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Nota di contenuto	3.13 Rx Front-End Block3.13.1 Noise Figure and Noise Temperature; 3.14 Received Power in the Communications System's RF Link; 3.14.1 The Angular Dependencies of the Uplink and Downlink; 3.15 Additional Losses in the Satellite and Antenna; 3.15.1 Additional Losses due to Propagation Effects and the Atmosphere; 3.15.2 Ionospheric Effects -- Scintillation and Polarization Rotation; 3.16 Thermal Noise and the Antenna Noise Temperature; 3.16.1 The Interface between the Antenna and the Communications System; 3.16.2 The Uplink Signal to Noise; 3.17 The SNR Equation and Minimum Detectable Signal. 3.7 Remote Sensing Satellites3.8 Architecture of Satellite Command and Control; 3.9 The Communications Payload Transponder; 3.9.1 Bent- Pipe Transponders; 3.9.2 Digital Transponders; 3.9.3 Regenerative Repeater; 3.10 Satellite Functional Requirements; 3.10.1 Key Performance Concepts: Coverage, Frequency Allocations; 3.10.2 Architecture of the Communications Payload; 3.10.3 Satellite

Communications System Performance Requirements; 3.11 The Satellite Link Equation; 3.12 The Microwave Transmitter Block; 3.12.1 Intercept Point; 3.12.2 Output Backoff; 3.12.3 The Transmit Antenna and EIRP. 2.4 Case Studies: Effects of the Satellite Body on the Radiation Patterns of Antennas 2.5 Summary; Acknowledgments; References; 3 System Architectures of Satellite Communication, Radar, Navigation and Remote Sensing; 3.1 Introduction; 3.2 Elements of Satellite System Architecture; 3.3 Satellite Missions; 3.4 Communications Satellites; 3.4.1 Fixed Satellite Services; 3.4.2 Broadcast Satellite Services (Direct Broadcast Services); 3.4.3 Digital Audio Radio Services; 3.4.4 Direct to Home Broadband Services; 3.4.5 Mobile Communications Services; 3.5 Radar Satellites; 3.6 Navigational Satellites. 1.3.4 Helical Antennas 1.3.5 Printed Antennas; 1.4 Arrays; 1.4.1 Array Configurations; 1.5 Basic Effects of Antennas in the Space Environment; 1.5.1 Multipaction; 1.5.2 Passive Inter-modulation; 1.5.3 Outgassing; References; 2 Space Antenna Modeling; 2.1 Introduction; 2.1.1 Maxwell's Equations; 2.1.2 CEM; 2.2 Methods of Antenna Modeling; 2.2.1 Basic Theory; 2.2.2 Method of Moments; 2.2.3 FEM; 2.2.4 FDTD Method; 2.3 Fast Algorithms for Large Space Antenna Modeling; 2.3.1 Introduction; 2.3.2 MLFMA; 2.3.3 Hierarchical Basis for the FEM. Space Antenna HANDBOOK; Contents; Preface; Acknowledgments; Acronyms; Contributors; 1 Antenna Basics; 1.1 Introduction; 1.2 Antenna Performance Parameters; 1.2.1 Reflection Coefficient and Voltage Standing Wave Ratio; 1.2.2 Antenna Impedance; 1.2.3 Radiation Pattern and Coverage; 1.2.4 Polarization; 1.2.5 Directivity; 1.2.6 Gain and Realized Gain; 1.2.7 Equivalent Isotropically Radiated Power; 1.2.8 Effective Area; 1.2.9 Phase Center; 1.2.10 Bandwidth; 1.2.11 Antenna Noise Temperature; 1.3 Basic Antenna Elements; 1.3.1 Wire Antennas; 1.3.2 Horn Antennas; 1.3.3 Reflectors.

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## Sommario/riassunto

This book addresses a broad range of topics on antennas for space applications. First, it introduces the fundamental methodologies of space antenna design, modelling and analysis as well as the state-of-the-art and anticipated future technological developments. Each of the topics discussed are specialized and contextualized to the space sector. Furthermore, case studies are also provided to demonstrate the design and implementation of antennas in actual applications. Second, the authors present a detailed review of antenna designs for some popular applications such as satellite communications.

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