

1. Record Nr.	UNINA9910865262503321
Autore	Wang Hui
Titolo	The Millimeter Wave Synthetic Aperture Radar Technology
Pubbl/distr/stampa	Singapore : , : Springer Singapore Pte. Limited, , 2024 ©2024
ISBN	9789819710447 9789819710430
Edizione	[1st ed.]
Descrizione fisica	1 online resource (368 pages)
Disciplina	621.38485
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Preface -- Contents -- 1 Overview -- 1.1 Principles and Development of SAR -- 1.1.1 Principles of SAR -- 1.1.2 Development of Synthetic Aperture Radar -- 1.2 Millimeter Wave Characteristics -- 1.2.1 Millimeter Wave Atmospheric Propagation Characteristics -- 1.2.2 Millimeter Wave Backscattering Characteristics of Objects -- 1.3 Development of Millimeter Wave SAR Technology -- 1.3.1 Development of Airborne Millimeter Wave SAR Technology -- 1.3.2 Development of Spaceborne Millimeter-Wave SAR Technology -- References -- 2 Continuous Wave Regime Airborne Millimeter Wave Synthetic Aperture Radar Technology -- 2.1 Overview -- 2.2 Airborne FMCW SAR Strip Mode Imaging -- 2.2.1 Airborne FMCW SAR Strip Imaging Model -- 2.2.2 Airborne FMCW SAR Strip Imaging Algorithm -- 2.2.3 Airborne Millimeter Wave FMCW SAR Measured Data Processing -- 2.3 Airborne FMCW SAR Sliding Spotlight Imaging -- 2.3.1 Airborne FMCW SAR Sliding Spotlight Imaging Model -- 2.3.2 Airborne FMCW SAR Sliding Spotlight Mode Imaging Algorithm -- 2.3.3 Airborne Millimeter Wave FMCW SAR Sliding Cluster SAR Real-World Data Processing -- 2.4 W-Band Small Unmanned Aerial Vehicle (UAV) Synthetic Aperture Radar (SAR) High-Resolution Imaging -- 2.4.1 Efficient Real-Time Imaging Algorithm for Small UAV-Based W-Band SAR -- 2.4.2 Design of Real-Time Imaging Processing Based on GPU -- References -- 3 Pulse Regime Airborne Millimeter Wave Synthetic

Aperture Radar -- 3.1 Overview -- 3.2 DBF-SCORE Fundamentals --
3.3 Channel Balanced DBF Processing Method -- 3.4 Airborne
Millimeter Wave DBF SAR Imaging -- 3.4.1 Single Channel Processing
-- 3.4.2 Two-Dimensional Multi-stage Phase Gradient DBF-SCORE
Synthesis -- 3.5 Airborne Millimeter Wave DBF SAR Moving Target
Detection Method -- 3.5.1 Multi-channel Moving Target Detection
Method -- 3.5.2 DBF SAR Moving Target Detection Processing --
References.
4 Ground-Based Millimeter-Wave Inverse Synthetic Aperture Radar
Technology -- 4.1 Overview -- 4.2 W-Band ISAR Echo Modeling --
4.2.1 W-Band ISAR Modeling -- 4.2.2 Echo Signal Processing -- 4.3 W-
Band ISAR Motion Compensation Technology -- 4.3.1 Envelope
Alignment -- 4.3.2 Envelope Regularization Processing -- 4.3.3 Phase
Correction Technology -- 4.4 W-Band ISAR Imaging and Migration
Compensation Technology -- 4.4.1 Conventional Imaging Methods --
4.4.2 Rotational Speed Stabilization Target Imaging Method -- 4.4.3
Imaging Method for Targets with Varying Rotational Speed -- 4.5 W-
Band ISAR Actual Measurement Data Processing -- 4.5.1 Simulation
System and Target Parameters -- 4.5.2 Coherent Processing -- 4.5.3
Envelope Regularization Processing -- 4.5.4 Phase Correction
Simulation Experiment -- 4.5.5 Target Imaging with Stable Rotational
Speed -- 4.5.6 Target Imaging with Changes in Rotational Speed --
References -- 5 Ka-Band Synthetic Aperture Radar Technology
for Continuous Wave Regimes -- 5.1 Overview -- 5.2 Ka-Band FM
Continuous Wave SAR Double Satellite Synchronization -- 5.2.1 Ka-
Band SAR Long-Range Spatial Synchronization Method -- 5.2.2 Time-
Frequency Synchronization Method Based on Signal-To-Transmission
-- 5.2.3 Continuous Wave SAR Heterodyne Phase Synchronization
Method -- 5.3 Double Satellite FM Continuous Wave SAR Strip Imaging
-- 5.3.1 Dual Satellite FM Continuous Wave SAR Echo Modeling -- 5.3.2
RD Imaging Methods -- 5.3.3 Frequency Variable Scale Imaging Method
-- 5.4 FM Continuous Wave SAR High-Resolution Imaging -- 5.4.1
Modeling the Interaction Mechanism Between Walking Correction
and 2D Null-Variance Correction -- 5.4.2 Wave Number Domain
Imaging Method Based on Higher-Order Singular Value Decomposition
-- References -- 6 Ka-Band Synthetic Aperture Radar in the Pulsed
Regime -- 6.1 Overview.
6.2 Pulsed Spaceborne SAR High-Resolution Imaging Processing --
6.2.1 Modeling of Azimuth Multichannel Sliding-Spotlight SAR Echoes
-- 6.2.2 Azimuth Multi-Channel Reconstruction Method -- 6.2.3
Channel Inconsistency Error Correction -- 6.2.4 Three-Step High-
Resolution Imaging Method -- 6.3 Spaceborne Ka-Band SAR
Interorbital Interferometry -- 6.3.1 Principle of InSAR -- 6.3.2
Interferometric Signal Processing Method -- 6.3.3 Ka-Band SAR
Experiment and Data Processing -- 6.4 Spaceborne Ka-Band SAR Along
Track Interferometry -- 6.4.1 Principle of Along Track Interferometry
-- 6.4.2 DBF-SCORE ATI Processing Method -- 6.4.3 ATI Test and Data
Processing -- References -- 7 Millimeter-Wave Synthetic Aperture
Radar Image Application Techniques -- 7.1 Overview -- 7.2 Coherent
Speckle Denoising Based on Trainable Nonlinear Diffusion Model --
7.2.1 Trainable Nonlinear Diffusion Process -- 7.2.2 Optimization-
Based Nonlinear Diffusion Process for Coherent Speckle Denoising --
7.2.3 Coherent Speckle Denoising Experimental Analysis -- 7.3 Object
Detection and Recognition -- 7.3.1 Ship Detection Method Based
on Dual-Parameter Global CFAR -- 7.3.2 Building Object Detection
Method Based on Interferometric Shadows -- 7.4 Inversion of Ocean
Information Based on Millimeter-Wave Synthetic Aperture Radar --
7.4.1 Methods for Sea Surface Current Inversion -- 7.4.2 Sea Surface

Height Inversion Method -- References.
