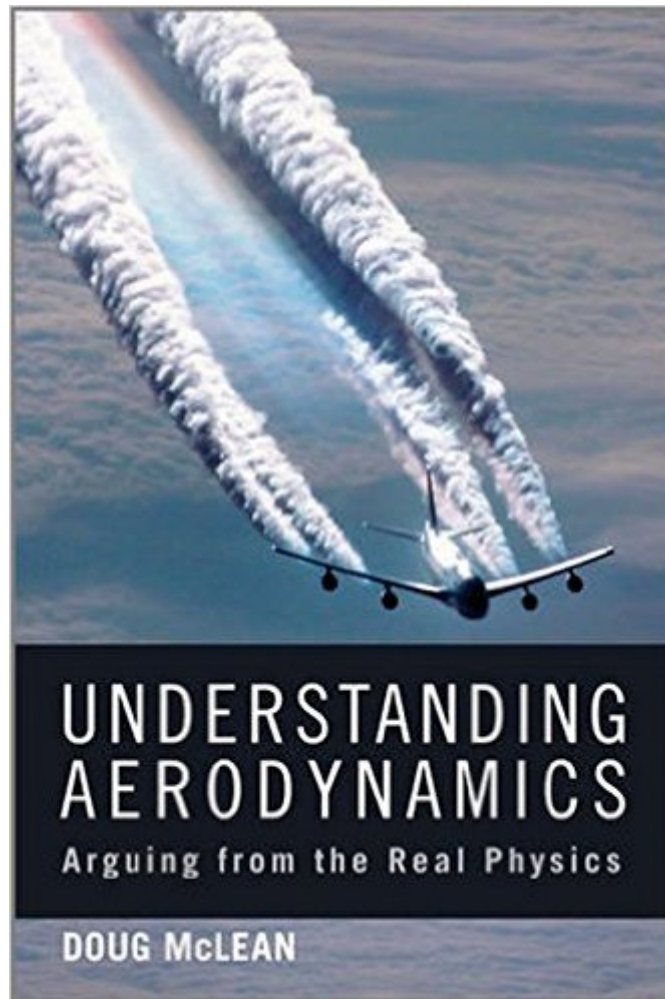


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# Understanding Aerodynamics: Arguing From The Real Physics



## Synopsis

Much-needed, fresh approach that brings a greater insight into the physical understanding of aerodynamics. Based on the author's decades of industrial experience with Boeing, this book helps students and practicing engineers to gain a greater physical understanding of aerodynamics. Relying on clear physical arguments and examples, Mclean provides a much-needed, fresh approach to this sometimes contentious subject without shying away from addressing "real" aerodynamic situations as opposed to the oversimplified ones frequently used for mathematical convenience. Motivated by the belief that engineering practice is enhanced in the long run by a robust understanding of the basics as well as real cause-and-effect relationships that lie behind the theory, he provides intuitive physical interpretations and explanations, debunking commonly-held misconceptions and misinterpretations, and building upon the contrasts provided by wrong explanations to strengthen understanding of the right ones. Provides a refreshing view of aerodynamics that is based on the author's decades of industrial experience yet is always tied to basic fundamentals. Provides intuitive physical interpretations and explanations, debunking commonly-held misconceptions and misinterpretations. Offers new insights to some familiar topics, for example, what the Biot-Savart law really means and why it causes so much confusion, what Reynolds number and incompressible flow really mean, and a real physical explanation for how an airfoil produces lift. Addresses "real" aerodynamic situations as opposed to the oversimplified ones frequently used for mathematical convenience, and omits mathematical details whenever the physical understanding can be conveyed without them.

## Book Information

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## Customer Reviews

Too often aerodynamics has been treated as applied mathematics. This is akin to force the learning of English by committing to memory English grammar rules that the vast majority of native speakers never think about. This has an effect of discouraging anyone but the most unusual students. This book, along with Ed Obert's Aerodynamic design of transport airplane, published in 2009, are important and refreshing in that both are highly informative but not math heavy. Obert's book is one of experience. McLean's book, however, tackles the theory of aerodynamics from a physical point of view. It enhances your understanding of the fundamentals, which is a necessary part of an aerodynamicist's know-how. Only by combining a strong background in theory and all-around experience can an aerodynamicist hope to function in today's highly competitive aircraft manufacturing business. I sincerely recommend this book to people who have long lost hope in a pure mathematical and lifeless approach.

Understanding Aerodynamics is a new approach at explaining why various aerodynamic characteristics take place. Most aerodynamics textbooks use experimental data and theoretical developments to explain aerodynamics, but there are very few equations or theories developed here. The basis is an understanding of the physical mechanisms that lead to lift and drag, which is a refreshing and important contribution. The downside is that the author tends to throw out many classic theories because they can't explain all details of aerodynamics: my response to that is to quote the well-used statement "all theories are wrong, but some are useful." Just because a theory isn't perfect (and none of them are) doesn't mean the theory can't be useful and important. What the author should concentrate on, perhaps, is that we should never confuse our theories with reality, and I think that is an important contribution.

This book, for an aero engineering student, will feel like a light read. Purchase this and put it on your shelf. You will enjoy its coverage of the fundamentals and find yourself referencing it from time to time to clarify things. I don't personally know the author but my colleagues at Boeing speak to his knowledge in the field of aerodynamics. Cited this text several times in my MS thesis.

Very in-depth discussion of the complex interactions in aerodynamics. Difficult to verbalize this subject but Doug McLean does a commendable job!

Great information for those interested in the mechanics of flight. Highly recommended.

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