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Energy Consumption and Autonomous Driving
Proceedings of the International Symposium on Advanced Vehicle Control 1994
Automated Driving Systems 2.0.

Engineering Autonomous Vehicles and Robots

U.S. Air Force (USAF) planners have envisioned that uninhabited air vehicles (UAVs), working in concert with inhabited vehicles, will become an integral part of the future force structure. Current plans are based on the premise that UAVs have the potential to augment, or even replace, inhabited aircraft in a variety of missions. However, UAV technologies must be better understood before they will be accepted as an alternative to inhabited aircraft on the battlefield. The U.S. Air Force Office of Scientific Research (AFOSR) requested that the National Research Council, through the National Materials Advisory Board and the Aeronautics and Space Engineering Board, identify long-term research opportunities for supporting the development of technologies for UAVs. The objectives of the study were to identify technological developments that would improve the performance and reliability of "generation-after-next" UAVs at lower cost and to recommend areas of fundamental research in materials, structures, and aeronautical technologies. The study focused on innovations in technology that would "leapfrog" current technology development and would be ready for scaling-up in the post-2010 time frame (i.e., ready for use on aircraft by 2025).

Creating Autonomous Vehicle Systems

This book aims to teach the core concepts that make Self-driving vehicles (SDVs) possible. It is aimed at people who want to get their teeth into self-driving vehicle technology, by providing genuine technical insights where other books just skim the surface. The book tackles everything from sensors and perception to functional safety and cybersecurity. It also passes on some practical know-how and discusses concrete SDV applications, along with a discussion of where this technology is heading. It will serve as a good starting point for software developers or professional engineers who are eager to pursue a career in this exciting field and want to learn more about the basics of SDV algorithms. Likewise, academic researchers, technology enthusiasts, and journalists will also find the book useful. Key Features: Offers a comprehensive technological walk-through of what really matters in SDV development: from hardware, software, to functional safety and cybersecurity Written by an active practitioner with extensive experience in series development and research in the fields of Advanced Driver Assistance Systems (ADAS) and Autonomous Driving Covers theoretical fundamentals of state-of-the-art SLAM, multi-sensor data fusion, and other SDV algorithms. Includes practical information and hands-on material with Robot Operating System (ROS) and Open Source Car Control (OSCC). Provides an overview of the strategies, trends, and applications which companies are pursuing in this field at present as well as other technical insights from the industry.

Technology Development for Army Unmanned Ground Vehicles

Advanced automotive technology : visions of a super-efficient family car.

The main topics of this book include advanced control, cognitive data processing, high performance computing, functional safety, and comprehensive validation. These topics are seen as technological bricks to drive forward automated driving. The current state of the art of automated vehicle research, development and innovation is given. The book also addresses industry-driven roadmaps for major new technology advances as well as collaborative European initiatives supporting the evolution of automated driving. Various examples highlight the state of development of automated driving as well as the way forward. The book will be of interest to academics and researchers within engineering, graduate students, automotive engineers at OEMs and suppliers, ICT and software engineers, managers, and other decision-makers.

Advanced Motion Control and Sensing for Intelligent Vehicles

Embedded computing systems play an important and complex role in the functionality of electronic devices. With our daily routines becoming more reliant on electronics for personal and professional use, the understanding of these computing systems is crucial. Embedded Computing Systems: Applications, Optimization, and Advanced Design brings together theoretical and technical concepts of intelligent embedded control systems and their use in hardware and

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software architectures. By highlighting formal modeling, execution models, and optimal implementations, this reference source is essential for experts, researchers, and technical supporters in the industry and academia.

