

Chehab Salih

International Aviation Law for Aerodrome Planning

 Springer

International Aviation Law for Aerodrome Planning

Chehab Salih

International Aviation Law for Aerodrome Planning

 Springer

Chehab Salih
Berlin, Germany

ISBN 978-3-030-56841-2 ISBN 978-3-030-56842-9 (eBook)
<https://doi.org/10.1007/978-3-030-56842-9>

© The Editor(s) (if applicable) and The Author(s), under exclusive licence to Springer Nature Switzerland AG 2021

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG.
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

Ich erinnere mich noch sehr gut an diese Zeit. Es waren heiße und sonnige Sommertage Mitte der 1990er. Meine kleinen Geschwister Hadi und Halah und ich konnten es kaum erwarten, aus der Schule nach Hause zu rennen. Denn es war der letzte Schultag im Jahr und somit stand die jährliche Reise von Berlin nach Kairo an. Ich fühle sogar noch die Spannung, die in mir aufstieg, sobald wir auf den Parkplatz des Flughafens fuhren. Der Flughafen war so faszinierend. So viele Menschen, so viel Technik, so viel Aufregung. Das Bemerkenswerte an dieser Erfahrung war, dass vier Stunden und 3000 km weiter die gleiche Lebhaftigkeit am Flughafen Kairo auf uns wartete. Und das, obwohl wir in einem anderen Land, auf einem anderen Kontinent, in einer anderen Kultur ankamen. Für mich wurde jedes Jahr insbesondere an diesem Tag bestätigt: Eines Tages will ich an diesem Ort arbeiten und mich mit ihm beschäftigen. Ich möchte mich herzlichst bei meiner Mutter Sayeda Gebril und meinem Vater Mohamed Salih bedanken. Sie haben für eine hervorragende Kindheit. Insbesondere möchte ich ihnen dafür danken, dass sie mir die Möglichkeit gegeben haben, zu träumen. Ein Gut, welches in der heutigen Welt für Kinder nicht selbstverständlich ist. Nachdem der liebe Gott meinen Kindheitstraum erfüllt hat und ich mich sowohl im Studium als auch im Beruf mit den technischen und wirtschaftlichen Belangen der Flughafenplanung auseinandersetzen durfte, wuchs in mir auch das Interesse, die rechtlichen Rahmenbedingungen der Flughafenplanung kennenzulernen. Dieses Interesse mündete letztendlich im November 2019 in die Einreichung meiner Dissertation an der Juristischen Fakultät der Universität Potsdam. Die Dissertation wurde im folgenden halben Jahr weiterentwickelt, ihre Ergebnisse innerhalb dieses Buches festgehalten und veröffentlicht. Ich möchte mich an dieser Stelle als erstes bei Herrn Prof. Dr. Marcus Schladebach bedanken. Ohne seine tatkräftige Unterstützung wäre dieses Werk niemals möglich gewesen. Er ist die Definition eines ausgezeichneten Doktorvaters, der sich nicht nur inhaltlich, sondern auch auf menschlicher Ebene um seine Studenten kümmert. Als nächstes möchte ich mich bei meiner Schwester Halah Salih bedanken, die es stets schaffte, mir komplexe rechtliche Sachverhalte einfach zu erklären. Weiterhin bedanke ich mich bei Herrn Prof. Dr. Norman Weiß

und Herrn PD Dr. Lutz Lammers für das Zweitgutachten und die Prüfung im Rahmen der Disputation. Ein großer Dank gilt ebenfalls meinem Freund Dieter Petzsch, der sich die Zeit nahm, meine Arbeit Korrektur zu lesen. Zu guter Letzt bedanke ich mich bei dem Rest meiner Familie und Freunden für ihre Unterstützung auf meinem Weg zum Ziel.

I remember those days very well—hot and sunny summer days in the mid-1990s. My little siblings Hadi and Halah and I could hardly wait to run home from school because it was the last school day of the year and thus the annual trip from Berlin to Cairo was coming up. I can still feel the tension that was rising in me as soon as we entered the airport parking lot. The airport was so fascinating. So many people, so much technology, so much excitement. The remarkable thing about this experience was that four hours later and 3000 km further on at Cairo International Airport, exactly the same attributes were present. Even though we arrived in another country, on another continent, in another culture. For me, in particular this event confirmed that one day I want to work at this place and deal with it. From the bottom of my heart, I would like to thank my mother Sayeda Gebril and my father Mohamed Salih. They have ensured and provided an excellent childhood and education. Especially, I want to thank them for giving me the opportunity to dream. A commodity that is not self-evident for children in today's world. After God made my childhood dream come true and I was privileged to explore the technical and economic facets of airport planning, both in my academic and professional life, I also became interested in understanding the legal framework of airport planning. This interest resulted in the submission of my dissertation to the Faculty of Law at the University of Potsdam in November 2019. The doctoral thesis was developed in the next 6 months and its conclusions are published in this book. At this point, I would like to thank Prof. Dr. Marcus Schladebach at first. Without his active support, this work would have never been possible. In the truest sense of the word, he represents the definition of an excellent doctoral supervisor who cares for his students not only on an academic but also on a personal basis. Next, I would like to thank my sister Halah Salih who always managed to explain complex legal issues to me in a simple way. Furthermore, I would like to thank Prof. Dr. Norman Weiß and PD Dr. Lutz Lammers for the second advisory opinion and the examination in the context of the disputation. Many thanks also to my friend Dieter Petzsch who took the time to proofread my work. Last but not least, I would like to thank the rest of my family and friends for their support on the way to my goals.

