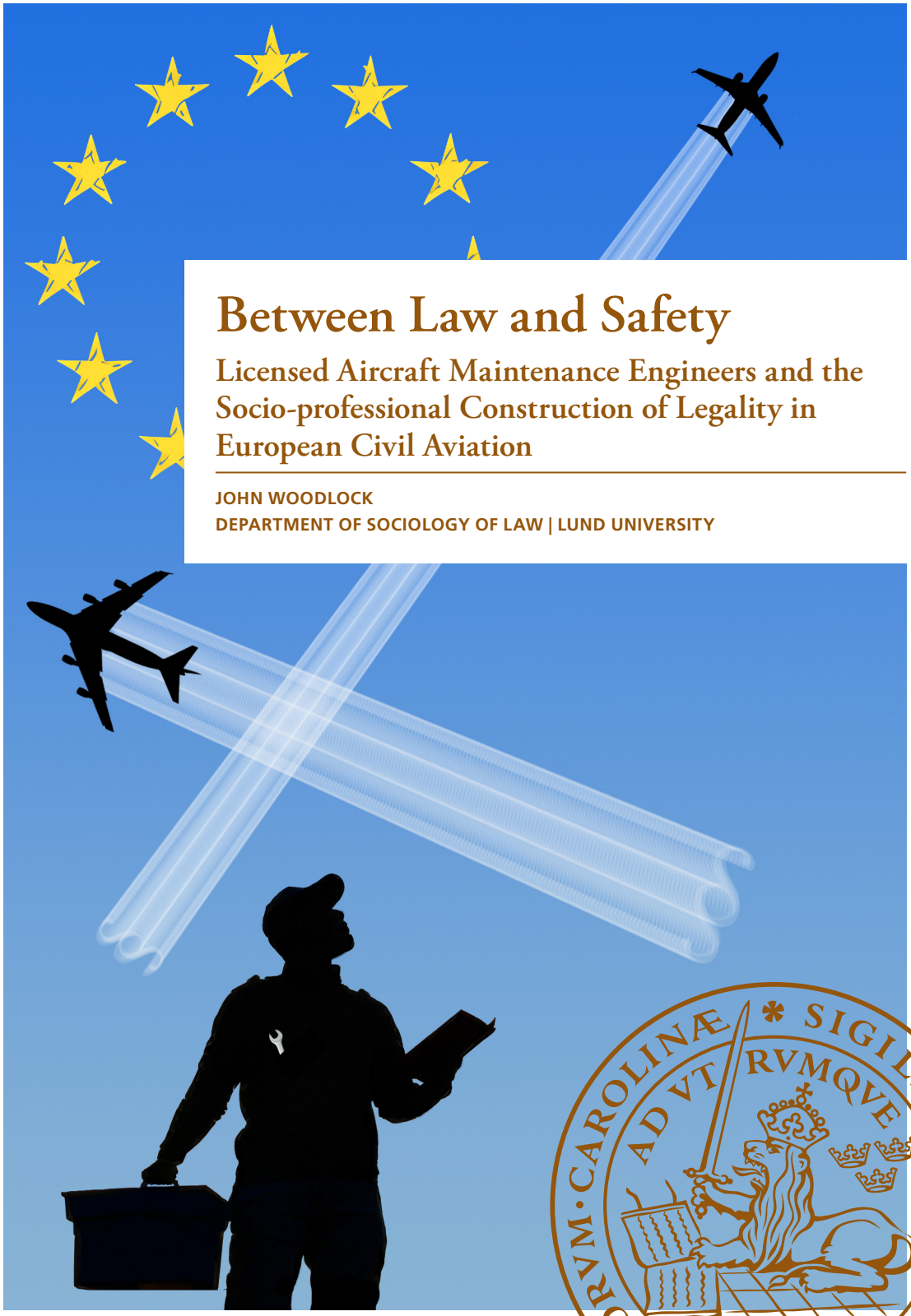
Between Law and Safety

Licensed Aircraft Maintenance Engineers and the Socio-professional Construction of Legality in European Civil Aviation

Woodlock, John

2023

Document Version:
Publisher's PDF, also known as Version of record



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LUND
UNIVERSITY

DOCTORAL DISSERTATION

Doctoral dissertation for the degree of Doctor of Philosophy (PhD) at the Faculty of Social Sciences at Lund University to be publicly defended on 28th August 2023 at 14.00 at the Pufendorf Institute, Biskopsgatan 3, Lund.

Faculty opponent
Professor Susan S. Silbey

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Front cover image by John Woodlock and Nina Brand. Back cover photograph by Max Rau.

Faculty of Social Sciences

Department of Sociology of Law

ISBN 978-91-8039-768-1 (print)

ISBN 978-91-8039-767-4 (pdf)

ISSN 1403-7246 Sociology of Law Dissertations

Printed in Sweden by Media-Tryck, Lund University

Lund 2023

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MADE IN SWEDEN

To Nina, Kira and Morris – you are all that matters.

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Acknowledgements

First and foremost, I extend my sincere thanks to the licensed aircraft maintenance engineers in Portugal, Norway and Sweden who participated in this research project. I extend my thanks also to the AEI leadership and the affiliate gatekeepers for their help and participation in allowing this research project to come together. I hope that my research respectfully captures the voices of the research participants and reflects the professional integrity and the true value that licensed aircraft maintenance engineers bring to aviation and public safety.

The sincerest of thanks to my main supervisor, Ida Nafstad, for her support and encouragement throughout my PhD, both as co-supervisor and main supervisor. Ida, your presence as a stable supervisor has been unquestionable over the years. I thank you for your guidance, your honesty, your calmness at all times, and for trusting in me to work so independently. I consider you a valued mentor and a dear friend. Appreciation also to my co-supervisor Måns Svensson for inputs and challenging comments during phases of my PhD. Although we have had very little contact these past three years since you left Lund, I have always known that you are in the background if needed. I wish to thank and pay tribute to the memory of Reza Banakar who, for a short time, was my main supervisor, but who sadly passed away in 2020. It was an honour for me to have shared some of this journey with Reza. Gratitude also to Eva Schömer and Karl Dahlstrand for supervisory counsel during earlier stages of my PhD. I extend the sincerest of thanks to my co-author on Paper I, Håkan Hydén, who, from the very first day of my PhD, has been supportive, uplifting, genuinely interested in my progress as a scholar and so very decent in all his engagements with me. I hold you in the highest regard Håkan. I also wish to express my appreciation and thanks to my start, midway and final seminar discussants – Magnus Eriksson, Martin Joormann, Mikael Lundholm and Kenneth Pettersen-Gould – your detailed readings of my ongoing work and your insightful comments have helped me to develop my research and to improve my work to get it to where it is today.

I extend heartfelt thanks to my head of department, Isabel Schoultz. During a period of illness near the end of my thesis, you showed kindness and understanding towards me and you could not have been more supportive. Thank you for your leadership during this time, for being so humanly attentive to my situation, and for being so professionally capable of taking action. Thank you,

Isabel, for also showing me the best of academia! On that note, I also want to thank the dearest of friends, Martin Joormann, for his warm collegiality, his support at all times and his deeply valued friendship throughout these years. Dear Martin, you too have shown me the best of academia and also, of effective vegetarian fishing. I started my PhD with three other candidates – Marie Leth-Espensen, Cansu Bostan, and Nicolas Serrano Cardona. I thank you Marie for your honesty, friendship and collegiality. Over these years we have spent a lot of time working in the same office space but never once did we share a bitter word between us. I consider you a dear friend, now and always. Thanks also to my friend and colleague Nico, for your depth of character, your incredible capacity to give honest and accurate feedback, and your deep sense of care and good judgment on so many things. To the dearest of friends, Cansu. Dostum, not only are you a great scholar, a true intellectual and the best ethnographer both sides of the Greenwich Meridian, but you are also one of the wittiest and funniest people I have ever known. Thank you for your solidarity in good times and bad! Cansu, it is such a privilege for me to call you my friend. I extend my thanks and kindest encouragement to another dearly appreciated PhD friend, Oscar Björkenfeldt. Keep believing in yourself Oscar as you near the endline. And to Lisa, Hera, Sophia and Carlo – I wish you all the very best on your PhD journey.

I wish to thank past and present colleagues in Lund University – at the Sociology of Law Department, the International Graduate School, LTH and other LU departments – for their collegiality, friendship and encouragement over the years. I especially wish to mention Hildur Antonsdottir, Peter Bergwall, Michael Molavi, Marcin Wróbel, Jonna Rennerskog, Amin Parsa, Mikael Sundström, Kadri Kuusk and Catia Gregoratti – inspiring scholars and amazing people all of you! Gratitude also to Johanna Alkan Olsson, Stuart Reid, Håkan Silverup, Johan Bergström, Anthony Smoker, Lena Svenaeus, Per Wickenberg, Marie Appelstrand, Davor Vuletta, Ole Hammerslev, Staffan Michelson, and all my colleagues at RÄS, new and old, for sharing this journey with me. The warmest of thanks to my friend Sidsel Hansen, the most fantabulous of Norwegians, for her help with translations. Thanks also to Erwin Langejan, Björn Holm, Vasco Morãu and Jose Figueiredo for their valuable feedback and expert comments on Swedish, Norwegian and Portuguese regulations. Appreciation and thanks to the well-grounded James Root for proof-reading, to Ola Stjärnhagen for survey program advice, to Jonas Palm at Media-Tryck for bringing order and honesty to the chaos, to Helena Edberg at Räs for kindly organizing viva matters, and to my

dear friend Max Rau for allowing me use his photograph of me. Thanks also to the students, colleagues and friends at the International Institute for the Sociology of Law (IISL) in Oñati. I especially wish to mention Rakel, Leire, Ainhoa, Manttoni, Maite, Marije, Malen (the 4 M's), and the dearest of friends, Susana, for their encouragement, willingness to help, and for making my teaching experiences there in 2021 and 2023 so memorable. I also extend sincerest of thanks to Martin Ramstedt for giving me the opportunity to develop a course based on my research and to teach it with him in Oñati. Dear Martin, you are an appreciated peer and a much-valued friend. Thanks also to Sabine Frerichs for allowing me, with latitude, to teach my course at IISL in 2023.

To my dear friends from our past Air Corps days – Clive Byrne, Damien Leahy, and Seamus Clare – thank you for your support, encouragement and belief in me throughout my PhD, for help with finding aviation documentation and information, and for always being there as true friends. I am so honoured to have friends like you in my life for so many years. Heartfelt gratitude also to Reza Zamani, my Persian brother and the most trustworthy of friends. Reza, thank you so much for your support, solidarity and loyalty throughout these years. And to my Swedish brother, Håkan Elmström, words cannot express my gratitude to you for your constant support and unconditional friendship over the years. You are one in a million Håkan! And my love and appreciation to my dear friends Eric, Sara (Hed), Melissa, Malin, Fred, Ole, Jörgen, Matti and Kerstin, Stefan, Aron, Mark, Hughie, Brian, Willie, Meredith, Samira and Ann – my life is so much richer for having friends like you. Sincerest of thanks also to Anabela and Ulrika to whom I owe a huge depth of gratitude.

My thanks and love to my sister Valerie, to my brothers Eoin, Richard, Brian and Niall, their families and our extended Clondalkin family who have always been curious and supportive of my life choices. Most importantly, I extend my grateful thanks and deep love to my partner Nina for her unwavering support throughout these years. Dearest Nina, finishing this PhD would not have been possible without you. I thank and commend you for your patience, your sensibility and your willingness to help and push me through tough times. To my darling children, Kira and Morris, whom I love dearly. Thank you for your patience with me during this long process. If at times during my PhD I seemed present in body but absent in mind, I hope that you can forgive me. You are my life and I am so proud of both of you! I also wish to honour here the memory of my mother, Anne,

who gave me so much love in life. Thank you, dear mother, for your strength, your intelligence, your courage, and your dignity in the face of poverty. Ní bheidh do leithéid arís ann. Thanks and love also to Hasse, Ann and Fingal in my extended Swedish family, and my deepest respects to the memory of my mother-in-law Iris, who passed away in 2020. If this journey has taught me anything, it is to appreciate and be thankful for my wonderful family and irreplaceable friends. In closing, if I have forgotten to thank or mention anyone, I extend here my broader thanks and appreciation.

And now that I have reached the end of my PhD journey, it feels only fitting for me, in my best aviation-technical idiolect, to finally "sign-off" from my project and to "release" this dissertation into service! Catch you on the flip side.

List of Papers

Paper I

Woodlock, J. and Hydén, H. (2020) "(f)Lex avionica; How soft law serves as an instrumental mediator between professional norms and the hard law regulation of European civil aviation maintenance", *Safety Science*, 121, pp. 54–63. https://doi:org/10.1016/j.ssci.2019.08.037

Paper II

Woodlock, J. (2022) "Procedural Justice for All? Legitimacy, Just Culture and Legal Anxiety in European Civil Aviation". *Law & Society Review*, 56(3), pp. 441–476. https://doi.org/10.1111/lasr.12622

Paper III

Woodlock, J. (manuscript unpublished) "A Gap too Far? A Socio-Legal Study of Licensed Aircraft Maintenance Engineers' Experiences of Release to Service Regulation in European Civil Aviation".

Paper IV

Woodlock, J., (2022) "Arbitrators of safety and authors of law – legal consciousness, normative pluralism and modulated derogation among European licensed aircraft maintenance engineers" *Oñati Socio-Legal Series*, vol.12, issue S1, pp. S172-S215. https://doi.org/10.35295/osls.iisl/0000-0000-0000-1292

Abbreviations

AEI	Aircraft Engineers International
AMC	Acceptable Means of Compliance
AML	Aircraft Maintenance Licence
AMO	(Approved) Aircraft Maintenance Organisation
ANAC	Portuguese CAA (Autoridade Nacional da Aviação Civil)
CAA	Civil Aviation Authority
CAAN	Civil Aviation Authority of Norway (Luftfartstilsynet)
CAMO	Continuing Airworthiness Management Organisation
CRS	Certificate of Release to Service
EASA	European Union Aviation Safety Agency
EASP	European Aviation Safety Plan
EASR	EASA Annual Safety Review
EC	European Commission
ECCAIRS	European Coordination Centre for Accident and Incident Reporting Systems
EEA	European Economic Area
EP	European Parliament
EPAS	European Plan for Aviation Safety
ESS	European Social Survey
EU	European Union
GM	Guidance material
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
LAME	Licensed aircraft maintenance engineer
MEL	Minimum Equipment List
MMEL	Master Minimum Equipment List
MOE	Maintenance Organisation Exposition
MRO	Maintenance Repair Organisation
NAA	National Aviation Authority
NCA	National Competent Authority
PBE	Performance-Based Environment
RMT	Rule making task
SMS	Safety Management Systems
SMM	Safety Management Manual (ICAO Doc 9859)
STA	Swedish Transport Agency (Transportstyrelsen)

Chapter 1.

Introduction

> /…/for the systems which must be operational for operating an aircraft, there is a master Minimum Equipment List (MEL) from the aircraft manufacturer. Often airline companies want to be one step better [means they expand upon the master MEL], and it can be about a comfort issue for passengers /…/ But when the aircraft is, for example, at an airport where there are no maintenance staff to fix their aircraft, then it becomes okay according to their MEL. Then, it is suddenly alright to deviate from that [means the extended MEL outlined in the organisational MOE] and go back to the master MEL [meaning the aircraft manufacturer's MEL]. This has happened in both the companies I have been in before. That is one thing, for example, where the regulations that the company has written up about how we should work, and where they ignore that and take a step back (LAME, 2021).

The opening quote in this thesis is taken from an interview with a licensed aircraft maintenance engineer (hereafter LAME) conducted as part of the presented doctoral research project. The LAME shared this story based on his experiences of working with two former employers – aircraft maintenance organisations (AMOs) within European-based airline companies. His story exposed a similar tendency within these different organisations to employ situation-specific approaches to the aircraft "minimum equipment list" (hereafter MEL) when complying with the regulatory requirements for aircraft release as described in each organisation's "Maintenance Organisation Exposition" (hereafter MOE). By interchangeably employing two different versions of the MEL, it would seem that these companies had independently invoked similar backup strategies to ensure that aircraft could continue flying. The LAME explained that while employers can follow the aircraft manufacturer's "master MEL" (commonly referred to as MMEL), some organisations opt to build on that document to develop their own expanded version, often in accordance with state-specific requirements. Once

written into the MOE and approved by the national competent authority, the expanded MEL becomes a legally approved document that outlines the procedures and requirements with which LAMEs must comply when certifying and releasing company aircraft into service. It emerged that both former employers, in situations where an aircraft could not continue flying due to an item on the expanded MEL, had asked certifying LAMEs to revert to the master MEL to release an aircraft – that is, the version not described in the MOE.

Although this LAME acknowledged this as a somewhat duplicitous practice, he also explained that it is not a serious breach of aircraft safety standards but rather, an exposé of a double-standard concerning conflicting expectations of regulatory compliance between employing organisations and their professional staff. Whether viewed as a top-down strategic procedural derogation from the formal rules or an institutionally acceptable flexible grey area of compliance that tolerates local interpretations of regulatory rule requirements, this LAME's story provides a critical insight into the complexity surrounding the everyday operation, application and experience of law and legality in this sector. It also demonstrates how his profession, as certifying staff releasing aircraft into service, must negotiate with hegemonic understandings of compliance as a structure of meaning that affects the socio-professional production of legality and the normative character of safety in this sector.

Risk and safety management has been extensively researched within safety science and safety-focused scholarship, which has commonly addressed problems relating to the regulation, proceduralisation and working practices of organisations and their employees within risk-critical industries, including the international aviation sector (see Lawrenson and Braithwaite 2018; Bieder and Bourrier 2013; Bergström et al. 2009; Reason 1997). Much of this research has addressed the operational side of aviation, that is to say, flight operations and air traffic management/control where, by extension, the safety conduct, working practices and professionalism of aircraft pilots and air traffic controllers are frequently studied (see Tamuz 1987, 2001; Reason 1997; Schubert 2004; Dekker 2017; Tear et al. 2016; Reader et al. 2015; cf. Kirwan et al. 2019; McMurtrie and Molesworth 2018). However, research since the early 2000s has noted that shortcomings in the aircraft maintenance sector are increasingly associated with a significant number of serious aircraft accidents (Tsagkas et al., 2014:106; see Kraus and Gramopadhye 2001:142). More specifically, scholars have identified

that some of the foremost causal factors accounting for maintenance-related aircraft accidents are embedded in regulatory issues, inadequate maintenance procedures and documentation, inadequate and poorly enforced regulations, incorrect procedures, and working practices of aircraft maintenance technical personnel when performing tasks (Marais and Robichaud 2012; Insley and Turkoglu 2020; see Shanmugam and Robert 2015). These findings align with those of previous European aircraft maintenance-focused empirical studies that shed light on regulatory and procedural concerns (Haas and Ourtau 2009; Atak and Kingma 2011; Zafiharimalala et al. 2014; Hampson and Fraser 2016; Clare and Kourousis 2021a, b). They also align with key areas of concern raised in official safety reviews and evaluation reports issued by the European Union Aviation Safety Agency (hereafter EASA) (see BV 2006; EASA 2018).

Notwithstanding, the role of LAMEs in ensuring that the airworthiness of the global fleet of operational aircraft consistently reflects the highest levels of safety performance has been poorly recognised in scholarship. LAMEs are highly qualified licensed technical maintenance personnel who are educated and approved under strict regulatory requirements and international standards. They perform scheduled and unscheduled maintenance tasks of varying degrees of technical and procedural complexity and, when authorised as certifying staff according to different categories of qualification, are responsible and legally accountable for the legal release of an aircraft or components into service (de Florio 2016; Yadav 2010; Sulocki and Cartier 2003; see AEI 2018)[1]. Considering that this profession has the sole authority to legally certify and release aircraft into service following performed maintenance, the lack of socio-legal and regulatory research into this regulated sector and this occupational profession is surprising but needed (see Atak and Kingma 2011; Yadav 2010). In fact, aircraft maintenance as a socio-technical professional domain has been disproportionately typecast in scholarship as a problem child of aviation and has been described as an activity highly prone to human error and a sector rife with rule and procedural deviations and violations (see Langer and Braithwaite 2016:986; Dekker and

[1] See Commission Regulation (EU) No 1321/2014 (OJ L362,17.12.2014:84-192) – Annex III (Part-66) outlines educational requirements and categorical licensing for LAMEs. Annex IV (Part-147) outlines requirements for maintenance training organisations. Unless otherwise stated, all legal references to EU/EASA regulation here are taken from the 'The Official Journal of the European Union (OJ) and are accessible on the website 'Eur-Lex' (see Bibliography).

Breakey 2016; Zafiharimalala et al. 2014; Pettersen et al. 2010; Reason and Hobbs 2003; Hobbs and Williamson 2002, 2003).

Although focus has been given to the study of working practices, safety culture, safety climate, safety management, human error and the prevalence of rule and procedural deviations among maintenance personnel (see McDonald et al. 2000; Hobbs and Williamson 2002; Pettersen and Aase 2008), aircraft maintenance as a heavily regulated sector has not been afforded much, if any, scholarly interest as the *main focus* of socio-legal studies of law and legality. This is surprising given the "ubiquity and inescapable normativity of regulation" defining this sector (see Silbey 2013:15). As such, the sequential mixed-methods research conducted in this PhD compilation thesis focuses on the multi-level regulatory environment of the aircraft maintenance sector in the European Union (EU) and EASA Member States. It explores the bottom-up perspectives and experiences of LAMEs working as certifying staff in aircraft maintenance organisations in Portugal, Sweden and Norway. Informed by a critical positioning to the field of research that understands the operation of law in this heavily regulated sector as a late modern hegemonic structure of meaning that employs hard and soft law forms to support the EU single market goals and ideals, the research employs procedural justice theory, gap analysis and legal consciousness theory to explore and explain LAMEs' everyday perceptions and experiences of, and interactions with, law, legality and safety as they carry out their work in the European civil aviation sector.

In this dissertation, I employ procedural justice theory to distinguish between instrumental and normative attitudes when exploring law which implies a "legal consciousness as attitude" approach to the regulated phenomena of occurrence reporting and just culture in this sector where, as addressed in Paper II, LAMEs (attitudes) are the units of analysis. A gap-focused analysis of law identifies "tears in the regulatory fabric" of EU civil aviation and addresses this issue as an ideological operation of law that institutionally facilitates and upholds the EU single market structure – this implies "legal consciousness as epiphenomenon". Although social relations and LAMEs are collectively in focus as law-produced professional and legal identities, rule adequacy and uniformity surrounding the release of aircraft into service, as institutional sought-after regulatory goals in the EU single market social and economic structure, are also objects of analysis. Legal consciousness theory is applied in Paper IV. Through a cultural analysis of law (law in society) which combines and condenses human action and structural

control, an inward sector-specific legal consciousness emerged among the LAMEs. Moreover, an outward legal consciousness was also observed concerning a state-based image of criminal law. In Paper IV, the socio-professional production of legality among LAMEs in this EU sector is the focus of analysis (see Ewick and Silbey 1998:33-44).

Two regulated phenomena are identified in this dissertation as especially pertinent for exploring the everyday experiences of law, legality and safety in the working lives of certifying LAMEs – the certification and release of aircraft into service and occurrence reporting. In EU/EASA Member States, the signing and issuance of a Certificate of Release to Service (CRS) is a regulated phenomenon under Commission Regulation (EU) No 1321/2014 of 26 November 2014 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks (OJ L362,17.12.2014:1-194). It is a regulatory privilege that is unique to and defining of the professional and legal identity of LAMEs working as certifying staff in (European) AMOs. As formally explained in Commission Regulation (EU) No 1321/2014[2];

> A *certificate of release to service* (CRS) "shall be issued by appropriately authorised certifying staff on behalf of the organisation when it has been verified that all maintenance ordered has been properly carried out by the organisation in accordance with the procedures specified in point 145.A.70, taking into account the availability and use of the maintenance data specified in point 145.A.45 and that there are no non- compliances which are known to endanger flight safety./…/shall be issued before a flight following the completion of all maintenance tasks" (OJ L362,17.12.2014:73).[3]

Moreover, in all EU/EASA Member States, occurrence reporting is a regulated requirement under Regulation (EU) No. 376/2014 on the reporting, analysis and follow-up of occurrences in civil aviation (OJ L 122, 24.4.2014:18-43). This applies to all authorities, organisations and professional staff working in European civil aviation (see Pellegrino 2019). As formally defined under Regulation (EU) No. 376/2014, by;

[2] See Annex 1 (Part-M) and Annex II (Part-145) (OJ L362,17.12.2014:1-194).

[3] See Point 145.A.70 (a) (b) in Annex II.

reporter is meant "a natural person who reports an occurrence or other safety-related information pursuant to this Regulation";

occurrence is meant "any safety-related event which endangers or which, if not corrected or addressed, could endanger an aircraft, its occupants or any other person and includes in particular an accident or serious incident"; (OJ L122, 24.4.2014:25).

just culture is meant "a culture in which front-line operators or other persons are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but in which gross negligence, wilful violations and destructive acts are not tolerated" (OJ L 122,24.4.2014:25).[4]

Throughout the four research papers comprising this dissertation, I have employed much aviation-based terminology and acronyms. These terms should not be understood as loosely applied idiolects expressing an informal sectorial phraseology, but rather as legally defined formal concepts in EU regulations that have consequences for how organisations and professionals in EU civil aviation understand this sector and their (and others') roles and responsibilities. In other words, I have been watchful to recognise the legal complexity enveloping the sector that defines the legal status of the professional role, responsibilities, and identity of certifying LAMEs. Therefore, as employed throughout this dissertation and defined in EU law, by;

maintenance is meant "/…/any one or combination of the following activities: overhaul, repair, inspection, replacement, modification or defect rectification of an aircraft or component, with the exception of pre-flight inspection" (OJ L362,17.12.2014:3);

continuing airworthiness is meant "all of the processes ensuring that, at any time in its operating life, the aircraft complies with the airworthiness requirements in force and is in a condition for safe operation" (OJ L362,17.12.2014:3);

certifying staff is meant "personnel responsible for the release of an aircraft or a component after maintenance" (OJ L362,17.12.2014:2);

[4] See Art. 2 (1) (7) and (12).

> *maintenance organisation exposition (MOE)* is meant "the document or documents that contain the material specifying the scope of work deemed to constitute approval and showing how the organisation intends to comply with this Annex (Part-145)" (OJ L362,17.12.2014:75-76).

I have also frequently employed the term "socio-professional" throughout the dissertation papers. By this is meant the profession-specific actions and interactions of and between European LAMEs, who, as a regulation-defined occupational group, share the same educational qualifications required for working with aircraft maintenance. As competent professionals in the European civil aviation sector, and through a shared recognition of their unique profession-specific capacity to legally release aircraft into service, LAMEs are approached here as "sociological professionals" within the aviation sector. This describes a sectorial equivalent of what Silbey et al. (2009) have previously termed "sociological citizens" concerning organisational managers and law enforcement officers' capacity "to see relational interdependence and to use this systemic perspective to meet occupational and professional obligations" (Silbey et al. 2009:203; see also Silbey 2011). Therefore, based on the long-recognised existence of a professional sub-culture among maintenance personnel, and in consideration of the fact that employing organisations' authorise LAMEs as certifying staff, the term socio-professional further infers here a collective capacity among LAMEs to recognise relational interdependence in making sense of their professional roles and legal obligations when carrying out their work in complex socio-technical and high-risk AMOs (see McDonald et al. 2000; Silbey et al. 2009:203).