Research and Advanced Technology for Digital Libraries

Informatics in Control Automation and Robotics

The present book includes a set of selected papers from the third “International Conference on Informatics in Control Automation and Robotics” (ICINCO 2006), held in Setúbal, Portugal, from 1 to 5 August 2006, sponsored by the Institute for Systems and Technologies of Information, Control and Communication (INSTICC). The conference was organized in three simultaneous tracks: “Intelligent Control Systems and Optimization”, “Robotics and Automation” and “Systems Modeling, Signal Processing and Control”. The book is based on the same structure. Although ICINCO 2006 received 309 paper submissions, from more than 50 different countries in all continents, only 31 were accepted as full papers. From those, only 23 were selected for inclusion in this book, based on the classifications provided by the Program Committee. The selected papers also reflect the interdisciplinary nature of the conference. The diversity of topics is an important feature of this conference, enabling an overall perception of several important scientific and technological trends. These high quality standards will be maintained and reinforced at ICINCO 2007, to be held in Angers, France, and in future editions of this conference.

The DARPA Urban Challenge

This book explores the technical advances in vehicle and infrastructure systems that are taking place in response to the increasing congestion of our roads. It describes all the relevant computer and control techniques and takes an applications-oriented approach to fill the many gaps that exist in the mass knowledge in the field.

Autonomous Guided Vehicles

Offers a step-by-step guide to building autonomous vehicles and robots, with source code and accompanying videos. The first book of its kind on the detailed steps for creating an autonomous vehicle or robot, this book provides an overview of the technology and introduction of the key elements involved in developing autonomous vehicles, and offers an excellent introduction to the basics for someone new to the topic of autonomous vehicles and the innovative, modular-based engineering approach called DragonFly. *Engineering Autonomous Vehicles and Robots: The DragonFly Modular-based Approach* covers everything that technical professionals need to know about: CAN bus, chassis, sonars, radars, GNSS, computer vision, localization, perception, motion planning, and more. Particularly, it covers Computer Vision for active perception and localization, as well as mapping and motion planning. The book offers several case studies on the building of an autonomous passenger pod, bus, and vending robot. It features a

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large amount of supplementary material, including the standard protocol and sample codes for chassis, sonar, and radar. GPSD protocol/NMEA protocol and GPS deployment methods are also provided. Most importantly, readers will learn the philosophy behind the DragonFly modular-based design approach, which empowers readers to design and build their own autonomous vehicles and robots with flexibility and affordability. Offers progressive guidance on building autonomous vehicles and robots Provides detailed steps and codes to create an autonomous machine, at affordable cost, and with a modular approach Written by one of the pioneers in the field building autonomous vehicles Includes case studies, source code, and state-of-the art research results Accompanied by a website with supplementary material, including sample code for chassis/sonar/radar; GPS deployment methods; Vision Calibration methods Engineering Autonomous Vehicles and Robots is an excellent book for students, researchers, and practitioners in the field of autonomous vehicles and robots.

Design and Advanced Robust Chassis Dynamics Control for X-by-Wire Unmanned Ground Vehicle

This book is one of the first technical overviews of autonomous vehicles written for a general computing and engineering audience. The authors share their practical experiences designing autonomous vehicle systems. These systems are complex, consisting of three major subsystems: (1) algorithms for localization, perception, and planning and control; (2) client systems, such as the robotics operating system and hardware platform; and (3) the cloud platform, which includes data storage, simulation, high-definition (HD) mapping, and deep learning model training. The algorithm subsystem extracts meaningful information from sensor raw data to understand its environment and make decisions as to its future actions. The client subsystem integrates these algorithms to meet real-time and reliability requirements. The cloud platform provides offline computing and storage capabilities for autonomous vehicles. Using the cloud platform, new algorithms can be tested so as to update the HD map—in addition to training better recognition, tracking, and decision models. Since the first edition of this book was released, many universities have adopted it in their autonomous driving classes, and the authors received many helpful comments and feedback from readers. Based on this, the second edition was improved by extending and rewriting multiple chapters and adding two commercial test case studies. In addition, a new section entitled “Teaching and Learning from this Book” was added to help instructors better utilize this book in their classes. The second edition captures the latest advances in autonomous driving and that it also presents usable real-world case studies to help readers better understand how to utilize their lessons in commercial autonomous driving projects. This book should be useful to students, researchers, and practitioners alike. Whether you are an undergraduate or a graduate student interested in autonomous driving, you will find herein a comprehensive overview of the whole autonomous vehicle technology stack. If you are an autonomous driving practitioner, the many practical techniques introduced in this book will be of interest to you. Researchers will also find extensive references for an effective, deeper exploration of the various technologies.