Berlin, Germany

Chehab Salih

Contents

1	Relevance of Aerodrome Planning	1
1.1	Importance of Aviation	1
1.2	Airport Development	1
1.3	Airport Planning	5
1.4	International Aviation Law	5
1.5	Definition of the Terms “Airport” and “Aerodrome”	7
1.6	Objective and Motivation	8
1.7	Book Overview	10
	References	13
2	History of Aerodrome Planning	15
2.1	The Term “Aviation Law”	15
2.2	Beginning of International Aviation Law	16
2.3	Aerodrome Planning Within International Regulation	17
2.3.1	The Air Navigation Conference (Paris 1910)	17
2.3.2	The Paris Convention 1919	22
2.3.3	The Ibero-American Convention 1926	28
2.3.4	The Pan-American Convention 1928	30
2.3.5	Short Summary of Aerodrome Requirements in International Regulation Before the Chicago Convention	32
2.4	Aerodrome Planning Within National Regulation	33
2.4.1	National Legislation Dealing with Air Navigation	33
2.4.2	Germany	33
2.4.3	France	40
2.4.4	Italy	45
2.4.5	Other European States	46
2.4.6	United States of America	46
2.4.7	The Target of Establishing International Aerodrome Requirements	53
	References	54

3	Chicago Convention and Aerodrome Planning	57
3.1	The End of World War II	57
3.2	The International Civil Aviation Organization	59
3.2.1	The Organisation	59
3.2.2	The Assembly	60
3.2.3	The Council	61
3.2.4	The Air Navigation Commission	61
3.3	Binding Effect of ICAO Regulations for States and Aerodromes	62
3.3.1	Adoption of International Standards and Procedures (Article 37)	62
3.3.2	Definition of SARPs	63
3.3.3	Deviation from Regulation (Article 38)	64
3.3.4	Legal Effect of SARPs	66
3.4	Aerodrome Planning in the Articles of the Chicago Convention	82
3.4.1	Prohibited Areas	82
3.4.2	Military Aerodromes Serving International Air Service	83
3.4.3	Landing at Customs Airport	83
3.4.4	Airport and Similar Charges	84
3.4.5	The Chicago Convention Allowing Operation of an Unsafe Aerodrome	86
3.4.6	The Chicago Convention Allowing Construction of an Unsafe Aerodrome	90
3.5	Aerodrome Planning in the Technical Drafts of the Annexes	93
3.5.1	Establishment of Provisions for Aerodromes	93
3.5.2	Development of the Technical Draft Annexes	94
3.5.3	Annex A: Airways Systems	95
3.5.4	Annex B: Communication Procedures and Systems	98
3.5.5	Annex C: Rules of the Air	99
3.5.6	Annex D: Air Traffic Control Practices	100
3.5.7	Aerodrome Regulation Between 1944 and 1951	100
3.5.8	The Paris Convention: A Better Role Model for Aerodrome Regulation	103
3.5.9	Practical Example of a Perfect Legal Aerodrome System	105
3.6	Amendment to the Chicago Convention in the Twenty-First Century	106
3.6.1	The Chicago Aerodrome System	106
3.6.2	Necessity of Amending the Chicago Convention	107
3.6.3	Draft for Amendments to Articles 37, 38, 69 and 70 of the CC	109
	References	112
4	Development of International Aerodrome Regulation	115
4.1	ICAO Regulatory Framework	115
4.1.1	Annexes to the Chicago Convention	115
4.1.2	Procedure for Air Navigation Services (PANS)	121

4.1.3	Regional Supplementary Procedures (SUPPS)	124
4.1.4	ICAO Manuals	125
4.2	ICAO Legal Aerodrome System	127
4.2.1	Essential Aerodrome Planning Requirements	127
4.2.2	Additional Aerodrome Planning Requirements and Legal Considerations	137
4.3	ICAO Rulemaking Process: Analysis and Recommendations	139
4.3.1	Rulemaking Phases	139
4.3.2	Analysis of Parties Involved in the Rulemaking Process	143
4.3.3	Strengthen States’ Role in the ICAO Rulemaking Process	152
4.4	Integration of International Law into National Legislation	164
4.4.1	Introduction	164
4.4.2	Relation Between International and National Law	165
4.4.3	Interaction Between International and National Law	166
4.4.4	Integration of the Paris- and the Chicago Convention into National Law	169
4.4.5	Applicability of International Law and the Chicago Convention	170
4.4.6	Adoption of ICAO Annex 14 into National Legal Framework	175
4.4.7	The Ideal Method to Integrate ICAO’s Annex 14 into National Law	182
4.4.8	Dealing with Standards and Recommended Practices on National Level	185
4.5	Law Enforcement of Aerodrome Regulation	186
4.5.1	International Level	186
4.5.2	National Level	195
4.6	Aerodrome Certification	196
4.6.1	Purpose of Aerodrome Certification	196
4.6.2	Legal Questions Associated with Aerodrome Certification	198
	References	206
5	Establishment of a Legal Framework Through Performance-Based Regulation	211
5.1	Maintaining and Demonstrating Compliance	211
5.1.1	Development of the Universal Safety Oversight Audit Programme (USOAP)	211
5.1.2	The First and Second USOAP Cycle	213
5.1.3	Continuous Monitoring Approach (CMA)	215
5.1.4	Legal Questions Associated with USOAP	219
5.2	Performance-Based Regulation	227
5.2.1	ICAO’s Perspective	227
5.2.2	ACI’s Perspective	230

- 5.2.3 EASA’s Perspective 231
- 5.2.4 Challenge with Regard to Performance-Based Regulation . . . 233
- 5.3 Proposals for the Implementation of Performance-Based Regulation 238
 - 5.3.1 Runway End Safety Area (RESA) 238
 - 5.3.2 Jetblast 243
 - 5.3.3 Further Application Areas for Performance-Based Regulation 248
- References 249
- 6 Final Results 251**
 - 6.1 Executive Summary 251
 - 6.2 Recommended Actions 257
 - 6.3 List of Hypotheses 259

List of Abbreviations

AASL	Annals of Air and Space Law
ABAJ	American Bar Association Journal
ACAP	Airplane Characteristics For Airport Planning
ACAS	Airborne Collision Avoidance System
AMC	Acceptable Means of Compliance
ACI	Airports Council International
ADM	Aerodrome Design Manual
ADOP	Aerodrome Design & Operations Panel
ADREP	ICAO Aircraft Accident/Incident Data Reports
ADRM	Airport Development Reference Manual
AFIS	Aerodrome Flight Information Services
AGA	Air Routes and Ground Aids
AIP	Aeronautical Information Publication
AJIL	The American Journal of International Law
ALARP	As Low As Reasonably Practicable
AMS	Apron Management System
AMSH	Apron Markings & Signs Handbook
ANC	Air Navigation Commission
ANP	Air Navigation Plan
APEX	Airport Excellence (Programme)
APM	Airport Planning Manual
ARIWS	Autonomous Runway Incursion Warning System
ASAL	Annual Survey of American Law
ASM	Airport Services Manual
ATC	Air Traffic Control
ATM	Air Traffic Management
BAF	Bundesaufsichtsamt für Flugsicherung
BFU	Bundesamt für Flugunfalluntersuchung
BGBI.	Bundesgesetzblatt
BVerfGE	Entscheidung des Bundesverfassungsgericht

