SOFTWARE-ENABLED CONTROL

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SOFTWARE-ENABLED CONTROL

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CONTENTS

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PREFACE

This edited volume is the product of a research initiative undertaken by the U.S. Defense Advanced Research Projects Agency (DARPA) and the U.S. Air Force Research Laboratory (AFRL) to exploit recent developments in software and computing technologies for applications to control systems in general, and autonomous aircraft in particular. Control, in this context, should not be interpreted in some narrow sense. Here it encompasses algorithms for inner-loop regulation as well as supervisory and mission-level optimization, modeling and estimation of vehicle dynamics and environmental influences, real-time computing platforms and software design tools, and much else besides.

The "Software Enabled Control" program is ongoing and the chapters in this volume do not document the culmination of the research. But with some years of effort completed by a number of multidisciplinary teams there is much to report: A number of innovations have resulted and been validated through some combination of theoretical analyses, simulation experiments, and laboratory demonstrations. In the near future, many of the developments detailed in this book are planned to be further evaluated through flight testing.

The SEC program was envisioned and initiated at DARPA by Dr. Helen Gill and Dr. David Tennenhouse and has subsequently benefited from the support and leadership provided by Dr. Shankar Sastry and Dr. John Bay. At the U.S. Air Force Research Laboratory, Ray Bortner, Bill Koenig, Reed Morgan, and Dale Van Cleave have been instrumental in overseeing the program and its constituent projects. Todd Carr, Jessica Greenhalgh,

Nikki Morris, and Carmen Whitson have ably fulfilled a variety of coordination and administration responsibilities. We speak for the SEC research community in expressing our gratitude to these individuals, and to several others who were involved in advisory capacities, for creating and supporting this practically important and intellectually exciting program.

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