



MASTER PLAN

**EUROPEAN
REDUCED VERTICAL SEPARATION MINIMUM
PROGRAMME**

Distribution List

Internal *		External
SDE	PM Project P4	National PM's
DSA	SQS	Members PMB
DIS	AMN	
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RVSM PM	IANS	
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PM Project P0	CFMU	
PM Sub Programme P1	MAS/UAC	
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PM Sub Programme P3		

* Being revised to take into account the new EATCHIP/EATMP organisation

Revision History

Version Number	Issue Date	Status	Reason for Change
0.1	01/10/98	Draft	Initial Draft (submitted to PMM/1)
1.0	26/10/98	Draft	Internal comments
2.0	06/11/98	Draft	For PMB/1
3.0	04/12/98	Draft	Comments internal team, State PM's and PMB/1
3.1	24/12/98	Draft	Comments following PMM/2
3.2	18/01/99	Final Draft	Comments following final internal team review
3.3	15/02/99	Proposed ACG/4 Issue	Comments following PMB/2
3.4	31/03/99	Proposed PC Issue	Inclusion of Executive Summary
3.5	23/04/99	PC Approved Issue	Approved by Provisional Council

EUR RVSM Reference Material

Document Name	Reference	Version
Report of the Special European Regional Air Navigation Meeting September 1994	ICAO Doc. 9639 SP EUR (1994)	N/A
ICAO Manual on RVSM	ICAO Doc 9574	1.0
Cost Benefit Analysis	Final report EUROCONTROL contract C/1.248/HQ/BE/96	1.5 (June'97)
JAA Temporary Guidance Leaflet No 6	TGL 6	July 1998
ATC Manual for Reduced Vertical Separation Minimum (RVSM) in Europe	Approved by ANT/18, February 1999	
ICAO Guidance Material for the implementation and use of RVSM in European airspace	Endorsed by EANPG/40, January 1999	
Amendment proposal to ICAO Doc 7030 (technical requirements and RVSM area)	Endorsed by EANPG/40, January 1999	

Document Approval

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GLOSSARY

Being revised to take into account the new EATMP/EATCHIP organisation

ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACG	EATMP ATM/CNS Consultancy Group
AIS	Aeronautical Information Service
AMN	Airspace Management & Navigation Unit
ATC	Air Traffic Control
ANT	EATCHIP Airspace and Navigation Team
APDSG	ATM Procedures Development Sub Group
ATD	Air Traffic Control & Data Processing
ATM	Air Traffic Management
ATS	Air Traffic Service
ATSU	Air Traffic Services Unit
ATCO	Air Traffic Control Officer
CFMU	EUROCONTROL Central Flow Management Unit
CNS	Communication, Navigation & Surveillance
CREO	Central Route Charges Office
DSA	Directorate Safety, Airspace, Airports & Information Services
DIS	Directorate of EATCHIP Implementation Support
EANPG	ICAO European Air Navigation Planning Group
EATCHIP	European ATC Harmonisation and Integration Programme
EATMS	European Air traffic Management System
ECAC	European Civil Aviation Conference
EEC	EUROCONTROL Experimental Centre
EUR RAN	ICAO European Regional Air Navigation meeting
FDPS	Flight Data Processing System
FL	Flight Level
FUSG	Flexible Use of Airspace Sub Group
GMU	Portable GPS Monitoring Unit
HME	Height Measuring Equipment
HMI	Human Machine Interface
HMU	Ground based Height Monitoring Unit
ICAO	International Civil Aviation Organisation
IFPS	EUROCONTROL Integrated Initial Flight Plan Processing System
JAA	Joint Aviation Authorities
MASPS	Minimum Aircraft System Performance Specification
MAS/UAC	Maastricht Upper Airspace Centre
MNPS	Minimum Navigation Performance Standard
NAT	North Atlantic
NATSPG	North Atlantic Systems Planning Group
NSSG	Navigation and Separation Sub Group
ODT	EATCHIP Operational Requirements and Data Processing Team
PC	EUROCONTROL Provisional Council
PMB	Programme Management Board
PMM	Programme Managers Meeting
PMP	Programme Management Plan
PSO	Programme Support Office
RGCSF	ICAO Review of the General Concept of Separation Panel
RUSC	RVSM Users Support Cell
RNDSG	ATS Route Network Development Sub Group
RVSM	Reduced Vertical Separation Minimum
SRC	EUROCONTROL Safety Regulation Commission
SRU	EUROCONTROL Safety Regulation Unit
SURT	EATCHIP Surveillance Team
TCAS	Traffic Alert and Collision Avoidance System
TGL	Temporary Guidance Leaflet
TLS	Target Level of Safety
TMU	Total Vertical Error Monitoring Unit



VSM	Vertical Separation Minimum
WBS	Work Breakdown Structure
WP	Work Package
www	World Wide Web

EXECUTIVE SUMMARY

Introduction

The Master Plan of the European Reduced Vertical Separation Minimum (RVSM) Programme sets out the scope of the work needed to safely implement RVSM at the earliest realistic date and in an efficient manner. It identifies the key activities of stakeholders within the Programme and the scale of commitment to be made by EUROCONTROL and the participating States.

The Master Plan has been developed in consultation with National RVSM Programme Managers, ICAO, JAA, Airspace User Associations, Agency staff and other RVSM Stakeholders.

European RVSM

The RVSM Programme will provide an additional six flight levels between FL 290 and FL 410 inclusive by January 2002 in the airspace of 39 RVSM States. This will result in additional airspace capacity, reduced inflight delays and fuel economies for the users. The Programme is an element in the suite of EATMP Programmes designed to improve the utilization of European airspace in a safe and cost effective manner.

RVSM will be introduced after a thorough assessment of the safety implications, with safety evaluations before and after RVSM implementation as established within the EATMP Safety Policy and in accordance with ICAO Guidance Material.

The cost benefit case for RVSM remains overwhelming in favour of the Programme continuation with a benefit to cost ratio of 14:1 and a large positive Net Present Value. The results, which have been updated in February 1999, are robust when tested against a numerous uncertainties such as traffic growth.

The RVSM Programme involves activities from a wide range of stakeholders and has been organised into three main Sub-Programmes i.e. Airspace User Preparation & Performance Verification, Air Traffic Management Preparation and Safety Assurance. Taking into account lessons learnt from previous projects, a RVSM Programme Management structure has been introduced and a new organisation has been established to effectively manage the work of the many stakeholders and the interdependency of their tasks.

If the Programme is to succeed and attain the agreed implementation date, it requires the co-operation and commitment of its numerous stakeholders and necessitates that they deliver elements of the programme on time and to the agreed standards.

RVSM Programme Schedule

The schedule for all the activities has been developed and will serve as the benchmark against which the programme progress will be assessed. The schedule, developed in close consultation with national RVSM Programme Managers, contains the following significant dates:

- | | |
|---|----------------|
| • Provisional Council approval of Master Plan | April 1999 |
| • Monitoring Infrastructure Fully Operational | September 200 |
| • Sufficient Aircraft Approved | March 2001 |
| • Pre-Implementation Safety Assessment | July 2001 |
| • Go/Delay Decision | September 2001 |
| • Implementation Date | January 2002 |
| • Initial Post Implementation Safety Assessment | December 2002 |
| • Final Post Implementation Safety Assessment | December 2004 |

Programme Assumptions and Risks

The Programme is based upon a number of assumptions, such as the interface with ACAS, which may change during the life of the programme. If this happens the Programme and RVSM Master Plan may need to be revised.

Steps have been made to reduce risks through the design of the work break down structure and through the implementation of a risk management process. Even so, with such a large number of Stakeholders involved in the programme it is not without risk e.g.

A delay in the National plans of any of the 39 States could significantly affect the RVSM Programme implementation date

Operators not having sufficient aircraft approved for the Go/Delay decision could delay the Programme
A delay in the monitoring infrastructure completion could result in insufficient data for the safety assessment that in turn could also affect the implementation date

Master Plan Document

The Programme Management Board and ACG have endorsed the Master Plan including the date of 24 January 2002 for RVSM implementation throughout the EUR RVSM area and agreed to the submission of the Plan to the Provisional Council.

1. INTRODUCTION TO RVSM

1.1 The RVSM Programme

This Master Plan introduces the European Reduced Vertical Separation Minimum (RVSM) Programme, its contents and challenges, and describes how it will be organised and managed by EUROCONTROL and the numerous Stakeholders. The Programme is an element in the suite of EATCHIP Programmes designed to improve the utilisation of European airspace in a safe and cost effective manner.

The RVSM Programme will provide additional six flight levels between FL 290 and FL 410 inclusive in January 2002 in the airspace of 39 RVSM States. This will result in additional airspace capacity, reduced inflight delays and fuel economies for the users.

The application of a Reduced Vertical Separation Minimum by the RVSM States' ATS Providers requires the completion of a wide ranging co-ordinated array of activities by the different Stakeholders in the European RVSM States as well as airspace users. These activities have been developed to enable RVSM operations to be conducted in a safe and efficient manner.

This document illustrates the scale of the commitment to be made by the States, EUROCONTROL and other Stakeholders to implement RVSM safely at the earliest possible date.

1.2 Background

1.2.1 RVSM Developments

In the late 1970s, faced with rising fuel costs and growing demands for a more efficient use of the available airspace, the International Civil Aviation Organisation (ICAO) initiated a comprehensive programme of studies to examine the feasibility of reducing the 2000 ft Vertical Separation Minimum (VSM) applied above 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 USA.

The studies demonstrated that the global reduction of vertical separation was safe, feasible, 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 Region for the introduction of 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 (at and between FL 330 and FL 370), began on the 27th 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 Reduced Vertical Separation Minimum in the transition area 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, high traffic density and 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 would have to address all aspects of European en-route operations such as the safety implications of European traffic complexity, the mix of aircraft types and the many Stakeholders involved (39 RVSM Participating States, industry, aircraft operators) etc.

1.2.2 Special European Regional Air Navigation Meeting September 1994

At the ICAO Special European Regional Air Navigation Meeting (SPEC EUR RAN) held in September 1994, as a result of representations by EUROCONTROL and the User Organisations, the following text was agreed.

