					Doc. 9574 Chapter 5 National RVSM Plan
	Has the administration foreseen the information process to ARMA during the next tour for RVSM implementation?					Doc. 9574 Chapter 5 National RVSM Plan
	Has the administration foreseen the information process to ARMA during the following 12 and 24 hours after RVSM implementation?					Doc. 9574 Chapter 5 National RVSM Plan)
	Has the administration assessed the impact that the lack of an RVSM transition plan and associated contingency measures could have in safety?					National RVSM Plan.

SUBJECT	ITEMS ASSESSED	TD	DC	NA	REMARKS	Ref. ICAO Regional/National Doc
	RVSM Resources					
11. Assignment of Resources for the Implementation of RVSM program	Have adequate measures been adopted in order to have the necessary resources for a successful RVSM implementation?					Conclusion: ARTF 4/11 National RVSM Plan
	For changes in ATC equipment?					Conclusion: ARTF 4/17 & 4/18
	For personnel training and associated material?					Conclusion: ARTF 4/17 & 4/18
	For training of OPS/Airworthiness inspectors?					Conclusion: ARTF 4/17 & 4/18
	To face administrative costs?					National RVSM Plan
	Has the administration evaluated the impact that the lack of assignment of sufficient resources in the RVSM national implementation program would have in air safety?					National RVSM Plan

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STATUS OF AFI RVSM STATES RVSSM READINESS SURVEY														
STATES	NPM	AIC	LOA	State Plan	AFI Safety Policy	ATC Manual	AC RVSM Readiness	ATC Training	Pilot Training	State AC Approval	Legis lation	Safety Forms	Military Ready	Seminar
Algeria	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Angola	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Benin	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Botswana	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Burkina Faso	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Burundi	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cameroon	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cape Verde	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Central African Republic	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Chad	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Congo	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Comores	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cote d'Ivoire	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
DRC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Djibouti	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Egypt	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ethiopia	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Eritrea	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Equatorial Guinea	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Gabon	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Gambia	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ghana	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Guinea	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Guinea Bissau	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Kenya	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lesotho	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

STATUS OF AFI RVSM STATES RVSSM READINESS SURVEY

STATES	NPM	AIC	LOA	State Plan	AFI Safety Policy	ATC Manual	AC RVSM Readiness	ATC Training	Pilot Training	State AC Approval	Legis lation	Safety Forms	Doc 7030	Military Ready	Seminar
Liberia	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Libya															
Madagascar	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Mali	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Malawi	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Mauritius	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Morocco	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Mozambique	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Namibia	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Niger	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nigeria	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Réunion	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Rwanda	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sao Tome and Principe	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Senegal	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Seychelles	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y
Sierra Leone	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Somalia (CACAS)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	N/A	Y
South Africa	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sudan	Y	Y						Y							Y
Swaziland	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Tanzania	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y
Tunisia	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Togo	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Uganda	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Zambia	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y
Zimbabwe	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

AFI RVSM

SWITCH - OVER PLAN

T -24 ToS T+24

AFI RVSM SWITCHOVER PLAN

EXECUTIVE SUMMARY

The AFI RSVM Task Force has been tasked to provide guidance material for the States Switchover Plans so that they can refer to and adapt to their own local requirements. The AFI Functional Hazard Assessment final version, as accepted by Task Force 6, was referred to as guidance material when compiling the AFI Switchover Plan.

The switchover document satisfies the identified major switchover hazards resulting from the Functional Hazard Assessment that will need to be considered in order to accomplish a safe and successful switchover from CVSM to RVSM at time of switchover.

The switchover plan only addresses the switchover period and does not address the timelines as reflected in the action plan required to implement RVSM. The actions to RVSM implementation should be considered as the RVSM Task Force timetable that is issued periodically by the Task Force and lodged with the ARPO.

RECOMMENDATIONS

It is recommended that States:

- Review the switchover plan, against their own detailed switchover plan and incorporate any amendments as required.

- Action any additional requirements as issued periodically by the ARPO appropriate to the States switchover plans.

ARPO
ICAO ESAF
NAIROBI KENYA

AFI RVSM SWITCHOVER PLAN

1. INTRODUCTION

1.1 The AFI RVSM Task Force has been tasked to provide a Switchover Plan for States to adapt to their own local requirements. The principle concerns of the Aviation Community have been addressed in the AFI Switchover Plan. This document should be referred to by States/FIR's to produce a plan that will be relevant to their ACC. This will in effect mean that there will need to be greater detail for individual actions within each FIR.

1.2 The assumption within this switchover plan is that the Go decision will only be made if the fundamental processes for the implementation of RVSM are in place:

- The Safety Case, with special reference to the CRA and TLS, would have been presented, and assurances provided that the level of safety preparedness of the States as reflected in the NSP's is sufficient for the task.

1.3 The AFI RVSM implementation Decision Process should result in a Go/Delay decision being verified in late June 2006. In the event of a Go decision, the Switchover Plan will be continually reviewed and checked for the commencement of RVSM operations on 28th September 2006 with special reference to the switchover period. The process will culminate in the switchover from CVSM to RVSM at ToS, which will require specific attention to ensure a safe and effective changeover with the minimum disruption to the flow of air traffic. At the ToS the whole of the RVSM airspace will be in a transition phase for controllers and aircrews until it is reported that all aircraft are at the required RVSM FLAS.

1.4 The ARMA and ASECNA (via WACAF) will serve as the focal points of contact during the switchover period. ASECNA will be required to report all significant operations/events relating to the switchover, in the ASECNA area of operations to the ARMA.

2. ACTIONS PRIOR TO ToS AFI RVSM SWITCHOVER T-24

2.1 AFI RVSM implementation readiness reporting will continue throughout the switchover period with the National Program Managers reporting to the ARMA.

2.2 Airspace

It is essential that there is a stable airspace configuration during the Switchover period from CVSM to RVSM. The stability of the airspace will also require the utmost co-operation from military organizations.

2.3 Flight Planning

Flight planning, will continuously be checked during the switchover period for irregularities including incorrect RVSM status in Flight Plan and the flight level in the filed ATC Flight Plan not being in accordance with FLAS.

Within the switchover period there will continue to be increased contact between Aircraft Operators and ATS and the overall awareness as to the necessary flight planning and approval requirements for entry into RVSM airspace will be reinforced. Warnings will be provided to non-RVSM approved aircraft that would incorrectly penetrate AFI RVSM airspace.

Aircraft Operators and ATS should note that the submission of RPLs will require specific and separate attention. Operators of RVSM approved aircraft shall indicate the approval status by inserting the letter W in Field 10 of the ICAO FPL, regardless of the Requested Flight Level (RFL). From 26 September 2006, ATS may invalidate a flight plan that does not comply with the RVSM requirements at ToS.

2.4 Civil/Military Coordination

Military exercises during switch over period should be suspended as per the FHA. If they do need to take place they should be coordinated with the greatest of care.

2.5 Ground Communications

During the switchover period redundant ground communication facilities must be available and ready for immediate use and adequately supported by competent technical staff.

2.6 Letters of Agreement/Procedures LOAs/LOP's.

States/FIR'/ACC's will ensure that the current LOA/LOP is easily accessible for reference purposes during the Switchover period. The following points should be carefully and continuously reviewed with regard to:

- FLAS for consistency with RVSM
- RVSM status of aircraft on the flight plan and if in doubt verify information with ARMA

3. AWARENESS CAMPAIGN

3.1 During the switchover period operators should be reminded of the flight planning requirements as well as the requirement of RVSM operator/aircraft approvals in order to operate within the AFI RVSM airspace.

4. SWITCHOVER (28 SEPTEMBER 2006) ToS

4.1 Switchover

A prime activity of the switchover period will be the switchover from CVSM to RVSM.

- Non RVSM approved flights airborne in the immediate period prior to the switchover may be adjusted to their new levels below FL290
- Operators must manage contingency fuel requirements as appropriate.
- At ToS, aircraft will be reassigned to their new levels.
- Operation above FL410 will not be permitted during the specified interval during the Switchover period by non RVSM approved aircraft.

4.2 Timing of Change.

The AFI RSVM Task Force has conducted a traffic analysis to determine a quiet and stable period, which confirmed the suitability for the switchover at 0001 HRS (UTC) 28 September 2006 ToS.

4.3 Aircraft in Flight at Time of Switchover.

The sequence of events at switchover will be:

- Warning of Switchover from CVSM to RVSM by all ground stations
- Implementation of Switchover from CVSM to RVSM by all RVSM approved aircraft and the exclusion of all non-RVSM approved aircraft. State aircraft will be managed accordingly.
- An on going verification of Operator/Aircraft approval status
- Heightened vigilance for any irregularities and reporting to ARMA

Inevitably, there will be a mixed population of air traffic being handled at the time of switchover however preparations to limit the amount of non RVSM aircraft should be increased prior to the switchover.

Repeated broadcasts of the pending switchover will be made to aircraft in flight commencing 45 minutes before switchover. Phraseology for broadcast as an example is:

"All stations, All stations, (*ACC identification*) Control Broadcast, RVSM operations commence at time 0001 HRS 28th September 2006."

4.4 Flow Management.

ACC's should apply flow management during the switchover period if required.

4.5 Staffing Levels at Time of Switchover.

- ACC staffing will be a major focus of attention with a need for back-up staff, engineering staff and in particular software support as reflected in the FHA.
- Comprehensive briefings will be provided by supervisors to all operational staff during ToS.
- ACC management shall suspend operational training during the switchover period.

4.6 Weather Phenomena during Switchover Period

Any adverse weather phenomena, sand storms or volcanic activity will be reported immediately to the ARMA during the Switchover period to assist with contingency planning.

4.7 Contingency Planning.

Contingency plans are already in place for the normal operation of ACCs. The RVSM ATC manual provides some guidance on contingency procedures for degradation of aircraft equipment associated with height keeping or the occurrence of weather phenomena, which directly affect the ability of aircraft to maintain their allocated flight level.

ACCs should therefore review their contingency arrangements prior to switchover and then have them readily available during the switchover period for any eventuality. Various failure conditions will have to be considered.

4.8 Hazard Identification and Mitigation.

National Safety Plans shall satisfy the requirements of the AFI FHA Appendix E.2 (AFI RVSM Switchover Period) and Appendix F.2 (allocated safety requirements for AFI RVSM Switch over period.)

5. IMMEDIATE POST IMPLEMENTATION PHASE (SWITCHOVER – 28 SEPTEMBER 2006 PLUS 24 HOURS

Twenty four hours after the introduction of RVSM each FIR will be required to provide a report to ARMA. FIR's experiencing problems or envisaging problems will report as such so that remedial action can be suggested. The report shall also include any large height deviations, wake vortex encounters and any other reportable incident brought about by the implementation of RVSM.

6. CONCLUSION

6.1 The AFI RVSM Task Force has been tasked to provide a switchover plan for States to utilize as guidance material. The launch of the Switchover Plan will commence on acceptance by the AFI RVSM Task Force.

6.2 National Program Managers must action any additional requirements as issued periodically by the ARPO appropriate to the States switchover plans.

6.3 The Switchover from CVSM to RVSM will require further activity within States with further guidance and direction provided to ACCs by their Civil Aviation Authorities. Aircraft Operators will also need to note the flight planning aspects and the operational aspects of the switchover.

THE NATIONAL SAFETY PLAN VALIDATION PANEL (NSPVP)

COMMENTS AND GUIDANCE REPORT

The Panel was satisfied to see that the vast majority of the States used the NSP template as it was developed by the RVSM Task Force earlier this year. However, the Panel was concerned by what it perceived to be a lack of detail and substance behind the plans. In many cases, it seemed that the plans were completed simply by replacing blanks in the template with the name of the State but without specifying details of how the State is complying or what specific actions are being taken to comply with requirements or make its plans a reality.

It appeared to the Panel that often the text on the template was simply replaced with the name of the State and that no further examination of the text was made, often resulting in confusing or contradictory information. In that regard, the Panel recommends that States conduct a through examination of the template for application in the State.

Many of the details of activities are written in the past tense and they need to be updated to reflect current realities. For example, plans sometimes mention that training was conducted but there is no evidence to show that the training actually took place. In addition, the NSP template proposes two different texts for certain sections and States were expected to select the most appropriate and often this was not the case. States are reminded that they will need to continue to reflect the current situation and change the selected paragraph if so required.

The comments offered in this cover document apply to a majority of the States that sent NSPs for validation and assessment by this Panel. The attached document contains detailed comments on the NSP as submitted by your State. The NSP assessments were conducted by evaluating the State's compliance with each of the following eight sections:

1. Section 1: Introduction
2. Section 2: Aircraft and Operator Approvals for RVSM
3. Section 3: ATS Training
4. Section 4: ATS Equipment
5. Section 5: ATS Procedures
6. Section 6: Airspace Design
7. Section 7: RVSM Switchover
8. Section 8: Operational Monitoring of RVSM

In addition, the Panel reviewed NSPs for references to various documents that must be part of the NSP such as ICAO documentation, manuals, switchover plans, and others. An example of the minimum reference documentation is at **Attachment A.**

During the review process, the Panel found serious deficiencies with significant portions of the plans of the majority of States. Although those deficiencies are identified in the State's individual document, the Panel was of the opinion that these matters required further clarification and correction. The common areas requiring particular attention by the States are found below with suggestions on how they may be improved. The eight sections mentioned above share two elements judged to be deficient in the opinion of the Panel. The Panel was very concerned to find that there seems to be broad misunderstanding and confusion on how to address these two activities. The two activities are:

1. RVSM RISK MANAGEMENT and,
2. CRITERIA FOR APPROVAL OF ACTIVITIES

Given the importance of these two activities, the Panel decided to include particular comments about these in addition to the general comments about the eight sections mentioned above.

RISK MANAGEMENT

Given that Risk Management is a key activity to be described in each of the significant sections of the plan, the Panel is very concerned by the unsatisfactory responses received from the majority of the States. The Panel was of the opinion that there appears to be a broad misunderstanding of the activities that need to be undertaken in the area of Risk Management. It is the intent of the Panel to clarify the concept of Risk Management and what the Panel expects from States in future submissions of the NSP for review.

The templates on Risk Management provided to the States to assist them in the preparation of their safety plans, contained a list of Hazard Identification as well as proposed Mitigations for those hazards. States in their plans were requested to include in their NSPs the actions or activities to be undertaken by the States in order to comply or fulfill the various mitigations identified.

The responses that were reviewed by the Panel under the Actions/Activities column of the template showed that there was broad confusion and/or misunderstanding by States on what constituted appropriate actions/activities to fulfill the various mitigations listed. An example of a properly completed hazard log and mitigation tables is attached at **Attachment B**.

Risk is an integral part of any activity and in this case it is the responsibility of the civil aviation authorities to mitigate those risks by undertaking activities that bring those risks to an acceptable level. These activities need to have a level of detail and granularity that guarantees that the acceptable levels of risk will not be exceeded. This level of detail is missing from this plan.

Many plans seemed to have the necessary text to indicate that the actions have been taken but upon closer examination there is no backing evidence to indicate that the actions mentioned have actually occurred or how the State intends to ensure that the actions are appropriately executed.

In addition to the description of activities related to risk management, States should explain the process/methodology they used to review and adapt the FHA results to their national airspace. This explanation can be provided in the Appendix related to the State's hazard log matrices. To this end, States can refer to the guidance material provided during the NSP workshops (material is available from ARPO).

CRITERIA FOR APPROVAL OF ACTIVITIES

Criteria for approval of the necessary activities (ATS Training, ATS Equipment Changes, etc), prior to implementation are in the opinion of the Panel widely misunderstood by a majority of States. Consequently, NSPs were found to be generally vague when specifying and documenting criteria.

The Panel acknowledges that some States may have problems with identifying criteria. However, these criteria must be explicitly stated in the subsequent editions of the NSP. To this end, States are encouraged to use the regional guidance material as developed by the RVSM Task Force as appropriate as a basis for the criteria. **Attachment C** contains an example of approval criteria related to ATS training activities.

Included below are general comments by the Panel about each of the sections of the NSP. Specific comments about each of these sections related to your State NSP are included in the attached document.

DOCUMENT APPROVAL

The Panel found that the table that identifies the authorities that are responsible for various levels of implementation activities are often not filled or only filled partially. The Panel would like to remind authorities that the final edition of these plans will need to be signed by the designated authorities as reflected in the NSP. The Panel is of the opinion that this will help in certifying that the activities and plans contained in the document are substantiated and carried out in the State.

DOCUMENT CHANGE RECORD

The document change table needs to reflect all the successive editions of the plan including the present edition.

INTRODUCTION

Generally this section was properly completed with the appropriate substitutions on the part of States. This section contains information from States on their approach to RVSM implementation as well as information on individuals who will be responsible for RVSM implementation in that State. The Panel would like to stress the fact that this section is critical in that it places responsibility for various implementation activities on specific personnel within the administration. In that regard, States and specifically the authorities and personnel named as responsible for the activities in these plans are to be reminded that these documents will become a permanent part of Regional ICAO documentation for future reference.

States should note that the guidance material on the safe implementation of RVSM requires not only pre-implementation planning to assure a smooth transition but also specifies that specific follow up and monitoring activities need to be carried out in order to support post implementation safety assessment. These follow-up activities are critical in helping to ensure that safety levels are maintained at an acceptable level after implementation. The Panel would like to urge States that have not done so, to immediately consider the inclusion of the responsible team members for post implementation activities in their RVSM planning efforts in the introduction section.

AIRCRAFT AND OPERATOR APPROVALS

The Panel was concerned with the level of detail provided in the description of the awareness activities related to aircraft and operator approval. In this regard, the level of detail was, in the opinion of the Panel, not sufficiently documented. For example, there are no references made to mandatory AICs or to the existence of required committees that need to be established with the local operators.

The Panel would also like to remind that status reports of aircraft and operator approvals are required in this section. These reports among other details should include the number of operators, aircraft (civil and military), approved and not approved. In that regard, the Panel was concerned by the fact that most of the plans contain information not consistent with the ARMA database.

ATS TRAINING

A review of this section by the Panel found that there was a general lack of detailed training programs including refresher training related to RVSM. Panel commentaries are contained in the attached individual report.

In reviewing some training syllabus submitted the Panel noted that those documents were not consistent with mitigations related to training. States need to ensure that their training syllabus complies with the mitigation activities related to ATS training.

ATS EQUIPMENT

In reviewing this section the Panel found that the necessary equipment changes and associated planning activities in individual States were often poorly documented. The Panel would like to remind States that should these changes not be completed or carried out before implementation, States should develop a contingency plan to be included in the appendix of their NSP. This contingency plan should be able to accommodate possible changes in dates of implementation. In addition, States are reminded that both, technical and operational approvals of modified ATS equipment is required

ATS PROCEDURES

In general the Panel found that the need for simulation activities was often misunderstood. When simulations activities are planned, States need to describe those activities in detail, even if the simulations consist of desktop studies.

AIRSPACE DESIGN

The Panel was of the opinion that the Flight Level Allocation Scheme was often overlooked and that it needed to be considered and included as part of the airspace redesign effort. In that regard, States are reminded that they need to include this activity as part of their NSPs.

When simulations activities are planned, States need to describe those activities in detail, even if the simulations consist of desktop studies.

RVSM SWITCHOVER

In reviewing this section the Panel found that this item would need to be delayed due to the lack of guidance material at a regional level. However, States should start working on the mitigations reflected in the FHA with regard to the switchover period.

OPERATIONAL SAFETY MONITORING

The Panel found a significant number of NSP that utilised earlier editions of the templates and as a result, there was a wide variation in the quality and level of detail in the submitted plans. The Panel urges States to ensure that their operational safety monitoring plans use the newest templates as issued by the RVSM NSP Workshops.

In relation to Quality Assurance of Operational Safety Monitoring, States can describe any elements that provide confidence in the efficiency and quality of the post-implementation activities. For example, one element could be the review of the data collected, the documentation of that review, the experience of the people responsible for these activities, etc.

APPENDICES TO BE INCLUDED

In reviewing the NSPs, the Panel found that a significant number of NSPs did not include the required appendix listing the supporting reference documents as shown in Attachment A.

In addition, the following documents must be attached to the NSP:

- National RVSM Hazard Log Matrices (Core airspace and Switchover period)
- National Switchover Plan
- Reference Documents List
- ATS Equipment Contingency Plan (if appropriate)

ATTACHEMENT A : REFERENCES DOCUMENTATION APPENDIX

Note from the NSPVP: the following constitute the minimum references to be included in a specific appendix of the National Safety Plan. These documents should be available to the NSPVP upon request.

