Ducted Fans For Model Jets
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Preliminary Design of a Ducted-fan Propulsion System for General Aviation Aircraft
Thrust Vectoring of a Ducted Fan Jet Utilizing a Novel Piezoelectric Composite Morphing Nozzle
Ducted Fans for Model Jet
Investigation of Pneumatic Inlet and Diffuser Blowing on a Ducted Fan Propulsor in Static Thrust Operation
Building & Flying Ducted-fan RC Aircraft
Development of Modeling and Simulation Tools for Analysis of Ducted Fan Aircraft
Commercial Aircraft Propulsion and Energy Systems
Research/Aeroacoustics of Low Mach Number Flows
Sport Aviation
E-Project Study of the Propulsive System (ducted Fans) of a Light Electric Aircraft
34th Aerospace Sciences Meeting & Exhibit
Modeling and Control of a Tailsitter with a Ducted Fan Stability and Control Characteristics of a Model of an Aerial Vehicle Supported by Four Ducted Fans
RC Ducted Fans
Airplane Flying Handbook (FAA-H-8083-3A)
Popular Mechanics
Twin-Shaft and Ducted-Fan Aircraft Engines
IUTAM Symposium on Flow Control and MEMS
Fundamentals of the Control of Gas-turbine Power Plants for Aircraft
GAS Turbine Engines for Model Aircraft
Stability and Control Characteristics of a Small-scale Model of an Ariel Vehicle Supported by Two Ducted Fans
Advanced UAV Aerodynamics, Flight Stability and Control
UTIAS Technical Note
Aerodynamics of a Tilting Ducted Fan Configuration
Aerospace Engineering
Large-scale Wind-tunnel Investigation of a Ducted-fan--Deflected-slipstream Model with an Auxiliary Wing
How to Build and Fly Electric Model Aircraft
The Complete Book of Model Aircraft
Spacecraft and Rockets
Transition and Hovering Flight Characteristics of a Tilt-duct VTOL
Research Aircraft
Ducted Fan Design, Volume I
General Aviation Aircraft Design
Flight Control Design of Tandem Ducted Fan Aircraft Using Redundant Control Effectors
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Ducted Fan Design
The Wind Tunnel Test of a Ducted Fan Flying Model of the F9F-6 Jet Aircraft
Ducted Fan Aerodynamics and Modeling, with Applications of Steady and Synthetic Jet Flow Control
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Technology
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 penetrate 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 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 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. After defining the aims and requirements to be set for a control system of gas-turbine power plants for aircraft, the report will deal with devices that prevent the quantity of fuel supplied per unit of time from exceeding the value permissible at a given moment. The general principles of the actuation of the adjustable parts of the power plant are also discussed. This book is a compilation of peer-reviewed papers from the 2018 Asia-Pacific International Symposium on Aerospace Technology (APISAT 2018). The symposium is a common endeavour between the four national aerospace societies in China, Australia, Korea and Japan: the Chinese Society of Aeronautics and Astronautics (CSAA), Royal Aeronautical Society Australian Division (RAeS Australian Division), the Korean Society for Aeronautical and Space Sciences (KSAS) and the Japan Society for Aeronautical and Space Sciences (JSASS). APISAT is an annual event initiated in 2009 to provide an opportunity for researchers and engineers from Asia-Pacific countries to discuss current and future advanced topics in aeronautical and space engineering. A new thrust vectoring technique is represented in this thesis where a novel piezoelectric composite material also known as a Macro Fiber Composite (MFC) was used. The propulsive jet of a ducted fan or turbine is normally achieved by utilizing mechanical or fluidic actuators placed at the jet nozzle. Thrust-vectoring has the potential to reduce the size and power requirements of tradition tail control surfaces (i.e., elevator and rudder utilized for aircraft flight control) and/or increase the maneuverability of the aircraft by augmenting these control surfaces. However, in the case of mechanical nozzle manipulation thrust vectoring, it can become an overly complex mechanism often requiring considerable power. Fluidic actuators (such as synthetic jets that impart low levels of momentum compared to the primary jet) achieve very marginal levels of thrust vectoring which become ineffective for flight control/maneuvering at high turbine or ducted fan jet speeds. In this study a circle to square shaped nozzle was designed with MFC actuators consisting of the MFC bonded to fiberglass plates. These MFCs were actuated by high voltage amplifier. Measurements were taken for three voltages- 200, 800 and 1200V for both pitch thrust vectoring (PTV) and yaw thrust vectoring (YTV). Forces, torques for thrust vectoring gained from load cell and voltage, current data for operating the ducted fan were achieved from NI DAQ X-series 16-bit board system which was connected to computer through Matlab code. Also the angular acceleration was measured. The ducted fan was operated at various duty cycles through a speed controller. The MFCs showed good performance for thrust vectoring at 1200V. For lower voltages the thrust vectoring performance was unpredictable. The angular acceleration also showed a linear relationship with both pitching torque and yawing torque. The Symposium brought together many of the world's experts in fluid mechanics, microfabrication and control theory