# Engineering for Advanced Radar and Electromagnetic Spectrum Operations

The nations and their forces are progressing toward a new era of modernization. These technological advancements leave no stone unturned for the dominance of the electromagnetic spectrum. The availability of high computational advanced electronics, modularity, and low cost is providing anyone and everyone a chance to develop and deploy their own electronic warfare system. The use of EM spectrum across all domains targets EM energy for detection, denial, and deception – either to protect or to destruct. Electronic warfare is modern warfare, where the ability to ensure spectrum-wide superiority is one of the biggest determinants of success or failure.

Limited project timelines, tight precision and accuracy, planning, development, deployment, execution, and maintenance all underscore the need for test and measurement. This book is an attempt to highlight the advancements mentioned above, the challenges they invite, and innovative solutions across all stages. The unique customization needs or open platform architectures require similar or higher degrees of flexibility and scalability in test platforms.
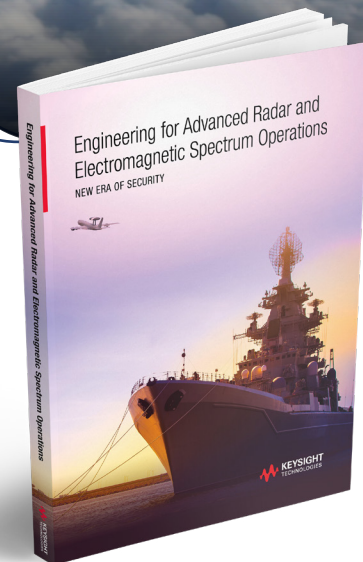
**Available now online.
Download here.**

KEYSIGHT
TECHNOLOGIES

Section 1: Prepare for a New Era of Security Threats

Chapter 1. Introduction & Evolving Challenges in Radar and EW

Understand the broader landscape of evolving EW technology and electromagnetic spectrum operations. This chapter covers various types of EW threats, the cognitive or adaptive nature of these threats, and the role of software and artificial intelligence to analyze the data, electronic intelligence, and countermeasure techniques.

Section 2: Virtual Prototyping using Design Tools

Transformation starts with design and virtual prototypes. This section delves into radar and EW development using model-based engineering techniques, design, simulation, and verification at the component, subsystem, or system level.

Chapter 2. Radar and EW Development Using Model-Based Engineering

Since the inception of radar and EW systems, signal complexity has risen by several orders of magnitude. New technological innovations also have been introduced to realize ever-increasing capabilities. These aspects increase the complexity of the radar and EW systems development lifecycle. Without modern tools and processes, it would be almost impossible to meet today's delivery times and budget requirements. Several big organizations such as Raytheon, Northrop Grumman, Lockheed Martin, Boeing, and others have come together to evolve new methods for radar and EW systems development. Model-Based Engineering (MBE) is one such technique. Learn about a design methodology and flow that are well suited for use in MBE.

Chapter 3. Radar and EW System Design and Interference Analysis

This chapter outlines an example of PathWave System Design (SystemVue) software for performing radar and EW system design and jammer/interferer analysis. Some of the key areas to be discussed include how to implement a radar chirp waveform, design an RF chain for the transmitter and receiver, and perform pulse-compression analysis using Fast Fourier Transform (FFT) based convolution. Finally, the radar system is tested in the presence of unwanted interference and jamming signals to study the impact of such unwanted impairments on radar performance.

More Chapters...Comprehensive Information...

Chapter 4. Simulation and Verification of Pulse Doppler Radar Systems

Chapter 5. Applying Ultra-Wideband Technology in Radar and EW Systems

Chapter 6. Dealing with the Complexity of Phased-Array Systems

Chapter 7. Generating Signals for Radar and EW Design and Verification

Chapter 8. Virtual Flight Testing of Radar System Performance

Download the book at
https://connectlp.keysight.com/
Radar_EW_
Systems_ebook

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

KEYSIGHT
TECHNOLOGIES