Jet Engine Air Intakes

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Aircraft Circulars Elsevier

The primary human activities that release carbon dioxide (CO2) 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 CO2 emissions only make up approximately 2.0 to 2.5 percent of total global annual CO2 emissions, research to reduce CO2 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 CO2 emissions. Commercial Aircraft Propulsion and Energy Systems Research develops a national research agenda for reducing CO2 emissions from commercial aviation. This report focuses on propulsion and energy technologies for reducing carbon emissions from large, commercial aircraftâ€" single-aisle and twin-aisle aircraft that carry 100 or more passengersâ€"because such aircraft account for more than 90 percent of global emissions from commercial aircraft. Moreover, while smaller aircraft also emit CO2, they make only a minor contribution to global emissions, and many technologies that reduce CO2 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.

Jet Engines Hungry Tomato ®

From extremely fast passenger planes to stealthy military vehicles, jets have come a long way since their invention. Action shots and diagrams along with high-interest text explore these superfast aircraft.

The History of North American Small Gas Turbine Aircraft Engines Cambridge University Press

Effects of roughness, size, and constructional features on efficiency and pressure loss are checked in two intake ducts of different area. Results indicate that larger internal passages increase efficiency. Poor finishing may decrease efficiency by as much as 50%, while spoilers may increase duct pressure los by 700%. Splitter vanes across duct, to insure rigidity, increase pressure loss by about 50%.

Intake Aerodynamics Crowood Press (UK)

This book provides, for the first time, the distilled experience of authors who have been closely involved in design of air intakes for both airframe and engine manufacturers. Much valuable data from systematic experimental measurements on intakes for missiles, combat, and V/STOL aircraft from research sources in the United Kingdom, the United States, France, and Germany are included, together with the latest developments in computational fluid dynamics applied to air intakes.

The Bulletin of the Experimental Department, Airplane Engineering Division, U.S.A. Wiley-Blackwell

This introductory 2005 text on air-breathing jet propulsion focuses on the basic operating principles of jet engines and gas turbines. Previous coursework in fluid mechanics and thermodynamics is elucidated and applied to help the student understand and predict the characteristics of engine components and various types of engines and power gas turbines. Numerous examples help the reader appreciate the methods and differing, representative physical parameters. A capstone chapter integrates the text material into a portion of the book devoted to system matching and analysis so that engine performance can be predicted for both on- and off-design conditions. The book is designed for advanced undergraduate and first-year graduate students in aerospace and mechanical engineering. A basic understanding of fluid dynamics and thermodynamics is presumed. Although aircraft propulsion is the focus, the material can also be used to study ground- and marine-based gas turbines and turbomachinery and some advanced topics in compressors and turbines.

Aircraft Jet Engines Crowood Press UK

Y-intake is synonymous with 'twin intake' or ' bifurcated intake'. These are referred to a pair of intakes in the wing root or on the two sides of a fuselage, feeding a single engine via a common plenum chamber. Y shaped intake is the popular choice for air intake in single engined fighter aircraft. The air intake must meet the engine mass flow demand over a range of aircraft speeds and altitudes with pressure recovery and low distortion of the exit flow. These types of intakes are normally side mounted and the two limbs of the duct are merged inside the fuselage into one and supply air at the compressor face with minimum turbulence and impact. The center line offset of the intakes with respect to the engine is a real challenge in designing the intake conforming to the constraints imposed by other aspects of the aircraft design. In the present work the flow and performance characteristics of a rectangular Y-intake diffusing duct studied extensively and the the experimental results are compared with numerical work after validate the numerical model and boundary parameters and observed that the pressure recovery increases with increase of aspect ratio and decrease in angle of turn.

Aircraft Propulsion and Gas Turbine Engines National Academies Press

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.

Wartime Report LAP Lambert Academic Publishing

Put your pressure suit on and strap yourself in for a Mach 3 ride! Former SR-71 Wing Commander Rich Graham tells the amazing inside story of the Lockheed SR-71 Blackbird. Graham provides a detailed look at the entire SR-71 story beginning with his application to be an SR pilot through commanding an entire wing.

German Jet Engine and Gas Turbine Development, 1930-45 AIAA (American Institute of Aeronautics & Astronautics)

This book describes the design, operation, performance, and selection of the inlets (also known as intakes and air-induction systems) indispensable to proper functioning of an airbreathing engine. Topics include functions and fundamentals, supersonic diffusers, subsonic diffusers, viscous effects, operational characteristics, performance estimation, installation factors, variable geometry, and proof of capability.

Technical Manual AIAA (American Institute of Aeronautics & Astronautics)

"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.

Fundamentals of Jet Propulsion with Applications Cambridge University Press

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.

