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Environments; 2.3 Operational Spacecraft Environments; 2.4 Environmental Effects on Design; 3 DYNAMICS OF SPACECRAFT; 3.1 Introduction; 3.2 Trajectory Dynamics; 3.3 General Attitude Dynamics 3.4 Attitude Motion of Specific Types of Spacecraft 3.5 Oscillatory Modes; 3.6 In Conclusion; Appendix: The Inertia Matrix; 4 CELESTIAL MECHANICS; 4.1 Introduction; 4.2 The Two-body Problem-Particle Dynamics; 4.3 Specifying the Orbit; 4.4 Orbit Perturbations; 4.5 Restricted Three-body Problem; 5 MISSION ANALYSIS; 5.1 Introduction; 5.2 Keplerian Orbit Transfers; 5.3 Mission Analysis; 5.4 Polar LEO/Remote-Sensing Satellites; 5.5 Satellite Constellations; 5.6 Geostationary Earth Orbits (GEO); 5.7 Highly Elliptic Orbits; 5.8 Interplanetary Missions; 6 PROPULSION SYSTEMS; 6.1 Systems Classification 6.2 Chemical Rockets 6.3 Spacecraft Propulsion; 6.4 Electric Propulsion; 7 LAUNCH VEHICLES; 7.1 Introduction; 7.2 Basic Launch Vehicle Performance and Operation; 7.3 Spacecraft Launch Phases and Mission Planning; 7.4 The Ariane 5 Launch Vehicle; 7.5 US Crewed Launch Systems; 7.6 Small Launchers and Reusable Sub-Orbital Vehicles; 7.7 Re-Entry into Earth's Atmosphere; 7.8 Specific Launch Costs and Reliability; 8 SPACECRAFT STRUCTURES; 8.1 Introduction; 8.2 Design Requirements; 8.3 Material Selection; 8.4 Analysis; 8.5 Design Verification; 8.6 Impact Protection; 8.7 Configuration Examples 8.8 The Future of Space Structures 9 ATTITUDE CONTROL; 9.1 Introduction; 9.2 ACS Overview; 9.3 The Spacecraft Attitude Response; 9.4 Torques and Torquers; 9.5 Attitude Measurement; 9.6 ACS Computation; 10 ELECTRICAL POWER SYSTEMS; 10.1 Introduction; 10.2 Power System Elements; 10.3 Primary Power Systems; 10.4 Secondary Power Systems: Batteries; 10.5 Power Management, Distribution and Control; 10.6 Power Budget; 11 THERMAL CONTROL OF SPACECRAFT; 11.1 Introduction; 11.2 The Thermal Environment; 11.3 Thermal Balance; 11.4 Thermal Analysis; 11.5 Thermal Design; 11.6 Thermal Technology 11.7 Thermal Design Verification 11.8 Example of Satellite Thermal Design-XMM/Newton; 12 TELECOMMUNICATIONS; 12.1 Introduction; 12.2 Techniques of Radio Communications; 12.3 The Communications Payload; 12.4 Conclusion; 13 TELEMETRY, COMMAND, DATA HANDLING AND PROCESSING; 13.1 Introduction; 13.2 System Architecture; 13.3 Telemetry Data Formatting; 13.4 Telecommand; 13.5 Communication Techniques and Protocols; 13.6 On-Board Data Handling (OBDH) and Processing; 13.7 Technology; 13.8 Tools and Controlling Documents; 14 GROUND SEGMENT; 14.1 Introduction; 14.2 The Ground Station 14.3 Flight Dynamics

Sommario/riassunto

This fourth edition of the bestselling Spacecraft Systems Engineering title provides the reader with comprehensive coverage of the design of spacecraft and the implementation of space missions, across a wide spectrum of space applications and space science. The text has been thoroughly revised and updated, with each chapter authored by a recognized expert in the field. Three chapters - Ground Segment, Product Assurance and Spacecraft System Engineering - have been rewritten, and the topic of Assembly, Integration and Verification has been introduced as a new chapter, filling a gap in p