BYBIL	British Yearbook of International Law
BYULR	Brigham Young University Law Review
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CASA	Civil Aviation Safety Authority
CC	Chicago Convention
CCLR	Carbon and Climate Law Review
CE	Critical Elements
CETS	Central European Touristic Solutions
CFD	Computational Fluid Dynamics
CIANA	Convenio Ibero-Americano de Navegación Aérea
CINA	Commission Internationale de Navigation Aérienne
CIR	Circular
CJEU	Court of Justice of the European Union
CJIL	Chinese Journal of International Law
CMA	Continuous Monitoring Approach
CSA	Comprehensive Systems Approach
CTS	Consolidated Treaty Series
DELAG	Deutsche Luftschiffahrtsaktiengesellschaft
DH	Decision Height
DJILP	Denver Journal of International Law and Policy
Doc	Document
DVBI	Deutsches Verwaltungsblatt
DSU	Dispute Settlement Understanding
EASA	European Aviation Safety Agency
EC	European Commission
ECHR	European Convention on Human Rights
EFOD	Electronic Filing of Differences System
EJCLS	E-Journal of International and Comparative Labour Studies
ELOS	Equivalent Level of Safety
EMAS	Engineered Materials Arresting System
ERJ	Embraer Regional Jet
EU	European Union
EU-OPS	European Union Requirement—Operations
EuR	Zeitschrift Europarecht
FAA	Federal Aviation Administration
ft	Feet
FOD	Foreign Object Debris
GASP	Global Aviation Safety Plan
GDP	Gross Domestic Product
GM	Guidance Material
GoJIL	Goettingen Journal of International Law
HILJ	Harvard International Law Journal

IALP	Issues in Aviation Law and Policy
IAOPA	International Council of Aircraft Owner and Pilot Associations
IATA	International Air Transport Association
ICAN	International Commission for Air Navigation
ICAO	International Civil Aviation Organization
ICLQ	International and Comparative Law Quarterly
ICVM	ICAO Coordinated Validation Mission
IFR	Instrument Flight Rules
IJPL	Italian Journal of Public Law
ILC	International Law Commission
ILS	Instrument Landing System
JAL	The Journal of Air Law
JALC	Journal of Air Law and Commerce
JAM	Journal of Airport Management
JLA	Journal of Legal Analysis
JPSIR	Journal of Political Science and International Relations
JURA	Juristische Ausbildung
JuS	Juristische Schulung
lbs	Pound (mass)
LGBI.	Landesgesetzblatt
LCC	Low-Cost Carrier
LNTS	League of Nations Treaty Series
LuftVG	Luftverkehrsgesetz
LVP	Low Visibility Procedures
m	Metres
MAD	Magazine of Aviation Development
MGLJ	McGill Law Journal
MOCA	Manual on Certification of Aerodromes
MoT	Ministry of Transport
MoU	Memorandum of Understanding
mpa	Million passengers per annum
MTOM	Maximum Take-off Mass
NAIA	Nigeria Nnamdi Azikiwe International Airport
NCILJ	North Carolina Journal of International Law and Commercial Regulation
NCLB	No Country Left Behind
NGO	Non-Governmental Organisation
NLA	New Larger Aeroplane
NTIR	Nederlands Tijdschrift voor Internationaal Recht
NZCAA	New Zealand Civil Aviation Authority
NZV	Neue Zeitschrift für Verkehrsrecht
OMGWS	Outer main gear wheel span
p.a.	Per annum
PANS	Procedures for Air Navigation Services

PASG	PANS Aerodromes Study Group
PASO	Pacific Aviation Safety Office
PELJ	Potchefstroom Electronic Law Journal
PICAO	Provisional International Civil Aviation Organization
PICASST	Pacific Islands Civil Aviation Safety and Security Treaty
RAN	Regional Air Navigation
RESA	Runway End Safety Area
RGBL	Reichsgesetzblatt
RGDIP	Revue générale de Droit internationale publique
RSOO	Regional Safety Oversight Organisation
SARPs	Standards and Recommended Practices
SMGCS	Surface Movement Guidance Control System
SMM	Safety Management Manual
SMS	Safety Management System
SRIEL	Swiss Review of International & European Law
SSRN	Social Science Research Network
SUPPS	Supplementary Procedures
TCAS	Traffic Alert and Collision Avoidance System
TFEU	Treaty on the Functioning of the European Union
TLD	Transport, Law and Development
TLJ	Transportation Law Journal
TLS	Target Level of Safety
UKTS	United Kingdom Treaty Series
UMLR	University of Miami Law Review
UNFCCC	United Nations Framework Convention on Climate Change
UNTS	United Nations Treaty Series
USAP	Universal Security Audit Programme
USOAP	Universal Safety Oversight Audit Programme
VCLT	Vienna Convention on the Law of Treaties
WTO	World Trade Organization
YLJ	The Yale Law Journal
ZLW	Zeitschrift für Luft- und Weltraumrecht
ZöR	Zeitschrift für öffentliches Recht

Chapter 1

Relevance of Aerodrome Planning



1.1 Importance of Aviation

It is a fact that aviation plays a huge role in today's world. Continents, states and even small villages are networked to each other, allowing people all over the world to travel for different purposes. In this regard, states are connected by 3250 airports.¹ Hence, different cultures come together, thus flattening the path for a more liberal atmosphere, that will contribute to the improvement of global peace. Not only sociological advantages derive from aviation, but also global economic benefits. Business travellers can travel from any point in the world to another in less than 24 h. As a consequence, economic processes are accelerating, leading to a positive impact on market growth. The aviation industry profits from a rise in jobs in the air transport sector and its supply chain.² Currently, 65 million jobs and \$2.7 trillion in global GDP are supported through aviation.³

1.2 Airport Development

Market forecasts prove that air traffic will double within the upcoming 15 years.⁴ Due to the catastrophe of 9/11, global passenger traffic declined by 2.7% compared to the year 2000.⁵ Since then, air transport has doubled until 2017 with a 60% growth

¹Airbus S.A.S, Global Market Forecast, Global Networks, Global Horizons 2018–2037, 2018, p. 3.

²IATA, Annual Review, 2017, p. 12.

³IATA, Annual Review, 2019, p. 6.

⁴Airbus S.A.S, Global Market Forecast, Global Networks, Global Horizons 2018–2037, 2018, p. 8f.

