



[Books] The Future Of Air Traffic Control: Human Operators And Automation

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The Future of Air Traffic Control-National Research Council 1998-01-26

Automation in air traffic control may increase efficiency, but it also raises questions about adequate human control over automated systems.

Following on the panel's first volume on air traffic control automation, *Flight to the Future* (NRC, 1997), this book focuses on the interaction of pilots and air traffic controllers, with a growing network of automated functions in the airspace system. The panel offers recommendations for development of human-centered automation, addressing key areas such as providing levels of automation that are appropriate to levels of risk, examining procedures for recovery from emergencies, free flight versus ground-based authority, and more. The book explores ways in which technology can build on human strengths and compensate for human vulnerabilities, minimizing both mistrust of automation and complacency about its abilities. The panel presents an overview of emerging technologies and trends toward automation within the national airspace system--in areas such as global positioning and other aspects of surveillance, flight information provided to pilots and controllers, collision avoidance, strategic long-term planning, and systems for training and maintenance. The book examines how to achieve better integration of research and development, including the importance of user involvement in air traffic control. It also discusses how to harmonize the wide range of functions in the national airspace system, with a detailed review of the free flight initiative.

Flight to the Future-National Research Council 1997-02-28 Despite the strong safety record of the national airspace system, serious disruptions occasionally occur, often as a result of outdated or failed equipment. Under these circumstances, safety relies on the skills of the controllers and pilots and on reducing the number of aircraft in the air. The current and growing pressures to increase the capacity to handle a greater number of flights has led to a call for faster and more powerful equipment and for equipment that can take over some of the tasks now being performed by humans.

Increasing the role of automation in air traffic control may provide a more efficient system, but will human controllers be able to effectively take over when problems occur? This comprehensive volume provides a baseline of knowledge about the capabilities and limitations of humans relative to the variety of functions performed in air traffic control. It focuses on balancing safety with the expeditious flow of air traffic, identifying lessons from past air accidents. The book discusses the function of the national airspace system and the procedures for hiring, training, and evaluating controllers. Decisionmaking, memory, alertness, vigilance, sleep patterns during shift work, communication, and other factors in controllers' performance. Research on automation and human factors in air traffic control and incorporation of findings into the system. The Federal Aviation Administration's management of the air traffic control system and its dual mandate to promote safety and the development of air commerce. This book also offers recommendations for evaluation the human role in automated air traffic control systems and for managing the introduction of automation into current facilities and operations. It will be of interest to anyone concerned about air safety--policymakers, regulators, air traffic managers and controllers, airline officials, and passenger advocates.

The Future Air Navigation System (FANS)-Vincent P. Galotti 2019

Future Flight-National Research Council (U.S.). Transportation Research Board. Committee for a Study of Public-Sector Requirements for a Small Aircraft Transportation System 2002

Securing the Future of U.S. Air Transportation-National Research Council 2003-11-18 As recently as the summer of 2001, many travelers were dreading air transportation because of extensive delays associated with

undercapacity of the system. That all changed on 9/11, and demand for air transportation has not yet returned to peak levels. Most U.S. airlines continue to struggle for survival, and some have filed for bankruptcy. The situation makes it difficult to argue that strong action is urgently needed to avert a crisis of undercapacity in the air transportation system. This report assesses the visions and goals for U.S. civil aviation and technology goals for the year 2050.

Developing the Future Aviation System-Rod Baldwin 1998 This book provides a general account, with more breadth and depth than usual for a general book, of how some aspects of aviation will develop in the next few decades.

Airport and air traffic control system.-

Air Traffic Control-Sundara Mahalingam 1999 With The Volume Of Air Traffic Steadily Growing And Airspace Congestion Consequently Increasing, The Control And Regulation Of Such Air Traffic Assume Greater And Greater Importance. Yet, The Average Individual Or Even The Regular Air-Traveller Whose Safety Depends On Air Traffic Control, Has Little Or No Knowledge Of The Way It Functions, Mainly Because Of The Lack Of Access To Such Information. This Book Explains In A Simple And Interesting Manner The Basic Concepts Of Air Traffic Control And How It Is Exercised In The Present Day Scenario. It Also Traces The Genesis And Development Of This Profession Through Its Early Times. The Icao (International Civil Aviation Organisation) Sponsored Cns, Atm (Communication Navigation Surveillance, Air Traffic Management) System Which Is The Air Navigation System For The Future, Conceived To Meet The Requirements Of The Projected Increase In Volume Of Air Traffic In The Next Decade, Is Also Explained. A Number Of Interesting Occurrences Based On The Author S Own Experience In Air Traffic Control Are Also Narrated Which Give A Fascinating Insight Into Many Aspects Of The Controllers Job. This Book Is Written In A Narrative And Reader-Friendly Style; Aviation Professional As Well As Others Will Find In Interesting And Useful Reading. Contents Chapter 1: Initiation As Air Traffic Controller; Chapter 2: Development Of Flying And Air Traffic Control; Chapter 3: Art Of The Controller; Chapter 4: Thrills And Throes Of Air Traffic Control; Chapter 5: Mid-Air Collision Over Charkhi Dadri; Chapter 6: Black Box: A Brief Description; Chapter 7: Indian Air Traffic Services System; Chapter 8: Modernisation Of Air Traffic Services- Mumbai-Delhi (Mats Bd Project); Chapter 9: Air Navigation System For Future; Chapter 10: Controller And His Job.

