# HUMAN FACTORS FOR PILOTS AND AVIATION SPECIALISTS

## Flight Safety Through Modern Approaches to Human Behavior

Aleksandra Kapela

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# Human Factors for Pilots and Aviation Specialists

This book investigates human behavior within the aviation sector. Authored by an experienced aviation psychologist, it reveals the complexities of human performance in flight operations. From understanding the question of how human factors shape aviation safety to exploring decision-making, spatial awareness, stress management, and well-being, this book details what aviation professionals need to know about the industry of flight and psychology.

This title integrates current research, industry practice, and regulatory frameworks to show how human factors and psychological principles influence aviation safety and performance. It offers experience-based insights into the psychological dimensions of flight operations, fostering a deeper understanding of how human performance shapes safety and efficiency in modern aviation. Drawing on more than forty recent real-world case studies and operational examples, the book bridges theory and practice through practical takeaways and reflective questions that support confident, applied decision-making across aviation roles.

*Human Factors for Pilots and Aviation Specialists: Flight Safety Through Modern Approaches to Human Behavior* will appeal to experienced aviation professionals, human-factors specialists, students of aerospace and aeronautical engineering and researchers studying the human aspects of flight.

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*For my daughter, Rose – may you always know that there are no limits to what you can achieve.*

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# About the Author

**Aleksandra Kapela** is Founder of MyWingman.eu an aviation psychology initiative focused on supporting pilot training, assessment, and wellbeing. She is an aviation psychologist and human-factors specialist with over a decade of experience supporting pilots and aviation organizations worldwide. She holds master's degrees in Occupational Psychology and Human Resource Management and is also a ground school instructor involved in pilot training. Certified by the European Association for Aviation Psychology (EAAP), she specializes in competency-based training, KSA100 assessment, and crew performance. Ms. Kapela regularly speaks at international aviation conferences and works with airlines, training organizations, and universities to integrate psychological science into aviation training and safety culture. Her work focuses on bridging operational aviation with modern insights from psychology, neuroscience, and human performance.

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# Foreword

Aviation is a contradiction.

In 2023, commercial aviation generated approximately US $4.1 trillion in global economic impact – around 3.9% of world GDP. If aviation were a country, its contribution would rank it among the four largest economies on Earth.

Aviation is also extraordinarily safe. In the same year, 4.4 billion passengers flew on nearly 29,000 aircraft, completing around thirty-eight million flights, without a single fatality in a commercial jet aircraft. Yet this statement, while factually correct, is incomplete.

Aviation is not safe because accidents are rare. It is safe because, every day, thousands of professionals detect, absorb, correct, and recover from small failures before they escalate. Safety is not an outcome. It is a habit. A culture. Something people do when no one is watching – especially when things go wrong.

Why do intelligent people fear flying? Given the transparency of aviation safety data, a troubling question remains: why do nearly 20% of the population fear flying, including some of the most intelligent, analytical, and experienced professionals? Why do around 8% choose not to fly at all, opting instead for ground transport that is orders of magnitude more dangerous?

I encounter this contradiction frequently. Leaders who confidently calculate risk, champion artificial intelligence, and speak fluently about resilience will quietly admit they fear boarding an aircraft. The problem is not ignorance of statistics. It is a failure to understand how safety works.

Resilience is not a single skill. Many leaders speak about resilience as if it were a standalone trait: knowledge, training, experience, teamwork, leadership, decision-making, crisis management, and risk. Resilience is none of these in isolation. True resilience emerges only when they are interlinked through communication, trust, and shared understanding of our capabilities and limitations.

A founder with a high IQ but poor emotional intelligence is not resilient.
A technically brilliant expert who cannot regulate stress or work in a team is not resilient.

Resilience is systemic. Human Factors for Pilots and Aviation Specialists (HFPAP) bridges the gaps between technology, complexity, risks, culture, safety, and resilience. It explains how people remain calm in crises while others lose cognitive control. It is both a technical and human guide to maintaining physical and mental performance when the unthinkable occurs.

Professionalism, as this book makes clear, is not blind obedience. It is understanding systems to their foundations, why each step exists and knowing when breaking the rules is required. In an increasingly complex environments where automation does most of the work but takes none of the responsibility, it is up to the pilots to save the day, a team alone, often with no way to stop or call a friend.

