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 Flight Physics TC. Within the broad EUCASS framework, the specific purpose of the Flight Physics TC is to promote the technology, sciences, and arts of flight physics 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 fifth volume of the EUCASS book series on advances in aerospace sciences is dedicated to progress in flight 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 nine chapters covering experimental, theoretical, and numerical aspects of the flight physics:

Chapter 1 Turbulence Modeling

Chapter 2 Boundary Layer Stability

Chapter 3 Flow Control

Chapter 4 Vortex, Wake, and Base Flows

Chapter 5 Shock Interaction

Chapter 6 Hypersonics

Chapter 7 Reentry

- Chapter 8 Real Gases and Rarefied Flows
- Chapter 9 Configuration Aerodynamics, Sonic Boom, and Aircraft Aerodynamic Model

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 nine 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



1961-2011: 50 years after Yu. Gagarin's historical flight