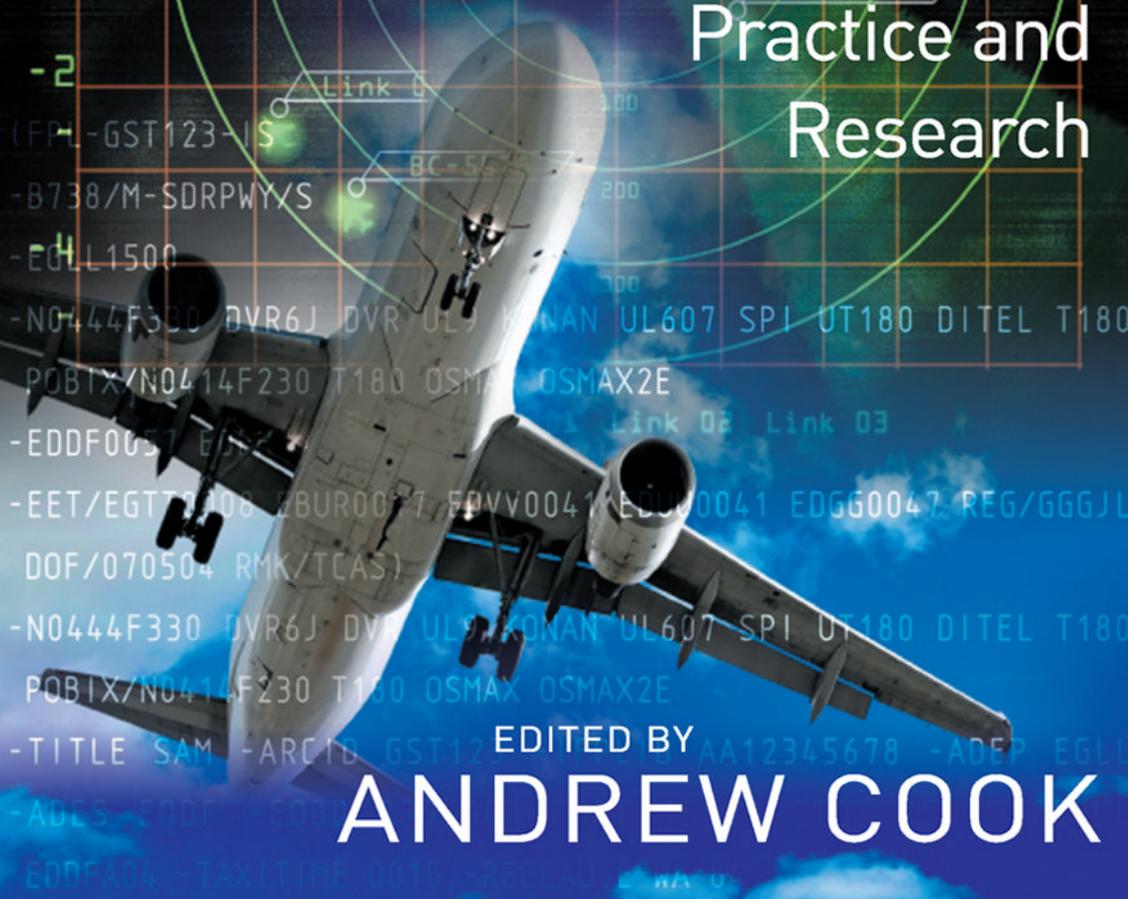


# European Air Traffic Management

Principles,  
Practice and  
Research



EDITED BY  
**ANDREW COOK**

# EUROPEAN AIR TRAFFIC MANAGEMENT

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Principles, Practice and Research

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 **Routledge**  
Taylor & Francis Group  
LONDON AND NEW YORK

First published 2007 by Ashgate Publishing

Published 2016 by Routledge  
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN  
711 Third Avenue, New York, NY 10017, USA

*Routledge is an imprint of the Taylor & Francis Group, an informa business*

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**British Library Cataloguing in Publication Data**

European air traffic management : principles, practice and research

1. Aeronautics, Commercial - Europe - Management 2. Air traffic control - Europe 3. Air traffic capacity - Europe

I. Cook, Andrew

387.7'4042'094

**The Library of Congress has cataloged the printed edition as follows:**

European air traffic management : principles, practice, and research / [compiled] by Andrew Cook.

p. cm.

Includes bibliographical references and index.