ICAO Document:

- ICAO Doc 9574

Regional documents:

- TGL6 edition 1 or FAA 91-RVSM
- ICAO Document 7030/4 AFI Regional Supps
- AFI RVSM ATC Manual
- AFI RVSM Switch-over Plan
- AFI RVSM Functional Hazard Assessment – edition 0.1 – 12 May 2005

References related to the necessary activities prior to RVSM:

- [State] National RVSM Action Plan
- [State] RVSM ATC Manual
- [*References of document(s) related to aircraft and operator RVSM approval awareness activities: AICs references, RVSM workshops reports, RVSM committee terms of reference...*]
- [*References of the State ATS training material*]
- [*reference of contract with the external supplier who will/has perform(ed) the necessary changes to ATS Equipment*]

References related to the Approval of the necessary activities prior to RVSM:

- [*Reference of the documented evidence of the approval of the State training program: report or minutes of approval meeting...*]
- [*Reference of the documented evidence of the approval of the modified ATS Equipment (technical approval): report or minutes of approval meeting...*]
- [*Reference of the documented evidence of the approval of the modified ATS Equipment for operational use in ACC(s): report or minutes of approval meeting...*]
- [*Reference of the documented evidence of the approval of the ATSU operations manual (for each ACC)*]
- [*Reference of the documented evidence of the approval of the ACC amended agreements (LoA/P)(for each ACC)*]
- [*Reference of the documented evidence of the approval of the Airspace Design changes: report or minutes of approval meeting...*]
- [*Reference of the documented evidence of the approval of the State switch-over plan*]

References related to the Quality Assurance Activities:

- [*Reference of the documented evidence of the review of the training material by ACC operational and management staff*]
- [*Reference of the documented specification of the functional requirements for ATS Equipment changes*]
- [*Reference of the internal contractor software development procedures (for ATS Equipment changes)*]
- [*Reference of the modified ATS Equipment acceptance criteria*]
- [*Reference of the documented evidence of the review of the ATSU operations manual by ACC operational and management staff*]

- [*Reference of the documented evidence of the review of the amended LoA/Ps*]
- [*Reference of the documented description of the ATS simulations (or desktop exercises) for ATS procedures and Airspace Design changes*]
- [*Reference of the documented evidence of the review of the Airspace Design changes: report or minutes of meeting...*]
- [*Reference of the documented evidence of the review of the State switch-over plan by ACC operational and management staff: report or minutes of meeting...*]

ATTACHEMENT B : RVSM RISK MANAGEMENT - EXAMPLES

The process of review of the FHA results and of their adaptation to the national airspace is presented in detail in the guidance material provided during the NSP workshops (material is available from ARPO).

This process is based on a 4-steps approach that can be summarised as follows:

- Step 1 : Development of the hazard/risk log matrices (for the core airspace and the switch-over period) applicable to the State national airspace
- Step 2 : Assessment of hazard severity and specification of the safety objectives
- Step 3 : Development of the mitigation strategy to ensure the acceptability of the risks associated to the hazards
- Step 4 :
    - Step 4a: Allocation of the mitigations to the RVSM System elements (ATS Training, ATS Equipment...)
    - Step 4b: Identification of the project activities to be undertaken to ensure the implementation of the mitigations

Step 1 aims to develop the list of the hazards relevant to the national airspace. It is composed of FHA-proposed hazard (FHA Appendix D) and of additional hazards identified by the State (if any). The FHA-proposed hazards judged as not relevant (if any) should also be listed and the rationale of their exclusion should be provided.

Step 2 is an intermediate step. It should be reflected in the tables at State discretion. It aims to assess the effects of the hazards on the safety of RVSM operations (severity) and then to specify the safety objectives (maximum likelihood) according to these severities. It should be remembered that the combination of the severity and the safety objective of a given hazard represent the acceptable level of risk to be achieved.

Step 3 aims to specify the mitigation strategies. These strategies are derived from the severities and the safety objectives along two approaches and they are, the hazard control (reduction of the operational effects) and the hazard reduction (reduction of the likelihood). They are composed of mitigating factors expressed as safety requirements to be fulfilled to ensure an acceptable level of risk. States should review the mitigations proposed by the FHA (Appendix E) and to identify additional ones if appropriate.

Step 4 firstly aims to allocate these mitigations (safety requirements) to the national RVSM System (ATS Training, ATS Procedures...). States should review the allocation proposed by the FHA (Appendix F) and to allocate additional safety requirements as appropriate. Secondly, each mitigation should be associated to project actions/activities to be undertaken to ensure its implementation. These activities provide evidence that the State has/will undertake(n) the appropriate actions to ensure that the mitigation will be efficiently in place prior to the RVSM implementation.

It should be remembered that the FHA results are classified by operational environment. It means that States should identify the FHA operational environment(s) (ENV_X) applicable to their national airspace.

The following tables contain some examples that are illustrative and aim to provide clarifications:

For a given State in ENV 1 (controlled airspace with surveillance capabilities).

Extract of the State Hazard Log for its RVSM Core Airspace (Appendix of the Safety Plan)

Hazard ID	**Hazard Description**	**Mitigations (safety requirements)**
AH $_{core}$_6	Loss of aircraft communications capabilities (voice)	**Req $_{Core}$_9** Radio Communications Failure procedures shall be defined. **Req $_{Core}$_10** Controllers shall be trained appropriately with regards to Radio Communications Failure procedures. **Req $_{Core}$_11** Flight crew shall be trained appropriately with regards to Radio Communications Failure procedures.
AH $_{core}$_7	Loss of ground/air (ATC R/T) communications capabilities	**Req $_{Core}$_9** Radio Communications Failure procedures shall be defined. **Req $_{Core}$_10** Controllers shall be trained appropriately with regards to Radio Communications Failure procedures. **Req $_{Core}$_11** Flight crew shall be trained appropriately with regards to Radio Communications Failure procedures. **Req $_{Core}$_12** Air/Ground Communication system shall be designed to ensure a total coverage of the RVSM Airspace with a minimum MTBF of 2 months for a given FIR **Req $_{Core}$_13** Air/Ground Communications system maintenance procedures shall be defined to ensure a communication system recovery in MTTR defined in Service Level Agreement **Req $_{Core}$_14** Air/Ground Communications Maintenance team shall be trained appropriately with regards to Air/Ground Communication system maintenance procedures

Extract of the State table for excluded hazards (Appendix of the Safety Plan)

Hazard ID	Hazard description	Rationale for exclusion
AH $_{core}$_10	Controller provides incorrect traffic information	This hazard is applicable to an uncontrolled airspace and is judged as not relevant to [State] airspace

Extract of the mitigation table related to ATS Training (§3.7 of the Safety Plan)

Mitigation	Actions / Activities	Hazard ID
Req $_{Core}$_10 Controllers shall be trained appropriately with regards to Radio Communications Failure procedures.	To update the State training material to reflect that RCF procedures (Ref : 7030) will be addressed during training courses To organise training sessions on contingency procedures Responsible : Name of Head of Operational Training Services	**AH $_{core}$_6** **AH $_{core}$_7**
Req $_{Core}$_14 Air/Ground Communications Maintenance team shall be trained appropriately with regards to Air/Ground Communication system maintenance procedures.	To check the Training Manual of Engineers to ensure that a course about Air/Ground Communications maintenance has been run If not, to specify a specific course for Air/Ground Communications Maintenance to be attended by all technicians by not later than [date]. Responsible : Name of Head of Technical Training Services	**AH $_{core}$_7**

Extract of the mitigation table related to ATS Equipment (§4.7 of the Safety Plan)

Mitigation	Actions / Activities	Hazard ID
Req Core_12 Air/Ground Communication system shall be designed to ensure a total coverage of the RVSM Airspace with a minimum MTBF of 2 months for a given FIR	To verify if the Air/Ground Communication system provide a full coverage of the FIR and if its performances meets a MTBF of 2 Months. Evidence to be documented. If the FIR is not full covered, to identify the required new/upgrade of the equipment. If the MTBF does not achieve the required level, to conduct a study to improve equipment robustness Responsible : Name of Head of Engineering Services	**AH core_7**

Extract of the mitigation table related to ATS Procedures (§5.7 of the Safety Plan)

Mitigation	Actions / Activities	Hazard ID
Req Core_9 Radio Communications Failure procedures shall be defined.	To update the ACC Operations Manual to reflect that RCF procedures described in ICAO 7030/4 are addressed Responsible : Name of Head of ACC Operations	**AH core_6** **AH core_7**
Req Core_13 Air/Ground Communications system maintenance procedures shall be defined to ensure a communication system recovery in MTTR defined in Service Level Agreement	To define the acceptable MTTR at a service level To verify if the procedure in place are sufficient to meet this MTTR. If not, to improve the current procedure. Responsible : Name of Head of Engineering Services	**AH core_7**

ATTACHEMENT C: APPROVAL CRITERIA - EXAMPLES

This attachment aims to provide guidance to States on how to provide supporting criteria for the various activities that need to be carried out during the RVSM planning and implementation process. The example below refers to criteria related to the approval of the State's training material. The same rationale or methodology can be applied to specify approval criteria applicable to other activities such as ATS equipment, airspace design, etc. This example is illustrative and aims to provide clarification.

In this case the assumption is made that :

Firstly, the basis for the State Training Material is the AFI RVSM Training Guidance Material approved by the AFI RVSM Task Force for application within the AFI Region. The approval could thus be based on this regional material.

Secondly, States have developed mitigations related to ATS Training. These mitigations should be reflected in the Training Material as appropriate.

Thirdly, quality assurance activities have been undertaken during the development of the Training material. These activities include the review of the material by ACC management and operational staff and the approval can be based on the outcome of this review.

As a conclusion, the approval of the State Training Material can be based on the following criteria:

- Consistent with the AFI RVSM Training Guidance Material
- Reflecting and addressing the State mitigations related to ATS Training
- The outcome of the review of the material by ACC management and operational staff is documented and available.

TEMPLATE

LETTER OF PROCEDURE/LETTER OF AGREEMENT BETWEEN

..... AREA CONTROL CENTRE AND ....AREA CONTROL CENTRE

1. PREAMBLE

The authorized representatives of ..... and ..... agree that the procedures contained in this document shall remain in force from the effective date specified until either amended or cancelled.

This letter of Agreement supersedes and cancels the existing Letters of Agreement between ..... and ..... dated .....

2. EFFECTIVE DATE

The provisions in the Letter of Agreement shall be implemented on ..... at 0001 UTC.

3. OBJECTIVE

The objective of this Letter of Agreement is to specify co-ordination procedures between ..... and .....

4. SCOPE

4.1 The procedures contained herein are supplementary to the ICAO Standards and Recommended Practices in Annexes 2 and 11, the Procedures for Air Navigation Services in Document 4444 and the Regional Supplementary Procedures (Doc 7030). They detail the conditions under which the responsibility for the provision of air traffic services shall be transferred between the ATS units mentioned in paragraph 3 above.

4.2 This Letter of Agreement also formalises the delegation of responsibility from ..... to ..... and vice versa for the provision of air traffic services within those portions of airspace which lie between the FIR boundaries and the agreed points of transfer of responsibility as defined in paragraph 7.4.1. The establishment of transfer points is based on operational considerations only and does not therefore contribute to, neither can it be invoked for, any other purpose beyond this context.

5. AMENDMENTS

5.1 Any change to this Letter of Agreement, including its cancellation or replacement, requires the consent of the ATS units concerned. This applies to the substance of the change as well as to its date of applicability. Any change shall be made either in the context of a meeting between the two units, or by exchange of correspondence, or by exchange of AFTN messages, with acknowledgement by all signatories.

5.2 Whilst temporary deviations from these procedures may be agreed between the ACC supervisors concerned, as specified in paragraph 8.1 below, permanent amendments to this document shall be effective only in the form of a written amendment duly signed by authorized representatives.

6 AFI RVSM AIRSPACE

6.1 The AFI Region airspace between FL 290 and FL 410 inclusive, encompassing all FIRs in the AFI Region is the designated AFI RVSM airspace.

6.2 There is no transition airspace in the AFI RVSM airspace.

6.3 PROCEDURES FOR THE AFI RVSM AIRSPACE

6.3.1 The applicable RVSM procedures in the AFI RVSM airspace are contained in the Regional Supplementary Procedures – Doc. 7030/4 – African Indian Ocean Region. The detailed procedures are contained in the ATC Operations Manual for RVSM in AFI Region.

6.3.2 RVSM compliant aircraft and non-RVSM compliant aircraft entering RVSM airsapce from a non-RVSM airspace shall be established at a flight level in accordance with the ICAO Table of Cruising Levels, as published in ICAO, Annex 2, Appendix 3, (a).

6.3.3 **The following table contains RVSM FL applicable in the AFI RVSM airspace.**

Cruising levels as per direction of flight – FL280 to FL430	
Route from 180 degrees to 359 degrees*	**Route from 000 degrees to 179 degrees ***
← **FL 430 (non RVSM level above RVSM airspace)**	
	FL410 →
← FL400	
	FL390 →
← FL380	
	FL370 →
← FL360	
	FL350 →
← FL340	
	FL330 →
← FL320	
	FL310 →
← FL300	
	FL290 →
← FL280 (non RVSM level below RVSM airspace)	

6.3.4 **Flight operations within the AFI RVSM airspace.**

6.3.4.1 Except for State aircraft as defined in Article 2 to the Chicago Convention (Doc. 7333) only RVSM approved aircraft shall be approved to operate within the AFI RVSM airspace.

6.4 CONTINGENCY PROCEDURES FOR INCREASED SEPARATION

6.4.1 (*Name*) ACC will consider increasing vertical separation within affected areas of the (*Name*) FIR RVSM airspace when there are pilot reports of greater than moderate turbulence. Within areas where significant turbulence is reported, vertical separation minimum between all aircraft will be increased.

7. PROCEDURES

7.1 Movement and control messages

7.1.1 Flight plans

Filed Flight Plan (FPL) messages shall be transmitted for flights originating within one FIR and entering the other, not less than ..... minutes before the estimated time of the aircraft over the common FIR boundary.

7.1.2 Departures

Departure (DEP) messages shall be transmitted for all flights mentioned in 7.1.1 above, as soon as practicable after the aircraft is airborne.

7.1.3 Estimates

Estimate (EST) messages shall be transmitted for all flights crossing the common FIR boundary, in sufficient time to permit its receipt by the receiving ATS unit at least .... minutes before the estimated time of the aircraft over the transfer points specified in paragraph 7.4.1 below.

7.1.4 Revisions

Co-ordination (CDN) messages shall be transmitted as soon as practicable whenever the estimated time of the aircraft over the transfer point differs by .... minutes or more from the estimated time originally passed or when a change of cleared level and/or crossing condition is planned.

7.1.5 Acceptance

Co-ordination messages (EST and CDN) require an operational acceptance, in the form of an acceptance (ACP) message, to be transmitted to the transferring unit.

7.2 Message transmission and co-ordination procedures

7.2.1 FPL Messages shall be transmitted via AFTN. DEP messages shall be transmitted by AFTN or ATS/DS or both as applicable.

7.2.2 Co-ordination messages (EST, CDN and ACP) shall be transmitted using (the ATS direct speech circuits (ATS/DS) as applicable.

7.2.3 In case of non-availability of the ATS direct speech circuit between the ATS units concerned, the transferring ATS unit shall forward the relevant flight data to the receiving ATS unit by means of HF radiotelephone (RTF) and/or AFTN.

7.2.4 When effecting the necessary co-ordination by use of the AFTN or HF RTF the transferring ATS unit shall send the appropriate co-ordination message in sufficient time to permit its receipt by the receiving ATS unit at least ..... minutes prior to the aircraft's estimated time over the transfer point.

7.2.5 After co-ordination of the transfer, the conditions of transfer shall not be changed by the transferring unit, unless prior agreement has been obtained from the accepting unit.

7.2.6 In case of flights departing from aerodromes (.....) for which, due to their proximity to the FIR boundary, application of the procedures set out in 7.1.2 above would not be possible after departure, co-ordination between the transferring ATS unit and the accepting ATS unit shall be effected prior to the issuance of the ATC clearance to the aircraft concerned.

7.2.7 In the event of communications failure between the ATS units concerned, a departing aircraft shall be cleared only to such a level as can be reached before it arrives within 10 minutes flying time from the transfer of control point. If such a level is lower than that specified in the flight plan, the aircraft shall be instructed to request approval for a higher level direct from the accepting unit and then obtain clearance from the transferring unit to climb to the level approved by the accepting unit.

7.3 Transfer of communications

7.3.1 Aircraft shall be instructed to establish communications with the accepting unit **5** minutes before the transfer of control point. Transfer of communications does not constitute transfer of control.

7.3.2 In case of communications failure between the ATS units concerned, the transferring ATS unit will inform the aircraft of the absence of co-ordination between the two ATS units and will instruct the aircraft to establish contact with the accepting ATS unit 10 minutes before the boundary in order to provide it with the necessary flight data.

7.3.3 Whenever the accepting ATS unit is unable to establish contact with an aircraft within .... minutes after its estimated time over the transfer point, it shall inform the transferring ATS unit so that appropriate measures may be taken.

7.3.4 With reference to paragraph 10.4.2.4.4 of Part VIII of the PANS-ATM, the accepting ATS unit need not, as a matter of routine, notify the transferring ATS unit that radiocommunication has been established with an aircraft being transferred.

7.3.5 Whenever an aircraft is unable to establish or maintain radio communication with the ATS unit responsible for the provision of air traffic services in the airspace in which it is operating, other ATS units shall, if possible, assume relay functions between them.

7.3.6 Primary frequency assignment for transfer of communications is as follows:

ATS route	ATS unit call sign	Frequency

7.3.7 Secondary frequency assignment, for use when no contact can be made on the primary frequencies, is as follows:

ATS route	ATS unit call sign	Frequency

7.4 Transfer of responsibility

7.4.1 Responsibility for the provision of air traffic services shall be transferred to the accepting unit at the following significant points:

ATS route	Transfer of Control point
a)	(e.g. ABAB at 3030S 9015E, ~~or bearing a distance from a VOR/DME~~)
b)	(or bearing a distance from a VOR/DME)

7.4.2 If transfer of responsibility is required at points other than those specified in 6.4.1 above, this shall be co-ordinated individually for each flight.

7.4.3 The accepting unit shall assume responsibility of a transferred aircraft as soon as it has reported to that unit passing the appropriate transfer point. There is no requirement for additional transfer or acceptance messages unless requested.

7.4.4 Control of traffic communicating with the accepting unit shall not be assumed prior to the aircraft passing the transfer point, unless specifically agreed by the transferring unit.

7.5 Flight levels

7.5.1 Aircraft outside ATS route shall be assigned flight levels as follows:

ATS route	From	To	Flight Levels

7.6 Separation

7.6.1 Aircraft at the same level shall be longitudinally separated by not less than **10** minutes.

7.6.2 When the succeeding aircraft is faster than the preceding aircraft, the transferring unit shall notify the accepting unit and seek its approval of the transfer of control. The accepting unit shall have the right to determine the transfer of control conditions.

7.7 Clearance limit

7.7.1 The clearance limit shall normally be the destination aerodrome. However, if the necessary co-ordination cannot be effected in good time (paragraph 6.4 refers) e.g. due to communications failure between ATS units, the clearance limit shall be the transfer point and the aircraft instructed to request onward clearance from the accepting unit before proceeding beyond that point.

7.8 Weather Information

7.8.1 ATS units shall keep each other informed of SIGMET information and of weather conditions at destination aerodromes within their respective FIRs whenever such conditions may fall below aircraft operating minima and consequently may result in diversion or holding for weather improvement.

7.9 Flow control (if applicable)

7.9.1 Should it become necessary to implement flow control to avoid excessive delays at destination aerodromes within their respective FIRs, ATS units shall negotiate and agree a mutually acceptable number of aircraft per hour. All such agreements shall be terminated at_____ as soon as circumstances permit resumption of normal operations. The decision of the ACC supervisors shall be sufficient authority in all such cases.

8. Deviations

8.1 Deviation from the procedures specified in this Letter of Agreement shall only be permitted in exceptional circumstances and not without prior co-ordination on a case-by-case basis.

8.2 Any deviations from these provisions, that arise due to an emergency or are applied to ensure the safety of air traffic, shall immediately be notified to the other ATS unit(s) concerned and shall be terminated as soon as the circumstances that caused the deviation cease to exist.

9. Search and Rescue

9.1 Search and Rescue operation within the respective areas of responsibility of _____ and _____ shall be conducted in full compliance with the Standards and Recommended practices indicated in Annex 12 to the Chicago Convention and the related organization of National Search and Rescue procedure.

10. Authorized signatories

For.....

Place.....

Date.....

