

## **Aircraft Engine Design Second Edition Aiaa Education Series**

Aircraft Electrical and Electronic Systems  
Hydrogen Aircraft Technology  
Airplane Flying Handbook (FAA-H-8083-3A)  
Uncertainty Quantification in Computational Fluid Dynamics and Aircraft Engines  
Design and Manufacturing of Composites, Second Edition  
Gas Turbines  
Designing Unmanned Aircraft Systems  
The Design of the Aeroplane  
Aircraft Engine Design, Second Edition  
Aircraft Engine Design  
Journal of Propulsion and Power  
The Design of High-Efficiency Turbomachinery and Gas Turbines, second edition, with a new preface  
Commercial Aircraft Propulsion and Energy Systems Research  
Gas Turbine Performance  
Allied Aircraft Piston Engines of World War II  
Theory of Aerospace Propulsion  
Aircraft Design  
Introduction to Flight Testing and Applied Aerodynamics  
Aircraft Design  
GAS Turbine Combustion, Second Edition  
Aircraft Engine Controls  
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Advanced Aircraft Design  
Elements of Gas Turbine Propulsion  
Aircraft Engines and Gas Turbines  
Space Vehicle Design  
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Commercial Airplane Design Principles  
Intake Aerodynamics  
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Aerothermodynamics of Aircraft Engine Components  
Aircraft Propulsion and Gas Turbine Engines  
Introduction to Aircraft Design  
The Development of Piston Aero Engines  
Composite Materials for Aircraft Structures

### **Aircraft Electrical and Electronic Systems**

Liquid hydrogen is shown to be the ideal fuel for civil transport aircraft, as well as for many types of military aircraft. Hydrogen Aircraft Technology discusses the potential of hydrogen for subsonic, supersonic, and hypersonic applications. Designs with sample configurations of aircraft for all three speed categories are presented, in addition to performance comparisons to equivalent designs for aircraft using conventional kerosine-type fuel and configurations for aircraft using liquid methane fuel. Other topics discussed include conceptual designs of the principal elements of fuel containment systems required for cryogenic fuels, operational elements (e.g., pumps, valves, pressure regulators, heat exchangers, lines and fittings), modifications for turbine engines to maximize the benefit of hydrogen, safety aspects compared to kerosine and methane fueled designs, equipment and facility designs for servicing hydrogen-fueled aircraft, production methods for liquid hydrogen, and the environmental advantages for using liquid hydrogen. The book also presents a plan for conducting the necessary development of technology and introducing hydrogen fuel into the worldwide civil air transport industry. Hydrogen Aircraft Technology will provide fascinating reading for anyone interested in aircraft and hydrogen fuel designs.

### **Hydrogen Aircraft Technology**

The Gas Turbine Engineering Handbook has been the standard for engineers involved in the design, selection, and

operation of gas turbines. This revision includes new case histories, the latest techniques, and new designs to comply with recently passed legislation. By keeping the book up to date with new, emerging topics, Boyce ensures that this book will remain the standard and most widely used book in this field. The new Third Edition of the Gas Turbine Engineering Handbook updates the book to cover the new generation of Advanced gas Turbines. It examines the benefit and some of the major problems that have been encountered by these new turbines. The book keeps abreast of the environmental changes and the industries answer to these new regulations. A new chapter on case histories has been added to enable the engineer in the field to keep abreast of problems that are being encountered and the solutions that have resulted in solving them. Comprehensive treatment of Gas Turbines from Design to Operation and Maintenance. In depth treatment of Compressors with emphasis on surge, rotating stall, and choke; Combustors with emphasis on Dry Low NOx Combustors; and Turbines with emphasis on Metallurgy and new cooling schemes. An excellent introductory book for the student and field engineers A special maintenance section dealing with the advanced gas turbines, and special diagnostic charts have been provided that will enable the reader to troubleshoot problems he encounters in the field The third edition consists of many Case Histories of Gas Turbine problems. This should enable the field engineer to avoid some of these same generic problems

