

Next Generation Mobility Management in Connected Vehicle Environment

Primary Author: Yehuda Gross, United States Department of Transportation

Secondary Author(s): Gwo-Wei Torng, Noblis Inc.

In 2010, the U.S. Department of Transportation's (USDOT) Intelligent Transportation Systems (ITS) Joint Program Office (JPO) launched the connected vehicle research program. The connected vehicle research includes a suite of technologies and applications that use wireless communications to provide connectivity among vehicles, the infrastructure, and traveler' personal communications devices at all time. It is a multimodal research effort involving all USDOT surface modal partners, including the Federal Transit Administration (FTA), as transit is positioned as a key element of this integrated transportation solution. Within the concept of a connected vehicle environment, transit is regarded as a major contributor of reliable and consistent traffic data, as well as a beneficiary to use real-time intelligence to support decision making by system operators and travelers.

The connected vehicle research program has established three major application areas of focus: safety, mobility and environment. Of these three major application areas, the authors envision a particular active and visible role from the transit community in the mobility application area. In the near term, the USDOT is committed to the concept exploration and feasibility analysis of several dynamic mobility applications (DMA) "bundles", including a transit-oriented bundle titled Integrated Dynamic Transit Operations, or IDTO. The IDTO bundle contains three separate, and yet inter-connected mobility applications: connection protection, dynamic transit operations and dynamic ride-sharing. In addition, there are few transit-related mobility applications embedded in other DMA bundles, such as emergency communications and evacuation in the Response, Emergency Staging, Communications, Uniform Management, and Evacuation (R.E.S.C.U.M.E.) bundle.

The authors believe that the connected vehicle environment will provide a promising opportunity to revolutionize the current mobility management practices. This opportunity is driven by the notion of ubiquitous connectivity among mobility service clients, transit vehicles, service providers and mobility managers. Through this connectivity, the mobility service providers are empowered to deliver a higher quality of service, such as a narrower pick-up time window, shorter trip time and lessened advanced booking requirement. Mobility service users can better manage their own mobility need and make more informed travel choices with respect to when and how to travel. Mobility managers are able to make informed decision to match mobility need with service based on real-time information. For mobility program funding agencies, this ubiquitous connectivity will result in lower program cost due to higher system productivity and efficiency, and greater accountability through automated management and billing process. In the end, the society as a whole will experience a more integrated and productive mobility service network available to all Americans when needed with lower environmental impacts.

Through this presentation, the authors will provide a concept overview and status update of the USDOT connected vehicle research program, and explain why and how transit stakeholders can and should play an active role in this effort. The presentation will then target the discussion on the meaning and implications of ubiquitous connectivity on mobility management. This discussion will put a special focus on selected dynamic mobility applications, including IDTO, that are under the concept exploration phase and are particularly relevant to mobility management in rural and small urban settings. Build upon recent research and development outcomes, the authors will challenge the audience to revisit the current concept of mobility management and shape a strategic path to utilize connected vehicle capability for the next generation mobility management.