" The Meeting endorsed the objectives of capacity and economy benefits associated with future implementation of a 300m (1000ft) reduced VSM in the EUR Region, and therefore concluded that such implementation planning should be progressed as a priority item. It was recognised that a number of complex issues required to be resolved, including meteorological and topographical questions, aircraft equipment fit and air traffic control implications, which at the time of the EUR RAN Meeting precluded a definition of firm timescales for implementation. However, a programme for implementation in the earliest possible time frame should be pursued actively. The Meeting emphasised that implementation planning should be carried out by the [ICAO] EANPG and should be fully co-ordinated for the entire area of future application, and should take full account of the work carried out by the Review of the General Concept of Separation Panel (RGCSP), North Atlantic Systems Planning Group (NATSPG), EUROCONTROL and States in the Region. Co-ordination with States outside the EUR Region might also be necessary due to the location of the transition areas. Concerted effort and manpower would be required to accomplish the task ". (Para 3.8.4. - ICAO Doc. 9639 SP EUR (1994)).

1.2.3 EUROCONTROL RVSM Activities

European States and EUROCONTROL have been involved in RVSM since first discussions in the ICAO Review of the General Concept of Separation Panel (RGCSP). Since the EUR RAN agreement in 1994, EUROCONTROL has continued to investigate the feasibility of RVSM in European airspace, taking into account the experience of the RVSM implementation in the NAT Region. At EANPG/37 it was agreed that EUROCONTROL would be requested to develop proposals for the amendment to the appropriate ICAO documentation with the objective of obtaining a regional air navigation agreement for the implementation of RVSM in the EUR Region. EANPG/39 concluded that non-ECAC States wishing to implement RVSM be urged to participate in EUROCONTROL RVSM related activities and provide information about their actual plans.

To-date the principle European RVSM activities, including co-ordination with State RVSM activities, have been performed in the EATCHIP Airspace and Navigation Domain of EUROCONTROL. These activities as well as those proposed within this Master Plan are being undertaken within the framework of ICAO's activities in the European Region.

1.2.4 European RVSM Cost/Benefit Study

The RVSM Programme forms part of the EATCHIP portfolio of programmes. The main benefits arising from the implementation of RVSM in European airspace is a significant en-route airspace capacity increase. Allowing for an estimated capacity increase of at least 20% (ref. Cost/Benefit Analysis, June'97), RVSM is seen to be the main EATCHIP contributor for European en-route capacity increase in the time frame up to 2005.

The results of the initial Cost Benefit Study for RVSM were presented to the EATCHIP Airspace & Navigation Team (ANT) in September 1995. This study was subsequently updated and refined, and the results were presented to the ANT in June 1997. This refined analysis took into account, inter alia :

- ATC Capacity enhancements
- Cost for Aircraft Altimetry Upgrades
- Cost for ATM Systems Upgrades
- Cost for Height Monitoring systems and operation
- Fuel Efficiency Gains
- Costs of Delay

1.2.4.1 Re-Validation of Cost Benefit Analysis

The original RVSM programme allowed for re-validations of the Cost Benefit Analysis (CBA) as part of its business case. In January 1999, EUROCONTROL undertook to re-validate the RVSM business case using updated assumptions and forecasts to reduce potential uncertainties in the original study, and thereby increase the robustness of the re-validated case.

As the initial 20 year evaluation horizon has now moved forward, from 1995-2014 to 1998-2017, the assumptions and traffic forecasts have also been updated.

The revised CBA concluded in summary that:

- **the refined overall cost benefit case for RVSM is positive with a Benefit/Cost ratio of 14 and a large positive Net Present Value**

The overall results are depicted in **Attachment A**.

The CBA update has confirmed that the cost benefit case is seen to be robust against a wide range of uncertainties. Delay reductions are by far the most important contributor to aircraft operator benefits.

1.2.5 European RVSM Programme

The go-ahead to proceed with RVSM activities was proposed by the EATCHIP Airspace & Navigation Team (ANT) in June 1997, and was subsequently agreed by the EUROCONTROL Committee of Management (October 1997) and the EATCHIP Project Board (November 1997). The go-ahead was based on:

- estimations of the safety levels meeting the safety objectives
- the operational acceptability and feasibility of RVSM in European airspace
- a positive cost/benefit ratio

Based on the go-ahead given in 1997, an initial RVSM plan was developed by EUROCONTROL, which included the tasks required by ANT to allow confirmation of the aspects of:

- estimations of the safety levels meeting the safety objectives
- the operational acceptability and feasibility of RVSM in European airspace

In early 1998, the EATCHIP ATM/CNS Consultancy Group (ACG) and the EUROCONTROL Provisional Council agreed that although all States fully supported the introduction of RVSM in European airspace, two aspects were still required:

- a detailed plan containing all RVSM related tasks, with realistic timescales, obtained through consultation with all parties (Stakeholders) concerned
- an appropriate programme management organisation to effectively manage the RVSM Programme considering the many Stakeholders and the interdependence of their tasks

In May 1998, EUROCONTROL reorganised the work into a standalone programme within EATCHIP and started work on the development of this RVSM Master Plan.



2. RVSM MASTER PLAN

2.1 Scope of the RVSM Master Plan

The RVSM Programme involves activities from a wide range of Stakeholders (see **Attachment C**).

The RVSM Master Plan is the basis for managing Stakeholder activities to a common timescale. The scope of the RVSM Master Plan encompasses:

- all key activities, including tasks for the EUROCONTROL Agency team, tasks for States, Airspace Users, Manufacturers etc
- an overview of RVSM Programme tasks
- key Milestone dates and associated timescales of required activities
- assumptions on which the RVSM Programme and its activities & timescales have been based
- the RVSM Programme organisation, structure and management, allowing effective co-operation between all participants involved

2.2 Objectives of the RVSM Master Plan

The objectives of the RVSM Master Plan are to:

- identify all key activities, milestones, and deliverables
- establish ambitious but realistic time scales
- obtain and reflect (*once approved by the Provisional Council*) the commitment by all States involved in the RVSM Programme
- serve as baseline for the European RVSM Programme
- serve as the basis for National RVSM programme plans

2.3 Evolution of the RVSM Master Plan

The EUROCONTROL RVSM Programme Management was instructed to establish an RVSM Programme schedule which:

- allowed the safe operational introduction of RVSM at the earliest possible date
- combined tasks with realistic timescales
- enabled full commitment to the RVSM Programme

The RVSM Master Plan has been developed in consultation with National Programme Managers, ICAO, JAA, Airspace Users, EUROCONTROL staff and other RVSM Stakeholders.

An initial proposal of the implementation date was made to the Programme Management Board in November 1998. The timescales within that proposal were derived and agreed through the development of a detailed Work Breakdown Structure (WBS), containing Stakeholder tasks as required for the execution of the Programme.

The PMB1 instructed the RVSM Programme Manager to re-evaluate the programme further to see whether an earlier implementation date could be achieved. National Programme Managers were requested to assess the possibilities for reducing the timescales of their National RVSM Programme tasks. After carefully balancing the benefits and the increased risk associated with shortened timescales, the timescales proposed in this Master Plan were adopted.

2.4 Application of the RVSM Master Plan

The EUROCONTROL RVSM Programme Management, the National Programme Managers, and all other Stakeholders are integral parts of the RVSM Programme. The identification and resolution of any issue that may affect the overall RVSM Programme will need to be a co-operative effort, with the RVSM Master Plan as a common basis for all States.

Development of the RVSM Master Plan and the detailed WBS, through consultation with the States and other Stakeholders, has produced an agreed basis for submission and approval by the Provisional Council.

Once approved, the RVSM Master Plan will be used as the framework for the organisation, management and execution of the RVSM Programme. For States the RVSM Master Plan will be used to meet the agreed common target dates. The major milestones will be used to assess progress by all Stakeholders. National Programme Managers will report progress to EUROCONTROL for inclusion in the RVSM master schedule. Potential delays to the RVSM master schedule will be identified by the EUROCONTROL RVSM Programme Manager, who will take the necessary actions to address the relevant issues and to find potential solutions.

This Master Plan will be supplemented by a Programme Management Plan (PMP), which will contain the detailed management and control activities required to manage this multi-national, multi-domain programme.

3. MAIN PROGRAMME TOPICS

3.1 Safety

The introduction of RVSM must be achieved in conjunction with, a thorough assessment of the safety implications of this change, the establishment of clear safety objectives, and safety evaluations showing the attainment of these objectives, before and after RVSM introduction

The RVSM Safety Policy has been developed taking into account the EATCHIP Safety Policy and ICAO guidance. The derived safety objectives, after approval by the EUROCONTROL Provisional Council, will form the basis for the RVSM Programme tasks that will assure the safe introduction and application of RVSM in European airspace:

1. the implementation of RVSM should not adversely affect the risk of en-route mid-air collision
2. the management of vertical collision risks within RVSM airspace should meet the Target Level of Safety (TLS) of 5×10^{-9} fatal accidents per flight hour, as contained within ICAO guidance material, and
3. the risk of mid-air collision in the vertical dimension within RVSM airspace due to technical height-keeping performance shall meet a TLS of 2.5×10^{-9} fatal accidents per flight hour

In order to demonstrate that the above objectives are met appropriate risk estimation methodologies will need to be available, and sufficient operational and technical data will need to be collected to obtain risk estimates with sufficient confidence

After implementation of RVSM, post-implementation safety assessments need to confirm that the safety objectives are continued to be met.

3.2 Airspace Aspects

The definition of the extent of the European RVSM area has been based on the operational requirement for a homogeneous area without significant gaps. Additionally, considering its significant benefits, the objective is the implementation of RVSM in an area as wide as possible.

The proposed geographical area (as set out in the Doc. 7030 proposed amendment) encompassing the airspace of the RVSM participating States, i.e. the European RVSM airspace, is depicted in **Attachment B**.

Within RVSM airspace, sectorisation and ATS routes will need to be reviewed in the context of the availability of the additional RVSM Flight Levels. These aspects need separate attention in airspace where the transition to and from non-RVSM airspace will be accommodated, including those interfaces where a feet/metric transition is required.

3.3 ATC Procedures

ATC Operational Procedures for the European RVSM airspace will need to be developed and implemented, including:

- Flight Planning Procedures
- Contingency Procedures
- Transition Procedures
- Procedures for handling non-RVSM State aircraft

These procedures will be reflected in the **ATC Manual for Reduced Vertical Separation Minimum (RVSM) in Europe**, and in amendments to ICAO Doc 7030 (Regional Procedures). Further, ATC training syllabi will be developed to support RVSM ATC training by the ATS providers. In the context of the additional RVSM Flight Levels, the associated review of sectorisation, ATS routes, and locally applied Flight Level Allocation Systems, Letters of Agreement will need to be reviewed and amended. Further, the legal aspects associated with RVSM operations require identification, with possible consequential amendments to National legislation.

