

Explorer51 – Indoor Mapping, Discovery, and Navigation for an Autonomous
Mobile Robot
(Technical Report)

The United States Drone Program as Counterproductive Counterterrorism
(STS Research Paper)

An Undergraduate Thesis Portfolio
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Bachelor of Science in Systems Engineering

by

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Preface

How should unmanned robotic vehicles be used to achieve military and civilian goals? The consequences of this novel technology's diverse applications are only beginning to be understood.

The nexus of robotics, autonomous systems and artificial intelligence (AI) may transform exploration. For example, in military reconnaissance a tele-operator can guide a robot to generate a map of a building while discovering and tagging objects of interest, ultimately equipping it to autonomously navigate to the objects' vicinity. The research team implemented such a robot. Our objectives included: (i) incorporating a first-person view (FPV) system that enables non-line-of-sight operation; (ii) implementing automatic collision avoidance; (iii) saving maps of the space in real time; (iv) locating objects of interest within the map; and (v) implementing autonomous navigation to reach a chosen waypoint. Objectives (i) through (iv) were accomplished through the use of a FPV camera and lidar. Researchers may use cameras to improve the mapping and object tagging tasks and use a timed elastic band path planner to complete the autonomous navigation implementation.

U.S. armed services and intelligence agencies have used drones extensively in counterterrorism efforts outside the battlefield. A case study of U.S. operations in Pakistan during the Obama Presidency, based on evidence from U.S. and Pakistani political figures, from residents of targeted areas of Pakistan, and from terrorists themselves, indicates that the consequences of drone strikes are both disturbing and dangerous. U.S. military and intelligence agencies have acted irresponsibly in their use of drones for targeted killings, contributing to the destabilization of allied nations and setting a dangerous precedent for other international powers in their use of force.

List of Contents

1. Preface
2. Technical Report: Explorer51 – Indoor Mapping, Discovery, and Navigation for an Autonomous Mobile Robot
3. STS Research Paper: The United States Drone Program as Counterproductive Counterterrorism
4. Prospectus