## **Airplane Flying Handbook (FAA-H-8083-3A)**

## **Uncertainty Quantification in Computational Fluid Dynamics and Aircraft Engines**

Covering basic theory, components, installation, maintenance, manufacturing, regulation and industry developments, Gas Turbines: A Handbook of Air, Sea and Land Applications is a broad-based introductory reference designed to give you the knowledge needed to succeed in the gas turbine industry, land, sea and air applications. Providing the big picture view that other detailed, data-focused resources lack, this book has a strong focus on the information needed to effectively decision-make and plan gas turbine system use for particular applications, taking into consideration not only operational requirements but long-term life-cycle costs in upkeep, repair and future use. With concise, easily digestible overviews of all important theoretical bases and a practical focus throughout, Gas Turbines is an ideal handbook for those new to the field or in the early stages of their career, as well as more experienced engineers looking for a reliable, one-stop reference that covers the breadth of the field. Covers installation, maintenance, manufacturer's specifications, performance criteria and future trends, offering a rounded view of the area that takes in technical detail as well as industry economics and outlook Updated with the latest industry developments, including new emission and efficiency regulations and their impact on gas turbine technology Over 300 pages of new/revised content, including new sections on microturbines, non-conventional fuel sources for microturbines, emissions, major developments in aircraft engines, use of coal gas and superheated steam, and new case histories throughout highlighting component improvements in all systems and sub-

systems.

## **Design and Manufacturing of Composites, Second Edition**

Bill Gunston takes a thorough look at the theory, history, development and application of piston aero engines, from those used by the Wright Brothers for their pioneering flights right up to the small engines fitted to micro lights today. Illustrated throughout, this classic aviation title is available in paperback for the first time.

## **Gas Turbines**

## **Designing Unmanned Aircraft Systems**

This book is an introduction to the design of modern civil and military jet engines using engine design projects.

## **The Design of the Aeroplane**

"Aircraft Engine Design, Third Edition presents a complete and realistic aircraft engine design experience. From the request for proposal for a new aircraft to the final engine layout, it outlines the concepts and procedures required for the entire process. The writing of the third edition of Aircraft Engine Design began as soon as the second edition was published in 2003. The ensuing 15 years of evolutionary changes have created an improved, new work. The special contributions of uniquely qualified experts continue to provide valuable material to this new edition. These include Appendix L on Turbine Engine Life Management by Dr. William D. Cowie and Appendix M on Engine Controls by Charles A. Skira (with Timothy J. Lewis and Zane D. Gastineau) with update by Dr. Link Jaw"--

## **Aircraft Engine Design, Second Edition**

## **Aircraft Engine Design**

An introduction into the art and science of measuring and predicting airplane performance, "Introduction to Flight Testing and Applied Aerodynamics" will benefit students, homebuilders, pilots, and engineers in learning how to collect and analyze data relevant to the takeoff, climb, cruise, handling qualities, descent, and landing of an aircraft. This textbook presents a

basic and concise analysis of airplane performance, stability, and control. Basic algebra, trigonometry, and some calculus are used.

## **Journal of Propulsion and Power**

This text provides an introduction to gas turbine engines and jet propulsion for aerospace or mechanical engineers. The text is divided into four parts: introduction to aircraft propulsion; basic concepts and one-dimensional/gas dynamics; parametric (design point) and performance (off-design) analysis of air breathing propulsion systems; and analysis and design of major gas turbine engine components (fans, compressors, turbines, inlets, nozzles, main burners, and afterburners). Design concepts are introduced early (aircraft performance in introductory chapter) and integrated throughout. Written with extensive student input on the design of the book, the book builds upon definitions and gradually develops the thermodynamics, gas dynamics, and gas turbine engine principles.

## **The Design of High-Efficiency Turbomachinery and Gas Turbines, second edition, with a new preface**

Annotation Design and R & D engineers and students will value the comprehensive, meticulous coverage in this volume. Beginning with the basic principles and concepts of aeropropulsion combustion, chapters explore specific processes, limitations, and analytical methods as they bear on component design.