ATTACHMENT

PROPOSAL FOR AMENDMENT TO THE REGIONAL SUPPLEMENTARY PROCEDURES – DOC.7030/4 AFRICAN INDIAN OCEAN (AFI) REGION

(Serial No. ESAF-S 06/2 – AFI RAC/1)

a) Proposed by:

AFI Planning and Implementation Regional Group (APIRG)

b) Proposed amendment: *(cf. Regional Supplementary Procedures,* Doc.7030/4 – AFI, Part 1, Rules of the Air, Air Traffic Services and Search and Rescue, incorporating Amendment No.208). Editorial note**:** Amendments are arranged to show deleted text using strikeout (~~text to be deleted~~), and added text with grey shading (text to be inserted).

Amend the SUPPs in the AFI Region as follows:

AFI REGIONAL SUPPLEMENTARY PROCEDURES

PART 1 – RULES OF THE AIR, AIR TRAFFIC SERVICES AND SEARCH AND RESCUE

These procedures are supplementary to the provisions contained in Annex 2, Annex 6 (Part II), Annex 11, PANS-ATM (Doc 4444) and PANS-OPS (Doc 8168).

1.0 FLIGHT RULES

1.1 Visual flight rules (VFR) (A2-4.7 and 4.8)

1.1.1 ~~At selected aerodromes, only~~ VFR flights to be operated ~~within a control zone established at an aerodrome serving international flights and~~ in specified portions of ~~the associated~~ terminal control areas of selected aerodromes serving international flights shall:

a) have two-way radio communications;

b) obtain clearance from the appropriate ATC unit; and

c) report positions, as required.

Note. - The phrase "specified portions of ~~the associated~~ terminal control areas" is intended to signify at least those portions of the TMA used by international IFR flights in association with approach, holding, departure and noise abatement procedures.

1.2 Instrument flight rules (IFR)
(A2 – 2.2 and Chapter 5)

Note. - Annex 2, 2.2 permits a choice for a flight to comply with either the instrument flight rules or the visual fight rules when operated in visual meteorological conditions subject to certain limitations in Chapter 4 of the Annex. The following indicates certain further restrictions to that choice.

1.2.1 Special application of instrument flight rules

1.2.1.1 Flights shall be conducted in accordance with the instrument flight rules ~~(even when not operating in instrument meteorological conditions)~~ when operated above flight level 150.

1.3 Changes of flight levels
(A2 – 5.2.2)

1.3.1 All changes of flight levels required by transition from the system of designated cruising levels for flights along controlled routes to the semicircular system of cruising levels, or vice versa, shall be made at points within controlled airspace.

1.3.2 The specific points to be used for the changes of flight levels mentioned in 1.3.1 shall be subject of coordination between the ATS units concerned, bearing in mind the need to avoid ~~border~~ points **over boundaries** or other points where transfer of communications/transfer of responsibility would be adversely affected.

1.4 Air traffic advisory service
(P-ATM, 9.1.4)

Note. - The PANS-ATM leaves it to the discretion of the pilot whether or not to obtain air traffic advisory service when available. The following procedures make it compulsory to obtain such service ***when operating in class F airspace*** ~~*under certain circumstances*~~*.*

1.4.1 All IFR flights shall comply with the procedures for air traffic advisory service when operating in ~~advisory~~ *class F* airspace.

1.5 Reduced Vertical Separation Minimum (RVSM) of 300 m (1,000 ft)

1.5.1 Area of Applicability

1.5.2 RVSM shall be applicable in that volume of airspace between FL290 and FL410 inclusive in the following flight information regions/upper flight information regions (FIRs/UIRs):

Accra, Addis Ababa, Algiers, Antananarivo, Asmara, Beira, Brazzaville, Cairo, Canarias, Cape Town, Casablanca, Dakar, Dakar Oceanic, Dar es Salaam, Entebbe, Gaborone, Harare, Johannesburg, Johannesburg Oceanic, Kano, Khartoum, Kinshasa, Lilongwe, Luanda, Lusaka, Mauritius, Mogadishu, Nairobi, N'Djamena, Niamey, Roberts, Sal Oceanic, Seychelles, Tripoli, Tunis, Windhoek.

Note. – The volume of airspace specified in 1.5.2 will be referred to as " AFI RVSM airspace

2.0 FLIGHT PLANS

2.1 Contents of flight plans
(A2 – 2.3; P-ATM, 4.4.1 and Appendix 2)

~~2.1.1 Route~~

~~2.1.1.1 Whenever possible, flights should be authorized to fly direct between any two intermediate or terminal points of the AFI ATS route network. In this case, flight progress reports should be made in relation to the significant points defining the basic route.~~

2.1.2 Mach number

2.1.2.1 For turbo-jet aircraft intending to operate at or above FL 250 within FIR Canarias, the **True** Mach number planned to be used shall be specified in Item 15 of the flight plan.

~~**2.1.3 RVSM Approval status and aircraft registration**~~

~~2.1.3.1 Item 10 of the flight plan (Equipment) shall be annotated with the letter W if the aircraft and operator have received RVSM State approval. Furthermore, the aircraft registration shall be indicated in Item 18 of the flight plan.~~

2.1.3 ***RNP type***

~~6.1.3.1~~ 2.1.3.1 The letter R shall be annotated in item 10 (Equipment) of the flight plan to indicate that the aircraft meets the RNP type prescribed, has been appropriately approved, and can comply with all conditions of that approval

2.2 **~~Presentation~~ Submission of flight plan** (A2 – 3.3.1.4)

2.2.1 ~~The appropriate ATS authority~~ When exercising the Annex 2 provision, 3.3.1.4, to prescribe a lead-time for the submission of a flight plan other than 60 minutes before departure, ~~for the submission of a fight plan concerning a flight to be provided with air traffic control service, air traffic advisory service or flight information service~~ the appropriate ATS authority shall, ~~as far as practicable~~, prescribe a period of not less than 30 minutes ~~for that purpose.~~

2.3 RVSM Approval status and aircraft registration

2.3.1 Item 10 of the flight plan (Equipment) shall be annotated with the letter W if the aircraft and operator have received RVSM State approval. Furthermore, the aircraft registration shall be indicated in Item 18 of the flight plan.

~~**2.3.2 Submission of a flight plan**~~

~~2.3.2.1 Information relative to an intended flight or portion of a flight, to be provided to air traffic services units, shall be in the form of a flight plan.~~

2.3.2 In addition to military operations, operators of customs or police aircraft shall insert the letter M in Item 8 of the ICAO flight plan form.

2.3.3 Use of repetitive flight plans

2.3.3.1 Provision shall be made so that: repetitive flight plans be accepted for any flight conducted in the AFI RVSM airspace.

2.3.3.2 Operators of RVSM approved aircraft shall also include the letter W in Item Q of the RPL, regardless of the requested flight level. If a change of aircraft operated in accordance with a repetitive flight plan results in a modification of the RVSM approval status as stated in Item Q, a modification message (CHG) shall be submitted by the operator

2.3.4 Flight planning for RVSM approved aircraft

2.3 4.1 Operators of RVSM approved aircraft shall indicate the approval status by inserting the letter W in Item 10 of the ICAO flight plan form, regardless of the requested flight level.

2.3.4.2 Operators of RVSM approved aircraft and non-RVSM approved State aircraft intending to operate within the AFI RVSM airspace, ~~as specified in 2.1~~, shall include the following in Item 15 of the ICAO flight plan form:

a) the entry point at the lateral limits of the AFI RVSM airspace and the requested flight level for that portion of the route commencing immediately after the RVSM entry point; and

b) the exit point at the lateral limits of the AFI RVSM airspace and the requested flight level for that portion of the route commencing immediately after the RVSM exit point.

2.3.4.3 Operators of non-RVSM approved State aircraft with a requested flight level of FL 290 or above shall insert STS/NON RVSM in Item 18 of the ICAO flight plan form.

2.3.5. Flight planning for non-RVSM approved aircraft

2.3.5.1 Operators of non-RVSM approved aircraft shall flight plan to operate outside the AFI RVSM airspace.

2.3.5.2 Operators of non-RVSM approved aircraft intending to operate from a departure aerodrome outside the lateral limits of the AFI RVSM airspace to a destination aerodrome within the lateral limits of the AFI RVSM airspace shall include the following in Item 15 of the ICAO flight plan form:

a) the entry point at the lateral limit of the AFI RVSM airspace; and

b) a requested flight level below FL 290 or above FL410 for that portion of the route commencing immediately after the entry point.

2.3.5.3 Operators of non-RVSM approved aircraft intending to operate from a departure aerodrome to a destination aerodrome which are both within the lateral limits of the AFI RVSM airspace shall include in Item 15 of the ICAO flight plan form a requested flight level below FL 290 or above FL410.

2.3.5.4 Operators of non-RVSM approved aircraft intending to operate from a departure aerodrome within the lateral limits of the AFI RVSM airspace to a destination aerodrome outside the lateral limits of the AFI RVSM airspace shall include the following in Item 15 of the ICAO flight plan form:

a) a requested flight level below FL 290 or above FL410 for that portion of the route within the lateral limits of the AFI RVSM airspace; and

b) the exit point at the lateral limit of the AFI RVSM airspace, and the requested flight level for that portion of the route commencing immediately after the exit point.

2.3.5.5 Operators of non-RVSM approved aircraft intending to operate from a departure aerodrome to a destination aerodrome which are both outside the lateral limits of the AFI RVSM airspace, with a portion of the route within the lateral limits of the AFI RVSM airspace, shall include the following in Item 15 of the ICAO flight plan form:

a) the entry point at the lateral limit of the AFI RVSM airspace, and a requested flight level below FL 290 or above FL 410 for that portion of the route commencing immediately after the entry point; and

b) the exit point at the lateral limit of the AFI RVSM airspace, and the requested flight level for that portion of the route commencing immediately after the exit point.

Note. Non-RVSM aircraft intending to operate above FL 410 will need to flight plan in accordance with RVSM procedures of neighbouring regions should the flight commence or terminate in those regions.

3.0 AIR-GROUND COMMUNICATIONS AND IN-FLIGHT REPORTING

~~Note. Annex 2, 3.6.3, 3.6.5.1 and 5.3.3 and PANS ATM, 4.11, require controlled flights and certain IFR flights outside controlled airspace to maintain a continuous listening watch on the appropriate radio frequency and to report positions in specified circumstances. The following expands such requirements and specifies additional details regarding the transmission and contents of in flight reports.~~

3.1 Application

(A2 – 3.6.3, 3.6.5, 5.3.3; P-ATM, 4.11)

3.1.1 All ~~aircraft on~~ VFR flights, and ~~aircraft on~~ IFR flights outside controlled airspace, shall maintain a listening watch on the frequency where ~~a radio station furnishing communications~~

~~for the unit providing~~ flight information service is provided, ~~in the flight information region and file with that station information as to their~~ and report position unless otherwise authorized by the State overflown.

3.2 Time or place of position reports
(A2 – 3.6.3, 3.6.5, 5.3.3; P-ATM, 4.11)

~~3.2.1 Position reports additional to those required by the general position reporting procedures shall be made when entering or leaving controlled or advisory airspace.~~

3.3 Transmission of position reports
(P-ATM, 4.11)

~~3.3.1 The last position report before passing from one flight information region to an adjacent flight information region shall also be made to the ATS unit serving the airspace about to be entered.~~

~~3.4 Air-Ground Communication Failure Procedures~~

~~3.4.1 As soon as it is known that two-way communication has failed, ATC shall maintain a vertical separation of 600m (2000ft) between an aircraft with radio communication failure and another aircraft when both aircraft are operating within the AFI RVSM airspace in accordance with the FLAS, unless the horizontal separation between the aircraft is considered adequate. The foregoing is based on the assumption that the aircraft will operate in accordance with 3.4.2 or 3.4.3.~~

~~Visual Meteorological Conditions (VMC)~~

~~3.4.2 Except as provided for in 3.4.3, a controlled flight experiencing communication failure in VMC shall:~~
~~a) set transponder to Code 7600;~~
~~b) continue to fly in VMC;~~
~~c) land at the nearest suitable aerodrome;~~
~~d) report its arrival time by the most expeditious means to the appropriate ATS unit.~~

~~Instrument Meteorological Conditions (IMC)~~

~~3.4.3 An IFR flight experiencing communication failure in IMC, or where it does not appear feasible to continue in accordance with 3.4.2, shall:~~

~~a) set transponder to Code 7600; and~~

~~b) maintain for a period of 7 minutes the last assigned speed and level or the minimum flight altitude, if the minimum flight altitude is higher than the last assigned level.~~

~~In FIRs~~
~~The period of 7 minutes commences:~~
~~i) if the aircraft is operating on a route without compulsory reporting points or has been instructed to omit position reports:~~

~~1) at the time the last assigned level or minimum flight altitude is reached, or~~

~~2) at the time the aircraft sets transponder to Code 7600, whichever is later; or~~

~~ii) if the aircraft is operating on a route with compulsory reporting points and has not been instructed to omit position reports:~~

~~i) a) at the time the last assigned level or minimum flight altitude is reached, or~~

~~ii) b) at the previously reported pilot estimate for the compulsory reporting point, or~~

~~iii) c)at the time the aircraft fails to report its position over a compulsory reporting point, whichever is later;~~

~~*Note 1: The period of 7 minutes is to allow the necessary air traffic control and co-ordination measures.*~~

Note 2: instrument meteorological conditions (IMC), aircraft will maintain the last assigned speed and level or minimum flight altitude for a period of 20 minutes instead of 7 minutes.

c) thereafter adjust level and speed in accordance with the filed flight plan;

Note: As regards changes to levels and speed, the Filed Flight Plan, which is the flight plan as filed with an ATS unit by the pilot or a designated representative, without any subsequent changes will be used.

d) if being radar vectored or proceeding offset according to RNAV without a specified limit, proceed in the most direct manner possible to rejoin the current flight plan route no later than the next significant point, taking into consideration the applicable minimum flight altitude;

Note: As regards the route to be flown or the time to begin descent to the arrival aerodrome, the Current Flight Plan, which is the flight plan, including changes, if any, brought about by subsequent clearances, will be used.

e) proceed according to the current flight plan route to the appropriate designated navigation aid serving the destination aerodrome and, when required to ensure compliance with (f) below, hold over this aid until commencement of descent;

f) commence descent from the navigation aid specified in (e) above at, or as close as possible to, the expected approach time last received and acknowledged; or, if no expected approach time has been received and acknowledged, at, or as close as possible to, the estimated time of arrival resulting from the current flight plan;

g) complete a normal instrument approach procedure as specified for the designated navigation aid; and

h) land, if possible, within thirty minutes after the estimated time of arrival specified in (f) above or the last acknowledged expected approach time, whichever is later.

4.0 SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES EUR/SAM CORRIDOR

4.1 Introduction

4.1.1 The following procedures are intended for guidance only and will be applicable within the EUR/SAM corridor. Although all possible contingencies cannot be covered, they provide for cases of:

a) inability to maintain assigned flight level due to weather, aircraft performance, pressurization failure and problems associated with high-level supersonic flight;

b) loss of, or significant reduction in, the required navigation capability when operating in parts of the airspace where the navigation performance accuracy is prerequisite to the safe conduct of flight operations; and

c) en route diversion across the prevailing EUR/SAM traffic flow.

4.1.2 With regard to 4.1.1 a) and c) above, the procedures are applicable primarily when rapid descent, turnback, or both are required. The pilots's judgement shall determine the sequence of actions to be taken, having regard to the specific circumstances. Air traffic control (ATC) shall render all possible assistance.

4.2 General procedures

4.2.1 The following general procedures apply to both subsonic and supersonic aircraft.

4.2.1.1 If an aircraft is unable to continue flight in accordance with its ATC clearance, and/or an aircraft unable to maintain the navigation performance accuracy specified for the airspace, a revised clearance shall whenever possible, be obtained prior to initiating any action, using the distress or urgency signals as appropriate. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and the overall traffic situation.

4.2.1.2 If prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time and, until revised clearance is received, the pilot shall:

a) if possible, deviate away from an organized track or route system before commencing emergency descent;

b) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals, aircraft identification, flight level, aircraft position (including the ATS route designator or the track code) and intentions, on the frequency in use, and as well as on frequency 121.5 MHz (or, as a back up[, on the inter-pilot air to air frequency 123.45 MHz);

c) watch for conflicting traffic both visually and by reference to ACAS (if equipped);

d) turn on all aircraft exterior lights (commensurate with appropriate operating limitations);

e) switch on the SSR transponder at all times; and

f) initiate such action as necessary to ensure the safety of the aircraft.

4.3 Subsonic aircraft

4.3.1 Initial action

4.3.1.1 If unable to comply with the provisions of 4.2.1.1 to obtain a revised ATC clearance, the aircraft should leave its assigned route or track by turning 90 degrees to the right or left whenever this is possible. The direction of the turn should, where possible, be determined by the position of the aircraft relative to any organized route or track system,
eg. whether the aircraft is outside, at the edge of, or within the system. Other factors that may affect the direction of the turn to consider are the direction to an the alternative airport, terrain clearance and the flight levels allocated to adjacent routes or tracks.

4.3.2 Subsequent action (RVSM airspace)

4.3.2.1 In RVSM airspace, an aircraft able to maintain its assigned flight level should turn to acquire and maintain in either direction a track laterally separated by 46 km (25 NM) from its assigned route or track in a multi-track system space at 93 km (50 NM) or otherwise, at a distance which is mid point from the adjacent parallel route or track and:

a) if above FL 410, climb or descend 300 m (1 000 ft); or

b) if below FL 410, climb or descend 150 m (500 ft); or

c) if at FL 410, climb 300 m (1 000 ft) or descend 150 m (500 ft).

4.3.2.2 An aircraft that is unable to maintain its assigned flight level should:

a) initially minimize its rate of descent to the extent that it is operationally feasible;

b) turn while descending to acquire an d maintain in either direction a track laterally separated by 46 km (25 NM) from its assigned route or track in a multi track system spaced at 93 km (50 NM) or otherwise, at a distance which is the mid point from the adjacent parallel route or track; and

c) for the subsequent level flight, select a level which differs from those normally used by 300 m (1 000 ft) if above FL 410, or by 150 m (500 ft) if below FL 410.

4.3.3 Subsequent action (non RVSM airspace)

4.3.3.1 In non RVSM airspace, an aircraft able to maintain its assigned flight level should turn to acquire and maintain in either direction or track laterally separated by 46 km (25 NM) from its assigned route or track in a multi track system spaced at 93 km (50 NM) or otherwise, at a distance which is mid point from the adjacent parallel route or track and:

a) if above FL 290, climb or descend 300 m (1 000 ft); or

b) if below FL 290, climb or descend 150 m (500 ft); or

c) if at FL 290, climb 300 m (1 000 ft) or descend 150 m (500 ft).

4.3.3.2 An aircraft unable to maintain its assigned flight level should:

a) initially minimize its rate of descent to the extent that it is operationally feasible;

b) turn while descending to acquire and maintain in either direction a track laterally separated by 46 km (25 NM) from its assigned route or track in a multi track system spaced at 93 km (50 NM) or otherwise, at a distance which is mid point from the adjacent parallel route or track; and

c) for the subsequent level flight, a level should be selected which differs from those normally used by 300 m (1 000 ft) if above FL 290 or by 150 m (500 ft) if below FL 290.

4.3.3.3 En route diversion across the prevailing SAT air traffic flow

4.3.3.3..1 Before diverting across the flow of adjacent traffic, the aircraft should climb above FL 410 or descend below FL 290 using the procedures specified in 4.3.1 or 4.3.2 or However, if the pilot is unable or unwilling to carry out a major climb or descent, the aircraft should be flown at a level as defined in 4.3.2.1 or 4.3.3.1 until a revised ATC clearance is obtained.

4.3.3.4 Extended range operations by aeroplanes with two turbine power units (ETOPS)

4.3.3.4.1 If these contingency procedures are employed by a twin engine aircraft as a result of an engine shutdown or failure of an ETOPS critical system, the pilot should advise ATC as soon as practicable of the situation reminding ATC of the type of aircraft involved, and request expeditious handling.

4.4 Supersonic aircraft

4.4.1 Turnback procedures

4.4.1.1 If a supersonic aircraft is unable to continue flight to its destination and a reversal of track is necessary, it should:

a) when operating on an outer track of a multi track system, turn away from the adjacent track;

b) when operating on a random track or on an inner track of a multi track system, turn either left or right as follows:

1) if the turn is to be made to the right, the aircraft should attain a position 46 km (25 NM) to the left of the assigned track and then turn to the right into its reciprocal heading, at the greatest practical rate of turn;

2) if the turn is to be made to the left, the aircraft should attain a position 46 km (25 NM) to the right of the assigned track and then turn to the left into its reciprocal heading, at the greatest practical rate of turn;

c) while executing the turnback, the aircraft should lose height so that it will be at least 1 850 m (6 000 ft) below the level at which turnback was started, by the time the turnback is completed;

d) when turnback is completed, heading should be adjusted to maintain a lateral displacement of 46 km (25 NM) from the original track in the reverse direction, if possible maintaining the flight level attained on completion of the turn.