to discover the synergy that can lead to real advances and perhaps find ways in which collaborative projects may proceed. The high profile meeting was attended by keynote speakers who are leaders in their fields. A key driver was the improvement in flow efficiency to reduce drag, and thereby emissions arising from transport. About 65 papers were presented. The longitudinal aerodynamic characteristics of a semispan wing deflected-slipstream configuration with a double-slotted flap and an auxiliary wing were determined. The model was powered by two low-pressure-ratio ducted fans. A comparison of static test results with results obtained from various propeller-driven configurations indicates that the turning effectiveness of fan-powered deflected-slipstream configurations can be correlated with propeller-powered configurations with the same flap-chord to slipstream-diameter ratio. The turning effectiveness of the auxiliary wing was essentially the
same as would be produced by a conventional slotted flap system with the same flap-chord to slipstream-diameter ratio. The auxiliary wing reduced the thrust required at low speeds as would be expected due to the increase in lifting surface area. 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). Comprehensively covers emerging aerospace technologies. Advanced UAV aerodynamics, flight stability, and control: Novel concepts, theory, and applications presents emerging aerospace technologies in the rapidly growing field of unmanned aircraft engineering. Leading scientists, researchers, and inventors describe the findings and innovations accomplished in current research programs and industry applications throughout the world. Topics included cover a wide range of new aerodynamics concepts and their applications for real-world fixed-wing (airplanes), rotary-wing (helicopters), and jet aircraft. The book begins with two introductory chapters that address fundamental principles of aerodynamics and flight stability and form a knowledge base for the student of Aerospace Engineering. The book then covers aerodynamics of fixed-wing, rotary-wing, and hybrid unmanned aircraft, before introducing aspects of aircraft flight stability and control. Key features: Sound technical level and inclusion of high-quality experimental and numerical data. Direct application of the aerodynamic technologies and flight stability and control principles described in the book in the development of real-world new unmanned aircraft concepts.

Written by world-class academics, engineers, researchers, and inventors from prestigious institutions and industry. The book provides up-to-date information in the field of Aerospace Engineering for university students and lecturers, aerodynamics researchers, aerospace engineers, aircraft designers, and manufacturers. Popular Mechanics inspires, instructs, and influences readers to help them master the modern world. Whether it's practical DIY home-improvement tips, gadgets, and digital technology, information on the newest cars or the latest breakthroughs in science -- PM is the ultimate guide to our high-tech lifestyle. There are two traditional aircraft categories: fixed-wing which have a long life and a high airspeed and rotorcraft which can take-off and land vertically. The tail-sitter is a type of aircraft that has the strengths of both platforms, with no additional mechanical complexity, because it takes off and lands vertically on its tail and can transition the entire aircraft horizontally into high-speed flight. In this dissertation, we develop the entire control system for a tail-sitter with a ducted fan. In recent years, the interest in developing aircrafts with VTOL characteristics like helicopters has increased. Initially, these aircrafts were thought to provide a service, like rescue missions. However, this idea has evolved to small aircrafts which can replace the use of cars in the future. Moreover, electric motors and batteries have had a fast evolution in the last years and they are called to be the future technology. Combining these two basic ideas, the appearance of light electric aircrafts flying our skies seems only a matter of time. In this situation, the E-Project appeared. The idea is to develop a light electric aircraft with VTOL features with a propulsive system composed by ducted fans or free propellers. Ducted fans might play an important role in the project. The increase in the static thrust generated or in the safety are only a few properties that can make the ducted fans the proper propulsion system to fit the necessities of these new aircrafts. Furthermore, with a system of vanes the flux can be oriented towards the desirable part of the wing. Due to these properties, aircrafts with ducted fans were thought to be a replacement of the helicopters, therefore some projects appeared along the 50s and 60s. However, they never reached the performance of helicopters and they lost performance comparing to contemporary aircrafts, hence some projects were cancelled. Technology has evolved and some projects which study the use of ducted fans in aircrafts have appeared again. And the results are encouraging. Therefore, it is a good idea to study ducted fans as a possible propulsion system for a light aircraft. This study wants to report the performance of ducted fans applied for VTOL aircrafts. Therefore, a research about the background and the state of the art of this technology is an important point to start with. Later, a physics