

Thesis Portfolio

Cubetrix

(Technical Report)

**The Relationship Between Society and Commercial Aviation Industry:
Electric and Private-owned Aircrafts**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Sciences

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science in Engineering

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Engineers and scientists are pushed to produce innovations regardless of what the technology given at the time may be and can lead to technological breakthroughs that are too ahead of its time and unappreciated or incremental on surface but economically better. Certain technologies serve different purposes and my theses serve to explore question of why would a group of engineering students would choose to make a light up toy lamp instead of attempting an engineering marvel such as the next breakthrough in airplane technology. The technical thesis focuses on creating a device in the shape of a cube that plays musical sounds and when a user touches or presses that side and is further indicated by colored LEDs lighting up for each side with the limited resources available. The STS research paper focuses on electrification and privatization of airplanes as potentially the next generational shift in technological breakthrough in the aviation industry.

Many people view technology as solely innovation and solving problems and forget what makes it unique to humans, creativity. Airplane technology mainly serves to connect the world and transport people to further destinations as convenient as possible. Engineers must look at developing airplane technologies from an economic standpoint, a perspective that most people adopt. The technical thesis focuses on creating an interactive LED object that produces various lights and music. The main objective is to develop this device from an economic point of view. This device will mainly be controlled by an MSP430, a mixed-signal microcontroller for low-cost and low-power embedded applications. Each side will be equipped with a force sensitive resistor (FSR or force sensor) which will detect whether the side is being “pressed” or not (Ada, 2018). This algorithm will be programmed on the MSP430 based on the inputs of the accelerometer and FSR. We were unsuccessful in creating the device to follow the functions

mentioned previously and compromised by configuring the device to respond to gravitational orientation and display different colored LED lights unique to the orientation of the cube device.

The STS research explores the increasing integration and development of electric technology and privatization in the aviation industry as well as past industry wide overhauls in airplane technology breakthrough to discuss what the future in airplane technology could be. From approximately 1945 to 1971, a period from post-World War II and Cold War, the transition from propeller driven aircrafts to jet engine aircrafts revolutionized air travel. However, the world today looks to seek greener solutions as it has stuck with mostly the same jet technology from that period, despite incremental innovations in efficiency. Electrification is a widely accepted path towards reaching that goal, opening opportunities for privatization in aircrafts and services. My technical thesis and STS research topic are loosely coupled but reveal that not all technologies are fruitful in the end. The technical project needed to be delivered but due to technical and logistical issues, we had to compromise our initial plan and develop a more budgeted project.