**Thesis Project Portfolio**

# Exploring the Future of Autonomous Truck Platooning: A Focus on Trust and Reliability

(Technical Report)

# From Drivers to Monitors: The Impact of Autonomy and Platooning on Truckers and the Trucking Industry

(STS Research Paper)

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## Executive Summary

The emergence of autonomous truck platooning demands investigating real-world system reliability and socioeconomic consequences. As these systems become more integrated into transportation networks, a systematic review of reliability and fault areas becomes increasingly important. By systematically cataloguing and analyzing fault modes in real-world conditions, we can improve overall dependability, safety, and operational readiness of autonomous truck platoons. System dependability is critical for widespread deployment; however, understanding the impacts of this technology on the trucking industry is necessary for adoption. Autonomous trucks will fundamentally change the traditional role of truckers; understanding their perspectives and investigating the consequences of restructuring is essential. One of the most common reservations truckers have about truck platooning surrounds its reliability; by transparently improving technical dependability and safety, drivers will be more open to accepting autonomous systems.

By recording and categorizing fault points in operational contexts, trends can be identified, and the technology's overall fault tolerance will improve. This research outlines a methodology for consistently recording and categorizing faults in the real-world use of autonomous truck platooning. New faults will emerge in real-world environments; acknowledging and addressing these faults is key to improving overall system reliability and trust. Highlighting and improving the most fault-prone components in the system will propel development with a focus on the fault-tolerance aspect of the technology. Improving fault tolerance will enhance the safety of the technology as well as the trust in its abilities. Drivers must feel safe and have complete trust for autonomous truck platooning to work; by improving upon the common fault points, driver trust will also improve.

Truck platooning adoption will depend heavily on current drivers' acceptance. What are drivers' current views about autonomous truck platooning? How will this technology affect drivers? Answering these questions provides insights into how to improve the relationship between drivers and the industry. By conducting a literature review of driver interviews and the history of innovation in trucking, and analyzing the industry as a network of human and non-human actors using Actor Network Theory, a better understanding of impacts emerges. Specifically, truck driving has traditionally been a very independent profession, and introducing platooning introduces a new connection that many drivers find difficult to accept. This new reliance on other drivers, along with reliance on automation, causes a fundamental shift in the trucking industry. Historically, drivers have not been receptive to change, especially since innovation often comes at the cost of their autonomy, something truck drivers value greatly. As autonomous truck platooning adoption continues, understanding the network and the shifts this innovation will cause is necessary to limit the alienation of the already dwindling number of truck drivers.