## **Commercial Aircraft Propulsion and Energy Systems Research**

Annotation A design textbook attempting to bridge the gap between traditional academic textbooks, which emphasize individual concepts and principles; and design handbooks, which provide collections of known solutions. The airbreathing gas turbine engine is the example used to teach principles and methods. The first edition appeared in 1987. The disk contains supplemental material. Annotation c. Book News, Inc., Portland, OR (booknews.com).

## **Gas Turbine Performance**

This revised edition provides understanding of the basic physical, chemical, and aerodynamic processes associated with gas turbine combustion and their relevance and application to combustor performance and design. It also introduces the many new concepts for ultra-low emissions combustors, and new advances in fuel preparation and liner wall-cooling techniques for their success. It details advanced and practical approaches to combustor design for the clean burning of alternative

liquid fuels derived from oil shades, tar sands, and coal. Additional topics include diffusers, combustion performance fuel injection, combustion noise, heat transfer, and emissions.

## **Allied Aircraft Piston Engines of World War II**

Aircraft Engines and Gas Turbines is widely used as a text in the United States and abroad, and has also become a standard reference for professionals in the aircraft engine industry. Unique in treating the engine as a complete system at increasing levels of sophistication, it covers all types of modern aircraft engines, including turbojets, turbofans, and turboprops, and also discusses hypersonic propulsion systems of the future. Performance is described in terms of the fluid dynamic and thermodynamic limits on the behavior of the principal components: inlets, compressors, combustors, turbines, and nozzles. Environmental factors such as atmospheric pollution and noise are treated along with performance. This new edition has been substantially revised to include more complete and up-to-date coverage of compressors, turbines, and combustion systems, and to introduce current research directions. The discussion of high-bypass turbofans has been expanded in keeping with their great commercial importance. Propulsion for civil supersonic transports is taken up in the current context. The chapter on hypersonic air breathing engines has been expanded to reflect interest in the use of scramjets to power the National Aerospace Plane. The discussion of exhaust emissions and noise and associated regulatory structures have been updated and there are many corrections and clarifications. Jack L. Kerrebrock is Richard Cockburn Maclaurin Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology.

## **Theory of Aerospace Propulsion**

A significant addition to the literature on gas turbine technology, the second edition of Gas Turbine Performance is a lengthy text covering product advances and technological developments. Including extensive figures, charts, tables and formulae, this book will interest everyone concerned with gas turbine technology, whether they are designers, marketing staff or users.

## **Aircraft Design**

## **Introduction to Flight Testing and Applied Aerodynamics**

Investigates all elements of the UAS design process, including architectural options and design drivers across diverse system classes. This book provides a comprehensive understanding of the end-to-end unmanned aircraft system and a

deeper appreciation for the multidisciplinary nature of UAS design.

## **Aircraft Design**

Although the overall appearance of modern airliners has not changed a lot since the introduction of jetliners in the 1950s, their safety, efficiency and environmental friendliness have improved considerably. Main contributors to this have been gas turbine engine technology, advanced materials, computational aerodynamics, advanced structural analysis and on-board systems. Since aircraft design became a highly multidisciplinary activity, the development of multidisciplinary optimization (MDO) has become a popular new discipline. Despite this, the application of MDO during the conceptual design phase is not yet widespread. *Advanced Aircraft Design: Conceptual Design, Analysis and Optimization of Subsonic Civil Airplanes* presents a quasi-analytical optimization approach based on a concise set of sizing equations. Objectives are aerodynamic efficiency, mission fuel, empty weight and maximum takeoff weight. Independent design variables studied include design cruise altitude, wing area and span and thrust or power loading. Principal features of integrated concepts such as the blended wing and body and highly non-planar wings are also covered. The quasi-analytical approach enables designers to compare the results of high-fidelity MDO optimization with lower-fidelity methods which need far less computational effort. Another advantage to this approach is that it can provide answers to “what if” questions rapidly and with little computational cost. Key features: Presents a new fundamental vision on conceptual airplane design optimization Provides an overview of advanced technologies for propulsion and reducing aerodynamic drag Offers insight into the derivation of design sensitivity information Emphasizes design based on first principles Considers pros and cons of innovative configurations Reconsiders optimum cruise performance at transonic Mach numbers *Advanced Aircraft Design: Conceptual Design, Analysis and Optimization of Subsonic Civil Airplanes* advances understanding of the initial optimization of civil airplanes and is a must-have reference for aerospace engineering students, applied researchers, aircraft design engineers and analysts.

