The Use Of Unmanned Aerial Systems Drones Small Unmanned

Advances in unmanned aerial vehicle (UAV) technology have enabled these tools to become easier to use and afford. In a budget-limited environment, these flexible, remote-sensing technologies can help address transportation agency needs in operations, maintenance, and asset management while increasing safety and decreasing cost. This project tested and evaluated five main UAV platforms with a combination of optical, thermal, and LiDAR sensors to assess critical transportation infrastructure and issues such as bridges, confined spaces, traffic flow, and roadway assets. A State of the Practice report was completed, and a series of lab testing were accomplished to ensure practicality and safe operations. Field demonstrations were completed at bridge, pump stations, and conferences. The project team gave a series of technical demonstrations at the Intelligent Transportation Systems World Congress in Detroit in September 2014. These demonstrations were given to a wide international audience who gained understanding of the advanced research that MDOT is funding. These demonstrations showed how UAV technology can provide many advantages to help MDOT cost-effectively assess, manage, and maintain its services, providing benefit to the state and the public.

The idea behind the use of Unmanned Aerial Vehicles (UAVs) is astonishing because, there is so much technology that this could do in the future with occupations, money, and warfare with endless possibilities. Drones not only are replacing military troops in “hotspots” but could potentially replace other dangerous occupations in industries like firefighting, firefighting in hazmat situations, and the like. This fear that comes with this use will tend to present challenges with their legality and constitutionality. Gaps in current policy leave too much leeway for interpretation and justification for use, as well as holes in new designs and what is legally acceptable. The age of technological possibilities is quickly approaching as our advances in this technology are shifting. However, it is imperative that we consider the implementation of UAVs. The technology wants to acknowledge it or not, UAVs are here to stay and the infringement of our guaranteed rights by the United States Constitution could be in jeopardy. What to expect does or will safety costs citizens, in terms of personal privacy in exchange for the security that this technology can provide?

The use of Unmanned Aerial Vehicles (UAVs) in military operations for reconnaissance and other missions continues to grow. UAV systems using remote control guidance are limited in range and subject to Electronic Warfare concerns. Guidance Systems using only Global Positioning Service (GPS) or an Inertial Navigation System (INS) are limited to a pre-programmed route of flight. A vision guidance system that can control a UAV over an arbitrary route is needed. This thesis uses classical control techniques to develop and test an autonomous vision controller for the FROG-U UAV. First, a computer model of the camera output for a flight that tracks a river is used to develop the controller and to test it in a nonlinear simulation. Finally, the complete system is flight tested on the FROG-U UAV. The design and test environment include a modified FROG-U MAV from the U.S. Army, the MATRIX, a MAV, and a MAV Product Family of software tools developed by Integrated Systems, Inc., and a Ground Station built at NPS from commercially available computer and communication equipment.

The use of unmanned aerial vehicles (UAVs) plays an important role in humanitarian activities. In order to increase their efficiency, this research examines how the use of drones can perform better in terms of safety and effectiveness. Thus, the focus of this dissertation is to provide a comprehensive overview of the current and future potential role of unmanned aerial vehicles in humanitarian activities. The current research on the use of unmanned aerial vehicles in humanitarian activities focuses on a limited number of applications. This dissertation adds to this body of knowledge by exploring the potential role of unmanned aerial vehicles in humanitarian activities and identifying the challenges that are associated with their use. The book provides a resource for educators and students with geographic information and are seeking to enhance these data with the use of unmanned aerial vehicles. Topics covered include: i) primer on UAVs and the many different ways they can be used for geographic observation, 2) a detailed overview on the use of aviation maps and charts for operating UAVs in complex urban airspace, 3) techniques for integrating UAV-derived data with more traditional geographic information, 4) application of spatial analytic tools for urban and environmental planning, and 5) an exploration of privacy and public safety issues associated with UAV operations.

