Dynamics Of Atmospheric Re Entry

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Atmosphere, Ocean and Climate Dynamics - John Marshall 2007-12-19
For advanced undergraduate and beginning graduate students in atmospheric, oceanic, and climate science, Atmosphere, Ocean and Climate Dynamics is an introductory textbook on the circulations of the atmosphere and ocean and their interaction, with an emphasis on global scales. It will give students a good grasp of what the atmosphere and oceans look like on the large-scale and why they look that way. The role of the oceans in climate and paleoclimate is also discussed. The combination of observations, theory and

accompanying illustrative laboratory experiments sets this text apart by making it accessible to students with no prior training in meteorology or oceanography. * Written at a mathematical level that is appealing for undergraduates and beginning graduate students * Provides a useful educational tool through a combination of observations and laboratory demonstrations which can be viewed over the web * Contains instructions on how to reproduce the simple but informative laboratory experiments * Includes copious problems (with sample answers) to help students learn the material.

Applied Mechanics Reviews - 1973

Aerodynamic Data of Space Vehicles - Claus Weiland 2014-02-22

The capacity and quality of the atmospheric flight performance of space flight vehicles is characterized by their aerodynamic data bases. A complete aerodynamic data base would encompass the coefficients of the static longitudinal and lateral motions and the related dynamic coefficients. In this book the aerodynamics of 27 vehicles are considered. Only a few of them did really fly. Therefore the aerodynamic data bases are often not complete, in particular when the projects or programs were more or less abruptly stopped, often due to political decisions. Configurational design studies or the development of demonstrators usually happen with reduced or incomplete aerodynamic data sets. Therefore some data sets base just on the application of one of the following tools: semi-empirical design methods, wind tunnel tests, numerical simulations. In so far a high percentage of the data presented is incomplete and would have to be verified.

Flight mechanics needs the aerodynamic coefficients as function of a lot of variables. The allocation of the aerodynamic coefficients for a particular flight operation at a specific trajectory point is conducted by an aerodynamic model. The establishment of such models is described in this book. This book is written for graduate and doctoral students to give them insight into the aerodynamics of the various flight configurations. Further for design and development engineers in industry and at research institutes (including universities) searching for an appropriate vehicle shape, as well as for non-specialists, who may be interested in this subject. The book will be helpful, too, in the case that system studies require in their concept phases the selection of suitable vehicle shapes.

Hypersonic and Planetary Entry Flight Mechanics - Nguyen X. Vinh 1980-01-01

OPTIROB 2013 - Adrian Olaru 2013-07-15
The main objective for this collection of 80 peer reviewed papers was to provide a platform for researchers, engineers, academicians as well as industrial professionals to present their latest experiences and developments activities in the field of Smart Systems and their Applications in Aerospace, Robotics, Mechanical Engineering, Manufacturing Systems, Biomechatronics and Neurorehabilitation.

Monthly Catalog of United States Government Publications, Cumulative Index - United States. Superintendent of Documents 1970

Space Debris - Heiner Klinkrad 2006-09-01
The future evolution of the debris environment will be

forecast on the basis of traffic models and possible hazard mitigation practices. The text shows how large trackable objects will have re-entry pinpointed and predictions made on related risk assessment for possible ground impact. Models will also be described for meteoroids which are also a prevailing risk.

Proceedings of the International Conference on Aerospace System Science and Engineering 2019 - Zhongliang Jing 2020-02-29

This book presents the proceedings of the International Conference on Aerospace System Science and Engineering (ICASSE 2019), held in Toronto, Canada, on July 30–August 1, 2019, and jointly organized by the University of Toronto Institute for Aerospace Studies (UTIAS) and the Shanghai Jiao Tong University School of Aeronautics and Astronautics. ICASSE 2019 provided a forum that brought together experts on aeronautics and astronautics to share new ideas and findings. These proceedings present high-quality contributions in the areas of aerospace system science and engineering, including topics such as trans-space vehicle system design and integration, air vehicle systems, space vehicle systems, near-space vehicle systems, aerospace robotics and unmanned systems, communication, navigation and surveillance, aerodynamics and aircraft design, dynamics and control, aerospace propulsion, avionics systems, optoelectronic systems, and air traffic management.