## **GAS Turbine Combustion, Second Edition**

New edition of the successful textbook updated to include new material on UAVs, design guidelines in aircraft engine component systems and additional end of chapter problems *Aircraft Propulsion, Second Edition* follows the successful first edition textbook with comprehensive treatment of the subjects in airbreathing propulsion, from the basic principles to more advanced treatments in engine components and system integration. This new edition has been extensively updated to include a number of new and important topics. A chapter is now included on General Aviation and Uninhabited Aerial Vehicle (UAV) Propulsion Systems that includes a discussion on electric and hybrid propulsion. Propeller theory is added to the presentation of turboprop engines. A new section in cycle analysis treats Ultra-High Bypass (UHB) and Geared Turbofan

engines. New material on drop-in biofuels and design for sustainability is added to reflect the FAA's 2025 Vision. In addition, the design guidelines in aircraft engine components are expanded to make the book user friendly for engine designers. Extensive review material and derivations are included to help the reader navigate through the subject with ease. Key features: General Aviation and UAV Propulsion Systems are presented in a new chapter Discusses Ultra-High Bypass and Geared Turbofan engines Presents alternative drop-in jet fuels Expands on engine components' design guidelines The end-of-chapter problem sets have been increased by nearly 50% and solutions are available on a companion website Presents a new section on engine performance testing and instrumentation Includes a new 10-Minute Quiz appendix (with 45 quizzes) that can be used as a continuous assessment and improvement tool in teaching/learning propulsion principles and concepts Includes a new appendix on Rules of Thumb and Trends in aircraft propulsion Aircraft Propulsion, Second Edition is a must-have textbook for graduate and undergraduate students, and is also an excellent source of information for researchers and practitioners in the aerospace and power industry.

## **Aircraft Engine Controls**

The Aircraft Engineering Principles and Practice Series provides students, apprentices and practicing aerospace professionals with the definitive resources to take forward their aircraft engineering maintenance studies and career. This book provides a detailed introduction to the principles of aircraft electrical and electronic systems. It delivers the essential principles and knowledge required by certifying mechanics, technicians and engineers engaged in engineering maintenance on commercial aircraft and in general aviation. It is well suited for anyone pursuing a career in aircraft maintenance engineering or a related aerospace engineering discipline, and in particular those studying for licensed aircraft maintenance engineer status. The book systematically covers the avionic content of EASA Part-66 modules 11 and 13 syllabus, and is ideal for anyone studying as part of an EASA and FAR-147 approved course in aerospace engineering. All the necessary mathematical, electrical and electronic principles are explained clearly and in-depth, meeting the requirements of EASA Part-66 modules, City and Guilds Aerospace Engineering modules, BTEC National Units, elements of BTEC Higher National Units, and a Foundation Degree in aircraft maintenance engineering or a related discipline.

## **Design and Development of Aircraft Systems**

"Aircraft Propulsion presents thorough coverage of fundamental concepts along with numerous detailed examples and extensive illustrations. This accessible introduction first discusses compressible flow with heat and friction as well as engine thrust and performance parameters. Readers will then learn about aircraft gas turbine engine cycles followed by aircraft engine components. And they'll discover the aerodynamics and performance of centrifugal compressors." -- Publisher description.

