Rotary Aircraft Engine Design

The incorporation of technology into aviation has been exponential. Advancements in microelectronics, stealth technology, engine design, and electronic sensors and displays have converted simple aircraft into formidable flying machines. In this book, recognised experts in aviation helmet-mounted displays (HMDs) summarise 25 years of knowledge and experience in the area of HMD visual, acoustic, and biodynamic performance, and user interface issues such as sizing, fitting, and emergency egress.

A chronological history of American aviation is followed by coverage of such topical themes as balloons and dirigibles, government in aviation, and military airpower developments.

Commercial Aircraft Propulsion and Energy Systems Research

Rotary balance data for a typical single-engine general aviation design for an angle of attack range of 8 deg to 90 deg. 1: Low wing model C

Rotary Balance Data for a Typical Single-engine General Aviation Design for an Angle-of-attack Range 8˚to 90˚: Low-wing model B

Rotary balance data for a typical single-engine general aviation design for an angle-of-attack range of 8 deg to 90 deg. 1: High-wing model B

Rotary Balance Data for a Typical Single-engine General Aviation Design for an Angle-of-attack Range of 8ıo 90˚

Please note that the content of this book primarily consists of articles available from Wikipedia or other free sources online. Pages: 67. Chapters: 2si 215, 2si 230, 2si 460, Alfa Romeo 115, Allen Aircraft Engine Corp O-675, Argus As 10, Argus As 410, Argus As 411, Argus As 8, Arrow 1000, Arrow 250, Arrow 500, Avia M332, Avia M 337, Bentley BR1, Bentley BR2, Blackburn Cirrus Bombardier, Blackburn Cirrus Major, Blackburn Cirrus Midget, Blackburn Cirrus Minor, Cirrus Aero-Engines, Clerget 11Eb, Clerget 7Z, Clerget 9B, Clerget aircraft engines, Cuyuna 430, Daiichi Kosho DK 472, De Havilland Gipsy Major, De Havilland Gipsy Minor, De Havilland Gipsy Queen, De Havilland Gipsy Six, De Havilland Gipsy Twelve, Elizalde Tigre IV, ERCO I-L 116, Gnome Delta, Gnome Gamma, Gnome Lambda, Gnome Monosoupape, Gnome Omega, Hirth 2702, Hirth 2704, Hirth 3202, Hirth F-23, Hirth F-263, Hirth F-30, Hirth F-33, Hirth F-36, Hirth HM 504, Hirth HM 506, Hitachi Hatsukaze, Isotta Fraschini Delta, JPX D-320, JPX PUL 425, Kawasaki 340, Kawasaki 440, KFM 107, Konig SC 430, Konig SD 570, Le Rhone, Le Rhone 9C, Le Rhone 9J, McCulloch MAC-101, Menasco Buccaneer, Menasco Pirate, Menasco Unitwin 2-544, Napier Javelin, Nelson H-44, Nelson H-63, Oberursel U.I, Packard DR-980, Per Il Volo Top 80, Radne Raket 120, Ranger L-440, Ranger V-770, Rotax 185, Rotax 277, Rotax 377, Rotax 447, Rotax 462, Rotax 503, Siemens-Halske Sh.III, Simonini 200cc, SMA SR305-230, Walter Mikron, Walter Minor, Yamaha KT100, Zanzottera MZ 201, Zanzottera MZ 301, Zanzottera MZ 34, Zenoah G-25, Zenoah G-50, Zoche aero-diesel. Excerpt: The Monosoupape (French for single-valve), was a rotary engine design first introduced in 1913 by Gnome Engine Company (since 1915 called Gnome et Rhone). It used a clever arrangement of internal transfer ports and a single pushrod-operated exhaust valve to replace a large number of moving parts found on more conventional rotary engines, and made the Monosoupape engines some of the most...