Safety Design for Space Operations - Paul D. Wilde 2013-03-24

From the beginning of humankind’s use of space, human-made objects have re-entered the Earth’s atmosphere and experienced the severe aerodynamic heating and loads characteristic of high-

speed atmospheric re-entry. Some of these reentries have generated fragments that survived to impact the Earth's surface and be hazardous to people and damaging to property. This chapter addresses the safety of both broad types of space hardware re-entries: either controlled so impact is targeted in a specific area, or uncontrolled, where re-entry can occur anywhere within the latitude band defined by the orbital inclination of the reentering object. The overall objective of this chapter is to help prepare safety engineers to answer the ultimate questions involved in the design of safety re-entry operations. Re-Entry Aerodynamics - Wilbur L. Hankey 1988

Computational Space Flight Mechanics - Claus Weiland 2010-06-29 Themechanicsofspace?ightis an olddiscipline.Itstopicoriginal lywasthemotion of planets, moons and other celestial bodies in gravitational ?elds. Kepler's (1571 - 1630) observations and measurements have led to probably the ?rst mathematical description of planet's motion. Newton (1642 - 1727) gave then, with the devel- ment of his principles of mechanics, the physical explanation of these motions. Since then man has started in the second half of the 20th centuryto capture ph- ically the Space in the sense that he did develop arti?cial celestial bodies, which he brought into Earth's orbits, like satellites or space stations, or which he did send to planets or moons of our planetary system, like probes, or by which p- ple were brought to the moon and back, like capsules. Further he developed an advanced space transportation system, the U.S. Space Shuttle Orbiter, which is the only winged space vehicle ever in operation. In the last two

and a half decades there were several activities in the world in order to succeed the U.S. Orbiter, like the HERMES project in Europe, the HOPE project in Japan, the X-33, X-34 and X-37 studies and demonstrators in the United States and the joint U.S. - European project X-38. However, all these projects were cancelled. The motion of these vehicles can be described by Newton's equation of motion.

Occupational Outlook Handbook - United States. Bureau of Labor Statistics 1976

Radiation and Reentry - S. S. Penner 1968

Optimal Trajectories in Atmospheric Flight - Nguyen Vinh 2012-12-02 Optimal Trajectories in Atmospheric Flight deals with the optimization of trajectories in atmospheric flight. The book begins with a simple treatment of functional optimization followed by a discussion of switching theory. It then presents the derivation of the general equations of motion along with the basic knowledge in aerodynamics and propulsion necessary for the analysis of atmospheric flight trajectories. It goes on to the study of optimal trajectories by providing the general properties of the optimal aerodynamic controls and the integrals of motion. This is followed by discussions of high subsonic and supersonic flight, and approximation techniques to reduce the order of the problem for a fast computation of the optimal trajectory. The final chapters present analyses of optimal reentry trajectories and orbital maneuvers. This book is intended as a reference text for scientists and engineers wanting to get into the subject of optimal trajectories in atmospheric flight. If used for teaching purposes, the book is written in a self-

contained way so that a selective use of the material is at the discretion of the lecturer. The first 11 chapters are sufficient for a one-semester course with emphasis on optimal maneuvers of high performance aircraft.
Dynamics of Atmospheric Re-entry - 1993