## **Aircraft Engine Design**

Commercial Airplane Design Principles is a succinct, focused text covering all the information required at the preliminary stage of aircraft design: initial sizing and weight estimation, fuselage design, engine selection, aerodynamic analysis, stability and control, drag estimation, performance analysis, and economic analysis. The text places emphasis on making informed choices from an array of competing options, and developing the confidence to do so. Shows the use of standard, empirical, and classical methods in support of the design process Explains the preparation of a professional quality design report Provides a sample outline of a design report Can be used in conjunction with Sforza, Commercial Aircraft Design Principles to form a complete course in Aircraft/Spacecraft Design

## **Gas Turbine Engineering Handbook**

The new edition of this popular textbook provides a modern, accessible introduction to the whole process of aircraft design from requirements to conceptual design, manufacture and in-service issues. Highly illustrated descriptions of the full spectrum of aircraft types, their aerodynamics, structures and systems, allow students to appreciate good and poor design and understand how to improve their own designs. Cost data is considerably updated, many new images have been added and new sections are included on the emerging fields of Uninhabited Aerial Vehicles and environmentally-friendly airlines. Examples from real aircraft projects are presented throughout, demonstrating to students the applications of the theory. Three appendices and a bibliography provide a wealth of information, much not published elsewhere, including simple aerodynamic formulae, an introduction to airworthiness and environmental requirements, aircraft, engine and equipment data, and a case study of the conceptual design of a large airliner.

## **Advanced Aircraft Design**

The second edition of a comprehensive textbook that introduces turbomachinery and gas turbines through design methods and examples. This comprehensive textbook is unique in its design-focused approach to turbomachinery and gas turbines. It offers students and practicing engineers methods for configuring these machines to perform with the highest possible efficiency. Examples and problems are based on the actual design of turbomachinery and turbines. After an introductory chapter that outlines the goals of the book and provides definitions of terms and parts, the book offers a brief review of the basic principles of thermodynamics and efficiency definitions. The rest of the book is devoted to the analysis and design of real turbomachinery configurations and gas turbines, based on a consistent application of thermodynamic theory and a more empirical treatment of fluid dynamics that relies on the extensive use of design charts. Topics include turbine power cycles, diffusion and diffusers, the analysis and design of three-dimensional free-stream flow, and combustion systems and

combustion calculations. The second edition updates every chapter, adding material on subjects that include flow correlations, energy transfer in turbomachines, and three-dimensional design. A solutions manual is available for instructors. This new MIT Press edition makes a popular text available again, with corrections and some updates, to a wide audience of students, professors, and professionals.

## **Elements of Gas Turbine Propulsion**

This textbook for advanced students focuses on industry design practice rather than theoretical definitions. Covers configuration layout, payload considerations, aerodynamics, propulsion, structure and loads, weights, stability, and control, performance, and cost analysis. Annotation copyright Book

## **Aircraft Engines and Gas Turbines**

Aircraft Propulsion and Gas Turbine Engines, Second Edition builds upon the success of the book's first edition, with the addition of three major topic areas: Piston Engines with integrated propeller coverage; Pump Technologies; and Rocket Propulsion. The rocket propulsion section extends the text's coverage so that both Aerospace and Aeronautical topics can be studied and compared. Numerous updates have been made to reflect the latest advances in turbine engines, fuels, and combustion. The text is now divided into three parts, the first two devoted to air breathing engines, and the third covering non-air breathing or rocket engines.

