

1. Record Nr.	UNINA9910967745403321
Autore	Beard Randal W
Titolo	Small unmanned aircraft : theory and practice // Randal W. Beard, Timothy W. McLain
Pubbl/distr/stampa	Princeton, N.J., : Princeton University Press, c2012
ISBN	9786613379672 9781680159028 168015902X 9781283379670 1283379678 9781400840601 1400840600
Edizione	[Course Book]
Descrizione fisica	1 online resource (317 p.)
Classificazione	ZO 7400
Altri autori (Persone)	McLainTimothy W. <1963->
Disciplina	623.74/69
Soggetti	Drone aircraft - Control systems Drone aircraft - Automatic control Guidance systems (Flight)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes bibliographical references (p. [291]-298) and index.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Frontmatter -- Contents -- Preface -- 1. Introduction -- 2. Coordinate Frames -- 3. Kinematics and Dynamics -- 4. Forces and Moments -- 5. Linear Design Models -- 6. Autopilot Design Using Successive Loop Closure -- 7. Sensors for MAVs -- 8. State Estimation -- 9. Design Models for Guidance -- 10. Straight-line and Orbit Following -- 11. Path Manager -- 12. Path Planning -- 13. Vision-guided Navigation -- Appendix A. Nomenclature and Notation -- Appendix B. Quaternions -- Appendix C. Animations in Simulink -- Appendix D. Modeling in Simulink Using S-Functions -- Appendix E. Airframe Parameters -- Appendix F. Trim and Linearization in Simulink -- Appendix G. Essentials from Probability Theory -- Appendix H. Sensor Parameters -- Bibliography -- Index
Sommario/riassunto	Autonomous unmanned air vehicles (UAVs) are critical to current and future military, civil, and commercial operations. Despite their

importance, no previous textbook has accessibly introduced UAVs to students in the engineering, computer, and science disciplines--until now. *Small Unmanned Aircraft* provides a concise but comprehensive description of the key concepts and technologies underlying the dynamics, control, and guidance of fixed-wing unmanned aircraft, and enables all students with an introductory-level background in controls or robotics to enter this exciting and important area. The authors explore the essential underlying physics and sensors of UAV problems, including low-level autopilot for stability and higher-level autopilot functions of path planning. The textbook leads the student from rigid-body dynamics through aerodynamics, stability augmentation, and state estimation using onboard sensors, to maneuvering through obstacles. To facilitate understanding, the authors have replaced traditional homework assignments with a simulation project using the MATLAB/Simulink environment. Students begin by modeling rigid-body dynamics, then add aerodynamics and sensor models. They develop low-level autopilot code, extended Kalman filters for state estimation, path-following routines, and high-level path-planning algorithms. The final chapter of the book focuses on UAV guidance using machine vision. Designed for advanced undergraduate or graduate students in engineering or the sciences, this book offers a bridge to the aerodynamics and control of UAV flight.
