Aircraft Engine Design

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.
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.
The aim of the Liberty was to standardize aircraft engine design. The theory was to have an engine design that could be built in several sizes and thus power airplanes for any purpose, from training to bombing. The differences in sizes would be obtained by using different numbers of cylinders in the same design. A large number of other parts would also be used in common by all resulting sizes of the engine series. The initial concept called for four-, six-, eight- and 12-cylinder models. An X-24 version was built experimentally, and one- and two-cylinder models were built for testing purposes. The engine design eventually saw use on land, sea, and in the air, and its active military career spanned the years 1917 to 1960. In addition, it provided noble service in a multitude of civilian uses, and still does even today, some 90 years after the first engine ran. This book covers the complete history of the Liberty's design, production, and use in amazing detail and includes appendices covering contracts, testing, specifications, and much more.
"Making Jet Engines" presents a radical re-interpretation of the early history of the jet engine in Germany, Britain, and the United States and, through this, sets out a new account of the central features of twentieth-century invention. Hermione Giffard, without invoking foresight or conservative resistance to novelty, explores why individual firms decided not to develop jet engines, failed to do so, or succeeded, highlighting how each country pursued jet engines for reasons that reflected their particular war aims and industrial expertise. By beginning with production, the very structure of "Making Jet Engines "challenges the traditional way of telling stories of invention, for it focuses consecutively on production, development, inventive institutions, and, lastly, the celebrity of the jet engine s inventors, who she portrays as the employees that they were. By demonstrating the crucial importance of industry in the emergence of novelty, this is a game changing book for anyone interested in technological invention today. "
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.
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).
Contents: Types and classification of gas-turbine engines; Axial compressors; Centrifugal compressors; Gas turbines; Oscillation of buckets and disks; Balancing gas-turbine engine rotors; Rotor shafts and supports; Critical number of rotor shaft revolutions; Combustion chambers; Exhaust assemblies and afterburners; Turboprop reduction gears; Drives for gas-turbine-engine assemblies; System of load-bearing housings of the gas-turbine engine; Lubrication system of the gas-turbine engine; Fuel system of the gas-turbine engine and its assemblies; Adjusting the gas-turbine engine; Ignition units of the gas-turbine engine; The kinematics and dynamics of the crankgear mechanism; Balancing of piston engines; Crankshafts; Connecting rods; Pistons; Cylinders; Gas distribution; Reduction gears and blowers; Casings and drives for the lubrication units and piston engine systems; Piston-engine ignition system.
Annotation The last of three texts on aircraft propulsion technology planned by Gordon C. Oates. Other titles: Aerodynamics of gas turbine and rocket propulsion (1988); Aerothermodynamics of aircraft engine components (1985). Chapters treat combustion technology, engine/airplane performance matching, inlets and inlet/engine integration, variable convergent/divergent nozzle aerodynamics, engine instability, aeroelasticity, and unsteady aerodynamics. Annotation(c) 2003 Book News, Inc., Portland, OR (booknews.com)
Good,No Highlights,No Markup,all pages are intact, Slight Shelfwear,may have the corners slightly dented, may have slight color changes/slightly damaged spine.
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.
This is a textbook for course work and diploma projects in the field of aircraft engine building. It can also be used by students in institutes of higher education and technical schools of other machine building specialties, as well as by engineering and technical personnel working in the field of aircraft engine building and gas turbine building. The various design solutions used in the design of aircraft engine parts and units are examined. In each chapter are discussed the general requirements on the examined design elements, and recommendations are given on the basis of experience gained in industry. After an over all evaluation of the given design procedure, actual examples are given of various solutions of some problem taken from the practice of aircraft engine building. Based on examples of the design of several units of gas turbine

engines, the relationship is shown between the design solutions for separate elements of the unit according to the technical requirements the accepted and design scheme of a unit and an engine as a whole. (Author).

This is a high quality facsimile of Aircraft Engine Design by Joseph Liston, originally published in 1942.This text has been assembled to aid technical students in bridging the gap between the point where they have a fairly complete knowledge of the fundamentals of mathematics, mechanics, and machine design, and the point where they are sufficiently familiar with the application of these fundamentals to the design of aircraft engines to enable them to be of value to aircraft engine building industry.Chapters:1. Requirements, Possibilities, and Limitations2. Outline of the Project3. Gas-Pressure Forces4. Analysis of the Crank Chain5. Analysis of Bearing Loads6. Design of Reciprocating Parts7. Crankshaft Vibration and Balance8. Crankshaft Details and Reduction Gearing9. Cylinders and Valves10. Valve Gear11. The Crankcase, Superchargers, and Accessories

Written by an author who has devoted the past twenty-five years ofhis life to studying and designing shock wave engines, this uniquebook offers comprehensive coverage of the theory and practice ofshock wave engine design. The only book treating the completepreliminary design of shock wave engines, it provides engineerswith practical step-by-step guidelines applicable to the design andconstruction of small, light- weight, low-powered industrialturbines as well as high performance jet aircraft engines. In his discussions of the advantages and disadvantages of shockwave versus other types of combustion engines, Dr. Weberdemonstrates how and why shock wave engines can be made to workmore efficiently than conventional gas turbines. Among otherthings, he shows quantitatively why combustion temperatures can besignificantly higher in shock wave engines than conventional gasturbines. He evaluates temperatures of moving parts in terms ofcombustion and engine inlet temperatures, and explores the effectof shock coalescence, expansion fan reflections and intersectionson port sizes and locations. And throughout, real and imaginedperformance problems are posed and proven solutions given for shockwave engines--alone and in conjunction with conventional gasturbines or reciprocating internal combustion engines. Designed to function as a practical guide, Shock Wave Engine Designoffers concise step-by-step design techniques in a readily usableformat. Engineers will find precise, detailed directions on suchessentials as how to size wave rotor blade lengths and heights andthe correct rotor diameter for a specified power, and materialselection for rotor and stator. And one entire chapter (Chapter 12)is devoted exclusively to a detailed example design for a 500 hpengine. An authoritative, highly practical guide to state-of-the-art shockwave engine design, this book is an important resource formechanical and aerospace engineers who design aircraft engines orvirtually any type of turbomachinery. Timely, authoritative, practical--an important resource forengineers who design aircraft engines or virtually any type ofturbomachinery

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equations and calculationmethods

Aircraft Engine DesignAIAA

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 refl ect 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 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.

?????Aircraft engine design

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

Automated techniques for selecting jet engines that minimize overall fuel consumption for a given aircraft mission have recently been developed. However, the current techniques lack the efficiency required by Wright Laboratories. Two noted dependencies between turbine engine fan pressure ratio, bypass ratio, high pressure compressor pressure ratio and overall engine mass flow allows for a reduction in the number of independent design variables searched in the optimization process. Additionally, through the use of spatial statistics (specifically kriging estimation), it is possible to significantly reduce the number of time consuming response function evaluations required to obtain an optimal combination of engine parameters. A micro Genetic Algorithm (microGA) is employed to perform the non linear optimization process with these two

computation saving techniques. Optimal engine solutions were obtained. in 25 percent of the time required by previous automated search algorithms.