

# Dynamics Modeling And Attitude Control Of A Flexible Space

Eventually, you will definitely discover a extra experience and carrying out by spending more cash. still when? get you receive that you require to acquire those all needs once having significantly cash? Why dont you attempt to acquire something basic in the beginning? Thats something that will guide you to comprehend even more something like the globe, experience, some places, later than history, amusement, and a lot more?

It is your no question own become old to produce a result reviewing habit. in the course of guides you could enjoy now is **Dynamics Modeling And Attitude Control Of A Flexible Space** below.

## **Scientific and Technical Aerospace Reports - 1993**

*NASA Conference Publication - 1990*

### **Spacecraft Dynamics and Control - Yongchun Xie 2021-07-13**

This book presents up-to-date concepts and design methods relating to space dynamics and control, including spacecraft attitude control, orbit control, and guidance, navigation, and control (GNC), summarizing the research advances in control theory and methods and engineering practice from Beijing Institute of Control Engineering over the years. The control schemes and systems based on these achievements have been successfully applied to remote sensing satellites, communication satellites, navigation satellites, new technology test satellites, Shenzhou manned spacecraft, Tianzhou freight spacecraft, Tiangong 1/2 space laboratories, Chang'e lunar explorers, and many other missions. Further, the research serves as a guide for follow-up engineering developments in manned lunar engineering, deep space exploration, and on-orbit service missions.

### **Journal of Guidance, Control, and Dynamics - 2009**

*Flight mechanics estimation theory symposium 1995 - Kathy R. Hartman 1995*

### **Fast Satellite Attitude Maneuver and Control - Dong Ye 2022-08-31**

Fast Satellite Attitude Maneuver and Control introduces the concept of agile satellites and corresponding fast maneuver attitude control systems, systematically and comprehensively presenting recent research results of fast maneuver attitude control for agile satellites by using advanced nonlinear control techniques. This reference book focuses on modeling and attitude control, considering different actuator combinations, actuator installation deviation, actuator fault, and flexible appendage coupling effect for agile satellites. The book provides a unified platform for understanding and applicability of agile satellites fast maneuverer and stabilization control for different purposes. It will be an excellent resource for researchers working on spacecraft design, nonlinear control systems, vehicle systems and complex control systems. Unifies existing and emerging concepts concerning nonlinear control theory, fault tolerant, and attitude control for agile satellites Provides a series of the latest results, including, but not limited to, fast maneuverer and stabilization control, hybrid actuator control, nonlinear attitude control, fault tolerant control, and active vibration suppression towards agile satellites Comprehensively captures recent advances of theory, technological aspects and applications of fast maneuverer and stabilization control in agile satellites Addresses research problems in each chapter, along with numerical and simulation results that reflect engineering practice and demonstrate the focus of developed analysis and synthesis approaches Contains comprehensive, up-to-date references, which play an indicative role for further study

### **Space Station Systems - 1986**

### **Tethered Space Robot - Panfeng Huang 2017-11-06**

Tethered Space Robot: Dynamics, Measurement, and Control discusses a novel tethered space robot (TSR) system that contains the space platform, flexible tether and gripper. TSR can capture and remove non-cooperative targets such as space debris. It is the first time the concept has been described in a book, which

describes the system and mission design of TSR and then introduces the latest research on pose measurement, dynamics and control. The book covers the TSR system, from principle to applications, including a complete implementing scheme. A useful reference for researchers, engineers and students interested in space robots, OOS and debris removal. Provides for the first time comprehensive coverage of various aspects of tethered space robots (TSR) Presents both fundamental principles and application technologies including pose measurement, dynamics and control Describes some new control techniques, including a coordinated control method for tracking optimal trajectory, coordinated coupling control and coordinated approaching control using mobile tether attachment points

### **Space Vehicle Dynamics and Control - Bong Wie 1998**

A textbook that incorporates the latest methods used for the analysis of spacecraft orbital, attitude, and structural dynamics and control. Spacecraft dynamics is treated as a dynamic system with emphasis on practical applications, typical examples of which are the analysis and redesign of the pointing control system of the Hubble Space Telescope and the analysis of an active vibrations control for the COFS (Control of Flexible Structures) Mast Flight System. In addition to the three subjects mentioned above, dynamic systems modeling, analysis, and control are also discussed. Annotation copyrighted by Book News, Inc., Portland, OR