## **Space Vehicle Design**

The primary human activities that release carbon dioxide (CO<sub>2</sub>) into the atmosphere are the combustion of fossil fuels (coal, natural gas, and oil) to generate electricity, the provision of energy for transportation, and as a consequence of some industrial processes. Although aviation CO<sub>2</sub> emissions only make up approximately 2.0 to 2.5 percent of total global annual CO<sub>2</sub> emissions, research to reduce CO<sub>2</sub> emissions is urgent because (1) such reductions may be legislated even as commercial air travel grows, (2) because it takes new technology a long time to propagate into and through the aviation fleet, and (3) because of the ongoing impact of global CO<sub>2</sub> emissions. Commercial Aircraft Propulsion and Energy Systems Research develops a national research agenda for reducing CO<sub>2</sub> emissions from commercial aviation. This report focuses on propulsion and energy technologies for reducing carbon emissions from large, commercial aircraft—single-aisle and twin-aisle aircraft that carry 100 or more passengers—because such aircraft account for more than 90 percent of global emissions from commercial aircraft. Moreover, while smaller aircraft also emit CO<sub>2</sub>, they make only a minor contribution to global emissions, and many technologies that reduce CO<sub>2</sub> emissions for large aircraft also apply to smaller aircraft. As

commercial aviation continues to grow in terms of revenue-passenger miles and cargo ton miles, CO2 emissions are expected to increase. To reduce the contribution of aviation to climate change, it is essential to improve the effectiveness of ongoing efforts to reduce emissions and initiate research into new approaches.

## **Aircraft Propulsion**

### **Jet Propulsion**

### **Aircraft Engine Design**

A comprehensive approach to the air vehicle design process using the principles of systems engineering. Due to the high cost and the risks associated with development, complex aircraft systems have become a prime candidate for the adoption of systems engineering methodologies. This book presents the entire process of aircraft design based on a systems engineering approach from conceptual design phase, through preliminary design phase and to detail design phase. Presenting in one volume the methodologies behind aircraft design, this book covers the components and the issues affected by design procedures. The basic topics that are essential to the process, such as aerodynamics, flight stability and control, aero-structure, and aircraft performance are reviewed in various chapters where required. Based on these fundamentals and design requirements, the author explains the design process in a holistic manner to emphasize the integration of the individual components into the overall design. Throughout the book the various design options are considered and weighed against each other, to give readers a practical understanding of the process overall. Readers with knowledge of the fundamental concepts of aerodynamics, propulsion, aero-structure, and flight dynamics will find this book ideal to progress towards the next stage in their understanding of the topic. Furthermore, the broad variety of design techniques covered ensures that readers have the freedom and flexibility to satisfy the design requirements when approaching real-world projects. Key features:

- Provides full coverage of the design aspects of an air vehicle including: aeronautical concepts, design techniques and design flowcharts
- Features end of chapter problems to reinforce the learning process as well as fully solved design examples at component level
- Includes fundamental explanations for aeronautical engineering students and practicing engineers
- Features a solutions manual to sample questions on the book's companion website

Companion website - <http://www.wiley.com/go/sadraey>

### **Commercial Airplane Design Principles**

"Intake Aerodynamics, Second Edition" presents computational advancements and discoveries in intake aerodynamics. A companion volume to "Practical Intake Aerodynamic Design," this important text considers the problem of airflow, both internal and external to air intake, as applied to civil and military aircraft. It covers the aerodynamics of subsonic and supersonic intakes in real flows, maintaining a progression through the transonic range. Also considered is the joint perspective of the airframe designer and the propulsion specialist in practical cases. Readers will gain insight into the fluid mechanics behind the deceleration of air from free stream to engine velocity, and an understanding of air compression and external drag in extensively revised chapters reflecting progress in the field. More than 300 drawings and diagrams help to illustrate the points defined throughout the book. Copublished with Blackwell Science Ltd. Outside the United States and Canada, order from Blackwell Science Ltd., United Kingdom, tel 44 1865 206 206.