Throughout this dissertation I have also frequently employed the term "safety science". As a contested term and field of research, safety science has been described as a multi- and interdisciplinary safety-focused scientific field of inquiry that "covers the totality of relevant educational programmes, journals, papers, researchers, research groups and societies" (Aven 2014: 20). The term safety science also implies "/…/a safety knowledge generating process, comprising two components, (i) knowledge about safety-related phenomena, processes, events, etc., and (ii) conceptual tools which cover the development of concepts, theories, principles and methods to understand, assess, communicate and manage (in a broad sense) safety" (Aven 2014: 20). Given the multifaceted character of safety research, and against the backdrop of "scientific diversity and fragmentation within safety science", some scholars also recognise the loosely coordinated and

wide heterogeneity behind intellectual safety knowledge production and thus allude to a pluralistic notion of "the safety sciences" (Le Coze et al. 2014:2). More recently, Dekker (2019:1) describes safety science as "the interdisciplinary study of accidents and accident prevention". He charts the plurality of safety science disciplines and offers that as a social science discipline, safety science describes how accidents are understood and responded to in society; as a psychology discipline, it examines human behaviour (individual, group and organisational) before and after accident occurrences; as a population health discipline, it explores trends and patterns surrounding accident occurrence; as a combination of physical science disciplines, it describes and explains the physical processes and practices underpinning accidents and their causes; and finally, as an engineering discipline, it identifies and examines actions and interventions to reduce accident occurrence and practices to deal with their consequences (Dekker 2019: 1-2). Although the use of the term safety science in this thesis embraces elements of the different descriptions outlined above, Dekker's association with accident prevention is highly relevant in the context of aviation and aircraft maintenance. This is because the development of international standards for safety management systems (hereafter SMS) and accident prevention and incident reporting in international aviation directly concern and affect the two regulated phenomena in focus – occurrence reporting and certification and release of aircraft into service.[5]

Research aims and questions

The main purpose of the research is to contribute new knowledge to build a better understanding of law and legality as it operates and is experienced by aviation professionals in relation to the implementation, application and enforcement of EU civil aviation regulations in different countries in the European aircraft maintenance sector. To do this, the research seeks to increase socio-legal understandings of law and legality in relation to LAMEs' experiences of the sector-specific regulatory requirements of occurrence reporting, just culture, and releasing aircraft into service. Of particular interest for advancing knowledge is building an understanding of how certifying LAMEs experience the vertical chain

[5] In Chapter 4, these international standards are discussed in relation to Annexes 13 and 19 of the Chicago Convention.

of hard and soft law comprising the EU regulations as implemented in national aviation regulatory frameworks and legal systems (hard law) and as applied and complied with by AMOs (soft law). Ultimately, the research aims to understand how LAMEs make law work as they uphold safety and participate in the socio-professional construction of legality in the multi-level regulatory environment framing this EU sector (see Ewick and Silbey 1998). With consideration of the normative heterogeneous character of aviation safety as a source of professional guidance in the aircraft maintenance sector, the research further explores if and how LAMEs' experiences of law are shaped by the normative sources with which they are associated (see Hertogh and Kurkchiyan 2016; Silbey 2013). I argue that much can be learned about the normative relationship between safety and law by exploring, through the critical lens of sociology of law, how aviation professionals engage with the different forms and levels of law in the EU civil aviation system as they go about their everyday work tasks. Throughout these tasks, they make law work by making safety work in an institutionalised hegemonic structure of rules where law operates ideologically as a risk and safety management strategy that ultimately supports the EU single market goals and ideals (see Banakar 2015; Ewick and Silbey 1998).

Four academic papers make up the dissertation and collectively address the research aims through the research questions that guided the work.

The overarching research question is:

> How can law, legality and safety be understood from licensed aircraft maintenance engineers' normative experiences of working in the regulated environment of the European aircraft maintenance sector?

The overarching research question is collectively answered through these sub-questions;

I. How can regulatory flexibility in European civil aviation maintenance be understood in relation to safety knowledge production, professional norms, and the employment of soft law as a form of regulation? (Paper I)

II. How can the relationship between law and safety be understood from European licensed aircraft maintenance engineers' perceptions of regulated occurrence reporting and just culture as procedurally just processes? (Paper II)

III. How can law, legality and safety be understood from European aircraft maintenance engineers' perceptions and normative experiences of certifying and releasing aircraft into service according to EU regulatory requirements? (Paper III)

IV. How can normative experiences of safety and legality be understood in relation to regulatory compliance and professional deviation as structures of meaning concerning law among licensed aircraft maintenance engineers working in the European civil aviation sector? (Paper IV)

Research question I is addressed in Paper I which provided the research project with a historical and socio-legal overview of relevant aviation and safety scholarship, not least to situate, explain and theoretically frame key concepts in the dissertation, such as just culture. Research question II is answered in Paper II, which employs a survey-based approach to explore just culture as a procedural justice-infused legal experience that enhances legitimacy, negates legal anxiety and facilitates safety reporting. Research question III is answered in Paper III, which uses a sequential mixed-methods approach employing survey (Sweden, Portugal and Norway) and interview data (Sweden and Portugal) to explore rule adequacy and normative experiences of safety surrounding EU requirements for CRS. Research question IV is answered in Paper IV by conducting a cultural analysis of law, and uses data gathered through qualitative semi-structured interviews with Swedish and Portuguese LAMEs to explore legal consciousness in the European aircraft maintenance sector.[6]

[6] The survey data included in Papers II and III was gathered using a single survey questionnaire for these two studies. The interview data in Papers III and IV was also gathered through the same interviews using thematically-aligned questions for the different studies.

Chapter 2.

Contextualising law and safety in the European civil aviation maintenance sector

With "an unusual degree of uniformity worldwide", commercial aviation is regarded as an ultra-safe yet high-risk industry in which the effective management of risk and safety is crucial to meet with aviation organisations' priority of ensuring profitability (Cusick et al. 2017:32; Huang 2009; Reason 1997:191; see EPAS 2019a; EPAS 2019b).

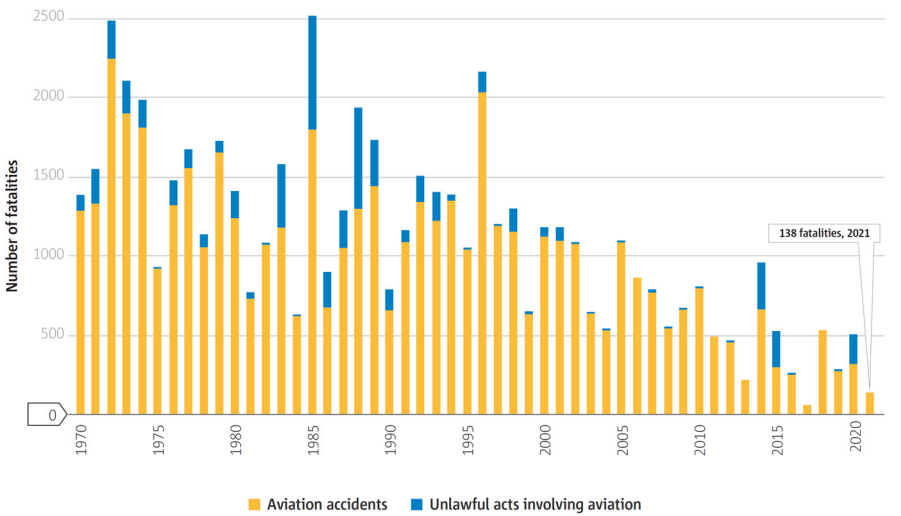

Figure 1:
Fatalities involving large aeroplane passenger and cargo operations worldwide (EASR 2022: 28, "EASA Annual Safety Review").

2017 has been identified as the safest year ever recorded in aviation with only five fatal accidents resulting in 50 fatalities in scheduled commercial flights, representing a global fatality rate of 12.2 fatalities per billion passengers (ICAO 2018:5; EASR 2019). To put this in perspective, pre-pandemic figures for 2019 show that 4.5 billion passengers flew on 46.8 million flights worldwide (IATA 2020:40).

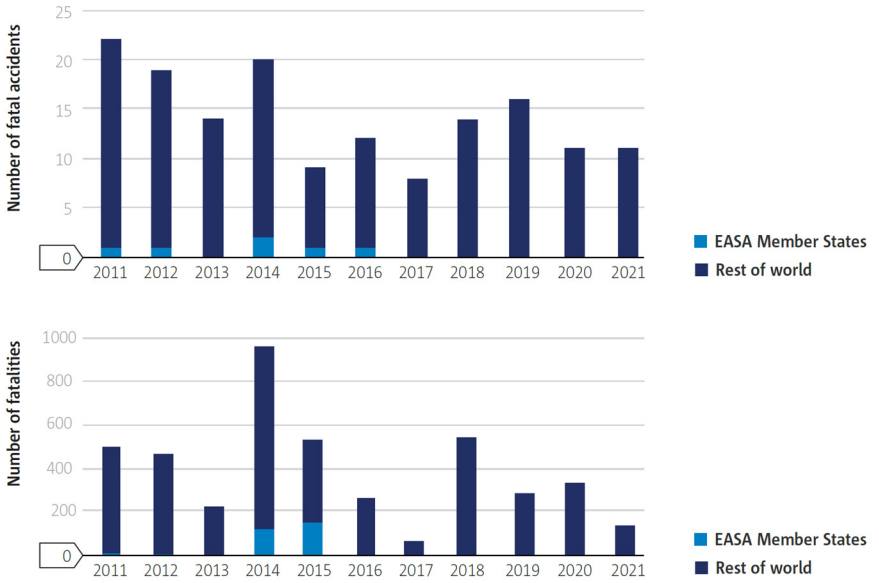

Figure 2:
Fatal accidents and fatalities involving large aeroplane passenger and cargo operations, EASA Member States and the rest of the world (EASR 2022: 27, "EASA Annual Safety Review").

Global aviation has experienced a 70% reduction in aircraft accidents from 3.60/million flights in 2008 to 1.08/million flights in 2017 (IATA 2018:18), and no fatal accidents in large commercial operations have occurred in EASA Member States since 2017 (see Figures 1 and 2 above). Considering these remarkable statistics, it is hardly surprising that the capacity of the aviation industry to manage risk, safety and human performance is frequently exemplified by other risk-critical societal sectors as an ideal model of safety management to follow (Pélegrin 2013:13; see Helmreich and Merrit 2016).

As a safety-critical complex socio-technical system, aircraft maintenance has been described as:

> /…/a highly dynamic and regulated industry characterised, for example, by complex and interdependent systems and technologies, detailed and legally binding task procedures and documentation, highly publicized accident rates and highly regulated management systems to ensure reliability, efficiency and safety at all times (Ward et al. 2010:248, citing Corrigan 2002).

Notwithstanding, the socio-professional context of aircraft maintenance provides scholarship with a prime example of a late-modern safety-critical sector defined by risks and uncertainty (see Banakar 2015:265-285; Silbey 2013; cf. Dekker 2019; Hollnagel 2014). Indeed, scholarship has long identified how working within the aircraft maintenance sector is particularly characterised by a "requirement of acting under uncertainty" (Pettersen 2013:108) and that aircraft maintenance safety is generally understood to accept that "deviations, uncertainties and surprises are inherent and to a large extent inevitable in maintenance operations" (Tsagkas et al., 2014:106). To control (and capture) uncertainty, previous research has, on the one hand, discussed a shift to performance-based regulation to succeed (or complement) compliance-based approaches for the management of safety in this sector (see Ulfengren and Corrigan 2015; Gerede 2015a; see Hodges 2015; EASA 2014; see also Lawrenson and Braithwaite 2018; Deharvengt 2013:168). On the other hand, scholarship has also identified the prevalence of informal work practices that accommodate and normalise procedural violations and deviations in the everyday functioning of the aircraft maintenance system (McDonald et al. 2000, 2002; Hobbs and Williamson 2002; Pettersen and Aase 2008; Ward et al. 2010; Pettersen 2013; Tsagkas et al. 2014). In the context of EU civil aviation, by:

> *performance-based regulation* is meant "a regulatory approach that focuses on desired, measurable outcomes";
>
> *performance-based regulatory environment* is meant "an environment based on safety performance indicators (SPIs) on which safety assurance and promotion as well as performance-based regulation and performance-based oversight can be built";
>
> *prescriptive regulation* is meant "a regulation that specifies requirements for mandatory methods of compliance" (EASA 2014:4).

The meaning and definition of safety in aviation must also be addressed here (see Cusick et al. 2017). ICAO's Safety Management Manual (Doc 9859, ICAO SMM) explicitly defines safety as:

> The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level (ICAO Doc 9859 2018:vii).

SMS is defined in the ICAO SMM as:

> A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures (ICAO Doc 9859 2018:viii).

And although safety culture is not (to date) a formal legal definition in EU legislation (see Lawrenson and Braithwaite 2018), it is described in the ICAO SMM which dedicates an entire chapter to safety culture and provides "guidance on the promotion of a positive safety culture" (ICAO Doc 9859 2018: 3-1). ICAO offer this description of safety culture:

> "/…/an expression of how safety is perceived, valued and prioritized by management and employees in an organization, and is reflected in the extent to which individuals and groups are: a) aware of the risks and known hazards faced by the organization and its activities; b) continuously behaving to preserve and enhance safety; c) able to access the resources required for safe operations; d) willing and able to adapt when facing safety issues; e) willing to communicate safety issues; and f) consistently assessing the safety related behaviours throughout the organization" (ICAO Doc 9859 2018:3-1).

More broadly, and with consideration of developments around safety thinking and safety management learning in safety science, Hollnagel (2014) distinguishes between two definitions of safety – Safety-I and Safety-II. In the older view, Safety-I, safety is defined as:

> /…/the condition where the number of adverse outcomes (accidents/incidents/near misses) is as low as possible. Safety-I is achieved by trying to make sure that things do not go wrong, either by eliminating the causes of malfunctions and hazards, or by containing their effects (Hollnagel 2014: 183).

In Safety-II, Hollnagel defines safety thus:

> /…/a condition where the number of successful outcomes is as high as possible. It is the ability to succeed under varying conditions. Safety-II is achieved by trying to make sure that things go right, rather than preventing them from going wrong (Hollnagel 2014:183).

Although these approaches to safety fundamentally differ with regard to a focus on outcomes, reducing failure, or improving success, Hollnagel stresses that Safety-I and Safety-II are compatible and thus signify two complementary rather than conflicting views of safety (Hollnagel 2014: 146). He describes Safety-II therefore as "a logical extension of Safety-I" (Hollnagel 2014:177). Given that the European civil aviation sector is undergoing a paradigmatic change from reactive to proactive approaches to safety management, a process which further involves a shift from compliance- to performance-based safety regulation, this thesis considers that safety management, as a regulated phenomenon (ideals and practices) in European aviation, continues to display both ways of thinking. While Safety-I remains influential, a transition towards Safety-II thinking increasingly defines safety management practices in most high-risk safety-critical sectors (see Hollnagel 2014:146-147; see also ICAO SMM 2018:2-1 – 2-20).

Chapter 3.

Previous research

In alignment with the previous research reviewed in the four research papers, I chronologically revisit some of the key studies and influential scholarship on the aircraft maintenance sector that have engaged with the concepts of compliance and performance, deviation and violation, safety culture and just culture. As discussed throughout the four research papers, I have identified these phenomena as characteristic of the socio-professional and regulatory context of the aircraft maintenance sector and apposite to situate and explain the everyday working lives of LAMEs.

Despite the diverse and comparative character of existing aircraft maintenance scholarship, it is fair to argue that, since the early 2000s, certain recurring topics have emerged and continue to dominate the scope and ambit of much discussion within this field of research. Some of these scholarly discussions are identified and addressed throughout the four dissertation papers; the empirical investigation of safety culture, safety climate, and SMS (see McDonald et al. 2000; Taylor and Thomas 2003; Ward et al. 2010; Atak and Kingma 2011; Gerede 2015a,b; Ulfengren and Corrigan 2015; see Dekker 2017; see Silbey 2009); the regulation and impact of occurrence reporting and just culture for the reduction of accidents and learning from incidents (Pérezgonzaléz et al. 2005; Reason and Hobbs 2003; Cromie and Bott 2016; Bükeç and Gerede 2017; Clare and Kourousis 2021a,c,d; Marais and Robichaud 2012; Insley and Turkoglu 2020; see Reason 1997); rule adequacy surrounding the implementation, adaptation and enforcement of EU regulations at national and organisational levels (Clare and Kourousis 2021b; Shanmugam and Robert 2015; Haas and Ourtau 2009); the prevalence and sectorial awareness of rule/procedural deviation and violation among aircraft maintenance personnel (McDonald et al. 2000; McDonald et al. 2002; Hobbs and Williamson 2002, 2003; Reason and Hobbs 2003; Pettersen and Aase 2008; Pettersen et al. 2010; Zafiharimalala et al. 2014; Tsagkas et al. 2014); and

divergences between top-down managerial and bottom-up hangar-floor level experiences and perceptions of professional roles and responsibilities (Gerede 2015a; Reason and Hobbs 2003).

Throughout the dissertation, I have engaged these discussions through key socio-legal scholarly approaches: the persistence of deterrence versus sectorial tendencies towards accommodative approaches to law to regulate conduct (Paper II; see Lind and Tyler 1988; Tyler 2006; Murphy et al. 2009; Dekker and Breakey 2016), the ubiquity of regulatory gaps (Paper III; see Banakar 2015; Nelken 1981; Gould and Barclay 2012), law and legal hegemony as an ideological operation of power (Paper IV; see Ewick and Silbey 1998; Ewick 2006; Sarat 1990a), and a late-modern shift from traditional regulation to regulation as risk management strategies (All papers; see Hodges 2015; Banakar 2015; Silbey 2013).

I wish to reiterate here that Paper I offers a critical analytical review that theoretically engages with the field of aircraft maintenance research, safety scholarship, expert and tacit knowledge, and the EU regulatory structure (see Banakar 2015; Silbey 2013; Luckmann 2008; Habermas 1996). The review of aircraft maintenance literature that follows includes and expands upon previous aircraft maintenance research and the reviewed literature in the four research papers. I approach the literature through the critical lens of sociology of law and expose what I argue is a gap in research defined by scholarly contradictions in much safety and aircraft maintenance research literature that frame and limit how normativity can be understood and articulated regarding law, legality and safety.

Should accommodative views accommodate or negate deterrence-based approaches?

Scholarly interest in aircraft maintenance studies has, since the early 2000s, employed and/or explored the concepts of safety culture and just culture. Against the backdrop of broader safety science discussions, on blame culture, the criminalisation of human error, and fear of retribution and punishment (Reason 1997; Schubert 2004; Dekker 2009, 2010; Michaelides-Mateou and Mateou 2010), empirical studies of aircraft maintenance have commonly contrasted the undesirability of blame and punishment approaches with the desirability and/or

necessity of just culture adoption for effective occurrence reporting and SMS (see Ward et al. 2010; Cromie and Bott 2016). In short, whereas blame culture, punitive retribution and the criminalisation of human error reflect a deterrence view of law and regulation, an accommodative approach embeds law as safety management (i.e. SMS), primarily through the regulation of occurrence reporting and just culture (see Hodges 2015).

As discussed throughout the dissertation papers, McDonald et al.'s (2000) scenario-based incident survey found that the most common expectation of technician respondents (~43%), across four AMOs and locations and four different occupational groups, was impartial investigation of incidents by maintenance organisations. Although over one-third (36.6%) indicated that maintenance technicians would face a disciplinary hearing in the wake of incidents, over one-third (35.3%) also expected that discussion with technicians to enhance learning from incidents would take place (McDonald et al. 2000:166). Organisational policies on discipline were found to mirror the incident survey findings where, for example, one organisation adopted disciplinary procedures aligned with a "no-blame policy" and open information sharing, another organisation demonstrated dependency on punitive courses of action such as suspending licences but also on post-incident retraining, while an impartial investigation was an expectation in another organisation showing little reliance on punitive measures (McDonald et al. 2000:172).

From a pre-EASA-era regulatory perspective (before 2002), these findings suggest that organisations employed differentiated approaches to deterrence and accommodative policies for handling incidents. Whereas the notion of a "no-blame policy" is discussed, it is noteworthy that no reference to just culture is made. An early EASA-era review of the then-proposed occurrence reporting system for Part-145 maintenance organisations was conducted by Pérezgonzaléz et al. (2005). Two points of interest in this review are especially relevant from a historical safety reporting perspective; first, that then-existing regulatory texts were identified as inadequate (pre-Regulation (No) 376/2014); second, that the fledgling EASA needed to establish a "coherent structural or procedural way" for internal reporting systems in maintenance organisations as well as the necessity for critically reviewing the EASA Part-145 regulations to evaluate which requirements needed improvement (Pérezgonzaléz et al. 2005:563-564). Importantly, just culture is not discussed directly.

Based on participatory action research conducted in a large European aircraft maintenance organisation, Ward et al. (2010) define a just culture as "one where people feel they can report mistakes made without fear of punishment (deliberate acts of damage or violations are different)" (Ward et al. 2010:264). Citing previous research involving 53 European aviation organisations (see Ward 2008), they highlight how most organisations struggled with adapting to the "no-blame" aspects of a just culture, not least in handling professional mistakes (Ward et al. 2010:265). Similar to McDonald et al.'s study discussed above, the notion of "no-blame" emerges here but as a normative expectation of just culture (see Pellegrino 2019:45-64; cf. Dekker 2017:21-25). It would seem that reconciling deterrence-based views reliant on blame with accommodative-based views promoting just culture was, in the early EASA period, proving problematic for organisations.

As discussed in Paper II, a top-down qualitative study of 30 expert and management participants in 23 AMOs across Turkey (Gerede 2015a) found that safety reporting was primarily challenged by a "culture of fear and blame" cultivated by poor just culture (Gerede 2015a:235-236, cites Dekker 2007). Gerede further claims that a "poor positive safety culture" may be a consequence of how organisations and regulatory authorities interact (Gerede 2015a:236). As such, a strong positive safety culture requires effective cooperation between organisations and authorities for establishing a working relationship in which accountability and a discipline system can be balanced and the culture of fear diminished (Gerede 2015a:238; cf. Silbey 2009:351). While Ward et al. (2010:264) argue that just culture is facilitated by a strong reporting culture, Gerede associates weak just culture (non-defined) with failing to facilitate safety reporting. In another study with 52 experts from 24 AMOs, Gerede (2015b) found that poor just culture was a problem at the regulation and implementation levels, negatively affecting safety and limiting SMS success (Gerede 2015b:115). He posits that "a blame culture and a punishment approach by authority", and the fear arising out of these disciplinary processes, constrain SMS development (Gerede 2015b:112). It is striking how in one study, Gerede identifies collaboration between organisations and authorities as necessary to establish an accommodative approach to safety management (Gerede 2015a) while in a second study, authorities are identified as the problematic purveyors of deterrence through poor just culture (Gerede 2015b).

Cromie and Bott's study of an international aircraft maintenance organisation operating in Europe and the United States explored organisational "culpability decision making in a just culture framework" (Cromie and Bott 2016:260). Their research found that aviation maintenance personnel in the studied organisation do think about culpability in ways that correspond with both "descriptive models of blame and with prescriptive culpability decision tools" (Cromie and Bott 2016:271). In other words, deterrence and accommodative views typify situational experiences and understandings of culpability in an organisational just culture framework. Whereas Gerede (2015b) identifies how managers uphold a deterrence view by conflating poor just culture with a blame culture reliant on punishment, Cromie and Bott present a more nuanced understanding of just culture in relation to culpability, one that favours accommodative views but does not accept undesirable unsafe behaviour. Importantly, they note that empirical studies of just culture must allow the concept to develop beyond dominant ideologically supported empirical research that continues seeking to confirm how open reporting is facilitated by a just culture (Cromie and Bott 2016:261). In other words, much research on just culture presents itself as a one-size fits all corroborative object of interest for accommodating an accommodative view.

In contrast, Bükeç and Gerede's qualitative study of seven large AMOs in Turkey exposed top-down managerial approaches to just culture that continue to espouse punishment as a deterrence strategy (Bükeç and Gerede 2017:191). They found that managers viewed disciplinary systems as imperative for ensuring safety in AMOs and therefore must build a just culture that embraces disciplinary processes (Bükeç and Gerede 2017:195). They aptly note that these top-down disciplinary practices are not commensurate with basic safety management requirements (Bükeç and Gerede 2017:194).

From law as regulation to law as safety management – does performance relegate compliance?

> The central aspect of regulatory compliance/…/institutionalisation and embedding of norms within some wider set of structures (Banakar 2015:274).

A second discussion linking the research papers addresses the purported changing role of law in aviation where performance supersedes compliance as the most effective means to regulate SMS in the EASA regulatory regime (see EASA 2014). Scholars have argued that following the introduction of ICAO's Annex 19 and the (global) SMS approach, a key feature of the regulation of aviation safety is that it is a sector that has evolved from compliance-based regulation reliant on prescriptive rules to a performance-based system that both supports and audits the safety (and regulatory) performance of regulators and operators alike (see Hodges 2015:580; Hodges and Steinholtz 2017; Ulfvengren and Corrigan 2015; cf. Huising and Silbey 2021). In the words of Hodges, "from law as regulation to law as safety management" (Hodges 2015:585-588).

Returning to McDonald et al.'s (2000) influential study, it was reported that many technicians understood their role as primarily signing off for the airworthiness of the aircraft rather than simply following prescribed task procedures. In contrast, their managers understood the technicians' role as strictly compliance-based, requiring them to always follow task and organisational procedures. Notwithstanding, the managers also recognised the inevitability of serious production delays if maintenance staff always followed strict compliance with procedural requirements (McDonald et al. 2000:163). However, compliance with the then JAR-145 requirements (now Part-145) was identified as a primary factor underlying policy and strategy for safety in all four organisations (McDonald et al. 2000:161). Of specific interest to current discussions on compliance and performance-based regulation is the finding that only one organisation had an explicitly articulated company safety standard, with *demonstrable compliance* with sectorial regulations as the effective criterion of safety performance in the other three organisations (McDonald et al. 2000:172, my italics). Pérezgonzaléz et al. (2005) identified that occurrence reporting was a requisite element of safety management in Part-145 approved maintenance organisations. Their suggestion that "the fast rate of regulatory change" (cf.

Banakar 2015:272, on Baumann) is a reason why many maintenance organisations lagged behind in applying EU/EASA regulations feels poorly reflected. They assert that an occurrence reporting system improves in different ways by employing the "Acceptable Means of Compliance (AMC)" for maintenance regulations yet fail to recognise that the AMC is the soft law material that organisations use to implement relevant regulations (cf. Haas and Ourtau 2009; Pérezgonzaléz et al. 2005:567).

Gerede (2015a) also addressed this process of change and describes the traditional approach to safety management as one that prescribes "how the world should be" through the provision of detailed (procedural) descriptions of an ideal world. This compliance-based approach requires that aviation operators "comply with the prescribed world order" to best ensure and improve on safety. In other words, safety is ensured through compliance with regulations "that guarantee an ideal world order are implemented" (Gerede 2015a:230; cf. Banakar 2015). In contrast, Gerede argues that the "new safety management paradigm" not only focuses on prescribing how the world ought to be but rather gives consideration to "how it really is". New safety system management thinking is built on achieving a "performance-based" approach to safety in which aviation organisations are expected to continuously advance their safety performance while still observing a high level of compliance with hard regulations (Gerede 2015a:230, referring to ICAO). This implies that the so-called shift from compliance to performance-based regulated safety management is still underpinned by a sectorial reliance on compliance (see EASA 2014). Gerede interestingly posits that the compliance-based approach is embedded in a deterrence view that secures compliance by employing blame and punishment (Gerede 2015a:236). And in contrast to Pérezgonzaléz et al.'s (2005:567) claim that "Acceptable Means of Compliance" improves the safety reporting system, Gerede identifies that SMS regulation and guidance is "not clear, comprehensible or comprehensive yet" with his study participants noting the "ambiguity of the place of the SMS in EASA Part-145" (Gerede 2015a:236).

Against the backdrop of a research gap surrounding the scope and adequacy of regulatory frameworks for implementing SMS in aviation, Batuwangala et al. (2018) investigated the regulatory framework for implementing SMS in initial and continuing airworthiness organisations. Similar to Gerede, they found that inadequate safety reporting and related feedback is at the core of these SMS

challenges and (unsurprisingly) name deficient just culture and reporting culture within organisations as such limitations (Batuwangala et al. 2018:11). They suggest that global levels of SMS implementation vary concerning maturity and regulatory enforcement (Batuwangala et al. 2018: 5).

Clare and Kourousis (2021a) explain that contemporary European occurrence reporting regulation "was developed to enable the collection, analysis and follow-up of occurrences for a performance-based safety oversight system" (Clare and Kourousis 2021a:341). Their qualitative assessment of the (international and European) regulatory structure for aircraft maintenance and continuing airworthiness exposes potential gaps and underperforming areas of the current legislative framework that does not sufficiently support learning from incidents, a vital aspect of SMS performance. Among the key areas highlighted were deficiencies in regulations and guidance that do not outline minimum competence requirements for human factors trainers, a lack of sufficient guidance for securing a standard approach to root-cause analysis, and a lack of guidelines for existing requirements in EU aircraft maintenance regulation to accurately assess just culture effectiveness (Clare and Kourousis 2021a:345). In a second paper, they analysed 15 deidentified mandatory occurrence reports to highlight the potential for aircraft maintenance and continuing airworthiness organisations to learn from reported occurrences (Clare and Kourousis 2021c:1). Despite the shift to performance-based regulation (Clare and Kourousis 2021a: 341), regulatory compliance emerged, among others (ethical, safety, best practice), as a key reason behind participants motivations to report incidents classified as mandatory (Clare and Kourousis 2021c: 11).