3.4 ATC Systems

In order to accommodate and support the provision of ATC in an RVSM environment, ATC systems will need modification. The modifications are related to the need for the controller to distinguish between RVSM approved aircraft and non-approved (State) aircraft, and to accommodate the extra RVSM flight levels, possible re-sectorisation, etc. ATC training simulators will need similar modifications. Further, the CFMU will need to adapt the system for RVSM, including modifications to the IFPS.

3.5 Aircraft Requirements

For operations in RVSM airspace, flights are required to be RVSM approved. State aircraft are exempted from this requirement, although military authorities are encouraged to make their transport fleet compatible with RVSM requirements. To obtain RVSM approval, aircraft may need modifications, on the basis of Service Bulletins produced by aircraft manufacturers. JAA Temporary Guidance Leaflet No.6 (TGL 6) provides MASPS, guidance on airworthiness and operational practices & procedures for RVSM airspace that can be used as basis for the approval processes. The RVSM requirements will also be reflected in ICAO Doc 7030 (Regional Procedures), as basis for National regulation.

3.6 Monitoring

In line with ICAO Guidance Material, regions among the first to introduce RVSM should have appropriate monitoring in place to confirm that the height keeping performance requirements are being met. The European RVSM Programme, being the first application of RVSM in a dense continental airspace environment, will adopt this ICAO Guidance.

Therefore, once approved, operators are required to participate in the height keeping performance programme. The monitoring programme requires the availability of height monitoring systems, both ground based (HMUs) and portable for on-board measurements (GMUs). Both RVSM approvals and monitoring programme are required early enough in the RVSM programme to allow the collection of sufficient data for safety assessments.

4. OVERVIEW OF THE RVSM PROGRAMME SCHEDULE

The RVSM Programme is large and complex with many interdependent Stakeholder activities. If the programme is to succeed and attain the agreed implementation date, it requires the cooperation, commitment and coordination of the numerous Stakeholders.

4.1 RVSM Programme Structure

The RVSM Programme includes many Stakeholder activities up to and including the implementation of RVSM as well as activities following implementation. Identified Stakeholder activities have been developed into a Work Breakdown Structure (WBS). The WBS is summarized into five sub programmes and projects. Each sub programme and project has been divided into a number of Work Packages (WPs). The sub programmes and projects, as well as their work packages, are shown diagrammatically in **Attachment D**. The three Sub Programmes P1-P3 represent the main workload of the RVSM Programme.

Project P0, "*Programme Validation & Management*". The main deliverables of P0 are the detailed RVSM Master Plan upon which Stakeholders will firmly commit to the implementation of RVSM at an agreed date and also includes the programme management activities, in particular progress monitoring and progress/status reports by the States and EUROCONTROL.

Sub Programme P1, "*Airspace User Preparation & Performance Verification*", will ensure that the technical, operational and regulatory means will be available for airspace users and States to enable RVSM approvals. Sub Programme P1 will also assist and monitor the approval process. Aircraft height keeping accuracy will be verified through the operation of a height monitoring infrastructure. The monitoring programme will provide the technical data to confirm that safety objectives are met (see Sub Programme P3).

Sub Programme P2, "*ATM Preparation*", will ensure all ATS provider units are well prepared and ready for the introduction of RVSM on the agreed date. To this end, Sub Programme P2 identifies the tasks which should allow States, inter alia, to make airspace changes, if required; introduce RVSM related ATC procedures; modify ATC systems; provide ATC training; and resolve legal issues.

Sub Programme P3, "*RVSM Safety Assurance*", constitutes the safety assessments necessary prior to implementation; just after implementation and at the end of the RVSM Programme to ensure that the agreed Safety Objectives are met. Sub Programme P3 includes the development of an agreed RVSM Safety Policy, and also identifies the possible need for States to prepare RVSM Safety Cases.

Project P4, "*Awareness and Marketing*", caters for awareness activities undertaken by EUROCONTROL and each State. Increasing the levels of awareness throughout the Industry and within each State will reduce risk of the programme failing to attain its objectives.

The Stakeholder activities within each WP result in deliverables. **Attachment E** describes in more detail the deliverables and/or objectives of each WP.

4.2 RVSM Programme Schedule

The schedule was developed in conjunction with the various Stakeholders but in particular the National Programme Managers. The NPMs have:

- reviewed and commented upon the programme
- have or are developing their National schedule to interface and conform with the RVSM Master Schedule
- ensured that they can implement RVSM at the date agreed in this document

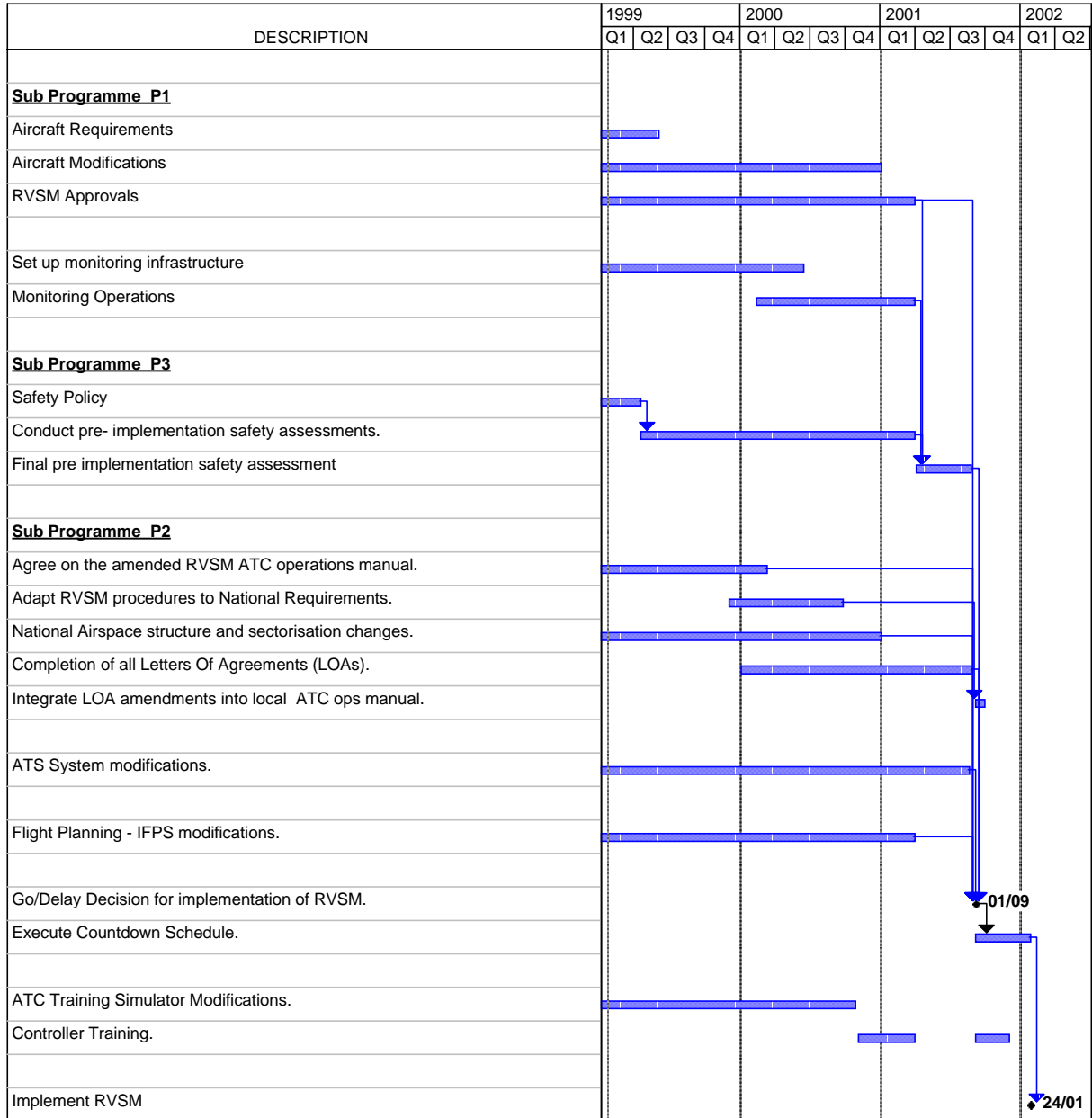
In addition the PMB has endorsed the Master Schedule and implementation date.



The table below indicates 6 key dates within the RVSM Programme Schedule:

Major Activity	Completion Month
Provisional Council approval of Master Plan	April 1999
Pre-Implementation Safety Assessment	July 2001
Go/Delay Decision	September 2001
Implementation Date	January 2002
Initial Post Implementation Safety Assessment	December 2002
Final Post Implementation Safety Assessment	December 2004

The RVSM Programme schedule (up to the operational introduction of RVSM) is summarized in the following chart.



5. STAKEHOLDER COMMITMENT TO THE RVSM PROGRAMME

Each of the Stakeholders has an important role to play. Successfully attaining the agreed implementation date necessitates that Stakeholders deliver their elements of the programme on time and to the agreed standards. Delivering the RVSM Programme to the agreed implementation date will require that each Stakeholder respects the schedule.

The commitment to the whole programme by National representatives signifies commitment by the States to key milestones within it. The detailed activities leading up to each milestone are to be managed by National Programme Managers. The range of Stakeholders is wide as can be seen in **Attachment C**.

The following tables outline the completion date for the key Stakeholder activities. Only if Stakeholders achieve these dates will the Programme as a whole attain the agreed RVSM implementation date. Post Implementation activities have not been included.

5.1 Stakeholder Responsibility

Each Stakeholder's responsibility is reflected in the key activities and the completion date outlined below.