⁵IATA, The Impact of September 11 2001 on Aviation, 2012, p. 4.

just over the last 10 years.⁶ Notably, the Asian, Middle Eastern, Latin American and African markets will experience an increase in the future.⁷ Aircraft demand, for instance, in the Asia-Pacific region will thereby represent 42% of the shares of new deliveries.⁸ Europe and the United States will together account for a relatively low 35%. Nevertheless, air traffic has also risen in Europe, in particular between the Western States by a market growth of 23% in 2016 compared with 2015.⁹ Inter alia, this increase was due to the air traffic operation of Low-Cost Carriers (LCC) and the market entry of new airlines.

Airports represent an integral part of the air transport system.¹⁰ These facilities provide the required infrastructure to accommodate the transfer of passengers and freight and allow landing and departing of aircraft. The risen demand in air traffic influences the finances of airports. In 2017, airports manifested an increase in revenue of 6.2% compared to 2016.¹¹ Airport revenues are mainly generated through aeronautical methods (e.g. landing charges, passenger charges) and non-aeronautical concessions (e.g. rents for real estate on landside).¹² The revenues from aeronautical streams are usually higher than those from non-aeronautical streams.¹³ This tendency evinces that the more capacity airports can offer the better their profitability will become. Mott MacDonald has published market forecasts proving that airports' operating costs grew more slowly than revenues in an examined period.¹⁴ If this trend continues, airport authorities will hold financial means to invest in airport infrastructure related projects like maintenance and expansion. That having been said, expansion projects can have a significant role in the development of the aviation industry.¹⁵

Strong evidence of several market forecasts conducted by the main aviation players depict that airports are currently facing significant challenges in providing

⁶Airbus S.A.S, Global Market Forecast, Growing Horizons 2017/2036, 2017, p. 7.

⁷Based on a study that was carried out for the Directorate General for Mobility and Transport in the European Commission. See Mott MacDonald, Annual Analyses of the EU Air Transport Market 2016, 2017, p. 7.

⁸In the following Airbus S.A.S, Global Market Forecast, Global Networks, Global Horizons 2018–2037, 2018, p. 10.

⁹Airbus S.A.S, Global Market Forecast, Growing Horizons 2017/2036, 2017, p. 53.

¹⁰In the following Graham (2008), p. 2.

¹¹ACI, 11th Annual Airport Economics and Finance Conference Report, 2019, p. 9.

¹²Mott MacDonald, Annual Analyses of the EU Air Transport Market 2016, 2017, p. 13.

¹³Ibid., p. 99; ACI, Annual Report, 2018, p. 19; ACI, 11th Annual Airport Economics and Finance Conference Report, 2019, p. 13.

¹⁴Mott MacDonald, Annual Analyses of the EU Air Transport Market 2016, 2017, p. 13.

¹⁵Metcalfe (2008), p. 316.

the required infrastructure and sufficient capacity to meet the stated market growth.¹⁶ In this context, the Commercial Market Outlook of Boeing notes in 2019:¹⁷

After nine straight years of above-trend passenger growth, many airports are experiencing pressure on operational capacity. This is particularly acute in high-growth regions such as Southeast Asia, China, and India and in Western airports where airport expansion is artificially restricted, such as in many parts of Europe.

Notably, the Asia-Pacific region incurs operational constraints. It is clear that the provision of sufficient capacity, operability, and affordability will benefit local communities and national economies.¹⁸ In high populous states like Thailand, Indonesia, Philippines and of course India and China, the middle class has gained financial power due to higher incomes.¹⁹ In result, the propensity of travelling due to sociological and in particular economic purposes is predicted. In the meantime, many local airports do not have the adequate capacity to satisfy the existing and prospected demand. The capital airport of Indonesia, Jakarta Soekarno-Hatta International Airport, has a calculated capacity of 38 million passengers per year (mppa).²⁰ Nevertheless, the airport handled around 54 million passengers in 2015. A similar tendency applies to Bangkok Suvarnabhumi Airport in Thailand, where the airport served about 52 million passengers despite a designated capacity of 45 mppa. These examples are not the only ones demonstrating the operational constraints airports are facing nowadays.

In reaction, many states initiate airport development projects to support air traffic growth in the upcoming 20 years.²¹ Around \$13 billion will be invested to develop Beijing's New International Airport.²² The airport will serve 130 mppa²³ while currently serving around 89 mppa (2015).²⁴ Another airport development project will be executed in New Delhi, India. According to a market analysis conducted for the European Commission, Delhi International Airport was the third fastest-growing airport between 2006 and 2015 with 10.1% p.a. (No. 1: Dubai International Airport—United Arab Emirates: 11.7% p.a., No. 2: Istanbul-Atatürk Airport—Turkey: 11.5% p.a.) handling approximately 48 million passengers in 2015.²⁵ In order to

¹⁶Mott MacDonald, *Annual Analyses of the EU Air Transport Market 2016, 2017*, p. 102; Airbus S. A.S, *Global Market Forecast, Global Networks, Global Horizons 2018–2037*, 2018, p. 142; Airbus S.A.S, *Global Market Forecast, Growing Horizons 2017/2036*, 2017, p. 35; IATA, *Annual Review*, 2017, p. 33; IATA, *Annual Review*, 2018, p. 33; Boeing, *Current Market Outlook*, 2017, p. 42.

¹⁷Boeing, *Commercial Market Outlook*, 2019, p. 7.

¹⁸IATA, *Annual Review*, 2017, p. 36.

¹⁹In the following Mott MacDonald, *Annual Analyses of the EU Air Transport Market 2016, 2017*, p. 102.

²⁰*Ibid.*

²¹IATA, *Annual Review*, 2017, p. 38; Boeing, *Current Market Outlook*, 2017, p. 9.

²²IATA, *Annual Review*, 2017, p. 39.

²³Chern (2015), p. 101.

²⁴Mott MacDonald, *Annual Analyses of the EU Air Transport Market 2016, 2017*, p. 32f.

²⁵*Ibid.*, p. 32.

increase capacity in India's capital, a new airport, namely Noida International Airport, will be built to serve additional 50 mppa. Thereby, the investment costs amount to \$3.1 billion.²⁶

But not only new airport developments will be initiated. Construction of additional terminals for existing airports are expected as well. The Chhatrapati Shivaji International Airport in Mumbai, India is an example of such projects. The Indian authorities will invest \$1.5 billion to complete a new terminal (Terminal 2).²⁷ As a result, so-called "super hubs" will arise in Asia, notably in Dubai and China in order to connect with the Western States.²⁸ In this context, over 40 airport development projects valued at \$100 billion will be accomplished in the Middle East Region.²⁹ The projects comprise terminal expansion and runway upgrades in Abu Dhabi, terminal enlargement and a possible new airport in Bahrain, as well as upgrades to the terminal and runway rehabilitation in Dubai. Further capital projects are foreseen in Jeddah, Riyadh, Muscat and Tehran because a capacity of 100 mppa is planned at these locations.