Note. for multi track systems where the route spacing is greater than 93 km (50 NM), the mid point distance should be used instead of 46 km (25 NM).

4.5 Weather deviation procedures

4.5.1 General

4.5.1.1 The following procedures are intended to provide guidance. All possible circumstances cannot be covered. The pilot's judgement shall ultimately determine the sequence of actions to be taken. ATC shall render all possible assistance.

4.5.1.2 If the aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. Until an ATC clearance is received, the aircraft shall follow the procedures detailed in 4.5.4 below.

4.5.1.3 The pilot shall advise ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to the center line of its cleared route.

4.5.2 Obtaining priority from ATC when weather deviation is required.

4.5.2.1 When the pilot initiates communications with ATC, rapid response may be obtained by stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response.

4.5.2.2 The pilot still retains the option of initiating the communications using the urgency call "PAN PAN" (preferably spoken three times) to alert all listening parties to a special handling condition which will receive ATC priority for issuance of a clearance or assistance.

4.5.3 Actions to be taken when controller-pilot communications are established

4.5.3.1 The pilot notifies ATC and requests clearance to deviate from tract, advising when possible, the extent of the deviation expected.

4.5.3.2 ATC takes one of the following actions:

a) If there is no conflicting traffic in the horizontal plane, ATC will issue clearance to deviate from track; or

b) If there is conflicting traffic in the horizontal plane, ATC separates

aircraft by establishing appropriate separation; or

c) If there is conflicting traffic in the horizontal plane and ATC is unable to establish appropriate separation, ATC shall:

1) advise the pilot of inability to issue clearance for requested deviation;

2) advise the pilot of confliction traffic; and

3) request the pilot's intentions.

SAMPLE PHRASEOLOGY

"UNABLE (*requested deviation*), *TRAFFIC IS (call sign, position, altitude, direction)*, ADVISE INTENTIONS".

4.5.3.3 The pilot will take the following actions:

a) advise ATC of intentions by the most expedious means; and

b) comply with the ATC clearance issued; or

c) execute the procedures detailed in 4.5.4 below. ATC will issue essential traffic information to all aircraft and;

d) if necessary, establish voice communications with ATC to expedite dialogue on the situation.

4.5.4 Actions to be taken if a revised ATC clearance cannot be obtained

4.5.4.1 The provisions of this section apply to situations where a pilot has the need to exercise the authority of a pilot in command under the provisions of Annex 2, 2.3.1.

4.5.4.2 If a revised ATC clearance cannot be obtained and deviation from track is required to avoid weather, the pilot shall take the following actions:

a) if possible, deviate away from the organized track or route system;

b) establish communications with and alert nearby aircraft broadcasting, at suitable intervals: flight level, aircraft identification, aircraft position (including ATS route designator or the track code) and intentions, on the frequency in use and on frequency 121.5 MHz (or, as a back up, on the inter pilot air to air frequency 123.45 MHz);

c) watch for conflicting traffic both visually and by reference to ACAS (if equipped);

Note. if, as a result of actions taken under the provisions of 4.5.4.2 b) and c) above, the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary to avoid conflict.

d) turn on all aircraft exterior lights (commensurate with appropriate operating limitations);

e) for deviations of less than 19 km (10 NM), aircraft should remain at a level assigned by ATC;

f) for deviation of greater than 19 km (10 NM), when the aircraft is approximately 19 km (10 NM) from track, initiate a level change based on the following criteria in Table 1;

~~Table 1~~

~~Route center line track~~	~~Deviations >19 km (10 NM)~~	~~Level change~~
~~EAST 0000 – 1790 magnetic~~	~~LEFT~~ ~~RIGHT~~	~~DESCEND 90 m (300 ft)~~ ~~CLIMB 90 m (300 ft)~~
~~WEST 1800 – 3590 magnetic~~	~~LEFT~~ ~~RIGHT~~	~~CLIMB 90 m (300 ft)~~ ~~DESCEND 90 m (300 ft)~~

~~g) when returning to track, be at its assigned level, when the aircraft is within approximately 19 km (10 NM) of the center line; and~~

~~h) if contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.~~

4.60 Special Procedures for in-flight contingencies involving a loss of vertical navigation performance required for flight within the AFI RVSM airspace

4.6.1 General

4.~~6~~.1.1 An in-flight contingency affecting flight in the AFI RVSM airspace pertains to unforeseen circumstances that directly impact on the ability of one or more aircraft to operate in accordance with the vertical navigation performance requirements of the AFI RVSM airspace, as specified in 1.5.2 Such in-flight contingencies can result from degradation of aircraft equipment associated with height-keeping, and from turbulent atmospheric conditions.

4.~~6~~.1.2 The pilot shall inform air traffic control as soon as possible of any circumstances where the vertical navigation performance requirements for the AFI RVSM airspace cannot be maintained. In such cases, the pilot shall obtain a revised air traffic control clearance prior to initiating any deviation from the cleared route and/or flight level, whenever possible. Where a revised air traffic control clearance could not be obtained prior to such a deviation, the pilot shall obtain a revised clearance as soon as possible thereafter.

4.~~6~~.1.3 Air traffic control shall render all possible assistance to a pilot experiencing an in-flight contingency. Subsequent air traffic control actions will be based on the intentions of the pilot, the over-all air traffic situation, and the real-time dynamics of the contingency.

4.1.4 Although all possible contingencies cannot be covered, they provide for cases of inability to maintain assigned level due to weather, aircraft performance, pressurization failure and problems associated with high-level supersonic flight. They are applicable primarily when rapid descent and/or turnback or diversion to an alternate airport are required. The pilot's judgment shall determine the sequence of actions taken, taking into account specific circumstances.

4.6.2 Degradation of aircraft equipment — pilot reported

4.~~6~~-2.1 When informed by the pilot of an RVSM approved aircraft operating in the AFI RVSM airspace that the aircraft's equipment no longer meets the RVSM MASPS, as specified in 18, air traffic control shall consider the aircraft as non-RVSM approved.

4-~~6~~).2.2 Air traffic control shall take action immediately to provide a minimum vertical separation of 600 m (2 000 ft) in accordance with FLAS, or an appropriate horizontal separation from all other aircraft concerned operating in the AFI RVSM airspace.

An aircraft rendered non-RVSM approved shall normally be cleared out of the AFI RVSM airspace by air traffic control, when it is possible to do so.

4.6.2.3 Pilots shall inform air traffic control, as soon as practicable, of any restoration of the proper functioning of equipment required to meet the RVSM MASPS.

4.6.2.4 The first ACC/UAC to become aware of a change in an aircraft's RVSM status shall coordinate with adjacent ACCs/UACs, as appropriate.

4.6.3 Severe turbulence — not forecast

4.6.3.1 When an aircraft operating in the AFI RVSM airspace encounters severe turbulence due to weather or wake vortex that the pilot believes will impact the aircraft's capability to maintain its cleared flight level, the pilot shall inform ATC. Air traffic control shall establish either an appropriate horizontal separation or an increased minimum vertical separation.

4.6.3.2 Air traffic control shall, to the extent possible, accommodate pilot requests for flight level and/or route changes, and pass traffic information, as required.

4.6.3.3 Air traffic control shall solicit reports from other aircraft to determine whether RVSM should be suspended entirely or within a specific flight level band and/or area.

4.6.3.4 The ACC/UAC suspending RVSM shall coordinate any such suspension(s), and any required adjustments to sector capacities with adjacent ACCs/UACs, as appropriate, to ensure an orderly progression to the transfer of traffic.

4.64 Severe turbulence — forecast

4.64.1 Where a meteorological forecast is predicting severe turbulence within the AFI RVSM airspace, air traffic control shall determine whether RVSM should be suspended and, if so, the period of time, and specific flight level(s) and/or area.

4.64.2 In cases where RVSM will be suspended, the ACC/UAC suspending RVSM shall coordinate with adjacent ACCs/UACs with regard to the flight levels appropriate for the transfer of traffic, unless a contingency flight level allocation scheme has been determined by letter of agreement. The ACC/UAC suspending RVSM shall also coordinate applicable sector capacities with adjacent ACCs/UACs, as appropriate.

5.0 AIR TRAFFIC CONTROL CLEARANCES

5.1 Adherence to ATC-approved Mach number

(A2 3.6.2)

5.1.1 Air Traffic Control clearances

5.1.1 Turbojet aircraft operating at or above FL 250 within the Canarias FIR shall adhere to the Mach number approved by ATC and shall request ATC approval before making any change thereto. If it is essential to make an immediate change in the Mach number (eg. due to turbulence), ATC shall be notified as soon as possible that such a change has been made.

5.1.2 If it is not feasible, due to aircraft performance, to maintain the last assigned Mach number during en-route climbs and descents, pilots of aircraft concerned shall advise ATC at the time of the climb/descent request.

5.0 5.1.30 ATC clearance into the AFI RVSM airspace

51.3.1 Only RVSM approved aircraft and non-RVSM approved State aircraft shall, subject to ATM capacity be issued an air traffic control clearance to join and operate within the AFI RVSM airspace.

5.2 Non-RVSM aircraft intending to climb or descend uninterrupted through the AFI RVSM airspace shall be given appropriate ATC clearance.

5~~1.3~~.2 Air traffic control clearance into the AFI RVSM airspace shall not be issued to formation flights of aircraft.

6.0 SEPARATION OF AIRCRAFT

6.1 Lateral separation
(A11 – Attachment B; RNP Manual Appendix E, P-ATM, 5.4.1 and 5.11, Ch. 15)

6.1.1 Minimum lateral separation shall be 185 km (100 NM) except as provided for in 6.1.2 and 6.1.3 below.

6.1.2 Where aircraft are transiting into an airspace with a larger lateral minimum than the airspace being exited, lateral separation will continue to exist provided that:

a) the smaller separation minimum exists;

b) flight paths diverge by 15 degrees or more until the larger minimum is established; and

c) it is possible to ensure, by means approved by the appropriate ATS authority, that the aircraft have navigation capability necessary to ensure accurate track guidance.

6.1.3 For flights on designated controlled oceanic routes or areas within the Canarias FIR (southern sector), Dakar Oceanic, Recife and Sal Oceanic FIRs, and including AORRA, the minimum lateral separation that shall be applied between RNAV-equipped aircraft approved to RNP 10 or better shall be 93 km (50 NM).

~~6.1.3.1 The letter R shall be annotated in Item 10 (Equipment) of the flight plan to indicate that the aircraft meets the RNP type prescribed.~~

6.1.3.~~2~~ 1 Operators shall establish programmes to mitigate the occurrence of large lateral track errors due to equipment malfunction or operational error, which:

a) ensure that operating drills include mandatory navigation cross-checking procedures to identify navigation errors in sufficient time to prevent aircraft inadvertently deviating from an ATC-cleared route; and

b) provide for the continued airworthiness of aircraft navigation systems necessary to navigate to the degree of accuracy required.

Note.- Detailed guidance material on RNP is contained in the Manual on Required Navigation Performance (RNP) (Doc 9613).

6.1.3.2 A target level of safety of 5×10^{-9} fatal accidents per flight hour per dimension shall be established for route systems operating a 93 km (50 NM) lateral separation minimum and the safety level of such airspace shall be determined by an appropriate safety assessment.

Note.- Detailed guidance on conducting safety assessments is contained in the Manual on Airspace Planning Methodology for the Determination of Separation Minima (Doc 9689).

6.1.3.3 The following criteria are used in the operational assessment of airspace system safety:

a) the proportion of the total flight time spent by aircraft 46 km (25

NM) or more off the cleared track shall be less than 7.0×10^{-4}; and

b) the proportion of the total flight time spent by aircraft between 74 km and 111 km (40 NM and 60NM) off the cleared track shall be less than 4.1×10^{-5}.

6.1.3.4 Adequate monitoring of flight operations shall be conducted to provide data to assist in the assessment of continuing compliance of aircraft with the lateral navigation performance capabilities of RNP 10 and 6.1.3.3 above. Such data shall include operational errors dues to all causes. A safety assessment shall be carried out periodically, based on the data collected, to confirm that the safety level continues to be met.

Note:- Detailed guidance on monitoring is contained in the Air Traffic Services Planning Manual (Doc 9426) and the Manual of Airspace Planning Methodology for the Determination of Separation Minima (Doc 9689).

6.1.4 For flights over continental Africa on RNAV airways designated as RNP 10, the minimum lateral separation that shall be applied is 93 km (50 NM) between aircraft, provided that the aircraft and the operator have been approved by the State of Registry or the State of the Operator, as appropriate, to meet the following requirements (or equivalent):

a) aircraft are approved to RNP 10 in accordance with provisions contained in the Manual on Required Navigation Performance, Doc 9613; and

b) operator programmes shall be established to mitigate the occurrence of large navigational errors due to equipment malfunction or operational error:

1) operator in-flight operating drills shall include mandatory navigation cross-checking procedures to identify navigation errors in sufficient time to prevent aircraft from inadvertent deviation from ATC-cleared route; and

2) the operator shall establish programmes to provide for the continued airworthiness of aircraft navigation systems necessary to navigate to the degree of accuracy required.

6.1.4.1 The letter R shall be inserted in Item 10 (Equipment) of the flight plan to indicate that the aircraft has been appropriately approved and can comply with all the conditions of that approval.

6.2 Longitudinal separation
(P-ATM, 5.4.2 and 5.11)

6.2.1 Except as provided for in 6.2.2, the minimum longitudinal separation between turbo-jet aircraft shall be:

a) 20 minutes, except as specified below;

b) 15 minutes at or above FL 250 within the Canarias, Dakar Oceanic, Recife and Sal Oceanic FIRs, provided that the Mach number technique is applied, and, whether in level, climbing or descending flight, the aircraft have reported over the same entry point to the ATS routes or a common point into the oceanic-controlled airspace and follow the same track or continuously diverging tracks; or

c) 10 minutes or 150 km (80 NM), derived by RNAV, when the Mach number technique is applied on designated controlled RNAV/RNP10 oceanic routes. in

the EUR/SAM corridor within the Dakar Oceanic, Recife and Sal Oceanic FIRs.

d) 10 minutes when the Mach number technique is applied on RNP 10 routes over continental Africa

6.2.2 Longitudinal distance-based separation minima of 93 km (50 NM) between RNAV aircraft on the same track on RNP 10 routes over continental Africa shall not be used.

6.2.2~~3~~ For flight in the EUR/SAM corridor (Canarias (southern sector), Dakar Oceanic, Recife and Sal Oceanic FIRs), the minimum longitudinal separation minima between RNAV-equipped aircraft approved to RNP 10 or better on the same track shall be 93 km (50 NM) and shall ONLY be applied in designated controlled airspaces or routes, provided that:

a) the letter R shall be annotated in Item 10 (Equipment) of the flight plan to indicate that the aircraft meets the RNP type prescribed; and

b) a target level of safety of 5 x 10^{-9} fatal accidents per flight hour per dimension shall be established and the safety level of such airspace shall be determined by an appropriate safety assessment.

6.2.~~3~~1 Adequate monitoring of flight operations shall be conducted to provide data to assist in the assessment of continuing compliance of aircraft with the longitudinal navigation performance capabilities of RNP 10. Such data shall include operational errors due to all causes. A safety assessment shall be carried out periodically, based on the data collected, to confirm that the safety level continues to be met.

Note.- Detailed guidance on monitoring is contained in the Air Traffic Services Planning Manual (Doc 9426) and the Manual on Airspace Planning Methodology for the Determination of Separation Minima (Doc 9689).

6.3 Reduced ~~V~~vertical separation ~~M~~ minimum (RVSM)

6.3.1. Between FL 290 and FL 410 inclusive within the AFI RVSM airspace, the vertical separation minimum shall be:

a) 300 m (1 000 ft) between RVSM approved aircraft;

b) 600 m (2 000 ft) between:

- non-RVSM approved State aircraft and any other aircraft operating within the AFI RVSM airspace in accordance with FLAS;

6.3.2 ATC shall provide a minimum vertical separation of 600 m (2 000 ft) between an aircraft experiencing a communications failure in flight and any other aircraft, where both aircraft are operating within the AFI RVSM airspace in accordance with FLAS.

~~The minimum vertical separation that shall be applied between FL 290 and FL 410 inclusive is 300 m (1 000 ft).~~

~~6.3.1 Area of applicability~~

~~The reduced vertical separation minimum (RVSM) shall be applied for flights between FL 290 and FL 410 inclusive, within the Canarias (Southern sector), Dakar Oceanic, Recife (oceanic portion) and Sal Oceanic FIRs.~~

~~*Note. Implementation will be carried out in phases and will be promulgated by appropriate AIP Supplements and included in the respective AIPs.*~~

~~6.3.2 Establishment of RVSM transition areas (A2 Appendix 3; A6, Parts I and II, 7.2.3; A11 3.3.4; P ATM, 5.3.2)~~

6.3.2.1 In order to allow for the transition of flights to and from EUR/SAM airspace, the ATS authorities responsible for Canarias, Dakar Oceanic, Recife and Sal Oceanic FIRs may establish designated RVSM transition areas. A 300 m (1 000 ft) vertical separation minimum can be applied between RVSM approved aircraft within these transition areas.

6.3.2.2 An RVSM transition area shall have a vertical extent of FL 290 to FL 410 inclusive, be contained within horizontal dimensions determined by the provider States, be overlapping with or contained within EUR/SAM RVSM airspace and should have direct controller pilot communications.

6.3.3 RVSM approval

The minimum separation in 6.3 shall only be applied between aircraft and operators that have been approved by the State of Registry or the State of the Operator, as appropriate, to conduct flights in RVSM airspace and that are capable of meeting the minimum aircraft system performance specification (MASPS) height keeping requirements (or equivalent).

6.3.4 MASPS

The MASPS height keeping requirements are as follows:

a) for all aircraft, the differences between cleared flight level and the pressure altitude actually flown shall be symmetric about a mean of 0 m (o ft), shall have a standard deviation no greater than 13 m (43 ft) and shall be such that the error frequency decreases with increasing magnitude at a rate which is at least exponential;

b) for groups of aircraft that are nominally of identical design and built with respect to all details that could influence the accuracy of height keeping performance in the RVSM flight envelope (FL 290 to FL 410 inclusive):

4) the mean altimetry system error (ASE) of the group shall not exceed 25 m (80 ft) in magnitude; and

5) the sum of the absolute value of the mean ASE and of three standard deviations of ASE shall not exceed 75 m (245 ft);

c) for non group aircraft for which the characteristics of the airframe and altimetry system fit are unique and so cannot be classified as belonging to a group of aircraft: the ASE shall not exceed 61 m (200 ft) in magnitude in the RVSM flight envelope (FL 290 to FL 410 inclusive); and

f) the following criteria shall be used in the operational assessment of airspace system safety: the total vertical error (TVE), which is the difference between the geometric height of the aircraft and the geometric height of the flight level to which it is assigned, is required to be such that:

1) the probability that TVE equal to or greater than 91 m (300 ft) in magnitude is equal to or less than 2.0×10^{-3};

2) the probability that TVE equal to or greater than 152 m (500 ft) in magnitude is equal to or less than 5.0×10^{-6};

3) the probability that TVE equal to or greater than 200 m (650 ft) in magnitude is equal to or less than 1.4×10^{-6};

4) the probability that TVE between 290 m and 320 m (950 ft and 1 050 ft), inclusive, in

~~magnitude is equal to or less than 1.7×10^{-7}; and~~

~~5) The proportion of time that aircraft spend at incorrect flight levels, 300 m (1 000 ft), or multiples thereof, away from assigned flight levels is equal to or less than 7.1×10^{-7}.~~

~~*Note. Guidance material regarding the initial achievement and contained maintenance of the height keeping performance in 6.3.4 is contained in the Guidance Material on the Implementation of a 300 m (1 000 ft) Vertical Separation Minimum (VSM) for Application in the EUR/SAM corridor.*~~

~~6.3.5 Target level of safety (TLS)~~

~~Application of RVSM in the airspace designated in 6.3.1 shall meet a TLS of 5×10^{-9} fatal accidents per aircraft flight hour due to all causes of risk in the vertical dimension.~~

~~6.3.6 Approval status and aircraft registration~~

~~Item 10 of the flight plan (Equipment) shall be annotated with the letter W if the aircraft and operator have received RVSM State approval. Furthermore, the aircraft registration shall be indicated on Item 18 of the flight plan.~~

~~6.3.7 Operation of aircraft not approved for RVSM~~

~~6.3.7.1 Except for areas where transition areas have been established, aircraft not meeting the requirements of 6.3.4 shall not be allowed to operate in EUR/SAM RVSM airspace.~~

~~6.3.7.2 Exceptionally, aircraft that have not received RVSM State approval may be cleared to operate in airspace where RVSM may be applied in accordance with policy and procedures established by the State provided that 5=600 m (2 000 ft) vertical separation is applied.~~

~~*Note. Transitions to and from EUR/SAM RVSM airspace will normally take place in the first FIR in EUR/SAM RVSM airspace.*~~

~~6.3.8 Monitoring~~

~~Adequate monitoring of flight operations in the EUR/SAM RVSM airspace shall be conducted to assist in the assessment of continuing compliance of aircraft with the height keeping capabilities in 6.3.4. Monitoring shall include assessment of other sources of risk to ensure that the TLS specified in 6.3.5 is not exceeded.~~

~~*Note. Details of the policy and procedures for monitoring established by the South Atlantic Monitoring Agency (SATMA) are contained in the Guidance Material on the Implementation of a 300 m (1 000 ft) Vertical Separation Minimum (VSM) for Application in the EUR/SAM Corridor.*~~

~~6.3.9 Wake turbulence procedures~~

~~6.3.9.1 The following special procedures are applicable to mitigate wake turbulence encounters in the airspace where RVSM is applied.~~

~~6.3.9.2 An aircraft that encounters wake turbulence should notify ATC and request a revised clearance. However, in situations where a revised clearance is not possible or practicable:~~

~~a) the pilot should establish contact with other aircraft, if possible, on the air to air frequency 123.45 MHz; and~~

b) one (or both) aircraft may initiate lateral offset(s) not to exceed 3.7 km (2 NM) from the assigned route(s) or track(s), provided that:

1) as soon as it is practicable to do so, the offsetting aircraft notify ATC that temporary lateral offset action has been taken and specify the reason for doing so; and

2) the offsetting aircraft notify ATC when re-established on assigned routes(s) or track(s).

