

Preface

As space exploration missions evolve from planetary flybys and orbiters towards in situ surface missions, in particular taking advantage of the mobility offered by rovers, so it seems appropriate to provide a textbook to bring together the many disparate aspects of planetary rover technology into a single source. Of course, I cannot claim any pretext for comprehension as such a text would be impossible in a volume of this size. However, I have attempted to provide a wide coverage to entail most of the major robotics aspects associated with rovers per se without sacrificing depth. Furthermore, although I have attempted to review the literature thoroughly, there will inevitably be unintentional omissions—for these I apologize. Please feel free to provide me with omitted information that may be incorporated in future editions.

The target audience for this book is anyone who requires an intimate and detailed technical knowledge of planetary rovers and how they are likely to evolve in their capabilities in the near future. For the most part that would mean primarily graduate students, final year undergraduates, and industry engineers who are involved with planetary rover development. This text has grown from a course I teach at Carleton University on planetary rovers based on my experiences through the years ranging from general spacecraft development at several institutions both industrial and academic, laboratory and computer modeling of mobile robotics projects with the Surrey Space Centre (U.K.), the ExoMars Rover program in the U.K. to the design and development of the major robotics systems of the Kapvik microrover prototype for the Canadian Space Agency. This latter vehicle was designed as an analog platform from the ground up for planetary exploration (as opposed to retro-fitted) with a clear path to flight qualification. Although administered by MPB Communications of Montreal as prime contractor, my team's role at Carleton University was as the primary technical authority in providing the design and the core mobile robotics aspects—mobility system, motor control avionics, autonomous navigation, vision-processing, camera

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control, and other motorized units. Indeed, the design had been based on the Vanguard Mars rover micromission developed by the author years before in the U.K. However, these platforms are used as illustrations and the text is applicable to any planetary rover project.

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