These developments are crucial for aviation, as the key factors that drive aircraft demand, for instance, are market liberalisation, environmental regulations and notably the development of airport infrastructure.³⁰ According to market forecasts initiated by Boeing, around \$1 trillion will be invested to improve existing airport facilities or spending on new airports all over the world until 2021, taking into account that expansion projects are prevalent in mature aviation markets. Also, Boeing estimates, that at least \$2 trillion will be spent on airport infrastructure until 2030.³¹ Airports have strategic importance for a state.³² They are part of the overall transport system and are linked "to high-speed rail and key road networks." Moreover, as *Graham* mentions, airports bring wealth and thorough employment opportunities and support economic development.

²⁶<https://www.reuters.com/article/us-india-airport/india-clears-plan-for-3-10-billion-second-airport-for-delhi-idUSKBN19F0FM>, assessed on 16.08.2019.

²⁷Mott MacDonald, Annual Analyses of the EU Air Transport Market 2016, 2017, p. 103.

²⁸Airbus S.A.S, Global Market Forecast, Growing Horizons 2017/2036, 2017, p. 46.

²⁹In the following Airbus S.A.S, Global Market Forecast, Global Networks, Global Horizons 2018–2037, 2018, p. 90.

³⁰Boeing, Current Market Outlook, 2017, p. 8.

³¹Ibid., p. 9.

³²Graham (2008), p. 2.

1.3 Airport Planning

Ultimately, states will have to invest in either airport expansion, new airport development or extensive maintenance projects to react to the capacity constraints.³³ Hence, a profound analysis of airport planning requirements is vital to achieving the goals set successfully.

Airport planning or aerodrome planning is treated through different perspectives. First, it can be examined from a purely technical point of view. This discipline encompasses aspects concerning design and infrastructure. Thereby, specifications thematise, for instance, width of runways, slopes on taxiway strips and markings on aprons.³⁴ Second, there is an economic perspective. As far as this discipline is concerned, likewise airport internal administration and finance, funding, marketing, public relations or airport charges, and fees are subject to discussion.³⁵ However, these and other disciplines must adhere to a regulatory framework, that targets safe and efficient airport operation. For instance, airports—being essential infrastructural elements of a state—have to meet high safety standards.³⁶ As a consequence, aerodrome planning depends on legal requirements which are subject to this work.

German law associates aerodrome planning directly with planning approval procedures of airports³⁷ according to § 8 of the German Air Traffic Act (LuftVG³⁸).³⁹ Jurisprudence has shown that an approval according to § 8 is required either when a new aerodrome is constructed or in case of infrastructural and operational changes that have an impact on publicity or environment.⁴⁰ However, this book will not interfere directly with German planning approval procedure but will take a more international and holistic approach.

1.4 International Aviation Law

This leads directly to the term aviation law in which legal requirements are manifested. Aviation law is dealt with on three different levels: national aviation law, supranational aviation law as regards European law and international aviation

³³See also Zielke (1998), p. 20.

³⁴See for further details ICAO, Annex 14—Aerodromes, Vol. I—Aerodrome Design and Operation, 8th edition, 2018.

³⁵More information is contained in ICAO, Doc 9184—Airport Planning Manual, Part 1—Master Planning, 2nd edition, 1987.

³⁶ICAO, Doc 9137—Airport Service Manual, Part 9—Airport Maintenance Practices, 1st edition, 1984, para. 1.4.2.

³⁷In German: “Planfeststellungsverfahren”.

³⁸BGBI. 2007 I, p. 698.

³⁹For further details see Schladebach (2018), p. 132ff.

⁴⁰Delbanco (1998), p. 243.

law.⁴¹ International aviation law is applicable in more than one state, beyond national and European aviation law, based on bilateral and inter alia multilateral treaties.⁴² The Vienna Convention on the Law of Treaties (VCLT)⁴³ defines in its second Annex a treaty as:⁴⁴

Treaty means an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation;

As a matter of fact, international aviation law contains regulations and rules affecting global aviation.⁴⁵ Furthermore, international aviation law provides a framework for multilateral aviation-specific concerns like safety, security, liability, aircraft financing, as well as aerodrome planning. Beside multilateral aviation law, there are also bilateral aviation law treaties.⁴⁶ In terms of supranational law and European Law respectively, the European Parliament and the Council adopt regulations that are directly binding upon all Member States.⁴⁷ Currently, there is a clear intention of the European Regulator to uniform aviation within the European Union through regulation rather than directives.⁴⁸ The binding character of regulation can be derived from Article 288 para 2 TFEU.⁴⁹

Without any doubt national aviation law is important since it regulates domestic aviation. In addition, powerful national jurisdictions had a remarkable impact on the evolution of international aviation law in the past.⁵⁰ This work will primarily focus on international aviation law because of two reasons. Firstly, it would require lots of efforts to analyse the single national aviation regulations in order to describe the derived differences. This, however, is not the target of this work at hand. Secondly, according to *Havel*, aviation is a massive industry, heavily regulated and structurally borderless.⁵¹ As a result, it is necessary to concentrate on international regulation with regards to aviation and inter alia aerodromes. Notwithstanding, an excursion into national law will be initiated at some points—either in order to understand international obligations better or to provide best-practice examples that could benefit regulatory frameworks of other states.

⁴¹Giemulla and Weber (2011), p. 63.

⁴²Ibid.

⁴³1155 UNTS 331; BGBl. 1985 II, p. 927.

⁴⁴United Nations, Great Britain Foreign and Commonwealth Office Miscellaneous, Vienna convention on the law of treaties, with final act of the conference, declarations and resolutions, Vienna, 23 May 1969, 1969, p. 333.

⁴⁵In the following Havel and Sanchez (2014), p. 5.

⁴⁶Schladebach and Bärmann (2006), p. 294ff.

⁴⁷Thiele (2019), p. 116ff.; Giemulla and Weber (2011), p. 336.

⁴⁸Schladebach (2018), p. 75.

⁴⁹OJ C 326, 26.10.2012, p. 47ff.