## **Intake Aerodynamics**

Readers of this book will be able to: utilize the fundamental principles of fluid mechanics and thermodynamics to analyze aircraft engines, understand the common gas turbine aircraft propulsion systems and be able to determine the applicability of each, perform system studies of aircraft engine systems for specified flight conditions, perform preliminary aerothermal design of turbomachinery components, and conceive, analyze, and optimize competing preliminary designs for conventional and unconventional missions. Early coverage of cycle analysis provides a systems perspective, and offers context for the chapters on turbomachinery and components. Broader coverage than found in most other books - including coverage of propellers, nuclear rockets, and space propulsion - allows analysis and design of more types of propulsion systems. In depth, quantitative treatments of the components of jet propulsion engines provides the tools for evaluation and component matching for optimal system performance. Worked examples and end of chapter exercises provide practice for analysis, preliminary design, and systems integration.

## **Aircraft Propulsion**

Provides a significant update to the definitive book on aircraft system design. This book is written for anyone who wants to understand how industry develops the customer requirement for aircraft into a fully integrated, tested, and qualified product that is safe to fly and fit for purpose. The new edition of Design and Development of Aircraft Systems fully expands its already comprehensive coverage to include both conventional and unmanned systems. It also updates all chapters to bring them in line with current design practice and technologies taught in courses at Cranfield, Bristol, and Loughborough universities in the UK. Design and Development of Aircraft Systems, 3rd Edition begins with an introduction to the subject. It then introduces readers to the aircraft systems (airframe, vehicle, avionic, mission, and ground systems). Following that comes a chapter on the design and development process. Other chapters look at design drivers, systems architectures,

systems integration, verification of system requirements, practical considerations, and configuration control. The book finishes with sections that discuss the potential impact of complexity on flight safety, key characteristics of aircraft systems, and more. Provides a holistic view of aircraft system design, describing the interactions among subsystems such as fuel, navigation, flight control, and more Substantially updated coverage of systems engineering, design drivers, systems architectures, systems integration, modelling of systems, practical considerations, and systems examples Incorporates essential new material on the regulatory environment for both manned and unmanned systems Discussion of trends towards complex systems, automation, integration and the potential for an impact on flight safety Design and Development of Aircraft Systems, 3rd Edition is an excellent book for aerospace engineers, researchers, and graduate students involved in the field.

## **Aircraft Design**

### **Aerothermodynamics of Aircraft Engine Components**

Covers the design of engine control & monitoring systems for both turbofan & turboshaft engines, focusing on four key topics: modeling of engine dynamics; application of specific control design methods to gas turbine engines; advanced control concepts; &, engine condition monitoring.

### **Aircraft Propulsion and Gas Turbine Engines**

### **Introduction to Aircraft Design**

### **The Development of Piston Aero Engines**

Illuminates some of the historically significant developments in WWII aircraft engines that directly contributed to the execution and tactics of war, divided into sections on British and American manufacturers including Rolls-Royce, Bristol, Price and Whitney, and General Electric Turbosuperchargers

### **Composite Materials for Aircraft Structures**

This book introduces novel design techniques developed to increase the safety of aircraft engines. The authors demonstrate how the application of uncertainty methods can overcome problems in the accurate prediction of engine lift, caused by manufacturing error. This in turn ameliorates the difficulty of achieving required safety margins imposed by limits in current design and manufacturing methods. This text shows that even state-of-the-art computational fluid dynamics (CFD) are not able to predict the same performance measured in experiments; CFD methods assume idealised geometries but ideal geometries do not exist, cannot be manufactured and their performance differs from real-world ones. By applying geometrical variations of a few microns, the agreement with experiments improves dramatically, but unfortunately the manufacturing errors in engines or in experiments are unknown. In order to overcome this limitation, uncertainty quantification considers the probability density functions of manufacturing errors. It is then possible to predict the overall variation of the jet engine performance using stochastic techniques. Uncertainty Quantification in Computational Fluid Dynamics and Aircraft Engines demonstrates that some geometries are not affected by manufacturing errors, meaning that it is possible to design safer engines. Instead of trying to improve the manufacturing accuracy, uncertainty quantification when applied to CFD is able to indicate an improved design direction. This book will be of interest to gas turbine manufacturers and designers as well as CFD practitioners, specialists and researchers. Graduate and final year undergraduate students may also find it of use.

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