Small Aircraft Engines

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Safety Standards on Small Passenger Aircraft--with Nine Or Fewer Seats--are Significantly Less Stringent Than on Larger Aircraft

Transportation Research Board Please note that the content of this book primarily consists of articles available from Wikipedia or other free sources online. Pages: 27. Chapters: Pratt & Whitney R-2800 Double Wasp, Pratt & Whitney R-985 Wasp Junior, Pratt & Whitney F135, Pratt & Whitney JT8D, Pratt & Whitney J58, Pratt & Whitney PW1000G, Pratt & Whitney J52, Pratt & Whitney R-4360 Wasp Major, Pratt & Whitney J57, Pratt & Whitney F100, Pratt & Whitney PW4000, Pratt & Whitney R-1830 Twin Wasp, Pratt & Whitney R-1340 Wasp, Pratt &

Whitney TF30, Pratt & Whitney JT3D, Pratt & Whitney R-1860, Pratt & Whitney PW2000, Pratt & Whitney R-1690 Hornet, Pratt & Whitney PW1120, Pratt & Whitney F119, Pratt & Whitney JT9D, Pratt & Whitney T34, Pratt & Whitney R-1535 Twin Wasp Junior, Pratt & Whitney X-1800, Pratt & Whitney R-2000 Twin Wasp, Pratt & Whitney PW6000, Pratt & Whitney J75, Pratt & Whitney JT12, Pratt & Whitney R-2180, Pratt & Whitney R-2060 Yellow Jacket, Pratt & Whitney XH-3130, Pratt & Whitney T73, Pratt & Whitney PT1. Excerpt: The Pratt & Whitney R-985 Wasp Junior is a series of nine-cylinder air-cooled radial aircraft engines built by the Pratt & Whitney Aircraft Company from the 1930s to the 1950s. These engines have a displacement of 985 cu in (16.14 L); initial versions produced 300 hp (224 kW), while the most widely used versions produce 450 hp (336 kW). Wasp Juniors have powered numerous smaller civil and military aircraft, including small transports, utility aircraft, trainers, agricultural aircraft, and helicopters. Over 39,000 of these engines were built, and many are still in service today. Pratt & Whitney developed the R-985 Wasp Junior as a smaller version of the R-1340 Wasp to compete in the market for medium-sized aircraft engines. Like its larger brother, the Wasp Junior was an air-cooled nine-cylinder radial, with its power boosted by a gear-driven single-speed centrifugal supercharger. Its cylinders were smaller, however, with a bore and stroke of in (132 mm), giving a...

Study of Bird Ingestions Into Small Inlet Area Aircraft Turbine Engines (May 1987-April 1989) MIT Press

The FAA Technical Center initiated a study in May 1987 to determine the numbers, sizes, and types of birds which are being ingested into

small inlet area turbofan and turbine engines and to determine what damage, if any, results. Bird ingestion data are being collected for the ALF502, TFE731, and TPE331 engines. This report analyzes the first of 2 years of data collection. Keywords: Ingestion engines probability; Tables data; Jet engine inlets; Statistical analysis; Bird ingestion; Turbine engines; Turbofan engines; Aircraft engines. (edc).

Commercial Aircraft Propulsion and Energy Systems Research

CRC Press

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

Aviation

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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 passengers â€"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 r evenue-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.

Duesenberg Aircraft Engines

Cambridge University Press

This study analyzes relationships between technology-base efforts applicable to small aircraft engines and DOD needs. DOD needs are identified in terms of future aircraft systems--helicopters, cruise missiles, and RPVs. The benefits of improved engine technology, defined in terms of aerothermodynamic performance, maintenance cost, manufacturing cost, and development cost, are assessed by their impact on total costs of these future systems, and the potential of technological improvements. The technology-base program is assessed on the bases of its orientation toward future systems and the associated quantitative benefits of potential engine improvements, and of the nature of the R and D activities being conducted.

Allied Aircraft Piston Engines of World War II

University-Press.org

The History of North American Small Gas Turbine Aircraft EnginesAIAA

Safety Standards on Small Passenger Aircraft - with Nine Or Fewer Seats - are Significantly Less Stringent