⁵⁰Havel and Sanchez (2014), p. 6ff.

⁵¹Ibid., p. 5.

1.5 Definition of the Terms “Airport” and “Aerodrome”

The term “aerodrome” is often used synonymously and associated with “airport”.⁵² Both, international and European regulations as well as guidelines fail to distinguish clearly between a definition of aerodromes and airports. On the international level, the Chicago Convention (CC) uses the term “airport”, whereas ICAO Annex 14 for Aerodromes⁵³ applies “aerodrome” in its wording. There is no explanation for this inconsistency.⁵⁴ ICAO Annex 14 defines an aerodrome as:⁵⁵

A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

ICAO Annex 9 defines an international airport as:⁵⁶

Any airport designated by the Contracting State in whose territory it is situated as an airport of entry and departure for international air traffic, where the formalities incident to customs, immigration, public health, animal and plant quarantine and similar procedures are carried out.

The introduced definitions are not contradictory. Accordingly, an aerodrome could be an airport and vice versa. Thus, a decisive differentiation is not possible. This uncertainty has a direct impact on national regulations, as German Aviation Legislation,⁵⁷ for instance, does not offer a legal definition for the term aerodrome.⁵⁸ Apart from this, there are no requirements listed that have to be fulfilled for an aerodrome to adapt to the status of an airport.⁵⁹

The Manual on Aerodrome Certification (MOCA) states that⁶⁰ “an aerodrome is considered to be an “airport” when the aerodrome operator has applied for and has been issued with an aerodrome certificate covering the operation of that airport.” The presented definition within the MOCA is not adequate since it connotes that every so-called airport is in possession of a certificate, and this is not true at all. The capital airport of Nigeria Nnamdi Azikiwe International Airport (NAIA)—Abuja has been certified recently in November 2017 and was denoted airport even before.⁶¹ In addition, the expression of “to be considered” does not have the same imperative character as “shall” for instance. The wording of ICAO is obviously one factor contributing to inconsistent usage of these terminologies.

⁵²Giemulla and Weber (2011), p. 57.

⁵³One of the Annexes to the Chicago Convention.

⁵⁴Abeyratne (2014), p. VI.

⁵⁵ICAO, Annex 14—Aerodromes, 2018, p. 1–2.

⁵⁶ICAO, Annex 9—Facilitation, 14th edition, 2015, p. 1–3.

⁵⁷See § 6 LuftVG.

⁵⁸Schladebach (2018), p. 132; Hobe and von Ruckteschell (2009), p. 170; Zielke (1998), p. 38.

⁵⁹Hobe and von Ruckteschell (2009), p. 173.

⁶⁰ICAO, Doc 9774—Manual on Certification of Aerodromes, 1st edition, 2001, p. 3f.

⁶¹See <https://allafrica.com/stories/201905060666.html>, assessed on 10.08.2019.

According to *Giemulla*, an airport is more than just an area where aircraft could arrive and depart from. Thus, an airport is associated with facilities.⁶² This approach is similar to the German Legislator's approach. Thereby, aerodromes are separated into three different classes: airports, airfields and glider fields.⁶³ Additionally, *Giemulla* states that an airport is a centre of legal relationship, bringing together economical, technical and political interests.⁶⁴ Hence, all airports are aerodromes, but not all aerodromes are airports. Legally, airports are private objects of a state, as their usage is not allowed to every single person. As a fact, an airport is subject to restrictions and principles. This separates an airport from an object of public nature. *Giemulla's* interpretation distinguishes clearly between both terms. Consequently, the term aerodrome will be used, as it encompasses not only airports but also other landing areas without facilities that must adhere to legal requirements in order to achieve safety.

1.6 Objective and Motivation

The main objective of this book is to discuss the following question: "What are the main legal questions and challenges regarding international requirements for aerodrome planning?" Different topics are derived from this question and discussed in legal terms. In the context of this work, aerodrome planning does not only refer to the construction and expansion of aerodromes but also to the operation, maintenance and surveillance. Keeping in mind that aerodrome developments will be accomplished in the future, the importance of the stated research question is further highlighted through the following aspects:

"SAFETY FIRST!" It is assumed that this principle prevails in many different industries. Especially in high-technology branches, namely, in aviation, this principle has an extremely high priority since a shortcoming can lead to a catastrophe. On the 5th of January 2018, a Boeing 737-800 operated by United Airlines lined up on runway 33L to depart from Boston Logan International Airport.⁶⁵ However, the crew contacted the tower in order to report that they have to taxi off the runway because they were not able to continue the take-off process. After cancelling the take-off clearance, the tower instructed the crew to taxi down runway 33L, which crosses runway 27, and to hold short at the runway holding position marking before crossing runway 27. Simultaneously, an Embraer ERJ-190 operated by Jetblue was on final approach of runway 27.

The tower instructed United Airlines again to hold short of runway 27. Five seconds later the tower agitatedly said again "hold short runway 27". The crew of

⁶²Giemulla and Weber (2011), p. 57.

⁶³§ 6 LuftVG; For more details see Pfisterer (2017), p. 84.

⁶⁴In the following Giemulla and Weber (2011), p. 57.

⁶⁵In the following <http://avherald.com/h?article=4b35692a&opt=0>, assessed on 10.08.2019.

United Airlines responded that they are short of runway 27. Notwithstanding, the tower instructed the Jetblue crew to abort the landing and to go-around. Jetblue started a second approach and landed safely, whereas United Airlines returned to the apron and departed later on. The airport authority reported that United Airlines entered the protection area of runway 27 which starts right after the runway holding position marking. This led to an alarm in the tower, resulting in a go-around instruction for Jetblue. Satellite photos illustrate that there is no runway holding position marking on runway 33L in the meantime, which could be the reason for entering the protection area of runway 27⁶⁶ because the crew was still looking for the marking to appear.

A Boeing 737-800 has a seat capacity of 189 seats and an Embraer ERJ-190 a seat capacity of 118 seats. The worst-case scenario would be a crash of both aeroplanes at the crossing point of runway 33L and runway 27, resulting in over 300 fatalities. If this had happened, it would have been a disaster, knowing that a runway holding position marking with a length of 45 m and a width of 1.05 m⁶⁷ would have saved many lives. This example clearly demonstrates how important adherence to international aerodrome planning requirements is in order to ensure safety and to save lives. It appears unreasonable and unsafe if a pilot would have to apply different rules once he overflies the invisible borders of a State.⁶⁸ That said, it is necessary to define legal requirements for aerodromes that apply internationally.