### **Government Reports Announcements & Index - 1988**

### **Technology for Large Space Systems - 1988**

### **Geometric Mechanics and Its Applications - Weipeng Hu 2023-01-01**

To make the content of the book more systematic, this book mainly briefs some related basic knowledge reported by other monographs and papers about geometric mechanics. The main content of this book is based on the last 20 years' jobs of the authors. All physical processes can be formulated as the Hamiltonian form with the energy conservation law as well as the symplectic structure if all dissipative effects are ignored. On the one hand, the important status of the Hamiltonian mechanics is emphasized. On the other hand, a higher requirement is proposed for the numerical analysis on the Hamiltonian system, namely the results of the numerical analysis on the Hamiltonian system should reproduce the geometric properties of which, including the first integral, the symplectic structure as well as the energy conservation law.

### **Spacecraft Modeling, Attitude Determination, and Control - Yaguang Yang 2019-02-06**

This book discusses all spacecraft attitude control-related topics: spacecraft (including attitude measurements, actuator, and disturbance torques), modeling, spacecraft attitude determination and estimation, and spacecraft attitude controls. Unlike other books addressing these topics, this book focuses on quaternion-based methods because of its many merits. The book lays a brief, but necessary background on rotation sequence representations and frequently used reference frames that form the foundation of spacecraft attitude description. It then discusses the fundamentals of attitude determination using vector measurements, various efficient (including very recently developed) attitude determination algorithms, and the instruments and methods of popular vector measurements. With available attitude measurements, attitude control designs for inertial point and nadir pointing are presented in terms of

required torques which are independent of actuators in use. Given the required control torques, some actuators are not able to generate the accurate control torques, therefore, spacecraft attitude control design methods with achievable torques for these actuators (for example, magnetic torque bars and control moment gyros) are provided. Some rigorous controllability results are provided. The book also includes attitude control in some special maneuvers, such as orbital-raising, docking and rendezvous, that are normally not discussed in similar books. Almost all design methods are based on state-spaced modern control approaches, such as linear quadratic optimal control, robust pole assignment control, model predictive control, and gain scheduling control. Applications of these methods to spacecraft attitude control problems are provided. Appendices are provided for readers who are not familiar with these topics.

*Fault Diagnosis of Nonlinear Systems Using a Hybrid Approach* - Ehsan Sobhani-Tehrani 2009-06-22

The increasing complexity of space vehicles such as satellites, and the cost reduction measures that have affected satellite operators are increasingly driving the need for more autonomy in satellite diagnostics and control systems. Current methods for detecting and correcting anomalies onboard the spacecraft as well as on the ground are primarily manual and labor intensive, and therefore, tend to be slow. Operators inspect telemetry data to determine the current satellite health. They use various statistical techniques and models, but the analysis and evaluation of the large volume of data still require extensive human intervention and expertise that is prone to error. Furthermore, for spacecraft and most of these satellites, there can be potentially unduly long delays in round-trip communications between the ground station and the satellite. In this context, it is desirable to have onboard fault-diagnosis system that is capable of detecting, isolating, identifying or classifying faults in the system without the involvement and intervention of operators. Toward this end, the principle goal here is to improve the efficiency, accuracy, and reliability of the trend analysis and diagnostics techniques through utilization of intelligent-based and hybrid-based methodologies.

*Analytical Mechanics of Space Systems* - Hanspeter Schaub 2003

**Stardust Final Conference** - Massimiliano Vasile 2018-02-10  
Space debris and asteroid impacts pose a very real, very near-term threat to Earth. In order to help study and mitigate these risks, the Stardust program was formed in 2013. This training and research network was devoted to developing and mastering techniques such as removal, deflection, exploitation, and tracking. This book is a collection of many of the topics addressed at the Final Stardust Conference, describing the latest in asteroid monitoring and how engineering efforts can help us reduce space debris. It is a selection of studies bringing together specialists from universities, research institutions, and industry, tasked with the mission of pushing the boundaries of space research with innovative ideas and visionary concepts. Topics covered by the Symposium: Orbital and Attitude Dynamics Modeling Long Term Orbit and Attitude Evolution Particle Cloud Modeling and Simulation Collision and Impact Modelling and Simulation, Re-entry Modeling and Simulation Asteroid Origins and Characterization Orbit and Attitude Determination Impact Prediction and Risk Analysis, Mission Analysis-Proximity Operations, Active Removal/Deflection Control Under Uncertainty, Active Removal/Deflection Technologies, and Asteroid Manipulation

