



Pathway into Full Autonomy by Leveraging Infrastructure Enabled Automation

Infrastructure Enabled Autonomy (IEA) is an evolving field of transportation. Unlike conventional autonomy, where the individual vehicles process perception and make decisions, IEA distributes some of the work to roadside infrastructure. IEA potentially addresses two obstacles hindering a full roll-out of vehicle automation:

i) accuracy and robustness of perception, and ii) high costs of equipment on vehicles. With fixed-location sensors, the accuracy of perception is improved to within a centimeter under all weather conditions. Additionally, vehicles do not require as much on-board computing capability as currently required for a fully autonomous driving mode. IEA offers the potential to make autonomy feasible at a lower cost to consumers. The role of transportation agencies or other stakeholders in managing and maintaining the needed roadside infrastructure is unknown.

Some researchers considered IEA to be critical for full automation, especially during a potentially long transitional period. The many impacts expected from IEA deployment include, but are not limited to, the following.

- **Changes in travel behavior, location choice, and land uses.** Autonomy requires upgrading the current infrastructure. As a result, the road system will mix autonomy-friendly and traditional infrastructure for a long time. The uneven distribution of infrastructure upgrades could significantly affect route and location decisions of drivers and the distribution of land uses.
- **Consumer acceptance of vehicle autonomy and differential equity outcomes.** As the cost of automated vehicles decreases, they will become affordable to a larger group of consumers. Quantifying the potential market size expansion in self-driving vehicle will be crucial for better policymaking. Additionally, when designing policies, policymakers need to consider not only how to deploy this technology quickly and safely, but also how to improve the well-being of those who need it most and avoid exacerbating barriers and increasing inequality.
- **Potential reductions in vehicle emissions.** Cooperative driving, platooning, and other more efficient driving patterns could be implemented and automated by IEA, reducing harmful vehicle emissions. IEA's central control could more effectively enforce these intricate driving patterns than the decentralized nature of fully automated vehicles, potentially enhancing emission reductions.

As of now, most studies focus on the technologies needed to enable IEA. Few studies explore policy and governance issues associated with IEA deployment and maintenance and the potential impacts of IEA on travel and the environment. Research in these areas is critical to planning for a sustainable future with IEA proactively.

- **Innovative policies addressing the deployment of IEA;**
- **Governance issues associated with deploying and maintaining IEA;**
- **Consumer acceptance of IEA;**
- **Impacts of IEA on land use;**
- **Impacts of IEA on travel behavior;**
- **Impacts of IEA on energy and environment;**
- **Equity issues associated with IEA.**

Timeline:

- Submission portal opens: **Dec 1st, 2020.**
- Submission deadline: **Nov 1st, 2021.**
- Special issue completed: **June 1st, 2022.**

Paper Submission Link

<https://www.elsevier.com/journals/transportation-research-part-d-transport-and-environment/1361-9209/guide-for-authors>

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