Connected, Autonomous, Shared, and Electric Vehicles

Northern Virginia Transportation Authority

VIRGINIA TECH TRANSPORTATION INSTITUTE

Advancing Transportation through Innovation

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What is “Driving” the Interest in CASE Vehicles?

Collectively, these advanced vehicles have the potential to positively disrupt the transportation community by:

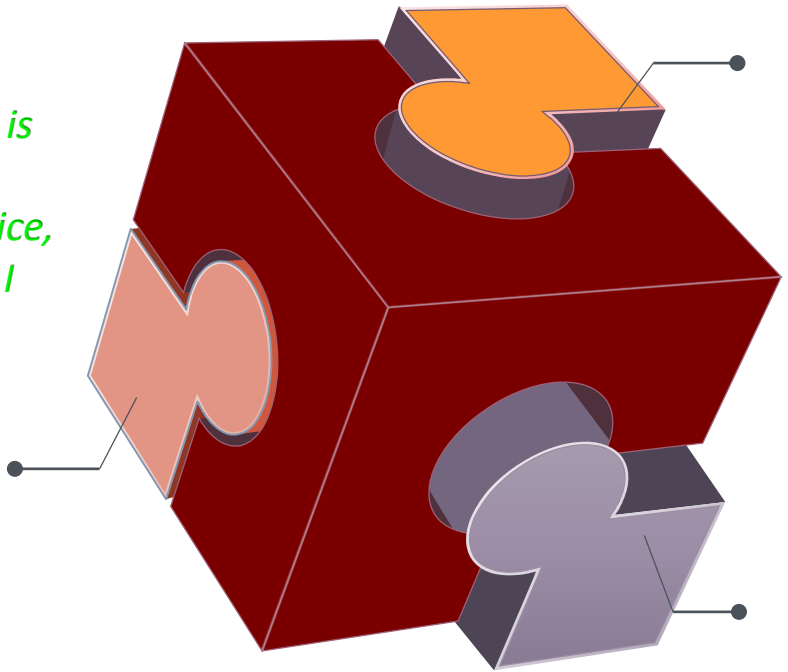
- Improving safety
- Mitigating traffic congestion
- Increasing mobility
- Potentially offsetting negative environmental effects

Opportunities for Innovation Begin With:

Lime

Relying on car transport is not always convenient. Having my own bike is nice, but also has limitations. I need something else!?

Solve a Problem?



Gap in Marketplace?

Lack of convenient, accessible, efficient movement from A to B (Smart Micro Mobility)

Leverage any Trends?

Electrification; Connectivity; Green

Barringer & Ireland 6 ed. "Entrepreneurship: Successfully Launching New Ventures"

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Solving Problem(s) for Citizens = Yes

Solving Problem(s) for Municipalities = ?

Is It Even Possible To Solve All Transportation Problems In Northern Virginia?

A Complex System

Definition by professor George Rzevski :

1. **INTERACTION** – A complex system consists of a large number of diverse components (Agents) engaged in rich interaction
2. **AUTONOMY** – Agents are largely autonomous but subject to certain laws, rules or norms; there is no central control but agent behaviour is not random
3. **EMERGENCE** – Global behaviour of a complex system "emerges" from the interaction of agents and is therefore unpredictable
4. **FAR FROM EQUILIBRIUM** – Complex systems are "far from equilibrium" because frequent occurrences of disruptive events do not allow the system to return to the equilibrium
5. **NONLINEARITY** – Nonlinearity occasionally causes an insignificant input to be amplified into an extreme event (butterfly effect)
6. **SELF-ORGANISATION** – Complex systems are capable of self-organisation in response to disruptive events
7. **CO-EVOLUTION** – Complex systems irreversibly co-evolve with their environments

Retrieved from: https://www.slideshare.net/andreheijstek/cynefin

Challenges:

- To focus on leveraging and sharing data correctly (Smart Data), not just collecting a lot of data (Big Data) without purpose
- As a municipality, do we:
  - Develop solutions ourselves?
  - Contract others to provide their services?
  - Let industry supply for the demand organically?
- How do we do all of this while 1) avoiding unintended consequences, and 2) make the experience for citizens elegant and seamless to citizens?

Overall Challenge: Creating/Supporting an Ecosystem that Allows for Integrated Innovative Solutions

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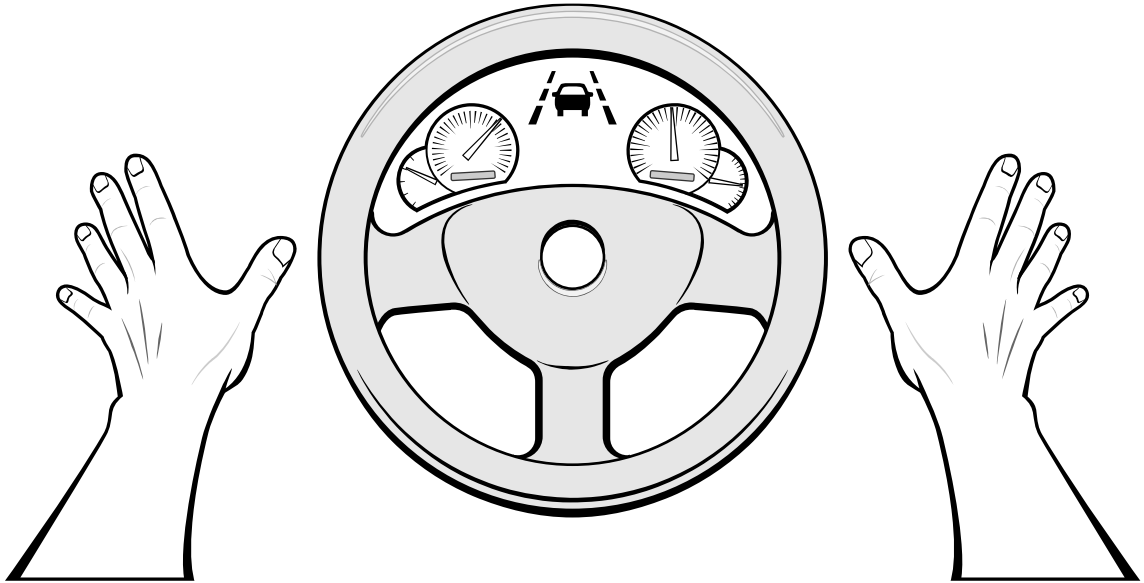

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