**Rigid-Flexible Coupling Dynamics and Control of Flexible Spacecraft with Time-Varying Parameters** - Jie Wang 2021-09-15

This book presents the dynamic modeling and attitude control of flexible spacecraft with time-varying parameters. The dynamic characteristics, vibration control methods and attitude stabilization methods for spacecraft are systematically studied in respects of the theoretical modeling, numerical simulation and the ground experiment. Three active control theories in complex mode space are presented for flexible space structures. Optimal slew strategies based on variable amplitudes input shaping methods and coupling control methods are proposed for stabilization of flexible spacecraft. The research provides an

important way to solve the problem of high-precision attitude control of flexible spacecraft with time-varying parameters. This book is appropriate for the researchers who focus on the multi-body dynamics, attitude and vibration control of flexible spacecraft.

*Spacecraft Dynamics and Control* - Marcel J. Sidi 2000-07-03  
Satellites are used increasingly in telecommunications, scientific research, surveillance, and meteorology, and these satellites rely heavily on the effectiveness of complex onboard control systems. This 1997 book explains the basic theory of spacecraft dynamics and control and the practical aspects of controlling a satellite. The emphasis throughout is on analyzing and solving real-world engineering problems. For example, the author discusses orbital and rotational dynamics of spacecraft under a variety of environmental conditions, along with the realistic constraints imposed by available hardware. Among the topics covered are orbital dynamics, attitude dynamics, gravity gradient stabilization, single and dual spin stabilization, attitude maneuvers, attitude stabilization, and structural dynamics and liquid sloshing.

*Infrared Horizon Sensor Modeling for Attitude Determination and Control* - 1985

*Proceedings of 2020 Chinese Intelligent Systems Conference* - Yingmin Jia 2020-09-23

The book focuses on new theoretical results and techniques in the field of intelligent systems and control. It provides in-depth studies on a number of major topics such as Multi-Agent Systems, Complex Networks, Intelligent Robots, Complex System Theory and Swarm Behavior, Event-Triggered Control and Data-Driven Control, Robust and Adaptive Control, Big Data and Brain Science, Process Control, Intelligent Sensor and Detection Technology, Deep learning and Learning Control Guidance, Navigation and Control of Flight Vehicles and so on. Given its scope, the book will benefit all researchers, engineers, and graduate students who want to learn about cutting-edge advances in intelligent systems, intelligent control, and artificial intelligence.

*Advances in Solar Sailing* - Malcolm Macdonald 2014-02-03

This book presents the best contributions of the the Third International Symposium on Solar Sailing Glasgow, 11 - 13 June 2013. It is a rapid snap-shot of the state-of-the art of solar sail technology in 2013 across the globe, capturing flight programs, technology development programs and new technology and application concepts. The book contains contributions from all of the leading figures in the field, including NASA, JAXA, ESA & DLR as well as university and industry experts. It therefore provides a unique reference point for the solar sail technology. The book also includes key contributions from the prospective users of solar sail technology, which will allow the technology to be considered by the user in this unique context.

**Rigid Body Dynamics for Space Applications** - Vladimir S Aslanov 2017-04-22

Rigid Body Dynamics for Space Applications explores the modern problems of spaceflight mechanics, such as attitude dynamics of re-entry and space debris in Earth's atmosphere; dynamics and control of coaxial satellite gyrostats; deployment, dynamics, and control of a tether-assisted return mission of a re-entry capsule; and removal of large space debris by a tether tow. Most space systems can be considered as a system of rigid bodies, with additional elastic and viscoelastic elements and fuel residuals in some cases. This guide shows the nature of the phenomena and explains the behavior of space objects. Researchers working on spacecraft attitude dynamics or space debris removal as well as those in the fields of mechanics, aerospace engineering, and aerospace science will benefit from this book. Provides a complete treatise of modeling attitude for a range of novel and modern attitude control problems of spaceflight mechanics Features chapters on the application of rigid body dynamics to atmospheric re-entries, tethered assisted re-entry, and tethered space debris removal Shows relatively simple ways of constructing mathematical models and analytical solutions describing the behavior of very complex material systems Uses modern methods of regular and chaotic dynamics to obtain results