Wartime Report AIAA

From propellers to turbofans, this illustrated history of engines will be “ of interest to modelers and aviation historians alike ” (AMPS Indianapolis). The first efforts of man to fly were limited by his ability to generate sufficient power to lift a heavier-than-air machine off the ground. Propulsion and thrust have therefore been the most fundamental elements in the development of aircraft engines. From the simple propellers of the first airliners of the 1920s and 1930s, to the turboprops and turbojets of the modern era, the engines used in airliners have undergone dramatic development over a century of remarkable change. These advances are examined in detail by aeronautical engineer Reiner Decher, who provides a layman ' s guide to the engines that have, and continue to, power the aircraft that carry millions of travelers across millions of miles each year. Decher also looks at the development of aero engines during the Second World War and how that conflict drove innovation and explains the nature of wing design, from the early twentieth century to the present. To enable an easy understanding of this intriguing subject, Powering the World ' s Airliners is profusely illustrated, transporting readers back to the time of each major development and introducing them to the key individuals of the aero industry in each era. After reading this comprehensive yet engaging story of the machines that power the aircraft in which we fly, no journey will ever seem quite the same again.

Practical Intake Aerodynamic Design MIT Press

A method is presented to design a supersonic inlet that will match turbojet-engine air mass-flow requirements over a wide Mach number range. Two types of bypasses were investigated; one had a 360 degree annular cowling and the other had twin slotted ducts. Three models were flight tested. Two of the models, which had bypass ducts, were also ground tested. The bypass models had higher external drags. Both bypass models approximated a typical turbojet-engine air mass-flow requirement between Mach numbers 1.0 and 2.0. The flight tests covered a Reynolds number range from 200,000 to 800,000 and a Mach number range from 0.8 to 1.95.

Aircraft Engines and Gas Turbines, second edition RCW Technology & Ebook Publishing

A flight investigation was made of a rocket-launched ram-jet engine incorporating an inlet designed for a Mach number of 4.1 and burning magnesium slurry fuel. In free-flight, the model accelerated from an Mach number of 1.73 and an altitude of 5,900 feet until burnout at a Mach number of 3.84 and an altitude of 38,100 feet in

an elapsed time of 13.2 seconds. Maximum values of acceleration (6.1 g), air specific impulse (150 seconds), and gross thrust coefficient (0.760) were obtained. The value of fuel specific impulse was 770 seconds.

Subject Classification of Technical Reports AIAA (American Institute of Aeronautics & Astronautics)

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 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.

Air Inlets for Turbojet Engines Through the Transonic Speed Range AIAA

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).

Programmed Text Air World

This landmark joint publication between the National Air and Space Museum and the American Institute of Aeronautics and Astronautics chronicles the evolution of the small gas turbine engine through its comprehensive study of a major aerospace industry. Drawing on in-depth interviews with pioneers, current project engineers, and company managers, engineering papers published by the manufacturers, and the tremendous document and artifact collections at the National Air and Space Museum, the book captures and memorializes small engine development from its earliest stage. Leyes and Fleming leap back nearly 50 years for a first look at small gas turbine engine development and the seven major corporations that dared to produce, market, and distribute the products that contributed to major improvements and uses of a wide spectrum of aircraft. In non-technical language, the book illustrates the broad-reaching influence of small turbinesfrom commercial and executive aircraft to helicopters and missiles deployed in recent military engagements. Detailed corporate histories and photographs paint a clear historical picture of turbine development up to the present. See for yourself why The History of North American Small Gas Turbine Aircraft Engines is the most definitive reference book in its field. The publication of The History of North American Small Gas Turbine Aircraft Engines represents an important milestone for the National Air and Space Museum (NASM) and the American Institute of Aeronautics and Astronautics (AIAA). For the first time, there is an authoritative study of small gas turbine engines, arguably one of the most significant spheres of aeronautical technology in the second half o

Commercial Aircraft Propulsion and Energy Systems Research

The German war machine resulted in many innovations in jet engine and gas turbine development. The most noteworthy was the Me262, the world's first operational jet fighting aircraft.

Jet-engine Fundamentals

This book is intended for those who wish to broaden their knowledge of jet engine technology and associated subjects. It covers turbojet, turboprop and turbofan designs and is applicable to civilian and military usage. It commences with an overview of the main design types and fundamentals and then looks at air intakes, compresors, turbines and exhaust systems in great detail.

Aircraft Engine Design

This is the second edition of Cumpsty's excellent self-contained introduction to the aerodynamic and thermodynamic design of modern civil and military jet engines. Through two engine design projects, first for a new large passenger aircraft, and second for a new fighter aircraft, the text introduces, illustrates and explains the important facets of modern engine design. Individual sections cover aircraft requirements and aerodynamics, principles of gas turbines and jet engines, elementary compressible fluid mechanics, bypass ratio selection, scaling and dimensional analysis, turbine and compressor design and characteristics, design optimization, and off-design performance. The book emphasises principles and ideas, with simplification and approximation used where this helps understanding. This edition has been thoroughly updated and revised, and includes a new appendix on noise control and an expanded treatment of combustion emissions. Suitable for student courses in aircraft propulsion, but also an invaluable reference for engineers in the engine and airframe industry.