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The Development Of Jet And Turbine Aero Engines



Synopsis

Using language understandable to those without an engineering background and avoiding complex mathematical formulae, Bill Gunston explains the differences between gas-turbine, jet, rocket, ramjet and helicopter turbo shaft aero engines and traces their histories from the early days through to today's complex and powerful units as used in the latest wide-bodied airliners and high performance military jets. --This text refers to an out of print or unavailable edition of this title.

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Customer Reviews

Bill Gunston, a former RAF pilot and flying instructor, is perhaps the best-known aviation writer in Britain today, with some 300 books published in a fifty-year writing career. His recent books include Night Fighters: A Development and Combat History (2nd edition, 2003) and World Encyclopedia of Aircraft Manufacturers: From the Pioneers to the Present Day (2nd edition, 2005). --This text refers to an out of print or unavailable edition of this title.

Just lots and lots of fun. A little less techy than some jet books, although it definitely assumes a solid grounding in basic engineering and physics. The author is a patriotic Brit and swells with justified pride in recounting the vision, courage, and perseverance of Frank Whittle in particular, whom he obviously reveres. He's much less complimentary about the brass in the RAF and other governmental obstructionists. The discussion of theory and design is accessible and enjoyable. Gunston makes passing references to oddball solutions that never came to fruition despite clear

advantages--thought-provoking for those who like to think out of the box. Unfortunately, he gets into the weeds a bit with historical detail about various manufacturers, makes, and models, getting more into the politics of development rather than sticking to the technical aspects.

Jet and Turbine Aero Engines by former RAF pilot Bill Gunsten is a delightful qualitative survey into the development of air breathing jet engines. My comments are based on the second edition of the book. If I have one constructive criticism to make of the book, it is that I'm hoping the material can be structured in a better way in upcoming editions. Comprising of 230 pages, the book starts off with an insightful look at the science behind the working of gas turbines. 100 pages are dedicated to how the different components function, their construction and installation. In 'Principles', Mr. Gunsten outlines the chief differences between gas turbines and internal combustion engines. He describes the unique cycles of both processes and defines what we mean by the different types of efficiency. In 'Compressors', the author distinguishes between an axial compressor and a centrifugal compressor. A pertinent note is that the chief design challenges with both rest on the aerodynamic considerations of air-blade interaction, temperature resistance of the materials, staying clear of surge and balancing capacity when operating off design points. In 'Combustion', we read about the unique requirements of air/fuel ratios in gas turbines followed by the methods employed to atomize and spray fuel into the air and few key points to keep in mind such as reducing residence time of the air-fuel mixture to reduce NOX production. In 'Turbines', we find material on the harsh demands asked of the turbine and blade geometry needed in order to capture some of the exhaust energy and expand it. They are the most important power producing component of the system. The rest of Part I is about jet pipes, engine systems and installation. The historical progress of jet turbines arrives in Part II and makes for good reading as it is full of interesting facts. It becomes easy for one to get lost in the details of model names, inventors and dates. However, the main point is clear that jet engines introduced a marked paradigm shift in how we think about transportation. Remarkable amount of development has happened within the field in just 60 years, where we went from clunky complicated systems where failures were the order of the day to high bypass ratio turbofans producing several thousand pounds of thrust with more reliability, efficiency, reduced noise and emissions. In 60 years, we also put man on the moon! The struggles of the bygone era is not lost on readers. Key figures such as F. Whittle met with considerable inertia to advance their ideas on their own turf, their only fault being they were down the order in ranks and their concepts substantially outside the state of the art. Others like von Ohain were able to conceive, build and test working models in just a few years. Why and how did those happen? The book describes those stories. One

can easily fathom the impact jet aircrafts made in the World War II, but it is anyone's guess how many lives could have been saved if the Allies had a mature jet technology earlier than history has it. The author has ended the book with the quip that in spite of the computer power we have in our possession, a new engine takes as many years to design these days as in 1944 it took weeks. Somewhat ironic but true. Given how competitive the GT market is, I'm sure it's not just design work that takes away from time to market. Some of the best turbofans on wide body jets such as the Trent 1000 for the Dreamliner was conceived of way back in the day but the chunk of development cost and time goes into the rigorous validation testing to prove the engine's airworthiness and that itself takes years.

Very technical & exhaustively detailed - might be more than some want to know. But if you read this, you WILL have a solid grasp of how turbine engines work.

A must for the layman or even the mildly well informed wishing to understand the jet engine. Also Bill Gunston's Piston Aero Engines is worth a look, but Bill's best in my opinion is his biography of Roy Fedden - "Fedden" published by the Rolls Royce historical trust. "Not much of an engineer", Hooker's biography is also essential reading for those interested in the jet plane. Brett O'Maley

A brilliant compilation of the technological advancements made in turbine engine propulsion for aircraft systems. I highly recommend it be used in engineering colleges by future aerospace engineers.

Very good book. The first part is a technical description on engines and the second one is the history of engine's development.

Fantastic. Technical yet readable. A gem.

Topically speaking this excellent book is probably closer to a college text than it is an introduction to jet engines, yet the material is put forth in a way which is uniquely entertaining from a historical point of view, without heavy mathematical formulas. For someone who has a substantive head start in understanding how a jet engine works, the technical and historical discussions will blend beautifully and provide a type of perspective that a formal classroom often does not have time for. I also find the illustrations to be quite nice. Overall, a great book for those who already have some technical

knowledge of the subject.

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