This book provides a comprehensive overview of the theory, design, and applications of unmanned aerial vehicles. It covers the basics, including definitions, attributes, manned vs. unmanned, design considerations, life cycle costs, architecture, components, air vehicle, payload, communications, data link, and ground control stations. Chapters cover types and civilian roles, sensors and characteristics, alternative power, communications and data links, technical considerations, life cycle costs, architecture, components, air vehicle, payload, communications, data link, and ground control stations. Chapters cover types and civilian roles, sensors and characteristics, alternative power, communications and data links, technical considerations, life cycle costs, architecture, components, air vehicle, payload, communications, data link, and ground control stations. Chapters cover types and civilian roles, sensors and characteristics, alternative power, communications and data links, technical considerations, life cycle costs, architecture, components, air vehicle, payload, communications, data link, and ground control stations. Chapters cover types and civilian roles, sensors and characteristics, alternative power, communications and data links, technical considerations, life cycle costs, architecture, components, air vehicle, payload, communications, data link, and ground control stations.
The use of unmanned aerial vehicles (UAVs) or drones for management of crops, livestock, forests and other natural resource-activities represents a new technological frontier and opens up a range of exciting opportunities. The latest issue of ICT Update is dedicated to the use of this technology and associated systems in different parts of the world. This issue - available online and in print format in both English and French has been published in collaboration with EIR. It includes 12 articles, one interview and a section featuring selected online resources on the topic. Articles range from the use of UAVs to design and test materials, to feeding a bountiful beach with marine sponges, from documenting elephant populations in West Africa to understanding changes in the peatland region of Eastern Africa, and more. Many industries have begun to recognize the potential support that UAVs or drones can provide the United Nations Conference on Sustainable Development (Rio+20), and this is no less true for the commercial sector. The Drone Debate offers a thorough investigation of the where, why, how, and when of the U.S.’s use of UAVs. Beginning with a historical overview of the use of drones in warfare, it then addresses whether targeted killing operations are strategically wise, whether they are permissible under international law, and the moral implications involved. The aviation industry is being transformed by the use of unmanned aerial vehicles, or drones - commercially, militarily, and in a growing number of civilian applications. There is a need for further attention to be paid to the ethical issues. This book provides a unique reference of the most innovative approaches to drones across disciplines and applications, including, but not limited to, fundamental design, mission and path planning, control theory, computer vision, artificial intelligence, applications requirements, and more. This book presents a comprehensive reference on unmanned aerial systems, which can be used as a guide for cutting-edge technologies and recent trends in the area.
The increasing civilian use of Unmanned Aircraft Systems (UASs) is not yet associated with a comprehensive regulatory framework, however new rules are rapidly emerging which aim to address this shortfall. This insightful book offers a thorough examination of the most up-to-date developments, and considers potential ways to address the various concerns surrounding the use of UASs in relation to safety, security, privacy and liability.

This book showcases how new and emerging technologies like Unmanned Aerial Vehicles (UAVs) are trying to provide solutions to unresolved socio-economic and environmental problems. Unmanned Vehicles can be classified into five different types according to their operation. These five types are unmanned ground vehicles, unmanned aerial vehicles, unmanned surface vehicles (operating on the surface of the water), unmanned underwater vehicles, and unmanned spacecraft. Unmanned vehicles can be guided remotely or function as autonomous vehicles. The technology has a wide range of uses including industry, transport, communication, surveillance and environment applications. UAVs are widely used in precision agriculture; from monitoring the crops to crop damage assessment. This book explains the different methods in which they are used, providing step-by-step image processing and real data. It also discusses how smart UAVs will provide unique opportunities for manufacturers to tackle new technological trends to come over the challenges of UAV adoption. The book will be of great interest to researchers engaged in forest carbon measurement, road patrolling, plantation monitoring, crop yield estimation, crop damage assessment, terrain modelling, fertilizer control, and pest control.