Violations as normal work practice – an acceptable means of "non-compliance"?

The influence of McDonald et al.'s oft-cited finding that over one-third of aircraft maintenance personnel regularly deviate from official routine procedures for tasks cannot be understated (McDonald et al. 2000:167-168). Notwithstanding, Hobbs and Williamson's (2003) study of the associations between errors and contributing factors in an Australian aircraft maintenance context did not wholly support these results. Based on their analysis of 619 occurrence reports included

with returned questionnaires (N = 1359), they found that licensed (93.7%) and unlicensed (5.6%) aircraft mechanic participants showed little tendency to allude to procedural concerns as explanations for the incidence of violations (Hobbs and Williamson 2003:196).[7] Violations nonetheless did account for ~17% of events involved in reported maintenance occurrences, and ~10% associated with rule-based errors. Procedure-related factors only accounted for 11.4% of reported maintenance occurrences (Hobbs and Williamson 2003:192-195). Hobbs and Williamson (2002) discuss how their survey-based study identified that routine violations, which they categorise as "rule-breaking actions that have become the normal way of working" (Hobbs and Williamson 2002:871), were most strongly associated with maintenance quality diminishing occurrences (Hobbs and Williamson 2002: 880). They assert that safety-focused interventions for dealing with such incidents must sufficiently account for the consequences of violations (and mistakes) while also paying due consideration to the factors fostering these incidents (Hobbs and Williamson 2002:866).

In this regard, Pettersen and Aase (2008) consider the socio-professional context of aircraft maintenance by examining safety through a practice-based perspective (Pettersen and Aase 2008:511). Based on a qualitative case study about safe work practices at the individual and group levels in line maintenance operations in Norway, they posit that work practices in aviation operations are ultimately embedded in the sector's regulatory frameworks and safety systems, and are affected by organisational procedural conditions and processes of change. However, they suggest that "grey zones" within the maintenance manuals and technical documentation limit the scope and capacity for technicians to carry out many tasks (Pettersen and Aase 2008:513). They claim that their study confirms their assertion that safe working practices are comprised of processes that are less visible in the production of safety, and dependent on "slack resources" as structural prerequisites for effectively establishing these practices within AMOs. By slack, they mean "an extensiveness of resources such as time, knowledge, competences and tangible assets (e.g., tools and spare parts) that are available for practitioners in the process of developing and/or maintaining adaptive capabilities" (Pettersen and Aase 2008:510). This understanding is also taken up by Ward et al. (2010), who argue that rather than assuming that safety procedures

[7] It is somewhat confusing that the authors also state that violations often involved decisions "to omit task procedures" and the use of "unapproved procedures" (Hobbs and Williamson 2003:193).

are "the ultimate criterion of system adequacy", an all-inclusive and ecologically valid model of the operational system is needed to exemplify not only what should happen, but also consider "what normally happens" (Ward et al. 2010:251). However, against the backdrop of McDonald et al.'s findings discussed above, they reflect on why violations are considered as violations when research consistently identifies this professional conduct as "normal practice". By recognising that violations occur up to 40% of the time in normal aircraft maintenance work practices, they also question the feasibility of concluding that violations are a major cause of accidents (Ward et al. 2010:250; cf. Insley and Turkoglu 2020; Hobbs and Williamson 2002).

Zafiharimalala et al. (2014:194) hypothesised that technicians' decisions not to use/read documentation (maintenance manuals) are because their costs-benefits estimation of using the documentation is less favourable at that specific point in time. They qualitatively explored why aircraft maintenance technicians do not systematically use their maintenance documents. Zafiharimalala et al. regard the use of documentation as an information-seeking, and as a secondary task (Zafiharimalala et al. 2014:190). By aligning their study with the results of previous research in aircraft maintenance (McDonald et al. 2000; Hobbs and Williamson 2002, 2003; Reason and Hobbs 2003), they suggest that maintenance engineers must engage with three main priorities when using documentation – safety, legality and efficiency (Zafiharimalala et al. 2014:205). In optimal circumstances, these three priorities should not be in conflict. Legality is often perceived as a means to achieve safety, with efficiency regarded as "a secondary criterion that is to be taken into account only if it does not threaten the two other priorities" (Zafiharimalala et al. 2014:205). They highlight, however, that in certain situations, tensions can arise between these three priorities where "a different relationship and a different order can be seen to be at work", which can occur despite safety still comprising "the highest priority" (Zafiharimalala et al. 2014:205).

Zafiharimalala et al.'s integrated results are interesting to reflect on in relation to Tsagkas et al.'s (2014:107) research, which sought to explore underlying factors of the organisational and cognitive dynamics behind deviating acts by mapping and analysing cases of formal procedural deviation observed during aircraft maintenance checks at a maintenance organisation in Greece. By deviation, they mean actions taken by technicians that depart from task prescriptions outlined in

aircraft manuals (Tsagkas et al. 2014:108). They found that deviations are frequently a consequence of very narrow margins of decision by maintenance technicians, that leave scant space for not deviating in some way or to some degree (Tsagkas et al. 2014:113). However, rather than the root cause, they suggest that technicians' decisions are often a consequence of an inherent impossibility to fully meet with all task requirements "at a specific time point" (Tsagkas et al. 2014:113). As they put it:

> The decisions taken by technicians and often considered as the causes of deviations are in fact the direct consequence of trade-offs in order to cope with the above-mentioned impossibility. This coping is presumably at the heart, not only of negative, but also of routine positive outcomes (Tsagkas et al. 2014:113).

This view contrasts with Zafiharimalala et al.'s hypothesis and subsequent claim that deciding to not use procedural documents may "be the cause, and not the consequence, of a procedural violation" (Zafiharimalala et al. 2014:194). Importantly, Tsagkas et al. note that "working at the edge of compliance and adaptation is actually inherent" in systems like aircraft maintenance (Tsagkas et al. 2014:113).

Analytical reflection on reviewed scholarship

As discussed in Paper I, scholarship on occurrence reporting and just culture is historically and epistemologically embedded in claims about law that support a dominating recurring linear argument – that is, invoking blame and punishment and/or legal consequences and state-based prosecutions of human error and honest mistakes generates fear of law among aviation professionals. As a consequence of legal proceedings, legal anxiety is exacerbated and safety reporting is hindered because professionals do not wish to expose themselves to potential punishment and/or legal sanctions (Schubert 2004; Dekker 2017; Pellegrino 2019; see Paper II). Yet the scholarship on aircraft maintenance and the professional conduct and work practices among aircraft maintenance personnel, as discussed in the above review, consistently reports that more than one-third of technical staff do not always follow procedural requirements and/or regularly deviate from or violate the prescribed standards and rules (see Papers III and IV). The reviewed scholarship (McDonald et al. 2000; Hobbs and Williamson 2002; Pettersen and Aase 2008; Cromie and Bott 2016; see Papers I, II, and III) has

frequently reported that rule inadequacy and non-uniformity, both for implementation and enforcement, may lie behind this shortfall.

By considering the two regulated phenomena in focus to explore law and legality in the everyday working lives of European LAMEs – occurrence reporting and the certification and release of aircraft into service – this dissertation identifies a fundamental epistemological disjunction in safety and maintenance scholarly research addressing blame culture and punishment, the criminalisation of human error, and fear of legal consequences as safety limiting problems. This gap in research concerns, on the one hand, the emergence of just culture to negate legal anxiety and, on the other hand, the findings from aircraft maintenance research consistently identifying the prevalence of procedural/rule violations and deviations. In short, in contrast to occurrence reporting, legal anxiety seems commonly absent for over one-third of LAMEs who may deviate as normal practice (cf. Vaughan 2016:119-195). This is even more remarkable given the fact that by signing a CRS, LAMEs are ensuring compliance with regulatory and procedural requirements and standards, and as such, are always legally accountable for their own actions, and those of others that they must verify (and supervise) to sign-off and release (cf. Huising and Silbey 2013; Huising and Silbey 2021).

This thesis argues that common to both of these regulated phenomena is the legal requirement of providing an account of one's actions – that is, through the reporting of safety occurrences or the signing of a CRS. This means that these professionals must engage with law in their everyday working lives in a way that not only exposes them to the sectorial legal framework but also potentially subjects them to the regulatory authorities and national justice system of their own or another country in the event of suspected wrongdoing, including violations. If fear of legal consequences hinders safety reporting but does not prevent LAMEs from violating the regulations and/or procedures to which they can be held legally accountable, especially through a signed CRS, then it seems to me that research to date has failed to explore if the experience of law and legality in this sector may well be layered according to the normative source and perhaps the form of legality with which it is associated and where it lands (see Hertogh and Kurkchiyan 2016:416; Silbey 2013:11). To the best of my knowledge, no research to date has identified this contradictory understanding of law in this sector as a factor that may affect the experience of law and the socio-professional production of legality in this sector.

Chapter 4.

Overview of the regulatory context of aircraft maintenance in Europe

Throughout the four research papers in the dissertation, I provide detailed overviews of the EU/EASA regulations for continuing airworthiness and occurrence reporting that apply to the LAME profession and the aircraft maintenance sector. In this section, I provide a general overview of the broader multi-level regulatory context of civil aviation to illustrate how the international, European and national levels of law and regulation interact. This is to elaborate on and complement the descriptions provided in the research papers as well as to situate the various levels and forms of law in the broader sectorial context that institutionally and structurally circumscribes the normative experiences of those working in the regulated environment of aircraft maintenance.

Civil aviation governance at the international level

The Convention on International Civil Aviation (hereafter "the Convention") and its functions set out the charter of the International Civil Aviation Organisation (ICAO), which was established in 1947 (the year that the Convention entered into force) as the United Nations (UN) specialised agency responsible for global aviation (ICAO 2022a; see Huang 2009; Havel and Sanchez 2014:55; Weber 2017:9-32). As of 2023, there are 193 sovereign signatory states party to the Convention, and the national governments of these states fund and direct ICAO "to support their diplomacy and cooperation in air transport" (ICAO 2022b). As ICAO members, all Contracting States to the Convention consent to international collaboration with the objective of securing "the highest practical degree of uniformity in regulations, standards, procedures, and

organization" concerning all aviation matters so that such uniformity may facilitate and improve aviation safety (Huang 2009:45; Dempsey 2004).[8] The Convention mandates ICAO to establish standardised benchmarks against which the performance of legal obligations by states can be measured. The primary instruments deployed by ICAO for fulfilling this purpose are the International Standards and Recommended Practices (hereafter SARPs) (Huang 2009:45; Weber 2017:19-22). Currently, there are over 12000 SARPs across 19 Annexes to the Convention which ICAO regularly updates in keeping abreast with global sectorial developments and industry technical innovations (ICAO 2022c).

Table 1.
Annexes pertinent to continuing airworthiness and aircraft maintenance

Annex	Domain
Annex 1	Personnel Licensing
Annex 6	Operation of Aircraft
Annex 8	Airworthiness of Aircraft
Annex 13	Air Accident and Incident Investigation
Annex 19	Safety Management
Standard and Recommended Practices – "SARPs"	
Standard	"Any specification for physical characteristics, configuration, matérial, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which Contracting States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 38" (ICAO 2020:x; see Huang 2009:45).
Recommended Practice	"Any specification for physical characteristics, configuration, matérial, performance, personnel, or procedure, the uniform application of which is recognized as desirable in the interest of safety, regularity, or efficiency of international air navigation, and to which Contracting States will endeavor to conform in accordance with the Convention" (ICAO 2020:x; see Huang 2009:45).

Table 1 above names five annexes to the Convention that are of most interest to the dissertation's focus on continuing airworthiness, aircraft maintenance, the LAME profession, the release of aircraft into service, and occurrence reporting. It

[8] See Art. 12 of the Chicago Convention.

also defines what is meant by an international standard and a recommended practice (SARPs) (see ICAO 2022g).

The Chicago Convention requires states "/…/to maintain uniform aviation regulations in conformity (to the greatest possible extent) with those established under the Chicago Convention, referring to the most important of ICAO's legislative function – the formulation and adoption of International Standards and Recommended Practices (SARPs)" (Leloudas and Haeck 2003:160).[9] However, scholars have long identified that the legally binding nature of the SARPs is a contentious issue with Article 12 of the Convention requiring that a contracting State "undertakes to keep its own [aviation] regulations...uniform, to the greatest possible extent, with those established from time to time under [the] Convention" (Havel and Sanchez 2014:60; see also Huang 2009). This implies that SARPs do not have the binding legal force of the Convention but rather, must be considered as (international) "soft law". However, notwithstanding the non-binding effect of soft law, it is in the immediate financial and trade interests of contracting States to comply with the SARPs lest they be excluded from the international aviation sector and incur related economic losses therewith (Leloudas and Haeck 2003:160; see also Dempsey 2004; cf. Creutz 2013).[10]

ICAO's Universal Safety Oversight Audit Programme (USOAP)

Launched in 1999, ICAO's Universal Safety Oversight Audit Programme (USOAP) oversees the attainment of the safety oversight obligations of ICAO Member States. More specifically, a USOAP is an audit carried out by ICAO to assess the effective implementation of the critical elements (CEs) of a safety oversight system (see Table 2), and involves carrying out a systematic and objective review of state safety oversight systems. This is to verify states' compliance with the Convention provisions or with national regulations and

[9] See Art. 12 of the Convention.

[10] In discussing normative pluralism in the context of "law versus codes of conduct", Creutz suggests that "the traditional binary conception of law had to make room for perceptions of relative normativity of which soft law is an embodiment" (Creutz 2013:186).

related implementing status of ICAO SARPs, procedures and aviation safety best practices (ICAO 2022d; see Weber 2017:23-25). ICAO defines the main objective of USAOP as "to promote global aviation safety by regularly auditing ICAO Member States to determine their capability for effective safety oversight" (ICAO 2010a). ICAO adopts a Continuous Monitoring Approach (CMA) to achieve its objective, which is a harmonised and coherent approach where ICAO Member States' safety oversight capabilities are continuously monitored to identify safety deficiencies, assess associated safety risks, develop strategies for CMA assistance activities, and facilitate the prioritisation of assistance (ICAO 2010b). ICAO has carried out USAOP activities in 187 of the ICAO Member States which ultimately means that 97% of Member States have safety oversight responsibility for 99% of all international air transport (ICAO 2023). More broadly, the USOAP results provide ICAO with an evidential basis to assess the capability of a state to provide safety oversight by examining if that state "has effectively and consistently implemented the eight critical elements (CEs) of a safety oversight system" (ICAO 2022e). By using the CEs, a state can effectively implement the ICAO SARPs and related procedures and guidance material (ICAO 2022e).

Table 2.
ICAO critical elements for USAOP

Critical Element	Audit Area
CE-1	Primary aviation legislation
CE-2	Specific operating regulations
CE-3	State civil aviation system and safety oversight functions
CE-4	Technical personnel qualification and training
CE-5	Technical guidance, tools and the provision of safety-critical information
CE-6	Licensing, certification, authorisation, and approval obligations
CE-7	Surveillance obligations
CE-8	Resolution of safety concerns

With consideration of the three EASA Member States included in the dissertation research, Figure 3 compares respective "effective implementation" performance for audits carried out in Norway (2018), Portugal (2019), and Sweden (2016), and compares these scores against a global average for the eight audit areas that

USAOP monitors (ICAO 2023). Noteworthy differences are discernible from the graph with Norway showing the highest scores for Accident Investigation (Annex 13). Although Norway reports scores that are equivalent to the global average for effective implementation of legislation, the results are noticeably lower than those for Sweden and Portugal in this audit area. And whereas all three EASA Member States scores perform well above the global average concerning Licensing, Sweden scores slightly lower for Airworthiness (Annex 6) but higher for Organisation than both Norway and Portugal (ICAO 2022f).

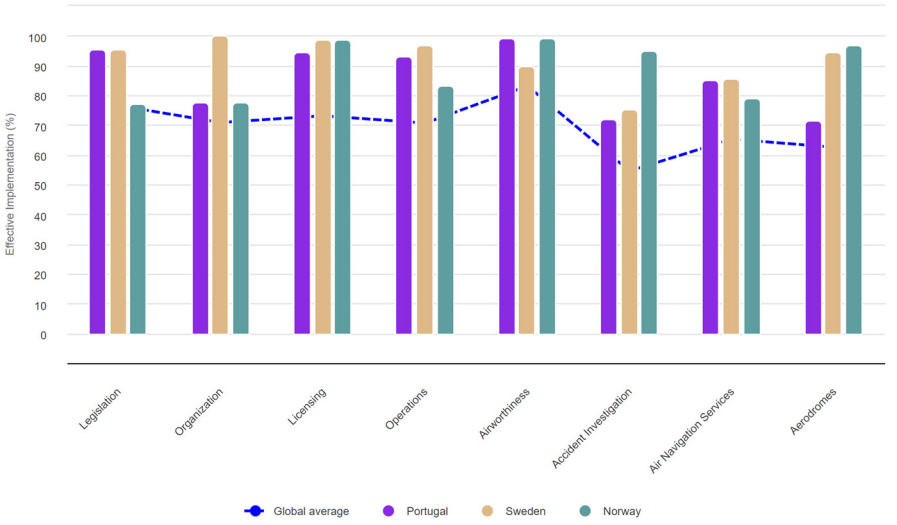

Figure 3.
USAOP effective implementation performance results in Norway (2018), Portugal (2019) and Sweden (2016) and showing global average (see ICAO 2022f)

Civil aviation governance at European level – The European Union Aviation Safety Agency (EASA)

In the EU, the European Commission (EC, hereafter the Commission) is the legislator (regulator) for civil aviation, which under its transport strategy for Europe has the aim of establishing the EU as the safest region globally for aviation (EC 2019; EC 2015a; Simoncini 2015; Hodges 2015:576). Broadly speaking, the

Commission extends "compliance and implementation-related tasks" to its agencies with the expectation that they will work to improve the application of EU rules across all Members States. As the mainstay of the EU aviation safety strategy, EASA is a supranational EU agency working as a "catalyst of compliance" for EU law. Established in 2002, EASA is the competent authority for aviation safety in the EU. Currently, the main regulation governing EASA and EU civil aviation (in all Member States) is "The Basic Regulation" – Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L212, 22.8.2018:1-122). Ultimately, in accordance with the requirements of the Basic Regulation, the international SARPs are met within EU Member States through shared administrative governance between the EASA and NAAs (see Huang 2009; Coman-Kund et al. 2017; see also Pierre and Peters 2009).

As an independent body regarding technical issues, EASA also has administrative, financial and legal autonomy with safety data analysis and research also fundamental to its scope of work. From a regulatory perspective, EASA is empowered to issue opinions, draft essential requirements and implement rules for adoption by the Commission. Consequently, the Commission must always consult with EASA before making any changes to the implementing rules. Across 31 Member States (EASA membership includes non-EU (EEA) countries of Norway, Switzerland, Iceland and Lichtenstein), EASA conducts standardisation inspections and audits to systematically monitor how National Competent Authorities (NCAs) (and/or NAAs) apply the Basic Regulation and its requirements, including the relevant Implementing Rules. These audits also entail assessing the uniform implementation of these regulations. According to EASA, this is to safeguard that the European public can safely fly within the EU, to enable the EU aviation industry to benefit from a level playing field, to provide assurance that NCA/NAA issued certificates are mutually recognised and trusted, and to guarantee that international partners recognise the European system. As part of its standardisation activities, EASA also provides training to Member State

officials. Notwithstanding EASA's powers, all EU/EASA Member States have the main responsibility for the implementation of EU civil aviation safety legislation and, by extension, are legally bound to comply with EASA-issued decisions and regulatory outputs (EASR 2022:167; EASP 2015:14; EASA 2019a; EASA 2019b; EASA 2019c; see Clare and Kourousis 2021:341-343; Simoncini 2015; Ratajczyk 2015; Busuioc 2013:31; Coman-Kund 2012; Huang 2009:208; Schout 2012:63-83; Sulocki and Cartier 2003:311). As EASA explains:

> Standardisation activities entail assessing the NCAs' ability to discharge their safety oversight responsibilities on a continuous basis, as well as conducting standardisation inspections as necessary to directly verify the implementation of the rules. Such inspections are prioritised, planned and performed using a risk-based approach, based on the Agency's assessment of all available indicators (EASR 2022:167).

National-level governance

The national aviation authorities – NAAs – in EU/EASA Member States are key actors in this multi-level regulatory environment. They transpose, implement and enforce the international SARPs and EU regulations into national law and legal frameworks as required. In doing so, the NAAs can both identify and stipulate state-specific requirements and amendments[11] (Müller and Drax 2014:50; see Coman-Kund et al. 2017). In this section, I offer a brief description of the NAAs and state legislation relevant to the aircraft maintenance sector in Sweden, Portugal and Norway. As discussed in the Introduction, across all EU/EASA Member States, continuing airworthiness and aircraft maintenance is primarily regulated through the requirements laid down in Commission Regulation (EU) No 1321/2014 (OJ L362,17.12.2014:1-194), with occurrence reporting regulated through Regulation (EU) No 376/2014 (OJ L 122,24.4.2014:18-43).

[11] See Art. 1(2)(g) Regulation (EU) No 1139/2018.

Portugal

The Portuguese Civil Aviation Authority ("Autoridade Nacional da Aviação Civil", hereafter ANAC) is the national authority for the field of civil aviation in Portugal with jurisdiction over the national territory and airspace of the Portuguese state and its dependencies. ANAC has a legal personality that is governed by public law and operates as an independent administrative entity endowed with administrative, financial and management autonomy, as well as its own assets. ANAC is empowered to carry out regulatory, inspection and supervision functions (oversight) in the Portuguese civil aviation sector and is governed in accordance with the provisions laid down in both international and European law, the Framework Law on regulatory bodies, related statutes and other applicable sectoral legislation (ANAC 2022, my transl.). Although there are three main levels of legislation (international, EU and domestic), civil aviation in Portugal is bound by EU treaties and therefore primarily subject to EU rules and statutes. Aviation safety is ultimately regulated through the Basic Regulation (EU) No. 1139/2018 where ANAC (together with other bodies) has the responsibility for its implementation into national law (Lexology 2022).

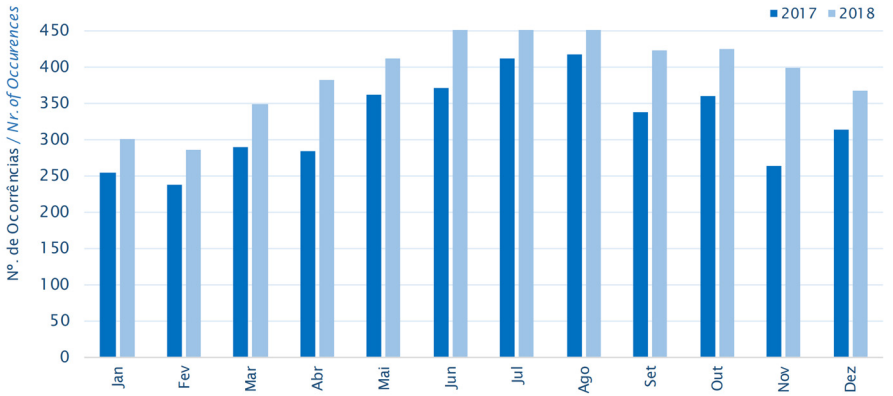

Figure 4.
Occurrence reporting rates to Portuguese CAA in 2017-2018 (ANAC 2018:62, "Anuário Nacional da Aviação Civil 2018"; see Paper II and Paper IV).

The EU legislation specifically covering the maintenance of aircraft is Commission Regulation (EU) No. 1321/2014 (Airworthiness and Personnel Approval regulation) but also Regulation (EU) No. 748/2012 (Airworthiness and Environmental Certification). At the national level, Decree-Law 66/2003 is the state legislation for regulating the "certification, approval and authorization of the entities responsible for the conception, project, production and maintenance of civil aircraft" including "the certification, approval and authorization of products, parts, components and equipment used in civil aviation" (Lexology 2022; see also Diário da República 2023a). The "Circular Técnica de Informção" (CTI) are also relevant sources of national regulation which lay down and communicate specific national-level technical requirements. Moreover, "Circular de Informção Aeronautica" more generically address procedural communication with stakeholders (see ANAC 2023). Occurrence reporting is covered by EU level Regulation (EU) No 376/2014 with national-level Decree-Law 318/99 requiring that all serious incidents and accidents, including maintenance related, must be reported to the Portuguese national safety investigation authority (GPIAAF)[12] (see Diário da República 2023b).

Sweden

In Sweden, the Swedish Transport Agency ("Transportstyrelsen", hereafter STA) is the government body responsible for rail, sea, air and road transport.[13] Civil aviation makes up a core department of the STA, which has overall responsibility for the drafting and oversight of civil aviation regulations as well as for examining and granting permits. In the field of civil aviation in Sweden, safety and security fall under the ambit of the STA, which adapts accordingly to industry changes and monitors the dynamic aviation market (STA 2022a). Civil aviation in Sweden is primarily regulated through the Aviation Act (2010:500) – "luftfartslagen" – where Chapter 1, Section 1[14] stipulates that "Aviation within Swedish territory may only be carried out in accordance with this act or other statute, unless otherwise stipulated in EU regulations" (see STA 2022b). With

[12] Gabinette de Provenção e Investigação de Acidentes com Aeronaves e de Acidentes Ferroviários

[13] *Transportstyrelsen* can be regarded as a National Competent Authority (NCA).

[14] "Introductory provisions"

regards to LAMEs, AMOs, CRS, and occurrence reporting, Chapter 3[15] of the Aviation Act covers airworthiness with aircraft maintenance specifically addressed in Section 11(1) (see also Swedish Aviation Ordinance (2010:770) "luftfartsförordningen" (STA 2022c)). Swedish national regulations specific to continuing airworthiness are subject to Commission Regulation (EU) No 1321/2014, but also include TSFS 2014:35 "Transportstyrelsens föreskrifter om godkännande av organisationer för underhåll av flygmateriell" (STA 2022d). The reporting of incidents is covered by Chapter 10,[16] Sections 8-10[17] (2010:500) and Chapter 10, Section 9 (2010:770) but more specifically outlined in TFHS 2017:75 "Transportstyrelsens föreskrifter och allmänna råd om rapportering av händelser inom civil luftfart" (STA 2022e).

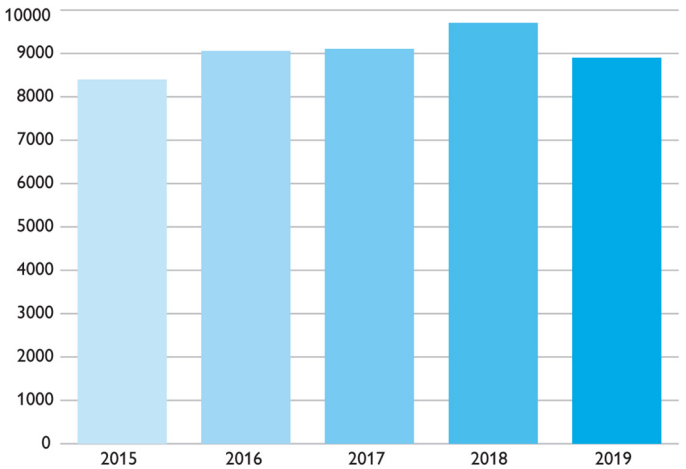

Figure 5.
Occurrence reporting rates to the STA in Sweden from 2015-2019 (STA 2019:11, "Transportstyrelsens säkerhetsöversikt Luftfart 2019"; see Paper II and Paper IV).

[15] Airworthiness and compliance with environmental standards.

[16] Search and rescue operations, salvage operations, investigation of aviation accidents and reporting of incidents.