Market forecasts expect that South-East Asian Nations will have to invest \$33 billion in aerodrome infrastructure in the next 5 years to successfully meet the demand.⁶⁹ Taking into account that these nations are Developing States with limited government budgets, this is an immense sum. Therefore, it is extremely important to be aware of aerodrome planning requirements to avoid planning errors, that could lead to immense additional costs.⁷⁰ Germany's capital aerodrome, Willy-Brandt-Airport, in Berlin should have opened its doors for international aviation in 2011 with 5 years of construction (since 2006) and estimated project costs of €2 billion.⁷¹ In 2018, the construction was still not finished, and the costs exceeded €7.3 billion. A further €3 billion will even be needed until 2030. Besides, all additional costs do not include potential revenues, which could have been generated by real-estate rents within each terminal.⁷² Incontrovertibly, this imperfection associated with aerodrome planning does not only incur losses to the government's and aerodrome

⁶⁶Crew keeps taxiing and is looking for the runway holding-position to stop.

⁶⁷ICAO, Annex 14—Aerodromes, 2018, p. 5–18.

⁶⁸Erler (1967), p. 11.

⁶⁹In the following Mott MacDonald, Annual Analyses of the EU Air Transport Market 2016, 2017, p. 104.

⁷⁰See also *Lelieur and Schlumberger* explaining how the World Bank is funding airport expansion in Asia and Africa. *Lelieur and Schlumberger* (2017), p. 135.

⁷¹<https://www.spiegel.de/wirtschaft/soziales/flughafen-berlin-brandenburg-ber-kosten-steigen-auf-7-3-milliarden-euro-a-1195101.html>, assessed on 10.08.2019.

⁷²<https://www.zeit.de/wirtschaft/2018-01/ber-flughafen-ausbau-betriebskosten>, assessed on 10.08.2019.

planners' reputation but also often leads to inexplicable financial losses. It is a fact that this condition will be more tragic for Developing States than for Developed States, given the formers' limited resources. In conclusion, the long-term nature of aerodrome construction along with significant financial requirements⁷³ force aerodrome planners to comply with legal requirements and to internationally accepted best-practices.

In the context of aerodrome developments, notably, Mott MacDonald mentions that high levels of expertise and resources are required in Asia to develop large scale aerodrome infrastructure.⁷⁴ In most Asian cases, neither expertise nor resources are available in government-owned and/or operated aerodrome authorities, which often necessitates seeking for private involvement in aerodrome development.

ICAO has established an audit program that foresees to examine the implementation status of its international legal requirements.⁷⁵ The results of 2018 have been alarming since only 58.5% of the Contracting States have effectively implemented international provisions for aerodromes. In addition, many states face severe shortcomings in their safety oversight system.⁷⁶

In result, the five mentioned aspects (safety, financial scale, limited expertise, few resources, alarming ICAO audit results) motivated the idea of discussing the stated research question. The objective thereby is to provide for states, international organisations, competent authorities, aerodrome planner and aerodrome operators a comprehensive overview of legal challenges and requirements with regard to aerodrome planning. In addition, answers to the derived legal questions as well as recommendations thereafter shall help to enhance regulative systems and to establish a safer aerodrome environment worldwide.

1.7 Book Overview

Before deriving and discussing legal questions and challenges, it is necessary to present the international requirements for aerodrome planning. Therefore, Chap. 2 illustrates the development of international aviation law. An analysis of the multi-lateral aviation law treaties in the first half of the twentieth century is conducted. The aim is to follow a chronological approach in order to point out whether states have defined legal requirements for aerodrome planning on an international basis already before the conclusion of the Chicago Convention in 1944. It is further examined what these requirements comprise and how they can be categorised. The analysis in this chapter is not limited to international law. An insight into national legislation is also necessary in order to determine whether states have adapted their national

⁷³Boeing, Current Market Outlook, 2017, p. 9.

⁷⁴Mott MacDonald, Annual Analyses of the EU Air Transport Market 2016, 2017, p. 103.

⁷⁵ICAO, Safety Report, 2018, p. 15.

⁷⁶Abeyratne (2009), p. 536; Dempsey (2017), p. 108f.

legislation to the international treaties and how they adhered to them. In addition, the national legislation of states that have not acceded to the international conventions will be reviewed. The purpose of this study is to analyse whether the absence of accession had an adverse effect on national legislation and more precisely, whether this circumstance had negative consequences for the development of national aerodromes. Hence, it will be summarised what the target of defining international legal requirements for aerodromes is.

There are legal questions that arose in the past but impact the present and therefore need to be addressed. Thus, Chap. 3 analyses the Chicago Convention of 1944, which is still in force. After an introduction to the circumstances under which the Convention has been concluded and to the supplementary agreements that are incorporated therein, the organs of ICAO are presented. The target of Chap. 3 is to examine how the Chicago Convention deals with legal requirements for aerodrome planning. For this purpose, it is first necessary to analyse the legal instruments—namely Standards and Recommended Practices—that have been provided to the ICAO through the Chicago Convention. One of the major open legal questions is related to the binding effect of Standards as well as of Recommended Practices and to associated obligations that have to be considered by the Contracting States. Subsequently, the legal aerodrome requirements in the Articles of the Chicago Convention as well as in the corresponding draft Annexes will be explained, and relevant legal questions will be analysed. The main legal question subject to the scrutiny is as to whether the Chicago Convention has ensured the safe construction and operation of aerodromes. This step is essential in order to clarify which of the two legal systems—namely the Chicago or Paris system—is more suitable to define legal requirements for aerodrome planning. Considering national and international regulation introduced in Chaps. 2 and 3, it will then be pointed out what a perfect legal system for aerodrome planning could have looked like in 1944. Based on the results of Chap. 3, an assessment shall derive as to whether states need to amend the Chicago Convention—75 years after its conclusion. This question will be answered from an aerodrome planning perspective and—if required—supported by proposals for an amendment.