In this paper, preliminary studies on two turbine engine applications relevant to the tilt-rotor rotary wing aircraft are performed. The first case-study is the application of variable pitch turbine for the turbine performance improvement when operating at a substantially lower shaft speed. The calculations are made on the 75 percent speed and the 50 percent speed of operations. Our results indicate that with the use of the variable pitch turbines, a nominal (3 percent (probable) to 5 percent (hypothetical)) efficiency improvement at the 75 percent speed, and a notable (6 percent (probable) to 12 percent (hypothetical)) efficiency improvement at the 50 percent speed, without sacrificing the turbine power productions, are achievable if the technical difficulty of turning the turbine vanes and blades can be circumvented. The second casestudy is the contingency turbine power generation for the tilt-rotor aircraft in the One Engine Inoperative (OEI) scenario. For this study, calculations are performed on two promising methods: throttle push and steam injection. By isolating the power turbine and limiting its air mass flow rate to be no more than the air flow intake of the take-off operation, while increasing the turbine inlet total temperature (simulating the throttle push) or increasing the air-steam mixture flow rate (simulating the steam injection condition), our results show that an amount of 30 to 45 percent extra power, to the nominal take-off power, can be generated by either of the two methods. The methods of approach, the results, and discussions of these studies are presented in this paper. Chen, Shu-cheng, S. Glenn Research Center NASA/TM-2009-215651/PART2, E-16964-2 AXIAL FLOW TURBINES; RELIABILITY ANALYSIS; ROTARY WING AIRCRAFT; TURBINE ENGINES; DESIGN ANALYSIS; MASS FLOW RATE; TILT ROTOR AIRCRAFT; FLOW VELOCITY; SIMULATION; SHAFTS (MACHINE ELEMENTS); AIR MASSES; VANES

The American Aviation Experience

Air-flow and Performance Characteristics of Engine-stage Supercharger of a Double-row Radial Aircraft Engine

A Handbook Upon Aeroplanes and Their Engines with Notes Upon Propellers

Rotary Balance Data for a Single Engine General Aviation Design Having a High Aspect-ratio Canard for an Angle-of-attack Range of 30 Deg to 90 Deg

Low-wing model A. I

The Design of a High-speed Single-stage Reduction Drive for a Rotary Aircraft EngineDesign of a Radial, Air-cooled Aircraft EngineAirframe and Powerplant Mechanics Powerplant HandbookPreliminary Axial Flow Turbine Design and Off-Design Performance Analysis Methods for Rotary Wing Aircraft Engines. Part 2; Applications

In this paper, preliminary studies on two turbine engine applications relevant to the tilt-rotor rotary wing aircraft are performed. The first case-study is the application of variable pitch turbine for the turbine performance improvement when operating at a substantially lower shaft speed. The calculations are made on the 75 percent speed and the 50 percent speed of operations. Our results indicate that with the use of the variable pitch turbines, a nominal (3 percent (probable) to 5 percent (hypothetical)) efficiency improvement at the 75 percent speed, and a notable (6 percent (probable) to 12 percent (hypothetical)) efficiency improvement at the 50 percent speed, without sacrificing the turbine power productions, are achievable if the technical difficulty of turning the turbine vanes and blades can be circumvented. The second casestudy is the contingency turbine power generation for the tilt-rotor aircraft in the One Engine Inoperative (OEI) scenario. For this study, calculations are performed on two promising methods: throttle push and steam injection. By isolating the power turbine and limiting its air mass flow rate to be no more than the air flow intake of the take-off operation, while increasing the turbine inlet total temperature (simulating the throttle push) or increasing the air-steam mixture flow rate (simulating the steam injection condition), our results show that an amount of 30 to 45 percent extra power, to the nominal take-off power, can be generated by either of the two methods. The methods of approach, the results, and discussions of these studies are presented in this paper. Chen, Shu-cheng, S. Glenn Research Center

High-wing model A. II

The Autocar

2 - Effect of Design Variables

Airplane Engine Encyclopedia

Rotary Balance Data for a Single-engine General Aviation Design Having a High Aspect-ratio Canard for an Angle-of-attack Range of 30˚to 90˚

An investigation has been conducted to determine the effect of the location of the diffuser vanes with respect to the supercharger outlets and the effect of flow conditions at the impeller inlet on the air-flow distribution in the outlets of the engine-state supercharger of an 18-cylinder double-row radial aircraft engine. The standard 13-vane diffuser rotated 180 degrees from its original position and an NACA designed 18-vane diffuser were used to determine the effect of the diffuser-vane location with respect to the supercharger outlets. The 18 vanes of the diffuser correspond to the 18 outlets of the supercharger. The effect of flow conditions at the impeller inlet was investigated by distorting the flow at the inlet and noting the effect in the supercharger outlets. An NACA vaneless diffuser was used in this investigation to eliminate the diffuser-vane effect.