Note. In the contingency circumstances above, ATC will not issue clearances for lateral offsets and will not normally respond to action taken by pilots.

6.4 Information on application of separation minima
(A11 – 3.4; P-ATM, 5.4.1, 5.4.2 and 5.11)

6.4.1 Where, circumstances permitting, separation minima lower than those specified in 6.1 and 6.2 will be applied in accordance with the PANS-ATM, appropriate information should be published in Aeronautical Information Publications so that users of the airspace are fully aware of the portions of airspace where the reduced separation minima will be applied and of the navigation aids on the use of which those minima are based.

7.0 ALTIMETER SETTING PROCEDURES APPLICABLE TO AIR TRAFFIC SERVICES AND MINIMUM LEVELS
(P-ATM, 4.10 AND 4.10.3, P-OPS, Volume 1,Part V1)

7.1 The lowest usable flight level for holding and approach manoeuvres shall be calculated from actual QNH, unless the pressure variation is so small that reference to climatological data is acceptable.

Note 1.- The lowest usable flight will provide a terrain clearance of at least 300 m (1 000 ft) and, for operation in the vicinity of an aerodrome will not be established below 450 m (1 500 ft) above aerodrome elevation.

Note 2.- MET Offices will inform ATS units when, in abnormal conditions, pressure goes below the minimum climatological value, in order that appropriate steps can be taken to cancel temporarily the use of the lowest flight level or levels that would not ensure the minimum terrain clearance.

7.2 Based on current and anticipated atmospheric pressure distribution, area control centers shall coordinate, where required, the lowest flight level to be used.

7.3 In determining the transition level, the table at Appendix A should be used when necessary. This table shows the transition level directly as a function of the transition altitude of the aerodrome and of the current QNH altimeter setting value.

8.0 FLIGHT INFORMATION SERVICE

8.1 Information on runway conditions
(A11 – 4.2.1; P-ATM, 6.6)

8.1.1 Unless otherwise provided, area control centers shall have available for transmission to aircraft on request immediately prior to descent, information on the prevailing runway conditions at the aerodrome of intended landing.

8.2 8.1 Transmission of SIGMET information
(P-ATM, 9.1.3.1 and 9.1.3.2)

8.1.1 Transmission of SIGMET information to aircraft shall be at the initiative of the appropriate ATS unit, by the preferred method of directed transmission followed by acknowledgement, or by a general call when the number of aircraft would render the preferred method impracticable.

8.1.2 SIGMET information passed to aircraft shall cover a portion of the route up to two hours' flying time ahead of the aircraft.

8.3-2 Transmission of amended aerodrome forecast
(P-ATM, 9.1.3.5)

8.2.1 Amended aerodrome forecasts shall be passed to aircraft within 60 minutes from the aerodrome of destination, unless the information would have been made available through other means.

8.3Transmission of trend forecasts
(A11 – 4.2.2)

8.3.1 The latest trend forecasts available to the ATS unit, provided it is no more than one hour old, shall always be transmitted to an aircraft together with the latest report of routine or special observation, when the aircraft requests the latter information.

9.0 AIR TRAFFIC SERVICES COORDINATION

9.1 Coordination between units providing area control service
(A11 – 3.6.2, P-ATM, 10.34)

9.1.1 If a flight should enter an adjacent area, information concerning any review of estimate of three minutes or more shall be forwarded to the adjacent area control center.

10. AIR TRAFFIC SERVICES MESSAGES

10.1 Flight plan and departure messages
(P-ATM, 11.3.3 and 11.4.2.2)

10.1.1 The procedures applicable for the AFI RVSM airspace are contained in the PANS-ATM Doc.4444 paragraphs 11.3.3 and 11.4.2.

~~10.1.1 Filed flight plan messages for flights intending to operate within the NAT Region at a distance of 60 NM or less from the northern and southern boundaries of Gander Oceanic and Shanwick Oceanic flight information regions shall be addressed to the area control centers in charge of the NAT flight information regions along the route and, in addition, to the area control centers in charge of the nearest adjacent NAT flight information regions.~~

~~10.1.2 For flights departing from points within the adjacent regions and entering the NAT Region without intermediate stops, filed flight plan message shall be transmitted to the appropriate area control centers immediately after the flight plan has been submitted~~.

10.2 Computer-assisted coordination process

10.2.1 Procedures

10.2.2 *Operational procedure*

10.2. 2.1 The following basic rules shall apply for the use of EST and ACT messages:

a) These messages shall be automatically generated, exchanged and processed to obviate human intervention to the extent practicable.

b) A single message shall be sent in respect of each flight due to be transferred and any subsequent revision shall be the subject of verbal coordination.

c) The message shall provide the most recent information available on all transfer conditions at the time of transmission.

d) Acceptance by the receiving unit of the transfer conditions implied in the message shall be assumed, unless the receiving unit initiates verbal coordination to amend the transfer conditions.

Note.— Bilateral arrangement may be required to cover the event of failure of the ATS direct speech circuit.

e) There shall be bilateral agreement as to the boundary point and transmission times for each route. The normal transmission time shall be 15 minutes before the flight concerned is expected to cross the boundary.

f) In the event of data not being correlated by the receiving computer with an appropriate entry in its flight plan database, the computer shall originate a warning to the appropriate air traffic control sector to take necessary action for the acquisition of missing flight plan details. This shall normally involve a telephone inquiry.

g) In the event of incomprehensible or illogical data being detected within the message, the computer shall initiate an appropriate warning to the air traffic control sector involved, if this can be determined, for further action.

Note. — Any system-initiated warning shall require reversion to verbal coordination.

h) If the receiving unit has not received a flight plan, the sending air traffic control unit shall verbally inform the receiving unit of whether or not the aircraft is RVSM approved.

i) When an automated message does not contain the information filed in Item 18 of the ICAO flight plan form relevant to RVSM operations, the sending air traffic control unit shall inform the receiving unit of that information by supplementing the ACT message verbally, using the term "NEGATIVE RVSM" or "NEGATIVE RVSM STATE AIRCRAFT", as applicable.

j) When a verbal coordination process is being used, the sending air traffic control unit shall include the information filed in Item 18 of the ICAO flight plan form relevant to RVSM operations at the end of the verbal estimate message, using the term "NEGATIVE RVSM" or "NEGATIVE RVSM STATE AIRCRAFT", as applicable.

k) When a single aircraft is experiencing an in-flight contingency which impacts on RVSM operations, the associated coordination message(s) shall be supplemented verbally by a description of the cause of the contingency.

11.0 ALERTING AND SEARCH AND RESCUE SERVICES

11.1 Routes and equipment of ~~private~~ general aviation aircraft

(A6-Part II – 6.3 and 6.4, A6-Part III-4.3 and 4.4) ~~P-ATM, 11.3.3 and 11.4.2.2~~

~~11.1.1 General aviation aircraft operating over designated areas, land or sea, where search and rescue operations would be difficult, should:~~

~~a) Carry appropriate survival equipment:~~

~~b) follow the route or specified procedures if not equipped with two-way radio, except that under special circumstances, the appropriate authority may grant specific exemptions from this requirement.~~

11.2 Alerting services

(P-ATM, 9.2)

~~11.2.1 The procedures for "Alerting Service" detailed in the PANS-ATM, 9.2, are applicable to all flights except those conducted wholly in the vicinity of an aerodrome when exempted by the appropriate air traffic control unit.~~

12.0 IDENTIFICATION OF ATS ROUTES (A11, Appendix 1 – 2.4)

12.1 Composition of designators

12.1.1 The letter D to indicate that on a route or portion thereof advisory service only is provided and the letter F to indicate that on a route or portion thereof flight information service only is provided shall be added after the basic designators of the ATS route in question.

132.0 USE OF SECONDARY SURVEILLANCE RADAR (SSR) (P-ATM, Chapter 8 P-OPS, Vol. I, part VIII)

12.1 Area of application

12.1.1 The procedures provided below shall be applicable within the AFI Region, except for Alger, Canarias, Casablanca and Tunis FIRs.

Note. Alger, Canarias and Casablanca FIRs are part of Originating Region Code Assignment Method (ORCAM) Participating Area (PA) South West (new PA EUR A) and Tunis FIR is part of ORCAM PA South East (new PA EUR D).Therfore, the procedure contained in the Regional Supplementary Procedures (Doc 7030), EUR, Part I, Rules of the Air, Air Traffic Services and Search and Rescue, Section 9.0 USE OF SECONDARY SURVEILLANCE RADAR (SSR) apply in Alger, Canarias Casablanca and Tunis FIRs.

Secondary surveillance radar information may be used alone for the provision of horizontal separation between properly equipped aircraft in the circumstances and under the conditions specified below:

a) Within the coverage area of the associated primary radar, in order to overcome known deficiencies of that radar, eg. the fact that primary radar echoes of cetin aircraft are not, or not continuously, presented on the radar display due to the reflecting characteristics of such aircraft, clutter, etc. In this case, SSR responses may be used for the separation of transponder equipped aircraft and, additionally, for the separation of transponder equipped aircraft from other known aircraft not using SSR but displayed clearly on the primary radar display, provided that the SSR responses from any aircraft (not necessarily the one being provided separation) coincide with the primary radar echo of the same aircraft.

Note. Where SSR accuracy cannot be verified by means of monitor equipment or by visual correlation of the SSR response with the primary radar echo from a given aircraft, SSR responses alone may be use only to provide identification.

b) Outside the coverage area of the associated primary radar, or in certain areas (which shall be defined horizontally as well as vertically) and under circumstances specified by the appropriate authority in consultation with the operators, provided:

1) reliable SSR coverage exists within the area;

2) the area is designated as controlled airspace;

3) the control of the air traffic in the area is vested in one ATC unit unless adequate means of coordination exists between all ATC units concerned;

4) actual operating experience has shown that loss of SSR responses is not occurring at a rate affecting the safety of operations and adequate measures for earliest possible detection of such losses have been developed;

5) density and/or complexity of air traffic in the area and provision of navigational guidance allow a safe reversion to other forms of separation in case of SSR failure;

6) the aircraft concerned have previously been identified and identification has been maintained;

7) procedural separation is applied between aircraft with functioning transponders and other aircraft; and

8) when primary radar fails and until procedural separation is established:

i) the positional accuracy of the SSR responses has been verified (see 13.1 a) and Note): and

ii) the pilots of the aircraft concerned have been advised.

c) In the case of aircraft emergency.

13.2 Carriage and operation of pressure-altitude reporting SSR transponders

13.2.1 With effect from 1 January 2000, all aircraft operating as IFR flights in the AFI Region shall be equipped with a pressure-altitude reporting SSR transponder.

13.2.2 Unless otherwise directed by air traffic control, the last assigned identity (Mode A) code shall be retained. If no identity code has been assigned, Mode A code 2000 shall be selected and retained.

14.0 USE OF AIRBORNE COLLISION AVOIDANCE SYSTEMS (ACAS)

(A2 –3.2; A6, Part I – 6.18; A10 – Vol. IV; A11 – 2.4.2; P-OPS, Vol. I, Part VIII; P-ATM, Chapter 4)

14.1 Carriage and operation of ACAS II

14.1.1 ACAS II shall be carried and operated in the AFI Region by all aircraft that meet the following criteria:

a) With effect from 1 January 2000 all civil fixed-wing turbine-engined aircraft having a maximum take-off mass exceeding 15 000 kg or maximum approved passenger seating configuration of more than 30.

b) With effect from 1 January 2005, all civil fixed-wing turbine-engined aircraft having a maximum take-off mass exceeding 5 700 kg or a maximum approved passenger seating configuration of more than 19.

14.2 Responsibility for separation of aircraft during manoeuvres in compliance with a resolution advisory (RA)

14.2.1 The use of ACAS II does not alter the respective responsibilities of pilots and controllers for the safe operation of aircraft.

14.2.2 On being notified that an aircraft, under air traffic control, is manoeuvres in accordance with a resolution advisory (RA), a controller should not issue instructions to that aircraft which are contrary to the RA as communicated by the pilot. Once an aircraft departs from the current ATC clearance compliance with an RA,

~~the controllers cease to be responsible for providing separation between that aircraft and other aircrafts affected as a direct consequence of the manoeuvre induced by the RA. However, when circumstances permit, the controller should endeavour to provide traffic information to aircraft affected by the manoeuvre. The controller's responsibility for providing separation for all the affected aircraft resumes when:~~

~~a) the controller acknowledges a report from the pilot that the aircraft has resumed the current clearance; or~~

~~b) the controller acknowledges a report from the pilot hat the aircraft is resuming the current clearance and issues an alternative clearance which is acknowledged by the flight crew.~~

~~14.3 ACAS~~

~~14.3.1 ACAS can have a significant effect on air traffic control. Therefore there is a continuing need to monitor the performance of ACAS in the developing air traffic management environment.~~

~~14.3.2 Following and RA event, or other significant ACAS event, pilots and controllers should complete an ACAS RA report; aircraft operators and ATS authorities should forward the completed reports through established channels.~~

~~14.~~ 15. Special procedures applicable to designated airspaces

15.*1* *RVSM approved aircraft and non-RVSM approved State aircraft entering the AFI RVSM airspace from a non-RVSM environment*

15.2 RVSM approved aircraft and non-RVSM approved State aircraft entering the AFI RVSM airspace from a non-RVSM environment shall be established at a flight level in accordance with:

a) the Tables of Cruising Levels, as published in ICAO Annex 2, Appendix 3, a); and/or

b) a flight level allocation scheme, if applicable; and/or

c) as specified in an inter area control centre (ACC) letter of agreement.

15.3 Any changes from non-RVSM levels to RVSM flight levels shall be initiated by the first ACC/upper area control centre (UAC) providing air traffic control service to the aircraft within the AFI RVSM airspace, and shall be achieved before the aircraft passes the transfer of control point to the adjacent ACC/UAC, unless otherwise specified in an inter ACC letter of agreement.

15.4 *Aircraft entering a non-RVSM environment from the AFI RVSM airspace*

15.4.1 Aircraft entering a non-RVSM environment from the AFI RVSM airspace shall be established with the applicable vertical separation minimum.

15.4.2 The applicable vertical separation minimum shall be established by the last ACC/UAC providing air traffic control service to the aircraft within the AFI RVSM airspace, and before the aircraft passes the transfer of control point to the adjacent ACC/UAC.

15.4.3 Such aircraft shall be established at a flight level in accordance with:

a) the Tables of Cruising Levels, as published in ICAO Annex 2, Appendix 3, b); and/or

b) a flight level allocation scheme, if applicable; and/or

c) as specified in an inter ACC letter of agreement.

15.5 *Non-RVSM approved civil aircraft operations*

15.5.1 Non-RVSM approved civil aircraft operating from a departure aerodrome outside the lateral limits of the AFI RVSM airspace with a destination aerodrome within the lateral limits of the AFI RVSM airspace:

a) shall be cleared to a flight level below FL 290; and

b) any such flight level changes shall be initiated by the first ACC/UAC providing air traffic control service to the aircraft within the AFI RVSM airspace, and shall be achieved before the aircraft passes the transfer of control point to the adjacent ACC/UAC.

15.5.2 Non-RVSM approved aircraft operating from a departure aerodrome to a destination aerodrome which are both within the lateral limits of the AFI RVSM airspace shall be cleared to a flight level below FL 290.

15.5.3 Non-RVSM approved aircraft operating from a departure aerodrome within the lateral limits of the AFI RVSM airspace to a destination aerodrome outside the lateral limits of the AFI RVSM airspace:

a) shall be cleared to a flight level below FL 290; and

b) may be cleared to FL 290 or above by the last ACC/UAC providing air traffic control service to the aircraft within the AFI RVSM airspace, and any such flight level changes shall be achieved before the aircraft passes the transfer of control point to the adjacent ACC/UAC.

15.5.4 Non-RVSM approved aircraft operating from a departure aerodrome to a destination aerodrome which are both outside the lateral limits of the AFI RVSM airspace, with a portion of the route within the lateral limits of the AFI RVSM airspace:

a) shall be cleared to a flight level below FL 290 or above FL 410 by the first ACC/UAC providing air traffic control service to the aircraft within the AFI RVSM airspace, and any such flight level changes shall be achieved before the aircraft passes the transfer of control point to the adjacent ACC/UAC, in accordance with the flight level allocation system (FLAS), if applicable, and/or as specified in an inter ACC letter of agreement; and

b) may subsequently be cleared to a requested flight level within, or through, the AFI RVSM airspace by the last ACC/UAC providing air traffic control service to the aircraft within the AFI RVSM airspace, and any such flight level changes shall be achieved before the aircraft passes the transfer of control point to the adjacent ACC/UAC.

~~15~~ 16. Phraseology related to RVSM Operations in the AFI RVSM AIRSPACE (P-ATM)

~~14.1 Controller/pilot RTF phraseology~~

~~Phrase Meaning~~	~~Phrase Meaning~~
~~*(call sign)* CONFIRM RVSM APPROVED~~	~~For a controller to ascertain the RVSM approval status of an aircraft.~~
~~NEGATIVE RVSM*~~	~~For a pilot to report non-RVSM approval status:~~ ~~a) on the initial call on any frequency within the AFI RVSM airspace (controllers shall provide read back with this same phrase); and~~ ~~b) in all requests for flight level changes pertaining to flight levels~~

	within the AFI RVSM airspace; and
	g) in all read backs to flight level clearances pertaining to flight levels within the AFI RVSM airspace. Additionally, except for State aircraft, pilots shall include this RTF phrase to read back flight level clearances involving the vertical transit through FL 290 or FL 410.
AFFIRM RVSM*	For a pilot to report RVSM approval status.
NEGATIVE RVSM STATE AIRCRAFT*	For a pilot of a non-RVSM approved State aircraft to report non RVSM approval status, in response to the RTF phrase *(call sign)* CONFIRM RVSM APPROVED.
UNABLE RVSM DUE TURBULENCE*	Denial of air traffic control clearance into the AFI RVSM airspace.
UNABLE RVSM DUE EQUIPMENT*	For a pilot to report that the aircraft's equipment has degraded below the MASPS required for flight within the AFI RVSM airspace. This phrase is to be used to convey both the initial indication of the non-MASPS compliance, and henceforth, on initial contact on all frequencies within the lateral limits of the AFI RVSM airspace until such time as the problem ceases to exist, or the aircraft has exited RVSM airspace.
READY TO RESUME	For a pilot to report the ability to resume RVSM*	operation within the AFI RVSM airspace after an equipment or weather related contingency.

Phrase Meaning	Phrase Meaning
REPORT ABLE TO RESUME RVSM	For a controller to confirm that an aircraft has regained its RVSM approval status, or to confirm that the pilot is ready to resume RVSM operations.