[17] See also Chapter 10, Sections 8-18 of the Swedish Aviation Ordinance (2010:770)

Norway

The Civil Aviation Authority of Norway ("Luftartstilsynet", hereafter CAAN) defines its main objectives as "to contribute to safe civil aviation in Norway" (CAAN 2022a). The CAAN is responsible for the oversight and regulation of "all aspects of civil aviation in Norway", a responsibility that also involves "implementing and customising national and international legislation and regulations". As an EASA Member State but not in the EU, and together with Lichtenstein, Iceland and the EU Member States, Norway is part of the European common market in the field of aviation through the European Economic Area Agreement (hereafter EEA Agreement). All countries party to the EEA Agreement must demonstrate compliance with common safety regulations issued by the European Parliament and Council as well as by the European Commission (CAAN 2022b).

In Norway, "Lov om luftfart" (LOV-1993-06-11-101) is the main legal act regulating Norwegian civil aviation. Commonly referred to as "luftfartsloven" (The Aviation Act), it stipulates that "aviation in Norway may only take place in accordance with this Act and other regulations that are issued pursuant to the Act. In that Norway is not a Member State of the EU, for aviation authorities that are covered by the provisions of the EEA Agreement, the rules on the completion and implementation of the EEA Agreement for the field of aviation in 'luftfartsloven' take precedence over the other provisions" (Lovdata 2022a, my transl.) Chapter 4 (§§4-1 – 4-11) covers airworthiness and environmental standards (FOR-2021-06-25-2247[18] and FOR-2015-05-07-488[19]), while incident and occurrence reporting is covered under Chapter 12 (see FOR-2016-07-01-868).[20]

[18] See (Lovdata 2022b). See also BSL B 3-3 "Forskrift om kontinuerlig luftdyktighet for nasjonalt sertifiserte luftfartøy (CAAN 2022).

[19] See (Lovdata 2022c). See also BSL B 3-3 "Forskrift om kontinuerlig luftdyktighet mv. (vedlikeholdsforskriften) (CAAN 2022)

[20] See (Lovdata 2022d). See also BSL A 1-3 "Forskrift om rapporterings- og varslingsplikt ved luftfartsulykker og luftartshendelser mv." (CAAN 2022)

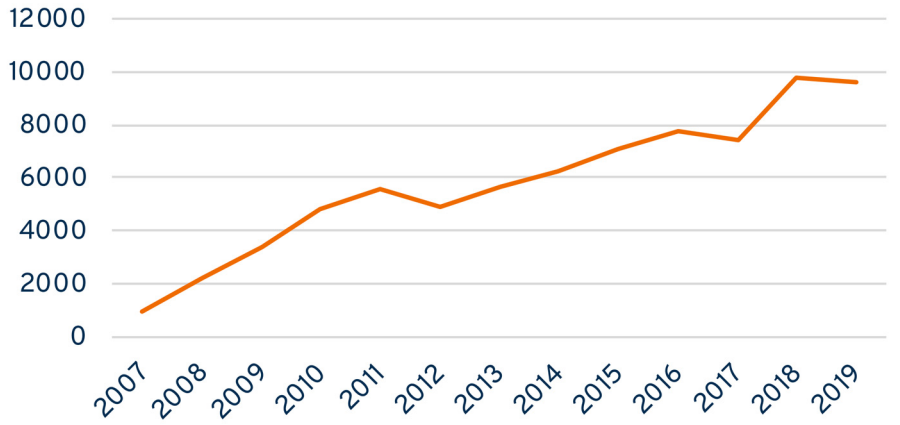

Figure 6.
Occurrence reporting rates to Norwegian CAA from 2007-2019 (CAAN 2019:12, "Norskeflygsäkerhetsresultater 2019"; see Paper II and Paper IV).

In sum, and as I have discussed in Paper II and Paper IV, reporting rates (to NAAs) are almost twice as high in Sweden and Norway compared with Portugal. This does not mean, however, that Portugal has low rates or poor safety performance, but rather that it has *lower* reporting rates. Indeed, as the results of the USAOP audits show, Portugal performs well above the global average and, for most CEs, performs equivalent to or better than, its Nordic counterparts. To make sense of these national-level reporting rates in a broader context of occurrence reporting in the EU, Figure 7 shows the number of reports collected in the European Central Repository (ECR) per year since 2016.

Reporting rates have risen continually from 2016 to 2019 and almost a quarter of a million reports were collected in the ECR in 2019. Given that Regulation (EU) No 376/2014 entered into force in November 2015, a strong positive trend defines occurrence reporting in the EU/EASA civil aviation system (Ratajczyk 2015:130).

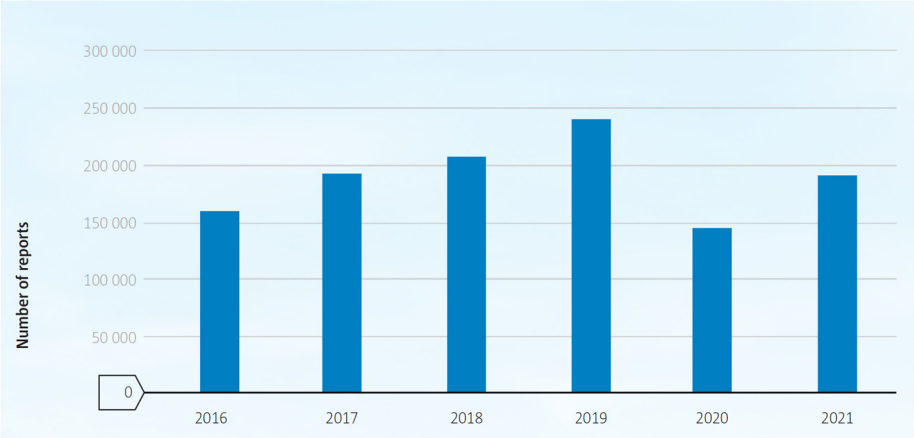

Figure 7.
Number of occurrence reports collected in the ECR per year (EASA Annual Safety Review 2022: 161).

Analytical reflection on the regulation of aviation – from soft to hard to soft to flexible (hard/soft) law

What emerges from the multi-level regulatory context of civil aviation outlined above is that despite the shift towards a performance-based regulatory environment, the achievement of uniformity still relies heavily on the achievement of compliance, whether directly enforced or softly presumed. This holds true for the SARPs and EU/EASA regulation implementation at the national and organisational levels. National-level enforcement remains central in this process. The fulfilment of the sought-after ideal of uniformity establishes a dynamic flow through hard and soft law forms of law and legality – from the soft law SARPs to the hard law EU (and national) regulations to the soft law AMC/GM and to a legally approved MOE embracing regulatory flexibility. Figure 8 illustrates this meandering flow of hard and soft law in the context of aircraft maintenance, consonant with what Silbey refers to as "normative transformations" that modify the form of regulation to achieve regulatory goals, in this case, across the

institutional and structural levels of civil aviation regulation (Silbey 2013:8; see Terpan 2015; Saurugger and Terpan 2021[21]; see Banakar 2015:265-285).

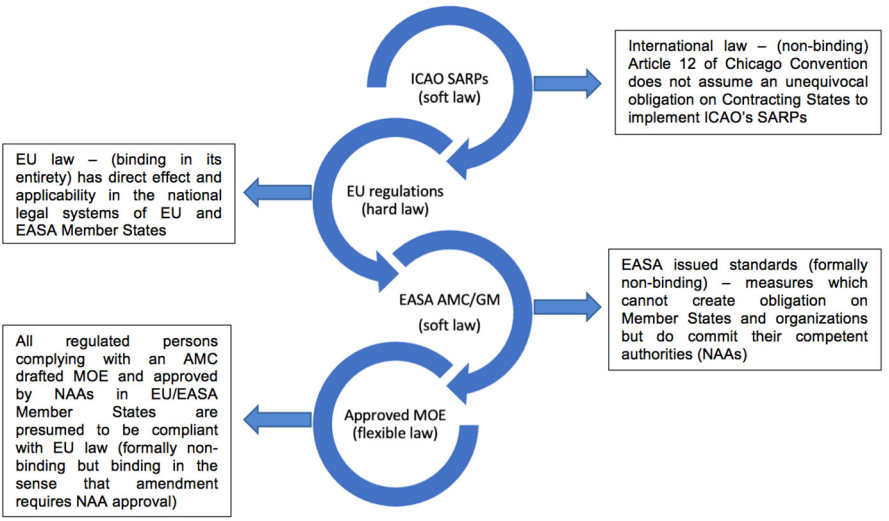

Figure 8.
The meandering flow of hard, soft and flexible law defining regulation of the European aircraft maintenance sector (developed by the author; see EC 2011: 9-11).

With consideration of international and European rules, it is important to reiterate here that for EU/EASA Member States, the hard law EU regulations differ distinctly from ICAO's SARPs in that they are not minimum requirements but directly binding EU law in its entirety. And as a principle of EU law reflected in the Treaties, Member States are not permitted to derogate from or impose additional requirements to these hard law EU regulations (Ratajczyk 2015:148). It also merits mention that the EASA is unequivocally clear that regulation in a performance-based environment should not be understood as "deregulation" or "absence" of "binding or concrete rules". EASA states that it "is not a relaxation or substitute of the prescriptive system" where "continued adherence to

[21] Saurugger and Terpan discuss normative transformations in the EU in relation to processes surrounding the hardening and softening of law and how these processes operate in oppositional directions (Saurugger and Terpan 2021:7-8)

prescriptive rules remains a success factor in a PBE [performance-based environment] to meet the targets" (EASA 2014:8-9; see also EC 2011:9-11).

Scholarly discussions on civil aviation and the regulation of this EU sector must consider the European Commission's "Aviation Strategy" described as "a milestone initiative to boost Europe's economy, strengthen its industrial base and contribute to the EU global leadership" (EC 2015a). The priorities of this strategy are predominantly single market-focused for placing the EU as a leader in international aviation while maintaining a level playing field, addressing barriers to growth in the air and on the ground, sustaining high EU standards and advancing progress on innovation, digital technologies, and investments (EC 2015a; see also EC 2015c).

As discussed throughout the research papers, the EU civil aviation safety system covers all principal regulated domains of this sector – design, production, airworthiness, maintenance, operation of aircraft, licensing, and provision of air navigation services, to name a few key areas. Figure 9 below shows how although common European rules govern this sector, implementation responsibilities such as certification, regulatory oversight and enforcement tasks, are shared between the EU and Member States with the NAAs ultimately having direct enforcement powers over legal and natural persons subject to the EU safety rules. As stated by Coman-Kund et al. (2017), "The shared and complementary responsibilities of EASA, the Commission and the NAAs in respect of oversight and enforcement are the hallmark of the EU aviation safety system" (Coman-Kund et al. 2017:117). Or as Simoncini aptly describes the EU civil aviation regulatory system:

> Safety is built around the paradigm of the rule of law: by controlling the compliance with the prescriptions of EU regulation and employment of soft law instruments, EASA measures if and how regulated subjects are complying with EU regulation. This means verifying the compliance with the basic regulation and its implementing regulations – that are binding – even through the substantive compliance with CS and AMC[22] – which are not binding in a strict sense, but can however be derogated from only if the same level of safety is achieved (Simoncini 2015:325-326).

[22] Certification Specifications and Acceptable Means of Compliance.

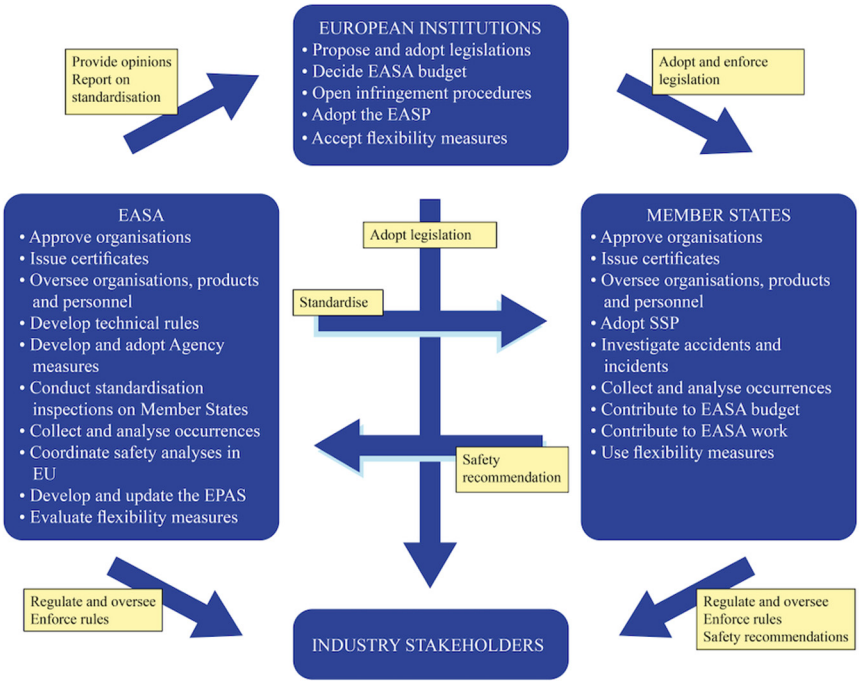

Figure 9:
Interrelationships between stakeholders in the EU civil aviation system (see EC 2015b)[23]

Figure 9 refers to "SSP", meaning *State Safety Programme*. In the ICAO SMM, by SSP is meant "An integrated set of regulations and activities aimed at improving safety" (ICAO Doc 9859:viii). Defined under Regulation (EU) No 376/2014, it means "an integrated set of legal acts and activities aimed at managing civil aviation safety in a Member State" (OJ L 122,24.4.2014: 25). Several Annexes to the Chicago Convention (including 1, 6, 8, 13, 19 discussed above) require that Contracting States establish an SSP with the main objective to harmonise and extend provisions to safety management to ensure the achievement of an acceptable level of safety in aviation services and operations within and related to

[23] Figure 9 is adopted from "Annex 1 to The European Aviation Safety Programme Document (2nd Edition) to the Report to the European Parliament and the Council, the European Aviation Safety Programme" (EC 2015b).

that state. The ICAO Safety Management Manual (SMM – Doc 9859) contains the framework and guidance for developing and implementing an SSP, and is applied together with Annex 19 for establishing effective safety management systems. An SSP must include four components; state's safety policy and objectives; state's safety risk management; state's safety assurance, and state's safety promotion (see Skybrary 2022; Clare and Kourousis 2021b; see also ICAO Doc 9859 2018).

The EASP refers to the *European Aviation Safety Programme*. As an EU-level equivalent to the SSP, the EASP provides a more efficient means of meeting the main areas of SSP obligations outlined above and thus supports EU/EASA Members in developing SSPs. The EASP is a Commission staff working paper developed jointly by the Commission with the EASA to describe the integrated EU-level regulations as well as the processes and activities employed for the harmonious interactional management of safety at the European level (EC 2011:7). The EASP's main objective is to ensure effectual systems management of aviation safety in the EU to provide "a safety performance that is the best of any world region, uniformly enjoyed across the whole Union, and continuing to improve over time" (EC 2011:9). The sharing of roles and competences between the EU (EASA) and Member States described in the Basic Regulation is required for Member States' SSP implementation (EC 2011; see also Coman-Kund et al. 2017). In EASA Member States, the *European Plan Aviation Safety (EPAS)* lays down the regional aviation safety plan (EU) outlining current "strategic priorities, strategic enablers and main risks affecting the European aviation system" (EASA 2023a). It also sets out the required actions to mitigate risks and continue the improvement of aviation safety. The EPAS is a 5-year plan that is continuously reviewed and improved and it is updated annually as a key component of EASA's work programme. It is developed by EASA in consultation with EASA Member States and industry stakeholders to ensure safety improvement as a continual goal within the dynamic European aviation industry (EASA 2023a). As EASA state:

> The main objective of the EPAS is to further improve aviation safety and the environmental performance of the aviation system throughout Europe, while ensuring a level playing field, as well as fostering efficiency and proportionality in regulatory processes (EPAS 2023:9, Vol. 1).

Safety expertise largely follows the safety recommendations arrows in Figure 9, concerning the development of technical rules, the coordination of safety analyses, and the contribution to EASA's work. Member State officials, industry representatives and academics collaborate and contribute to EASA's work via participation in, for example, expert working groups, designated task forces, and stakeholder advisory committees (see EASA 2023b)

Chapter 5.
Theory

With consideration of the idea of law as a fundamental constitutive characteristic of people's social consciousness, and, given the multi-level structure of law and regulation framing EU civil aviation, critically informed legal consciousness theory is employed as an overarching synthesising theory to frame this PhD research project (see Ewick and Silbey 1998; see Silbey and Sarat 1987). In this chapter, I discuss the relevance of employing legal consciousness theory in the dissertation as an overarching theoretical framework to describe and explain LAME experiences of law and legality (Ewick and Silbey 1998; Hertogh and Kurkchiyan 2016). First, I describe how law and legality are defined in the dissertation through Ewick and Silbey's legal consciousness approach. Then I discuss legal consciousness theory as implied – as "legal consciousness as attitude" in Paper II and "legal consciousness as epiphenomenon" in Paper III. Following that, I provide a broad overview of legal consciousness as "cultural practice" as applied in Paper IV and conceptualised as "sectorial legal consciousness". A final short discussion addresses how, despite Ewick and Silbey's problematisation of these two approaches as limiting, they can be theoretically synthesised to complement rather than contrast with an overarching critical understanding of the socio-professional construction of legality among LAMEs.

Theoretical definitions of law and legality

Law and legality in the dissertation are defined in relation to Ewick and Silbey's (1998) critical legal consciousness theory and cultural analysis of law. As I have discussed in Paper IV and elsewhere (see Woodlock 2020:270), Ewick and Silbey's cultural analytical approach to legal consciousness conceptually distinguishes between *law* and *legality*. Their concept of law denotes authoritative

formal features of legality that are employed by and upheld through formal state-based institutions and officials (Ewick and Silbey 1998:23). Their concept of legality operates as a structure of interpretation and as varied resources that interactively constitute the social world of which law is a constituent part (Ewick and Silbey 1998:23). Accordingly, they conceptualise legality as pertaining to "the meanings, sources of authority, and cultural practices that are commonly recognized as legal" where "who employs them or for what ends" is not predominant (Ewick and Silbey 1998:22; see Woodlock 2020:270).

Situating and explaining experiences of law in the regulatory environment of the EU civil aviation system through the lens of Ewick and Silbey's cultural analysis of law requires extending their conceptualisation of law beyond state-specific experiences. This is needed to capture the multi-level regulatory framework and different levels of authority defining the EU/EASA civil aviation system and manifest through the instrumental employment of a vertical chain of hard and soft law (see Figure 8). Therefore, by *law* in this dissertation is meant the facets of legality principally associated with and operated by the formal institutions and competent authorities at the international, European, national, and organisational levels of civil aviation and within the continuing airworthiness/aircraft maintenance sector. With consideration of the phenomenon of the criminalisation of human error in national jurisdictions (see Dekker 2010; Michaelides-Mateou and Mateou 2010), law also refers to the national legal frameworks and criminal justice systems and practices in the different EU/EASA Member States (see Woodlock 2022a, b; cf. Gibson and Caldeira 1996).

Given Ewick and Silbey's understanding that legality is socially constructed through people's participation in the process of making law work, adequately capturing certifying LAMEs' sectorial experiences of legality requires consideration of the normative heterogeneity surrounding their work practices (formal and informal), reliance on tacit knowledge, and the prevalence of violations as normal work practice (Ewick and Silbey 1998:22; Silbey 2009; McDonald et al. 2000; Hobbs and Williamson 2002a; cf. Vaughan 2016). Therefore, my research approached legality exploratively, as an interpretative framework, to understand how law operates, as a set of resources with which and through which the socio-professional world of European certifying LAMEs is normatively constituted. Thus, *legality* is conceptualised here as applying to "the meanings, sources of authority, and cultural practices that are commonly

recognized as legal" (see Ewick and Silbey 1998:22) within the continuing airworthiness/aircraft maintenance sector of Europe, where law and safety interact through the actions of LAMEs to produce normative pluralistic expectations of professional conduct that commonly puts safety and not law first as a source of guidance.

Legal consciousness theory – applied and implied in the research papers

In Paper IV, and as the main overarching theory in the dissertation, I position my research in the slipstream of Ewick and Silbey's theoretical alignment within the critical tradition in socio-legal studies and employ their cultural analysis of law approach and interpretative schemas to study legal consciousness in the EU civil aviation sector (see Ewick and Silbey 1992; 1998; see also Halliday and Morgan 2013). Ewick and Silbey's work is based on an empirical study of a section of an American population and, in conjunction with adopting a cultural-constructivist approach to analyse their material, the interactive development of a critical theoretical framework to understand and explore legal consciousness. They employ the term legal consciousness to designate people's participation in the social process of constructing legality in everyday life where "repeated invocation of the law sustains its capacity to comprise social relations" (Ewick and Silbey 1998:45). Moreover, they argue that uncovering the presence and consequences of law in social relations requires critical understanding for how legality is perceived, experienced and understood in ordinary citizens' everyday life "as they engage, avoid, or resist the law and legal meanings". For Ewick and Silbey, this is the study of legal consciousness (Ewick and Silbey 1998:35; see Woodlock 2020:269-270).

As a structural property of society, law is described through three stories expressing different forms of legal consciousness – "before the law", "with the law", and "against the law". These stories – narrative schemas – collectively compose legality as an everyday lived experience "a struggle between desire and the law, social

structure and human agency" (Ewick and Silbey 1998:29)[24]. Legality experienced "before the law" interprets law as a formal domain of authority that is objective, external to, distant from, and subordinating of people's everyday lives. Experiences of legality "with the law" depict law as a game wherein differing interests are served and strategically contested. Legality experienced through the "against the law" schema understands law as a product of power to socially control people by arbitrarily enforcing imposed rules to coercively ensure social order. People employ tactical resistance to "appropriate part of law's power" (Ewick and Silbey 1998:28; see Kurkchiyan 2011:371). The different varieties of legal consciousness, or what Ewick and Silbey term "the polyvocality of legality", and different schemas constituting legality afford broad scope to individuals to understand and interpret their social experiences and how law arbitrates those experiences (Ewick and Silbey 1998:52-53).[25]

Ewick and Silbey analytically interpret the different stories shared about law through four dimensions of legal consciousness, which they apply through the interpretative schemas – normativity, constraint, capacity, and the time and space of law. These dimensions of legal consciousness afford alternate points of perspective to consider legality in the different interpretative schemas (Ewick and Silbey 1998:82-98). Table 3 below outlines how they integrate the schemas with the dimensions.

[24] Ewick and Silbey (1998:243) approach stories as "socially organized phenomena whose production, meaning, and effects are not solely individual but collective".

[25] It is noteworthy that, in keeping with their cultural-constructivist approach, Ewick and Silbey (1998:261) ultimately sought to "mediate the tension" between their "sociologists' interpretive role" and preserving of their respondents' meanings, that is, retaining the integrity and meaning of their respondents' accounts. In Paper IV, I too have followed this approach.

Table 3.
Interpretive schemas and dimensions of commonplace stories of law (Ewick and Silbey 1998:224)

	Before the Law	With the Law	Against the Law
Normativity	impartiality, objectivity	legitimate partiality, self-interest	power, "might makes right"
Constraint	organisational structure	contingency, closure	institutional visibility
Capacity	rules, formal organisation	individual resources, experiences, skills	social structures, (roles, rules, hierarchy)
Time/Space	separate sphere from ordinary life	simultaneous with everyday	colonising time/space of everyday life
Archetype	bureaucracy	game	making do

Importantly, Ewick and Silbey emphasise that legality is a resilient and powerful structure "because it is not exclusively legal" (Ewick and Silbey 1998:248). In other words, whereas bureaucracies, games and making do characterise archetypes of legality experienced through the "before", "with" and "against the law" interpretive schemas, these characteristics are not unique to law but also define other structures of society. As they argue:

> Sharing schemas and resources among different institutions and structures creates supplements that can be appropriated for legal purposes (Ewick and Silbey 1998:248).

This is especially pertinent with regards to the appropriation of the concept of just culture from academia and the safety sciences as critically discussed in Paper I, from a safety scientific concept addressing a problem of law to a legal concept serving law and legal purposes such as legitimising law as knowledge-based law and de-legitimising safety scientific critiques of how law administers justice for human error (see Sewell 1992:17).

According to Silbey, the primary significance of Ewick and Silbey's work lies in their explanation for how the narratives in the three schemas "work to constitute both a hegemonic legal consciousness, the rule of law, and openings for change or resistance" (see Silbey 2005:349). By hegemonic, they mean that structures not only embed power but also obscure how power operates in and through structures to continue working "unquestioned and unrecognized" (Ewick and Silbey 1998:225; see Ewick 2006:xiv). In and through the language of the narratives,

Ewick and Silbey contend that people's stories not only reflect or express existing structures and ideologies but rather, through telling their stories, they participate in the (social) production of legality. Storytelling is facilitated and as such, legality is strengthened through the oppositions, contradictions and tensions between the "before the law" and "with the law" forms of legal consciousness. These two forms of legal consciousness work "in tandem" in that they present a commonplace story of law that is everyday but also timeless even when the interaction between the stories is eroded (Ewick and Silbey 1998:30-31).

In short, the forms of consciousness they call "before the law" and "with the law", although expressing very different and oppositional portrayals of law, are cultural narratives that constitute a hegemonic conception of law (they discuss state law). And it is through these two forms of consciousness and the conflicting tensions between them that legality can function as an unopposed power implicitly operating to shape everyday life (Ewick and Silbey 1998:231). As Ewick and Silbey argue:

> /…/it is precisely because law is what it is and what it is not, both general and particular, both here and not here, sacred and profane, something to stand before and to play with, that it is hegemonic (Ewick and Silbey 1998:233).

Thus, it is because people can invoke contrasting narratives in various situations and distinctive times that legality can sustain its dominating position and command conformity among its subordinates (Halliday 2019:862). Notwithstanding, it is the very same oppositions that uphold the power of legality as a social structure that also permit the production of counter-hegemonic stories of legality that, in the "against the law" schema, are described as accounts of resistance. These acts of resistance reveal and exploit the contradictions underpinning legality to enable reprieve from its power (Ewick and Silbey 1998:31). The "against the law" schema is the form of consciousness that stands away from and above the hegemony of law and can be understood as a counter-hegemonic struggle (Halliday 2019:862). As Ewick and Silbey identify: "If legality's power relies, in part, on its unarticulated duality (before and with the law), resistance recognizes and reveals this duality" (Ewick and Silbey 1998:31).

In Paper IV, I also employ Hertogh and Kurkchiyan's (2016) comparative cultural theoretical insights on collective legal consciousness in Europe and adopt and build upon their concepts of "inward" and "outward" legal consciousness

(Hertogh and Kurkchiyan 2016; see Halliday 2019). According to Hertogh and Kurkchiyan (2016: 404), collective legal consciousness is a foundational component of the notion of a common European legal culture (see also Nelken 2002:334). They highlight how, in situating and explaining commonly shared views of European legal culture, scholars have observed fundamental differences in how people perceive law in EU Member States, despite "a thin layer of EU consensus" (Hertogh and Kurkchiyan 2016:404). As such, they examine the idea of a common European legal culture by exploring legal consciousness to uncover the ways that European citizens relate to law. They posit that if "legal consciousness is shaped by the societal context in which people live", it merits asking then if "social and political differences between societies will cause differences in their legal consciousness" (Hertogh and Kurkchiyan 2016:405; cf. Nielsen 2006).

Moreover, Hertogh and Kurkchiyan found that, in general, people in their sampled populations (UK, Bulgaria and Poland) shared broadly similar ideas about law in a domestic context. For most people, regardless of where they live, law was frequently associated with "the foundations of social order" and described as "a force that protects society from chaos and anarchy" by curtailing undesirable behaviours (Hertogh and Kurkchiyan 2016:407). Law in this sense, they suggest, was primarily associated with determining an appropriate code of conduct in society including employing rules and regulations for applying law to situation-specific cases (Hertogh and Kurkchiyan 2016:407). As I have discussed in Paper IV, collective legal consciousness was discernible in Hertogh and Kurkchiyan's observance of an "inward" legal consciousness that they related to perceptions of domestic national law and "outward" legal consciousness related to views on EU law. They also found that collective legal consciousness is "layered according to the source it is associated with" (Hertogh and Kurkchiyan 2016:416).

