Aerodynamic Public Transit Vehicle

Opportunity and Significance

- Transportation within the city could be enhanced by forging together the autonomous vehicle technology and electric-drive components.
- We provide a design for such a vehicle concept, aerodynamically shaped to seat up to 12 people.
- Examples of such concepts: Navya on London Heathrow Airport and EZ10 in Hamburg, Germany.

Technical Objectives

- Designing a aerodynamic body for the concept vehicle, hence, improving the fuel efficiency
- Design visualization by:
  - foam models
  - design software called as “Blender”.
- Obtaining a drag coefficient below average for the design when compared to similar vehicle concepts.
- Design iteration process similar to used by industries for a vehicle design, involving feedback to designers for improvements [1].

Current State of Practice

- Less aerodynamic and boxy structure in current concepts.
- Protruding sensors/displays affecting the aerodynamic performance of vehicle.
- Average road vehicle drag coefficients land between 0.3 and 0.45 [2].

Next Steps for Development and Test

- Determine optimal roof curvature without reducing passenger headroom.
- Wind Tunnel testing of the model.
- Testing cross-wind performance (yaw) of the model.

Commercialization Plan & Partners

Steps for Commercialization:

- Patenting the design features.
- Discovering organizations planning to/currently working on such a vehicle concept and proposing the design to them.

Partners:

- Industrial Design students for design visualization.
- Dr. Eagle for aerodynamic applications.
- Fellow Engineering students.
- Potential Future Partners:
  - Autonomous vehicle companies such as Tesla and Almotive.
  - Public and private transportation companies.

Accomplishments

- Low aerodynamic drag Vehicle Body obtained.
- Complete Aerodynamic flow analyses using “SimScale” software at 40 mph.
- Air-dam added to front of vehicle to reduce drag and lift.
- Resultant Coefficient of Drag: 0.40.
- Resultant Coefficient of Lift: 0.33.

Conclusion

With the opportunity to enter the public and private transportation fields, our design provides an aerodynamic concept that results in low drag values while maintaining ample passenger room. With more development and testing, our vehicle has the potential of being seen in everyday use.

References