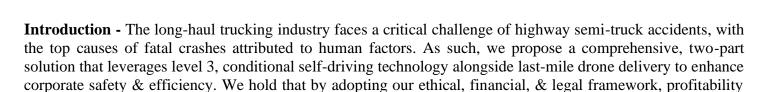**Topic:** Level-3 Self-Driving Trucks & Drone Last-Mile Delivery
University of Florida: Green Gators Consulting Group
Audience: Board of Directors, Old Dominion Freight Line (ODFL)
<u>**Undergraduate:**</u> Max Banach (Third-year, EE), Riley Deputy (Second-Year, ChemE)
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Introduction - The long-haul trucking industry faces a critical challenge of highway semi-truck accidents, with the top causes of fatal crashes attributed to human factors. As such, we propose a comprehensive, two-part solution that leverages level 3, conditional self-driving technology alongside last-mile drone delivery to enhance corporate safety & efficiency. We hold that by adopting our ethical, financial, & legal framework, profitability will ensue.

Problem Description - Trucking accidents in the US have reached alarming levels, with over 523,000 crashes in 2021 – a 26% year-over-year increase. Human error accounts for the cause of 93% of accidents, highlighting the urgent need for intervention. Indeed, of the 5,788 fatal large truck accidents, 53% were caused by semi-trucks comparable to the vehicles ODFL operates. Of those accidents, an average of 11/year were ODFL drivers. Current, less technical level 1-2 AI self-driving models fall short of addressing all human causes, while unproven level 4-5 implementations fail to prove resilient to complex environmental hazard conditions.

Solution Overview - To address this problem, our two-part technical solution incorporates level 3 self-driving technology alongside last-mile drone delivery to revolutionize modern trucking. Level 3 self-driving calls upon sensor systems, AI conditional driving model, & fail-safe mechanisms to ensure safety & efficiency by controlling normal roadway operation except in circumstances that require driver takeover. By enabling trucks to autonomously navigate highways while requiring human oversight, a level 3 approach minimizes human error & enhances safety without supplanting the current trucker workforce. Moreover, addressing how many other accidents occur near intersections, our last-mile delivery offers inaccessible or difficult-to-reach customers unparalleled speed & service availability. By addressing fatal crash prevalence, we can directly reduce ODFL's litigation costs & decrease insurance carrying costs. These cost reductions combined with increasing revenue through added efficiencies & competitive advantage culminate in increased profitability.

Implications:
1. **Ethical:** In self-driving truck operations, prioritizing safety, fairness, and reliability is vital. These are all aimed at ODFL safeguarding stakeholders, minimizing risks, and fostering trust in autonomous transportation systems.
2. **Financial:** Implementation ensures financial security for the trucking workforce, reduces insurance costs, & enhances operational efficiency, provides a competitive advantage; reduces litigation costs from lethal accidents averaging $7.2 million.
3. **Legal:** Our solution passes legality through current frameworks for autonomous vehicle deployment; level 3 reduces corporate liability by adding data-based evidence.

Conclusion - By embracing leading innovation while upholding safety, ethics, & collaboration, Old Dominion Freight Line can position itself as a leader in the transportation industry. Our proposal offers a strategic roadmap for navigating our two-part technical solution while ensuring a safer, more prosperous future for all stakeholders involved.