



## Principles of Modern Radar: Basic Principles

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*Principles of Modern Radar: Basic Principles* is a comprehensive and modern textbook for courses in radar systems and technology at the college senior and graduate student level; a professional training textbook for formal in-house courses for new hires; a reference for ongoing study following a radar short course; and a self-study and professional reference book. *Principles of Modern Radar* focuses on four key areas: Basic concepts, such as the radar range equation and threshold detection; radar signal phenomenology, such as radar cross section models, clutter, atmospheric effects, and Doppler effects; descriptions of all major subsystems of modern radars, such as the antenna, transmitter, receiver, including modern architectural elements such as excitors, and advanced signal processors; and signal and data processing basics, from digital signal processing (DSP) fundamentals, through detection, Doppler processing, waveforms and pulse compression, basic imaging concepts, and tracking fundamentals. While several established books address introductory radar systems, *Principles of Modern Radar* differs from these in its breadth of coverage, its emphasis on current methods (without losing sight of bedrock principles), and its adoption of an appropriate level of quantitative rigor for the intended audience of students and new professional hires. The manuscript for this book was reviewed by over 50 professionals in academia, military, and commercial enterprises. These reviewers were among thousands of potential users approached by the publisher and asked to share their expertise and experience in radar training and instruction. Their extensive comments, corrections, and insights ensure that *Principles of Modern Radar* will meet the needs of modern radar educators and students around the world. Written and edited by world-renowned radar instructors and critically reviewed by users before publication, this is truly a radar community-driven book.

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### Editorial Review

#### Review

This book is unique in that it is written so that people can understand it easily, and quickly. Great pains were taken to make sure that this is not just another radar book to sit on the shelves of a company library or in the home of an engineer who just likes to buy nice books. This one is meant to be used, read, and profited from. Each contributor has given not just his slant on their subject, but has made extra effort to TEACH the material, and there are not many books like that, especially when there are multiple authors. The style is even and clear throughout. I recommend it to new engineers hired to work on radar systems and older ones who need to brush up or learn things they never had a chance to work on in their careers. --Edward Barile, Raytheon Corporation

This is well-written, readable book that covers all the basics in modern radar. It is sure to be the new standard with its breadth of topics and depth of coverage. It can be used as a text book in a beginning radar class, and is equally valuable for the self learner. The modern system approach is particularly helpful in putting the various components of radar in context. I will be using this book in a graduate class on radar." -- David D. Long, Brigham Young University

This should be required reading, and the basis of every undergraduate or industry course, for both future engineers as well as any others working in the field who need a solid introduction to modern radar. It is an easily understandable, yet truly comprehensive, text that is designed from the ground up as a teaching textbook, rather than as a reference handbook. Each chapter includes a set of related problems to test the student's understanding of the material plus a well-organized list of additional suggested readings if the student wants to explore any specific topic in more detail. Answers to selected problems in each chapter are provided in the back of the book and answers to others are intentionally omitted -- an approach that makes this book ideally suited for both a self-taught course as well as for use in a more formal classroom environment. --Marshall Greenspan, Northrop Grumman Corporation

#### From the Back Cover

Below is a list of the volunteer reviewers who dedicated their time and efforts to ensuring that Principles of Modern Radar: Basic Principles meets the needs of instructors and students in industry, the military, and academia.

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Byron Edde, Consultant in Radar and Electronic Warfare Systems

Dr. Marshall Greenspan, Senior Systems Consulting Engineer - Northrop Grumman Corporation

Paul Hennen - SAIC, Beavercreek, OH and Wright State University

Randy Jost - Utah State University

David G. Long, Professor - Brigham Young University

Dr. John M. Milan - Consultant

Simon Watts, Deputy Scientific Director - Thales, UK Aerospace Division

#### REVIEWERS

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Dick Wiley - Syracuse Research Associates (retired)

Ben Winstead, Principal Development Engineer - Honeywell International, Inc.

## About the Author

Mark A. Richards

James A. Scheer has been directly involved radar research and development for over 40 years. He is an instructor in a variety of radar short courses, including Principles of Modern Radar.

## Users Review

### From reader reviews:

#### **David Hernandez:**

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