**Spacecraft Dynamics and Control** - Enrico Canuto 2018-03-08  
Spacecraft Dynamics and Control: The Embedded Model Control Approach provides a uniform and systematic way of approaching space engineering control problems from the standpoint of model-based control, using state-space equations as the key paradigm for simulation, design and implementation. The book introduces the Embedded Model Control methodology for the design and implementation of attitude and orbit control systems. The logic architecture is organized around the embedded model of the spacecraft and its surrounding environment. The model is compelled to include disturbance dynamics as a repository of the uncertainty that the control law must reject to meet attitude and orbit requirements within the uncertainty class. The source of the real-time uncertainty estimation/prediction is the model error signal, as it encodes the residual discrepancies between spacecraft measurements and model output. The embedded model and the uncertainty estimation feedback (noise estimator in the book) constitute the state predictor feeding the control law. Asymptotic pole placement (exploiting the asymptotes of closed-loop transfer functions) is the way to design and tune feedback loops around the embedded model (state predictor, control law, reference generator). The design versus the uncertainty class is driven by analytic stability and performance inequalities. The method is applied to several attitude and orbit control problems. The book begins with an extensive introduction to attitude geometry and algebra and ends with the core themes: state-space dynamics and Embedded Model Control. Fundamentals of orbit, attitude and environment dynamics are treated giving emphasis to state-space formulation, disturbance dynamics, state feedback and prediction, closed-loop stability. Sensors and actuators are treated giving emphasis to their dynamics and modelling of measurement errors. Numerical tables are included and their data employed for numerical simulations. Orbit and attitude control problems of the European GOCE mission are the inspiration of numerical exercises and simulations. The suite of the attitude control modes of a GOCE-like mission is designed and simulated around the so-called mission state predictor. Solved and unsolved exercises are included within the text - and not separated at the end of chapters - for better understanding, training and application. Simulated results and their graphical plots are developed through MATLAB/Simulink code.

**Proceedings of 2013 Chinese Intelligent Automation**

**Conference** - Zengqi Sun 2013-07-10

Proceedings of the 2013 Chinese Intelligent Automation Conference presents selected research papers from the CIAC'13, held in Yangzhou, China. The topics include e.g. adaptive control, fuzzy control, neural network based control, knowledge based control, hybrid intelligent control, learning control, evolutionary mechanism based control, multi-sensor integration, failure diagnosis, and reconfigurable control. Engineers and researchers from academia, industry, and government can gain an inside view of new solutions combining ideas from multiple disciplines in the field of intelligent automation. Zengqi Sun and Zhidong Deng are professors at the Department of Computer Science, Tsinghua University, China.

Flight Mechanics/Estimation Theory Symposium 1990 - 1990

**Advances in Spacecraft Attitude Control** - Timothy Sands 2020-01-15

Spacecraft attitude maneuvers comply with Euler's moment equations, a set of three nonlinear, coupled differential equations. Nonlinearities complicate the mathematical treatment of the seemingly simple action of rotating, and these complications lead to a robust lineage of research. This book is meant for basic scientifically inclined readers, and commences with a chapter on the basics of spaceflight and leverages this remediation to reveal very advanced topics to new spaceflight enthusiasts. The topics learned from reading this text will prepare students and faculties to investigate interesting spaceflight problems in an era where cube satellites have made such investigations attainable by even small universities. It is the fondest hope of the editor and authors that readers enjoy this book.

**Control of Spacecraft and Aircraft** - Arthur E. Bryson Jr. 2015-11-03

Here a leading researcher provides a comprehensive treatment of

the design of automatic control logic for spacecraft and aircraft. In this book Arthur Bryson describes the linear-quadratic-regulator (LQR) method of feedback control synthesis, which coordinates multiple controls, producing graceful maneuvers comparable to those of an expert pilot. The first half of the work is about attitude control of rigid and flexible spacecraft using momentum wheels, spin, fixed thrusters, and gimballed engines. Guidance for nearly circular orbits is discussed. The second half is about aircraft attitude and flight path control. This section discusses autopilot designs for cruise, climb-descent, coordinated turns, and automatic landing. One chapter deals with controlling helicopters near hover, and another offers an introduction to the stabilization of aeroelastic instabilities. Throughout the book there is a strong emphasis on the mathematical modeling necessary for designing a good feedback control system. The appendixes summarize analysis of linear dynamic systems, synthesis of analog and digital feedback control, simulation, and modeling of flexible vehicles.

**Spacecraft Attitude Dynamics** - Peter C. Hughes 2012-05-23

Comprehensive coverage includes environmental torques, energy dissipation, motion equations for four archetypical systems, orientation parameters, illustrations of key concepts with on-orbit flight data, and typical engineering hardware. 1986 edition.