European Air Traffic Management-Andrew Cook 2016-12-05 *European Air Traffic Management: Principles, Practice and Research* is a single source of reference on the key subject areas of air traffic management in Europe. It brings together material that was previously unobtainable, hidden within technical documents or dispersed across disparate sources. With a broad cross-section of contributors from across the industry and academia, the book offers an effective treatment of the key issues in current, and developing, European ATM. It explains the principles of air traffic management and its practical workings, bridging the academic and operational worlds to give an insight into this evolving field, with a number of fresh perspectives brought to the text. On-going research and developments are closely integrated into the themes, demonstrating the likely directions of future ATM in Europe and the challenges it will face. It is anticipated that many readers will already have expertise in one or more of the chapters' subject matter, but wish to develop a further understanding of the areas covered in others, taking advantage of the many thematic and operational links which have been illustrated. The book will appeal to both aviation academics and practitioners, equally for those whose area of expertise is outside ATM but want a clearly elucidated source of reference, as to those wishing to broaden existing knowledge.

Staffing the ATM System-Hinnerk Eißfeldt 2017-05-15 Issues of personnel development in air traffic control (ATC) have become a major topic in aviation recruitment and training. Proper selection and training methods are needed in order to reach a high level of efficiency and reliability in ATC. Pilots were considered the most prominent group in aviation for a long time, but with the development of flight guidance technologies came a second operational occupation in aviation: the air traffic controller (ATCO). This volume provides a state-of-the-art overview of controller selection from an impressive collection of international specialists in research and practice. It will prove a valuable and key insight into the demands of air traffic controller selection through its comprehensive and enlightening examination of the current practice in the USA and Europe for the job-analysis requirements of future air traffic management (ATM) systems.

Air Traffic Management-Margaret Arblaster 2018-02-06 Air Traffic Management: Economics Regulation and Governance provides the latest insights on approaches and issues surrounding the economic regulation and governance of air traffic management (ATM). The book begins by explaining what ATM is, showing its importance within the aviation industry. It then outlines the unique institutional characteristics that govern ATM, also discussing its implications for economic regulation and investment. Technological developments and the issues and approaches to safety regulation are also covered, as are the implications ATM has on airports. The book concludes with an exploration of future directions, including the entry of drones into airspace and the introduction of competition in ATM services Air traffic management plays a critical role in air transport, impacting both air safety and the efficiency of air services. Yet air navigation services are shifting from government provision to private industry, creating the need for more critical analysis of governance and economic regulation within the ATM industry. Consolidates the latest economic regulation and reform material regarding air traffic management Provides numerous practical examples and real-world case studies drawn from around the globe Explores economic regulation in both larger and smaller economies Written from an objective, informed and practical perspective by an experienced regulation practitioner and researcher

Future Air Traffic Controller-Bw Journals 2019-09-21 Get yourself a journal to write in. Journal your thoughts, notes, and much more.

The Future of Air Transport-Great Britain. Department for Transport 2003 This White Paper sets out a strategic policy framework for the development of airport capacity in the UK over the next 30 years. Chapters focus on the following: the strategic framework; the environmental impacts; the air transport sector. It also looks at individual regions and the impact for them, including: Scotland, Wales and Northern Ireland, also the North of England, the Midlands, the South West and finally the South East. The framework itself can be used by public bodies, air operators and airlines for future planning applications. It also sets out the Government and devolved administrations' conclusions on the case for future airport expansion, taking into account the large consultation exercise of over half million respondents. This paper provides reasons why airport capacity should be expanded, but recommends a balanced approach to the issue. Among the reasons are: the economic importance of air travel for the country's economy and the increased desire amongst the population for foreign travel, which should be balanced against minimizing, where possible the environmental effects to an area where airports are situated. These are some of the main cases for future development following a full environmental assessment: for Scotland: an additional runway at Edinburgh Airport; substantial terminal development at Glasgow Airport. For Wales: further terminal development needed at Cardiff airport. For Northern Ireland: development of increased capacity at Belfast. For the North of England: additional terminal capacity provided at Manchester Airport and development of increased capacity at Liverpool John Lennon Airport. For the Midlands: additional runway for Birmingham. For South West England: expansion of Bristol Airport. For South East England: a new runway at Stansted; further development of Heathrow supported, including a further runway and additional terminal capacity. Some options though are not to be followed through, including: two new runways at Gatwick, a development of a second runway at Luton, and a new airport at Cliffe, a new airport of central Scotland, and a new airport at Rugby.