The FAO-ITU E-agriculture strategy guide (available at http://www.fao.org/3/a-d584a.pdf) is actively being used to assist countries in the successful identification, development and implementation of sustainable ICT solutions for agriculture. The use of unmanned aerial vehicles (UAVs), also known as drones, and connected analytics has great potential to support and address some of the most pressing problems faced by agriculture in terms of access to actionable real-time quality data. Goldman Sachs predicts that the agriculture sector will be the second largest user of drones in the world in the next five years. Sensor networks based on the Internet of things (IoT) are increasingly being used in the agriculture sector to meet the challenge of harvesting meaningful and actionable information from the big data generated by these systems. This publication is the second in the series titled E-agriculture in action (2016), launched by FAO and ITU, and builds on the previous FAO publications that highlight the use of ICT for agriculture such as Middle technologies for agriculture and rural development (2012), Information and communication technologies for agriculture and rural development (2013). The ultimate aim is to promote successful, scalable, and sustainable ICT for agriculture (ICT4Ag) solutions.

Since 2005, the number of countries that acquired an unmanned aerial vehicle (UAV) system nearly doubled from about 40 to more than 75. In addition, countries of proliferation concern developed and fielded increasingly more sophisticated systems. Recent trends in new UAV capabilities, including armed and miniature UAVs, increased the number of military applications for this technology. A number of new civilian and commercial applications, such as law enforcement and environmental monitoring, are available for UAVs, but these applications are limited by regulatory restrictions on civilian airspace. The United States likely faces increasing risks as countries of concern and terrorist organisations seek to acquire UAV technology. Foreign countries and terrorist organisations’ acquisition of UAVs could provide them with increased abilities to gather intelligence on and conduct attacks against U.S. interests. This book examines the global trends in the use of UAV technology, U.S. national security considerations concerning acquisition of UAVs, and the U.S. export control system.

The use of Unmanned Aerial Vehicles (UAVs) and the importance of their role have evolved and increased recently in both civilian and military operations. In this research, we study the routing of Unmanned Aerial Vehicles (UAVs) in the presence of the risk of enemy threats. The main goal for this research is to find optimal routes that consider the targets visited, the expected fuel burn, the threat exposure, and the travel time. We formulated two mixed integer linear programs. In the first formulation, we minimize the total expected fuel burn for multiple UAVs in order to visit multiple targets while maintaining the total threat exposure level for all UAVs to a predetermined constant parameter. In the second formulation, we maximize the total number of visited targets for multiple UAVs while maintaining both the travel time for a UAV and the total threat exposure level for all UAVs to predetermined constant parameters. Both formulations consider a set covering Vehicle Routing Problem (VRP), and some assumptions are made. The expected fuel burn, the risk of threat exposure and the travel time are modeled and calculated for each edge and for each route. Several waypoint generation methods are proposed. In this research, waypoints are considered targets that do not need to be visited. However, a UAV may or may not visit a waypoint while traveling from a target to another in order to reduce the threat level. The Branch and Cut and Price (BCP) methodology is used to solve the problem. In the BCP, the linear programming relaxation of the problem solved at each node is restricted. A cut generation step is called to try to find Minimum Independent Set (MIS) cuts and add them to the Restricted Master Problem (RMP) in order to cut some fractional solutions and encourage integrality. If the MIS cuts do not exist, the pricing step is called. In the pricing step, routes, variables, with negative reduced costs are generated using a Delayed Column Generation (DCG) algorithm and added to the RMP. In our sub problem, the Integer Programming Shortest Path (IPSP) algorithm is used as an engine for the DCG algorithm. A simple path heuristic (HEU) is used with the DCG algorithm in order to generate simple paths from negative cost cycles. Finally, bounds are updated and branching is carried out using a variant of Ryan and Foster branching logic. A computational study for both formulations is done and results for different scenarios are presented. The results for the first formulation show that for the 10-target case, as the total threat level decreases, both the total expected fuel burn and the number of waypoints visited increase for both algorithms, the DCG-HEU and the DCG-HEU-MIS. In addition, only one UAV is used. Therefore, the problem is considered a Travelling Salesman Problem with waypoint generation. The results for the second formulation show that both algorithms, the DCG-HEU and the DCG-HEU-MIS, perform better when using fewer waypoints based on the 4-hour run time limit. For the small-sized problem, the DCG-HEU performs better than the DCG-HEU-MIS when using the same number of waypoints. For the large-sized problem, the DCG-HEU-MIS performs better than the DCG-HEU when using same number of waypoints.