ISBN: 978-0-7546-7295-1

1. Air traffic control--Europe. I. Cook, Andrew, Dr.

TL725.3.T7E94 2008

387.7'40426094--dc22

2007030988

ISBN 9780754672951 (hbk)

ISBN 9781138255760 (pbk)

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# Contents

<i>List of Figures</i>	<i>vii</i>
<i>List of Tables</i>	<i>ix</i>
<i>List of Contributors</i>	<i>xi</i>
<i>Foreword</i>	<i>xiii</i>
<i>Preface</i>	<i>xv</i>
<i>Acknowledgements</i>	<i>xvii</i>
1 The Organisation and Operation of European Airspace <i>Marc Baumgartner</i>	1
2 The Principles of Flight Planning and ATM Messaging <i>Graham Tanner</i>	35
3 Understanding En-Route Sector Capacity in Europe <i>Arnab Majumdar</i>	65
4 The Management and Costs of Delay <i>Andrew Cook</i>	97
5 European ATM and the Environment <i>Victoria Williams</i>	123
6 The Future of European Air Transport Operations <i>Nigel Dennis</i>	151
7 The Single European Sky – EU Reform of ATM <i>Ben Van Houtte</i>	181
8 ATM and Society – Demands and Expectations <i>Nadine Pilon</i>	199
Conclusions and a Look Ahead <i>Andrew Cook</i>	221
<i>Appendix</i> <i>Graham Tanner</i>	<i>229</i>
<i>Glossary</i>	<i>237</i>
<i>Bibliography</i>	<i>243</i>
<i>Index</i>	<i>255</i>

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# List of Figures

1.1	Summary of Air Navigation Services (ANS)	2
1.2	Control strip from the Geneva ACC	27
1.3	Two control strips showing complexity of annotation	28
1.4	Strip racks at Geneva ACC (left) and Swanwick (right)	28
1.5	TC-PC pairs at Geneva ACC (left) and Swanwick (right)	32
1.6	An earlier prototype of an electronic strip rack (Guichard, 2000)	33
2.1	CFMU Area and IFPS Zone (IFPZ) in 2007	38
2.2	Example flight plan	45
2.3	London Heathrow (EGLL) to Frankfurt Main (EDDF) flight plan	56
2.4	Overview of a flight plan message in ETFMS	60
2.5	Example of a Slot Allocation Message	61
3.1	Estimation of capacity using a model of controller workload	71
3.2	Basic approaches to capacity estimation using the TAAM model	76
3.3	Basic approaches to capacity estimation using the RAMS model	79
3.4	CAPAN approach to capacity estimation	81
3.5	ATC complexity, controller errors and workload	85
3.6	Four complexity variables relating to sector geometry	90
4.1	Delay as a relative concept	100
4.2	Model for delay cost elements by level of calculation	111
4.3	Gate-to-gate delay cost framework	112
5.1	Landing-take-off cycle defined for regulating low altitude emissions	130
5.2	CO <sub>2</sub> from aviation for six highest emitting European countries	133
5.3	Contrails begin as linear tracks	137
5.4	Contrail formation threshold temperature	138
6.1	S-curve of market share (two-carrier market)	159
6.2	The wave concept	167
6.3	World airline passenger traffic forecast to 2024	176
8.1	Trade-off levels <i>versus</i> levels of objectives	213

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# List of Tables

1.1	Summary ECAC data for 2006	11
1.2	Air traffic control services	13
1.3	Track-keeping performance against RNAV applicability	24
2.1	Addresses of the IFPS units	41
2.2	Relevant Route Availability Document restrictions	53
2.3	Relevant UK and Ireland Standard Route Document restrictions	54
2.4	Relevant Aeronautical Information Publication restrictions	54
3.1	EUROCONTROL forecast traffic scenarios	66
3.2	A comparison of air traffic controller workload models	73
3.3	ANSPs in the survey	75
3.4	The Workload Share in the DFS Model	76
3.5	Taxonomy of complexity variables	87
3.6	ACC Taxonomy variables rated by impact	91
3.7	Possible changes in duties due to increased delegation	94
4.1	Airport slot coordination	99
4.2	Definition of four basic types of delay cost	102
4.3	Timetable illustrating buffers	105
4.4	Main advantages and disadvantages of buffers	106
4.5	Some key delay statistics for 2006	108
4.6	Contextual definitions of unit and marginal costs	110
4.7	Hard and soft costs of passenger delay to airlines	114
4.8	Reactionary delay multipliers for 'long' delay types only	116
4.9	Costs of delay (2003 base) by phase of flight and aircraft type	117
4.10	Estimated 2007 'long' delay costs for A320	119
4.11	Estimated 2007 'long' delay costs for B737-300	119
5.1	Defining the standardised landing-take-off cycle	130
5.2	Changes in international CO <sub>2</sub> emissions	134
5.3	Optimisation opportunities to improve fuel efficiency	135
5.4	Comparing mechanisms for aviation's impact on climate	140
5.5	Industry sector goals for 2020	147
6.1	Examples of use of secondary airports by low-cost carriers	153
6.2	Secondary airports and fast turnarounds (2004)	154
6.3	Ryanair passengers at Charleroi by residential location	155
6.4	Traffic splits by route for selected London short-haul markets	155
6.5	Changes in average aircraft load at UK airports	157
6.6	Low-cost traffic between London and North-East Italy	157
6.7	Developments in London-Amsterdam service	160
6.8	Major international alliance groupings (March 2007)	163
6.9	Franchises and code-shares: Air France at Lyon (2005)	164
6.10	Long-haul services by European airport (July 2004)	165

6.11	Air Berlin hub at Palma	171
6.12	Key inputs to forecasting models	175
6.13	Differential growth rates in major markets	177
6.14	Modal split of travellers between the UK and EU countries (2003)	177
8.1	Possible negative consequences of living near an airport	205

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# Foreword

Air Traffic Management (ATM) aims at ensuring the safe and efficient flow of air traffic. This looks simple and evokes control towers to the layman. It is, in fact, a complex and largely unknown subject, whose many facets are covered in massive specialist documentation, but very seldom addressed in comprehensive and authoritative books. Both first-time and expert readers will find these facets very ably presented by leading specialists in this book. I must say I read it with interest and learnt!