The FAA Plans and Programs for the Future Airport and Air Traffic Control System- 1980

Managing the Skies-Clinton V. Oster 2017-03-02 Over the past two

decades, the organization and provision of air traffic control (ATC) services has been dramatically transformed. Privatization and commercialization of air navigation has become commonplace. Far-reaching reforms, under a variety of organizational structures and aviation settings, have occurred across the world, most notably in Canada, Britain, Australia, New Zealand, and South Africa. In contrast, innovations have lagged behind in other countries - including the United States. In addition, much recent attention has been given to aviation infrastructure and safety in Africa, in some parts of Asia and Latin America, and in rapidly growing air markets including India and China. In response, the International Civil Aviation Organization (ICAO), the International Air Transport Association (IATA), and multilateral banks and institutions have launched a major effort to improve the performance and safety of civil aviation in developing economies. *Managing the Skies* has been written to provide a guide to what has been tried in air traffic management, what has worked, and what lessons might be learned. The book starts with an introduction to air navigation, its development and current state, as well as trends in aviation activity. It examines in detail the experiences of ATC in both mature and emerging markets across the world, considering many alternative models, efforts to restructure and comparisons of performance. The book contains several in-depth case studies to provide a truly global perspective of ATC practices. Particular attention is given to the FAA and its efforts and challenges in reforming ATC in the US, both historically and in the current climate. It addresses the issues of finance, organization, investment, and safety restructuring and reform options that are at the core of current debates involving air traffic control in the United States. Further to this, the authors discuss the alternatives available for future change. The book concludes by examining the cross-cutting issues of labor relations and organizational structures, presenting the lessons learned and considering what the future may hold. As the world experiences a resurgence in air travel and civil aviation, the issues discussed in *Managing the Skies* are particularly timely not only for industry and government leaders, but for the world's air travelers.

Automation and Systems Issues in Air Traffic Control-John A. Wise 2012-12-06 In recent years, increases in the amount and changes in the distribution of air traffic have been very dramatic and are continuing. The need for changes in the current air traffic systems is equally clear. While automation is generally accepted as a method of improving system safety and performance, high levels of automation in complex human-machine systems can have a negative effect on total system performance and have been identified as contributing factors in many accidents and failures. Those responsible for designing the advanced air traffic control systems to be implemented throughout the alliance during the next decade need to be aware of recent progress concerning the most effective application of automation and artificial intelligence in human-computer systems. This volume gives the proceedings of the NATO Advanced Study Institute held in Maratea, Italy, June 18-29, 1990, at which these issues were discussed.

Air Transportation Systems Engineering-George L. Donohue 2001

Assessment of Staffing Needs of Systems Specialists in Aviation-National Research Council 2013-07-29 Within the Federal Aviation Administration (FAA), the Airway Transportation System Specialists (ATSS) maintain and certify the equipment in the National Airspace System (NAS). In fiscal year 2012, Technical Operations had a budget of \$1.7B. Thus, Technical Operations includes approximately 19 percent of the total FAA employees and less than 12 percent of the \$15.9 billion total FAA budget. Technical Operations comprises ATSS workers at five different types of Air Traffic Control (ATC) facilities: (1) Air Route Traffic Control Centers, also known as En Route Centers, track aircraft once they travel beyond the terminal airspace and reach cruising altitude; they include Service Operations Centers that coordinate work and monitor equipment. (2) Terminal Radar Approach Control (TRACON) facilities control air traffic as aircraft ascend from and descend to airports, generally covering a radius of about 40 miles around the primary airport; a TRACON facility also includes a Service Operations Center. (3) Core Airports, also called Operational Evolution Partnership airports, are the nation's busiest airports. (4) The General National Airspace System (GNAS) includes the facilities located outside the larger airport locations, including rural airports and equipment not based at any airport. (5) Operations Control Centers are the facilities that coordinate maintenance work and monitor equipment for a Service Area in the United States. At each facility, the ATSS execute both tasks that are scheduled and predictable and tasks that are stochastic and unpredictable in. These tasks are common across the five ATSS disciplines: (1) Communications, maintaining the systems that allow air traffic controllers and pilots to be in contact throughout the flight; (2) Surveillance and Radar, maintaining the systems that allow air traffic controllers to see the specific locations of all the aircraft in the airspace they are monitoring; (3) Automation, maintaining the systems that allow air traffic controllers to