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By the dawn of the new millennium, robotics has undergone a major transformation in scope and dimensions. This expansion has been brought about by the maturity of the field and the advances in its related technologies. From a largely dominant industrial focus, robotics has been rapidly expanding into the challenges of the human world. The new generation of robots is expected to safely and dependably co-habitat with humans in homes, workplaces, and communities, providing support in services, entertainment, education, healthcare, manufacturing, and assistance. Beyond its impact on physical robots, the body of knowledge robotics has produced is revealing a much wider range of applications reaching across diverse research areas and scientific disciplines, such as: biomechanics, haptics, neurosciences, virtual simulation, animation, surgery, and sensor networks among others. In return, the challenges of the new emerging areas are proving an abundant source of stimulation and insights for the field of robotics. It is indeed at the intersection of disciplines that the most striking advances happen. The goal of the series of Springer Tracts in Advanced Robotics (STAR) is to bring, in a timely fashion, the latest advances and developments in robotics on the basis of their significance and quality. It is our hope that the wider dissemination of research developments will stimulate more exchanges and collaborations among the research community and contribute to further advancement of this rapidly growing field.

Advanced Vehicle Control

The automotive industry appears close to substantial change engendered by “self-driving” technologies. This technology offers the possibility of significant benefits to social welfare—saving lives; reducing crashes, congestion, fuel consumption, and pollution; increasing mobility for the disabled; and ultimately improving land use. This report is intended as a guide for state and federal policymakers on the many issues that this technology raises.

Automated Driving

This book provides the latest information in intelligent vehicle control and intelligent transportation. Detailed discussions of vehicle dynamics and ground-vehicle interactions are provided for the modeling, simulation and control of vehicles. It includes an extensive review of past and current research achievements in the intelligent vehicle motion control and sensory field, and the book provides a careful assessment of future developments.

Autonomous Driving

The IFAC Workshop on Intelligent Components for Autonomous and Semi-Autonomous Vehicles (ICASAV '95) was held in Toulouse, France, 25-26 October 1995 and provided academic and industrial researchers from all over the world with an opportunity to discuss their experiences and research results in this field. Areas covered included vehicle dynamics, navigation, localization estimation, driver assistance and energy management.

Control Strategies for Advanced Driver Assistance Systems and

Autonomous Driving Functions

How to leave behind our unwieldy, gas-guzzling, carbon dioxide-emitting vehicles for cars that are green, smart, connected, and fun. This book provides a long-overdue vision for a new automobile era. The cars we drive today follow the same underlying design principles as the Model Ts of a hundred years ago and the tail-finned sedans of fifty years ago. In the twenty-first century, cars are still made for twentieth-century purposes. They are inefficient for providing personal mobility within cities—where most of the world's people now live. In this pathbreaking book, William Mitchell and two industry experts reimagine the automobile, describing vehicles of the near future that are green, smart, connected, and fun to drive. They roll out four big ideas that will make this both feasible and timely. The fundamental reinvention of the automobile won't be easy, but it is an urgent necessity—to make urban mobility more convenient and sustainable, to make cities more livable, and to help bring the automobile industry out of crisis.

Intelligent Components for Autonomous and Semi-Autonomous Vehicles

This book provides readers with extensive information on path planning optimization for both single and multiple Autonomous Guided Vehicles (AGVs), and discusses practical issues involved in advanced industrial applications of AGVs. After discussing previously published research in the field and highlighting the current gaps, it introduces new models developed by the authors with the goal of reducing costs and increasing productivity and effectiveness in the manufacturing industry. The new models address the increasing complexity of manufacturing networks, due for example to the adoption of flexible manufacturing systems that involve automated material handling systems, robots, numerically controlled machine tools, and automated inspection stations, while also considering the uncertainty and stochastic nature of automated equipment such as AGVs. The book discusses and provides solutions to important issues concerning the use of AGVs in the manufacturing industry, including material flow optimization with AGVs, programming manufacturing systems equipped with AGVs, reliability models, the reliability of AGVs, routing under uncertainty, and risks involved in AGV-based transportation. The clear style and straightforward descriptions of problems and their solutions make the book an excellent resource for graduate students. Moreover, thanks to its practice-oriented approach, the novelty of the findings and the contemporary topic it reports on, the book offers new stimulus for researchers and practitioners in the broad field of production engineering.

