

Preface

This book results from the author's lectures at the Universität Stuttgart. The idea comes from a visit by the Institute of Space Systems management team to EADS Astrium GmbH - Satellites in Friedrichshafen, a key European satellite developer.

Astrium has been developing a complex system simulation infrastructure for several years. However, it is difficult for industry to find graduates which are not only well trained in space engineering but also have adequate knowledge in simulator software development. The idea was to address this shortfall by giving lectures and workshops by the author at the Institute of Space Systems, (IRS). These lectures meanwhile have evolved comprising industry infrastructure visits, tutorials etc. From University side they are based on according teaching assignments whilst Astrium authorized the project as an agreed sideline task of the Author.

The decision to write a book on system simulation from the lecture notes originates because there is indeed lots of technical literature on simulation, but all with deficiencies for the target audience. There are many books on simulation in control engineering, however tackling almost exclusively special development tools. The literature on process engineering simulation again mostly concentrates on specific tools like flowsheet applications. All books known to the author put only little emphasis on how the simulator development is interwoven with engineering pathway of the to be simulated target system. Therefore application examples in this book address this deficit and always explain simulation in the context of the engineering process towards satellites, space probes and rocket stages.

Another important deficit is, very few books considering, that most interested students are beginners in the simulation domain. Such students need to be guided to receive a proper introduction. This results in a requirement on the author to guide the reader on their way from spacecraft system engineering topics to the system simulation case, and beyond to the modeling of the system inside the simulator. Finally arriving at the deeper topics of simulator coding, whilst addressing all the caveats along the journey.

Students' responses to the lectures, and the demand for study, diploma and doctoral theses topics since the beginning of this IRS / Astrium cooperation, clearly show great interest in this fascinating subject. I hope this book contributes to imparting background knowledge to the student, enabling them to begin professionally in the simulation domain.

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