Spacecraft Attitude Dynamics and Control - Vladimir A. Chobotov 1991

Written for aerospace engineering courses of senior undergraduate or graduate level, this work presents basic concepts, methods and mathematical developments in spacecraft attitude dynamics and control. Topics covered include rigid body dynamics, environmental effects and linear control theory.

**Large Space Structures & Systems in the Space Station Era** - 1991

*Atmospheric and Space Flight Dynamics* - Ashish Tewari 2007-05-08

This book offers a unified presentation that does not discriminate between atmospheric and space flight. It demonstrates that the two disciplines have evolved from the same set of physical principles and introduces a broad range of critical concepts in an accessible, yet mathematically rigorous presentation. The book presents many MATLAB and Simulink-based numerical examples and real-world simulations. Replete with illustrations, end-of-chapter exercises, and selected solutions, the work is primarily useful as a textbook for advanced undergraduate and beginning graduate-level students.

**Model Free Adaptive Control** - Zhongsheng Hou 2013-09-24

Model Free Adaptive Control: Theory and Applications summarizes theory and applications of model-free adaptive control (MFAC). MFAC is a novel adaptive control method for the unknown discrete-time nonlinear systems with time-varying parameters and time-varying structure, and the design and analysis of MFAC merely depend on the measured input and output data of the controlled plant, which makes it more applicable for many practical plants. This book covers new concepts, including pseudo partial derivative, pseudo gradient, pseudo Jacobian matrix, and generalized Lipschitz conditions, etc.; dynamic linearization approaches for nonlinear systems, such as compact-form dynamic linearization, partial-form dynamic linearization, and full-form dynamic linearization; a series of control system design methods, including MFAC prototype, model-free adaptive predictive control, model-free adaptive iterative learning control, and the corresponding stability analysis and typical applications in practice. In addition, some other important issues related to MFAC are also discussed. They are the MFAC for complex connected systems, the modularized controller designs between MFAC and other control methods, the robustness of MFAC, and the symmetric similarity for adaptive control system design. The book is written for researchers who are interested in control theory and control engineering, senior undergraduates and graduated students in engineering and applied sciences, as well as professional engineers in process control.

**Fault-Tolerant Attitude Control of Spacecraft** - Qinglei Hu 2021-06-18

Fault-Tolerant Attitude Control of Spacecraft presents the

fundamentals of spacecraft fault-tolerant attitude control systems, along with the most recent research and advanced, nonlinear control techniques. This book gives researchers a self-contained guide to the complex tasks of envisaging, designing, implementing and experimenting by presenting designs for integrated modeling, dynamics, fault-tolerant attitude control, and fault reconstruction for spacecraft. Specifically, the book gives a full literature review and presents preliminaries and mathematical models, robust fault-tolerant attitude control, fault-tolerant attitude control with actuator saturation, velocity-free fault tolerant attitude control, finite-time fault-tolerant attitude tracking control, and active fault-tolerant attitude control.

Finally, the book looks at the future of this interesting topic, offering readers a one-stop solution for those working on fault-tolerant attitude control for spacecraft. Presents the fundamentals of fault-tolerant attitude control systems for spacecraft in one practical solution Gives the latest research and thinking on nonlinear attitude control, fault tolerant control, and reliable attitude control Brings together concepts in fault control theory, fault diagnosis, and attitude control for spacecraft Covers advances in theory, technological aspects, and applications in spacecraft Presents detailed numerical and simulation results to assist engineers Offers a clear, systematic reference on fault-tolerant control and attitude control for spacecraft

**Spacecraft Modeling, Attitude Determination, and Control** - Yaguang Yang 2019-02-06

This book discusses all spacecraft attitude control-related topics: spacecraft (including attitude measurements, actuator, and disturbance torques), modeling, spacecraft attitude determination and estimation, and spacecraft attitude controls. Unlike other books addressing these topics, this book focuses on quaternion-based methods because of its many merits. The book lays a brief, but necessary background on rotation sequence representations and frequently used reference frames that form the foundation of spacecraft attitude description. It then discusses the fundamentals of attitude determination using vector measurements, various efficient (including very recently developed) attitude determination algorithms, and the instruments and methods of popular vector measurements. With available attitude measurements, attitude control designs for inertial point and nadir pointing are presented in terms of required torques which are independent of actuators in use. Given the required control torques, some actuators are not able to generate the accurate control torques, therefore, spacecraft attitude control design methods with achievable torques for these actuators (for example, magnetic torque bars and control moment gyros) are provided. Some rigorous controllability results are provided. The book also includes attitude control in some special maneuvers, such as orbital-raising, docking and rendezvous, that are normally not discussed in similar books. Almost all design methods are based on state-spaced modern control approaches, such as linear quadratic optimal control, robust pole assignment control, model predictive control, and gain scheduling control. Applications of these methods to spacecraft attitude control problems are provided. Appendices are provided for readers who are not familiar with these topics.