Uninhabited Air Vehicles

Model-Based Safety and Assessment

The AVEC symposium is a leading international conference in the fields of vehicle dynamics and advanced vehicle control, bringing together scientists and engineers from academia and automotive industry. The first symposium was held in 1992 in Yokohama, Japan. Since then, biennial AVEC symposia have been established

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internationally and have considerably contributed to the progress of technology in automotive research and development. In 2016 the 13th International Symposium on Advanced Vehicle Control (AVEC'16) was held in Munich, Germany, from 13th to 16th of September 2016. The symposium was hosted by the Munich University of Applied Sciences. AVEC'16 puts a special focus on automatic driving, autonomous driving functions and driver assist systems, integrated control of interacting control systems, controlled suspension systems, active wheel torque distribution, and vehicle state and parameter estimation. 132 papers were presented at the symposium and are published in these proceedings as full paper contributions. The papers review the latest research developments and practical applications in highly relevant areas of vehicle control, and may serve as a reference for researchers and engineers.

International Journal of Vehicle Design

The technology and engineering behind autonomous driving is advancing at pace. This book presents the latest technical advances and the economic, environmental and social impact driverless cars will have on individuals and the automotive industry.

Road Vehicle Automation 6

This book takes a look at fully automated, autonomous vehicles and discusses many open questions: How can autonomous vehicles be integrated into the current transportation system with diverse users and human drivers? Where do automated vehicles fall under current legal frameworks? What risks are associated with automation and how will society respond to these risks? How will the marketplace react to automated vehicles and what changes may be necessary for companies? Experts from Germany and the United States define key societal, engineering, and mobility issues related to the automation of vehicles. They discuss the decisions programmers of automated vehicles must make to enable vehicles to perceive their environment, interact with other road users, and choose actions that may have ethical consequences. The authors further identify expectations and concerns that will form the basis for individual and societal acceptance of autonomous driving. While the safety benefits of such vehicles are tremendous, the authors demonstrate that these benefits will only be achieved if vehicles have an appropriate safety concept at the heart of their design. Realizing the potential of automated vehicles to reorganize traffic and transform mobility of people and goods requires similar care in the design of vehicles and networks. By covering all of these topics, the book aims to provide a current, comprehensive, and scientifically sound treatment of the emerging field of "autonomous driving".

Advanced Manned Launch System (AMLS) Study

This is the sixth volume of a sub series on Road Vehicle Automation published within the Lecture Notes in Mobility. The contents have been provided by researchers, engineers and analysts from all around the world. Topics covered include public sector activities, human factors and challenges, ethical, legal, energy and technology perspectives, vehicle systems development, as well as

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transportation infrastructure and planning. The book is based on the Automated Vehicles Symposium held on July 9-12, 2018 in San Francisco, CA (USA).

Measuring Automated Vehicle Safety

Advanced Vehicle and Infrastructure Systems

This book constitutes the refereed proceedings of the 4th International Symposium on Model-Based Safety and Assessment, IMBSA 2014, held in Munich, Germany, in October 2014. The 15 revised full papers presented were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on modeling paradigms, validation and testing, fault detection and handling, safety assessment in the automotive domain, and case studies.