5.1.1 EUROCONTROL

EUROCONTROL are responsible for, the overall management of the RVSM Programme, the setup and operation of the monitoring infrastructure and preparing safety assessment

EUROCONTROL	END DATE
ATS System Modifications	
Issue modifications to ATS System Interface Specifications	18/1/99
RVSM Awareness	
Develop generic targeted RVSM information	31/3/99
Aircraft Requirements	
Develop European RVSM Guidance Material	25/3/99
Launch assessment of RVSM Approval Rate	1/10/99
Controller Training for RVSM	
Issue outline syllabus for Non Transition Areas RVSM FIRs	3/8/99
Issue outline syllabus for Transition RVSM FIRs	1/10/99
Legal Issues	
Identify RVSM Legal Issues	29/6/99
Develop generic solutions to RVSM Legal issues	29/6/00
Countdown Schedule	
Execute countdown plan/schedule	21/10/99
European Generic RVSM ATC Procedures	
Issue agreed RVSM ATC Ops Manual	7/3/00
Monitoring Infrastructure	
Set Up Monitoring Cell	9/2/00
Implement GMUs	9/2/00
Implement HMUs	20/9/00
Safety Assurance	
Develop agreed Safety Policy	23/4/99
Conduct Pre-implementation Safety Assessment	27/3/01
Produce final Pre-Implementation Report assessing each Safety Objective	13/7/01

IFPS Modifications for RVSM	
IFPS Acceptance testing complete	29/3/01
Monitoring Operations	
Produce height keeping and non height keeping results (Report 1)	30/3/01

5.1.2 ICAO

ICAO are responsible for providing a framework for enabling the introduction of National regulations needed to be in place for the introduction of RVSM.

ICAO	END DATE
Develop European RVSM Guidance Material	25/3/99
Approve and issue RVSM Technical Amendment to Doc 7030	2/6/99
Approve and issue RVSM Ops Doc Amendment to Doc 7030	25/4/00

5.1.3 JAA

JAA are responsible for providing Guidance Material for the approval of aircraft and operations in RVSM airspace.

JAA	END DATE
Publish Temporary Guidance Leaflet No. 6	1/7/98 Complete

5.1.4 RVSM STATES

State organisations identified as separate Stakeholders include National Civil Aviation Authority, Certification/Regulation Authorities and ATS Providers. Together they are responsible for the provision of regulations to enable ATCs to safely handle aircraft flying in RVSM airspace, as well as approving National users for RVSM operations.

RVSM STATES	END DATE
NATIONAL CIVIL AVIATION AUTHORITIES	
Programme Management	
Establish National RVSM programme organisation and budget	1/3/99
Awareness	
Launch National RVSM awareness programme	21/5/99
Aeronautical Publications	
Publish RVSM Aeronautical Information Circulars	First AIC: 23/8/99
European Generic RVSM ATC Procedures	
Agree Ops. Doc 7030 amendment on National level	31/12/99
Final Pre Implementation Safety Assessment	
States prepare own Safety Assessment	5/7/01
Legal Issues	
Implement National Legislation/Regulations	2/8/01
STATE CERTIFICATION/REGULATORY AUTHORITIES	
RVSM Approval	
Launch assessment of RVSM Approval Rate	1/10/99
Translate Technical Doc 7030 into National regulations	1/11/99
Provide certification criteria to National Operators	1/11/99
Approve suitably modified aircraft	30/3/01

STATE ATS PROVIDER	
Training Simulator Modifications	
Establish Simulator Modification Schedule	24/2/99
Validate and accept simulator modifications	25/10/00
ATS System Modifications	
Establish ATS System modification schedule	30/4/99
Validate and accept system modifications	17/8/01
ATC Procedures	
Adapt/Integrate RVSM ATC procedures in National local Ops Manual	22/9/00
Preparation of Airspace	
Agree on National Airspace Structure and sectorisation changes	29/12/00
Letters of Agreement	
Completion of all Letters of Agreement amendments	31/8/01
Integrate Letters of Agreement amendments into local ATC Ops manual	28/9/01
Execute Countdown Plan	
Finalize Countdown Plan/Schedule	30/6/00
Launch Countdown Plan/Schedule	28/8/01
Controller Training for RVSM	
Finalise National local training programme	9/11/00
Complete National ATC training	30/11/01
Implement RVSM	24/1/02

5.1.5 NON-RVSM STATES

Non-RVSM States are responsible for certifying aircraft requiring access to RVSM airspace. In addition, Non-RVSM States adjacent to the RVSM area may require airspace and procedure modifications to handle transition between RVSM airspace and non-RVSM airspace.

NON-RVSM STATES	END DATE
RVSM Approval	
Translate Technical Doc 7030 into National regulations	1/11/99
Provide certification criteria to National Operators	1/11/99
Approve suitably modified aircraft	30/3/01
Monitor approval rate of National aircraft modifications	27/8/01
Letters of Agreement	
Completion of all Letters of Agreement amendments	31/8/01
Integrate Letters of Agreement amendments into local ATC Ops manual	28/9/01

5.1.6 CIVIL AIRSPACE USERS

Users wishing to fly in RVSM airspace must gain RVSM approval. A large proportion of the aircraft population normally flying in RVSM airspace have to be approved and monitored before RVSM can be introduced.

CIVIL AIRSPACE USERS	END DATE
Aircraft Modifications	
Identify modification requirements	27/12/99
Set up modification programme	21/2/00
Develop Amendments to Ops Manual	12/7/00
Undertake aircraft modifications	29/12/00

RVSM Approval	
Commence participation in European RVSM monitoring programme	9/2/00
Request RVSM certification	19/3/01
Flight Crew Training	
Conduct flight crew training	10/10/01

5.1.7 MILITARY AUTHORITIES

Although Military aircraft are entitled to exemption from obtaining RVSM approval, Military Users are urged to modify their transport aircraft to meet RVSM requirements.

MILITARY AUTHORITIES	END DATE
Impact of RVSM on Military	
Assessment of RVSM impact on Military operations	15/9/99
Military Aircraft Modifications	
Modify transport aircraft where applicable	27/8/01
Flight Crew Training	
Conduct flight crew training	8/10/01

5.1.8 AIRCRAFT MANUFACTURERS

A wide variety of aircraft types will operate in the European RVSM airspace. Aircraft manufacturers and their suppliers are responsible for the development of new Service Bulletins and equipment to meet RVSM requirements.

AIRCRAFT MANUFACTURERS	END DATE
Aircraft Modifications	
Develop new Service Bulletins	27/12/99

6. ISSUES AFFECTING THE RVSM PROGRAMME

6.1 RVSM Programme Assumptions

The RVSM Programme tasks and their timescales are based on a number of assumptions which are listed below. If any of the assumptions change the Programme and RVSM Master Plan may need to be revised to take the new circumstances into account.

Assumption No.	Description RVSM Programme Assumptions
1	The EUROCONTROL Provisional Council approves the RVSM Master Plan at the meeting on the 23 April 1999.
2	All RVSM Participating States endorse the European RVSM Safety Policy.
3	The geographical area of implementation of RVSM will be as proposed in the Doc. 7030 proposed amendment ref. EANPG Circular Letter 290 Attachment 4 agreed at the time of approval of the RVSM Master Plan. (see Attachment B for geographical RVSM area)
4	Introduction of RVSM airspace will take place <i>simultaneously</i> in all RVSM States in a co-ordinated manner.
5	TCAS II Version 7.0, meeting ICAO ACAS II requirements, is compatible with RVSM operations.
6	The ICAO table of cruising levels as defined in ICAO Annex 2, Appendix 3 is applicable in the European RVSM airspace.
7	State aircraft will be exempted from the requirement for RVSM approval.
8	All Stakeholders involved have agreed the tasks and timescales within the RVSM Master Plan.
9	The Organisation structure, responsibilities, and the associated working methods for co-operation, as outlined in the RVSM Master Plan, will be agreed by all the Stakeholders involved.
10	National RVSM Programme Managers co-ordinate and manage all internal State RVSM activities.
11	Participating States will perform their RVSM related activities on the basis of a National RVSM Plan, which is compatible with the RVSM Master Plan.
12	Sufficient resources and expertise will be available within the EUROCONTROL Agency and States to perform the RVSM Programme activities.

6.2 RVSM Programme Dependencies

The RVSM Programme forms a part of the EATCHIP portfolio of programmes. An identified dependency is given below. If the timescales of this programme are modified there may be consequences for the established timescales of the RVSM Programme.

Dependency No.	EUROCONTROL Programme or other European Development
1	EUROCONTROL Airborne Collision Avoidance System (ACAS) Implementation Programme Current planned timescales: start implementation (requiring ACAS II) January 2000 transition phase: January 2000 - March 2001

6.3 Programme Risk Assessment

A series of RVSM Programme Risk Assessments has been carried out with the co-operation of a large number of Stakeholders, to identify:

- risks associated with the RVSM Programme
- impact of the risks on the RVSM Programme

The most significant RVSM Programme risks have been identified as:

Risk Description	Consequence
Delay in the National plans of any of the 39 States	This could significantly affect RVSM implementation
Insufficient number of aircraft approved for the Go/Delay decision	Delay in RVSM Programme
Insufficient data available (e.g. delay in monitoring infrastructure completion, late approval of aircraft) to enable assessment of operational and technical aspects of Safety Objectives	Reduction in level of confidence of safety assessment. Safety assessment not conclusive for Go/Delay Decision.
Insufficient ATC staff trained to be able to handle aircraft flying in RVSM airspace	Reduced capacity and safety risk
National ATC System not modified on time for the agreed implementation date	The programme will be delayed
Delay to the ACAS Programme	Too many aircraft will have a version of ACAS which causes problem in RVSM environment

Other risks and more details can be found in **Attachment F**. Where appropriate, these results have been taken into account in the development of the schedule. A Risk Management Plan for the RVSM Programme will be incorporated into the RVSM Programme Management Plan and will identify:

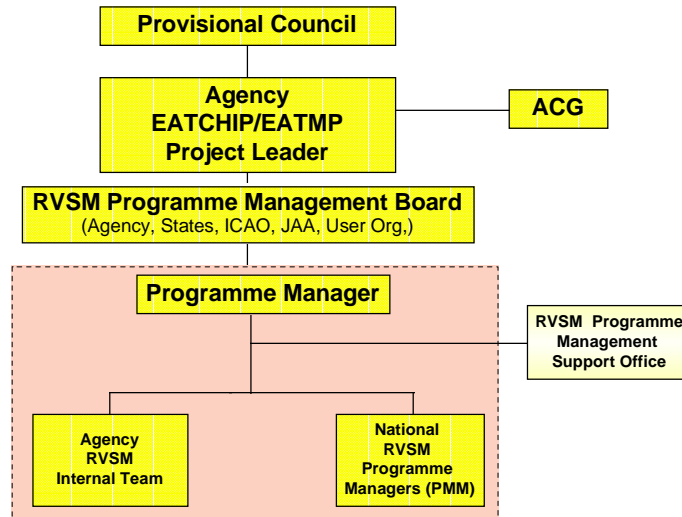
- mitigation strategies for RVSM Programme risks
- actions required by Stakeholders to contain risks
- processes to effectively manage and report on RVSM Programme Risks

Risk Management will be an ongoing Programme Management activity and results will be communicated via regular progress reports. All significant known risks will be monitored, updated and reported regularly. This process will serve as an important means for the EUROCONTROL RVSM Programme Management and the National RVSM Programme Managers to assess the need for, and the extent of, changes to plans and schedules.