track each aircraft's current and future position, speed, and altitude; (4) Navigation, maintaining the systems that allow pilots to take off, maintain their course, approach, and land their aircraft; and (5) Environmental, maintaining the power, lighting, and heating/air conditioning systems at the ATC facilities. Because the NAS needs to be available and reliable all the time, each of the different equipment systems includes redundancy so an outage can be fixed without disrupting the NAS. Assessment of Staffing Needs of Systems Specialists in Aviation reviews the available information on: (A) the duties of employees in job series 2101 (Airways Transportation Systems Specialist) in the Technical Operations service unit; (B) the Professional Aviation Safety Specialists (PASS) union of the AFL-CIO; (C) the present-day staffing models employed by the FAA; (D) any materials already produced by the FAA including a recent gap analysis on staffing requirements; (E) current research on best staffing models for safety; and (F) non-US staffing standards for employees in similar roles.

Airport capacity constraints and strategies for mitigation: A global perspective-Marc Gelhausen 2019-09-15 Capacities, Capacity Constraints and Capacity Reserves of Airports, Today and in the Future analyzes airport capacity constraints with empirical methods that forecast future capacities and their capacity shortfalls. When predicting the future of air traffic development, it is imperative for researchers and planners to possess the most accurate data for airport capacity constraints. The book discusses in detail the importance of airport capacity constraints on air traffic development, especially for international hubs, along with mitigation strategies for already packed airports. The book analyzes cross-sectional time-series data to provide greater insight into the problems of airport crowding and over-capacity. The authors go beyond mere strategies to derive capacity, adding estimates for comparable capacities and capacity constraints of airports worldwide. As expanding current airports becomes increasingly difficult, and time consuming-especially for hub-the study of current and future airport capacity constraints becomes ever more needed. Large international airports are especially essential to the global air transport network. The book provides insight into correctly assessing and quantifying the problem of limited airport capacity, while offering strategies for overcoming these issues for a healthy global air traffic network. Focuses on airport capacity constraints in the global air traffic network and their implications for the future of air traffic development Features empirical and model-based approaches that forecast airport capacities and capacity shortcomings Provides over capacity mitigation strategies based on sound and reliable data and methodology Addresses capacity constraints at hub airports, providing insight into correctly assessing and quantifying limited capacity for these important players in the global air transportation network Applies econometric models for the implication of restraining factors on the future volume and structure of air traffic

Future Needs and Opportunities in the Air Traffic Control System-United States. Congress. House. Committee on Science and Technology. Subcommittee on Transportation, Aviation, and Weather 1977

The Air Transport System-M Hirst 2008-09-24 Major operational elements of the world's air transport system are examined in this important book, which provides a rare overview and an invaluable single information source to managers in all sectors of the air transport industry. The air transport system considers route structure options in terms of operational impacts and describes the context and boundaries of the industry - the natural, regulatory and operational environments. 'Systems' perspectives are introduced to integrate the discussion of aircraft, airlines, airports and airspace issues. The issues faced in ensuring symbiosis of all these elements of the changing scene and the scope for developing balanced strategies to suit all stakeholder requirements are considered in depth to produce a comprehensive text with the potential to influence how well the air transport industry succeeds in meeting its many future challenges. Examines major operational elements of the world's air transport system Considers route structure options in terms of operational impacts Examines the natural, regulatory and operational boundaries of the industry

Aviation Investment-Dr Doramas Jorge-Calderón 2014-01-31 Aviation Investment uniquely addresses investment appraisal methods across the key industries that make up the aviation sector, including the airports, air traffic management, airline and aircraft manufacturing - or aeronautic - industries. It is a practice-oriented book where methods are presented through realistic case studies. The emphasis is on economic appraisal, or cost-benefit analysis, in order to determine the viability of projects not only for private investors but for society as a whole. Financial (cash flow) appraisal is illustrated alongside economic appraisal, as the latter builds on the former, but also to show how economic appraisal enhances standard financial appraisal to determine the long-term sustainability of any investment.

Aviation is a capital-intensive sector that is growing rapidly, with world traffic expected to double over the next 15 years or so. A great deal of economic appraisal of investment projects takes place already, as aviation is subject to government intervention through economic regulation and financial support, and as both investors and policy makers seek to understand issues such as how environmental legislation may impact the viability of investments. Both economic growth and welfare go hand in hand with sound investment decisions, particularly regarding sectors such as aviation where investments are large and almost invariably debt-financed. Aviation Investment offers all aviation sub-sectors a single-source reference, bringing together the theoretical background of the economic appraisal literature and aviation investment in practice. It is written in a style that is accessible to non-academic professionals, using formulae only where strictly necessary to enable practical applications, and benefits from the substantial practical experience of the author.

