

NEW!

Through-the-Wall RADAR IMAGING

Edited by **Moeness G. Amin**
Villanova University, Pennsylvania, USA

Through-the-wall Radar Imaging (TWRI) allows police, fire and rescue personnel, first responders, and defense forces to detect, identify, classify, and track the whereabouts of humans and moving objects. Electromagnetic waves are considered the most effective at achieving this objective, yet advances in this multi-faceted and multi-disciplinary technology require taking phenomenological issues into consideration and must be based on a solid understanding of the intricacies of EM wave interactions with interior and exterior objects and structures.

Providing a broad overview of the myriad factors involved, namely size, weight, mobility, acquisition time, aperture distribution, power, bandwidth, standoff distance, and, most importantly, reliable performance and delivery of accurate information, **Through-the-Wall Radar Imaging** examines this technology from the algorithmic, modeling, experimentation, and system design perspectives. It begins with coverage of the electromagnetic properties of walls and building materials, and discusses techniques in the design of antenna elements and array configurations, beamforming concepts and issues, and the use of antenna array with collocated and distributed apertures.

The book discusses suitable waveforms inverse scattering approaches and the relevance of physical-based model approaches in TWRI. It presents theoretical and experimental research in 3D building tomography using microwave remote sensing, high-frequency asymptotic modeling methods. The chapters also cover synthetic aperture radar (SAR) techniques, impulse radars, airborne radar imaging of multi-floor buildings strategies for target detection, and detection of concealed targets. The book concludes with a discussion of how the Doppler principle can be used to measure motion at a very fine level of detail.

Stressing the multidisciplinary and phenomenological nature of TWRI, the book provides a deep understanding of the challenges of this technology. The breadth and depth of topics covered presents a highly detailed and comprehensive treatment of this potentially life saving technology.

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ISBN: 978-1-4398-1476-5, \$149.95 / £95.00

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FEATURES

- Discusses wall attenuation and dispersion effects in view of angles of incidence and antenna polarization
- Covers wideband, low-profile, and printed antennas, as well as planar/conformal ultrawideband antennas
- Emphasizes the PSF characteristics that result from the use of ultrawideband waveforms
- Examines the design of emerging waveforms to optimize target detection by increasing target-to-noise and clutter ratio with special emphasis of matched illumination-based signature exploitation techniques
- Studies EM wave propagation through walls and shows the dispersion and blurring effects on behind-the-wall target images

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