Re-entry and Planetary Entry Physics and Technology - W.H.T. Loh 2013-11-11
During the last decade, a rapid growth of knowledge in the field of re-entry and planetary entry has resulted in many significant advances useful to the student, engineer and scientist. The purpose of offering this course is to make available to them these recent significant advances in physics and technology. Accordingly, this course is organized into five parts: Part 1, Entry Dynamics, Thermodynamics, Physics and Radiation; Part 2, Entry Abla tion and Heat Transfer; Part 3, Entry Experimentation; Part 4, Entry Concepts and Technology; and Part 5, Advanced Entry Programs. It is written in such a way so that it may easily be adopted by other universities as a textbook for a two semesters senior or graduate course on the sub ject. In addition to the undersigned who served as the course instructor and wrote Chapters, 1, 2, 3 and 4, guest lecturers included: Prof. FRANKLIN K. MOORE who wrote Chapter 5 "Entry Radiative Transfer," Prof. SHIH-I PAI who wrote Chapter 6 "Entry Radiation-Magnetogasdy namics," Dr. CARL GAZLEY, J r. who wrote Chapter 7 "Entry Deaccelera [ion and Mass Change of an Ablating Body," Dr. SINCLAIRE M. SCALA who wrote Chapter 8 "Entry Heat Transfer and Material Response," Mr.
Coming Home - Roger D. Launius 2012
NOTE; NO FURTHER

DISCOUNT ON THIS PRINT PRODUCT-- OVERSTOCK SALE -- Signficantly reduced list price The technologies for the reentry and recovery from space might change over time, but the challenge remains one of the most important and vexing in the rigorous efforts to bring spacecraft and their crews and cargo home successfully. Returning to Earth after a flight into space is a fundamental challenge, and contributions from the NASA Aeronautics Research Mission Directorate in aerodynamics, thermal protection, guidance and control, stability, propulsion, and landing systems have proven critical to the success of the human space flight and other space programs. Without this base of fundamental and applied research, the capability to fly into space would not exist. Other related products: NASA Historical Data Book, V. 7: NASA Launch Systems, Space Transportation/Human Spaceflight, and Space Science can be found here: https: //bookstore.gpo.gov/products/sku/033-000-01309-4 Revolutionary Atmosphere: The Story of the Altitude Wind Tunnel and the Space Power Chambers can be found here: https: //bookstore.gpo.gov/products/sku/033-000-01342-6 Spinoff: Innovative Partnerships Program 2009 can be found here: https: //bookstore.gpo.gov/products/sku/033-000-01331-1 Spinoff 2010: NASA Technologies Benefit Society can be found here: https: //bookstore.gpo.gov/products/sku/033-000-01343-4 Spinoff 2015: Technology Transfer Program can be found here: https: //bookstore.gpo.gov/products/sku/033-000-01372-8 Aerospace, Astronomy & Space Exploration resources collection can be found here: https: //bookstore.gpo.gov/catalog/

science-technology/aerospace-astronomy... Other products produced by the U.S. National Aeronautics and Space Administration (NASA) can be found here: https://bookstore.gpo.gov/agency/550"

Selected Aerothermodynamic Design Problems of Hypersonic Flight Vehicles - Ernst Heinrich Hirschel 2009-11-26

In this book selected aerothermodynamic design problems in hypersonic vehicles are treated. Where applicable, it emphasizes the fact that outer surfaces of hypersonic vehicles primarily are radiation-cooled, an interdisciplinary topic with many implications.

Introduction to Astrodynamic Reentry - Kerry Hicks 2014-12-02

Updated for 2015, the second edition of Introduction to Astrodynamic Reentry continues my tradition of teaching atmospheric entry from an analytical perspective, with finding closed-form solutions being the preferred approach. The over-arching goal is to instill an understanding of how "families of solutions" behave as well as the general trends, tradeoffs, and nature of atmospheric entry. My approach is to use easily visualized variables to solve the analytical problems first and keep them (more-or-less) consistent as we move to the computer for the harder problems. This is a "back to the basics" approach for a new generation of students who've become more comfortable with numerical solutions than analytical ones. The pages are loaded with equations because I've included the details of most of the derivations. This book pulls together many classical analyses and presents them in a consistent notation for the first time. It provides a

convenient starting point for an analytical understanding of atmospheric entry, with plenty of references to those original works. It ties together results that were originally published years apart by different authors. And, peppered throughout, you'll find some new approaches and results. *Computational Flight Dynamics* - Malcolm J. Abzug 1998

