
PREFACE

EUCASS addresses all topics of interest to aerospace, from research challenges to long-term programmes and administrative problems. It is organized in several permanent Technical Committees (TC). One of them is the Propulsion Physics TC. Within the broad EUCASS framework, the specific purpose of the Propulsion Physics TC is to promote the technology, sciences, and arts of aeronautic and space propulsion and to help those engaged in these pursuits to develop their skills and those of their students.

The Propulsion Physics Symposium covers all aspects of air-breathing and space propulsion, spanning from new developments in engines and propellants to modeling and testing. Topics range from basic research and development to applied studies, using experimental, theoretical, and/or advanced numerical methods, with a special focus on fundamental physical understanding.

This fourth volume of the EUCASS book series on advances in aerospace sciences is dedicated to progress in propulsion physics and includes a collection of the best papers, presented in this or closely connected areas, at the 4th European Conference for Aerospace Sciences held in Saint Petersburg, Russia, July 4–8, 2011.

The Propulsion Symposium of this conference was ideally dedicated to the 50th anniversary of the historical orbital flight by Yu. Gagarin (April 12, 1961) and turned out to be a major meeting in the field of propulsion R&D with around 180 presentations.

About 1/4 of the total number of papers accepted for presentation at the conference was later selected by the volume editors and subsequently edited by an international body of peer reviewers. The current book is the product of this long distillation process.

The volume includes eight chapters covering most of the traditional aspects and topics in aeronautic and space propulsion sciences as well as several innovative ones:

Chapter 1 Solid and Hybrid Rocket Propulsion

Chapter 2 Liquid and Gelled Rocket Propulsion

Chapter 3 Nuclear and Electric Rocket Propulsion

Chapter 4 Air-Breathing and Pulse Detonation Propulsion

Chapter 5 Combustion Diagnostics and Modeling

Chapter 6 Fluid/Structure Interactions

Chapter 7 Environmental Impact of Rocket Emissions

Chapter 8 Mitigation and Removal of Space Debris

To easily identify and put in the right perspective the material of interest, the reader is invited to consult the brief introduction and paper summaries compiled at the start of the eight chapters.

We sincerely trust that this joint international effort will help all readers to gain a better understanding of aerospace propulsion and to further appreciate and widen the fascinating horizons of the aerospace world.

EUCASS Technical Committee Chair

Max Calabro