The Geographies of Air Transport-Dr Lucy Budd 2014-07-28 Making a detailed contribution to geographies of air transport and aeromobility, this book examines the practices and processes that produce particular patterns of air transport provision both regionally and globally. In so doing, it updates the seminal contributions of Eva Taylor (1945), Kenneth Sealy (1957), Brian Graham (1995) and others to the study of air transport geography. Leading scholars in the field offer a unique insight into the key developments that have occurred in the field and the implications that these developments have had for geography, geographers, and global patterns of past, present and future air transport. Although globalization and liberalization processes have greatly expanded the demand for air transport over the last two decades, the industry has experienced several major setbacks due to economic, security, and environmental concerns. Many of these impacts have been much more pronounced in some regions, such as North America and Europe while others, such as Asia-Pacific have not been as adversely affected. Accordingly, there is a clear need to examine these recent economic and geopolitical changes from a geographical perspective given the differentiated pattern of effects from global processes. Addressing this need, this volume opens with thematic chapters covering key topics such as the historical geographies, socio-cultural mobilities, environmental externalities, urban geographies, and sustainability of the global air transport industry, followed by regional analysis of the industry in Asia-Pacific, Latin America, Greater Middle East and Africa as well as North America and Europe.

A Career in Air Traffic Control, 2nd Ed.-Michael S. Nolan 2018-01-01 Air traffic control is an exciting, interesting, exacting, and high paying career open to anyone with a willingness to study, learn, and work hard. It can be a difficult profession to enter, but the rewards are worth it! This book is an attempt to inform you about all the different careers available. It acts as a primer concerning the basic principles and practices of air traffic control. This book will make you a better-informed applicant or student of the profession. Nolan's and LaRue's practical approach to the field and comprehensive coverage of difficult-to-understand concepts is key in providing you with a decisive advantage in reaching your goals of becoming an air traffic controller. They bring years of experience as a professor, FAA traffic air controller, and pilot to the subject. Unlike other books, which focus only on reciting rules and regulations, this book focuses on teaching you how the air traffic control system works and the rationale for why the system functions.

Hybrid Systems: Computation and Control-Rajeev Alur 2004-03-12 This book constitutes the refereed proceedings of the 7th International Workshop on Hybrid Systems: Computation and Control, HSCC 2004, held in Philadelphia, PA, USA, in March 2004. The 43 revised full papers presented together with an invited article were carefully reviewed and selected from 117 submissions. The papers address all current issues in hybrid systems such as tools for analysis and verification, control and optimization, modeling and engineering applications, and emerging topics in programming language support and implementation; a special focus is on the interplay between biomolecular networks, systems biology, formal methods, and control of hybrid systems.

Maintaining U.S. Leadership in Aeronautics-National Research Council 1998-11-07 After the completion of the National Research Council (NRC) report, Maintaining U.S. Leadership in Aeronautics: Scenario-Based Strategic Planning for NASA's Aeronautics Enterprise (1997), the National Aeronautics and Space Administration (NASA) Office of Aeronautics and Space Transportation Technology requested that the NRC remain involved in its strategic planning process by conducting a study to identify a short list of revolutionary or breakthrough technologies that could be critical to the 20 to 25 year future of aeronautics and space transportation. These

technologies were to address the areas of need and opportunity identified in the above mentioned NRC report, which have been characterized by NASA's 10 goals (see Box ES-1) in "Aeronautics & Space Transportation Technology: Three Pillars for Success" (NASA, 1997). The present study would also examine the 10 goals to determine if they are likely to be achievable, either through evolutionary steps in technology or through the identification and application of breakthrough ideas, concepts, and technologies.

The Future of Aerospace-National Academy of Engineering 1993-02-01

Few technological advances have affected the lives and dreams of individuals and the operations of companies and governments as much as the continuing development of flight. From space exploration to package transport, from military transport to passenger helicopter use, from passenger jumbo jets to tilt-rotor commuter planes, the future of flying is still rapidly developing. The essays in this volume survey the state of progress along several fronts of this constantly evolving frontier. Five eminent authorities assess prospects for the future of rotary-wing aircraft, large passenger aircraft, commercial aviation, manned spaceflight, and defense aerospace in the post-Cold War era.

New Concepts and Methods in Air Traffic Management-Lucio Bianco 2001-05-08

This volume presents new concepts and methods in Air Traffic Management, in particular: Collaborative Decision Making, as it incorporates for the first time airline companies in the management process; Congestion Pricing, as many part of the systems are and will remain saturated, hence only leveling of demand can contribute to global efficiency; Flow Management Methods, as the most important tools in planning and analysis; Models of Controller-Pilot Interaction, as deregulation increases the workload of this communication; Weather Forecast, as airport capacity is strongly affected by weather conditions.