Autonomous Vehicle Technology

Classical vehicle dynamics, which is the basis for manned ground vehicle design, has exhausted its potential for providing novel design concepts to a large degree. At the same time, unmanned ground vehicle (UGV) dynamics is still in its infancy and is currently being developed using general analytical dynamics principles with very little input from actual vehicle dynamics theory. This technical book presents outcomes from the NATO Advanced Study Institute (ASI) 'Advanced Autonomous Vehicle Design for Severe Environments', held in Coventry, UK, in July 2014. The ASI provided a platform for world class professionals to meet and discuss leading-edge research, engineering accomplishments and future trends in manned and unmanned ground vehicle dynamics, terrain mobility and energy efficiency. The outcomes of this collective effort serve as an analytical foundation for autonomous vehicle design. Topics covered include: historical aspects, pivotal accomplishments and the analysis of future trends in on- and off-road manned and unmanned vehicle dynamics; terramechanics, soil dynamic characteristics, uncertainties and stochastic characteristics of vehicle-environment interaction for agile vehicle dynamics modeling; new methods and techniques in on-line control and learning for vehicle autonomy; fundamentals of agility and severe environments; mechatronics and cyber-physics issues of agile vehicle dynamics to design for control, energy harvesting and cyber security; and case studies of agile and inverse vehicle dynamics and vehicle systems design, including optimisation of suspension and driveline systems. The book targets graduate students, who desire to advance further in leading-edge vehicle dynamics topics in manned and unmanned ground vehicles, PhD students continuing their research work and building advanced curricula in academia and industry, and researchers in government agencies and private companies.

Autonomous Underwater Vehicles

As the progression of the internet continues, society is finding easier, quicker ways of simplifying their needs with the use of technology. With the growth of lightweight devices, such as smart phones and wearable devices, highly configured hardware is in heightened demand in order to process the large amounts of raw

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data that are acquired. Connecting these devices to fog computing can reduce bandwidth and latency for data transmission when associated with centralized cloud solutions and uses machine learning algorithms to handle large amounts of raw data. The risks that accompany this advancing technology, however, have yet to be explored. Architecture and Security Issues in Fog Computing Applications is a pivotal reference source that provides vital research on the architectural complications of fog processing and focuses on security and privacy issues in intelligent fog applications. While highlighting topics such as machine learning, cyber-physical systems, and security applications, this publication explores the architecture of intelligent fog applications enabled with machine learning. This book is ideally designed for IT specialists, software developers, security analysts, software engineers, academicians, students, and researchers seeking current research on network security and wireless systems.

Autonomous Driving

Contributed papers presented at the conference held at Central Mechanical Engineering Research Institute, Durgapur.

Introduction to Self-Driving Vehicle Technology

Driving is a fact of life. We are all spending more and more time on the road, and traffic is an issue we face everyday. This book will make you think about it in a whole new light. We have always had a passion for cars and driving. Now Traffic offers us an exceptionally rich understanding of that passion. Vanderbilt explains why traffic jams form, outlines the unintended consequences of our attempts to engineer safety and even identifies the most common mistakes drivers make in parking lots. Based on exhaustive research and interviews with driving experts and traffic officials around the globe, Traffic gets under the hood of the quotidian activity of driving to uncover the surprisingly complex web of physical, psychological and technical factors that explain how traffic works.

Reinventing the Automobile

Advances in Intelligent Vehicles presents recent advances in intelligent vehicle technologies that enhance the safety, reliability, and performance of vehicles and vehicular networks and systems. This book provides readers with up-to-date research results and cutting-edge technologies in the area of intelligent vehicles and transportation systems. Topics covered include virtual and staged testing scenarios, collision avoidance, human factors, and modeling techniques. The Series in Intelligent Systems publishes titles that cover state-of-the-art knowledge and the latest advances in research and development in intelligent systems. Its scope includes theoretical studies, design methods, and real-world implementations and applications. Provides researchers and engineers with up-to-date research results and state-of-the art technologies in the area of intelligent vehicles and transportation systems Covers hot topics, including driver assistance systems; cooperative vehicle-highway systems; collision avoidance; pedestrian protection; image, radar and lidar signal processing; and V2V and V2I communications