ATM is moving from an art, whose origins are exposed vividly by Marc Baumgartner, a prominent figure in ATM, to a sophisticated industry with wide implications for airspace users, airports, travellers, shippers, and society at large. ATM is reaching such economic, social and environmental significance that it hits political circles. The creation of the Single European Sky was explicitly included in Mr Romano Prodi's presentation of the Commission's work programme in 2000. The Single European Sky regulations, whose adoption in 2004 is a landmark in the EU reform of ATM, are presented by their 'father', Ben Van Houtte.

The different facets of ATM, such as flight planning, sector capacity and cost of delays, environmental impacts and demand to be expected from future developments in air transport are examined as well, and rounded off by my colleague Nadine Pilon.

May I wish readers much pleasure and benefit in reading this book.

Xavier Fron  
Head, Performance Review Unit  
EUROCONTROL

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# Preface

This book is designed to offer the reader a single source of reference on the key subject areas of air traffic management in Europe. It brings together material that was previously unobtainable, hidden within technical documents or dispersed across disparate sources. With a broad cross-section of contributors from across the industry and academia, the book aims to offer an effective treatment of the key issues in current, and developing, European ATM. It explains the principles of air traffic management and its practical workings, bridging the academic and operational worlds to give an insight into this evolving field, with a number of fresh perspectives brought to the text. On-going research and developments are closely integrated into the themes, demonstrating the likely directions of future ATM in Europe and the challenges it will face. It is hoped that the book will appeal to both aviation academics and practitioners, equally for those whose area of expertise is outside ATM but want a clearly elucidated source of reference, as to those wishing to broaden existing knowledge. It is anticipated that many readers will already have expertise in one or more of the chapters' subject matter, but wish to develop a further understanding of the areas covered in others, taking advantage of the many thematic and operational links which have been illustrated.

Chapter 1 sets the scene for the rest of the book, establishing in some detail the fundamental principles and practices of how European airspace has evolved, and operates today. It is thus the longest chapter and some of the concluding comments have been saved for the closing section of the book. Chapter 2 then builds on this foundation, with a detailed and specialist description of the processes of flight planning and messaging, introducing the fundamental concept of capacity management, which is then explored in greater detail through numerous practical and research-based concepts in Chapter 3.

Chapter 4 addresses the inevitable consequences of a system operating under the increasing challenges of capacity constraints – delays, and the costs thereof. No book on air traffic management these days can be complete without a consideration of the concomitant environmental impacts of aviation, and the challenges these present us with; Chapter 5 explores a wide range of such issues. Chapter 6 then sets the developing story into the broader context of the future of air transport operations in Europe, which are intimately bound with ATM through issues such as fleet development, aircraft utilisation trends, airline networks and efficiency.

Chapter 7 offers an invaluable and detailed discussion of how some of the future challenges are being addressed through reform of European ATM, whilst Chapter 8 closes with an exploration of a new area of vital development in ATM – its two-way, evolving relationship with society. The book closes with a comprehensive list of further information resources and a concluding look ahead.

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# Acknowledgements

Air traffic management is indeed a singular affair. Some aspects remain cast in stone for decades, whilst others change more rapidly than the time it takes to create a book about them. As chapters were being religiously compiled by the contributors, the industry was furtively changing a manual here and a policy declaration there. Nevertheless, a book has been produced which, it is hoped, strikes the right balance between establishing the fundamental principles with clarity, and having many up to the minute examples to bring to the text a certain immediacy.

I would like to thank all the contributors for their painstaking investment of effort in their chapters. My first impression on reading each was that their knowledge and first-hand experience was literally jumping off the page. They made this book possible through such efforts: my thanks to them all, and apologies in equal measure for any oversights in the final version, the blame for which lies entirely at my door.

In addition, I am indebted to Gerhard Meise (Lufthansa Systems Aeronautics) and Gerhard Berz (EUROCONTROL) for invaluable suggestions regarding certain technical sections of the book, drawing on their expertise and personal experience. Sincere thanks are also extended to Xavier Fron (Performance Review Unit, EUROCONTROL) for kindly agreeing to write our foreword. Further thanks to EUROCONTROL for permission to use outputs from SkyView2, in Chapter 2.

My final word of wholehearted thanks goes to my colleague, Graham Tanner. Over the two years it has taken to produce this book (with quite a sharp peak towards the end!) he has unfailingly and tirelessly given enormous amounts of his expertise and time – time which could otherwise have been spent with his new daughter. I hope that his generous investment can now be reversed.

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