*Note. *indicates a pilot transmission*

14.2 Phraseology between ATS units

NEGATIVE RVSM *or* NEGATIVE RVSM STATE AIRCRAFT [*as applicable*]	To verbally supplement an automated estimate message exchange that does not automatically transfer Item 18 information. Also used to verbally supplement estimate messages of non-RVSM approved aircraft.
UNABLE RVSM DUE TURBULENCE [*or* EQUIPMENT, *as applicable*]	To communicate the cause of a contingency relating to an aircraft that is unable to conduct RVSM operations due to severe turbulence or other severe weather related phenomenon [or equipment failure, as applicable]. End of new text.

16 15. RVSM Approval

15.1 Except for State aircraft, operators intending to conduct flights within the volume of airspace specified in 14.1.2 where RVSM is applied shall require an RVSM approval either from the State in which the operator is based or from the State in which the aircraft is registered.

~~To obtain RVSM approval, operators shall satisfy the said State that:~~

~~a) aircraft for which the RVSM approval is sought have the vertical navigation performance capability required for RVSM operations through compliance with criteria of the RVSM minimum aircraft systems performance specifications (MASPS);~~

~~b) they have instituted procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; and they have instituted flight crew procedures for operations in AFI RVSM airspace specified in 14.1.2~~

~~*Note 1. An RVSM approval is not restricted to a specific region. Instead, it is valid globally on the understanding that any operating procedures specific to a given region, in this case the AFI Region, should be stated in the operations manual or appropriate crew guidance.*~~

~~*Note 2. Aircraft that have received State approval for RVSM operations will be referred toas "RVSM approved aircraft".*~~

~~*Note 3. Aircraft that have not received State approval for RVSM operations will be referred to as "non RVSM approved aircraft".*~~

~~17.~~ 17. Minimum Aircraft Systems Performance Specification (MASPS) (Doc 9426-ATS Planning Manuel)

~~16.1 The characteristics of total vertical error (TVE) distribution form the basis of the MASPS which were developed to support the introduction of RVSM operations in accordance with agreed global safety standards. The MASPS were designed to ensure that:~~

~~a) in respect of groups of aircraft that with respect to all details that could influence the accuracy of height keeping performance, height keeping capability shall be such that TVE for the group of aircraft shall have a mean no greater than 25 m (80ft) in magnitude and shall have standard deviation no greater than 92 0.004z for 0<_z<0 where z is the magnitude of the mean TVE in feet or 28 0.013z for 0 <_ z <_ 25 when z is in metres. In addition, the components of TVE must have the following characteristics:~~

~~1) the mean altimetry system error (ASE) of the group shall not exceed 25 m (80ft) in magnitude;~~

~~2) the sum of the absolute value of the mean ASE and of three standard deviations of ASE shall not exceed 75 m (245 ft); and~~

~~3) the differences between cleared flight levels and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in frequency of differences with increasing difference magnitude shall be at least exponential.~~

~~b) in respect of a non group aircraft for which the characteristics of the airframe and altimetry system fit are unique and so cannot be classified as belongings to a group of aircraft, height keeping performance capability shall be such that the components of the TVE of the aircraft have the following characteristics:~~

~~1) the ASE of non group aircraft shall not exceed 60 m (200 ft) in magnitude under all flight conditions; and~~

~~2) the differences between the cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in frequency of differences with increasing difference magnitude shall be at least exponential.~~

~~16.2 Guidance material of use to those involved in the initial achievement and continued maintenance of the height-keeping performance capability has been issued by ICAO under the title Manual on the Implementation of a 300 m (1,000 ft) Vertical Separation Minimum (VSM) between FL290 and FL410 Inclusive. Detailed technical guidance material on the airworthiness, continued airworthiness, and the operational practices and procedures for AFI airspace is provided in the Joint Aviation Authorities Administrative and Guidance Material, Section one: General, part 3: Leaflet No. 6~~

~~18~~ 18. RVSM Monitoring

17.1 Adequate monitoring of flight operations in the AFI RVSM airspace shall be conducted to assist in the assessment of continuing compliance of aircraft with the height-keeping capabilities in ~~17.~~ **16.** Monitoring shall include assessment of other sources of risk to ensure that the TLS specified in ~~19~~ 18. is not exceeded.

Note.— Details of the policy and procedures for monitoring established by the AFI Monitoring Agency (South Africa) are contained in the Guidance Material on the Implementation of a 300 m (1000 ft) Vertical Separation Minimum (VSM) for Application in the AFI Region are contained in ICAO Doc 9574 and other appropriate documentations on the subject.

~~19~~. 19. Target level of safety (TLS)

18..1 Application of RVSM in the airspace designated ~~in 6.3.1.1~~ shall meet a TLS of 5 x 10^{-9} fatal accidents per aircraft flight hour due to all causes of risk in the vertical dimension.

~~21. Wake turbulence procedures~~

~~21.1 The following special procedures are applicable to mitigate wake turbulence encounters in the airspace where RVSM is applied.~~

~~21.2 An aircraft that encounters wake turbulence should notify air traffic control (ATC) and request a revised clearance. However, in situations where a revised clearance is not possible or practicable:~~

~~a) the pilot should establish contact with other aircraft, if possible, on the appropriate VHF inter-pilot air to air frequency; and~~

~~b) one (or both) aircraft may initiate lateral offset(s) not to exceed 2 NM from the assigned route(s) or track(s), provided that:~~

~~as soon as it is practicable to do so, the offsetting aircraft notify ATC that temporary lateral offset action has been taken and specify the reason for doing so; an the offsetting aircraft notify ATC when re established on assigned route(s) or track(s).~~

~~*Note.— In the contingency circumstances above, ATC will not issue clearances for lateral offsets and will not normally respond to action taken by pilots.*~~

20. Special procedures for strategic lateral offsets in Oceanic Controlled Area (OCA) and remote continental airspace within AFI Region (P – ATM)

Note. The following incorporates lateral offset procedures for both the mitigation of the increasing lateral overlap probability due to increased navigation accuracy, and wake turbulence encounters.

19.1 The use of highly accurate navigation systems (such as the global navigation satellite system (GNSS)) by an increasing proportion of the aircraft population has had the effect of reducing the magnitude of lateral deviations from the route centre line and consequently increasing the probability of a collision should a loss of vertical separation between aircraft on the same route occur.

19.2 The application of lateral offsets to provide lateral spacing between aircraft, in accordance with the procedures specified in 19.3 and 19.4, can be used to mitigate the effect of this reduction in random lateral deviations, thereby improving overall system safety.

A – Implementation considerations for ATS authorities

19.3 The application of lateral offsets requires authorization from the ATS authority responsible for the airspace concerned. The following considerations shall be taken into account by the ATS authority when planning authorization of the use of strategic lateral offsets in a particular airspace:

a) Strategic lateral offsets shall only be authorized in en route oceanic or remote continental airspace. Where part of the airspace in question is within radar coverage, transiting aircraft should normally be allowed to initiate or continue offset tracking.

b) Strategic lateral offsets may be authorized for the following types of routes (including where routes or route systems intersect):

1) uni-directional and bi-directional routes; and

2) parallel route systems where the spacing between route centre lines is not less than 55.5km (30 NM).

c) In some instances it may be necessary to impose restrictions on the use of strategic lateral offsets, e.g. where their application may be inappropriate for reasons related to obstacle clearance.

d) These offset procedures should be implemented on a regional basis after coordination between all States involved.

e) The routes or airspace where application of strategic lateral offsets is authorized, and the procedures to be followed by pilots, shall be promulgated in aeronautical information publications (AIPs).

f) Air traffic controllers shall be made aware of the airspace within which strategic lateral offsets are authorized.

~~**B - Lateral offset procedures to be applied by pilots**~~

~~20.4 In the application of strategic lateral offsets, pilots should take the following points into consideration:~~

~~a) Offsets shall only be applied in airspace where this has been approved by the appropriate ATS authority.~~

~~b) Offsets shall be applied only by aircraft with automatic offset tracking capability.~~

~~c) The decision to apply a strategic lateral offset is the responsibility of the flight crew.~~

~~d) The offset shall be established at a distance of one or two nautical miles to the right of the centre line relative to the direction of flight.~~

~~e) The strategic lateral offset procedure has been designed to include offsets to mitigate the effects of wake turbulence of preceding aircraft. If wake turbulence needs to be avoided, one of the three available options (centreline, 1 NM or 2 NM right offset) shall be used.~~

~~f) In airspace where the use of lateral offsets has been authorized, pilots are not required to inform air traffic control (ATC) that an offset is being applied.~~

~~g) Aircraft transiting areas of radar coverage in airspace where offset tracking is permitted may initiate or continue an offset.~~

~~19.5 Pilots may, if necessary, contact other aircraft on the air to air frequency 123.45 MHz to coordinate offsets.~~

PART 2 - COMMUNICATIONS

These procedures are supplementary to the provisions contained in Annex 10.

~~1.0 AERONAUTICAL MOBILE SERVICE~~

~~1.1 Languages to be used in radiotelephony~~
~~(A10, Vol.II 5.2.1.2, Note 2)~~

~~1.1.1 In English speaking countries the alternative shall be French.~~

~~*Note : Maintenance of this procedure does not require implementation beyond the extent to which it has been carried out so far.*~~

~~2.0 AERONAUTICAL FIXED SERVICE~~

~~2.1 Priority of MOTNE messages on AFTN~~

~~2.1.1 « MOTNE Bulletins » for circulation on the MOTNE system which are handled on the AFTN shall be given FF priority.~~

~~3.0 RADIO FREQUENCIES~~

~~3.1 Air to Air VHF channel (A10, Vol.I, Part II 4.1.3.2)~~

~~3.1.1 The frequency 128.950 MHz has been approved for use as the air to air channel in the AFI region, to enable aircraft engaged in flight over remote and oceanic areas out of range of VHF ground stations to exchange necessary operational information and to facilitate the resolution of operational problems.~~

C - Proposer's reason for amendment:

Implementation of Reduced Vertical Separation Minimum (RVSM) in the AFI Region. The reduction in vertical separation will improve the provision of air traffic services in the areas concerned and is in line with the implementation strategy adopted in the AFI CNS/ATM implementation plan. This will improve ATC efficiency and airspace capacity.

D - Proposed implementation date of the amendment:

Upon approval by Council.

E - Proposal has been circulated to the following States and International Organizations:

Afghanistan	Cape Verde	Ethiopia	Japan
Algeria	Central African Republic	Finland	Jordan
Angola	Chad	France	Kenya
Argentina	Chile	Gabon	Kuwait
Armenia	China	Gambia	Lebanon
Australia	Colombia	Germany	Lesotho
Austria	Congo	Ghana	Libyan Arab Jamahiriya
Bahrain	Comoros	Greece	Liberia
Bangladesh	Cote d'Ivoire	Guinea	Luxembourg
Belarus	Croatia	Guinea Bissau	Madagascar
Belgium	Cuba	Hungary	Malawi
Benin	Cyprus	Iceland	Malaysia
Bosnia and Herzegovina	Czech Republic	India	Maldives
Botswana	Democratic Republic of Congo	Indonesia	Mali
Brazil	Democratic Peoples' Republic of Korea	Iran, Islamic Republic of	Malta
Bulgaria	Denmark	Iraq	Mauritania
Burkina Faso	Djibouti	Ireland	Mauritius
Burundi	Egypt	Israel	Mexico
Cameroon	Equatorial Guinea	Italy	Morocco
Canada	Eritrea	Jamaica	Mozambique

Namibia	Sweden
Netherlands	Switzerland
New Zealand	Syrian Arab Republic
Niger	Thailand
Nigeria	The former Yogoslav Republic of Macedonia
Norway	Togo
Oman	Tunisia
Pakistan	Turkey
Philippines	Uganda
Poland	United Arab Emirates
Portugal	United Kingdom
Qatar	United Republic of Tanzania
Republic of Korea	United States
Romania	Uruguay
Rwanda	Viet Nam
Russian Federation	Yemen
Sao Tome and Principe	Zambia
Saudi Arabia	Zimbabwe
Senegal	ASECNA
Seychelles	IATA
Sierra Leone	IFALPA
Singapore	IFATCA
Slovakia	
Slovenia	
Somalia	
South Africa	
Spain	
Sri Lanka	
Sudan	
Swaziland	

F - Secretariat comments

a) This amendment proposal has been developed within the framework or the APIRG/12, 13 and 14 Meetings Conclusions/Decisions 12/66, 13/58 and 14/21 respectively concerning the planning and evolutionary implementation of RVSM in the AFI Region.

b) Implementation of RVSM in the AFI Region would enable aircraft operating in the AFI RVSM airspace to continue under RVSM in EUR/NAT, MID/ASIA, CAR/SAM and ASIA/PAC RVSM airspaces, thereby enhancing the efficiency of seamless flight operations.

AFI RVSM STRATEGY/ACTION PLAN FOR IMPLEMENTATION OF REDUCED VERTICAL SEPARATION MINIMA IN THE AFRICA-INDIAN OCEAN REGION

MARCH 2006

Prepared by the Secretary of the RVSM/TF

AFI RVSM IMPLEMENTATION STRATEGY/ACTION PLAN					
ID	Description	Target Date	Status	Resources	Remarks
	Program Management				
1	Agree on structure of TF to enable efficient handling of specialist technical tasks	21/11/03	Completed	Secretariat Support Team: ASECNA, SA, IATA, Nigeria, Tunisia	Completed 21 Nov 2003
2	RVSM SIP Report	21/11/03	Completed	RVSM/ITF2	Completed 21 Nov 2003
3	RVSM/RNAV/RNP TF/2 Meeting	21/11/03	Completed	RVSM/ITF2	Completed 21 Nov 2003
4	Identify resources for performing specialist technical tasks	21/11/03	Completed	RVSM/ITF2	Completed 21 Nov 2003
5	Investigate methods of funding any outside assistance required	31/03/04	Completed	ICAO/IATA	To address future funding as/when required
6	Finalize the RVSM Implementation Strategy/ Action Plan	31/12/03	Completed	ICAO	Sent 05 Dec 2003
7	Circulate RVSM Implementation Strategy/Action Plan for comments from States	5/01/04	Completed	ICAO	Sent 05 Dec 2003
8	a) Doc 7030 amendment Proposal b) Circulate proposal to States (c) ANC Approval	01/06/04 15/06/04 May 06	In progress Completed In Progress	ICAO ICAO ICAO	* Completed 31 May * Approval draft by (TF/6) *Approval final draft by TF/9 April 2006
9	States comments on RVSM implementation Strategy/Action Plan	31/-3/04	Completed	States, ICAO RVSM/ITF3	Completed 31 March 04
10	Regional RVSM informational Website	31/03/04	Completed	IACO/IATA/States	Completed 1 Feb 04
11	RVSM Seminar/RVSM ITF3	19-22/04/04	Completed	ICAO	Completed on Time
12	RVSM Seminar /RVSM/ITF/4	26-30/07/04	Completed	ICAO/RVSM ITF/4	Completed on Time

AFI RVSM IMPLEMENTATION STRATEGY/ACTION PLAN					
ID	Description	Target Date	Status	Resources	Remarks
13	Coordination and harmonization of procedures with adjacent Regions	Ongoing	Ongoing	ICAO and AFI RMA	Continuous contact
14	States to send AIC to notify their intention to Implementation of RVSM	Oct 05	In Progress	ICAO/States	Continuous
15	Confirm target AIRAC implementation date (AIP Supplement to be published)	Jun 06	In progress	ICAO/States	TF10 to review requirement
16	Regional RVSM implementation status reports	Ongoing	Ongoing	ICAO	Monthly
17	State Readiness Assessment, CRA, PISC	March 2006	In Progress	ICAO	NSPVP TF/9
18	RVSM/ARTF/5	15-16/11/04	Completed	ICAO/RVSM ITF/5	
19	RVSM/ARTF/6	25-27/05/05	Completed	ARTF/6	
20	RVSM/ARTF/7 ATS/AIS/SAR/SG/8	08-09/08/05 10-12/08/5	Completed Completed	ARTF/7 ATS SG/8	
21.	RVSM/ARTF/8 and RVSM Seminar	10 – 14 October 2005	Completed		
22.	RVSM/ARTF/9 meeting	April 06	In Progress	ARTF	
23.	RVSM TF/10 meeting and GO/NO GO meeting	June 06	In Progress	States and Stakeholders	Dakar 26-30 June 2006
24	Publish Trigger NOTAM	June 06	In Progress	States	TF/10 and GO/NO GO meeting to confirm date
25	Develop switch over plan	Apr 06	On Going	ICAO/ARMA	TF9

AFI RVSM IMPLEMENTATION STRATEGY/ACTION PLAN					
ID	Description	Target Date	Status	Resources	Remarks
	Aircraft Operations and Airworthiness				
26	Regional OPS/Airworthiness RVSM Guidance Doc	21/11/03	Completed	ICAO	Sent 05 Dec 2003 to states for action.
27	Develop regional Pilot Training RVSM Guidance Material	30/04/04	Completed	IATA	Sent to States for action May 2004.
28	Aircraft Operational approval process guidelines	31/05/04	Completed	States, ICAO	Sent to States for action June 2004.
29	Aircraft RVSM Approval Survey	On Going	In progress	ICAO/States	Continuous
30	Ensure aircraft/operator approval process	On Going	In progress	ICAO/ARMA	Airworthiness training to be provided for State authorities
	Air Traffic Management				
31	National RVSM plan	31/03/04	Ongoing	States, ICAO	States to complete by June 2006.
32	National Safety Plan Validation Panel	March 06	In progress	NSPVP	
33	APIRG/15 Consideration of TF Reports	25-30-9-05	Completed	ICAO	
34	Regional ATC OPS Manual	Apr 06	On Going	ICAO	Update in progress
35	Determine the limits of RVSM airspace	30/06/04	Completed	States/ICAO	TF4 verified limits.
36	Regional ATC Training Program & Guidance Material	June 06	On Going	States	Instructor training completed. Refresher Retraining necessary for all ops staff
37	Simulations to assess ATC workload and possible need for airspace/air route Sector changes				Core Team have determined that this is not required
38	Letters of Agreement	Apr 06	On Going	States	Updated LOA sent to States.
39	Military aviation preparation	March 06	In progress	States	In National RVSM Plan

AFI RVSM IMPLEMENTATION STRATEGY/ACTION PLAN					
ID	Description	Target Date	Status	Resources	Remarks
40	National RVSM Regulatory Material	March 06	In progress	States, ICAO	States to publish
41	States assess the impact of RVSM implementation on controller automation systems and plan for upgrades/ modifications	Sept 05	In progress	States	In National Plan
42	Collect weather and turbulence data for analysis	On Going	On Going	ARMA ICAO/States	TF/9
43	a) States to conduct local ATC RVSM training b) Re-training for all operational Staff	May 06 July 2006	In progress	States	TF/10 and GO/NO GO meeting June 2006
RVSM Safety Assurance					
44	Conduct preliminary data collection and readiness assessment	On Going	In progress	ARMA/ICAO	Ongoing
45	Develop AFI RVSM Safety Policy	30/06/04	Completed	RVSM/ARTF4	Sent to States for publication July 2004.
46	a) Develop National RVSM Safety Plan b) Conduct NSP workshops facilitated by ATC experts	30/06/04 July 05	Completed Completed	ICAO ICAO /IATA/ATNS/ASE CNA	Sent to States for Action July 2004. Nairobi & Dakar July 2005
	c) Submit NSP's for validation d) Submit final NSP's after validation comments have being taken into account	March 06 March 06	In Progress On Going	States States	TF9 TF9

AFI RVSM IMPLEMENTATION STRATEGY/ACTION PLAN					
ID	Description	Target Date	Status	Resources	Remarks
	e) Once NSP's are implemented, DCA's to confirm State readiness to Implement RVSM in writing	June 06		States	TF10
	f) Update State readiness document	June 06	On Going	ICAO	TF9
47	RVSM Functional Hazard Assessment (FHA)	4-8/04/05	Completed	ARMA/ICAO	3 FHA meetings conducted Final FHA 4-8/04/05. Report Completed May 2005 and adopted.
48	Validate Functional Hazard Assessment	31/05/05	Completed	RVSM ARTF/6	TF/6/25-27/05/05
49	Update activities on NSPVP, PISC, CRA, Doc.7030	Apr 06	On Going	ICAO	TF/9
50	RVSM Collision Risk Assessment	March 06	In progress	ARMA/ICAO/IATA	Revised methodology required
51	Validate Collision Risk Assessment	June 06	In progress	Core Team	TF/10
52	Develop AFI Pre-Implementation Safety Case	June 06	In Progress	Core Team	TF9 review PISC progress
53	AFI Pre-Implementation Safety Case: APIRG/ANC	May 06	In Progress	ARPO/ANC/IATA	
54	RVSM Implementation	28/09/06		States	Tentative target date.
	Monitoring Agency				
55	Evaluate options for setting up AFI RMA	21/11/03	Completed	RVSM/ITF2	Completed on time
56	Identify an AFI RMA	21/11/03	Completed	RVSM/ITF/2	Completed on time
57	Establish an AFI RMA.	31/03/04	Completed	South Africa/ICAO	Completed on time

AFI RVSM IMPLEMENTATION STRATEGY/ACTION PLAN					
ID	Description	Target Date	Status	Resources	Remarks
	Post Implementation Safety Case (POSC)				
58	Validate implementation readiness template	15/11/04	Completed	ICAO/ARMA	
59	Data collection to continue for submission to ARMA	Monthly	In Progress	States	
60	Evaluate system safety after implementation plus 3, 6, 12 and 24 months			ARMA	
61	Monitor system safety in adjacent Regions			ARMA	

International Civil Aviation Organization

SAMPLE AIR TRAFFIC CONTROL OPERATIONS MANUAL FOR IMPLEMENTATION OF REDUCED VERTICAL SEPARATION MINIMUM IN THE AFI REGION

(State Name)

(Date)

DOCUMENT IDENTIFICATION SHEET		
DOCUMENT DESCRIPTION		
Document Title **ATC Manual for a Reduced Vertical Separation Minimum (RVSM) in Africa - Indian Ocean**		
PROGRAMME REFERENCE INDEX	**EDITION:**	
	EDITION DATE:	
Abstract This manual represents an operational reference document intended for the use of ATS personnel involved in the planning, implementation and application of a Reduced Vertical Separation Minimum (RVSM) in Africa - Indian Ocean		
Keywords RVSM Reduced Vertical Separation Minimum AFI		
CONTACT PERSON:	**TEL:**	**DIVISION:**

DOCUMENT STATUS AND TYPE					
STATUS		**CATEGORY**		**CLASSIFICATION**	
Working Draft	□	Executive Task	□	General Public	□
Draft	□	Specialist Task	□	Restricted	□
Proposed Issue	□	Lower layer Task	□		
Released Issue	□				

DOCUMENT APPROVAL

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

AUTHORITY	NAME AND SIGNATURE	DATE

DOCUMENT CHANGE RECORD

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

EDITION	DATE	REASON FOR CHANGE	SECTIONS PAGES AFFECTED

AMENDMENT SUMMARY

Note: This document was developed by AFI RVSM/RNAV/RNP Task Force and will be amended as required.