Advanced Microsystems for Automotive Applications 2014

This book describes different methods that are relevant to the development and testing of control algorithms for advanced driver assistance systems (ADAS) and automated driving functions (ADF). These control algorithms need to respond safely, reliably and optimally in varying operating conditions. Also, vehicles have to comply with safety and emission legislation. The text describes how such control algorithms can be developed, tested and verified for use in real-world driving situations. Owing to the complex interaction of vehicles with the environment and different traffic participants, an almost infinite number of possible scenarios and situations that need to be considered may exist. The book explains new methods to address this complexity, with reference to human interaction modelling, various theoretical approaches to the definition of real-world scenarios, and with practically-oriented examples and contributions, to ensure efficient development and testing of ADAS and ADF. Control Strategies for Advanced Driver Assistance Systems and Autonomous Driving Functions is a collection of articles by international experts in the field representing theoretical and application-based points of view. As such, the methods and examples demonstrated in the book will be a valuable source of information for academic and industrial researchers, as well as for automotive companies and suppliers.

Proceedings of the 8th Annual Summer Conference: NASA/USRA Advanced Design Program

This volume collects selected papers of the 3rd CESA Automotive Electronics Congress, Paris, 2014. CESA is the most important automotive electronics conference in France. The topical focus lies on state-of-the-art automotive electronics with respect to energy consumption and autonomous driving. The target audience primarily comprises industry leaders and research experts in the automotive industry.

Advances in Intelligent Vehicles

Traffic

Digital Libraries are complex and advanced forms of information systems which extend and augment their physical counterparts by amplifying existing resources and services and enabling development of new kinds of human problem solving and expression. Their complexity arises from the data-rich domain of discourse as well as from extended demands for multi-disciplinary input, involving distributed systems architectures, structured digital documents, collaboration support, human-computer interaction, information filtering, etc. In addition to the broad range of technical issues, ethics and intellectual property rights add to the complication that is normally associated with the development, maintenance, and use of Digital Libraries. The Second European Conference on Digital Libraries (ECDL'98) builds upon the success of the first of this series of European Conferences on Research and Advanced Technology for Digital Libraries, held last year in Pisa, Italy, September 1-3, 1997. This series of conferences is partially funded by the TMR

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Programme of the European Commission and is actively supported and promoted by the European Research Consortium on Informatics and Mathematics (ERCIM). The aim is to bring together the different communities involved in the development of Digital Libraries, to review progress and to discuss strategies, research and technological development (RTD) issues, as well as specific topics related to the European context. These communities include professionals from universities, research centres, industry, government agencies, public libraries, etc.

Autonomous Vehicles in Support of Naval Operations

X-by-wire Unmanned Ground Vehicles (UGVs) have been attracting increased attention for various civilian or military applications. The x-by-wire techniques (drive-by-wire, steer-by-wire, and brake-by-wire techniques) provide the possibility of achieving novel vehicle design and advanced dynamics control, which can significantly improve the overall performance, maneuverability, and mobility of the UGVs. However, there are few full x-by-wire UGVs prototype models reported in the world. Therefore, there is no book that can fully describe the design, configuration, and dynamics control approach of full x-by-wire UGVs, which makes it difficult for readers to study this hot and interesting topic. In this book, we use a full x-by-wire UGV, developed by our group, as the example. This UGV is completely x-by-wire with four in-wheel motors driven and a four-wheel independent steer. In this book, the overall design of the UGV, the design of the key subsystems (battery pack system, in-wheel motor-driven system, independent steer system, remote and autonomous control system), and the dynamics control approach will be introduced in detail, and the experiment's results will be provided to validate the proposed dynamics control approach.

Architecture and Security Issues in Fog Computing Applications

The automobile is going through the biggest transformation in its history. Automation and electrification of vehicles are expected to enable safer and cleaner mobility. The prospects and requirements of the future automobile affect innovations in major technology fields like driver assistance systems, vehicle networking and drivetrain development. Smart systems such as adaptive ICT components and MEMS devices, novel network architectures, integrated sensor systems, intelligent interfaces and functional materials form the basis of these features and permit their successful and synergetic integration. It has been the mission of the International Forum on Advanced Microsystems for Automotive Applications (AMAA) for more than fifteen years to detect novel trends and to discuss the technological implications from early on. Therefore, the topic of the AMAA 2014 will be "Smart Systems for Safe, Clean and Automated Vehicles". This book contains peer-reviewed papers written by leading engineers and researchers which all address the ongoing research and novel developments in the field.

