1. Record Nr. UNINA9910137425903321

Titolo	Doppler radar physiological sensing / / edited by Olga Boric-Lubecke, Victor M. Lubecke, Amy D. Droitcour, Byung-Kwon Park, Aditya Singh
Pubbl/distr/stampa	Hoboken, New Jersey : , : IEEE, Wiley, , [2016] [Piscataqay, New Jersey] : , : IEEE Xplore, , [2016]
ISBN	1-119-07843-1 1-119-07842-3
Descrizione fisica	1 online resource (303 p.)
Collana	Wiley series in biomedical engineering and multi-disciplinary integrated systems
Disciplina	362.11068
Soggetti	Patient monitoring - Equipment and supplies Doppler radar Heart beat
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	List of Contributors xi -- 1 Introduction 1 /Amy D. Droitcour, Olga Boric-Lubecke, Shuhei Yamada, and Victor M. Lubecke -- 1.1 Current Methods of Physiological Monitoring, 2 -- 1.2 Need for Noncontact Physiological Monitoring, 3 -- 1.2.1 Patients with Compromised Skin, 3 -- 1.2.2 Sleep Monitoring, 4 -- 1.2.3 Elderly Monitoring, 5 -- 1.3 Doppler Radar Potential for Physiological Monitoring, 5 -- 1.3.1 Principle of Operation and Power Budget, 6 -- 1.3.2 History of Doppler Radar in Physiological Monitoring, 8 -- References, 16 -- 2 Radar Principles 21 /Ehsan Yavari, Olga Boric-Lubecke, and Shuhei Yamada -- 2.1 Brief History of Radar, 21 -- 2.2 Radar Principle of Operation, 22 -- 2.2.1 Electromagnetic Wave Propagation and Reflection, 23 -- 2.2.2 Radar Cross Section, 24 -- 2.2.3 Radar Equation, 25 -- 2.3 Doppler Radar, 28 -- 2.3.1 Doppler Effect, 28 -- 2.3.2 Doppler Radar Waveforms: CW, FMCW, Pulsed, 29 -- 2.4 Monostatic and Bistatic Radar, 32 -- 2.5 Radar Applications, 35 -- References, 36 -- 3 Physiological Motion and Measurement 39 /Amy D. Droitcour and Olga Boric-Lubecke -- 3.1 Respiratory System Motion, 39 -- 3.1.1 Introduction to the Respiratory System, 39 -- 3.1.2 Respiratory Motion,

Suppression, 224 -- 8.2.1 Interference Cancellation, 226 -- 8.2.2 Bistatic Radar: Sensor Nodes, 231 -- 8.2.3 Passive RF Tags, 240 -- 8.3 Range Detection, 250 -- 8.3.1 Physiological Monitoring with FMCW Radar, 250 -- 8.3.2 Physiological Monitoring with UWB Radar, 251 -- References, 266 -- 9 Applications and Future Research 269 /Aditya Singh and Victor M. Lubecke -- 9.1 Commercial Development, 269 -- 9.1.1 Healthcare, 269 -- 9.1.2 Defense, 272 -- 9.2 Recent Research Areas, 272 -- 9.2.1 Sleep Study, 272 -- 9.2.2 Range, 275 -- 9.2.3 Multiple Subject Detection, 276 -- 9.2.4 Animal Monitoring, 279 -- 9.3 Conclusion, 282 -- References, 282 -- Index 285.

Sommario/riassunto

Presents a comprehensive description of the theory and practical implementation of Doppler radar-based physiological monitoring This book includes an overview of current physiological monitoring techniques and explains the fundamental technology used in remote non-contact monitoring methods. Basic radio wave propagation and radar principles are introduced along with the fundamentals of physiological motion and measurement. Specific design and implementation considerations for physiological monitoring radar systems are then discussed in detail. The authors address current research and commercial development of Doppler radar based physiological monitoring for healthcare and other applications. . Explains pros and cons of different Doppler radar architectures, including CW, FMCW, and pulsed Doppler radar. Discusses nonlinear demodulation methods, explaining dc offset, dc information, center tracking, and demodulation enabled by dc cancellation. Reviews advanced system architectures that address issues of dc offset, spectrum folding, motion interference, and range resolution. Covers Doppler radar physiological measurements demonstrated to date, from basic cardiopulmonary rate extractions to more involved volume assessments Doppler Radar Physiological Sensing serves as a fundamental reference for radar, biomedical, and microwave engineers as well as healthcare professionals interested in remote physiological monitoring methods.