7. RVSM PROGRAMME MANAGEMENT

7.1 Organisation Structure

The EUROCONTROL RVSM Programme Management structure is depicted below.



It can be seen that the Programme Management Board acts as the interface between the Programme, EATCHIP/EATMP and the Provisional Council. Work within the programme is managed by the Programme Manager who is the Chairman of the Programme Managers Meeting. The detailed work is managed by the sub programme managers within EUROCONTROL and the National Programme Managers within each State. Programme management co-ordination is undertaken by the Programme Support Office.

The following paragraphs describe the responsibilities of the various RVSM programme management roles.

7.2 Responsibilities

7.2.1 RVSM Programme Management Board (PMB)

RVSM PMB membership shall comprise:

- Chairman
- Senior representatives with overall strategic responsibility for the RVSM Programme from ECAC and non-ECAC States participating in the RVSM Programme
- Senior representatives from relevant User and other International Organisations
- Heads of Divisions of the Agency involved in the RVSM Programme

The RVSM Programme Management Board will:

- provide strategic guidance to the RVSM Programme Manager
- ensure continued involvement and commitment of participating States, Users and other International Organisations to all elements of the RVSM Programme
- where necessary, submit specific proposals for strategic actions, such as funding arrangements for Sub-Programme/Project elements, to the EATCHIP/EATMP Project Leader
- monitor the overall RVSM Programme on the basis of progress reports by the RVSM Programme Manager

- check progress and expenditure against agreed milestones and propose necessary corrective actions
- submit progress reports through the EATCHIP Project Leader to all ACG meetings
- provide detailed and in-depth analysis of the RVSM Programme progress and/or specific elements of it to the Project Leader and through him to the ACG when appropriate

7.2.2 RVSM Programme Manager

The RVSM Programme Manager shall:

- be responsible and accountable for the day-to-day management of the RVSM Programme
- be responsible for ensuring adequate co-ordination with all RVSM Sub-Programme and Project-Managers
- submit 6-weekly progress reports to the RVSM Programme Management Board, focusing on constraints, difficulties and areas which require strategic decisions
- ensure that the RVSM Programme is maintained on schedule and within the overall assigned budget
- co-ordinate the required availability of resources with all concerned
- ensure co-ordination with and between the National RVSM Programme Managers

7.2.3 National RVSM Programme Managers

In addition to their national responsibilities, nominated RVSM Programme Managers will:

- be responsible to the RVSM Programme Manager for the execution of the applicable National activities within RVSM Programme Master Plan
- report, in accordance with the Communication Plan, on progress against the agreed RVSM Programme Master Plan
- participate at the RVSM Programme Managers Meetings

7.2.4 RVSM Programme Managers Meeting (PMM)

All National RVSM Programme Managers will meet regularly under the Chairmanship of the Agency RVSM Programme Manager in the RVSM PMMs to review RVSM Programme progress and agree any remedial action necessary. The PMM membership shall comprise:

- Chairman, EUROCONTROL RVSM Programme Manager
- National RVSM Programme Managers of all ECAC and non-ECAC States participating in the RVSM Programme
- representatives from appropriate User, Agencies and other International Organisations
- relevant Staff of the EUROCONTROL Agency and RVSM Sub-Programme Managers

The RVSM Programme Managers Meetings will:

- act as the focal point for RVSM issues
- develop and review the RVSM Programme
- conduct general preparation for RVSM Programme Management Board meetings
- act as the key forum for RVSM Programme progress tracking
- support and provide feedback for the RVSM Awareness Programme

7.2.5 RVSM Programme Management Support Office (PSO)

EUROCONTROL has established a Programme Support Office (PSO) to support the RVSM Programme and its projects on a day-to-day basis. The PSO has been set up under the responsibility of the RVSM Programme Manager. Its responsibilities include the establishment and maintenance of the RVSM Programme and Project Management Plans and their subsidiary Plans (Risk Management, Procurement, Budget etc.) as well as monitoring the RVSM Programme progress against the agreed base line. The PSO will ensure that National RVSM plans are integrated into the overall RVSM Programme.

7.2.6 EATCHIP Airspace and Navigation Team

The Airspace & Navigation Team (ANT) within EATCHIP is the Domain Team with the broad overview of all airspace and navigation developments. Hence it has a significant interface with the RVSM Programme.

ANT and its sub-groups will be the bodies invited to develop, propose and agree the technical content of ECAC-wide airspace and navigation deliverables required for RVSM implementation.

Currently ANT and its sub-groups are conducting RVSM related activities, which have been incorporated into the revised RVSM programme. These include:

- APDSG – Completion of RVSM Ops Manual, Development of Feet/Metric RVSM Transition procedures and drafting of the RVSM Ops Amendment Proposal to Doc. 7030
- NSSG – Aircraft Height Keeping Monitoring Policy, development of draft RVSM Safety policy
- RNDSG-has under its work programme the development and implementation of Version 4 of the ATS Route network. It has been agreed to incorporate most of the RVSM Airspace Issues work i.e. Route and Sectorisation evaluation studies, simulations and implementation plans within the RNDSG V4 activities

Close and regular consultation will take place between the RVSM Programme Management and the Chairmen of ANT and its Sub Groups. This will allow the Programme Manager to integrate and coordinate the results of the Team work into the overall programme, avoid any incompatibilities between programme requirements and deliverable content and assess at the earliest possible stage the impact of the results on the programme schedule and costs.

The Chairmen of the three ANT Sub-Groups have been assigned responsibility for related projects and work packages within the RVSM Programme Organisation. This will ensure content coherency in a practical manner.

In addition to the current contribution of ANT's Sub-Groups it is expected that the operational and technical expertise of the Team will be called upon throughout the RVSM Programme timeframe. A formal request will be made to ANT in each case detailing the request with appropriate content and context within the overall RVSM programme and indicating target completion dates. If accepted, the ANT would task the appropriate Sub-Group accordingly.

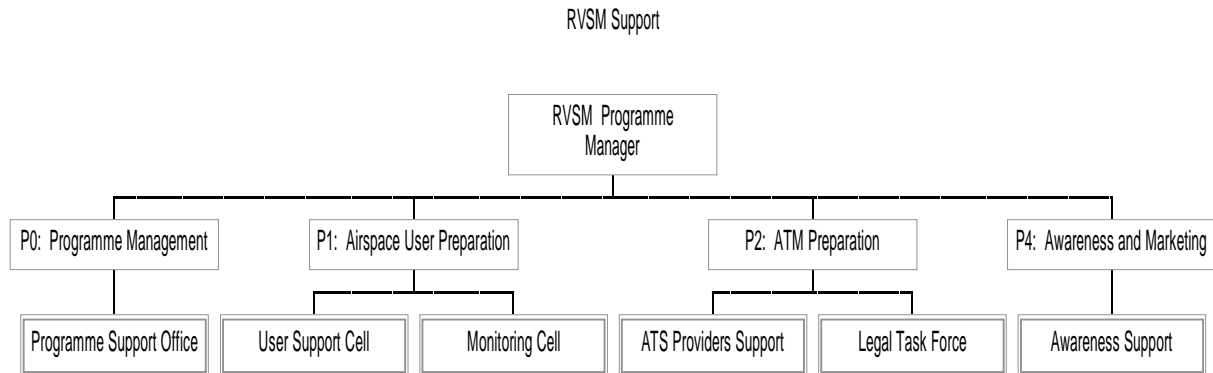
7.2.7 Other Related Groups

Relationships exist between the Programme and other teams/groups e.g. ODT, EAG, SRU. The links between the RVSM Programme and these teams/groups is in the course of being defined but will follow the spirit of section 7.2.6.

Specifically, the relationship between the RVSM Programme and its Management Board, and the Safety Assurance activities within the RVSM Programme will be defined in the PMP. This PMP will include the relationship with the Safety Regulation Unit and Safety Regulation Commission.

7.2.8 RVSM Support

In addition to the current teams and their sub-groups, the experiences of other major programmes such as BRNAV have highlighted the need for additional support during the life of the programme. The RVSM Programme has included in its organisational structure 6 small functions to coordinate the programme and interface with Stakeholders. These units will decrease risk and improve the likelihood of success and are set out below.



7.2.8.1 Programme Support Office

The RVSM Programme Support Office are responsible for establishing and maintaining the overall RVSM Management Plans, as well as monitoring the RVSM programme progress against the agreed baseline.

7.2.8.2 User Support Cell

The User Support Cell will assist airspace users and States to enable RVSM approvals and to monitor progress towards sufficient aircraft being approved for participation in the monitoring programme and for the Go/Delay Decision.

7.2.8.3 Monitoring Cell

The Monitoring Cell will collect the required technical data to support the safety assessment for the Go/Delay Decision.

7.2.8.4 ATS Providers Support

The ATS Providers Support will assist the States ATS providers, where applicable, in their preparation for RVSM

7.2.8.5 Legal Task Force

The Legal Task Force will facilitate the development of the regulatory framework so as to enable individual States to implement their own legal changes.

7.2.8.6 Awareness Support

The Awareness Support will develop an awareness programme for all Stakeholders and assist the National awareness activities as required.

7.3 RVSM Management Processes

7.3.1 Programme Management Plan (PMP)

A detailed management control document, the Programme Management Plan (PMP) will be developed which will provide a baseline and communication tool against which to monitor the cost, schedule and performance aspects of the RVSM Programme. Using the approved RVSM Master Plan and current programme management techniques as a basis, the PMP will include the following:

- work break down structure and schedule
- change management
- dependency management
- risk and issue management plan
- communications management plan
- each States National Plan

The proposed issue of the PMP will be available at the end of March 1999.

7.3.2 Communications Management

Communications management is a key programme control process and will contribute to the Stakeholders achieving the agreed implementation date set out in this document. Communications management is summarised here but will be fully described in the PMP.