By extension, the theoretical insights of Hertogh and Kurkchiyan on collective legal consciousness are interactively combined with Ewick and Silbey's "before", "with", and "against the law" interpretive schemas in Paper IV (framing and interpreting interview data) to devise the concept of "sectorial legal consciousness". This interactive approach allowed for a heuristic critical understanding of the socio-professional construction of legality among Swedish and Portuguese LAMEs working in the European aircraft maintenance sector. It also allowed for a cultural analysis of law to explore if experiences of EU/EASA

rules are layered in relation to the two regulated phenomena in focus – issuing a CRS and occurrence reporting – by considering organisational and national-level applications of hard and soft law surrounding these phenomena.[26]

This is because Hertogh and Kurkchiyan's comparative mixed-methods study reveals important cross-national insights concerning perceptions and experiences of national law in relation to EU law[27] – a highly relevant perspective to consider given the EU/EASA regulation and cross-national character (Sweden, Portugal, and Norway) of the dissertation research and LAME samples. On the other hand, Ewick and Silbey's cultural analysis of law approaches law as emergent and indeterminate, in which their account of legal consciousness in their study of American citizens is not one of people (as the direct focus) but rather, of what they term "legality" as a socially constructed process (Ewick and Silbey 1998:45; Silbey 2005:347). Given that the studied LAMEs work in different countries and organisations, Ewick and Silbey's conceptions of law and legality are highly relevant to explore sector-specific experiences of hard and soft law, as applied and enforced, in EU civil aviation. As Silbey proffers:

> "The analytical construct "legality" names a structural component of society, that is, cultural schemas and resources that operate to define and pattern social life" (Silbey 2005:347; see Sewell 1992).

[26] Discussing the "the intersection of structures" Sewell argues that a given arrangement of resources can be differentially claimed by the same actors if embedded in different structural complexes where he further tenders that "schemas can be borrowed or appropriated from one structural complex and applied to another" (Sewell 1992:19).

[27] These findings confirming the continuing significance of national law, especially in the UK case, are not entirely congruent with later claims by Hertogh in his book *Nobody's Law*, (2018) that critical legal consciousness research is methodologically flawed with an interpretive bias that assumes the salience of state law. The findings of the current study support Ewick and Silbey's approach to the legal hegemony of state law where, as discussed in Paper IV, the sectorial legal consciousness of LAMEs collectively expressed both lament for the loss of state-specific law and desire for greater state involvement in the European level sectorial regulatory process.

Occurrence reporting in a procedurally just culture – legal consciousness as attitude?

I address regulated occurrence reporting and just culture in Paper II, in which, using survey-based research, I engage with Tyler's procedural justice theory which distinguishes between normative and instrumental judgements of legitimacy and compliance concerning law and legal authority (Tyler 2006; see also Murphy et al. 2009; Murphy 2009; Murphy 2016; Tankebe 2009; cf. Sarat 1975). Legal consciousness scholarship has previously engaged with Tylerian scholarship, focusing primarily on compliance with the law and showing how perceived procedurally just (fair) treatment by legal authorities influences the level of perceived legitimacy (see Hertogh 2018:162-163).[28] According to Hertogh, a central assumption underpinning research on legitimacy (and public trust) is the notion that procedural justice – how people experience the fairness of law and a legal procedure – enhances their perceived legitimacy of legal authorities and their rules. Moreover, and in relation to Paper II, procedural justice studies across different countries and social contexts have consistently demonstrated that beyond fear of punishment and sanctions, people comply with the law and legal rules mostly because they feel that legal authorities and institutions are legitimate (see Hertogh 2018:16).

From the perspective of Ewick and Silbey, survey-based Tylerian scholarship can be categorised as "legal consciousness as attitude" (Ewick and Silbey 1998:35-36; Silbey 2018:712; see Lind and Tyler 1988; Tyler and Lind 1992; Tyler 2006). This body of work, they suggest, implies that people evaluate their legal experiences based on their affiliations to realise ideals of fairness, equal treatment and due process rather than on their concerns with the outcomes of legal interactions (Ewick and Silbey 1998:36). They further posit that procedural justice approaches have found that attitudes about the law and legal authorities are less concerned with who wins or loses in a legal process but are instead strongly correlated with people's normative judgements about the fairness of procedures used by legal authorities. As such, legal consciousness as attitude research reveals a common and often positive appreciation and support for authorities (and their

[28] In a Continental European context, Hertogh explores traffic offenders in the Netherlands using Tyler's procedural justice model (see Hertogh 2018:163).

rules) perceived as neutral and trustworthy and who can tolerate the openly voiced concerns of people while fundamentally treating them with respect and dignity (Ewick and Silbey 1998:36). In Paper II, legitimacy measured as support for law and legal authorities in the context of EU civil aviation was found to be a reliable measure of legitimacy (perceived obligation to obey was less reliable), where legal anxiety was not found to influence occurrence reporting behaviour to any significant extent. In other words, sector-specific normative experiences of law are stronger than self-regarding instrumental decisions.

In Paper II, and against the backdrop of both safety science and procedural justice scholarship (Dekker and Breakey 2016; Tyler 2006; Nagin and Telep 2017), I explore just culture as a procedural justice-infused *legal* intervention (a legally appropriated concept from safety science) that serves to enhance the legitimacy of occurrence reporting regulation in the EU/EASA system by negating legal anxiety. Just culture therefore also represents a broader sectorial shift from deterrence to an accommodative understanding of law and regulation in EU civil aviation and, as such, is approached in Paper II as a legal experience among LAMEs. Paper II employs legal anxiety as a concept to explore if legal experiences of just culture, as a procedural justice-infused legal intervention, are perceived as accommodative or as constrained by anxiety-inducing experiences of law as a capricious and arbitrary power.

Importantly, however, Ewick and Silbey point to what they consider an important ironic development in "legal consciousness as attitude" scholarship – notwithstanding the fact that the desires, beliefs and attitudes of individuals are the main focus of these studies, it is a description of "deep, broad-based normative consensus" that emerges and not of individual variation. By this, they mean that although people critically reflect and are sceptical about the fairness of legal institutions, they still seem to maintain a shared commitment "to both the desirability and possibility of realizing legal ideals of equal and fair treatment" (Ewick and Silbey 1998:36; see also Ewick and Silbey 1992:740). As Silbey puts it, "/…/the stratified, hierarchical structure of the legal system is sustained by a 'procedural consciousness' represented in citizens' commitments to formal rather than substantive equality" (Silbey 2018:712). As reported in Paper II, across all three LAME samples (Portugal, Sweden and Norway), legal anxiety, as an instrumental judgment was not found to significantly affect the relationship between procedural justice and legitimacy measured as support for law and

authority as normative judgments. From a legal consciousness as attitude perspective, this suggests a "deep, broad-based normative consensus" across the LAME samples concerning occurrence reporting as a legal phenomenon (see Ewick and Silbey 1998: 36). In other words, a collective "procedural consciousness", as participation in the socio-professional construction of just culture as an accommodative experience of legality among LAMEs (whether for regulatory compliance or upholding safety), is not significantly shaped by the potential of instrumental judgements of legal anxiety but by collective positive attitudes towards sector-specific law as it operates to uphold safety, in this context, in the EU/EASA system.

Certifying aircraft across "the gap" to serve the EU single market aviation strategy – "legal consciousness as epiphenomenon"?

Against the backdrop of Ewick and Silbey's cultural analysis of law, Silbey highlights that socio-legal scholars have interpreted the gap between law in books and law in action as "an imperfection in the fabric of legality" and a problem that needs to be solved (Silbey 2018:729). Instead, Silbey argues that gaps must be recognised as ideological operations of law that seek to circumscribe and maintain legality "as a durable and powerful social institution" (Silbey 2018:729). In the words of Ewick and Silbey:

> Because meaning and sense making are dynamic, internal contradictions, oppositions, and gaps are not weaknesses or tears in the ideological cloth. On the contrary, an ideology is sustainable only through such internal contradictions (Ewick and Silbey 1998: 226).

Using mixed-methods (survey-based and semi-structured interviews), Paper III engages with sociology of law gap theory where I expose and critically reflect on a late-modern non-classic regulatory gap problem of law between the EU hard law regulations for aircraft maintenance and EASA-issued soft law applications of those requirements by European AMOs and enforced by Member States NAAs. Importantly, Paper III moves beyond the classic notion of "law in books" and

"law in action" by challenging the limits of this binary. This is because the instrumental use of non-binding soft law, as it serves to maintain a level playing field in the European aviation single market and to remove barriers to trade, concomitantly exhibits characteristics of both "law in books" and "law in action" (see Senden 2004; Banakar 2015; Simoncini 2015). In this sense, soft law and its application in EU civil aviation is described in Paper III as "grey-lettered law" that operates to ensure that EU civil aviation system hard law requirements and organisational commercial needs are met using flexibility and internally contradictory meaning of "presumed compliance". Put differently, the use of soft law, a late-modern application of law as a risk management strategy (RMS) as discussed in Paper I, blurs the experience of law as a real or ideal experience, as a material or ideational phenomenon (see Ewick and Silbey 1998:38-39).

Understood through Ewick and Silbey's lens of legal consciousness, this suggests that law and legality in the EU civil aviation structure are epiphenomenal, that is, a consequence of a certain social and economic structure wherein a correspondingly suitable legal order and related legal subjects are produced. Research conducted within this paradigmatic tradition commonly explains legal behaviour and legal consciousness as being shaped by the "needs of capitalist production and reproduction" (Ewick and Silbey 1998:37; see Sewell 1992:25). The EU single market goals and related economic structure both necessitates and is facilitated by EU law which underpins the operation of EU civil aviation system. This is initially explained in Paper I through the devised concept of (f)Lex avionica which describes the ideological operation of EU law in European civil aviation. As noted, the employment of soft law in American and European law, is, in a broader sense, historically embedded in processes of globalisation that are underpinned by structures of international political economy (Heydebrand 2007:93; see also Senden 2004). Or, as Simoncini more specifically argues, in the context of EU civil aviation:

> In order to make this decentralized supranational approach able to pursue the internal market goals, the (both hard and soft) law clearly needs to become the paradigm around which agencies' regulation revolves. EASA can be considered a pioneer of this regulatory model through administrative soft law powers (Simoncini 2015:326).

As discussed in Paper III, the EU/EASA civil aviation regulatory structure produces the legal subjects of "Part-145 approved AMOs" and "certifying staff"

as participating subjects providing added value to serve the EU civil aviation single market goals. The versatility of mutual recognition of state-issued aircraft maintenance licenses across EASA Member States is explicitly described in Paper III in relation to their added value for the EU single market (see EASA 2018:42).

Important for understanding the gap surrounding CRS and the professional identity of LAMEs as "certifying staff", defined in and through EU law but also in the MOE formulated using soft law as a means to ensure compliance, is what Ewick and Silbey highlight as a structuralist perspective that views legal consciousness as a modus operandi for how organisations "produce the means of authorizing, sustaining and reproducing themselves" (Ewick and Silbey 1992:740). Thus, by discussing the legitimating functions of law as the main focus of legal consciousness research, it is possible to describe how law instrumentally induces in people a perception that their private and public worlds are "natural rather than constituted through social interaction" (Ewick and Silbey 1992:740-741).

However, although this scholarship advances our knowledge regarding how people think and use legal institutions, Ewick and Silbey also problematise this approach for its overly theoretical and abstract character, which they suggest proves challenging for connecting with the observations of particular legal practices and institutions (Ewick and Silbey 1992:741). In Paper I, through the concept of (f)Lex avionica, the legal appropriation of just culture to enhance compliance to EU occurrence reporting requirements further describes how EU law not only operates in the interest of improving safety reporting behaviours but also, as law, ideologically legitimates itself and Regulation (EU) No. 376/2014 as knowledge-based law. In this sense, LAME experiences of the gap between hard and soft law surrounding CRS and institutional denial of a regulatory problem as well as the institutionally supported corporate attempts to downplay the future professional role of LAMEs, as discussed in Paper III, can be understood to imply a "legal consciousness as epiphenomenon" understanding.

Theoretical discussion – why a cultural analysis of law is needed to explore LAME experiences of law

It is in contrast to the "legal consciousness as attitude" and "legal consciousness as epiphenomenon" research traditions that Ewick and Silbey's social constructionist understanding of law develops from their cultural analysis of law wherein "human action and structural constraint" are combined. They argue that these other conceptualisations "often cast law and legal consciousness as products rather than producers of social relations" (Ewick and Silbey 1998:38; see Sewell 1992). As such, they reject deterministic understandings of "structure, action and practice" to embrace a "constitutive perspective" that considers law to be part of the cultural processes that dynamically contribute to the configuration of social relations (Silbey 1992:41). In doing this, they ascertain and denote "the mediating processes through which social interactions and local processes aggregate and condense into institutions and powerful structures" (Ewick and Silbey 1998:38).

Ewick and Silbey observed a complexity surrounding people's lived experiences of law and legality that challenges what they consider the limits of attitudinal and/or epiphenomenal approaches to legal consciousness. More specifically, they argue that a conception of consciousness that is only shaped by forces beyond the individual is problematic in that it "renders the thinking, knowing subject absent" (Ewick and Silbey 1998:38).[29] Confining consciousness to such a limited understanding, they argue, cannot adequately capture "the rich interpretative work, the ideological penetrations, and the inventive strategies" that people share in their accounts of everyday life (Ewick and Silbey 1998:38). A view of legal consciousness that focuses only on attitudes or opinions as individual ideas is limited for connecting people's stories with their lived experiences, and not least for adequately capturing the particularities of the constraints at work within specific regulated domains (Ewick and Silbey 1998:38). Thus, the cultural analysis of law in Paper IV, the limitations of a legal consciousness as attitude approach implied in Paper II, and legal consciousness as epiphenomenon understanding implied in Paper III together can adequately capture "the

[29] This view, supported in this dissertation, calls into question the basis of Hertogh's (2018) critique of "critical empirical" approaches to legal consciousness research (see Silbey and Sarat 1987; cf. Trubek and Esser 1989).

particularities of the constraints at work" within the sector-specific regulated domain of aircraft maintenance (Ewick and Silbey 1998:38).

However, Ewick and Silbey go further, offering that beyond the limitations of attitudinal and structural conceptualisations of consciousness are also theoretical limitations with the analytical strategies of each model. As they put it:

> The dualism illustrated by these two conceptualizations opposes idealist with materialist models of thought and action (Ewick and Silbey 1998:38).

They suggest that, in trying to determine "the locus of agency in social relations", sociological theory has inherited and reproduced longstanding philosophical queries surrounding antagonisms between ideal and material phenomena. In this sense, sociological theory has sought to resolve problems inherent in these "dyadic oppositions" – "free will and determinism, subject and object, individual and society, or agency and structure" (Ewick and Silbey 1998:39). The development of the opposing dualism "law in books" and "law in action" is how socio-legal scholarship also reflected this dichotomy when trying to distinguish between real and ideal experiences, that is, law as a material phenomenon or law as ideational (Ewick and Silbey 1998:38-39). More specifically, they argue that socio-legal scholarship has long been consumed by these dichotomies such as "between law and state, equality and hierarchy" and has even employed an account of structure and agency in socio-legal discipline-specific polemics addressing "consent and coercion" (Ewick and Silbey 1998:39).

Thus, to explore and understand "*how"* individual action and understanding are involved in the social production of legality, Ewick and Silbey developed an approach to legal consciousness that ultimately sought to mediate these dichotomies (Ewick and Silbey 1998:39). As Silbey has argued:

> Treating consciousness as historical and situational, cultural analyses also shift attention to the constitution and operation of *social structure historically specific situations* rather than macro-sociological, transhistorical processes. These analyses reject the dualisms implied by recurrent debates about the relative role of consciousness in (re)producing the social world (Silbey 1992:47, my italics).

Understanding how law operates and how legality is socially constructed among LAMEs working in the EU civil aviation system requires taking critical consideration of sector-specific experiences of the multi-level structure of law as a

safety management ideal, as a hard and soft law instrument of social control, and as an ideological process for ensuring successful integration of the EU aviation single market (see Figure 8). In Paper I, the theoretical concept of (f)Lex avionica critically describes both the ideological operation and mutability of law in this sector as a historical process of change and structural transformation moving from a compliance-based towards a performance-based regulatory environment in which safety management embraces flexibility provisions that facilitate single market goals and expansion (see EC 2011). Based on the research findings and applications of theory in Papers II, III, and IV, I submit here that certifying LAMEs, as they go about their everyday work, make sense of and construct legality not only in relation to structurally embedded expectations of compliance to the hard law EU civil aviation regulations but also organisational expectations of compliance to the soft law applications in organisational procedures (MOE) enforced through national legal frameworks (law in books and law in action) (see Paper III).[30] They also participate in the construction of legality in communion with, as well as in conflict with, the dominance of a safety-first norm that guides certifying LAMEs actions and is upheld through a collective commitment to a socio-professional culture that serves as a de facto authority socially controlling behaviour in this sector (Papers II and IV).[31]

More recently however, on the issue of varieties of legal consciousness, Ewick and Silbey discuss how, on the one hand, important and provocative research focusing on "situational and institutional fields within in which legality is narrated and enacted" moves the field forward by challenging the limits of their three narrative schemas of legality (Ewick and Silbey 2020:167). Although considering the relevance of collective actors for challenging legal hegemony, these studies continue to commit what Ewick and Silbey term "the individualistic fallacy" with which people and/or groups are depicted as having a particular *type* of legal consciousness (my italics). In other words, the social actor rather than ideological

[30] By arguing that structural change is possible by rethinking of the concept of structure, Sewell (1992:16) contends that everyday operations of structures can generate structural transformations and proposes the following five axioms: the multiplicity of structures, the transposability of schemas, the unpredictability of resource accumulation, the polysemy of resources, and the intersection of structures.

[31] It is noteworthy that some aviation legal scholars have discussed the potential of elevating the concept of safety-first to an overriding international sectorial principle (*jus cogens*) to be recognised in the same way as constitutional principles in national jurisdictions (see Huang 2009:173-174; cf. Silbey 2009).

formation is treated as the unit of analysis. They offer that these scholars show how "varieties of legal consciousness are distributed among different social actors, but not how they coalesce in the social structure" (Ewick and Silbey 2020:167-168; see Halliday and Morgan 2013).

I suggest here that the concept of sectorial legal consciousness devised through the current study of LAMEs considers the importance of collective actors in the EU civil aviation sector and attempts to avoid the individualistic fallacy. It does so by identifying how, despite scholarly findings showing the emergence of a professional sub-culture among technical personnel where safety is collectively prioritised, LAMEs as a collective and professional group is established in and sustained through law, that is, as a legal identity. In the context of EU civil aviation regulations and the single market goals underpinning EU aviation strategy, how EU law allows for the acceptability of aircraft maintenance technical licences across all EASA Member States is, as I have discussed in Paper III, identified as providing added value to the EU system (see EASA 2018). As such, the collective identity of LAMEs is part of the ideological formation of law in this sector and also coalesces into the social structure of the EU (an economics-based structure) by adding value to the greater project of the EU and the EC aviation strategy.

Chapter 6.

Methodology

In this chapter I discuss methodology and the method-specific aspects of the research design employed in the PhD project. I describe the main research design and the choice to adopt a mixed-methods approach to explore LAME experiences of law and legality in the European aviation sector. Paper I is a discussion essay which offers a historical and socio-legal overview of relevant aviation literature and regulations and of aircraft maintenance and safety scholarship, not least to situate, explain and theoretically frame key concepts in the dissertation, such as just culture. Papers II, III and IV provide in-depth descriptions and detailed expositions of the methods used and the data collected and analysed in each study. Therefore, I include here a summary of the research in action describing how I have carried out the different phases of data collection and analyses for the studies presented in the different research papers. I also discuss the epistemological underpinnings and tensions to appropriately motivate the methodological choices for using a mixed-methods approach to comparative studies in sociology of law, and, in particular, legal consciousness research in an aircraft maintenance context. Following that, I provide a discussion on the ethical considerations that support my research decisions as the project progressed. I end with a brief outline of some strengths, weaknesses and limitations/delimitations of the research.

Employing a mixed-methods research design

Based on a comprehensive review of the history and literature surrounding mixed methods research[32], Johnson et al. (2007) define mixed methods thus:

[32] Their research endeavor listed and summarized nineteen scholarly definitions of mixed methods research using content analysis.

> Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purpose of breadth and depth of understanding and corroboration (Johnson et al. 2007:123).

As a field of research, sociology of law has increasingly embraced the use of mixed methods approaches, not least in socio-legal research designs for comparative studies of law and legal culture (see Nelken 2007; see also Kurkchiyan 2011). This trend also includes case and comparative studies of legal consciousness (Kurkchiyan 2011; Hertogh and Kurkchiyan 2016). Comparative research design commonly infers that certain social phenomena can be better understood by comparing "two or more meaningfully contrasting cases or situations" (Bryman 2012:72; see Yin 2003).

Nelken (2002) posits that the choice of empirical research methods depends on the theoretical positioning of the researcher, where comparative research can test the claims and assumptions of sociology of law. Notwithstanding, he cautions against using comparative research solely as an occasion to recreate "past theoretical battles such as those between positivists and interpretivists" (Nelken 2002:331). Banakar suggests however, that method choices are underpinned by specific and often conflictual epistemological standpoints that affect the empirical study of law and related investigations of various social realities (Banakar 2015:5). In the same vein, mixed methods scholars also argue that mixed methods research design should be attentive to the philosophical scientific positioning of the researcher, whether post-positivist, constructivist or pragmatist, depending on the type of knowledge sought, whether objective, subjective, or even experiential. This positioning especially concerns choices of the methods and strategies employed to collect, analyse and produce knowledge, such as the use of survey questionnaires and semi-structured interviews, or even the complimentary combination of both (see Migiro and Magangi 2011:3759; Tebes 2012). However, Harrits (2011) suggest that researchers must outline their reasoning around choices of methods and/or use of mixed methods research by addressing epistemological tensions and solutions (Harrits 2011:163). Aligned with this rationale, Beach and Kaas distinguish between methods and methodology thus:

> Research methods are particular tools and techniques for analyzing the social world, whereas a research methodology defines a family of methods that share similar foundational ontological and epistemological assumptions (Beach and Kaas 2020:215).

However, given that the employment of mixed methods is commonly understood as an attempt to synthesise, rather than distinguish, between quantitative and qualitative paradigms of research (Johnson et al. 2007:112-113), expressing commitment to a theoretical tradition can be challenging and also problematic. Notwithstanding, Banakar and Travers (2002) posit that, as a field of research and as a distinct academic discipline, the sociology of law must embrace several divergent approaches to best advance the empirical study of law and society (and perhaps law *in* society). This may require reconciling what have long been regarded as irreconcilable perspectives, such as those surrounding mixed methods (Banakar and Travers 2002:3). Tashakkori and Creswell (2007) argue that despite seeming interchangeable, distinct differences exist between mixed methods as the collection and analysis of two types of data – qualitative and quantitative with the focus more on "methods" – and mixed methods as the integration of two approaches to research – quantitative and qualitative with "methodology" more in focus. Put differently, distinctive studies are defined by the varying levels and importance of integration of the two types of data, whether mixed as a single phase in a study or *mixing across different phases of a sequentially designed study* (Tashakkori and Creswell 2007:3-4, my italics).

With consideration of these methodological and epistemological concerns, the overarching research design framing the research presented in this dissertation is a cross-national comparative socio-legal study employing a mixed methods research design that includes distinct and sequentially deployed quantitative and qualitative phases of data collection. This core mixed-methods design largely follows an explanatory sequential design as described by Creswell and Plano Clark (2018:79), albeit a variant where I have placed greater weight on the qualitative findings for exploring, in-depth, the structural meaning and ideological consequences surrounding the regulated phenomena in focus (see Paper III and Paper IV). Although the survey was the sole method of data collection employed and analysed in Paper II, as a mainly "qualitative heavy" design, the quantitative element of the greater research project afforded a more general overview of the research problem and also served to identify and purposively select interview participants for the qualitative phase of data collection for the studies in Papers

III and IV (see Creswell and Plano Clark 2018:82; see also Tashakkori and Creswell 2007; Beach and Kaas 2020). Interpreting the quantitative results was also used to identify key issues and trends, in communion with qualitative analysis conducted on official documentation – EU/EASA regulations and policies, AEI documentation, EASA Safety Reviews and Evaluation Reports, EP documentation, EC Aviation Strategy and EC publications and communication media – and then used to formulate the thematic-based semi-structured interview guide for conducting the qualitative phase of data collection needed for the studies presented in Papers III and IV (see "List of official documents and reports" in the "References" section of this thesis).

As expounded in Paper III, by employing a comparative mixed-methods approach, the research could explore in-depth LAME experiences of EU law to understand and explain the extent that European aircraft maintenance regulations in these EU/EASA Member States are harmonised and/or uniformly applied. On the other hand, the cross-national comparative study of the perceived adequacy EU/EASA regulatory requirements for releasing aircraft into service allowed the study to examine if noticeable differences emerged between the three samples concerning the meaning LAMEs accord to law in this regulatory context (Hertogh and Kurkchiyan 2016:405-406).

The social context of European civil aviation, and especially aircraft maintenance, is situated in a complex arrangement of law and different levels and forms of legal authority. Therefore, approached as a "society which prevails across society" (see Hertogh and Kurkchiyan 2016:416), a comparative study of legal consciousness in this EU sector requires building knowledge to develop a deep understanding of "the role of law in the pro-active perspective of EU civil aviation" (see Woodlock and Hydén 2020). It must also be attentive to the individual and collective experiences of the professionals who work in aviation, are governed by the sector-specific rules and are affected by their application across different European countries. Ultimately, the choice to use a research design employing a sequential mixed-methods (survey and interview research methods) in my PhD studies is based on the comparative character of the research but also considers the employment of legal consciousness as an overarching theoretical framework – both as applied and implied (see Ewick and Silbey 1998; Hertogh and Kurkchiyan 2016).

The research presented in this thesis more specifically positions itself in alignment with the legal consciousness scholarship of Ewick and Silbey (1998), which adopts a critical theoretical stance and conducts a cultural analysis of law employing and advocating for a qualitative research strategy. That being noted, the inclusion of a mixed methods approach considers that a researcher must explore the specific exigencies of different situations and contexts for a specific study when choosing the most appropriate approach or combination of approaches to the research (Hertogh 2018:78). But as mixed methods research has also shown, critical engagement using mixed methods is possible for addressing critical issues.

Why mixed-methods is an appropriate research design to explore legal consciousness in aviation

With consideration of the employment of Ewick and Silbey's legal consciousness as the overarching synthesising theory employed in the project, I position the research as critically situated and empirically informed. In other words, it supports the view of Sarat and Silbey (1987) that socio-legal research can be both critical and empirical. This alignment with a critical scholarly stance implies epistemological consequences for how a study of legal consciousness can and should be executed (see Hertogh 2018).

As discussed earlier in the theory chapter and as employed in Paper IV, Hertogh and Kurkchiyan's (2016) comparative cultural study of collective legal consciousness exemplifies how a mixed-methods approach is relevant for conducting a cross-national exploration of people's perceptions and experiences of EU and domestic law in different European countries. Their mixed-methods approach comprised focus group discussions, survey research, and semi-structured interviews. They further contend that a comparative research design permitted them to "contrast the respective interpretations of law and politics in different societies" while also enabling them to identify "what is unique about the way in which people construct concepts of law in their own social setting" (Hertogh and Kurkchiyan 2016:406). They also argue that if the societal context in which people live can shape legal consciousness, it therefore merits exploring if social and political differences between societies affect differences in their legal consciousness. As such, Hertogh and Kurkchiyan suggest that a comparative

approach should allow research to "uncover the differences of meaning that people attach to law in one country as distinct from another" (Hertogh and Kurkchiyan 2016:405-406).

Data and methods

As discussed in all four research papers, the research process included material and data qualitatively gleaned from in-depth readings of relevant regulations and legislation, official documentation such as safety reports, safety plans, annual safety reviews, evaluation reports and state safety programmes issued by various levels of authority in aviation – international (ICAO; IATA), European (EC; EASA) and national (STA; CAAN; ANAC) (see List of official documents and reports).

In Research Paper I, I conducted a broad review of the regulations and relevant legal framework for aircraft maintenance and occurrence reporting in EU civil aviation. Presented as a discussion essay, Paper I had the objective to address "practical and theoretical problems surrounding the regulation of performing professional tasks within the area of EU civil aviation maintenance" (Woodlock and Hydén 2020:55). It also established a critical socio-legal positioning that views the content and form of EU civil aviation regulation as an ideological operation of EU law that, in the interest of EU single market goals, instrumentally employs hard and soft forms of law and appropriates safety expertise to steer professional conduct and situate meaning – law and safety – in this hegemonic structure. Beyond previous research and theoretical literature, the reviewed literature also included official documentation and previous safety scientific research into the European aviation sector and aircraft maintenance research.