Amendment NR/Year	Publication date	Date inserted	Effective date	Inserted by

CHECKLIST OF PAGES

(Released Edition)

Page	Dated	Page	Dated	Page	Dated	Page	Dated

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ACAS	Airborne Collision Avoidance System
ATC	Air Traffic Control
ACC	Area Control Centre
ACT	Activation Message
AIC	Aeronautical Information Circular
AFI	Africa and Indian Ocean
AIP	Aeronautical Information Publication
APIRG	AFI Planning and Implementation Regional Group
ASE	Altimetry System Error
ATM	Air Traffic Management
ATS	Air Traffic Services
CDB	Central Data Base
CFL	Cleared Flight Level
CFMU	Central Flow Management Unit
CHG	Modification Message (IFPS
CMA	Central Monitoring Agency (NAT)
CVSM	Conventional Vertical Separation Minimum
FAA	Federal Aviation Administration (USA)
FDPS	Flight Data Processing System
FIR	Flight Information Region
FL	Flight Level
FLAS	Flight Level Allocation Scheme
FPL	Flight Plan
GA	General Air Traffic
GMU	GPS Height Monitoring Unit
GPS	Global Positioning System
HMU	Height Monitoring Unit
IFPS	Integrated Initial Flight Plan
IFR	Instrument Flight Rules
JAA	Joint Aviation Authorities
JAA AMC	JAA Acceptable Means of Compliance
JAR	Joint Aviation Requirements
LoA	Letter of Agreement
MASPS	Minimum Aircraft System Performance Specifications
MEL	Minimum Equipment List
MNPS	Minimum Navigation Performance Specifications
MTCD	Medium Term Conflict Detection

NAT	North Atlantic
NAT CMA	North Atlantic Region Central Monitoring Agency
NATSPG	North Atlantic Systems Planning Group
NOTAM	Notice to Airmen
OAT	Operational Air Traffic
OLDI	On-Line Data Interchange
RA	Resolution Advisory (ACAS
RFL	Requested Flight Level
RGCSP	Review of the General Concept of Separation Panel
RNAV	Area Navigation
RNP	Required Navigation Performance
RPL	Repetitive Flight Plan
RTF	Radiotelephony
RVSM	Reduced Vertical Separation Minimum of 1 000 ft between FL 290 and FL 410 Inclusive
SARPs	Standards and Recommended Practices
SDB	State Data Base
SSEC	Static Source Error Correction
SSR	Secondary Surveillance Radar
STCA	Short Term Conflict Alert
TA	Traffic Advisory (ACAS)
TGL	Temporary Guidance Leaflet (TGL-JAA)
TLS	Target Level of Safety (TLS)
TSE	Total System Error
TVE	Total Vertical Error
VFR	Visual Flight Rules
VSM	Vertical Separation Minimum
UAC	Upper Area Control Centre
UIR	Upper Flight Information Region

DEFINITIONS

Flight Level Allocation Scheme (FLAS)

The scheme whereby specific flight levels may be assigned to specific route segments within the network.

General Air Traffic (GAT)

Flight conducted in accordance with the rules and provisions of ICAO.

Operational Air Traffic (OAT)

Flights which do not comply with the provisions stated for GAT and for which rules and procedures have been specified by appropriate authorities.

RVSM Approval

The approval that is issued by the appropriate authority of the State in which the operator is based or of the State in which the aircraft is registered. To obtain such RVSM approval, Operators shall satisfy the said State:

1) that aircraft for which the RVSM Approval is sought have the vertical navigation performance capability required for RVSM operations through compliance with the criteria of the RVSM Minimum Aircraft Systems Performance Specification (MASPS).

2) That they have instituted procedures in respect of continued airworthiness (maintenance and repair) practices and programmes.

3) That they have instituted flight crew procedures for operations in the AFI RVSM airspace.

*Note: For the purposes of the application of RVSM, the term: "**RVSM APPROVED**" shall be used to indicate that an aircraft has been granted RVSM Approval.*

RVSM Entry Point

The first reporting point over which an aircraft passes or is expected to pass immediately before, upon, or immediately after initial entry into AFI RVSM airspace, normally the first reference point for applying a reduced vertical separation minimum.

RVSM Exit Point

The last reporting point over which an aircraft passes or is expected to pass immediately before, upon, or immediately after leaving AFI RVSM airspace, normally the last reference point for applying a reduced vertical separation minimum.

State Aircraft

Aircraft used in military, customs and police services shall be deemed to be State aircraft.

Ref: ICAO Convention on International Civil Aviation, Article 3 b

Strategic Flight Level

A flight level which is flight-plannable in accordance with the Table of Cruising Levels of ICAO Annex 2, Appendix 3 and the FLAS, as specified in the relevant Aeronautical Information Publications (AIPs).

Tactical Flight Level

A flight level which is not flight-plannable and which is reserved for tactical use by ATC.

RVSM REFERENCE DOCUMENTS

- ICAO Annexes; 2,3.2;A6,Part 1,6.18; A10 Vol. IV; A11, 2.4.2; P-OPS,Vol.1 Part VIII; P-ATM, CAP 4.
- EUROCONTROL - RVSM
- NAT RVSM
- FAA RVSM manuals

SAMPLE AIR TRAFFIC CONTROL OPERATIONS MANUAL FOR IMPLEMENTATION OF REDUCED VERTICAL SEPARATION MINIMUM

1 INTRODUCTION

In the late 1970s, the International Civil Aviation Organization (ICAO) initiated a comprehensive program of studies to examine the feasibility of reducing the 2000 ft vertical separation minimum (VSM) applied above flight level (FL) 290 to the 1000 ft VSM as used below FL 290. Throughout the 1980s, various studies were conducted under the auspices of ICAO in Canada, Europe, Japan and the United States.

The studies demonstrated that the global reduction of vertical separation was safe, feasible and without the imposition of unduly demanding technical requirements and would be cost-beneficial. The studies also showed that the North Atlantic (NAT) minimum navigation performance specification (MNPS) airspace was an ideal area for the introduction of a reduced vertical separation minimum (RVSM) because of the types of aircraft and the essentially unidirectional tidal flow of traffic. Planning for RVSM in the NAT Region commenced in 1990. The first stage of the Operational Evaluation phase, using the 1000 ft RVSM (between FL 330 and FL 370 inclusive), began in March 1997. A second stage extended RVSM to between FL 310 and FL 390 inclusive in October 1998.

NAT Region implementation involves the application of RVSM in the transition area of States within the European Region. In an early stage of the studies, it was determined that the introduction of RVSM in upper European airspace would have considerable benefits. However, from the outset, it was clear that the complex nature of the European air traffic services (ATS) route structure, its wide variety of aircraft types and high traffic density, as well as the high percentage of aircraft climbing and descending, would be a more demanding environment than the NAT Region. Therefore, the introduction of RVSM in the European environment addressed all aspects of en-route operations such as the safety implications of European traffic complexity, the mix of aircraft types, the many stakeholders involved (39 RVSM participating States, industry, aircraft operators), etc.

2 AFI RVSM IMPLEMENTATION BACKGROUND

ESTABLISHMENT OF APIRG RVSM/RNAV/RNP TASK FORCE

Pursuant to APIRG/13 Decision 13/58 which *inter alia* stated that:

DECISION 13/58 ESTABLISHMENT OF A TASK FORCE ON RVSM AND RNAV/RNP IMPLEMENTATION

THAT AN APIRG TASK FORCE DEDICATED TO RVSM AND RNAV/RNP IMPLEMENTATION BE ESTABLISHED, WITH THE FOLLOWING TERMS OF REFERENCE, WORK PROGRAMME AND COMPOSITON:

2.1 Terms of Reference of the ICAO RVSM/RNAV/RNP Implementation Task Force

The RVSM/RNAV/RNP Task Force was established within the framework of the ATS/AIS/SAR Sub-Group in order to explore ways and means for the implementation of RVSM/RNAV/RNP in the AFI Region.

2.2 Terms of Reference of RVSM and RNAV/RNP Task Force

a) To develop a comprehensive implementation plan for RVSM, RNAV and RNP in the AFI Region, taking into account the requirements contained in the ICAO Doc.9574, Doc.9613, Doc.9689, Doc.4444 and other relevant reference documents.

b) To identify any areas within the AFI Region where it may be feasible to introduce RVSM and RNAV/RNP in the initial implementation.

c) To determine the extent to which a cost/benefit analysis is required prior to implementation of RVSM and RNAV/RNP.

d) To coordinate with the bodies responsible for the implementation of RVSM and RNAV/RNP in adjacent regions in order to harmonize implementation plans.

e) To develop guidance material for RVSM and RNAV/RNP implementation in the AFI Region, including taking due account of experience gained in the SAT Region and existing material developed by other ICAO Regions (CAR/SAM,EUR, MID,NAT, ASIA/PAC, etc.).

f) To address any other matters, as appropriate, which are relevant to the implementation of RVSM and RNAV/RNP.

APIRG has endorsed the objectives of capacity and potential economy benefits associated with future implementation of a 1 000 ft reduced vertical separation minimum in the AFI Region and, therefore, concluded that such implementation planning should be progressed as a priority item. It is recognized that a number of complex issues need to be addressed, including meteorological and topographical considerations, aircraft equipment and air traffic control questions.

3 THE NEED FOR RVSM

It is accepted that major changes to the AFI ATM systems will be necessary in order to cope with the continued traffic growth. The implementation of RVSM is considered to be the most cost effective means of meeting this need through the provision of six additional flight levels for use in the AFI airspace from FL 290 to FL 410 inclusive.

3.1 The AFI RVSM Implementation Programme

The programme consists of a series of co-ordinated activities, performed within the AFI Region ICAO, Participating States and User Organisations.

The programme has followed the general strategy set out in the ICAO Doc.9574 (First Edition) – " Manual on Implementation of a 300 m (1000 ft) Vertical Separation Minimum between FL 290 and FL 410 inclusive" which proposed a multi-step approach within four distinct phases :

Phase 1 Initial Planning

Phase 2 Advanced Planning and Preparation

Phase 3 Verification of Aircraft Performance

Phase 4 Introduction of RVSM.

3.2 Supporting Documentation

The following reference documents will be amended to incorporate the changes necessitated by the introduction of RVSM in the AFI airspace :

- ICAO Doc. 7030 – Africa-Indian Ocean (AFI) Regional Supplementary procedures
- ICAO Doc. 9574 – Manual on Implementation of a 300 m (1000 ft) Vertical Separation Minimum between FL 290 and FL 410 inclusive.

The following documents are in the course of preparation and will provide the detailed procedures and requirements necessary for the implementation of RVSM in the AFI RVSM airspace :

- ICAO Guidance Material on the Implementation and Application of a 300 m (1000 ft) Vertical Separation Minimum in the AFI RVSM Airspace.
- JAA Temporary Guidance Leaflet on Approval of Aircraft and Operators for Flight in RVSM Airspace – TGL No.6.
- National AICs and/or. AIPs.

4 AFI RVSM AIRSPACE DESCRIPTION

4.1 AFI RVSM Airspace

4.1.1 RVSM shall be applicable in that volume of airspace between FL 290 and FL 410 inclusive in the following AFI Flight Information Regions (FIRs)/Upper Information Regions (UIRs):Accra, Addis Ababa, Algiers, Antananarivo, Asmara, Beira, Brazzaville, Cairo, Canarias, Cape Town, Casablanca, Dakar, Dakar Oceanic, Dar-es-Salaam, Entebbe, Gaborone, Harare, Johannesburg, Johannesburg Oceanic, Kano, Khartoum, Kinshasa, Lilongwe, Luanda, Lusaka, Mauritius, Mogadishu, Nairobi, N'Djamena, Niamey, Roberts, Sal Oceanic, Seychelles, Tripoli, Tunis, Windhoek.

4.1.2 There is NO transition airspace in entire AFI RVSM airspace.

4.2 AFI RVSM Transition Airspace

Transition tasks associated with the application of a 1 000 ft vertical separation minimum within the AFI RVSM Airspace shall be carried out in all, the adjacent FIRs/UIRs to the AFI RVSM airspace.

ATC units on the interface of AFI RVSM Airspace shall:

- establish RVSM approved & non-RVSM approved State aircraft entering RVSM Airspace at the appropriate RVSM FL
- apply 1,000 ft VSM between RVSM approved aircraft, otherwise apply 2,000 ft RVSM;

- establish non-RVSM approved civil aircraft below FL 290 if landing at an aerodrome below the RVSM Airspace;
- establish non-RVSM approved civil aircraft above FL 410 if transiting above the RVSM Airspace & landing at an aerodrome outside AFI RVSM Airspace;
- for aircraft leaving AFI RVSM Airspace, apply 2,000ft VSM and establish them at the appropriate non-RVSM levels.

4.3 AFI Interface with Adjacent Regions (ATSP_1-7)

ACCs/UACs providing air traffic control service within the airspace designated for the purpose of transitioning non-RVSM approved civil aircraft operating to/from the adjacent Regions (ie. Europe) may clear such non-RVSM approved civil aircraft to climb/descend through RVSM Airspace. Such climbs/descents through RVSM Airspace shall be achieved before the aircraft passes the transfer of control point to the adjacent ACC/UAC, if applicable, unless otherwise specified in the ATS Letter of Agreement.

4.4 ICAO Table of Cruising Levels for AFI RVSM Airspace(ATSP_1-2)

With the implementation of AFI RVSM, cruising levels within AFI Airspace will be organized in accordance with the Table of Cruising Levels contained in ICAO Annex 2, Appendix 3, a). The cruising levels appropriate to direction of flight within the AFI Region with the implementation of RVSM. As illustrated below:

Cruising levels as per direction of flight – FL280 to FL430	
Route from 180 degrees to 359 degrees*	**Route from 000 degrees to 179 degrees ***
← **FL 430 (non RVSM level above RVSM airspace)**	
	FL410 →
← FL400	
	FL390 →
← FL380	
	FL370 →
← FL360	
	FL350 →
← FL340	
	FL330 →
← FL320	
	FL310 →
← FL300	
	FL290 →
← FL280 (non RVSM level below RVSM airspace)	

4.5 Flight Operations Within the AFI RVSM Airspace (ATSP_1-2)

Except for State aircraft as defined in Article 2 to the Chicago Convention (Doc 7333) ONLY RVSM approved aircraft shall be permitted to operate within the AFI RVSM airspace It should be noted that within the AFI RVSM Airspace all cruising levels are equally assignable by ATC to all RVSM approved and State aircraft, provided that the applicable vertical separation minimum is applied.

ATC shall:

- Only clear IFR RVSM approved aircraft & State aircraft into AFI RVSM Airspace;
- provide a 1,000 ft vertical separation minimum (VSM) between RVSM approved aircraft;
- provide 2,000 ft VSM between all military formation flights and any other aircraft.

5. RVSM PROCEDURES

Detailed RVSM procedures are contained the Regional Supplementary Procedures DOC 7030/4 AFI Region

5.1 General (ATSP_1-1)

- Only approved State aircraft shall be entitled to operate within the AFI RVSM Airspace, regardless of the RVSM status of the aircraft. (ATSP_1-1)

- The Integrated Initial Flight Plan Processing System (IFPS) shall disseminate Item 8 flight plan information to the flight data processing systems (FDPS) concerned for the purpose of providing a clear indication to ATC that where such non-RVSM approved flights are "State aircraft", they are permitted to operate

- All operators filing Repetitive Flight Plans (RPLs) shall include in Item Q of the RPL all equipment and capability information in conformity with Item 10 of the ICAO Flight Plan.

- If a change of aircraft operated in accordance with a repetitive flight plan results in a modification of the RVSM approval status as stated in Item Q, a modification message (CHG) shall be submitted by the operator.

- Operators of RVSM approved aircraft shall indicate the approval status by inserting the letter **"W"** in Item 10 of the ICAO Flight Plan, and in Item Q of the Repetitive Flight Plan (RPL), regardless of the requested flight level.

- Operators of non-RVSM approved State aircraft with a requested flight level of FL 290 or above shall insert ***"STS/NONRVSM"*** in Item 18 of the ICAO Flight Plan.

- Operators of RVSM approved aircraft and non-RVSM approved State aircraft intending to operate within the AFI RVSM Airspace shall include the following in Item 15 of the ICAO Flight Plan:

  (i) the **entry point** at the lateral limits of the AFI RVSM Airspace, and the requested flight level for that portion of the route commencing immediately after the RVSM entry point; and

  (ii) the **exit point** at the lateral limits of the AFI RVSM Airspace, and the requested flight level for that portion of the route commencing immediately after the RVSM exit point.

- Operators of non-RVSM approved civil aircraft shall flight plan to operate outside of the AFI RVSM Airspace.

5.2 State Aircraft operating Within AFI RVSM Airspace (ATSP_1-1)

All State aircraft operating in AFI RVSM Airspace will be considered as non-RVSM MASPS compliant and therefore non- RVSM approved. Therefore, the VSM required between State and other traffic shall be 2,000 ft. State aircraft, i.e. military aircraft, might be exempted from AFI RVSM requirements and where applicable, the indication that a non-RVSM approved aircraft is a State aircraft should be displayed. The requirement for ATC to accommodate non-RVSM approved State aircraft within the AFI RVSM Airspace imposes significant increases in controller workload result from the requirement of having to selectively apply two distinct vertical separation minima (VSM) within the same volume of airspace.

5.3 Cruising Levels Appropriate to Direction of Flight (ATSP_1-2)

The cruising levels appropriate to direction of flight for RVSM and non-RVSM environments are contained in ICAO Annex 2, Appendix 3.

5.4 In-Flight Contingency Procedures (ATSP_2-1)

An in-flight contingency affecting flight in the AFI RVSM Airspace pertains to unforeseen circumstances, which directly impact on the ability of one or more aircraft to operate in accordance with the vertical navigation performance requirements of the AFI RVSM Airspace.

- The pilot shall inform ATC as soon as possible of any circumstances where the vertical navigation performance requirements for the AFI RVSM Airspace cannot be maintained.

- In above mentioned case, the pilot shall obtain a revised air traffic control clearance prior to initiating any deviation from the cleared route and/or flight level, whenever possible. Where a revised ATC clearance could not be obtained prior to such a deviation, the pilot shall obtain a revised clearance as soon as possible thereafter.