Air Transport - A Tourism Perspective-Anne Graham 2019-02-15

Air Transport: A Tourism Perspective provides rigorous insights into the current complexities, synergies and conflicts within air transportation and tourism, presenting a balanced, comprehensive, contemporary, and global analysis that thoroughly examines the links between theory and practice. The book offers readers a multi-sector, global perspective on the practical implications of the link between air transport and tourism. By using a novel approach, it systematically explores the successive stages of a tourist's trip-investigating reasons for flying, the airport experience, airline industry structures, competition and regulation, and air transportation and destination interrelationships. In addition, the book explores current and salient debates on such issues as the influence of traveling to visit friends and family, the role of charters versus low cost carriers, public subsidies to support airport development, and much more. Presents insights from an international team of expert contributors with proven research and publication experience in their specialty area Includes cutting-edge analyses based on original research that identifies emerging research directions and policy and managerial implications Utilizes a multidisciplinary approach to fully explore theoretical and policy concepts and their effect on air transportation and tourism development Provides case studies from around the globe in each chapter

Human-automation teamwork-Åsa Svensson 2020-04-07

This dissertation explores the topic of human-automation teamwork in Air Traffic Control (ATC). ATC is a high stakes environment where complex automation is being introduced while the human operator has the legal responsibility. With increasing demands on productivity in various industries (as also in ATC), automation is introduced for efficiency, maintaining safety, and to keep the workload of the human operator within acceptable limits. However, previous research has shown that automation may cause negative effects on the human operator and performance, such as forcing the operator out of the control loop, which might lead to problems or confusion. Previous research suggests a need for strengthening human-automation collaboration where automation is seen as a team member to keep the operator in the loop. In order to achieve such teamwork, the design of the automation needs to be human-centred, i.e. that the automation is designed for the underlying need of the operator. The aim of this dissertation is to explore teamwork in ATC from several angles to understand how the air traffic controllers are working in current ATC environments and how automation could be designed to support human-automation teamwork. The included studies rely on interviews, simulations, and questionnaires, all with operational air traffic controllers as participants. The results indicate that for both human-human teamwork and human-automation teamwork, teamwork factors such as adaptability and mutual performance monitoring (knowing what the other team members are doing) are important for the work performance in current ATC environments, where mutual performance

monitoring is especially important during stressful situations. When designing automation, lessons learned from human-human teamwork should be considered. The work within the scope of this dissertation identifies and concerns two human-automation teamwork aspects: boundary awareness and implicit communication. These are proposed to support the operator's knowledge about the automation and the communication flow between the operator and the automation. Boundary awareness is the operator's knowledge of the automation's abilities, its boundaries (what it can or cannot manage), and about consequences if it would go outside of these boundaries. Implicit communication is the unspoken or implied small cues that the operator and the automation can use to communicate with each other. It is proposed that implicit communication can be based on the work patterns of the operator. The knowledge gained through the work in this dissertation can be used as a foundation for further research and design of automation regarding operator knowledge about the automation boundaries and the communication within the team. Denna avhandling utforskar teamwork mellan människa och automation inom flygtrafikledning. Flygtrafikledning är en högriskmiljö där komplex automation introduceras samtidigt som den mänskliga operatören har det juridiska ansvaret. Med ökade krav på produktivitet inom olika industrier (och även inom flygtrafikledning) så introduceras automation för effektiviteten, för att bibehålla säkerheten och för att hålla arbetsbelastningen för den mänskliga operatören inom acceptabla gränser. Tidigare forskning har däremot visat att automationen kan orsaka negativa effekter på den mänskliga operatören och på prestationen, som till exempel att tvinga ut operatören utanför kontrollloopen vilket leder till problem och förvirring. Tidigare forskning föreslår ett starkare samarbete mellan människa och automation där automationen är sedd som en teammedlem för att behålla operatören i loopen. För att uppnå ett sådant samarbete behöver automation vara människo-centrerad, att automation med andra ord är designad för operatörens underliggande behov. Syftet med denna avhandling är att utforska teamwork från olika vinklar inom flygtrafikledning för att förstå hur flygledare jobbar i nuvarande flygtrafikledningsmiljöer och för att förstå hur automation skulle kunna designas för att stödja teamwork mellan människa och automation. Studierna som denna avhandling bygger på har använt sig av intervjuer, simuleringar och enkäter, alla med operativa flygtrafikledare som deltagare. Resultatet tyder på att för både människa-människa teamwork och människa-automations teamwork så är teamwork faktorer så som flexibilitet och ömsesidig övervakning av teammedlemmarnas prestationer viktiga där övervakning av teammedlemmarnas prestationer är speciellt viktigt under stressiga situationer. När man designar automation bör man ta lärdom från teamwork mellan människor. Vidare så identifierar och behandlar arbetet inom denna avhandling två aspekter gällande teamwork mellan människa och automation: gränsmedvetenhet och implicit kommunikation. Dessa aspekter är föreslagna vi att stötta operatörens kunskap om automationen och kommunikationsflödet mellan operatören och automationen. Gränsmedvetenhet är operatörens kunskap om automationens förmågor, dess gränser och dess konsekvenser när automation går utanför dessa gränser. Implicit kommunikation är de outtalade eller implicita ledtrådar som operatören och automationen kan använda för att kommunicera med varandra. Det är föreslaget att implicit kommunikation kan baseras på arbetsmönster från operatören eller från prediktioner från automationen. Kunskapen från denna avhandling kan användas som ett underlag för vidare forskning och design av automation gällande operatörers kunskap om automationens gränser och kommunikationen inom teamet.