Than on Larger Aircraft. Comptroller General's Report to the Congress

National Academies Press

Small aircraft engines traditionally have poorer performance compared to larger engines, which until recently, has been a factor that outweighed the aerodynamic benefits of commoditized and distributed propulsion. Improvements in the performance of small engines have, however, prompted another look at this old concept. This thesis examines aspects of aircraft engines that may have application to commodity thrust or distributed propulsion applications. Trends of engine performance with size and time are investigated. These trends are further extended to justify parameter choices for conceptual engines of the current, mid-term (10 years) and far-term (20 years). Uninstalled and installed performances are evaluated for these engines, and parametric studies are performed to determine the most influential and limiting factors. It is found that scaling down of engines is detrimental to SFC and fuel burn, mainly

due to the Reynolds number effect. The more scaling done, the more prominent the effect. It is determined that new technology such as higher TIT, OPR and turbomachinery [eta]poly's for small aircraft engines enable the operation of larger bypass ratios, which is the most influential parameter to SFC and fuel bum. The increase of bypass ratio up to a value of 8 is found to be effective for such improvement. SFC decrease from the current to mid-term model is found to be ~20% and ~9% from mid-term to far-term. Range and endurance improvements are found to be ~30% and ~10% respectively for the mission examined. Finally, the mid-term engine model has performance comparable to that of a current, larger state-of-the-art engine, thus suggesting that improvement in small gas turbine technology in the next 10 years will make the application of commodity thrust or distributed propulsion an attractive option for future aircraft.

Aircraft, Aircraft Engines and Propeller Type Certificate Data Sheets and Specifications

John Wiley & Sons

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. Replies to Questionnaires on Aircraft Engine Production Costs and Profits to the Subcommittee for Special Investigations of ... , 85-1 Under the Authority of H. Res. 67 John Wiley & Sons 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

Development of Small Fuel Efficient Aircraft Engines

The History of North American Small Gas Turbine Aircraft Engines

This book provides a comprehensive basics-to-advanced course in an aero-thermal science vital to the design of engines for either type of craft. The text classifies engines powering aircraft and single/multi-stage rockets, and derives performance parameters for both from basic aerodynamics and thermodynamics laws. Each type of engine is analyzed for optimum performance goals, and mission-appropriate engines selection is explained.

Fundamentals of Aircraft and Rocket Propulsion provides information about and analyses of: thermodynamic cycles of shaft engines (piston, turboprop, turboshaft and propfan); jet engines (pulsejet, pulse detonation engine, ramjet, scramjet, turbojet and turbofan); chemical and non-chemical rocket engines; conceptual design of modular rocket engines (combustor, nozzle and turbopumps); and conceptual design of different modules of aero-engines in their design and off-design state. Aimed at graduate and final-year undergraduate

students, this textbook provides a thorough grounding in the history and classification of both aircraft and rocket engines, important design features of all the engines detailed, and particular consideration of special aircraft such as unmanned aerial and short/vertical takeoff and landing aircraft. End-of-chapter exercises make this a valuable student resource, and the provision of a downloadable solutions manual will be of further benefit for course instructors.

Cost/benefit Analysis of Advanced Material Technologies for Small Aircraft Turbine Engines

Springer

The Aircraft Misfueling Detection Project was developed by the Goddard Space Flight Center/Wallops Flight Facility at Wallops Island, Virginia. Its purpose was to investigate the misfueling of reciprocating piston aircraft engines by the inadvertent introduction of jet fuel in lieu of or as a contaminant of aviation gasoline. The final objective was the development of a device(s) that will satisfactorily detect misfueling and provide pilots with sufficient warning to avoid injury, fatality, or equipment damage. Two devices have been developed and successfully tested: one, a small contamination detection kit, for use by the pilot, and a second,

more sensitive, modified gas chromatograph for use by the fixed-base operator. The gas chromatograph, in addition to providing excellent quality control of the fixed-base operator's fuel handling, is a very good backup for the detection kit in the event it produces negative results. Design parameters were developed to the extent that they may be applied easily to commercial production by the aircraft industry. Scott, J. Holland, Jr. Wallops Flight Facility...

Aircraft Engine Design Page Publishing Inc Find the right answer the first time with this useful handbook of preliminary aircraft design. Written by an engineer with close to 20 years of design experience, General Aviation Aircraft Design: Applied Methods and Procedures provides the practicing engineer with a versatile handbook that serves as the first source for finding answers to realistic aircraft design questions. The book is structured in an "equation/derivation/solved example" format for easy access to content. Readers will find it a valuable guide to topics such as sizing of horizontal and vertical tails to minimize drag, sizing of lifting surfaces to ensure proper

dynamic stability, numerical performance methods, and common faults and fixes in aircraft design. In most cases, numerical examples involve actual aircraft specs. Concepts are visually depicted by a number of useful black-and-white figures, photos, and graphs (with full-color images included in the eBook only). Broad and deep in coverage, it is intended for practicing engineers, aerospace engineering students, mathematically astute amateur aircraft designers, and anyone interested in aircraft design. Organized by articles and structured in an "equation/derivation/solved example" format for easy access to the content you need Numerical examples involve actual aircraft specs Contains high-interest topics not found in other texts, including sizing of horizontal and vertical tails to minimize drag, sizing of lifting surfaces to ensure proper dynamic stability, numerical performance methods, and common faults and fixes in aircraft design Provides a unique safety-oriented design checklist based on industry experience Discusses advantages and disadvantages of using computational

tools during the design process Features detailed summaries of design options detailing the pros and cons of each aerodynamic solution Includes three case studies showing applications to business jets, general aviation aircraft, and UAVs Numerous high-quality graphics clearly illustrate the book's concepts (note: images are full-color in eBook only)