RVSM Communications Management will ensure timely and appropriate generation, collection, dissemination and storage of programme information. The 3 major processes involved are:

- **Communications Planning**

The output of this process is the RVSM Communications Management Plan as agreed by all Stakeholders. It defines who needs what information, when they need it and how it will be provided to them. Preparation and maintenance of this plan is the responsibility of EUROCONTROL but the full support and commitment of the participating States and Stakeholders in this process is essential if the RVSM Programme is to attain the agreed implementation date.

- **Information Distribution**

Information Distribution is the means by which the Communications Management Plan will be implemented as well as responding to unexpected requests for information. The objective is to ensure that information is available to the relevant Stakeholders in a timely manner.

- **Performance Reporting**

Performance information will be provided by each State's National Programme Manager to EUROCONTROL. It will be assembled into an overall RVSM progress report for use by Stakeholders. It will provide Stakeholders with a means of measuring progress towards achieving the Programme objectives. The three major processes involved are:

- **Status reporting:**

This is a description of where the programme stands

- **Progress reporting:**

The progress report will describe what the Programme Stakeholders have accomplished.

As the National RVSM activities are critical to the timely success of the Programme, progress monitoring at national level is of great importance. In order to achieve a consistent monitoring picture at Programme level it is important that all States provide accurate and timely information of the achievements of each National RVSM Plan.

A generic list of critical State RVSM activities has been selected from the WBS against which all States will report progress to a defined timetable. This list of structured progress reporting tasks and the reporting timetable are defined in a document called "*National RVSM Progress Reporting Plan*". The document contains all the relevant reporting templates and information.

- **Forecasting:**

Predicting future Programme status and progress

The EUROCONTROL contact list is provided in **Attachment G**.

8. RVSM PROGRAMME COST FORECASTS AND RESOURCES

8.1 Stakeholder Cost Forecasts and Resource Requirements

The combined cost forecast for RVSM is estimated in the cost benefit analysis to be 270 M EUR.

It is the responsibility of Stakeholders to identify and gain approval for their own budget and resource requirements.

8.2 EUROCONTROL Agency Cost Forecasts

EUROCONTROL budget requirements for the RVSM Programme (included also in the 1998 EUROCONTROL five year plan) are given in K EUR required per year and are depicted in the following table:

1998	1999	2000	2001	2002	2003	2004
1,720 K EUR	8,790 K EUR	14,510 K EUR	6,400 K EUR	5,860 K EUR	1,860 K EUR	800 K EUR
TOTAL: 39.94 M EUR						

8.3 EUROCONTROL Agency Resource Requirements

EUROCONTROL resource requirements for the RVSM programme are given in Man-years and are depicted in the following table. Requirements up until implementation of RVSM have been identified. Requirements post implementation will be reviewed at a later date.

RVSM EUROCONTROL Agency Resource Requirements (Full Time Equivalent)				
1999	2000	2001	2002	2003
30	32	29	20	15
To be reviewed				

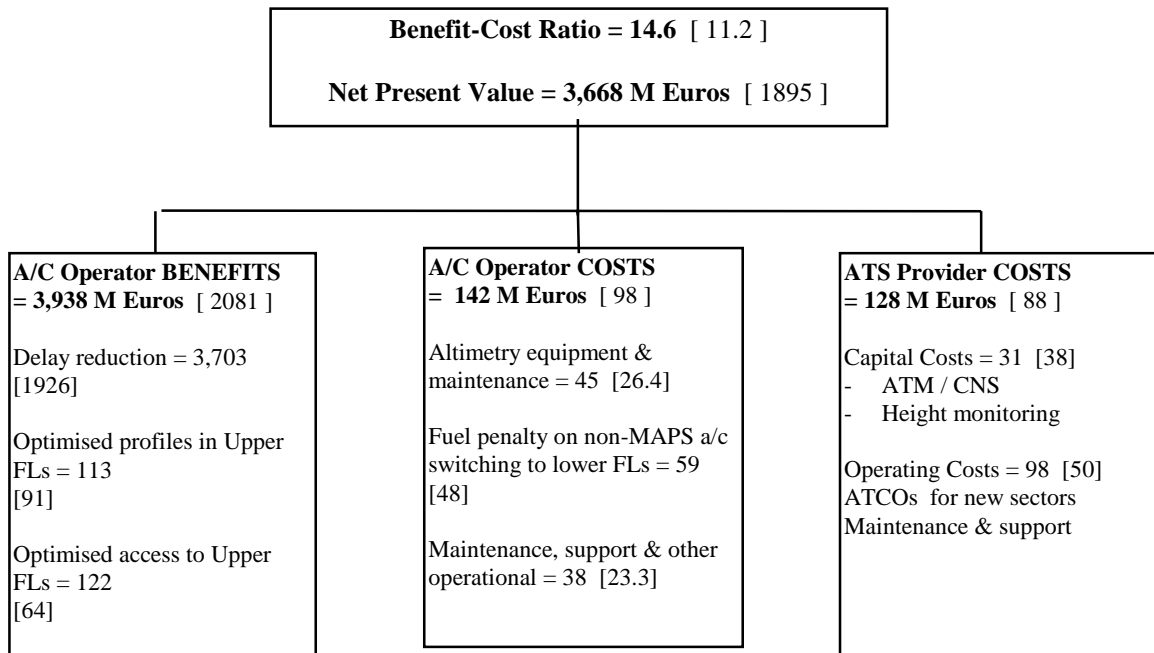
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Attachment A

Overall Results for Commercial Aircraft Operators for the Medium Cost/Medium Benefit Scenario

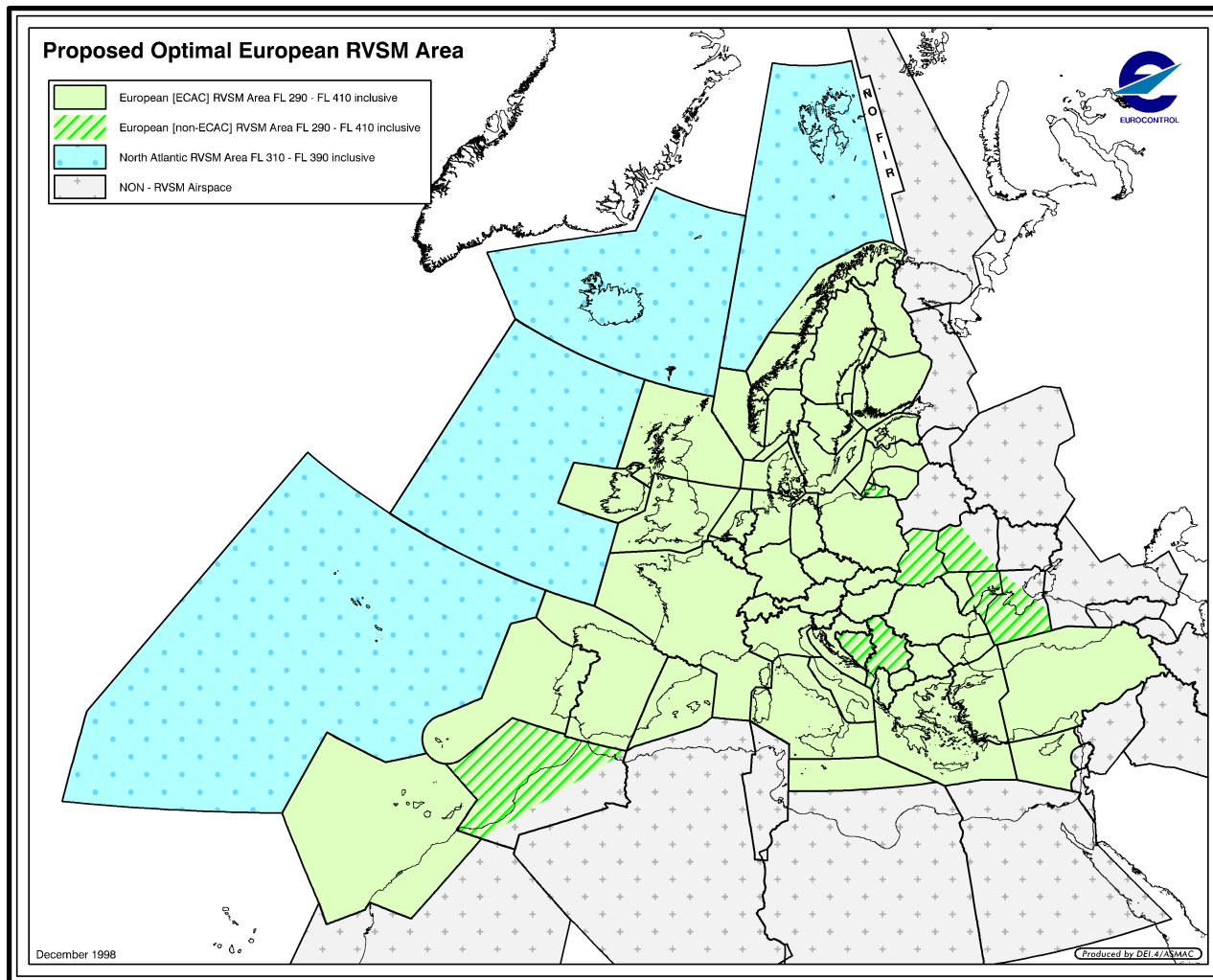
(Present Values are in 1999 EUR discounted at 12% pa)

[Source: Re-validated Cost Benefit Analysis January 1999]



Original 1995 figures are in brackets.

ATTACHMENT B-1
European RVSM Area as Endorsed by EANPG/40



FIRs/UIRs Where RVSM Shall be Applicable

RVSM shall be applicable in that volume of airspace between FL 290 and FL 410 inclusive in the following FIRs/UIRs:

Amsterdam, Ankara, Athinai, Barcelona, Beograd, Berlin, Bodo, Bratislava, Bremen, Brindisi, Brussels, Bucuresti, Budapest, Dusseldorf, France, Frankfurt, Hannover, Istanbul, Kaliningrad, Kobenhavn, Kishinev, Lisboa, Ljubljana, London, Madrid, Malmo, Malta, Milano, Munchen, Nicosia, Oslo, Praha, Rhein, Riga, Roma, Rovaniemi, Sarajevo, Scottish, Shannon, Skopje, Sofia, Stavanger, Stockholm, Sundsvall, Switzerland, Tallinn, Tampere, Tirana, Trondheim, Varna, Vilnius, Warszawa, Wien, Zagreb.