Biokerosene-Martin Kaltschmitt 2017-08-09

This book provides a detailed overview of aspects related to the overall provision chain for biokerosene as part of the global civil aviation business. Starting with a review of the current market situation for aviation fuels and airplanes and their demands, it then presents in-depth descriptions of classical and especially new types of non-edible biomass feedstock suitable for biokerosene provision. Subsequent chapters discuss those fuel provision processes that are already available and those still under development based on various biomass feedstock materials, and present e.g. an overview of the current state of the art in the production of a liquid biomass-based fuel fulfilling the specifications for kerosene. Further, given the growing interest of the aviation industry and airlines in biofuels for aviation, the experiences of an air-carrier are presented. In closing, the book provides a market outlook for biokerosene. Addressing a broad range of aspects related to the pros and cons of biokerosene as a renewable fuel for aviation, the book offers a unique resource.

Advances in Human Aspects of Aviation-Steven J. Landry 2012-07-11

Since the very earliest years of aviation, it was clear that human factors were critical to the success and safety of the system. As aviation has matured, the system has become extremely complex. Bringing together the most recent human factors work in the aviation domain, Advances in Human Aspects of Aviation covers the design of aircrafts for the comfort and well

being of the passenger. The book discusses strategies and guidelines for maximizing comfort, the design of aircrafts including cockpit design, and the training and work schedules for flight attendants and pilots. It is becoming increasingly important to view problems not as isolated issues that can be extracted from the system environment, but as embedded issues that can only be understood as a part of an overall system. In keeping with a system that is vast in its scope and reach, the chapters in this book cover a wide range of topics, including: Interface and operations issues from the perspectives of pilots and air traffic controllers, respectively. Specific human performance issues, studied from within the context of the air transportation system Issues related to automation and the delineation of function between automation and human within the current and future system The U.S. air traffic modernization effort, called NextGen Diverse modeling perspectives and methods Safety and ethics as driving factors for change Cognition and work overload Empirical research and evaluation of the air transportation domain As air traffic modernization efforts begin to vastly increase the capacity of the system, the issues facing engineers, scientists, and other practitioners of human factors are becoming more challenging and more critical. Reflecting road themes and trends in this field, the book documents the latest research in this area.

Megatrends and Air Transport-Ruwantissa Abeyratne 2017-08-03 This book discusses megatrends and subsequently applies them to the air transport industry from a legal, ethical and economic perspective. Starting with a detailed discussion on what these megatrends are, the book provides an essential overview of megatrends and air transport, including analytical discussions on how megatrends could affect basic issues such as nationalism and sovereignty, market access in air transport, and commercial space transport. It also delves into the rights of the airline passenger as affected by megatrends. Further, the book analyses a broad range of topics, including: the digital transformation of air transport; technology and air transport; robotic pilots and their legal ramifications; the human-robot interface and the law with focus on the pilot; cognitive computing; and issues of empowerment and connectivity. It discusses in detail United Nations initiatives and initiatives of the International Civil Aviation Organization, considering aspects such as: the new world order; e-trends and air transport; apps that make air travel easier; and apps designed to help the aviation authorities. Further topics include artificial intelligence and air transport and related technical, ethical and economic issues, as well as a legal inquiry into manufacturer's defects; design defects; and liability for failure to warn of defects. Questions are posed and answers provided on the effects of artificial intelligence and legal issues stemming from its use in air transport. Two major discussions follow on millennials and air transport, and on the Internet of everything as related to air transport. The conclusion ties in megatrends with air transport and offers the industry a way forward for adapting to these trends.