Space Flight Dynamics - Craig A. Kluever 2018-03-12 Thorough coverage of space flight topics with self-contained chapters serving a variety of courses in orbital mechanics, spacecraft dynamics, and astronautics This concise yet comprehensive book on space flight dynamics addresses all phases of a space mission: getting to space (launch trajectories), satellite motion in space (orbital motion, orbit transfers, attitude dynamics), and returning from space (entry flight mechanics). It focuses on orbital mechanics with emphasis on two-body motion, orbit determination, and orbital maneuvers with applications in Earth-centered missions and interplanetary missions. Space Flight Dynamics presents wide-ranging information on a host of topics not always covered in competing books. It discusses relative motion, entry flight mechanics, low-thrust transfers, rocket propulsion fundamentals, attitude dynamics, and attitude control. The book is filled with illustrated concepts and real-world examples drawn from the space industry. Additionally, the book includes a “computational toolbox” composed of MATLAB M-files for performing space mission analysis. Key features: Provides practical, real-world examples illustrating key concepts throughout the book Accompanied by a website

containing MATLAB M-files for conducting space mission analysis Presents numerous space flight topics absent in competing titles Space Flight Dynamics is a welcome addition to the field, ideally suited for upper-level undergraduate and graduate students studying aerospace engineering.

Hypersonic Vehicles - Giuseppe Pezzella 2019-10-02

In the aviation field there is great interest in high-speed vehicle design. Hypersonic vehicles represent the next frontier of passenger transportation to and from space. However, several design issues must be addressed, including vehicle aerodynamics and aerothermodynamics, aeroshape design optimization, aerodynamic heating, boundary layer transition, and so on. This book contains valuable contributions focusing on hypervelocity aircraft design. Topics covered include hypersonic aircraft aerodynamic and aerothermodynamic design, especially aeroshape design optimization, computational fluid dynamics, and scramjet propulsion. The book also discusses high-speed flow issues and the challenges to achieving the dream of affordable hypersonic travel. It is hoped that the information contained herein will allow for the development of safe and efficient hypersonic vehicles.

The Legacy of the White Oak Laboratory - 2000

Re-entry Vehicle Dynamics - Frank J. Regan 1984

Atmospheric Re-Entry Vehicle Mechanics - Patrick Gallais 2007-09-23

Based on a long engineering experience, this book offers a comprehensive and state-of-the-art analysis of aerodynamic and flight mechanic entry topics. This updated edition had new chapters on Re-entry on

Mars mission, flight quality, rarefied aerodynamics and re-entry accuracy. In addition, it provides a large set of application exercises and solutions.

Integrated Design for Space Transportation System - B.N. Suresh 2015-11-20

The book addresses the overall integrated design aspects of a space transportation system involving several disciplines like propulsion, vehicle structures, aerodynamics, flight mechanics, navigation, guidance and control systems, stage auxiliary systems, thermal systems etc. and discusses the system approach for design, trade off analysis, system life cycle considerations, important aspects in mission management, the risk assessment, etc. There are several books authored to describe the design aspects of various areas, viz., propulsion, aerodynamics, structures, control, etc., but there is no book which presents space transportation system (STS) design in an integrated manner. This book attempts to fill this gap by addressing systems approach for STS design, highlighting the integrated design aspects, interactions between various subsystems and interdependencies. The main focus is towards the complex integrated design to arrive at an optimum, robust and cost effective space transportation system. The orbital mechanics of satellites including different coordinate frames, orbital perturbations and orbital transfers are explained. For launching the satellites to meet specific mission requirements, viz., payload/orbit, design considerations, giving step by step procedure are briefed. The selection methodology for launch vehicle configuration, its optimum staging and the factors which influence the vehicle performance are

summarized. The influence of external, internal and dynamic operating environments experienced by the vehicle subsystems and the remedial measures needed are highlighted. The mission design strategies and their influence on the vehicle design process are elaborated. The various critical aspects of STS subsystems like flight mechanics, propulsion, structures and materials, thermal systems, stage auxiliary systems, navigation, guidance and control and the interdependencies and interactions between them are covered. The design guidelines, complexity of the flight environment and the reentry dynamics for the reentry missions are included. The book is not targeted as a design tool for any particular discipline or subsystem. Some of the design related equations or expressions are not attempted to derive from the first principle as this is beyond the scope of this book. However, the important analytical expressions, graphs and sketches which are essential to provide in-depth understanding for the design process as well as to understand the interactions between different subsystems are appropriately included.

