

**TRUST AND SECURITY OF EMBEDDED SMART DEVICES IN ADVANCED
LOGISTICS SYSTEMS**

**ACTOR NETWORK THEORY ANALYSIS OF THE UNITED STATES GOVERNMENT
WEAPONS PROGRAM**

An Undergraduate Thesis Portfolio
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School of Engineering and Applied Science
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Engineering Systems and Environment

By

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SOCIOTECHNICAL SYNTHESIS

This portfolio aims to further the research in logistics devices and how those devices influence society. The technical topic consists of three parts: an analysis on the research and development of hypersonic glide bodies in the United States, a risk assessment of the deployment of bidirectional charging systems, and an overall evaluation of IoT devices in logistical systems. This project was started because as advanced logistics devices become more popular in society, so does the need for safe security practices so that society does not lose control of the technological development of the devices. The STS topic examines how the United States government weapons program interacts with different aspects of American society. Specifically, the STS research aims to answer the question of “how American citizens can better influence the research and development of new weapons produced by the United States Military.” The technical and STS project are tightly coupled with the technical emphasis on security of hypersonic missiles and the STS emphasis on how those weapons and weapons like them are influencing the society around them.

The technical project aims to highlight the most important events that determine a device’s success. This was done by a scenario analysis that identifies a stakeholder’s most important factors to success, the key initiatives of the device or system, and any scenarios that would either positively or negatively impact the lifecycle of the system.

Through analysis of literature and interviews with industry experts, the technical project team produced a ranking for the most disruptive scenarios/events for all three projects and advised the sponsors on what potential actions could be taken to avoid the detrimental events while ensuring the advantageous events happened. For bidirectional charging systems, the most disruptive scenario was a change in the electricity market. For

the hypersonic glide bodies, the most disruptive scenario was an innovation in the enemy's detection capabilities. For the overall logistics devices space, the most disruptive scenario was threats to the supply chain during the device's production.

The STS research project is meant to address the issues in how society interacts with government weapons programs and proposes a fix to allow citizens more control over the development and production of these deadly weapons. The main belief behind the paper is that currently the United States military has gone largely unchecked in its development of weapons that can decimate entire countries and society has a chance to gain more control over the rapid development of these weapons. Through literature review and analysis of current military statistics, Actor Network Theory was used to model the current system and create a new system that can give more influence to the United States citizens over the weapons development process.

Currently, the United States military is only making incremental upgrades to their weapons arsenal, costing America billions of dollars. The new network introduces a citizen elected committee that acts as a buffer between the military and the funding of new weapons. This allows citizens to not only have better control of what weapons are produced but also allows them to gain more knowledge of the weapons industry as a whole through increased access to knowledge as they are electing the committee members.

With the technical research having a focus on hardware security in connected devices and the STS research having a focus on a more limited production of weapons, the United States can ensure that the next generation of weapons are meaningful upgrades and some of the most secure weapons ever built. This can allow America to remain a world powerhouse all while keeping a cap on the military budget.

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PROSPECTUS

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