Aircraft Technology-Melih Kushan 2018-09-12 It is well known that improvements in space and aviation are the leader of today's technology, and the aircraft is the most important product of aviation. Because of this fact, the books on aircraft are always at the center of interest. In most cases, technologies designed for the aerospace industry are rapidly extending into other areas. For example, although composite materials are developed for the aerospace industry, these materials are not often used in aircraft. However, composite materials are utilized significantly in many different sectors, such as automotive, marine and civil engineering. And materials science in aviation, reliability and efficiency in aircraft technology have a major importance in aircraft design.

Fundamentals of Air Traffic Control-Michael S. Nolan 2010-02-01 FUNDAMENTALS OF AIR TRAFFIC CONTROL International Edition is an authoritative book that provides readers with a good working knowledge of how and why the air traffic control system works. This book is appropriate for future air traffic controllers, as well as for pilots who need a better understanding of the air traffic control system. FUNDAMENTALS OF AIR TRAFFIC CONTROL, International Edition discusses the history of air traffic control, emphasizing the logic that has guided its development. It also provides current, in-depth information on navigational systems, the air traffic control system structure, control tower procedures, radar separation, national airspace system operation and the FAA's restructured hiring procedures. This is the only college level book that gives readers a genuine understanding of the air traffic control system and does not simply require them to memorize lists of rules and regulations.

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Cities and Their Vital Systems-Advisory Committee on Technology and Society 1988-02-01 Cities and Their Vital Systems asks basic questions about the longevity, utility, and nature of urban infrastructures; analyzes how they grow, interact, and change; and asks how, when, and at what cost they should be replaced. Among the topics discussed are problems arising from increasing air travel and airport congestion; the adequacy of water supplies and waste treatment; the impact of new technologies on construction; urban real estate values; and the field of "telematics," the combination of computers and telecommunications that makes money machines and national newspapers possible.

Aspects of International Cooperation in Air Traffic Management-Walter Schwenk 1998-01-01 This volume discusses various institutional, legal and operational aspects related to the provision of air navigation services, taking particular consideration of the current implementation of a new generation of communications, navigation and surveillance systems for future air traffic management (CNS/ATM). The primary intent is to critically review the current mechanisms for international co-operation in this field. Particularly in Europe, many efforts have been undertaken to enhance air traffic management by harmonization and integration of national developments but many parties claim that these are still insufficient and the processes are still dominated by the individual States. Following a short description of the historical developments, the global framework of cooperation established through ICAO is described, supplemented with a description of some multilateral organizations active in the field of air traffic management on a regional basis. The basic technological and operational changes envisaged with the implementation of the Future Air Navigation Systems (FANS) are described and, based on these, related institutional and legal aspects are discussed. Particular emphasis is given to developments in Europe, where during the last four decades several initiatives for enhancing the cooperation of States could not overcome the fragmentation of the airspace. The decisions of February 1997 of the ECAC Ministers of Transport on an Institutional Strategy are reflected. One chapter is devoted to questions of liability in air traffic management which are of particular importance with regard to international cooperation.

Complexity Science in Air Traffic Management-Andrew Cook 2016-06-03 Air traffic management (ATM) comprises a highly complex socio-technical system that keeps air traffic flowing safely and efficiently, worldwide, every minute of the year. Over the last few decades, several ambitious ATM performance improvement programmes have been undertaken. Such programmes have mostly delivered local technological solutions, whilst corresponding ATM performance improvements have fallen short of stakeholder expectations. In hindsight, this can be substantially explained from a complexity science perspective: ATM is simply too complex to address through classical approaches such as system engineering and human factors. In order to change this, complexity science has to be embraced as ATM's 'best friend'. The applicability of complexity science paradigms to the analysis and modelling of future operations is driven by the need to accommodate long-term air traffic growth within an already-saturated ATM infrastructure. Complexity Science in Air Traffic Management is written particularly, but not exclusively, for transport researchers, though it also has a complementary appeal to practitioners, supported through the frequent references made to practical examples and operational themes such as performance, airline strategy, passenger mobility, delay propagation and free-flight safety. The book should also have significant appeal beyond the transport domain, due to its intrinsic value as an exposition of applied complexity science and applied research, drawing on examples of simulations and modelling throughout, with corresponding insights into the design of new concepts and policies, and the understanding of complex phenomena that are invisible to classical techniques.

Air Transport Security-Joseph S. Szyliowicz 2018-08-31 The growing number of terrorist attacks throughout the world continues to turn the interest of scholars and governments towards security issues. As part of the Comparative Perspectives on Transportation Security series, this book provides a multidisciplinary analysis of the security challenges confronting air transportation. The first part encompasses the industry's characteristics and the policy, economic and regulatory issues shaping the security environment. The second provides a comparative analysis of security policies and practices in several key countries.