Large Space Structures & Systems in the Space Station Era - 1991

Fundamentals of Spacecraft Attitude Determination and Control - F. Landis Markley 2014-05-31

This book explores topics that are central to the field of spacecraft attitude determination and control. The authors provide rigorous theoretical derivations of significant algorithms accompanied by a generous amount of qualitative discussions of the subject matter. The book documents the development of the important concepts and methods in a manner accessible to practicing engineers, graduate-level engineering students and applied mathematicians. It includes detailed examples from actual mission designs to help ease the transition from theory to practice and also provides prototype algorithms that are readily available on the author's website. Subject matter includes both theoretical derivations and practical implementation of spacecraft attitude determination and control systems. It provides detailed derivations for attitude kinematics and dynamics and provides

detailed description of the most widely used attitude parameterization, the quaternion. This title also provides a thorough treatise of attitude dynamics including Jacobian elliptical functions. It is the first known book to provide detailed derivations and explanations of state attitude determination and gives readers real-world examples from actual working spacecraft missions. The subject matter is chosen to fill the void of existing textbooks and treatises, especially in state and dynamics attitude determination. MATLAB code of all examples will be provided through an external website.

**Space Station Systems** - 1990

**Spacecraft Attitude Control** - Chuang Liu 2022-02-14

Spacecraft Attitude Control: A Linear Matrix Inequality Approach solves problems for spacecraft attitude control systems using convex optimization, and more specifically, through a linear matrix inequalities approach (LMI). High-precision pointing and improved robustness in the face of external disturbances and other uncertainties are requirements for the current generation of spacecraft. The title develops an LMI approach to spacecraft attitude control and shows that all uncertainties in the maneuvering process can be solved numerically. The book develops a wide variety of novel and robust controllers, applicable both to spacecraft attitude control and easily extendible to second-order systems. This title introduces spacecraft attitude control and robust systems, giving an extensive survey of current research and helping researchers improve robust control performance. Considers the control requirements of modern spacecraft Presents rigid and flexible spacecraft control systems with inherent mathematic uncertainties that lead to a model-like state-space Develops a variety of novel and robust controllers directly applicable to spacecraft control and extendible to other second-order systems Includes a systematic survey of recent research in spacecraft attitude control

**Modeling and Simulation of Aerospace Vehicle Dynamics** - Peter H. Zipfel 2000

A textbook for an advanced undergraduate course in which Zipfel (aerospace engineering, U. of Florida) introduces the fundamentals of an approach to, or step in, design that has become a field in and of itself. The first part assumes an introductory course in dynamics, and the second some specialized knowledge in subsystem technologies. Practicing engineers in the aerospace industry, he suggests, should be able to cover the material without a tutor. Rather than include a disk, he has made supplementary material available on the Internet. Annotation copyrighted by Book News, Inc., Portland, OR

**Spacecraft Attitude Determination and Control** - J.R. Wertz 2012-12-06

Roger D. Werking Head, Attitude Determination and Control Section National Aeronautics and Space Administration/ Goddard Space Flight Center Extensive work has been done for many years in the areas of attitude determination, attitude prediction, and attitude control. During this time, it has been difficult to obtain reference material that provided a comprehensive overview of attitude support activities. This lack of reference material has made it difficult for those not intimately involved in attitude functions to become acquainted with the ideas and activities which are essential to understanding the various aspects of spacecraft attitude support. As a result, I felt the need for a document which could be used by a variety of persons to obtain an understanding of the work which has been done in support of spacecraft attitude objectives. It is believed that this book, prepared by the Computer Sciences Corporation under the able direction of Dr. James Wertz, provides this type of reference. This book can serve as a reference for individuals involved in mission planning, attitude determination, and attitude dynamics; an introductory textbook for students and professionals starting in this field; an information source for experimenters or others involved in spacecraft-related work who need information on spacecraft orientation and how it is determined, but who have neither the time nor the resources to pursue the varied literature on this subject; and a tool for encouraging those who could expand this discipline to do so, because much remains to be done to satisfy future needs.