In the subsequent three research papers, I describe in detail the survey design and distribution, the thematically informed interview guide, the quantitative and qualitative data collection processes, the handling of data and ethical considerations for each study, the processes surrounding the sampling for the survey and interviews, the presentation of results and subsequent analyses, and the scope and limitations of the three sub-studies. In the three research papers and related annexes to these different articles, tables and matrices are included

describing the survey and interview questions and different scales employed in the research.

The research design involved the construction of a survey questionnaire, which was developed and distributed to gather data for two sub-studies in the overall research project; a comparative case study of European LAMEs' experiences and attitudes to occurrence reporting and just culture as regulated and procedural justice-infused phenomena under EU law (Paper II), and a mixed-methods study of European LAME perceptions and experiences of the regulated phenomenon of certifying and releasing aircraft into service (CRS) with rule adequacy and uniformity of EU regulation in focus (Paper III). Moreover, the research process involved the collection of interview data where a thematic-based semi-structured interview guide was designed to gather qualitative data for two studies; first, the above-mentioned mixed-methods study integrating survey and interview data to explore perceptions and experiences of rule adequacy in relation to CRS (Paper III); and a third study of legal consciousness among LAMEs in Sweden and Portugal exploring their experiences of working under EU regulations, with occurrence reporting and certifying the release of aircraft into service in focus to analyse and explore the socio-professional construction of legality to understand how these professionals make law and safety work (Paper IV).

Why Norway, Sweden and Portugal?

In Papers II, III and IV, I have provided clear motivation for why LAMEs from Sweden, Portugal and Norway are included in the research. Besides their willingness to participate, the three sampled countries were very interesting to include in the research project both from a sociology of law research perspective and an aviation safety research perspective. As I state in Paper II, previous socio-legal studies of law and legality including these three countries have shown that there are differences in citizens' levels of trust in law and legal authority among these populations. In Sweden and Norway, the population displays high levels of trust in law and legal institutions, whereas Portuguese citizens have been found to show lower levels of trust (see Jackson et al. 2011; see also Gibson and Caldeira 1996). In Paper III, I discuss key findings from the analysed survey data supporting the inclusion of Swedish and Portuguese LAMEs only for the

interviews. For example, and as I have discussed above, Portuguese LAMEs showed a significantly higher frequency of worry about legal accountability when issuing a CRS (and when submitting occurrence reports) than their Swedish counterparts. As I also argue in Papers II and III, comparative socio-legal research exploring people's perceptions and attitudes towards domestic and EU law in different European populations have found and argued that the social setting and (political) context matters in which law is embedded (Kurkchiyan 2011:367; see also Hertogh and Kurkchiyan 2016). This is especially pertinent to my employment of Hertogh and Kurkchiyan's work on collective legal consciousness in Europe.

These three countries were also interesting to include in the research from an aviation safety culture, and just culture, perspective. When reviewing previous research, I found that safety and just culture-focused research on European aviation had explained variances in safety culture development in relation to Northern and Southern European regional differences, and was further attributed to the "national cultures" of countries in these regions. For example, safety culture development in Northern European countries was reported as most positive and Southern European countries reported less positive (see Reader et al. 2015:770; see also Cromie and Bott 2016: 270; cf. Silbey 2009). By including Sweden, Norway and Portugal, my research, to some degree problematises these studies for essentialist biases, and the findings in Paper II challenge these assumptions (see Silbey 2009).[33] Notwithstanding, legal research has discussed how the interpretation and enforcement of European regulations by the NAAs of different EU/EASA Member States can problematically differ (see Ratajczyk 2015:171; Pellegrino 2019). As such, and as stated in Paper III, exploring how LAMEs experience the regional (EU/EASA), national (NAA), and organisational (MOE) levels of law and legality in the aircraft maintenance sectors in Sweden, Norway and Portugal was interesting to explore.

[33] See Notes 40 and 41.

The quantitative phase of data collection - one survey, two studies

In Paper II and Paper III, I employ a survey questionnaire designed to provide data for two sub-studies to explore the two regulated phenomena in focus in the research – occurrence reporting (and just culture) and certifying and releasing aircraft into service (CRS). Paper II presents a purely quantitative exploration of LAME experiences of regulation surrounding the reporting of safety occurrences and just culture as a procedural justice-infused legal intervention. Paper III presents the gathered survey data as the first phase of data collection in a sequential mixed methods study exploring LAME perceptions and experiences of the multi-level regulation and hard/soft law rules governing the certification and release of aircraft into service in the EU. The analysed survey data from both studies was used to improve and thematically inform the interview guide as well as to help identify samples for the interviews (see Creswell and Plano Clark 2018:82). Participation in the survey was limited to LAMEs employed as certifying staff in Part-145 approved AMOs in EU/EASA Member States. Survey participants were recruited through affiliated professional associations/trade unions in EU/EASA Member States affiliated with Aircraft Engineers International (AEI). This is an international organisation that "promotes, protects and represents" the interests of licensed aircraft maintenance engineers and their affiliated representative organisations around the globe and has been in existence for over 50 years (AEI 2020).

I made contact with AEI in 2017 who subsequently expressed interest in participating in the research project. AEI leadership visited the Sociology of Law Department at Lund University in early 2018, where we discussed how to proceed with the research project. Upon invitation, I attended an AEI annual congress in the autumn of 2018, where I approached affiliate representatives from different countries to explain and inquire if they were interested in participating in the research project. Four affiliates from different countries expressed interest in the research project with a fifth country (non-AEI aligned) recruited through contacts made by AEI leadership. Through to early 2019, I provided both written and verbal information about the research project and held different meetings online, via telephone, and in person with the gatekeepers from the different organisations, to answer questions, explain in detail about the research project, the survey, and

develop a plan and coordinate a timeline for when and how to distribute the survey questionnaire. When the survey questionnaire was finalised and approved by my main supervisor,[34] a survey link was sent as planned to the gatekeepers in late March 2019 who agreed to distribute it via email to their members. Due to a slow response rate, the link was kept live for four months, with three reminders sent out by the gatekeepers. All survey responses were returned anonymously and all communication with affiliate members was handled by the gatekeepers only. This ensured that I had no access to personal data or email addresses of affiliate members.

A total of 262 questionnaires were returned by LAME respondents in the five countries. As outlined in detail in Papers II and III, the data was screened and cleaned, and an initial descriptive statistical analysis was carried out using SPSS software (see Field 2014; Pallant 2016). It became apparent that two of the five countries had returned too few responses to be considered statistically significant for inclusion in the studies. One of these countries was the non-AEI aligned sample. It also became known to me that the survey link in these two countries was not distributed in the same way as the other three countries. This left a full sample of 227 valid responses distributed between Sweden, Portugal and Norway. A total population of ~1211 certifying LAMEs received the survey link in these three countries (Norway, n = 384; Portugal, n = 262; Sweden, n = 565), and the final response rate of 19% was deemed acceptable. To put this in a broader perspective, EASA has reported (for 2022) a total population of 61,921 Part-66 qualified LAMEs across EASA Member States as shown in Table 4 (see EPAS 2023).[35] They also report that 1595 Part-145 AMOs operate in EASA Member States.

[34] I tested the questionnaire at an AMO in an airline in Sweden. This led to the reformulation of some items in the final questionnaire. The test study respondents were, to the best of my knowledge, excluded from participating in the final survey.

[35] The current EPAS (2023-2025) reports that 61,921 EASA Part-66 aircraft mechanic licenses are active in EU/EASA Member States (non-specified). EASA further provided information to me that there are approximately 58,000 active Part-66 aircraft mechanic licenses in Europe issued by the 31 Member States (active license means a license renewed in the past five years that has not been suspended, revoked or surrendered as of November 2022).

Table 4:
Overview of organisations and technical personnel in the domain of Continuing Airworthiness (see EPAS 2023-2025 Vol.1: 23).

Item	2019	2020	2021	2022
Continuing airworthiness domain				
Part-145 approved maintenance organisations	1,597	1,600	1,613	1,595
Part-M Subpart-F approved maintenance organisations	424	402	179	118
Continuing airworthiness management organisations	1,584	1,549	1,299	1,120
Part-147 approved maintenance training organisations	239	231	241	236
Part-66 EASA aircraft mechanic licenses	54,343	60,155	62,799	61,921

The survey respondents were predominantly male (96%), a finding that supports Newcomer et al.'s claim that "Certified aircraft mechanics represent the largest gender-based demographic disparity in aviation with a 49-to-1 male-to-female ratio" (Newcomer et al. 2018:509). Beyond gender, I did not gather any other personal data in the survey but, as required for the studies in Papers II and III, demographic and professional data was gathered on the country of employment, years of experience as a certifying LAME, category of employing aviation organisation, and aircraft type rating qualifications. As shown in Papers II and III, the survey also included items and closed-ended questions specific to each study, which are outlined in the Tables in the Appendixes of these papers. As Table I in Paper III shows, the majority of respondents are multiple type-rated and well-experienced LAMEs with ~80% having no language issues completing the survey (see Ma et al. 2009; see also EASA 2018b:23-24). Further exploration of the survey data determined that only responses from the commercial air transport (CAT) domain were sufficient in number to be considered statistically significant. The 187 responses from the CAT sector were found to be remarkably evenly distributed across the three countries – Sweden (N = 62), Portugal (N = 61) and Norway (N = 64).

While researching this field I found that, despite my own previous knowledge and experience of this sector, it is a difficult domain in which to carry out survey-based research. For example, the low response rate was found comparable with other pan-European studies, including evaluation studies conducted for and by EASA

(see BV 2007; EASA 2018). Ultimately, I consider that the quantitative phase of data collection was successful in that the two sub-studies became more focused on the CAT sector which employs most LAMEs and is the domain most problematised by scholars, not least concerning rule inadequacy and non-uniform enforcement of EU regulations for CRS.

The qualitative phase of data collection – semi-structured interviews for two studies

In-depth semi-structured interviews were conducted for the qualitative phase of data collection using a predetermined thematic-based interview guide that was designed for the two studies in Paper III and Paper IV. In Paper III, the three predetermined themes were the verification of completed work tasks or supervision of ongoing work tasks as a preferred practice among LAMEs for issuing a CRS for unlicensed mechanics; professional responsibility and legal accountability experiences among certifying LAME in different European countries; and LAME perceptions of CRS sectorial regulation adequacy at European, national and organisational levels. The four predetermined themes in Paper IV were experiences of law and legality by focusing on LAMEs professional experiences and perceptions of occurrence reporting and just culture in the aviation maintenance sector; safety and professional responsibility surrounding CRS; legal accountability, compliance, and procedural violations/deviation from sectorial rules; and the phenomenon of the criminalisation of human error.

In keeping with the sequential mixed-methods research design, the interview guide was improved and the themes revised based on the analysis of survey data and findings (Creswell and Plano Clark 2018:82; Bryman 2012:477). As Bryman notes, a semi-structured approach allows for flexibility and conversationally probing the world views of the interview participants (Bryman 2012:498). Moreover, this method of interviewing is open to departure from an interview guide by allowing for follow-up questions to expand upon interviewee replies and digressions. It also allows respondents to share their stories and for narratives to freely develop (Bryman 2012:470; see also Kvale 2007:72-74). More specifically, in line with the cultural analysis of law approach to legal consciousness research, the interviewing technique I adopted was largely aligned with that of Ewick and

Silbey (1998). By this, I mean that although interview questions were thematically predetermined and organised accordingly into groups of questions based on a qualitative exploration of official documentation, reports, regulation and policies, I did not set out to directly ask the LAMEs about their immediate legal and regulatory concerns and needs. Instead, I was interested in their answers, understandings and shared experiences of the themes I was probing, as they were "expressed in their words, revealed in their actions, or embedded in their stories and accounts" (Ewick and Silbey 1998:25). By using open-ended questions, LAMEs shared experiences and perceptions of law and legality that emerged in and through their answers and shared stories (see Ewick and Silbey 1998:23-28).

Based on the sequential mixed methods approach, I intended to generic purposively sample interview participants based on the survey findings with contact handled by the gatekeepers in the three AEI affiliates. In keeping with Swedish research ethical requirements, a letter was drafted in Swedish, Portuguese and Norwegian inviting certifying LAMEs to participate in the interviews. A more detailed informed consent text was also drafted in each language to describe the research and interview process. The sampling strategy for recruiting participants for the interviews was completely interrupted by the COVID-19 pandemic and its effects on the European aviation sector, as passenger-based CAT was largely shut down for an extended period in 2020 (see Woodlock 2023). In short, this entailed that coordination with gatekeepers for planning and conducting the qualitative data collection phase was interrupted and delayed due to the sector-paralysing disruptions caused by the pandemic. During late spring and through to November 2020, I kept respectful contact with AEI leadership, who were dealing with the difficulties and complications of the pandemic for their LAME members. These difficulties included travel restrictions, lay-offs, furloughs, and redundancies for many LAMEs. For ethical reasons, therefore, I waited until the gatekeepers indicated that it was appropriate to proceed. The drafted invitation letters were then sent to the gatekeepers, who distributed them to their members.

Primarily through purposive sampling handled by the gatekeepers, but also through snowball sampling and convenience sampling, four Portuguese and ten Swedish LAMEs agreed to be interviewed. They subsequently contacted me to

plan and arrange a time for an interview.[36] Before each interview, participants were sent the informed consent text. I conducted the interviews between mid-December (2020) and late February (2021). Interviews with the Portuguese LAMEs were conducted online and in English. The interviews with Swedish LAMEs were held in Swedish with one interview conducted over the telephone, three conducted online, and three held at a secure location decided by the participants. I also travelled to an aircraft maintenance workplace for three more interviews. As discussed in Papers II and III, the interviews ranged from approximately 50 minutes to 3 hours and 15 minutes in duration. As with the survey, the interview guide was designed to gather data for two sub-studies in the research. All interviews were transcribed in good time and as close as possible to the interview where the familiarity with the conversations was very beneficial to me when transcribing but also as a first step in conducting the thematic analysis.

Thematic analysis

Throughout the different research papers, I have conducted qualitative analysis when exploring the various official documents and relevant regulatory texts as sources of data. These documents ranged from EU regulations and official state documents to EASA safety plans and annual reviews as well as state-specific programmes and sectorial policies (see Bryman 2012:549-559).

In Papers III and IV, I more specifically applied qualitative thematic analysis (latent) to the interview transcripts using the six-step (phases) approach described by Braun and Clarke (2006) and Clarke et al. (2016). In doing this, in Paper IV, I have also been attentive to Ewick and Silbey's specific applications of thematic analysis (1998:253-256). As a first step, I familiarised myself with the interview data, which, as discussed above, began for me already during the transcription write-ups. I then carried out thorough first and second readings of the interview transcripts to look for substantive and shared meanings, emergent patterns and similarities in responses to interview questions. As a second step, I systematically examined the data line by line (which was numbered in each data transcript) and

[36] As a consequence of the pandemic, no Norwegian LAMEs contacted me to participate in interviews. Moreover, the convenience sampling meant that some of the interviewed LAMEs in Sweden were known to me from my previous professional career.

generated several initial codes. In keeping with the approach of Ewick and Silbey, I defined and labelled these using meaningful one-word mnemonics that I hand-wrote into the margins of the transcripts. In that each set of interview questions was formulated to correspond with pre-determined themes, in a third step, I further reduced the initial codes by identifying emerging themes which were both data and theory-driven, then grouping them together and eventually organising them under the four dimensions adopted by Ewick and Silbey to apply using their schemas – *normativity, capacity, constraint,* and *time and space*. As a fourth step, I further reviewed and refined these themes, first at the level of the coded data and then again at the level of the data set corresponding to each predetermined theme. I found more coherent patterns and cogent meanings in the data, allowing me to interpret how these reviewed themes seemed to best express "before-", "with-", and "against the law" stories. A fifth step of "refine and define" allowed me to further determine which story of law, that is, interpretive schema, the emergent themes best captured in how the LAMEs made law work by making safety work. Again, the themes were aligned under the four dimensions discussed above, which helped me to frame and establish the content of each theme and which story it told. For example, for references to constraint (one of the four dimensions) before the law, references to "conscience" were discussed directly and initially coded as "conscience" but then further refined under the theme of "legal conscience", a subtheme of constraint. In contrast, LAME experiences of feeling exposed before different levels and application of law were often alluded to less directly and were initially coded as "vulnerable", "sceptical" or "disposed", then subsequently reviewed and gathered under the refined theme "exposure", also a subtheme of the dimension of constraint (see Paper IV). In the final sixth step, I wrote up the thematic analysis and presented the themes in conversation with the previous literature and reviewed research, the legal consciousness theory of Ewick and Silbey (1998) and Hertogh and Kurkchiyan's (2016) work on collective legal consciousness in Europe (see Braun and Clarke 2006; Clarke et al. 2016; also Bryman 2012: 557; see also Ewick and Silbey 1998:253-256). In Paper IV, I explicated the named themes and provided several extracts from the interview data to show the prevalence of the theme and how it aligned under a specific dimension, for example, exposure as constraint "before the law".

Sectorial legal consciousness and modulated derogation, as two key concepts, developed through an iterative process between analysing the data, the emergent themes, and critically reflecting on the shared meaning and coherence across the

LAMEs' answers and follow-up comments. Accordingly, legality in the sectorial legal consciousness and outward legal consciousness, which I have discussed, was produced deductively and inductively by interactively working (iteratively) between existing theoretical and empirical studies of legal consciousness but also safety-focused research, especially within the context of aircraft maintenance and safety reporting in a just culture (Hertogh and Kurkchiyan 2016; Ewick and Silbey 1998).

Ethical considerations

Approaching the field of research, I have paid attention to the fact that the context and subject matter of my research requires ethical consideration. I offer here a brief overview of key ethical issues I have considered throughout the research process.

Participation in the research project was not considered to present direct risks or lead to problematic consequences for the research subjects. No ethical review was sought for the quantitative survey phase of data collection in the research project, in that no sensitive or personal data was gathered or handled by me. All contact was handled through the gatekeepers and all survey questionnaires were answered and returned anonymously using a survey weblink. However, the qualitative phase of the research was reviewed by the Swedish Ethical Review Board,[37] which judged that ethical assessment was not required for the research. Notwithstanding, there are some ethical issues that I wish to give further consideration to here.

For the qualitative phase of the research, all initial contact with the interview participants was conducted through the gatekeepers. All research participants have been disidentified and pseudonymised. Accordingly, participation in the research project is not considered to pose any risks to research persons or entail subsequent complications for the interviewed LAMEs. As a main focus of the research, the qualitative sub-studies included discussions with research participants on their experiences of occurrence reporting in relation to regulated requirements, employers' application of just culture policies, and various aspects of legal liability and accountability regarding the LAME profession and roles and responsibilities

[37] Stockholm Ethical Review Board Dnr 2020-03177.

when releasing aircraft into service. Given the open culture character of the aviation sector and just culture principles for the handling of occurrence reports (see Hodges and Steinholtz 2017), other ethical matters needed to be considered given that research participants shared professional experiences of regulations and problems they have encountered with regulations, different authorities, and employers' application of regulatory requirements. Since the research in part concerns aircraft technicians' experiences of legal accountability, and issues in relation to employers' and national aviation authorities handling of occurrence/incident reports were discussed, informed consent was sought from all interviewed persons. Given that some LAMEs shared personal experiences, the names of any people, employers or companies mentioned during interviews have been de-identified in transcripts and/or published data.

The qualitative data collected was not about individual deviations or serious violations of the law but focused on experiences of professional and organisational culture and the licensed aircraft maintenance engineering profession. This gathered data did include descriptions of individual experiences in the context of work situations, professional roles and experiences of regulations, but were not considered sensitive within the meaning of the law.

Based on my own long career working in the aircraft maintenance sector and my own experiences, I have a strong familiarity and affiliation with the field of study. By extension, I have a strong sense of sensitivity to organisational cultures in the aviation sector and experiential knowledge of the professional working lives of aircraft technicians. With consideration of my own bias, my work experience and insights in this context were invaluable for minimising potential risks but also for communicating in an open, informed and friendly manner with the LAMEs. However, it was important ethically to ensure that all research participants were well informed about my previous professional background in the aviation maintenance sector. I clarified that my role was solely as a researcher and that I worked only in the interest of research. For transparency reasons, I must also make mention here of the fact that some of the interviewed LAMEs in Sweden were known to me from my past career in aviation but that all of these previous professional relationships ended a long time ago. As such, no interviewed participants were in any position of dependency towards me.

I must also mention here that the extraordinary circumstances and effects of the COVID-19 pandemic did affect my access to the field of research, where the

planned interview phase of data collection was delayed twice. As a consequence, organising interviews with Norwegian LAMEs did not come to fruition and only a limited number of interviews were conducted with Portuguese LAMEs. I was mindful to exercise due care and caution when recruiting and interviewing participants, especially when discussing this subject with them. This was because I was made aware that many LAMEs were experiencing reduced working hours during the pandemic and knew colleagues who had lost their jobs. I was conscious of the possibility that strong emotions and feelings towards employers could emerge during interviews but this did not happen to any remarkable degree.

In that my thesis may well be read by working aviation professionals, I have been mindful that the content in my text concerning regulations and legal requirements must be in no way misleading. As such, I took an extra precaution to have my regulatory framework descriptions for Sweden, Norway and Portugal read and commented upon by a competent authority official from each country.

Data management plan

The gathered survey data was not considered sensitive. A hard copy of the downloaded survey data has been stored on an encrypted hard drive, which is not connected to the internet and is kept in a safe and secure place. No sensitive personal information was included in the article texts for publication. Regarding the qualitative data, all notes, audio recordings and transcripts are stored on a separate encrypted hard drive. When used, it was not connected to the internet. The hard drive will be stored in a locked safe at the Department of Sociology of Law upon completion of the research. No sensitive personal information is included in the published transcripts. All participants in the studies and any persons or organisations mentioned have been deidentified and/or pseudonymised. To further ensure anonymity for participants, selection criteria such as number of years in the profession and number of flight engineer certificates obtained have been generalised by clumping together in larger groups, for example, 1-5 years of experience, 6-10 certificates and so on. However, given that the research project is comparative in character, the data was processed to take into account the country of origin in which the participants work. In addition, a codebook was developed where the codes regarding pseudonymisation have been saved on a separately encrypted hard drive. Ten years after the doctoral dissertation has been completed, a decision will be made as to whether the stored

data should be archived or destroyed in accordance with Lund University routines.

None of the research participants were considered to be in a position of dependence towards the gatekeepers who primarily mediated initial contact with me. The main contact person (gatekeeper) is himself a member of the same professional organisation but has been elected by the members to the role of board member within the organisation and/or member representative within AEI. Participation in the research project has been entirely voluntary and the research persons could contact me directly about their participation without having to go through the contact person. It was an ethical consideration that no LAMEs in the research project could participate in the project unless their participation was entirely voluntary and independent of any relationship with the contact person or me as the researcher.

Strengths, weaknesses, limitations and delimitations

The research has some strengths and weaknesses that I briefly address here in conversation with some limitations and delimitations.

A strength of the thesis, and as highlighted in the research papers, is that the LAME professional collective identity is made visible in socio-legal research, where the bottom-up approach ensures that these important voices and experiences are lifted up to the foreground to better understand law and safety. Another strength is how the comparative socio-legal design and theoretical underpinnings of the research allowed for interesting empirical findings to emerge. When analysed through the lens of socio-legal thinking, these findings raise important new questions that can challenge the stagnancy of longstanding scholarly claims surrounding law in aviation and not least, concerning the effect of legal anxiety on safety reporting behaviour and just culture as a legal phenomenon in EASA Member States. Moreover, a strength of the research lies in the fact that it focuses on a societal context not often explored in the socio-legal field of research – aircraft maintenance – and that has allowed for new understandings of legal consciousness to develop, that is, as sectorial (collective) experiences of law.

A weakness of the thesis, for a reader not familiar with aviation, is the unavoidable use of acronyms and aviation terminology throughout. That said, as with any field of research, I consider this important also in that it captures the complexity of the aviation system and exposes how LAMEs must develop as competent speakers in this sector to navigate this complexity and carry out their work effectively and safely. A weakness that relates to the qualitative research is the fact that only two country-based LAME samples were included – Sweden and Portugal. However, although the COVID-19 pandemic was the main reason behind not including Norwegian LAMEs in these studies and so also, a smaller Portuguese sample, as I have discussed under the ethical section, their absence could also be supported by the findings of previous research, showing the versatility and usefulness of socio-legal studies in this sector.

The research has some limitations, most of which are addressed in the different research papers. However, I wish to add here that concerning a relevant sample to study the experience of law and legality in this sector, the research confined its scope to the occupational profession of LAMEs. This is because these professionals have a unique experience with law through their capacity to sign and issue a certificate of release to service. Therefore, the research excluded unlicensed aircraft mechanics and their experiences of working under LAMEs supervision and professional guidance. Moreover, in that certifying LAMEs cover several qualification categories (B1, B2, C etc.), in the thesis I have neither distinguished nor explored differences that may relate to these licensed categories. This is because when authorised as certifying staff, LAMEs can only issue a CRS in accordance with their license privileges and limitations, which are defined along the lines of their qualification categories and type ratings associated therewith (see EASA 2018). As I have discussed elsewhere in this chapter concerning the effects of COVID-19 on the qualitative research phase, a limitation of the research relates to the fact that no Norwegian LAMEs participated in the interviews and that only four Portuguese LAMEs did participate. In short, given that the survey studies included LAME samples from all three countries, it would have been ideal if the qualitative research phase had also included all three country-based samples.

Chapter 7.

Summary of articles

In this chapter, I provide short summaries of the four research papers included in this dissertation.

Research Paper I

(f)Lex Avionica. How soft law serves as an instrumental mediator between professional norms and the hard law regulation of European civil aviation maintenance.

Authors: John Woodlock and Håkan Hydén

This article sets the stage for how the research project approaches law and legality as it manifests in the regulatory environment surrounding the field of research, that is, aircraft maintenance in Europe. In this article, we confront the fixed boundaries framing law in this sector. We do so by describing how soft law serves as an instrumental mediator (intervening norm) between the professional norms that emerge from within aircraft maintenance in practice and the hard legal regulation framing the EU civil aviation sector. We describe how European civil aviation, as a risk and safety-critical sector, is regulated through a proactive performance-based strategy that supports regulatory flexibility using soft law provisions (AMC/GM), which are ultimately a function of the single market goals of the EU. We also explain that civil aviation is instrumentally framed by stringent rules classified as positive hard law, which are defined by structural expectations of uniform sectorial compliance from regulatory, organisational and professional actors alike. The article points to the flexible utilisation of hard and soft law in aviation which innovatively upholds the market-based core rationality of the EU.

Through the model of (f)Lex avionica, we explain flexibility as a two-way process; expansive and contractive flexibility.

We critically discuss and analyse how an expert knowledge community made up of safety and legal scholars, as well as sectorial experts and practitioners, have directly and indirectly exacted influence over the "written content" of EU law to shape the regulation of occurrence reporting and secure the inclusion of just culture as a legal definition in European civil aviation. Thus, we critically discuss how this scholarly concept has undergone a change in stature from a scholarly ideal to an actual legal concept in EU law – from safety in books to law in books – a process that we describe as the socio-legal mobility of a concept over time. By engaging with key safety scholarship that has engaged with law and law-making in the interest of safety, we argue that as both critics and contributors to law, these scholars are the double agents of social control. By this, we infer that safety scholarship has failed to adequately capture the complexity of law by ignoring or perhaps underestimating how the internal workings of law involve the participation of law in all matters legal, as done on law's own terms and, in the first hand, to serve law's own interests. This we explain as the conceptual appropriation of just culture, which is a manifestation of law in action, to serve its own interests. But, beyond Ewick and Silbey (1998), who suggest that social networks, like the safety expert knowledge community we critique, can shape "the behavioural enactment of law", we argue that the juridification of just culture in and through EU law can be understood as an ideological operation of law, an example of how the interests of law are served, and in doing so, how the political and economic interests of the EU and the single market are served. These "law-first" interests we identify as:

Legitimising just culture in EU law as knowledge-based law. This is at the core of the conceptual appropriation that turns safety knowledge and informal practices into legal knowledge and formal regulation. Safety in action is always bridled by law in action.

