



# Modern Lens Antennas for Communications Engineering

*By John Thornton, Kao-Cheng Huang*

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**Modern Lens Antennas for Communications Engineering** By John Thornton, Kao-Cheng Huang

The aim of this book is to present the modern design principles and analysis of lens antennas. It gives graduates and RF/Microwave professionals the design insights in order to make full use of lens antennas. Why do we want to write a book in lens antennas? Because this topic has not been thoroughly publicized, its importance is underestimated. As antennas play a key role in communication systems, recent development in wireless communications would indeed benefit from the characteristics of lens antennas: low profile, and low cost etc.

The major advantages of lens antennas are narrow beamwidth, high gain, low sidelobes and low noise temperature. Their structures can be more compact and weigh less than horn antennas and parabolic antennas. Lens antennas with their quasi-optical characteristics, also have low loss, particularly at near millimeter and submillimeter wavelengths where they have particular advantages.

This book systematically conducts advanced and up-to-date treatment of lens antennas.

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## **Editorial Review**

From the Back Cover

### **Lens antennas—why and how they should be used more often in modern communications systems**

This remarkable work provides RF/microwave engineers with complete guidance on how to develop lens antennas, focusing on recent advances in communications engineering where this often overlooked technology is especially useful. It clearly demonstrates the benefits of using lens antennas in modern communication systems, featuring numerous examples, measurement data, fabrication techniques, and real-world applications.

*Modern Lens Antennas for Communications Engineering* explores many types of lens antennas in great detail, from polyrods and low sidelobe antennas to the spherical lens and hemispherical lens-reflector scanning antennas. In addition to design principles and computational techniques, readers will find a host of helpful tips on how to fabricate lens antennas in small batches for assessment, choose the right dielectric material, configure measurement campaigns, and tackle practical issues when constructing antennas and measuring their properties.

The book provides information on:

- Economically coupling a millimeter-wave circuit into a radiating beam whose polarization and shape is tightly controlled
- Utilizing costly spectrum in cellular networks beamed to the ground from platforms high in the upper atmosphere
- Tracking two different satellites from a single terminal on a high-speed train

*Modern Lens Antennas for Communications Engineering* is an excellent resource for RF/microwave engineers, designers, and researchers in academia and industry, and anyone wishing to learn how to take full advantage of lens antennas and their many useful and interesting properties.

### About the Author

**JOHN THORNTON, PhD**, has held research posts at the University of Oxford and the University of York. In 2010, he joined MDA Space and Robotics Ltd to lead their UK antennas program. He has published a number of technical papers, reports, and patent applications, many in the field of antenna engineering.

**KAO-CHENG HUANG, PhD**, is a Fellow of the Institution of Engineering and Technology (IET) UK, Vice President at the Dharma Academy, and President of the Association of Vijnaptimatrata of China in Taiwan. Dr. Huang is the author of two previous books, including *Millimeter Wave Communication Systems* (Wiley-IEEE Press), and holds several patents in the area of millimeter wave antennas.

## **Users Review**

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**Miles Towles:**

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