Proceedings of the National Conference on Advanced Manufacturing & Robotics, January 10-11, 2004

Unmanned ground vehicles (UGV) are expected to play a key role in the Army's Objective Force structure. These UGVs would be used for weapons platforms,

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logistics carriers, and reconnaissance, surveillance, and target acquisition among other things. To examine aspects of the Army's UGV program, assess technology readiness, and identify key issues in implementing UGV systems, among other questions, the Deputy Assistant Secretary of the Army for Research and Technology asked the National Research Council (NRC) to conduct a study of UGV technologies. This report discusses UGV operational requirements, current development efforts, and technology integration and roadmaps to the future. Key recommendations are presented addressing technical content, time lines, and milestones for the UGV efforts.

Embedded Computing Systems: Applications, Optimization, and Advanced Design

This report presents a framework for measuring safety in automated vehicles (AVs): how to define safety for AVs, how to measure safety for AVs, and how to communicate what is learned or understood about AVs.

Intelligent Autonomous Systems, IAS--3

Underwater vehicles present some difficult and very particular control system design problems. These are often the result of nonlinear dynamics and uncertain models, as well as the presence of sometimes unforeseeable environmental disturbances that are difficult to measure or estimate. *Autonomous Underwater Vehicles: Modeling, Control Design, and Simulation* outlines a novel approach to help readers develop models to simulate feedback controllers for motion planning and design. The book combines useful information on both kinematic and dynamic nonlinear feedback control models, providing simulation results and other essential information, giving readers a truly unique and all-encompassing new perspective on design. Includes MATLAB® Simulations to Illustrate Concepts and Enhance Understanding Starting with an introductory overview, the book offers examples of underwater vehicle construction, exploring kinematic fundamentals, problem formulation, and controllability, among other key topics. Particularly valuable to researchers is the book's detailed coverage of mathematical analysis as it applies to controllability, motion planning, feedback, modeling, and other concepts involved in nonlinear control design. Throughout, the authors reinforce the implicit goal in underwater vehicle design—to stabilize and make the vehicle follow a trajectory precisely. Fundamentally nonlinear in nature, the dynamics of AUVs present a difficult control system design problem which cannot be easily accommodated by traditional linear design methodologies. The results presented here can be extended to obtain advanced control strategies and design schemes not only for autonomous underwater vehicles but also for other similar problems in the area of nonlinear control.

Energy Consumption and Autonomous Driving

"A Vision for Safety replaces the Federal Automated Vehicle Policy released in 2016. This updated policy framework offers a path forward for the safe deployment of automated vehicles by: encouraging new entrants and ideas that deliver safer vehicles; making Department regulatory processes more nimble to help match the

pace of private sector innovation; and supporting industry innovation and encouraging open communication with the public and with stakeholders."--Introductory message.

Proceedings of the International Symposium on Advanced Vehicle Control 1994

Autonomous vehicles (AVs) have been used in military operations for more than 60 years, with torpedoes, cruise missiles, satellites, and target drones being early examples.¹ They have also been widely used in the civilian sector--for example, in the disposal of explosives, for work and measurement in radioactive environments, by various offshore industries for both creating and maintaining undersea facilities, for atmospheric and undersea research, and by industry in automated and robotic manufacturing. Recent military experiences with AVs have consistently demonstrated their value in a wide range of missions, and anticipated developments of AVs hold promise for increasingly significant roles in future naval operations. Advances in AV capabilities are enabled (and limited) by progress in the technologies of computing and robotics, navigation, communications and networking, power sources and propulsion, and materials. *Autonomous Vehicles in Support of Naval Operations* is a forward-looking discussion of the naval operational environment and vision for the Navy and Marine Corps and of naval mission needs and potential applications and limitations of AVs. This report considers the potential of AVs for naval operations, operational needs and technology issues, and opportunities for improved operations.

Automated Driving Systems 2.0.

A collection of papers dealing with complete systems of intelligent robots, focusing on autonomy. The contributions cover intelligent perception, intelligent planning and control, and integrated systems.

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