De-legitimising future critiques that the safety expert knowledge community may have concerning the criminalisation of human error and how law does justice in safety-related matters. The socio-legal mobility of the just culture concept is, in this sense, a question of upholding the legitimacy of law and legal authority. This is because justice is, in the eyes of the law, a question of law's authority and therefore for law alone to determine, that is, law's autonomy.

Research Paper II

"Procedural justice for all? Legitimacy, just culture and legal anxiety in European civil aviation".

Author: John Woodlock

With data gathered using a survey-based questionnaire, this article explores if certifying LAMEs working in Norway, Sweden and Portugal, as European countries compliant with EU civil aviation regulations, experience regulated occurrence reporting as procedurally just processes across Europe. Perceptions of procedural justice are gauged in relation to just culture policy applications by aviation maintenance organisations. The study also examined if the occurrence reporting experiences of these aviation professionals enhance or not normative legitimacy perceptions of the EU/EASA regulations and related multi-level regulatory authorities. By drawing on Tylerian procedural justice theory (see Tyler 2006), the article argues that when approached from the bottom-up perspective of aviation professionals, occurrence reporting and just culture must be understood as discerned experiences of law and legality, where perceived procedurally fair treatment enhances perceived legitimacy and negates legal anxiety to improve compliance accordingly. What is important for the broader perspective of the PhD research is that just culture and occurrence reporting are measured as legal experiences in relation to the regulation of safety. The research was guided by the following questions:

How can the relationship between law and safety be understood from European licensed aircraft maintenance engineers' perceptions of regulated occurrence reporting and just culture as procedurally just processes?

The article found that occurrence reporting, perceived as procedurally just treatment among European LAMEs, generally enhances perceived legitimacy. Support for regulatory authority and sectorial rules was found to be a reliable construct of legitimacy in this aviation context. The study also found that in the wake of just culture juridification in EU law, perceived legitimacy was not significantly influenced by legal anxiety when occurrence reporting is perceived as a procedurally just process. In other words, the more procedurally fair occurrence reporting is perceived to be, the less legitimacy was influenced by legal anxiety and the less it affected safety occurrence reporting rates. A closer look at the results for

the three sampled countries revealed differences in LAMEs' experiences of law and legal anxiety and the effect of perceived procedural just approaches to occurrence reporting. It was found that, compared with their Scandinavian counterparts in the study, 11 times more Portuguese LAMEs do not use their employers' reporting system. A key finding was that LAMEs indicated that the main reason to report safety occurrences is to uphold aircraft safety, with a sensed duty to comply with the law second, and legal anxiety reported as the least significant reason for reporting. This finding is important for several reasons, not least because it suggests that a safety-first dominant norm guides behaviour concerning compliance with reporting obligations as they conduct their work.

The findings of the survey research challenge safety scholarly arguments that fear of legal consequences primarily gives rise to non-compliance to occurrence reporting regulation. They also suggest that certifying LAMEs may not always think about official law and regulatory requirements when they opt to report, but rather, demonstrate a normative commitment to upholding safety.

Research Paper III

A Gap too Far? A Socio-Legal Study of Licensed Aircraft Maintenance Engineers Experiences of Release to Service Regulation in European Civil Aviation.

Author: John Woodlock

This article presents the results of a mixed-methods socio-legal study of certifying LAMEs in Europe. A CRS is a signed legal statement certifying the safe operational state of an aircraft to continue flying and involves a high degree of legal accountability for the individual signing the certificate. In that only LAMEs are authorised to sign and legally issue a CRS, this regulated action is identified in this study as a unique regulated privilege endowed to (and professionally defining of) the everyday working life of these professionals. With data gathered in two phases using a survey questionnaire (Sweden, Portugal and Norway) and semi-structured interviews (Sweden and Portugal), the study examines how certifying LAMEs across these three countries relate to and experience working in accordance with EU civil aviation regulations and against the backdrop of a purported regulatory gap surrounding CRS issuance policy.

The article builds on the findings of previous research into the aircraft maintenance sector that problematise vague, contrasting and impractical sign-off and release-to-service rules. A long history of institutional neglect of such problems is identified through in-depth reading and qualitative analysis of EU safety reports, official documents, and questions raised in the European Parliament. Accordingly, the paper highlights a tension between CRS issuance and related professional responsibilities and, variations in organisational and national aviation authorities' (NAA) interpretation, application and enforcement of common EU regulations. By adopting a critical sociology of law approach to the research, the article frames these issues as a gap problem of law. This is to understand if and how, from a bottom-up perspective, the everyday working lives of these professionals are affected by this multi-level regulatory gap.

Key findings from the survey suggest that physical supervision followed by verification of signing-off tasks is favoured among LAMEs as the safest approach to confidently issue a CRS in Norway, Sweden and Portugal. By extension, the interview data anchored this stance confirming supervision as a shared preference among LAMEs from Sweden and Portugal. This is an important finding that lies at the heart of the questions addressing gaps in the regulatory enforcement surrounding release-to-service issues raised in the European Parliament. Relatedly, the study found that LAME/mechanic working relationships are both complex and contentious and commonly shaped by experiences of trust, mistrust and discomfort. An interesting finding was that conflictual relations can also arise between older and younger certifying LAMEs regarding professional responsibility for releasing aircraft into service. Moreover, it was found that some LAMEs in both Portugal and Sweden always think about law in a way that they feel professionally exposed as legally accountable for the actions of others, especially when certifying unlicensed mechanics work. The survey results also show that, in general, most EU/EASA regulations and rules are perceived as adequately meeting LAME needs. Yet the survey findings further indicated that LAMEs experience legal accountability for CRS differently across the country-based samples, with Portuguese LAMEs reporting higher levels of worry when legally releasing aircraft than Nordic respondents. Relatedly, the interview data showed how some LAMEs directly associate legal accountability with legal consequences for wrongdoing. Others conceded that legal sanctions are pertinent in certain circumstances given that their job involves human lives and public safety. Accordingly, LAMEs' consequence thinking was embedded in a shared

professional pride to always put safety first. However, legal accountability was perceived by some as a question of strict compliance to the legal regulations for CRS and therefore experienced as a source of protection, provided LAMEs are compliant with the prescribed rules. This relates to the adequacy of the rules for some, and/or a question of where the rules are applied and by whom for others.

It emerged that the soft law drafted MOE of employers describing how an organisation is compliant with the hard law is what most LAMEs accept, and comply with, as the official source of regulatory guidance. Many LAMEs offered that despite their claims of variable interpretation, they do not contrast the actual requirements outlined in the EU/EASA hard regulations with their employer's MOE. In fact, the majority of Swedish and Portuguese LAMEs expressed trust in their NAAs and employers' MOE. Although most LAMEs felt that their employer shares a similar understanding of aircraft safety, it was also observed that expectations can and do differ regarding corporate profit-making interests and LAME professionalism when delaying the release of aircraft for safety reasons. Both Swedish and Portuguese LAMEs problematised the unrealistic expectations of external airlines and offered that these "customers" often plea the release of aircraft as a paid-for service commodity.

The article concludes that European- and state-level regulatory authorities should be attentive to the collective concerns raised by LAMEs representative associations where the legitimacy of associating aviation safety with the uniformity of European rules is at stake. The article concludes that it is the diligence of LAMEs concerning aviation safety that provides the basis for achieving the sought-after regulatory uniformity in this single market-steered European sector. The article contributes important insights to better understand the problems facing the uniform application and interpretation of sign-off procedures and release-to-service rules in Europe. Supporting some findings of previous studies on the aircraft maintenance sector, the paper provides new insights that frame and address these regulatory issues as questions of a gap problem of law between hard law requirements and soft law application, as well as highlights a growing discord between different national authorities' expectations of uniform enforcement of the EU/EASA rules and the obligation for organisations to apply the rules as they are intended. When viewed in this sense, the regulatory gap is ultimately defined by a single market ideology in which compliance as an ideal for upholding safety

gives way to presumed compliance as an acceptable means to ensure that regulating safety will primarily uphold the EU single market ideals and goals.

Research Paper IV

Arbitrators of safety and authors of law – legal consciousness, normative pluralism and modulated derogation among European licensed aircraft maintenance engineers.

Author: John Woodlock

This article introduces the concepts of sectorial legal consciousness and modulated derogation to explain the everyday experiences of law, legality and safety among LAMEs working in the European civil aviation sector. Sectorial legal consciousness is a concept devised here to explain collective participation in the socio-professional construction of legality, where LAMEs show common "patterns of thinking" about law and regulation that can challenge the legal hegemony of state law across different countries. Modulated derogation is a devised concept employed in this article to explain, through the lens of normative pluralism and sectorial legal consciousness, how LAMEs permit rule and procedural deviation through a shared collective allegiance to a sectorial norm of putting safety first.

Using data gathered in qualitative semi-structured interviews with Swedish and Portuguese LAMEs, the paper explores professional experiences of the regulated phenomena of occurrence reporting and certifying the release of aircraft into service from the perspective of legal consciousness. Building on collective legal consciousness theoretical insights from Hertogh and Kurkchiyan (2016), the paper identifies inward and outward images of law that shape the legal consciousness of this occupational group. Inward legal consciousness emerges in relation to sector-specific experiences of the EU regulations ("our rules") while outward legal consciousness concerns LAME perceptions of state-based criminal law as external to but intervening in the aviation sector ("their law"). In conducting a cultural analysis of law by framing the results through the critical approach and interpretative schemas of Ewick and Silbey (1998), the sectorial legal consciousness that emerged is characterised by normative pluralism, where

professional behaviour is guided by both compliance "before the law" and "with the law" and modulated derogation "against the law" concerning sectorial regulatory rules and procedural standards. Putting safety first was found to be a resistant form of sectorial legal consciousness involving "modulated derogation", whereby LAMEs amend or displace the meaning of compliance to formal procedures and rules (compliance/non-compliance code) as the primary norms guiding professional conduct, to that of a safe/unsafe binary code. Outward legal consciousness "before the law" was also found to be shaped by hegemonic perceptions of state-based criminal law as a potential problem that can hinder the aviation sector's capacity to deal with safety shortcomings internally. The everyday working lives of European aviation professionals are embedded in a multi-level regulatory environment characterised by hard and soft forms of law.

The paper argues that legal consciousness research is needed to explore the experience of law in this sector, where a review of recent literature reviews exposes gaps in legal consciousness scholarship, not least concerning collective identity. In the spirit of Ewick and Silbey's (1998) critical and methodological stance, by first asking thematically informed questions that did not directly name law and legality, the study explored if and how these phenomena emerged in LAMEs' answers. The LAMEs were then asked questions directly addressing law and legal accountability towards the end of each thematic set of questions. Using Ewick and Silbey's four dimensions of legal consciousness – normativity, constraint, capacity and the time and space of law – to interpretively view legality "before the law", "with the law" and "against the law", the sub-themes of exposure, refusal, resolve, conscience, and time were extracted from the transcript readings and subsequent coding. Constraint "before the law" was, for example, expressed as an exposure to but reified view of law within the sector, where LAMEs commonly ascribed a thing-like law quality to the aircraft technical and procedural manuals. LAMEs first critiqued the ambiguity of these manuals but also described compliance with the same manuals as a redeeming source of legal protection, that is, certainty. Refusal and resolve as a capacity dimension "with the law" was observed in how LAMEs refuse to sign and release an aircraft into service, including when pressured by external airlines. Moreover, by submitting an occurrence report about the safety consequences of experiencing such pressures, LAMEs showed how they play the legal game and try to achieve closure through their strategic use of law in their everyday working lives.

A resistant legal consciousness "against the law" emerged as a capacity through "rule literalness" and as time through "foot-dragging". Modulated derogation as a concept was devised to explain a resistance legal consciousness against over-complex rules and vague procedures. To mitigate complexity and ambiguity, LAMEs professionally permit themselves to occasionally make benign deviations from official rules and procedures to make arduous working situations more suitable to complete ordinary non-critical tasks. As a question of normative pluralism, modulated derogation involves amending the binary code of compliance/non-compliance with sectorial rules to that of a safe/unsafe binary code guiding professional actions. An outward legal consciousness was visible in how LAMEs associated the purported phenomenon of the criminalisation of human error with limited knowledge and sectorial hearsay about known aircraft accidents where they believed maintenance staff were prosecuted. An interesting finding was that a primary source they gave for this phenomenon was the regulation-required human factors continuation training given by their employers.

The study concludes that within a post-just culture regulatory environment such as EU civil aviation, understandings of legality that are law-centred and continue to problematise law as a problem for safety do not recognise the normative pluralism underpinning experiences of working in the multi-level regulatory environment of European civil aviation. Reductionist approaches to legal complexity surrounding professional conduct and safety behaviour are no longer adequate to explain the experiences of law and legality among aviation professionals. Future research on legality in aviation and other risk-critical sectors should embrace legal consciousness and normative pluralism approaches that allow safety-first and not solely law-first understandings to develop and dominate.

Chapter 8.

Concluding discussion

In this chapter, I present a final critically reflexive concluding discussion on dissertation the research where I bring together important theoretical insights and integrate empirical findings to address how the main research question is answered through the four papers. These insights are: understanding the process of transforming safety knowledge into law as an ideological operation of EU law that embeds law as a safety management strategy, addressing how the sectorial and outward legal consciousness of LAMEs reflect both structural change and legal inheritances of law in late modernity, and explaining why the legal hegemony of state law pervades in this sector. I also highlight some key contributions and important conclusions that can be drawn from this study, and what can be learned from this research that can transfer to other fields.

Transforming "safety in books" to "law in books" – late-modern "law in action" as safety management

In Paper I, we argue that the history of safety legislation in EU civil aviation must be understood in relation to knowledge production in safety science and the role that this expertise has played "in shaping the trajectory, form and content of law in this sector" (Woodlock and Hydén 2020:61; see Schubert 2004; Pellegrino 2019). By extension, safety scholars are described as the double agents of social control who, as both critics of and contributors to law, have failed to sufficiently reflect on the power relations developing from the interplay between safety knowledge production and legal rule production (Woodlock and Hydén 2020: 59). Simply put, by looking outwards at law as a problem for safety, much of this scholarship fails to recognise inwardly that the safety knowledge they produce also

produces law. It is noteworthy that through three editions of the book "Just Culture" (2007, 2012 2017), Dekker, a prolific safety scientist and just culture scholar cited throughout the dissertation and an ardent critic of how law and legal proceedings handle human error, has afforded a four-sentence paragraph only to describe and discuss "lawmakers":

> Lawmakers do not have a direct stake in legal proceedings or what it does to the creation of just cultures – other than the stakes they represent for their constituencies (voters). But legislators do play an important role, as they are eventually the ones who help sketch out the lines in laws that then will be drawn more clearly and applied by prosecutors and judges. They may also have a stake in aligning national laws with those of international bodies. Employing organizations or professional organizations may find that without some type of access to relevant legislators, making changes in the direction of a just culture could be difficult (Dekker 2017:103).

This limited exposition of "lawmakers" seems to suggest homogeneity, ignores that asymmetrical power relations surround law and law-making, and does not acknowledge the active role of safety experts, including academics, in the making of law. However, Dekker does importantly recognise how legislators must align national legal frameworks with the legal standards of international institutions. As I have also discussed in Paper IV, safety science produced monolithic descriptions of *law as a problem* that also promote *just culture as a one-size fits all solution*, present a law/safety relationship that is akin to a "morganatic marriage" between two public goods where law problematically dominates safety.

Through the devised concept of (f)Lex avionica, the instrumentalisation of concepts like just culture in the EU/EASA civil aviation system through the appropriation of safety knowledge ultimately describes an ideological operation of law that primarily serves the interests of EU law and, by extension, the political and economic interests of the EU single market project. This process also both produces and conceals scholars as unrecognised lawmakers, even to themselves, and for whom, it would seem, the ideological power of law remains hidden in plain sight. Understood in terms of "ideological effects" rather than content, this expert knowledge appropriation implies a specification of "techniques and forms through which meaning is made and deployed in the service of power" and where, as Ewick argues, "the contingency of power and hierarchy are stabilized through

the processes of 'not knowing', an essential part of *the artful production of truth*" (Ewick 2006:xvi, my italics).

According to Ewick, power is articulated in ideology and hegemony where both express processes for "not knowing" (citing Smith 1987). This conceptualisation of ideology preserves a component of "concealment" where ideology "inheres in the *processes* or form of concealment, rather than in the content of that which is concealed" (Ewick 2006:xv-xvi). Ideology understood in this way acknowledges that it is not to be construed only as a partner to domination (for example, the collaboration between legal and safety expertise in a process of mutual legitimation) or as a means to conceal or avert from reality – as stated in Paper I, just culture is also an innovative concept that "regulates the delicate considerations necessary for promoting an open and informed safety culture for safety/risk critical work" (Woodlock and Hydén 2020:61-62; see Ewick 2006:xvi). Rather, domination is constituted through social meanings that are defined as ideological. Accordingly, Ewick (citing Thompson 1990) defines ideology as "the ways in which meaning serves, in particular circumstances, to establish and sustain relations of power which are systematically asymmetrical" (Ewick 2006:xvi). She further argues that:

> /…/ideologies are known in terms of their effects. A particular set of meanings can only be said to be ideological insofar as it 'serves' power. The emphasis is thus on the active verb *serve,* reminding us that ideological analysis can only take place by examining the particular situational contexts in which struggles over meaning occur and paying attention to how those struggles contingently stabilize power (Ewick 2006:xvi; cf. Thompson 1990:7).

Although legally defining just culture may explicitly demonstrate how law appropriates expert knowledge for its own legitimation, this process also conceals that the potential of mutual legitimation stemming from the interaction between law and safety expertise ultimately *serves* to uphold the authority of law in this sector, that is, cross-nationally authoritative as knowledge-based law in EASA Member States. By extension, this effectually *preserves* the autonomy of law within and beyond this sector for determining legal meaning in EU and national law. In this way, just culture, as a legal concept can be understood as an attempt to stabilise legal power (as uniformly as possible) for dealing with error, mistakes and administering justice throughout the multi-level structure of law in the situational context of EU civil aviation. As I have argued in Paper IV, structure as it is implied

here is not confined to a fixed articulation that is material and "external to the situations it constrains" but one that incorporates ideas and resources. Structures, according to Ewick and Silbey, emerge out of social interactions and embed power, even when it is acting upon them (Ewick and Silbey 1998:225; Woodlock 2022b:37).

Thus, it is against this backdrop that the "socio-legal mobility" of just culture as a concept, in and through EU civil aviation regulation, is explicated as an ideological operation of EU law where the meaning of just culture is transformed from an object of critical knowledge about law into an object of knowledge-based law to structurally serve broader EU interests. Put differently, from scholarly ideal as "safety in books" to material rule-based legal definition as "law in books" (Woodlock and Hydén 2020:61). It would seem that safety science production of knowledge about law avoids legal complexity and fails to recognise that the power of law lies in concealing its ideological operation as a process of meaning-making that serves powerful interests, including its own. However, as Ewick explains, it is exactly because they seem non-ideological that legal decision making and meanings are ideological (Ewick 2006:xvi). Thus, as a feature of late-modern "law in action", the process of power concealed through this transformation employs hard and soft law forms as a regulatory RMS to facilitate the embedding of EU legal meaning, where the idea of "presumed compliance" is embedded as the actual meaning of compliance through the espousal and exploitation of "flexibility" as a regulatory resource. As discussed in Paper IV and argued in Paper I:

> The complexity of legal effect (the power of law) surrounding EU/EASA regulation requirements for aircraft maintenance lies in the specificities of the relationship between the system hard law and AMC/GM soft law provisions. And, as the normative pendulum of law swings from traditional regulation to risk management strategies in EU civil aviation, in seeking to improve safety, it now swings at the behest of formal 'law' and protects the interests of EU law and law-making through the legalization and therefore juridification of just culture as a risk management strategy (Woodlock and Hydén 2020:61; cf. Hydén, 2002; Banakar, 2015:191).

However, Ewick and Silbey's study concluded that the distinction between law in books and law in action, that is, between ideal and practice, is a false dichotomy. By this they mean that the interpretative schemas of legal consciousness describe a specific relationship between ideals and practices, exposing a process of "mutual

interdependence". Thus, they tender that the assiduously perceived gap between law as ideal and law as practice "is a space, not a vacuum" and "is one source of the law's hegemonic power" (Ewick and Silbey 1998:248). Therefore, the "gap too far" discussed in Paper III, observed as one between the hard law requirements and soft law application concerning the regulation of CRS and organisational and professional roles, may well be experienced from below (LAMEs and their representative organisations) as a flaw and a shortcoming that needs to be solved. However, from a top-down perspective, the gap specifies a space of mutual interdependency between practice and ideal that is as much ideological as it is structural.

But how is the ideological operation of law in EU civil aviation manifest in and through sectorial experiences of law and how do LAMEs make law work when they are discontent with these perceived inconsistencies that may limit their trust in law? By combining the schemas of Ewick and Silbey with Hertogh and Kurkchiyan's (2016) concepts of inward and outward legal consciousness to frame and analyse the qualitative data, the concept of sectorial legal consciousness was devised as both a critical and empirically informed approach to legal consciousness research that critically embraces normative heterogeneity surrounding safety in this sector as an "empirical reality of law" and that captures, through the concept of modulated derogation, "safety-first" as a normative source of resistance that can subordinate law and legal authority as sources of professional guidance (see Silbey and Sarat 1987; see Banakar 2015).

Sectorial legal consciousness – embracing the critical and empirical to construct anew

At the heart of late-modern discussions on legal consciousness, as a field of scholarship within the law and society movement, is a longstanding provocative contention that socio-legal scholarship can and should be both critical and empirical (Silbey 1986; Silbey and Sarat 1987; see Trubek and Esser 1989; Sarat 1990b; cf. Hertogh 2018). As Silbey and Sarat have argued:

> To be critical bespeaks a desire to be faithful to a tradition by refusing to accept its imperfections. This requires an unwillingness to rest content with primary

> orienting norms and a willingness to invert what is central so that *the marginal, invisible, or unheard becomes a voice and a focus*. However, fidelity also requires more than unmasking and debunking; it demands a willingness to construct anew/…/We must be both critical and empirical (Silbey and Sarat 1987:172, my italics).

Accordingly, I start this section by including the voices of Swedish and Portuguese LAMEs which capture sectorial legal consciousness (inward) and outward legal consciousness based on differentiated experiences of law, empirically observed and critically theorised in Paper IV.[38]

When directly asked about what legal accountability means for him, a Swedish LAME answered that it means that he has a responsibility to follow the legal requirements, not least those laid down in "their" MOE which is the approved legal document for his employing organisation and therefore for him to adhere to. However, the LAME then discussed error in relation to the issue of intent behind actions and indicated that he knows that he cannot deviate from procedures in a way that can eventually be deemed criminal. He reasoned thus:

> /…/a mistake is a mistake, that gets reported in, and then we speak about how this and that went wrong and so, this I have no problem with. I can differentiate between that, I think, and what I can be held accountable for, purely juridically, outside this aviation environment that I work within (Swe10, 2021).

When asked a follow-up question if he means that the sectorial regulations have a protective function as he has described, the LAME elaborated further:

> Yes, I think so. And I lean against the regulations/…/So therefore I think that *if I keep to the regulations that I have in this environment* then, out of that one is secure, and happy (Swe10 2021, my italics).

When asked about the meaning of legal accountability, a Portuguese LAME answered that legal accountability is something he does think about and as such, he always double-checks his work. Legal accountability, he suggested, is also something that he and his colleagues discuss among themselves, from sharing information about accomplishing difficult tasks to mentoring younger technicians

[38] The preservation of the research participants voices is, as Ewick and Silbey (1998:258-261) argue, crucial to understand law as both embedded and emergent from a bottom-up perspective.

that "we should do like in the manual". When further asked what compliance means to him, he answered that:

> /…/when we stamp it [a CRS], the thing I told you, that we should think that we are giving the permission of flight. We have to get it 100% that the aeroplane is good for flight. So, I think that we should have this in mind, and that *there is a compliant way to think s*o that we should stamp it in [good] conscience (Por 3 2021, my italics).

When directly asked if he was familiar with the notion of "criminalising human error" during his interview, another Portuguese LAME answered in his interview that he has encountered this phenomenon as part of a human factors course but further claimed that:

> We have that in mind if something happens, or at least me. I have in mind that if something happens, regarding human lives, accidents, there will always be a criminal (investigation). How can I say? If there are human lives involved, loss of human lives, *of course that we have to answer in court*. We are taken to court. Besides that, no! But it is not something that we talk about, that's it (Por2 2021, my italics).

As I have discussed in Paper IV, such claims imply that despite coming from two different countries, these LAMEs share two similar images of law – an inward sectorial image by which they feel protected for reporting mistakes and conscience-free when releasing aircraft because they have complied with their law – the manuals – for "giving the permission of flight" and by leaning on legal regulations "inside" the sector – and an outward image that acknowledges and accepts that their professional (or unprofessional) actions can render them answerable before law "outside" the aviation sectorial regulatory environment. Their use of the term "we" is especially noteworthy in this context.

However, given that LAMEs work within a complex multi-level framework of formal rules and procedures, it seems to me that both the emergent sectorial and outward legal consciousness of LAMEs revealed in their stories conceal experiences of law as ideological expressions of strategically induced power relations. As outlined in the theory chapter above, Ewick and Silbey (1998) argue that people's stories not only reflect or express existing structures and ideologies but through their telling allow people to participate in the production of legality

where legality is strengthened through the oppositions, contradictions and tensions between the "before the law" and "with the law" form of legal consciousness. These two forms of legal consciousness reinforce each other because they construct an everyday story of law that is common and endures even when the interface between the stories erodes (Ewick and Silbey 1998:31). Therefore, it merits asking in this final discussion, how does law (as defined by Ewick and Silbey and explicated in Chapter 5) see itself and how does law want to be perceived in this sector? In other words, is it materially and ideationally possible to see how EU law operates ideologically in a civil aviation context?

According to Ewick and Silbey (1998:31), "a single account of law as venal would fail to secure the loyalty and legitimacy necessary to maintain its power". As the European Commission issued brochure below displays, on its cover (Figure 10a), the EU civil aviation system proactively promotes and projects images of law as both protective and fair and operating to sustain sectorial safety as a mutual responsibility between the regulator and maintenance staff to "make our industry safer" – this reflects a sectorial inward-looking inclusive image of law as belonging to "our" industry sector, much as described by the LAMEs above. However, the small print also reveals that law alone defines and determines acceptable and unacceptable behaviour, especially concerning if and when just culture principles apply or do not apply. The small text also states, in a cautionary tone, that "This text is informative and is not intended to replace the applicable legal requirements contained in Regulation (EU) No 376/2014" (EU 2020).

Figure 10a.
Safety reporting information leaflet for maintenance personnel (cover) (ECCAIRS 2020)

However, the inside of the brochure (see Figure 10b) is less inclusive where in outlining mandatory reporting requirements, a cautionary text (red box) is included and states "Always report any other occurrence that you consider safety relevant". This is an outward-looking exclusive image of law that distinguishes between the regulator and the regulated by placing responsibility on "you" as the "reporter" (as defined in Introduction chapter), the legal subject produced by law and mandated through law to comply with the law (EU 2020; OJ L122, 24.4.2014:25). This inclusive and exclusive establishment of power relations corresponds with the uncertainty associated with regulation as an RMS, as discussed in Paper I. In short, law in this sector is communicated as both protector and enforcer in the interest of safety. Yet, as this brochure on occurrence reporting shows, it also conceals contradictory images of law that, from the perspective of embedding power relations, projects inclusivity and exclusivity, depending on the schema of interpretation of those who receive this information – in other words, if LAMEs adopt a law-first or safety-first understanding. It merits mention here that these brochures are strategically adapted and issued to accommodate the requirements of different EU aviation sectorial domains (and are directed to the domain relevant professional groups).