Chapter 4 addresses present legal questions and challenges of aerodrome planning that are relevant for ICAO, states, competent authorities, and aerodrome operators. Firstly, the regulatory framework of ICAO is introduced and described. International legal requirements for aerodrome planning are not only defined in Annexes to the Chicago Convention but also in other levels of ICAO's regulatory framework. The binding effect of provisions on these levels differs and allows further analysis. It shall be derived to which extent Contracting States must adhere to those when planning an aerodrome. Secondly, the current legal requirements of aerodrome planning will be explored and categorised into essential and additional requirements. The objective is to give a generic overview of key considerations and different facets related to the planning of new aerodromes or the expansion of existing ones. ICAO develops the different legal requirements for aerodrome planning within its rulemaking process. This process needs to be analysed since it reveals legal weaknesses related to its democratic legitimacy. That said, a discussion shall

result in different approaches and methods of improvement. These methods will be either simple to introduce or more complex, requiring an amendment to the Chicago Convention. Drafts of possible amendments in this context are proposed.

States are responsible to integrate international law into their national legislation. This applies to the provisions of the Chicago Convention and to Annexes thereto. Incorporation is necessary to comply with the obligations under the Chicago Convention. There are different methods used to fulfil this requirement. Various theories are introduced in Chap. 4 that describe the relationship between international and national law and how both legal systems interact with each other. This introduction is essential to demonstrate how the Contracting States have integrated the Paris and the Chicago Convention into national law. The integration process does not always achieve the domestic applicability of international law, but instead requires it. An examination shall, therefore, clarify whether the aerodrome-related Articles of the Chicago Convention as well as the Standards and Recommended Practices in ICAO Annex 14 are directly applicable or still require additional national acts.

In the next step, an excursion into national legislation is sensible to illustrate different methods on how states integrate ICAO Annex 14 for Aerodromes into national law. The different methods have their advantages and disadvantages, which are particularly apparent when ICAO establishes amendments that have to be applied domestically. The Theory of Essentialness from Germany will be explained and used to point out if it is legitimate to provide an executive organ of the state with powers to introduce amendments to Annex 14. In result, it should be derived what the most appropriate way to incorporate Annex 14 is. Furthermore, an analysis shall reveal how states should deal with the integration of ICAO Standards and Recommended Practices nationally. The integration of international law motivates a discussion on available enforcement tools in both systems. In the first instance, sanctionable law and associated cases have to be determined. In the second step, an analysis shall derive whether ICAO's vertical or horizontal law enforcement mechanism is more suitable to enforce aerodrome regulation. ICAO's procedure for transparency and disclosure is in this regard analysed and evaluated. The chapter is finalised with an analysis of ICAO's aerodrome certification requirements. This step is necessary since a large number of Contracting States have not certified their aerodromes in accordance with international Standards yet.

Chapter 5 addresses legal questions and challenges that arise in the present and impact the future. The responsibility towards an aerodrome does not end with its certification. The aerodrome must continue to prove its operability and meet the existing and new legal requirements for aerodrome operation and infrastructure. ICAO uses the USOAP—an auditing program—to assess to which extent the Contracting States implement international regulation and whether states have established an oversight system. Chapter 5 analyses the USOAP from a legal point of view and examines whether the Chicago Convention has given the ICAO the necessary powers to execute this program. Furthermore, an analysis should highlight if states are legally obliged to participate in the auditing process and to implement corrective recommendations made by ICAO. Many states do not follow and comply with the Standards and Recommended Practices of ICAO. Notably, the USOAP

results for aerodromes are not satisfactory. Reasons for this shortcoming and the current mitigation practices of ICAO are pointed out and evaluated. This evaluation shall motivate ICAO to rethink the current way of rulemaking for aerodrome requirements. In this respect, a shift from prescriptive regulation to performance-based regulation could be beneficial. What exactly performance-based regulation is and where the differences to prescriptive regulation lie, will be answered in this chapter. In particular, the discussion will outline what needs to be taken into account when implementing performance-based regulation due to current challenges.

Chapter 5 also identifies which types of provisions in ICAO Annex 14 should be considered for the development of rulemaking in a performance-based way. Performance-based aerodrome planning requirements are then drafted and proposed for two safety-critical topics related to aerodrome planning—namely for the provision of a RESA and the management of jetblast hazards at the aerodromes. Additional considerations in this regard are provided for the implementation of an SMGCS and management of change at aerodromes.

Chapter 6 sums up the main results through the provision of hypotheses. Further, this chapter proposes recommended actions. These actions should be fulfilled by different entities: ICAO, the state, competent authorities, and aerodrome operators as well as aerodrome planners. Every stakeholder has a defined responsibility in the process chain that needs to be sufficiently addressed in order to achieve a safe and efficient aerodrome environment.

References

- Abeyratne R (2009) The role of the International Civil Aviation Organization (ICAO) in the twenty first century. *AASL* 34:529–544
- Abeyratne R (2014) *Law and regulation of aerodromes*. Springer, Cham
- Chern C (2015) *Chern on dispute boards: practice and procedure*, 3rd edn. Informa Law from Routledge, New York
- Delbanco H (1998) *Die Änderung von Verkehrsflughäfen*. Duncker & Humblot, Berlin
- Dempsey PS (2017) *Public international air law*, 2nd edn. William S. Hein & Co., Montréal
- Erler J (1967) *Rechtsfragen der ICAO: Die Internationale Zivilluftfahrtorganisation und ihre Mitgliedstaaten*. Heymanns, Munich
- Giemulla EM, Weber L (eds) (2011) *International and EU aviation law*. Kluwer Law International, Alphen aan den Rijn
- Graham A (2008) *Managing airports: an international perspective*, 3rd edn. Routledge, London
- Havel BF, Sanchez GS (2014) *The principles and practice of international aviation law*. Cambridge University Press, New York
- Hobe S, von Ruckteschell N (eds) (2009) *Kölner Kompendium des Luftrechts, Volume II - Luftverkehr*. Heymanns, Cologne
- Lelieur I, Schlumberger CE (2017) *Airport business and regulation*. In: Dempsey PS, Jakhu RS (eds) *Routledge handbook of public aviation law*. Routledge, New York, pp 114–136
- Metcalfe M (2008) *Managing environmental capacity constraints at airports: an approach developed by the US Air Force*. *JAM* 2:306–317
- Pfisterer H (2017) *European Regulation of Aerodrome Safety Management Systems in the EASA System*. Kassel University Press, Kassel

Schladebach M (2018) *Luftrecht*, 2nd edn. Mohr Siebeck, Tübingen

Schladebach M, Bärmann D (2006) Luftverkehrsabkommen als Grundlage internationalen
Fluglinienverkehrs. *NZV* 19:294–303

Thiele A (2019) *Europarecht*, 16th edn. J. Niederle Media, Altenberge

Zielke T (1998) *Verkehrsaufteilung in Flughafensystemen*. Duncker & Humblot, Berlin