

Thesis Portfolio

Fly-Crash-Recover: A Sensor-based Reactive Framework for Online Collision Recovery
(Technical Report)

**Making for fun or for growth? A comprehensive analysis on the development of
makerspaces within the US and China**
(STS Research Paper)

An Undergraduate Thesis

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Bachelor of Science, School of Engineering

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Thesis Prospectus

Sociotechnical Synthesis

The technical topic of this thesis aims to further research regarding the autonomous flight of unmanned aerial vehicles (UAVs). The usage of UAVs has become increasingly popular in various application areas, including surveillance, delivery services, as well as hobby and recreational activities. These UAVs are often deployed in unknown environments filled with obstacles, where a collision or system failure could completely compromise the mission. For these reasons, UAV systems must be designed resiliently and robustly to avoid mission failure. This work investigates strategies to recover a UAV after a collision has occurred, utilizing data available from onboard sensors as well as knowledge of system dynamics. In our results, we are able to show that the UAVs are successfully able to detect and avoid a collision, while also providing a rigorous analysis of the conditions in which the system can recover from imminent collisions.

The STS topic of this thesis is a comparative analysis on the development and usage of makerspaces within the United States and China. To cultivate a culture of innovation, the United States and China both embrace the idea of ‘maker-movement,’ a growing global phenomenon that emphasizes the value and practice of innovation. The goal of my research is to understand and compare how makerspaces are developing in the U.S. and China, as a lens to understand the innovation cultures grounded in the contrasting political, cultural, and social norms of each respective country. In this work, I utilize a case study approach to understand and analyze how the differing contexts of the United States and China have shaped their unique maker movement as well as the overall design of the makerspace.

The technical and STS components are not related.