explanation of the problem including a brief description of the basic parameters of a ducted fan will be done. It is important to understand how these parameters explained herein affect to the performance of a ducted fan. In order to make this, different experiments extracted from studies will be exposed. With these information, a study of possible configurations will be done, to choose those that could be interesting for the E-Project. In one complete volume, this essential reference presents an in-depth overview of the theoretical principles and techniques of electrical machine design. This timely new edition offers up-to-date theory and guidelines for the design of electrical machines, taking into account recent advances in permanent magnet machines as well as synchronous reluctance machines. New coverage includes: Brand new material on the ecological impact of the motors, covering the eco-design principles of rotating electrical machines. An expanded section on the design of permanent magnet synchronous machines, now reporting on the design of tooth-coil, high-torque permanent magnet machines and their properties. Large updates and new material on synchronous reluctance machines, air-gap inductance, losses in and resistivity of permanent magnets (PM), operating point of loaded PM circuit, PM machine design, and minimizing the losses in electrical machines. End-of-chapter exercises and new direct design examples with methods and solutions to real design problems. A supplementary website hosts two machine design examples created with MATHCAD: rotor surface magnet permanent magnet machine and squirrel cage induction machine calculations. Also a MATLAB code for optimizing the design of an induction motor is provided. Outlining a step-by-step sequence of machine design, this book enables electrical machine designers to design rotating electrical machines. With a thorough treatment of all existing and emerging technologies in the field, it is a useful manual for professionals working in the diagnosis of electrical machines and drives. A rigorous introduction to the theoretical principles and techniques makes the book invaluable to senior electrical engineering students, postgraduates, researchers and university lecturers involved in electrical drives technology and electromechanical energy conversion. Presents a simplified method of designing ducted fans for light aircraft propulsion. Includes a survey of ducted-fan-powered aircraft, ranging from amateur-built airplanes to military models.
and prototypes. Detailed discussion of engines and list of suitable powerplants drawn from automobiles, ATVs and personal watercraft. Extensive technical bibliography and list of sources. Ducted fans vehicles possess a superior ability to maximize payload capacity while minimizing vehicle size. Their ability to both hover and fly at high speed is a key advantage for information-gathering missions, particularly when close proximity to a target is essential. However, the ducted fan’s aerodynamic characteristics pose difficulties for stable vehicle flight and therefore require complex control algorithms. In particular, they exhibit a large nose-up pitching moment during wind gusts and when transitioning from hover to forward flight. Understood ducted fan aerodynamic behavior and how it can be altered through flow control techniques are the two prime objectives of this work. This dissertation provides a new paradigm for modeling the ducted fan’s nonlinear behavior and new methods for changing the duct aerodynamics using active flow control. Steady and piezoelectric synthetic jet blowing are employed in the flow control concepts and are compared. The new aerodynamic models captures the nonlinear characteristics of the force, moment, and power data for a ducted fan, while representing these terms in a set of simple equations. The model attains excellent agreement with current and legacy experimental data using twelve non-dimensional constants. Synthetic jet actuators (SJAs) have potential for use in flow control applications in UAVs with limited size, weight, and power budgets. Piezoelectric SJAs for a ducted fan vehicle were developed through two rounds of experimental designs. The final SJA design attained peak jet velocities in the range of 225 ft/sec (69 m/s) for a 0.03” x 0.80” rectangular slot. To reduce the magnitude of the nose-up pitching moment in cross-winds, two flow control concepts were explored: flow separation control at the duct lip, and flow turning at the duct trailing edge using a Coanda surface. Both concepts were experimentally proven to be successful. Synthetic jets and steady jets were capable of modifying the ducted fan flow to reduce pitching moment, but some cases required high values of steady blowing to create significant responses. Triggering leading edge separation on the duct lip was one application where synthetic jets showed comparable performance to steady jets operating at a blowing coefficient an order of magnitude higher. "Ducted fans represent the fastest growing and most exciting facet of aeromodelling, and there is now a tremendous growth of interest amongst fliers, as well as designers and builders. Ducted Fans for Model Jets is a thorough reference book on the technology, and examines the fan unit itself, suitable engines to power the fan, special airframe designs, commercially available engines and fans, and important experimental data on fan and aircraft performance." --Back