Preface

On June 11 and 12, 2012, several engineers and researchers from industry and academia met at the Georgia Institute of Technology to discuss the present and future of aerospace decision and control. This workshop was hosted by the School of Aerospace Engineering and the Decision and Control Laboratory. Featured in this workshop were aircraft and spacecraft control and autonomy, air traffic control and management, and embedded software verification and validation. From this workshop came the five essays printed thereafter.

Whether focusing on aeronautical or space applications, the decision and control sciences of today largely supersede the servomechanism theory that used to be, and still is, taught in all aerospace undergraduate curricula. Yet, the concern for mathematical rigor and safety present in even the most basic control course is the fertile ground upon which new disciplines, such as autonomy, can develop with a genuine concern for applicability to aerospace systems. In this volume, the reader will find a broad variety of topics that all share highly dynamical, real-time, and safety- or mission-critical decision-making as core elements.

When looking at the space adventure, the reader will see that autonomy is becoming, de facto, the prime mechanism through which humanity can project its mind and soul onto faraway, extraterrestrial destinations. In an increasingly technological world, the reader will, however, get some appreciation for the gap that separates the extremely high promise of autonomy technology for aerial applications from our ability to understand it well enough to let it take over part of our overhead traffic. Likewise, the reader will get an appreciation for the astonishing range of control issues raised by air transportation, including optimal control, queuing systems, and combinations of the above.

Professor Gary Balas understood, perhaps better than anyone else in the trade, the vastly expanded scope that the decision and control sciences need to cover to address the challenges that aerospace engineering faces today. He presided over the fast transformation of the aerospace decision sciences by fostering a climate of openness toward the new aerospace decision and control sciences, whether they are

named autonomy, software analysis, air traffic control, or human-centric systems, within his own University of Minnesota and the Department of Aerospace Engineering and Mechanics, which he led with enthusiasm and humor. This volume is dedicated to his memory.

Atlanta Eric Feron
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