Vertical and Short Takeoff and Landing (V/STOL) Aircraft AIAA This book is a compilation of a half-century of flying experience in general aviation machines (sixteen thousand hours) and provides specific techniques and tips to enhance your knowledge of aviation and to improve your abilities and confidence as a pilot or student (and person).

Coupling that flight background with decades of hands-on aircraft accident investigation involvement provides a completely fresh insight into being a pilot. The goal of this manual is to save lives! Small Aircraft Oper

Future Flight Butterworth-Heinemann Provides a Comprehensive Introduction to Aircraft Design with an Industrial Approach This book introduces readers to aircraft design,

placing great emphasis on industrial practice. It includes worked out design examples for several different classes of aircraft, including Learjet 45, Tucano Turboprop Trainer, BAe Hawk and Airbus A320. It considers performance substantiation and compliance to certification requirements and market specifications of take-off/landing field lengths, initial climb/high speed cruise, turning capability and payload/range. Military requirements are discussed, covering some aspects of combat, as is operating cost estimation methodology, safety considerations, environmental issues, flight deck layout, avionics and more general aircraft systems. The book also includes a chapter on electric aircraft design along with a full range of industry standard aircraft sizing analyses. Split into two parts, Conceptual Aircraft Design: An Industrial Approach spends the first part dealing with the pre-requisite information for configuring aircraft so that readers can make informed decisions when designing vessels. The second part devotes itself to new aircraft concept definition. It also offers additional analyses and design information (e.g., on cost, manufacture, systems, role of CFD, etc.) integral to conceptual design study. The book finishes with an introduction to electric aircraft and futuristic design concepts currently under study. Presents an informative, industrial approach to aircraft design Features design examples for aircraft such as

the Learjet 45, Tucano Turboprop Trainer, BAe Hawk, Airbus A320 Includes a full range of industry standard aircraft sizing analyses Looks at several performance substantiation and compliance to certification requirements Discusses the military requirements covering some combat aspects Accompanied by a website hosting supporting material Conceptual Aircraft Design: An Industrial Approach is an excellent resource for those designing and building modern aircraft for commercial, military, and private use.

Small Four-stroke Aero Engines

Textbook introducing the fundamentals of aircraft performance using industry standards and examples: bridging the gap between academia and industry Provides an extensive and detailed treatment of all segments of mission profile and overall aircraft performance Considers operating costs, safety, environmental and related systems issues Includes worked examples relating to current aircraft (Learjet 45, Tucano Turboprop Trainer, Advanced Jet Trainer and Airbus A320 types of aircraft) Suitable as a textbook for aircraft performance courses

Aircraft Engines and Gas Turbines, second edition

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.

How to Buy Surplus Aircraft, Parts, and Miscellaneous Air Equipment

Aircraft Design explores fixed winged aircraft design at the conceptual phase of a project. Designing an aircraft is a complex multifaceted process embracing many technical challenges in a multidisciplinary environment. By definition, the topic requires intelligent use of aerodynamic knowledge to configure aircraft geometry suited specifically to the customer's demands. It involves estimating aircraft weight and drag and computing the available thrust from the engine. The methodology shown here includes formal sizing of the aircraft, engine matching, and substantiating performance to comply with the customer's demands and government regulatory standards. Associated topics include safety issues, environmental issues, material choice, structural layout, understanding flight deck, avionics, and systems (for both civilian and military aircraft). Cost estimation and manufacturing considerations are also discussed. The chapters are arranged to optimize understanding of industrial approaches to aircraft design methodology. Example exercises from the author's industrial experience dealing with a typical aircraft design are included.

Scaling Considerations for Small Aircraft Engines

The Duesenberg name became legendary in early auto

racing and is now known around the world as one of the most sought after classic cars. For a brief period, encompassing World War I, Fred and Augie Duesenberg turned their attention to aircraft engines. In the span of five years, their company created four unique aircraft engines and was involved in the development of others. Duesenberg Aircraft Engines: A Technical Description contains over 100 illustrations and describes the aircraft engines from this nearly forgotten chapter in Duesenberg and aviation history.

Theory and Practice of Aircraft Performance

Includes a mid-December issue called Buyer guide edition.

Small Two-stroke Aero Engines