Aviation remains safe because professionals expect errors, respect them and then design for them. Stress cannot be eliminated, but it can be regulated. Resilience is the ability to prepare during calm periods so that teams can think, communicate, and decide effectively when things unravel. It is not merely about surviving adversity; resilient systems thrive during stability and perform under strain.

Resilience is not luck. It is preparation, teaming, and execution. Across its chapters, this book explores how attention, workload, situational awareness, and crisis decision-making evolves in real operations. It explains why situational awareness can appear stable until it collapses suddenly, why underload can be as dangerous as overload, and why experience can be a curse.

Aviation regulations are often described as "written in blood." But safety is sustained not by rules alone – it is sustained by people. The professionals we entrust with our lives do not simply follow SOPs in calm conditions; they possess the skills to create novel solutions when faced with unprecedented failures that no checklist can resolve.

To succeed in aviation – and in any high-risk domain – it is not enough to understand "what" to do. One must understand the "how" and the "why." This is what Human Factors really means.

I define Human Factors as studies of four interconnected dimensions:

- How humans are built
- What humans can do
- How humans respond to inputs
- How humans interact with machines

To grasp these, we must understand the neuroscience of the brain and mind – not just neurons and synapses, but sensory inputs, motor outputs, emotion, stress chemistry, and cognition. This knowledge allows us to connect every element of resilience into a coherent whole.

Human limits are not character flaws. They are biological facts. Understanding them gives us the confidence to own our limitations, explain our decisions, and shape outcomes deliberately. Human Factors teaches us how to harness both our strengths and our vulnerabilities, to mitigate threats, survive, and lead, through crises.

Leadership when the tide goes out. Fair-weather leaders can succeed during calm periods. But when pressure rises and margins disappear, the truth is revealed. As Warren Buffett famously observed, "Only when the tide goes out do you discover who's been swimming naked."

Sustained resilience belongs to those who understand – and respect – human factors.

Why this book matters. For my entire life, I have advocated continuous learning, adaptation, and improvement. I am a strong proponent of Human Factors and resilience – not as theory, but as a necessity for life.

That is why I am delighted that Aleksandra Kapela asked me to write this foreword. She is among the very few who understand Human Factors – and rarer still, written about it with clarity, depth, and operational relevance.

By exploring all four dimensions of Human Factors, this book explains how we think, act, communicate, and build resilience. In just over 122 years since the first powered flight, aviation has evolved from the most dangerous form of transport to the safest. The lessons in this book explain the WHYs, the HOWs, and the WHATs.

They are lessons not just for aviation, but for personal, corporate, and national resilience.

Human Factors for Pilots and Aviation Specialists is not a manual of procedures. It is a human performance book for people who operate in complex, high-risk systems – where failure is not an option, uncertainty is constant, and comfort is rare.

I commend this book to you.

**Captain Richard Champion de Crespigny**
*Pilot-in-Command, Qantas Flight QF32*
*4 November 2010*

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# Preface

*This book* offers a fresh, modern view of human performance in aviation. This may be the first book in aviation to bring together **academic insight, neurocognitive foundations, and a practical operational perspective –** making human factors both understandable and useful in everyday practice. Drawing on 40 real-world contemporary case studies from 2009 onwards, it explores how people think, decide, and perform under pressure – focusing primarily on pilots and instructors while recognizing the vital interdependence of all aviation roles, from cabin crew and engineers to air traffic controllers. These case studies include both lessons learned from setbacks and inspiring examples of resilience and good practice that have advanced modern aviation safety.

This book grew out of years spent listening to professionals across the flight deck, the cabin, and offices, all sharing the same curiosity about what truly shapes human performance. Written in clear, accessible language, it links scientific research with operational experience, showing how stress, fatigue, attention, leadership – but also mental health and well-being – influence safety and teamwork across the system.

It also looks ahead to emerging technologies, training innovations, and future human–machine collaboration, offering a holistic, forward-looking understanding of human factors for the next generation of aviation professionals.

By blending evidence, empathy, and forward-looking insight, this book invites everyone passionate about aviation to rethink safety, performance, and the human mind in flight. My hope is that it helps current and future professionals – pilots above all, yet every role beside them – see human factors not as a checklist, but as the living heartbeat of every safe and meaningful flight.