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Autore	Belous Anatoly
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Nota di contenuto	Space Microelectronics, Volume 1: Modern Spacecraft Classification, Failure, and Electrical Component Requirements; Contents; Preface; Chapter 1 Modern Spacecraft; 1.1 Space Industry Development; 1.2 Classification of Modern Spacecraft; 1.3 Spacecraft Designs and Structures; 1.4 Spacecraft Onboard Systems; 1.4.1 Classification of Spacecraft Onboard Systems; 1.4.2 Peculiarities of Design of Onboard Information Control Complexes with the Use of Programmable Logic Microchips; 1.5 Earth Remote Sensing Spacecraft; 1.5.1 ERS Spacecraft of the Russian Federation and the Republic of Belarus 1.5.2 ERS Spacecraft of Ukraine 1.5.3 ERS Spacecraft of the United States; 1.5.4 ERS Spacecraft of France; 1.5.5 ERS Spacecraft of Japan; 1.5.6 ERS Spacecraft of India; 1.5.7 ERS Spacecraft of China; 1.5.8 ERS Spacecraft of the European Space Agency; 1.5.9 Earth Remote Sensing Spacecraft of Other Countries; 1.6 Earth Remote Sensing Radar Stations; 1.7 The Effect of Space Radiation on SC; 1.8 Micrometeoroid Effect on SC; 1.9 The Problem of Space Debris in Earth Orbit; 1.10 The Use of Microelectronic Technologies for the Development of Space Microrocket Engines 1.11 Military and Special-Purpose Spacecraft 1.11.1 Missile Early-Warning System; 1.11.2 MEWS Ground-Based Echelon; 1.11.3 Phased

Arrays; 1.11.4 MEWS Space Echelon; 1.11.5 Military Reconnaissance Satellites; References; Selected Bibliography; Chapter 2 Launch Vehicle and Spacecraft Failures and Accidents; 2.1 Rocket and Space Technology Safety Issues; 2.2 Analysis of Launch Vehicle Failure Causes; 2.3 Analysis of Spacecraft Failures; 2.4 Analysis of Failure Causes of Rocket and Space Technology Products; 2.5 Trend Analysis of Launch Vehicle Accident Risks in 2000-2009
2.6 Analysis of SC Failure Trends in 2000-2009
2.7 Analysis of LV and SC Accident Causes in 2000-2009; 2.8 Analysis of Computer System and Software Failures; 2.9 Analysis of Onboard System Failures at the International Space Station in 2000s; 2.10 Methods of Ensuring Onboard Equipment Reliability of Spacecraft of Long-Life Operation; References; Chapter 3 Microwave Electronics for Space and Military Applications; 3.1 Basics of Microwave Electronics; 3.2 Structure and Properties of Gallium Arsenide; 3.3 Comparative Characteristics of GaAs and Si Properties
3.4 Microelectronic Devices Based on GaAs
3.4.1 Diodes Based on GaAs;
3.4.2 Field Transistors; 3.5 Heterojunction Bipolar Transistors; 3.6 Optoelectronic Devices on GaAs; 3.6.1 LEDs; 3.6.2 Solar Batteries; 3.7 New Devices on GaAs; 3.8 Condition and Prospects of Development of Monolithic Microwave Integrated Circuits; 3.8.1 Main Spheres of Usage of Monolithic Microwave Integrated Circuits; 3.8.2 Main Materials for MMIC Production; 3.8.3 MMIC Active Elements and Their Reliability; 3.8.4 Advanced MMIC Design and Technology Solutions; 3.9 Basic Areas and Peculiarities of GaAs MMIC Application

Sommario/riassunto

This authoritative first volume provides a solid understanding of modern spacecraft classification, failure, and electrical component requirements. This book focuses on the study of modern spacecraft, including their classification, packaging and protection, design versions, launch failure and accident analysis, and the main requirements of electronic components used. Readers find comprehensive coverage of the design and development of individual components as well as systems, their packaging, and how to make them last in space. This is a useful resource for military and civil applications.

Specific topics include:

- The manufacturing of electronics for space;
- The main physical mechanisms of the impact of destabilizing factors of outer space, including various kinds of radiation, high-energy galactic ions, and particles of cosmic dust;
- The design of advanced space-grade microelectronic products such as memory microcircuits, microprocessors, interface and logic of microcircuits and power control microcircuits;
- Facts and features about the "space race" that have not been available until now.