Intermediate Reader of Modern Chinese - Robert F. Stengel 2022-11-01

An updated and expanded new edition of an authoritative book on flight dynamics and control system design for all types of current and future fixed-wing aircraft Since it was first published, Flight Dynamics has offered a new approach to the science and mathematics of aircraft flight, unifying principles of aeronautics with contemporary systems analysis. Now updated and expanded, this authoritative book by award-winning aeronautics engineer Robert Stengel presents traditional

material in the context of modern computational tools and multivariable methods. Special attention is devoted to models and techniques for analysis, simulation, evaluation of flying qualities, and robust control system design. Using common notation and not assuming a strong background in aeronautics, Flight Dynamics will engage a wide variety of readers, including aircraft designers, flight test engineers, researchers, instructors, and students. It introduces principles, derivations, and equations of flight dynamics as well as methods of flight control design with frequent reference to MATLAB functions and examples. Topics include aerodynamics, propulsion, structures, flying qualities, flight control, and the atmospheric and gravitational environment. The second edition of Flight Dynamics features up-to-date examples; a new chapter on control law design for digital fly-by-wire systems; new material on propulsion, aerodynamics of control surfaces, and aeroelastic control; many more illustrations; and text boxes that introduce general mathematical concepts. Features a fluid, progressive presentation that aids informal and self-directed study Provides a clear, consistent notation that supports understanding, from elementary to complicated concepts Offers a comprehensive blend of aerodynamics, dynamics, and control Presents a unified introduction of control system design, from basics to complex methods Includes links to online MATLAB software written by the author that supports the material covered in the book

Atmospheric and Space Flight Dynamics - Ashish Tewari 2007-11-15

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.

Orbital Mechanics for Engineering Students - Howard D Curtis 2009-10-26

Orbital Mechanics for Engineering Students, Second Edition, provides an introduction to the basic concepts of space mechanics. These include vector kinematics in three dimensions; Newton's laws of motion and gravitation; relative motion; the vector-based solution of the classical two-body problem; derivation of Kepler's equations; orbits in three dimensions; preliminary orbit determination; and orbital maneuvers. The book also covers relative motion and the two-impulse rendezvous problem; interplanetary mission design using patched conics; rigid-body dynamics used to characterize the attitude of a space vehicle; satellite attitude dynamics; and the characteristics and design of multi-stage launch vehicles. Each chapter begins with an outline of key concepts and concludes with problems that are based on the material covered. This text is written for undergraduates who are studying orbital mechanics for the first time and have completed courses in physics, dynamics, and mathematics, including differential equations and applied linear algebra.

Graduate students, researchers, and experienced practitioners will also find useful review materials in the book. NEW: Reorganized and improved discusions of coordinate systems, new discussion on perturbations and quarternions NEW: Increased coverage of attitude dynamics, including new Matlab algorithms and examples in chapter 10 New examples and homework problems

Nonlinear Dynamics and Stability of Hypersonic Reentry Vehicles - Leonardo de Olivé Ferreira 1995

Advances in Small Satellite Technologies - PSR Srinivasa Sastry 2020-05-04

This volume contains select papers presented during the 1st International Conference on Small Satellites, discussing the latest research and developments relating to small satellite technology. The papers cover various issues relating to design and engineering, ranging from the control, mechanical and thermal systems to the sensors, antennas and RF systems used. The volume will be of interest to scientists and engineers working on or utilizing satellite and space technologies.

