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Nota di contenuto	Part I: System Modelling & Simulation: Recovery Phase Analysis of Pumping Kites Wind Generator -- Dynamic modeling of offshore airborne wind energy converters -- Dynamic Model of a Bridled Kite, including Rotational -- A 3D Tether Analytical Analysis for Static Flight Ability of Kite Operation -- Kite as a Beam - A Fast Method to Get the Flying Shape -- Enhanced kinetic energy entrainment in wind farm wakes: LES study of a wind turbine array with tethered kites -- Fluid Structure Interaction Model of a Flexible Membrane Traction Kite -- Part II: Control & Optimization -- Sensor fusion of IMU data -- On image interpretation for positioning detection of kites -- Flight path planning in realistic wind environments -- Automatic control of pumping cycles for the SkySails prototype in airborne wind energy -- Comparison of Passivity Based and Attitude Tracking Control of a FlyGen Airborne Wind Energy System -- Data-driven LPV Modeling for Flight Control of a Kite Power Airborne Wind Gener ator -- Optimization-inspired Control Strategy for a Magnus Effect-based Airborne Wind Energy System -- Nonlinear DC-link PI control for airborne wind energy systems during pumping mode -- On the

Optimization of Pumping Kites for Wind Power -- Design and Economics of a Pumping Kite Wind Park -- Part III: Concept Design & Analysis -- Un-tethered devices in airborne wind energy harvesting -- Rotating Reel -- Novel Airborne Wind Energy methods using tensioned kite nets and a prototype derived from kite arts -- Crosswind Kite Power with Tower -- Tether and Line Drag -- On Multicopter-Based Take Off and Landing for Lift Power Kites -- Part IV Implemented Concepts -- Quad-Rotorcraft to Harness High Altitude Wind Energy -- Airborne Magnus-effect wind energy system -- Pumping Cycle Kite Power with Twings -- Ampyx Power's roadmap towards Airborne Wind Energy in the utility sector -- Take-Off and Landing of a Rigid Aircraft for Airborne Wind Energy -- Fast Power Curve and Yield Estimation of Yo-Yo Airborne Wind Energy Systems -- Part V Technology Commercialisation Aspects -- The Trillion Dollar Drone - A Change of Perspective -- Niche strategy to introduce kite-based airborne wind energy -- Regulation of Airborne Wind Energy Systems -- Life Cycle Assessment of Electricity Production from Airborne Wind Energy -- Ecological impacts of PowerPlane technology: current state of knowledge and a future research agenda.

Sommario/riassunto

This book provides in-depth coverage of the latest research and development activities concerning innovative wind energy technologies intended to replace fossil fuels on an economical basis. A characteristic feature of the various conversion concepts discussed is the use of tethered flying devices to substantially reduce the material consumption per installed unit and to access wind energy at higher altitudes, where the wind is more consistent. The introductory chapter describes the emergence and economic dimension of airborne wind energy. Focusing on “Fundamentals, Modeling & Simulation”, Part I includes six contributions that describe quasi-steady as well as dynamic models and simulations of airborne wind energy systems or individual components. Shifting the spotlight to “Control, Optimization & Flight State Measurement”, Part II combines one chapter on measurement techniques with five chapters on control of kite and ground stations, and two chapters on optimization. Part III on “Concept Design & Analysis” includes three chapters that present and analyze novel harvesting concepts as well as two chapters on system component design. Part IV, which centers on “Implemented Concepts”, presents five chapters on established system concepts and one chapter about a subsystem for automatic launching and landing of kites. In closing, Part V focuses with four chapters on “Technology Deployment” related to market and financing strategies, as well as on regulation and the environment. The book builds on the success of the first volume “Airborne Wind Energy” (Springer, 2013), and offers a self-contained reference guide for researchers, scientists, professionals and students. The respective chapters were contributed by a broad variety of authors: academics, practicing engineers and inventors, all of whom are experts in their respective fields.