Automated Electric Transportation (AET) is a revolutionary example of a cooperative transportation system which combines recent advances in vehicle automation and electric power transfer. It is an emerging concept for a network of vehicles that essentially control themselves via vehicle-to-vehicle and vehicle-to-infrastructure communication. AET vehicles are also wirelessly powered through embedded technology in the roadway infrastructure, even while in motion.

**What is AET?**

Cooperative Transportation System – A system in which drivers, vehicles, and the roadway all function as a single, well-integrated system.

**How do we get there?**

**Transition Step 1:**

**Stationary Home Charging:**

This step represents the most simple implementation: installing a charging pad in one’s garage. This simply provides the benefit of not having to plug in your electric vehicle when you arrive home. The pad in the floor of your garage and the pad underneath your vehicle communicate in such a way that your vehicle automatically charges itself when the pads are aligned.

**Transition Step 2:**

**Stationary Public Charging:**

This step begins to resolve the range limitation of electric vehicles by allowing vehicles to not only charge at their point of origin, but at their point of destination as well.

**Transition Step 3:**

**Semi-Stationary Charging:**

This step further resolves range anxiety by adding the ability to charge at specific intermediate points along a route. This step is specifically beneficial to agencies in control of vehicle fleets that frequently use these locations for a short period of time. These locations include bus stops, loading docks for freight companies, and airports, public transit stations, or hotels where taxis frequently wait for passengers.

**Transition Step 4:**

**Charge-In-Motion:**

This step all but eliminates range anxiety for electric vehicles. By expanding on transition step 3, where vehicles gain a “mini-charge” at short stops along a route, by decreasing the distance between pads and increasing the frequency of passing over a charging pad, vehicles would have the ability to charge while in motion, even at speeds upwards of 75 mph. Critical links would first be identified for initial implementation for this technology. Over time, new links would be added, and old links would be expanded.

**Transition Step 5:**

**Assisted Control:**

This step introduces automated control to the system. This step utilizes current technology in collision avoidance and lane keeping to assist drivers with the longitudinal and lateral control of their vehicle. Due to the fact that optimum power transfer occurs when pads in the infrastructure and pads in the vehicle are directly aligned, this assistance begins to optimize the system in terms of efficiency and safety.

**Transition Step 6:**

**Automated Control:**

Fully automated control is finally possible upon the development of a check-in and check-out process. This includes points where control of a vehicle is switched from manual (human) control to automatic control.

**What’s happening today?**

**‘Going Green’**

Today there is an ever-growing push for “going green”, and the automotive industry is no exception. Gasoline combustion almost exclusively produces the energy powering our vehicles. Consequently, as emissions from millions of vehicles add up, automobiles are the single greatest source of pollution in numerous cities across America. Thus, requirements for reduced emissions and improved fuel economy have become stricter and travelers have increased their demand accordingly. Automotive companies such as Nissan, Chevrolet, and Ford have therefore engineered fully electric vehicles in the Leaf, the Volt, and the Focus Electric, respectively. These vehicles are also beneficial to agencies in control of vehicle fleets that frequently use these specific intermediate points along a route. This step is specifically designed to provide backwards compatibility to previous systems. When the Federal-Aid Highway Act (1956) was enacted, President Eisenhower sought a way to move military resources across the country in a more efficient and timely manner. In essence, improve the mobility of our transportation system with respect to the vehicles populating the roadways of that time.

**Why does this work matter?**

- **Tens of thousands of deaths**
- **Millions of injuries**
- **Billions of dollars in roadway inefficiency & property damage**

The majority of the injuries caused and the lives lost on today on America’s roadways are the result of various factors, over 90% of them due to some form of human error. Cooperative transportation systems like AET have the potential to prevent many of these factors, thereby saving thousands of lives and preventing millions of injuries each year.

However, one of the most common criticisms of fully-electric vehicles is range. Users hesitate adopting this type of vehicle because they feel it will limit their mobility. The transition strategy laid out for AET’s development shows that this limitation can be resolved, as well as travelers’ mobility increased.