Re-entry and Atmospheric Transfer Trajectory Flight Dynamics Software - J. Potti 1993

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

Re-entry Vehicle Dynamics - Frank J. Regan 1984

Practical Methods for Optimal Control and Estimation Using Nonlinear Programming - John T. Betts 2010-01-01

A focused presentation of how sparse optimization methods can be used to solve optimal control and estimation problems.

Dynamics of Atmospheric Re-Entry - Frank J. Regan 1993

Advances in Electromechanical Technologies - V. C. Pandey 2020-09-24

This book comprises select peer-reviewed papers from the International Conference on Emerging Trends in Electromechanical Technologies & Management (TEMT) 2019. The focus is on current research in interdisciplinary areas of mechanical, electrical, electronics and

information technologies, and their management from design to market. The book covers a wide range of topics such as computer integrated manufacturing, additive manufacturing, materials science and engineering, simulation and modelling, finite element analysis, operations and supply chain management, decision sciences, business analytics, project management, and sustainable freight transportation. The book will be of interest to researchers and practitioners of various disciplines, in particular mechanical and industrial engineering.

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 - Anton H. de Ruiter 2012-12-05

Provides the basics of spacecraft orbital dynamics plusattitude dynamics and control, using vectrix notation Spacecraft Dynamics and Control: An Introductionpresents the fundamentals of classical control in the context ofspacecraft attitude control. This approach is particularlybeneficial for the training of students in both of the subjects ofclassical control as well as its application to spacecraft attitudecontrol. By using a physical system (a spacecraft) that the readercan visualize (rather than arbitrary transfer functions), it iseasier to grasp the motivation for why topics in control theory areimportant, as well as the theory behind them. The entiretreatment of both orbital and attitude dynamics makes use ofvectrix notation, which is a tool that allows the user to writedown any vector equation of motion without consideration of areference frame. This is particularly suited to the treatment ofmultiple reference frames. Vectrix notation also makes a very cleardistinction between a physical vector and its coordinaterepresentation in a reference frame. This is very important inspacecraft dynamics and control problems, where often multiplecoordinate representations are used (in different reference frames)for the same physical vector. Provides an accessible, practical aid for teaching andself-study with a layout enabling a

fundamental understanding ofthe subject Fills a gap in the existing literature by providing ananalytical toolbox offering the reader a lasting, rigorousmethodology for approaching vector mechanics, a key element vitalto new graduates and practicing engineers alike Delivers an outstanding resource for aerospace engineeringstudents, and all those involved in the technical aspects of designand engineering in the space sector Contains numerous illustrations to accompany the written text.Problems are included to apply and extend the material in eachchapter Essential reading for graduate level aerospace engineeringstudents, aerospace professionals, researchers and engineers.

Re-entry and Planetary Entry Physics and Technology - W.H.T. Loh 2012-12-06

During the last decade, a rapid growth of knowledge in the field of re-entry and planetary entry has resulted in many significant advances useful to the student, engineer and scientist. The purpose of offering this course is to make available to them these recent significant advances in physics and technology. Accordingly, this course is organized into five parts: Part 1, Entry Dynamics, Thermodynamics, Physics and Radiation; Part 2, Entry Abla tion and Heat Transfer; Part 3, Entry Experimentation; Part 4, Entry Concepts and Technology; and Part 5, Advanced Entry Programs. It is written in such a way so that it may easily be adopted by other universities as a textbook for a two semesters senior or graduate course on the sub ject. In addition to the undersigned who served as the course instructor and wrote Chapters, 1, 2, 3 and 4, guest lecturers included: Prof. FRANKLIN K. MOORE

who wrote Chapter 5 "Entry Radiative Transfer," Prof. SHIH-I PAl who wrote Chapter 6 "Entry Radiation-Magnetogasdy namics," Dr. CARL GAZLEY, Jr. who wrote Chapter 7 "Entry Deaccelera tion and Mass Change of an Ablating Body," Dr. SINCLAIRE M. SCALA who wrote Chapter 8 "Entry Heat Transfer and Material Response," Mr.