The subject of this paper is so broad in scope that a large volume might be devoted to it. At the same time development is so rapid that such a volume would be obsolete before it got off to the press. This short paper sketches the high lights of aircraft engine design showing the developments to date, the possibilities of the future, and the underlying fundamental principles.

The Engineering Index

Preliminary Axial Flow Turbine Design and Off-Design Performance Analysis Methods for Rotary Wing Aircraft Engines. Part 2; Applications

Industrial Arts Index

High-wing model C. II

The influence of airplane components, as well as wing location and tail length, on the rotational flow aerodynamics is discussed for a 1/6 scale general aviation airplane model. The airplane was tested in a built-up fashion (i.e., body, body-wing, body-wing-vertical, etc.) in the presence of two wing locations and two body lengths. Data were measured, using a rotary balance, over an angle-of-attack range of 8 deg to 90 deg, and for clockwise and counter-clockwise rotations covering an omega b/2V range of 0 to 0.9.

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.

The Art of Aviation

Rotary Balance Data for a Typical Single-engine General Aviation Design for an Angle-of-attack Range of 200?to 900?

Aircraft Engine Design

Rotary Balance Data for a Typical Single-engine General Aviation Design for an Angle-of-attack Range of 8 Deg to 90 Deg. 1: Low-wing Model A

Rotary Balance Data for a Typical Single-engine General Aviation Design for an Angle-of-attack Range of 8 ?to 90.?

The rotary aero engine has always fascinated aviation historians and enthusiasts. When the 50hp Gnome appeared in 1908, it was the most powerful engine for its weight available and was used by almost all the notable pioneers to set records for height, speed and endurance. Rotaries also played a key role in the First World War, powering many of the famous 'fighting scouts' such as the Sopwith Camel and Fokker Monoplane. In this book, Andrew Nahum gives an original and well-argued explanation, showing that rotary development was limited by a 'power ceiling' which was a basic consequence of design.

Aerodynamic characteristics obtained in a rotational flow environment utilizing a rotary balance are presented in plotted form for a 1/5 scale, single engine, low-wing, general aviation airplane model. The configuration tested included the basic airplane, various control deflections, tail designs, fuselage shapes, and wing leading edges. Data are presented without analysis for an angle of attack range of 8 to 90 deg and clockwise and counterclockwise rotations covering a range from 0 to 0.85.

The Design of a High-speed Single-stage Reduction Drive for a Rotary Aircraft Engine

Rotary balance data for a typical single-engine general aviation design for an angle-of-attack range of 8 deg to 90 deg. 2: Influence of horizontal tail location for Model D

Rotary balance data for a typical single-engine general aviation design for an angle-of-attack range of 8t̃ o 90˚

Rotary Balance Data for a Typical Single-engine General Aviation Design for an Angle-of-attack Range of 8 Deg to 90 Deg. 1: Influence of Airplane Components for Model D

Peiping's Maneuvers on the Disarmament Question

The NASA Technical Reports Server (NTRS) houses half a million publications that are a valuable means of information to researchers, teachers, students, and the general public. These documents are all aerospace related with much scientific and technical information created or funded by NASA. Some types of documents include conference papers, research reports, meeting papers, journal articles and more. This is one of those documents.

Airframe and Powerplant Mechanics Powerplant Handbook

Design of a Radial, Air-cooled Aircraft Engine

Rotary balance data for a typical single-engine general aviation design for an angle-of-attack range of 8 deg to 90 deg. 2: High-wing model C

A History

Air-Cooled Aircraft Piston Engines