RVSM shall be applicable in all, or part of, that volume of airspace between FL 290 and FL 410 inclusive in the following FIRs/UIRs

Canaries (AFI Region), Casablanca, Simferopol, Odesa, L'viv

Attachment B-2**Participating States in the RVSM Programme**

Albania	Luxembourg
Austria	Malta
Belgium	Moldova
Bosnia and Herzegovina	Monaco
Bulgaria	Morocco
Croatia	The Netherlands
Cyprus	Norway
Czech Republic	Poland
Denmark	Portugal
Estonia	Romania
Federal Republic of Yugoslavia	Slovak Republic
Finland	Slovenia
France	Spain
Germany	Sweden
Greece	Switzerland
Hungary	The Former Yugoslav Republic of Macedonia
Ireland	Turkey
Italy	Ukraine
Latvia	United Kingdom
Lithuania	

ATTACHMENT C
RVSM PROGRAMME STAKEHOLDERS

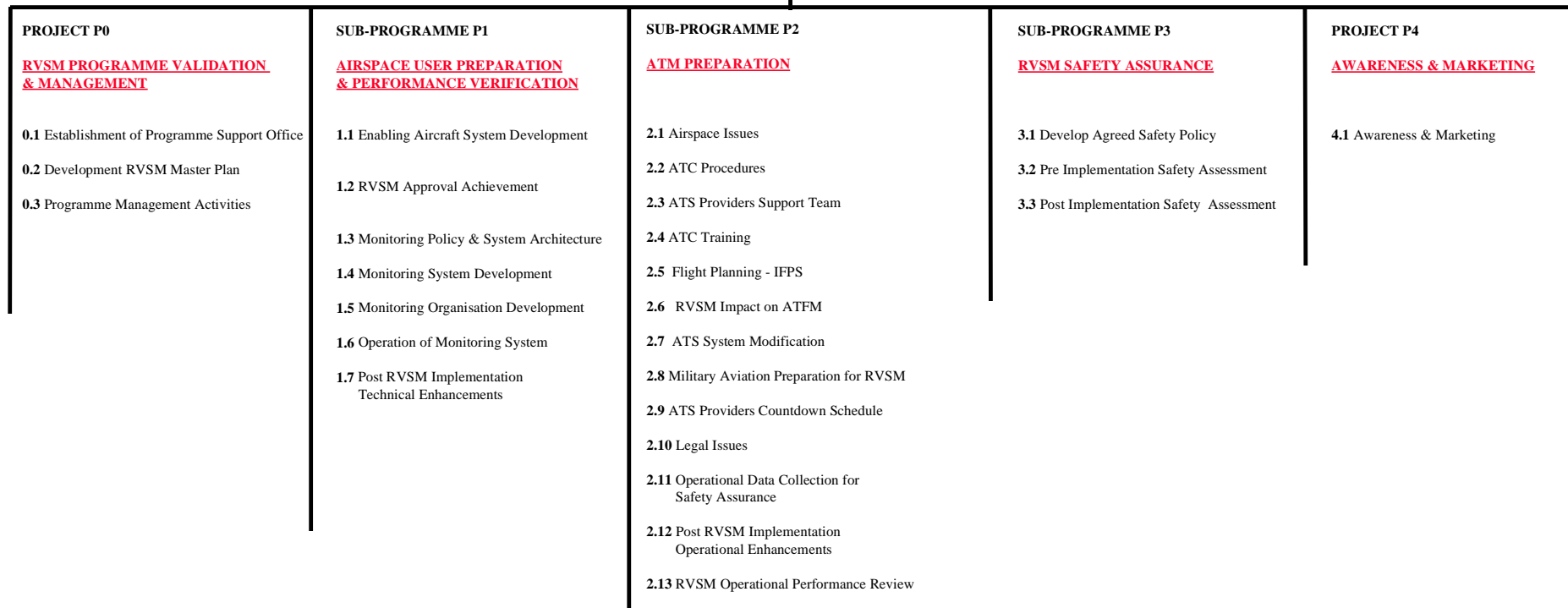
Stake holder	Stake holder code
ICAO	
North Atlantic System Planning Group	ICAO/NATSPG
European Air Navigation Planning Group	ICAO/EANPG
Paris ICAO Office	ICAO/EUR
ICAO HQ Montreal	ICAO/HQ
RVSM States	
National Civil Aviation Authority	STATE/NCAA
National RVSM Programme Manager	STATE/PM
ATS provider	STATE/ATS
Regulatory Authority	STATE/RA
Airworthiness Authority	STATE/AIRW
Legal Services	STATE/LS
Military Authority	STATE/MIL
HMU States	HMUSTATES
Non-RVSM States adjacent to RVSM airspace	
RVSM Contact	NASTATE/C
ATS Provider	NASTATE/ATS
Regulatory Authority	NASTATE/RA
Non-RVSM States	
Regulatory Authority	NSTATE/RA
Users	
International Air Transport Association	IATA
International Air Carrier Association	IACA
International Aircraft Owners & Pilots Association	IAOPA
Association of European Airlines	AEA
European Regional Airlines	ERA
International Business Aviation Council	IBAC
European Business Aviation Association	EBAA
Individual civil operators & airspace users	CIVUSER
Military airspace users	MILUSER
International Federations	
International Federation of Air Traffic Controller Associations	IFATCA
International Federation of Airline Pilot Associations	IFALPA
Regulatory Organisations	
Joint Aviation Authorities	JAA
European Union (EU)	EU
USA Federal Aviation Administration	FAA
NATO Air Traffic Management Committee	NATO
Other EATCHIP programmes	
ACAS Programme Manager	ACAS PM
"8.33MHz" Programme Manager	8.33 PM
Related EUROCONTROL Units	
RVSM Programme Manager	PM
RVSM Programme Support Office	EURO/PSO
European ATFM Group	EURO/EAG
SSR Code Assignment Group	EURO/ORCAM
Central Flow Management Unit	EURO/CFMU
Central Route Charging Office	EURO/CRCO
Institute for Air Navigation Services (Instilux)	EURO/IANS
EUROCONTROL Experimental Centre	EURO/EEC
Maastricht Upper ATS Centre	EURO/MUAC
Supporting Industry	
Aircraft Manufacturers	MANUF
GMU suppliers	GMUSUP

Stake holder	Stake holder code
HMU suppliers	HMUSUP
HME suppliers	HMESUP
GMU operators	GMUOP
Avionics suppliers	AVIONSUP
Maintenance Organisations	MAINT
Modification Centres	MODS
ATC system providers	ATSYST
AIS database providers	AISDB
Meteorological Office	MET
TMU suppliers	TMUSUP
GMU manufacturer	GMUMANUF
EATCHIP/EUROCONTROL reporting/consultation hierarchy	
Provisional Council	PC
Director General	DG
ATM Consultancy Group	ACG
EATCHIP Senior Director	SD
EATCHIP Director	D
RVSM Programme Management Board	PMB
RVSM Programme Managers Meeting	PMM
Civil-Military Interface Standing Committee	CMIC
Safety Regulation Commission	SRC
Airspace & Navigation Team (incl. Sub Groups)	ANT
Ops Reqmnts and Data Processing Team	ODT
Communications Team	COMT
Surveillance Team	SURT

ATTACHMENT D

**RVSM Programme
Organisation**

RVSM PROGRAMME



ATTACHMENT E
WORK PACKAGE DESCRIPTIONS AND DELIVERABLES

WBS number	Work Package Name	Work Package Description	Work Package Deliverable/Objective
P0: Programme Validation & Management			
0.1	Establish PSO	Defining tasks PSO, provide contracts, and set up facilities	Provision of a RVSM Programme Support Office to fulfill tasks as outlined in paragraph 2.1.2
0.2	Develop (endorsed) RVSM Master Plan	Develop, in consultation with States and other RVSM Stakeholders, a RVSM Master Plan with ambitious but realistic time scales	RVSM Master Plan, endorsed by EUROCONTROL Provisional Council, and been given commitment by European RVSM States
0.3	Programme Management Activities	<p>Develop an internal EUROCONTROL Management Plan satisfying internal programme processes.</p> <p>Develop Programme Management processes to enable effective and proactive management of the RVSM Programme. Manage the RVSM Programme throughout the life of the programme providing informative progress/status reports to Stakeholders. Give guidance/support to RVSM Programme Management.</p>	<p>EUROCONTROL RVSM Programme Management Plan</p> <p>Programme Management Processes. Templates for progress monitoring. Progress/status reports.</p>
P1: Airspace User Preparation & Performance Verification			
1.1	Enabling Aircraft System Development	Prepare the necessary regulatory and guidance material. The establishment of a database of affected aircraft and the use of this to ensure that all affected aircraft can be suitably prepared for RVSM. The establishment of contact with operators to ensure they are prepared to undertake the necessary actions to ensure readiness for RVSM	<p>The necessary regulatory material is issued the ability to undertake the necessary modifications and the readiness of operators for the execution of the changes are confirmed.</p> <p>The issue of reports to PMB confirming ability to modify aircraft and the state of preparation of operators to meet the required timescales for RVSM</p>
1.2	RVSM Approval Achievement	Ensuring that all actions are taken to ensure operators can achieve approval for RVSM. This includes establishing contact with regulatory authorities, preparing the necessary notification material and the monitoring of progress of operators towards meeting the RVSM requirements	<p>Operators ready for RVSM.</p> <p>Issue of periodic reports on the state of preparation of operators</p>
1.3	Monitoring Policy and System Architecture	Establish and agree means by which the monitoring policy is attained. Define the roles of all parties in the execution of the monitoring and the criteria by which the HMU and GMU will be managed. Definition of the monitoring system organisation	All specifications and contracts ready to enable the monitoring system to be developed and operated.
1.4	Monitoring System Development	Development and installation of 3 HMUs. Development of the required number of GMUs.	Monitoring equipment (HMU and GMU) developed and HMU deployed
1.5	Monitoring Organisation Development	The management of the GMU established. The necessary data management system constructed and prepared for operation	Monitoring system ready for operation
1.6	Operation of Monitoring Systems	Application of monitoring system to obtain ASE data. The analysis of performance, the dispatch of data to sub programme 3 for analysis. The follow up of aircraft which do not appear to be meeting the MASPS.	Technical data for consideration in Safety Assessment.