cover.Examines new technologies that allow enthusiasts to access areas with electric models which were previously inaccessible. Offers advice on choosing a battery, tethered and free flight, simple and advanced radio control, indoor flight, build-it-yourself kits and exact scale flying. The article discusses the development design and use of twin-shaft and ducted-fan aircraft engines in various countries. Specifications of engines cited are given; all specifications of engines mentioned are of western manufacture. (Author).Aeroacoustics of Low Mach Number Flows: Fundamentals, Analysis, and Measurement provides a comprehensive treatment of sound radiation from subsonic flow over moving surfaces, which is the most widespread cause of flow noise in engineering systems. This includes fan noise, rotor noise, wind turbine noise, boundary layer noise, and aircraft noise. Beginning with fluid dynamics, the fundamental equations of aeroacoustics are derived and the key methods of solution are explained, focusing both on the necessary mathematics and physics. Fundamentals of turbulence and turbulent flows, experimental methods and numerous applications are also covered. The book is an ideal source of information on aeroacoustics for researchers and graduate students in engineering, physics, or applied math, as well as for engineers working in this field. Supplementary material for this book is provided by the authors on the website aeroacoustics.net. The website provides educational content designed to help students and researchers in understanding some of the principles and applications of aeroacoustics, and includes example problems, data, sample codes, course plans and errata. The website is continuously being reviewed and added to. Explains the key theoretical tools of aeroacoustics, from Lighthill's analogy to the flows Williams and Hawkings equation Provides detailed coverage of sound from lifting surfaces, boundary layers, rotating blades, ducted fans and more Presents the fundamentals of sound measurement and aeroacoustic wind tunnel testingTilting ducted fans present a solution for the lifting and forward flight propulsion requirements of VTOL aircraft. However, the geometry of the duct enshrouding the propeller has a great effect on the efficiency of the fan in various flight modes. Shroud geometry controls the velocity and pressure at the face of the fan, while maintaining a finite loading out at the tips of the fan blades. A duct tailored for most efficient generation of static lifting thrust will generally suffer from performance deficiencies in forward flight. The converse is true as well, leaving the designer with a difficult trade affecting the overall performance and sizing of the aircraft. Ideally, the shroud of a vertical lifting fan features a generous bell mouth inlet promoting acceleration of flow into the face of the fan, and terminating in a converging nozzle at the exit. Flow entering the inlet is accelerated into the fan by the circulation about the shroud, resulting in an overall increase in thrust compared to an open propeller operating under the same conditions. The accelerating shroud design is often employed in lifting ducted fans to benefit from the thrust augmentation; however, such shroud designs produce significant drag penalties in axial flight, thus are unsuitable for efficient forward flight applications. Decelerating, or diffusing, duct designs are employed for higher speed forward flight configurations. The lower circulation on the shroud tends to decelerate the flow into the fan, which is detrimental to static thrust development; however, net thrust is developed on the shroud while the benefits of finite blade loading are retained. With judicious shroud design for intended flight speeds, a net increase in efficiency can be obtained over an open propeller. In this experiment, conducted under contract to NASA LaRC (contract NAG-1-02093) circulation control is being applied to a mildly diffusing shroud design, intended for improved forward flight performance. A summary is presented of some of the lift and lift/cruise fan technology including fan performance, fan stall, ground effects, ingestion and thrust loss, design tradeoffs and integration, control effectiveness and several other areas related to vertical short takeoff and landing (VSTOL) aircraft conceptual design. The various subjects addressed, while not necessarily pertinent to specific short takeoff/vertical landing (STOVL) supersonic designs being considered, are of interest to the general field of lift and lift/cruise fan aircraft designs and may be of importance in the future. The various wind tunnel and static tests reviewed are: (1) the Doak VZ-4 ducted fan, (2) the 0.57 scale model of the Bell X-22 ducted fan aircraft, (3) the Avocar, (4) the General Electric lift/cruise fan, (5) the vertical short takeoff and landing (VSTOL) lift engine configurations related to ingestion and consequent thrust loss, (6) the XV-5 and other fan-in-wing stall consideration, (7) hybrid configurations such as lift fan and lift/cruise fan or engines, and (8) the various conceptual design studies by airframe contractors. Other design integration problems related to small and large VSTOL transport aircraft are summarized including lessons learned during more recent conceptual design studies related to a small executive VSTOL transport aircraft. Cook, Woodrow L. Ames Research Center Copyright code: 626bbde1c1db129da559b70d7f77b1f89b