- Air traffic control actions will be based on the intentions of the pilot, the overall air traffic situation, and the real-time dynamics.

- Suspension of RVSM refers to a discontinuance of the use of a vertical separation minimum of 1 000 ft between RVSM approved aircraft operating within the AFI RVSM Airspace.

- A vertical separation minimum of 2 000 ft shall be applied between all aircraft operating within the portion of the AFI RVSM Airspace where RVSM has been suspended, regardless of the RVSM approval status of the aircraft.

5.4.1 Degradation of Aircraft Equipment (ATSP_2-2); (ATSP_2-3); (ATSP_2-4)

- The failure in flight of any component of the Minimum Equipment List (MEL) required for RVSM operations shall render the aircraft non-RVSM approved.
- Where an aircraft's Mode C displayed level differs from the cleared flight level by 300 ft (the allowable tolerance for Mode C readout) or more, the controller shall inform the pilot accordingly and the pilot shall be requested to check the pressure setting and confirm the aircraft's level.
- When the pilot of an RVSM approved aircraft confirms that the aircraft's equipment no longer meets the RVSM MASPS, the controller shall consider the aircraft as non-RVSM approved and take action immediately to provide a minimum vertical separation of 2 000 ft, or an appropriate horizontal separation minimum, from all other aircraft concerned.

- An aircraft rendered non-RVSM approved shall be cleared out of the AFI RVSM Airspace by air traffic control and the ACC/UAC to co-ordinate with adjacent ACCs/UACs.
- ATC shall manually apply the display of the a RVSM approved aircraft's associated radar label and/or radar position symbol, in accordance with established local radar display features applicable to non-RVSM approved aircraft in case of required RVSM equipment failure.

5.4.2 Severe Turbulence – Not Forecast (single aircraft) (ATSP_1-11)

When an aircraft operating in the AFI RVSM Airspace encounters severe turbulence due to weather or wake vortex which the pilot believes will impact the aircraft's capability to maintain its cleared flight level, the pilot shall inform ATC. ATC is required to establish either an appropriate horizontal separation minimum, or an increased vertical separation minimum of 2 000 ft. **(ATSP_1-12)**

- ATC shall co-ordinate the circumstances of an RVSM approved aircraft that is unable to maintain its cleared flight level due to severe turbulence by verbally supplementing the estimate message with: ***"UNABLE RVSM DUE TURBULENCE".***
- ATC shall manually apply the distinguishing feature of the radar label associated with non-RVSM approved aircraft and/or the radar position symbol to such an aircraft until such time as the pilot reports ready to resume RVSM. (ATSP_2-9)

- An aircraft experiencing severe turbulence while operating within the AFI RVSM Airspace need not be cleared out of RVSM airspace. If the pilot has informed ATC that the severe turbulence will impact the aircraft's capability to maintain the cleared flight level, the establishment of an appropriate horizontal separation minimum, or an increased vertical separation minimum may be accomplished within the AFI RVSM Airspace, traffic permitting.

5.4.3 *Severe Turbulence – Not Forecast (multiple aircraft)* (ATSP_2-9)

- When a controller receives pilot reports of severe turbulence which had not been forecast, and which could impact multiple aircraft with regards to their ability to maintain cleared flight level within the AFI RVSM Airspace, the controller shall provide for an increased vertical separation minimum or an appropriate horizontal separation minimum. (ATSP_2-5)

5.4.4 *Severe Turbulence – Forecast* (ATSP_2-10)

- Where a meteorological forecast is predicting severe turbulence within the AFI RVSM Airspace, ATC shall determine whether RVSM should be suspended, and, if so, the period of time, and specific flight level(s) and/or area.

- Consideration should be given to the development of a contingency FLAS to supplement any existing FLAS between ACCs/UACs.
- The importance of obtaining timely accurate forecasts of severe turbulence should be stressed within agreements with the appropriate meteorological services office responsible for the dissemination of such information for the area

6. PHRASEOLOGY

RVSM R/T Phraseology must be developed. A few examples are:

- ATC wish to know RVSM status of flight - ***CONFIRM RVSM APPROVED***
- Pilot indication that flight is RVSM approved - ***AFFIRM RVSM***
- Pilot indication that flight is NON RVSM approved - ***NEGATIVE RVSM***
- Pilot of State aircraft indicating that flight id NON RVSM approved - ***NEGATIVE RVSM STATE AIRCRAFT***
- ATC refuse clearance into RVSM Airspace - ***UNABLE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN [or DESCEND TO, or CLIMB TO] FL ...***
- Pilot reporting severe turbulence / weather affecting ability to maintain RVSM height keeping requirements - ***UNABLE RVSM DUE TURBULENCE***
- Pilot reporting equipment degraded below RVSM requirements - ***UNABLE RVSM DUE EQUIPMENT***
- ATC requesting pilot to report when able to resume RVSM - ***REPORT ABLE TO RESUME RVSM***
- Pilot ready to resume RVSM after equipment/weather contingency - ***READY TO RESUME RVSM***

7. VERTICAL SEPARATION

Reduced Vertical separation

7.1 Between FL 290 and FL 410 inclusive within the AFI RVSM airspace, the vertical separation minimum shall be;

a) 300M (1000 ft) between RVSM approved aircraft;

b) 600m (2000 ft) between
-non-RVSM approved State aircraft and any other aircraft operating within the AFI RVSM airspace in accordance with FLAS.

7.2 ATC shall provide a minimum vertical separation of 600M (2000ft between an aircraft experiencing a communication failure in flight and any other aircraft, where both aircraft are operating within the AFI RVSM airspace in accordance with FLAS.

7.3 Within the designated airspace where RVSM transition tasks are carried out, the applicable vertical separation minimum shall be 1 000 ft between RVSM approved aircraft, and 2 000 ft between any non-RVSM approved aircraft and any other aircraft.

7.4 The applicable vertical separation minimum between all formation flights of State aircraft and any other aircraft operating within the AFI RVSM Airspace shall be 2 000 ft.

7.5 The applicable vertical separation minimum between an aircraft experiencing a communication failure in flight and any other aircraft, where both aircraft are operating within the AFI RVSM Airspace, shall be 2 000 ft, unless an appropriate horizontal separation minimum exists.

7.6 All activities occurring within restricted or danger airspaces are to be considered as being non-RVSM approved. Consequently, the minimum vertical spacing required between the vertical limits of the activities contained within such airspaces non-participating aircraft operating within the RVSM airspace is 2,000 ft, above the upper and below the lower limits of such airspaces.

8. COMMUNICATION FAILURE

8.1 Communication Failure Procedures (ATSP_2-6)

The ICAO Regional Supplementary Procedures for AFI will specify that the applicable vertical separation minimum between an aircraft experiencing a communication failure in flight and any other aircraft, where both aircraft are operating within the AFI RVSM Airspace, shall be 2 000 ft, unless an appropriate horizontal separation minimum exists.

8.2 Compulsory Reporting Points

- One means used to determine that two-way communication between an aircraft and ATC has failed is the aircraft's failure to report its position over a compulsory reporting point. These points should be strategically located
  so as to enhance ATC's ability to detect air-ground communication failures on a timely basis, taking into account ATC separation and co-ordination requirements.
- There is a requirement to establish RVSM entry/exit points at or near the boundaries between the AFI RVSM Airspace and adjacent Regions for all ATS routes which cross the lateral limits of the AFI RVSM Airspace. The
- designation of these points as compulsory reporting points could also enhance ATC's ability to detect air-ground communication failures.

8.3 Laterally-Spaced, Uni-Directional ATS Routes

The use of laterally-spaced, uni-directional ATS routes as a means of strategically separating opposite-direction traffic operating to/from the AFIRVSM Airspace should be addressed.. In the context of air-ground communication failure procedures, laterally-spaced, uni-directional ATS routes between AFI RVSM Airspace and adjacent Regions could help mitigate the differences between cruising levels appropriate for direction of flight within the AFI RVSM Airspace versus the cruising levels applicable within adjacent Regions.

8.4 Flight Level Allocation Schemes (FLAS)

The strategic use of Flight Level Allocation Schemes should be considered and could also be used in the context of air-ground communication failure procedures.

9. ATS SYSTEMS SUPPORT

It is essential that ATC be aware as to the RVSM approval status of all aircraft operating within, outside of and in close proximity to the AFI RVSM Airspace if they are required to accommodate non-RVSM approved State aircraft.

9.1 Flight Data Processing Systems (FDPS).

In order to ensure RVSM separation between approved aircraft, it is important that ACCs/UACs receive the support of IFPS for the purpose of rejecting flight plans filed with for aircraft which do not qualify for operation within the AFI RVSM Airspace.

9.2 Radar Display Systems.

Radar display systems must provide controllers with continuous and unambiguous information on the RVSM approval status of all flights under their responsibility;

- In a radar environment, the radar position symbols and/or radar labels associated with aircraft operating within the AFI RVSM Airspace **shall** provide a clear indication of the current non-RVSM approval status.

- Where radar is used as the primary tool for applying separation, the radar position symbols and/or radar labels **should** provide a clear indication of the current non-RVSM approval status of aircraft operating within such level bands above and below the AFI RVSM Airspace.

- The means by which the distinguishing feature is applied to the radar position symbols and/or radar labels of the aircraft concerned **shall** be automatic.

- The possibility for the manual manipulation of the radar position symbols and/or radar labels of aircraft **shall** be available.

9.3 Flight Strips

Flight strips must display the non-RVSM approved status of all civil and State aircraft to controllers.

- Local FDPS shall indicate on all flight strips (paper, electronic or, in the absence of either, extended label) for non-RVSM approved aircraft the information filed by operators in respect of both their RVSM approval status and their status as that of a State aircraft (if applicable).
- Information regarding a State or civil aircraft's current non-RVSM approval status **shall** be displayed on the flight strip. Message example: ***(NON RVSM)***.
- Where applicable, the indication that a non-RVSM approved aircraft is a State aircraft **shall** be displayed on the flight strip. Message example: ***(STATE AIRCRAFT)***

9.4 On-Line Data Interchange (OLDI)

OLDI should:

- include the current RVSM approval status of an aircraft, as well as the information regarding an aircraft's status as being a "State" aircraft, where applicable.
- support the systematic transfer of information related to requests for "Special Handling" in the AFI RVSM Airspace, in Item 18 of the ICAO Flight Plan (Item 18 message: ***STS/NON RVSM***).

9.5 Short Term Conflict Alert (STCA), and Medium Term Conflict Detection (MTCD)

Automatic conflict alert systems should be modified to use the RVSM approval or non-approval status of aircraft and apply the appropriate VSM of 1,000/2,000 ft.

- STCA systems of ACCs/UACs applying RVSM **should** be able to selectively assess the applicable vertical separation minimum of either 1 000 ft or 2 000 ft, as determined by the current RVSM approval or non-approval status of the aircraft concerned, operating in the level band between FL 290 to FL 410 inclusive.
- Medium Term Conflict Detection (MTCD) systems of ACCs/UACs applying RVSM **shall** be able to assess the selective application of a vertical separation minimum of either 1 000 ft or 600 m 2 000 ft, as determined by the current RVSM approval or non-approval status of the aircraft concerned operating in the level band between FL 290 to FL 410 inclusive.

9.6 Flight Planning Requirements

Specific Flight Planning procedures are contained in the AFI RVSM in ICAO Doc 7030/4 AFI Regional Supplementary Procedures. The flight plan (FPL) shall include:

- the entry point at the lateral limit of AFI RVSM airspace and requested flight level after the entry point;
- the exit point at the lateral limit of the RVSM airspace and the requested flight level after the exit point;
- operators of RVSM approved aircraft shall insert "W" in Item 10 of the FPL regardless of requested FL;
- operators of non-RVSM approved State aircraft with a requested flight level of 290 or above shall insert "STS/NONRVSM" in Item 18 of the FPL;

- operators of formation flights of RVSM-approved State aircraft shall NOT insert **"W"** in Item 10 of the FPL;
- operators filing Repetitive Flight Plans (RPLs) shall include in Item Q of the RPL the RVSM approval status "**EQPT/W**" for RVSM approved aircraft, & "EQPT/ " for non-RVSM approved aircraft;
- if a change of aircraft on an RPL results in a modification of the RVSM approval status in Item Q, the operator shall submit a modification message (CHG).

10. AIR TRAFFIC MANAGEMENT CONSIDERATIONS (ATST_1-1); (ATST_1-2)

The introduction of RVSM will require that individual ACCs/UACs undertake a critical evaluation of operating practices so as to identify areas where adjustments and/or changes are required. Individual ACCs/UACs may wish to take the opportunity to maximize the operational benefits to be gained from the introduction of RVSM by undertaking an extensive critical operational analysis and the training of air traffic controllers in the following activities:-

10.1 The ATS Route Network

- It is expected that the existing ATS route network will be through a combination of Flight Level Allocation Schemes, sectorisation, and, to a lesser extent, changes to the ATS route network itself.

- On bi-directional ATS routes, climbing and descending aircraft will cross more cruising levels in an RVSM environment than in a non-RVSM environment. Therefore, consideration should be given to the potential benefit of expanding the use of uni-directional ATS routes.

- The introduction of AFI RVSM will permit Flight Level Allocation Schemes (FLAS) through the designation of new flight levels for specified ATS route segments. Strategic de-confliction at major crossing points will be facilitated through the availability of the additional cruising levels.

- The implementation of AFI RVSM may require an analysis of the optimal levels to be used for delineating the vertical limits of control sectors within ACCs/UACs.

- States shall ensure that the vertical limits of control sectors within ACCs/UACs also facilitate the requirement to provide a vertical separation minimum of 2,000 ft between a. non-RVSM approved aircraft and any other aircraft operating within the AFI RVSM Airspace;

- Consideration should be given to the impact on ATC co-ordination workload resulting from the requirement to provide a 2,000 ft vertical separation minimum for such aircraft operating at levels immediately above or below vertical sector boundaries within the AFI RVSM Airspace.

10.2 ATC Sectorisation

- The implementation of AFI RVSM will require an analysis of the optimal levels to be used for delineating the vertical limits of control sectors within ACCs/UACs. Operational experts should evaluate the requirement to re-define such vertical limits as a function of adaptations to FLAS, or predicted changes in the vertical profiles of major traffic flows expected from the implementation of RVSM.

- The vertical limits of control sectors within the AFI RVSM Airspace should also facilitate the requirement to provide a vertical separation minimum of 2 000 ft between RVSM approved and non-approved aircraft.

- The impact on ATC co-ordination workload resulting from the requirement to provide a 2,000 ft vertical separation minimum, for such aircraft operating at levels immediately above or below vertical sector boundaries within the AFI RVSM Airspace should be determined.

- Inter-Centre Letters of Agreement must be amended to reflect any changes to sector boundaries, where applicable. (ATSP_1-5)

10.3 Special Procedures applicable to designated airspaces

Such special procedures are contained in the Regional SUPPs (Doc. 7030) for the AFI regional

10.4 Flight Level Allocation Schemes (FLAS) (ATSP_1-2)

States should consider a Flight Level Allocation Scheme whereby specific flight levels are applied to specific segments within the ATS route network.

Organizing the use and non-use of flight levels on specific route segments could avoid potential traffic conflicts.

A Strategy could therefore be developed as to when to discontinue the use of FL 310, FL 350, and FL 390 as eastbound cruising levels taking into account different traffic scenarios at these flight levels.

10.5 *ATC* Clearances (ATSP_1-1) (ATSP_1-3)

- only RVSM approved aircraft and non-RVSM approved State aircraft shall, subject to ATC capacity be issued an air traffic control clearance to join and operate within the AFI RVSM Airspace.
- Non-RVSM aircraft intending to climb or descend through the AFI RVSM airspace shall be given appropriate ATC clearance.
- ATC clearance into the AFI RVSM airspace shall **not** be issued to formation flights in the AFI RVSM controlled airspace.
- ATC shall assign flight levels to non-RVSM approved aircraft in accordance with a published table.
- All ATC clearances must be read back and acknowledged.

10.6 ATS Letters of Agreement (ATSP_1-5) (ATSP_1-6) (ATSP_2-13)

10.6.1 ACCs/UACs should review existing Inter-Centre Letters of Agreement for the purpose of updating the content to include RVSM-related changes prior to the implementation of AFI RVSM.

10.6.2 ACCs/UACs should review existing Civil/Military LOAs and/or develop new LOAs defining ATS coordination procedures in RVSM environment.

10.7 Inter-Centre Co-ordination

10.7.1 Flight Plans (ATSP_1-4) (ATSP_2-8)

If the receiving unit has not received a flight plan, the sending air traffic control unit shall verbally inform the receiving unit of whether or not the aircraft is RVSM approved.

10.7.2 Computer-assisted Co-ordination of Estimate Messages (ATSP_1-1) (ATSP_1-6)

The On-Line Data Interchange (OLDI) System should support the co-ordination of requests for special handling (i.e. STS) as filed in Item 18 of the ICAO Flight Plan. When an automated message does not contain the information filed in Item 18 of the ICAO flight plan relevant to RVSM operations, the sending ATC unit shall inform the receiving ATC unit of that information by supplementing the ACT message verbally, using the term "***Negative RVSM***' or "***Negative RVSM State Aircraft***", as applicable.

10.7.3 Verbal Co-ordination of Estimate Messages (ATSP_1-6)

- When a verbal co-ordination process is being used, the sending ATC unit shall include the information filed in Item 18 of the ICAO flight plan relevant to RVSM operations at the end of the verbal estimate message, using the term "***Negative RVSM***' or "***Negative RVSM State Aircraft***', as applicable.

- When a single aircraft is experiencing an in-flight contingency which impacts on RVSM operations, the associated co-ordination messages shall be supplemented verbally by a description of the cause of the contingency.

10.7.4 Training for air traffic controllers and ATC maintenance personnel (Civil and Military) for RVSM. (ATST_1-1 to ATST_1-11); (ATST_2-1 to ATST 2-10); (ATST_3-1)

- 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. It is therefore essential that ATS providers recognize its responsibility for the competence of Air Traffic Controllers (ATC) in the provision of ATS in RVSM airspace.
- States must ensure that Air Traffic controllers and ATS Equipment personnel undergo full training and orientation in all the activities concerning the ATM Safety Elements Required for the safe implementation of RVSM in the AFI Continental airspace.

11 AIRCRAFT COLLISION AVOIDANCE SYSTEM

11.1 Carriage and Operation of Airborne Collision Avoidance System (ACAS) and Pressure-Altitude Reporting Transponder

The ICAO Standards relating to ACAS II as contained in the ICAO Annex 6, Part I paragraph 6.18 *inter alia* require that:

6.18.1 "From **1 January 2003**, all turbine-engined aeroplanes of a maximum certified take-off mass in excess of 15 000 kg or authorized to carry more than 30 passengers shall be equipped with an airborne collision avoidance system (ACAS II)".

6.18.2 "From **1 January 2005**, all turbine-engined aeroplanes of a maximum certified take-off mass in excess of 5 700 kg or authorized to carry more than 19

passengers shall be equipped with an airborne collision avoidance system (ACAS II)".

6.18.3 "An airborne collision avoidance system (ACAS) shall operate in accordance with the relevant provisions of ICAO Annex 10, Volume IV".

The ICAO Standards relating to pressure-altitude reporting transponders as contained in Annex 6, Part I paragraph 6.19 *inter alia* require that:

6.19 "All aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of Annex 10, Volume IV" and; The ICAO Standards relating to pressure-altitude transponders as contained in Annex 6, Part II paragraph 6.13.1 *inter alia* require as follows:

6.13.1 "**From January 2003**, unless exempted by the appropriate authorities, all aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of Annex 10, Volume IV".

Furthermore, other relevant ICAO provisions are contained in Annex 2, paragraph 3.2, Annex 11, paragraph 2.4.2, PANS/OPS Doc.8168, Volume I, Part VIII and PANS/ATM, Doc.4444 Chapter 8, paragraph 8.5.

It is relevant to note that TCAS II, Version 6.04A (or earlier), is **not** ICAO ACAS II SARPs compliant, and, as such, will require upgrading to TCAS II, Version 7. TCAS II, Version 6.04A (or earlier) models, were designed for an operating environment where a minimum vertical separation of 2 000 ft is applied above FL 290. TCAS II, Version 7, includes modifications intended to address operational issues, including its compatibility for operations within RVSM Airspace.

RVSM REFERENCE DOCUMENTS

ICAO The material is covered in the following documents:
Annex 2; chapter 3, para.2
Annex 6; part 1, paragraph 6.18
Annex 10;vol.iv
Annex 11; Para. 2.4.2
PANS-OPS; vol.1, part viii
PANS- ATM; chapter 4.

- EUROCONTROL - RVSM
- NAT RVSM
- FAA RVSM manuals