1.7	Post RVSM implementation Technical Enhancements	Follows up the monitoring following RVSM implementation. It provides observations of performance together with the analysis of causes for any degradation of performance. This will involve the follow up of any anomalies, the notification of common causes for any problems observed and recommendation for enhancements.	Performance reports and recommendations for system enhancements where appropriate.
P2: ATM Preparation			
2.1	Airspace Issues	Impact assessment of RVSM on Transition and non-Transition airspace simulation studies to validate airspace structure and sectorisation changes. Development of ATS Route network improvements and sectorisation changes.	Impact assessment report for all ACCs in RVSM area. RVSM simulation reports. Agreed proposals for ATS Route Network changes. Agreed plans for sectorisation changes where appropriate.
2.2	ATC Procedures	Develop ATM Procedures for the implementation of RVSM	Provision of "ATC Manual for RVSM in Europe", Provision of relevant amendments to ICAO Doc 7030
2.3	ATS Providers Support Team	Provide support for site-specific implementation of RVSM ATS Procedures	Site-specific ATS Procedures, as required
2.4	ATC Training	Preparation of training syllabus for RVSM controller training (transition and non-transition areas). RVSM briefing of ATC trainers. Training of controllers in preparation for RVSM operations.	ATC training syllabus. Briefing sessions for ATC trainers. National training programmes. All controllers prepared for RVSM.
2.5	Flight Planning IFPS	Develop software and procedures in IFPS to ensure the correct handling and distribution of FPLs in respect of RVSM requirements	Software and procedures to fulfill the requirement
2.6	RVSM impact on ATFM	Develop software and procedures in other CFMU systems (e.g. TACT, ENV) to ensure the correct sector loading indications and flight handling for ATFM purposes	Software and procedures to fulfill the requirement
2.7	ATS System Modification	Identify required ATS system modifications, express them in operational requirements for system support, amend existing interface specifications, provide guidance for HMI, follow up modifications to systems in all concerned ACCs.	Agreed Operational Requirements for System Support; Agreed Interface Specifications (OLDI); HMI guidance; Support/advice during system modification.
2.8	Military Aviation Preparation for RVSM	Identify military requirements related to RVSM implementation	Operational requirements, as applicable
2.9	ATS Providers Countdown Schedule	Develop an aeronautical publication schedule and a countdown plan/schedule. Monitor readiness of States in executing the plan/schedule.	Provision of an Aeronautical Publication Schedule and a Countdown Plan/Schedule to implement RVSM
2.10	Legal Issues	Creation of a legal task force, identification and study of legal issues, propose solutions for legal issues identified	Report by the legal task force on legal issues, drafting of legal texts or guidelines to be implemented by States
2.11	Operational Data Collection for Safety Assurance	Establish the mechanism by which information concerning operational ATC and pilot errors, in regards to, at a minimum, operational incidents/occurrences relevant to RVSM/height keeping, shall be received, collated and analysed. Execute the collection and analysis.	Report on ATC/pilot operational errors to P3
2.12	Post Implementation Operational Enhancements	Assessment of RVSM operations, development of revised procedures, airspace structure and sectorisation to improve the utilisation of RVSM in RVSM airspace.	Revised procedures of ATS Route Network improvements.
2.13	RVSM Operational Performance Review	Assessment of the ATM capacity before and after RVSM introduction with specific reference to changes directly related to RVSM.	Assessment report on achievement of operational benefits arising from RVSM.
P3: RVSM Safety Assurance			

3.1	Develop Agreed Safety Policy	Develop a European RVSM Safety Policy, in compliance with the EATCHIP Safety Policy, in consultation with the EATCHIP Safety Regulation Unit & Commission	European RVSM Safety Policy RVSM, endorsed by EUROCONTROL Provisional Council
3.2	Pre-Implementation Safety Assessment	Perform required activities to ensure that the safety objectives as set out in the European RVSM Safety Policy will be met when RVSM is introduced.	Go/no-go advice to PMB from a safety point of view
3.3	Post Implementation Safety Assessment	Perform required activities to confirm that the safety objectives as set out in the European RVSM Safety Policy are met after RVSM is introduced	Report on risk levels to PMB, as basis for a decision on the need for (further) risk reducing measures
P4: Awareness & Marketing			
4.1	Awareness & Marketing	Establish information methods and links with all RVSM affected professional sectors in order to provide support to the RVSM Programme via advance information and collaborative actions	Development, delivery and coordination of an awareness programme through actions, products and packages supporting RVSM milestones

ATTACHMENT F
RVSM PROGRAMME RISK ASSESSMENT

Risk No.	Risk Description	Overall Risk Rating	Risk Symptom	Risk Mitigation	Consequence
READINESS					
33	<u>Delay by any of 39 states in their national prog.</u> Non completion of national programme could delay RVSM programme.	H	Key national activities are late. No feedback on national activities.	Close monitoring of national programme plans.	This could significantly affect RVSM implementation.
264	<u>Insufficient number of aircraft monitored</u> Number of aircraft approved and monitored may be insufficient for Go/Delay Decision.	H	Interim targets not met	Dedicated Awareness Programme	Delay in RVSM Programme.
205	<u>Availability of service bulletins</u> Discrimination between users.	H	60% of the business jet population overflying Europe will not have a RVSN service bulletin available at all or on time.	EBAA position at RVSM Symposium and further RVSM meetings	Delay in RVSM Programme
TRANSITION AREA					
61	<u>Late change in the transition area</u> Changes to the transition area will have a significant impact on schedule	H	Lack of commitment and preparation	Close monitoring of national programme plans.	Delays to the schedule
SAFETY					
13	<u>Insufficient data to assess operational and technical aspects of Safety Objectives</u> Insufficient data on operational errors is available or supplied. Operational aspects must be assessed qualitatively.	H	Progress report at RVSM meetings	TBD	Reduction in level of confidence of safety assessment. Safety assessment not conclusive for Go Decision.
LETTERS OF AGREEMENT					
130	<u>Letters of Agreement can only be finalized once all RVSM airspace issues and procedures are agreed.</u> Development of ALL Letters of Agreement, including those dealing with FLAS's may take a long time.	H	Late start to negotiation	Monitoring/support through ATS Support Team.	Delay to RVSM Implementation
LATE CHANGE IN IMPLEMENTATION DATE					
113	<u>Implement systems modifications/no going back</u> The systems implementation schedule will probably be irreversible. Thus a delay in implementation or a late stage change in requirements (see BRNAV Contingencies) would be impossible to manage.	H	Delay in systems testing/implementation until the very last moment.	TBD	If problems arise concerning the testing implementation of systems they will happen late, will have a large impact
162	<u>Dependence on RVSM implementation date for RVSM training plan</u> Due to time/staffing + service delivery constraints it is important that	H	Difficulty in scheduling training for operational ATC personnel + subsequent effect on service provision.	Introduce Go/Delay milestone	Revised implementation date also not achieved.

Risk No.	Risk Description	Overall Risk Rating	Risk Symptom	Risk Mitigation	Consequence
	the RVSM implementation date is achievable and realistic so that the RVSM training plan can be scheduled efficiently. We would not want to take operational ATC personnel out of the system for training courses, only to find that the implementation date has skipped				
TRAINING					
142	ATC Training That insufficient staff or inadequate hands-on facilities are available for training. ACCs may not be able to train all staff and run the national operation	H	Complaints from staff of lack of training	Early training planning.	Reduced capacity and safety risk
SIMULATIONS					
137	National Airspace Simulations Insufficient time and resource is allowed for when planning and carrying out a national simulation	H	Late scheduling of simulations.	TBD	Delays to RVSM implementation are required because a simulation has not been performed to assess the effect on ATC operations
NON COMPLIANCE					
174	High number of non compliant flights More State aircraft exceptions granted than just for Military flights. Large numbers of non compliant flights expected.	H	Workload level of ATC above pre-RVSM capacity limitations	TBD	Capacity gains not as forecasted . Negative/reverse effect of RVSM
PROGRAMME MANAGEMENT					
45	Effective Progress monitoring of State Effective Progress monitoring of Programme/National activities due to large number of States involved.	H	Weak planning or last minute questions close to the date	Agreement by all to progress monitoring process	Lack or mistaken progress visibility
RVSM AREA					
9	Uncertainty re size of RVSM area Uncertainty regarding inclusion of non ECAC states in RVSM area.	H	Lack of indication by states concerned of commitment to RVSM programme.	Early ICAO Doc 7030 Amendment proposal.	Knock on effect of uncertainty on other states.
SYSTEM MODIFICATIONS					
117	ATC System Modification National ATC Systems are not technically modified in time for implementation target date	H	ATC centres say they will not be able to implement RVSM on time	Close monitoring of this issue.	The programme will be delayed
15	ATS Systems modification delays Inability to carry out ATS system mods. in some states due to old equipment and cost.	H	No mods. plan in place.	TBD	Key requirement at operational level will impact safety assessment.
259	ATS System modification System modifications required for RVSM will take place, in many States, at the same time that other major upgrades required to cope for example with the 2000 effect. Human and financial resources will be joined on these other majors upgrades and could be difficult to accommodate RVSM required modifications.	H	Actual ATS System modifications/upgrades planned in each State with other purposes different from RVSM	TBD	ATS System and simulations (for training) may be delayed on time if RVSM is considered less priority by the STATES.
233	Lack of manufacturers support Due to lack of manufacturers support, the ATC systems are not modified in time.	H	Delay in the implementation of modification to FDPS and RDPS as well as to simulators	Targeted Awareness Programme.	Delay will cause delay in training process and delay in implementation for RVSM

Risk No.	Risk Description	Overall Risk Rating	Risk Symptom	Risk Mitigation	Consequence
PROGRAMME DEPENDENCIES					
60	Delay to ACAS Programme ACAS Programme will slip causing a large number of aircraft to have equipment not compatible with RVSM.	H	Interim equipage targets are not met.	Close coordination with ACAS Programme.	Too many aircraft will have a version of ACAS which causes problem in RVSM environment
COMMITMENT					
38	RVSM Motivation High cost/complexity versus low RVSM benefit would be detrimental in implementing RVSM by certain Stakeholders	H	Early lack of motivation in all aspects of RVSM	TBD	Delay in RVSM implementation or forced to agree on RVSM partial implementation

ATTACHMENT G
RVSM PROGRAMME CONTACTS

EUROCONTROL Agency Contacts

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