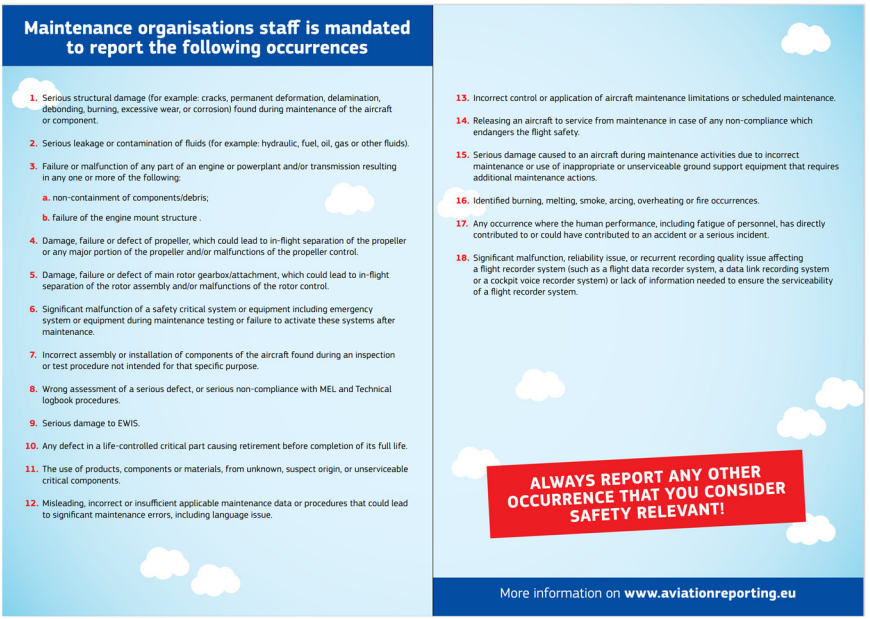

Figure 10b.
Safety reporting information leaflet for maintenance personnel (inside cover) (ECCAIRS 2020).

Indeed, as Ewick and Silbey put it:

> The apparent contradiction – and the source of much lament – is resolved once we abandon an understanding of the law as a single, coherent entity. If we set to one side for a moment the emblematic imagery of unity and consistency as hallmarks of law, we see that law is a complex structure (Ewick and Silbey 1998:17).

Opposing individuals' and groups' specific experiences in contradiction of "collective truths and abstractions" that are produced to frame those experiences assumes that the particular and concrete are detached and autonomous from one another. As such, the same fundamental and contradictory discordance maintains and produces the same hegemonic (and mythic) perception of law (Ewick and Silbey 1998:233). As such, to remain necessary, legality "must lay claim to the multiple and contradictory experiences of law" because "a single account of law as ahistorical, transcendent, and impartial" will not endure against critical proofs exposing the law as "partial, concrete, and flawed" (Ewick and Silbey 1998:31).

Modulated derogation, as discussed in Paper IV, as a counter-hegemonic resistance "against the law", represents a prime example of how a professional culture among LAMEs, as a system and beliefs embedded in putting safety first, clashes with the ideology of law and the interests invested in concealing the power of law that are exposed.[39]

Is state law still "all over" or is it all over for state law? From legal hegemony towards a sectorial legal culture

Silbey asserted in 1992:

> Just as this research abandons a static and deterministic view of structure, the cultural-constitutive perspective necessitates a similar abandonment of consciousness and hegemony as static disembodied sets of ideas – meanings and values – that are simply absorbed by members of a culture. If hegemony describes the ways in which dominant alliances of social groups exert total social authority over subordinate groups through a non-coercive process of the manufacture of consent among these groups, hegemony is not universal and given to the continuing rule of a particular class. It has to be won, reproduced, and sustained (Silbey 1992:45).

I also begin this discussion here by presenting LAMEs' voices based on two separate exchanges with Swedish and Portuguese interview participants. When directly asked about legal accountability in relation to occurrence reporting, a Swedish LAME suggested that LAMEs do not often think about legal consequences when conducting their work in Sweden. He went further, adding that cultural differences exist where "management by fear" may steer in "other places in the world" but not as much in Sweden, Scandinavia or Northern Europe in general. He explained that in Sweden "we have a more open society" where a hierarchy does not steer as much. Having worked in other European countries besides Sweden, these opinions were based on his actual professional experiences of working abroad and led him to conclude that the freedom from responsibility

[39] Ewick and Silbey (1998:234) discuss three conditions associated with counterhegemonic consciousness – motive (social marginality), means (recognising the world as socially constructed), and opportunity (story telling).

(meaning legal accountability) was greater in Sweden. As he stated concerning another European country he had worked in:

> Freedom of responsibility is not as great there, or so it feels, as we are used to up here as Swedish flight technicians. That we are allowed to do almost everything, and mostly to our own accord, and if you follow the framework of the manuals and rules, then it should be quite ok (Swe2, 2021, my transl.).

In a separate interview, a Portuguese LAME similarly stated that in Europe, the United States, and most "first world" countries, "the legislation is very competent" and "covers all the important aspects" in a way that solves most issues. However, he expressed concerns about poor regulation and enforcement by authorities in other global regions, especially in developing countries. He put it thus:

> And as the world gets smaller and smaller, and with this global village that we live on, I feel that we, here in Portugal, we work with some companies in [another global region], and I see a difference in that. I see something lacks in that. Regarding that situation, in the way people's sense of rules and the sense of neither safety. And, well, that's a risk we really have to deal with, we can't just shut our borders to these companies, but the way they are regulated/…/ (Por4 2021).

Considering the devised concept of sectorial legal consciousness in this dissertation, these LAMEs associate their perceptions of law within this sector with how they interpret and experience the regulation and enforcement of aviation standards by regulators, legislatures and authorities at a national level (and to a lesser degree, regional level) within and beyond their countries of employment. In terms of the legal consciousness approach of Ewick and Silbey, it would seem that the legal hegemony of state law pervades the everyday working lives of LAMEs. The dissertation's findings on legal anxiety best express the salience of state law and legal hegemony.

As discussed in Paper II, an important finding suggests that perceptions of national legal frameworks likely affect just culture (perception and implementation) where legal anxiety among Portuguese LAMEs was more prevalent than for Scandinavian LAMEs. Portuguese respondents indicated that they frequently or always worry about legal accountability issues (~39%) when submitting reports compared with the Swedish (~7%) and Norwegian LAME respondents (~10%) (see Table A6, Appendix A in Paper II). It is also remarkable

that, compared with their Nordic counterparts, 11 times more Portuguese LAMEs reported that they never use their employer's occurrence reporting system (Woodlock 2022a:19). And as shown above and discussed in Paper II, despite increasing sector-wide occurrence reporting trends to national competent authorities across all three countries, differences are noticeable in the reporting rates displayed in state-issued safety reports from each country. Sweden and Norway display similar rates (not accounting for sector size and population), with twice as many reports as Portugal (based on national data from 2019).

In Paper III, legal anxiety was also found to be more prominent among Portuguese LAMEs with 35.6% always feeling worry about legal accountability when issuing a CRS compared with Swedish (3.3%) and Norwegian (6.3%) respondents (see Table 3, Paper III). Despite this, the survey and interview findings also suggest that Swedish and Portuguese LAMEs are commonly satisfied with the EU/EASA regulatory framework and supportive and trusting of the NAAs in their country of employment. This suggests that state-level legal authority maintains strong legitimacy among the LAMEs in these countries, even as the EU/EASA system shifts towards a harmonised performance-based regulatory environment in EU civil aviation (Woodlock 2022b; EASA 2014; see also EASA 2018). It is noteworthy that the dynamics of law and legal change in this sector, as discussed throughout Papers II, III and IV, reflect and should be understood in relation to the wider processes of experimental governance that were developed and embraced in the EU, as discussed in Paper I (see Sabel and Zeitlin 2010).

Against the backdrop of previous research, Paper II problematises how "national culture" is commonly employed in several aviation-focused studies as an explanation for organisational variance in safety culture interpretation and application across different countries. These studies often associate blame, culpability determination and justice inside organisations with how national culture "is" in certain countries (see also Silbey 2009: 349).[40] I have problematised these claims as essentialist assumptions that are uncritically offered as deterministic fact-forming explanations but which ultimately expose the underlying biases of some authors about how "reality" needs to be understood to

[40] Silbey argues that using safety culture to explain variations in national cultures is "reminiscent of historic justifications for colonial rule" and as such, have not prevailed (Silbey 2009:349). In contrast, Reader et al. (2015) explain variation in ATM/ATC safety culture across four European regions as a consequence of different national cultures (see Paper II).

motivate why concepts like just culture need to be applied (what Ewick (2006:xvi) describes as "the artful production of truth"). It is remarkable how the results of so many studies, including in an aircraft maintenance context, irrefutably confirm the necessity of just culture (see Cromie and Bott 2016). Instead, I argue that all LAMEs working in a country may not share similar ideas of national culture or feel compelled to conform to a purported common system of "national" values and beliefs, but which are inevitably embedded in asymmetrical power relations. Notwithstanding, all are subject to the same EU/EASA regulations that are directly applicable and enforced at the national level in each Member State.

Approached as a question of the legal hegemony of state law, and as I have asserted in Paper II (citing Pellegrino 2019), although EU/EASA Member States can delegate and share specific regulatory functions at the European level, criminal jurisdiction and the sanctioning of wrongdoing is a national-level process (Woodlock 2022a:20). In other words, the stabilisation of legal power at the EU level still relies on the legal hegemony of state law. Returning to the discussion above, the juridification of just culture in EU law should therefore not only be construed as a process of mutual legitimacy production between law and safety science but also, as argued in Paper II, as a process of balancing different legal interests across the EU (see Schubert 2004). As such, I offer here and in Paper II, that "national legal culture" rather than "national culture" provides for a less essentialist and perhaps more empirically analytical explanation for how criminal justice systems handle human error in relation to blame, culpability and just culture. Notwithstanding, as addressed in the theory chapter above and in relation to the concept of sectorial legal consciousness in Paper IV, I discuss Hertogh and Kurkchiyan's (2016) claim that collective legal consciousness is a component of legal culture. Accordingly, they posit that to adequately understand common views of a European legal culture, the domestic national laws of EU Member States must be considered. And despite observing a thin layer of EU consensus, they found that fundamental differences exist in how people perceive law in different countries (Hertogh and Kurkchiyan 2016:404; see also Kurkchiyan 2011; see Ewick 2006:xv, on "consent and consensus"). In explaining these differences, they argue that even if it were possible for the EU to fully harmonise dimensions of legal culture including law and institutional performance across Member States, the creation of a single European legal culture would still remain questionable. They further contend that achieving this ideal requires the prior establishment of "an accepted common transnational polity" that shares similar

views on political identity in the EU based on commonly held "trust in the legitimacy of the European political authorities" (Hertogh and Kurkchiyan 2016:405).

It can be argued that the establishment of EASA, and subsequent state-based membership of EASA implies "an accepted common transnational polity with a feeling of shared political identity" in EU civil aviation (see Hertogh and Kurkchiyan 2016:405). This is further defined by a shared sense of trust across EASA Member States in the legitimacy of the EU regulations and the European competent authorities that enforce them (see Coman-Kund et al. 2017; Ratajczyk 2015). As reported in Paper II, support for the EU/EASA laws and authority was found to be the most reliable measure of legitimacy across the LAME samples in all three countries (Woodlock 2022a). In Papers III and IV, I discuss how Swedish and Portuguese LAMEs display high levels of trust and support for the EU/EASA regulatory system and framework and also for the NAAs in their countries of employment (with some exceptions). Moreover, the interviewed LAMEs in both countries shared remarkably similar views on LAME professional identity, a finding that supports, and is supported by, previous research findings explaining the existence of a shared professional culture among maintenance technical personnel (see McDonald et al. 2000; Pettersen and Aase 2008; Ward et al. 2010). As I have discussed and expanded upon in detail in Papers II and IV, this professional culture embraces a normative commitment to upholding safety through a shared allegiance to the norm of "safety first". By considering how "safety first" guides LAME professional behaviour, I have argued that legality among LAMEs is socially constructed (socio-professionally) through normative pluralism, a heterogeneity that on the one hand buttresses structural legitimacy (Paper II) while on the other facilitating "modulated derogation" as a feature of a sectorial legal consciousness (Paper IV). This leads to the question of whether we can speak of a sectorial legal culture in the context of EU civil aviation, and what that would entail, given collective legal consciousness is, as Hertogh and Kurkchiyan (2016:416) postulate, a component of legal culture that is "layered according to the source with which it is associated". To answer this, I again turn to Ewick and Silbey:

> While we describe a legal culture layered with the sediment of diverse interpretive schemas, the variability that an individual might express is neither limitless, random, nor arbitrary (Ewick and Silbey 1998:53).

In other words, the variability of experiences displaying a commonly shared sectorial legal consciousness as theorised in Paper IV suggests a sector-specific legal culture, emergent from below within the EU aviation industry where law and safety, as normative sources of guidance, operate both in harmony and in conflict with each other. The juridification of the concept of just culture in EU civil aviation, and what that means for dealing with human error, suggests the imposition of a sectorial legal approach from above that seeks to be more accommodative than a deterrent, more proactive than reactive, more descriptive than prescriptive, more performance-based than compliance reliant, and more forward-looking than backwards-looking concerning accountability. As Ewick and Silbey have long noted:

> Legal consciousness varies across time (to reflect learning and experience) and across interactions (to reflect opportunity, different objects, relationships or purposes, and the differential availability of schemas and resources) (Ewick and Silbey 1998: 53).

It seems fair to argue that the dynamics of law surrounding the EU civil aviation system projects an understanding that, from the inception of EASA, sectorial change is afoot – from national to European rules, from law as regulation to law as safety management, from compliance-based prescriptive rules to performance-based regulation, from deterrence to accommodation for handling human error, from a retributive approach to blame towards a restorative approach to just culture for safety reporting, and from traditional regulation to RMS (SMS). In the context of European civil aviation (and international)[41], the regulation of both occurrence reporting and just culture especially suggest an ongoing attempt to engineer a European sectorial legal culture around the regulation of aviation safety that is arguably based on safety scholarly models of safety culture (see Reason 1997). The question of harmonising European rules through an EU aviation sectorial legal culture must therefore be understood as never far removed from the notions of strategy and success for the integrated EU single market, as Håkan Hydén and I have argued through the concept of (f)Lex avionica in Paper I.

[41] Chapter 3 of the ICAO SMM (Doc 9859, 4th Ed.) discussed above is dedicated to safety culture and discusses national culture as a factor affecting organisations in relation to safety culture and managing cultural diversity (ICAO SMM 2018:3-3; see Note 39).

Just culture, as a relatively new concept (see Reason 1997; Dekker 2007) and its inclusion into EU civil aviation regulation is interesting when exploring and discussing the notion of engineering a sectorial legal culture. The purported tendencies to retributively and punitively deal with professional error through the national criminal justice system within Member States is being replaced by a new way of thinking that requires a sector-wide allegiance to just culture – as an innovative and strategic mode of social control in this industry sector, as a facilitator to sustain the durability of EU single market politics and the achievement of its objectives, and as a means to harmonise legal meaning regarding the regulation and management of aviation safety across the EU/EASA Member States. And whereas Hertogh and Kurkchiyan view the creation of a European legal culture as that of an overarching canopy under which formal law and legality are gathered, they also recognise that EU policy must broaden its scope to "one that is not restricted to the legal systems" (Hertogh and Kurkchiyan 2016:417). However, they neglect the possibility that a European legal culture need not be all-encompassing of countries but may operate in a cross-national sectorial capacity emergent from below. As I have argued in Paper II, a regulated just culture, as a procedural justice-infused intervention, is not only an RMS to improve safety but also a means to achieve uniform compliance to Regulation (EU) No 376/2014 across Member States and organisations operating in Europe. So, although a just culture, a reporting culture, a learning culture, an informed culture and a flexible culture are conceptually components of a safety culture in aviation, they combine in and through EU legislation to operate as emergent components of a European sectorial legal culture that is structurally transforming law in civil aviation from a regulation ideal to one that materially embeds law as a safety management strategy, a process of normative transformation which in turn serves the EU single market strategy and goals to make European aviation globally dominant (see Reason 1997; Schubert 2004; Hodges 2015; Pellegrino 2019).

Contributions and conclusions

In this final section, I outline the main contributions and summarise the conclusions of the research. Collectively, the research papers answer the main research question and in doing so contribute with new knowledge and innovative

concepts to bring sociology of law and safety scholarship closer together and provide a better understanding of the operation and experience of law in heavily regulated and law-saturated industry sectors such as aviation. The research contributes with important empirical findings which, when framed by the overarching notion of sectorial legal consciousness, build upon existing legal consciousness theory (critically informed) while also bringing a new dimension to safety research on how law and regulation can be approached and understood from below. More specifically, the research here contributes to understanding the relationship between law and safety in aviation and, in particular, the socio-professional domain of aircraft maintenance. Moreover, the research can also allow for building a better understanding of normativity surrounding law and safety in other safety and risk-critical sectors of society.

The dissertation importantly contributes with four devised concepts to situate and explain the operation and making of law in this sector, and to better understand professional experiences of law, safety, and the socio-professional construction of legality through submission to, engagement with, and/or resistance against law in everyday work life in aviation. These concepts are; (f)Lex avionica (Paper I), legal anxiety (Paper II), and sectorial legal consciousness and modulated derogation (Paper IV). I discuss these concepts here to connect with the overarching theoretical framework of legal consciousness and empirical findings.

In Paper I, (f)Lex avionica is a devised concept that describes how the operation of law in the EU/EASA aviation system engages a regulatory RMS using flexible soft law provisions to ensure acceptable compliance with hard law regulatory requirements. Described by Banakar (2015) as characteristic of late-modern law, regulatory RMSs exemplify a generic move from a modern understanding of law as an instrument of social control and change with the facility to provide certainty and protection, to a late-modern concept of law as a means to instrumentally manage risk, insecurities and uncertainties, where uncertainty, in and of itself, is a resource to exploit as a strategic means of control (Banakar 2015:191; cf. Sabel and Zeitlin 2010; le Coze and Wiig 2013).[42] As such, conceptually defined, (f)Lex avionica describes "the normative core from which conditional norms like safety and professional tasks are deduced and refers to the single market core rationality behind EU civil aviation regulation where non-binding soft law provides for

[42] Risk is defined "as a source of uncertainty and insecurity, or 'the potential for (the) realization of unwanted, negative consequences of an event'" (Banakar 2015:190, citing Rowe 1977).

regulatory flexibility but in a way which is always framed by legally effectual binding hard law" (Woodlock and Hydén 2020:61). Ultimately, (f)Lex avionica conceptually describes the ideological operation of EU law within this EU industry sector and encapsulates how, as knowledge-based law, professional and safety scientific knowledge and expertise are mutually subordinated to the authority of the EU/EASA system. This serves the interests of EU law (such as achieving regulatory uniformity and legal harmonisation) and by extension, the greater political, economic, trade, and single market-driven objectives of the EU. Accordingly, a main contribution of the dissertation is the introduction of the concept of (f)Lex avionica into the *law versus safety* scholarly conversation to situate and explain how EU law governing civil aviation is always embedded in a single market logic and strategy that instrumentally upholds and ideologically conceals powerful interests.

Paper I argues that just culture, as an innovative legal concept for encouraging (inducing) compliance to occurrence reporting regulation, ultimately seeks to lay the foundations for regulating the sought-after ideal of a uniform safety culture in risk-critical work environments. A main contribution of Paper I explains how cognitive-based knowledge, such as aircraft maintenance engineers' tacit knowledge, and safety scholarly expertise translates into legal claims when guiding practice. In this sense, regulated occurrence reporting in civil aviation serves the public interest of improving aviation safety but also serves law's interests by legally appropriating "just culture" to, in effect, regulate for a broadly acceptable safety culture (the meaning of which is imposed from above), an otherwise polysemic and difficult concept to regulate uniformly (see Lawrenson and Braithwaite 2018; le Coze and Wiig 2013; see Silbey 2009). Paper I importantly addresses how power is invested in and through law and law-making in the European civil aviation sector and contributes with critical perspectives explaining that the juridification of just culture provides a self-serving platform to the EU legal system from which safety scholarly critiques of law can be de-legitimised – ideological operation of law concealing the self-serving interests of law – legal authority and autonomy.

In Paper II, I employ Tylerian theoretical concepts such as procedural justice and legitimacy to explore the relationship between just culture, as a procedural justice-infused intervention, and obligation to obey and support for law and authority concerning occurrence reporting among European LAMEs (see Woodlock 2022a;

Tyler 2006). Although legal anxiety is not a new concept in socio-legal scholarship (see Sarat 1993), I devised and employed a contextual construct of legal anxiety in this paper to describe sector-specific instrumental judgments that avoid engaging with law and regulated requirements for reporting safety occurrences, including self-reporting of mistakes and errors. In this dissertation, legal anxiety is more precisely defined as "apprehension experienced by aviation professionals when submitting reports and concerns about legal accountability for submitted reports as a consequence of blame culture, perpetuated by fear of actual and potential legal consequences" (Woodlock 2022:443). Accordingly, the concept of legal anxiety in Paper II ultimately addresses if non-compliance pervades as a consequence of so-called "blame culture", as claimed by safety scholars, through retributive processes using blame and punishment that instrumentally shape LAME occurrence reporting behaviours. Although the findings in Paper II support those of previous research, which shows the effect of procedural justice on perceived legitimacy, these results importantly address a longstanding gap in research calling for an examination of procedural justice-infused interventions beyond policing and related law enforcement contexts (see Mazerolle et al. 2013).

Paper II concludes that reporting occurrences in a procedurally just culture is more strongly associated with legitimacy (support) than legal anxiety among Swedish, Portuguese and Norwegian LAMEs. The study contributes with an original empirical exploration of occurrence reporting and just culture in aviation when approached as questions of procedural justice, legitimacy, and the negation of legal anxiety. Perceived procedurally just treatment for reporting occurrences was found to be most effective in enhancing perceived legitimacy among LAMEs in Sweden and Norway, when measured as support for the regulatory authorities and rules. A procedurally just culture was not found to meaningfully predict legitimacy among Portuguese LAMEs when legal anxiety was entered into the equation. These LAMEs indicated higher levels of legal anxiety when reporting occurrences, with over one-third answering that they never use their employer's reporting system. Professional culture and a shared sectorial normative commitment to putting "safety first" in aircraft maintenance was explained as mediating a shared meaning of procedural justice, one that can enhance compliance and buttress legitimacy to negate legal barriers to safety. Paper II concludes that the potential of just culture as a procedural justice-infused legal intervention may now depend on different jurisdictional settings in which

national legal cultures may affect legal meaning surrounding sectorial compliance, but not to the extent that the operation of EU law is ideologically thwarted.

Paper IV proposes two new theoretical concepts – "sectorial legal consciousness" and "modulated derogation". Sectorial legal consciousness is an umbrella concept employed in this dissertation to describe what I have identified as an inward legal consciousness that emerged from LAME stories portraying collective "experiences and perceptions of working under the EU regulations for civil aviation" – "our rules" for "our sector" (Woodlock 2022b:185; cf. Hertogh and Kurkchiyan 2016). Building on the claims and findings of previous research, sectorial legal consciousness signifies how the socio-professional construction of legality encompasses normative heterogeneity, not least through a collective professional cultural alignment with a prevailing sectorial norm of "safety first" that can both support and subordinate formal law and its requirements (see McDonald et al. 2000; Pettersen and Aase 2008; Silbey 2009; Woodlock 2022:26).

The professional cultural collective allegiance to "safety first" further encompasses what I have conceptualised as "modulated derogation". More specifically, modulated derogation describes how aviation professionals adopt counter-hegemonic strategies of resistance to law and official forms of authority by occasionally deviating from formal rules and procedures. This resistance "against the law" involves amending a binary code of compliance/non-compliance to that of a safe/unsafe code as a resource for professionally constructing legality. In this sense, sectorial legal consciousness is not limited to a law-centred experience but rather involves normative pluralism where, interactively, the contradictory constrictions and obligations of formal law and a collective socio-professional cultural commitment to a norm of "safety first" produce "plural normative expectations" (Fortes and Kampourakis 2019: 644; see Ramstedt 2016; Twining 2010; Ewick and Silbey 1998; see also McDonald et al. 2002). In short, modulated derogation as professional permission to not strictly follow a rule in order to put safety first involves knowledge of how legal power operates in EU civil aviation and where, consequentially, LAMEs as "sociological professionals" are able "to turn it to their advantage in ways not formally permitted" (Ewick and Silbey 1998: 240; see Sewell 1992:17-18; Silbey et al. 2009). By rejecting the monolithic portrayals of law within safety science, the study findings in Paper IV show that two socially constructed images of law coexist and compete in the regulatory environment of the EU aircraft maintenance sector – an inward

sectorial legal consciousness (EU/EASA regulations as "our rules") and an outward legal consciousness (national criminal justice systems as "their rules") where the purported criminal prosecution external to the aviation sector shapes perceptions of law and legality within, and based on hearsay, outwardly from within this sector. The concepts of sectorial legal consciousness and modulated derogation contribute to understanding how law works in this sector from below by innovatively capturing how aviation professionals "make law" work by making safety work through the socio-professional construction of legality and normative pluralism in this regulated environment. This must be embraced to capture the heterogeneity of normative experiences of law, legality and safety within European civil aviation.

The survey and interview findings in Paper III contribute important understandings of LAME experiences of law and legality for issuing a CRS in European civil aviation and when approached through the socio-legal lens of "a gap problem of law". A noteworthy finding emerged from this study suggesting that trust in legal authority can be a unique sector-specific experience (not state-based). The study reveals, through the regulation of aviation, the limits of gap-focused studies employing the classic binary "law in books" and "law in action", where instrumentally applied soft law in EU aviation functions as both "law in books" and "law in action". This exposes the disputed gap as an ideological operation of law that sees "compliance" transform as a structure of meaning where "presumed compliance" functions as a safety management strategy that effectively supports EU single market goals. With consideration of the findings in Paper III, the idea and image of a meandering flow of hard and soft law, as depicted in Figure 8 in Chapter 4 of this kappa, contributes to building a better understanding that explains the hierarchical chain of different forms of law that frame and shape civil aviation but also LAME expectations of the role of law.

I conclude here that the juridification surrounding aviation as an industry sector, such as with the appropriation of just culture as a legal concept in EU civil aviation, can be understood as representing a process of ideologically establishing (and therefore imposing) a sector-specific EU legal culture that strategically seeks to homogenise legal meaning on matters pertaining to the regulation of aviation safety in Europe. This aviation strategy also sets out to harmonise the embedding of EU law as a uniformly regulated safety management system to mitigate the durability of the legal hegemony of the national legal frameworks of EU/EASA

Member States (see Nelken 1981; BV 2007; Haas and Ourtau 2009; Hodges 2015; Hertogh and Kurkchiyan 2016; Pellegrino 2019; cf. Banakar 2015:191). However, the problems surrounding CRS as a "gap too far" for the EU/EASA to deal with, as expounded in Paper III, represents how engineering a single European (sectorial) legal culture "would still remain questionable" (see Hertogh and Kurkchiyan 2016) due to the close and interdependent relationship between the NAAs of some EU/EASA Member States and large powerful airline companies in these countries.

In answering the main research question, the research ultimately sought to increase understanding of law and legality in relation to the normative character of aviation safety in the European aircraft maintenance sector. It takes into consideration the bottom-up experiences and perceptions of certifying LAMEs as they participate in the socio-professional construction of legality within this sector where putting safety first emphatically matters. With law and legality in focus, and by embracing the notion of normative pluralism, the research project ultimately contributes new knowledge to understanding legal consciousness in everyday work life and, therewith, expands on existing legal consciousness theory by introducing the concepts of sectorial legal consciousness and modulated derogation.

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Between Law and Safety

This compilation thesis explores how licensed aircraft maintenance engineers in Norway, Portugal and Sweden experience working under EU civil aviation regulations in this sector. By focusing on occurrence reporting and the certification and release of aircraft into service, as two regulated phenomena that directly affect the everyday working lives of these maintenance engineers, the research ultimately found that a sectorial legal consciousness emerged among these professionals that is characterised by normative pluralism and a shared professional cultural allegiance to a norm of putting safety first. This thesis contributes to a better understanding of the interaction between law, legality and safety in the aviation sector and how these are experienced among aviation professionals. It also contributes to sociology of law research by introducing new concepts such as sectorial legal consciousness and modulated derogation to explain socio-professional experiences of law and legality in high risk and complex socio-technical systems, such as aviation. By focusing on the bottom-up perspectives and experiences of professionals working at the sharp end of aviation, the research approach, findings and theoretically framed discussions in the research papers included in this thesis can also contribute to increasing knowledge on the relationship between law, legality, and safety in other high-risk and safety critical sectors of society.

Printed by Media-Tryck, Lund 2023
NORDIC SWAN ECOLABEL 3041 0903

LUND UNIVERSITY

Department of Sociology of Law
Faculty of Social Sciences
Lund university
ISBN 978-91-8039-768-1
ISSN 1403-7246