This book discusses state estimation and control procedures for a low-cost unmanned aerial vehicle (UAV). The authors consider the use of robust adaptive Kalman filter algorithms and demonstrate their advantages over the optimal Kalman filter in the context of the difficult and varied environments in which UAVs may be employed. Fault detection and isolation (FDI) and data fusion for UAV air-data systems are also investigated, and control algorithms, including the classical, optimal, and fuzzy controllers, are given for the UAV. The performance of different control methods is investigated and the results compared. State Estimation and Control of Low-Cost Unmanned Aerial Vehicles covers all the important issues for designing a guidance, navigation and control (GN&C) system of a low-cost UAV. It presents significant new approaches that can be exploited by GN&C system designers in the future and also reviews the current literature. The state estimation, control and FDI methods are illustrated by examples and MATLAB(R) simulations. State Estimation and Control of Low-Cost Unmanned Aerial Vehicles will be of interest to both researchers in academia and professional engineers in the aerospace industry. Graduate students may also find it useful, and some sections are suitable for an undergraduate readership.

The Development of Unmanned Aerial Conflict will examine the development and use of aerial drones, a topical subject that has not been written on to date. ??An unmanned aerial vehicle, commonly known as a drone, is an aircraft without a human pilot on board. Its flight is either controlled autonomously by computers in the vehicle, or under the remote control of a navigator or pilot on the ground or in another vehicle. ??Blending history with current and recent operations, Dr Stogett will set out to put the record straight. In some quarters of the press drones get a bad press and there has been much controversy over their deployment, some of which is not deserved. ??The book reveals the history of unmanned aircraft, their recent development and why they have emerged onto the scene. Why did the US, for example, really invest heavily in drone technology? When did all that start? What barriers had to be overcome? Was there before drones arrived????? The book also analyses their operations in Iraq in Gulf War Two and more recently Afghanistan. What role did drones play? Where they successful? What new developments emerged during operations? Did they save lives? Further to this is a detailed look at case studies where they have been used to remove some of the incorrect reporting, putting the record straight based on evidence. How many have been shot down and where???? The book then looks at strategic uses of drones at present: Iran is being monitored; they are already in action over parts of Africa; what are other countries doing... China, Iran? Turkey? The R&A’s use of drones, their deployment and operations is considered along with important questions such as who will own the drones in the future. What are the issues? Will all air forces be drone based in the future? What other applications may arise in the civilian market?

This title explores the development and use of unmanned aerial vehicles, or remote piloted aircraft, more commonly known as drones. Readers will follow the history of the origins and development of the incredible military technology behind UAVs such as the Predator Drone, the Watch Micro-Air Vehicle, the Global Hawk unmanned aerial vehicle, the hand-launched remote control RQ-11 Raven for field operations, and the long-endurance hunter-killer MQ-9 Reaper. Chapters will detail our military’s uses and specifications as well as their features and advantages in the field (including their cameras, sensors, control systems, and weapon systems) while also learning about their use in significant conflict and surveillance missions throughout the Middle East and in other countries. Includes specifications and other test features.

The character of warfare has changed over time. Indeed, developments may be so dramatic that they can be characterised as revolutionary. Technology developed new vehicles to attack enemies. In this book we will elaborate on Unmanned Aircraft System (UAS). These systems are also known as drones and UAVs (Unmanned Aerial Vehicle). In this book will be discussed what UAS are and what the legal limits are of the use of these unmanned systems. This book will first zoom in on lawful conflicts between nations based on the United Nations charter. Second, an international humanitarian law of war based on the first Geneva protocol. Moreover, the legality of targeted killing with the use of unmanned systems will be discussed—Provided by publisher.