

Demonstrating the Synergies between Vehicle Automation, Telematics Connectivity, and Electric Propulsion at Joint Base Lewis-McChord

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Center for Advanced Transportation and Energy Solutions (CATES)

Seattle, Washington USA | www.aboutcates.org

The Center for Advanced Transportation and Energy Solutions (CATES) is a non-profit think tank with an action focus on integrating and accelerating emerging and disruptive vehicle technologies in order to reduce road fatalities, vehicle emissions, and congestion.

We are cooperating with public and private organizations in Washington State and across North America to emphasize a focus on the synergistic combination of necessary vehicle technologies.

One of the potential obstacles to the deployment of self-driving vehicles is an underlying concern among policy makers that this technology will encourage more frequent use of single occupant cars, more traffic congestion, less use of public transportation and thus more urban pollution and greenhouse gas emissions.

But a combination of self-driving vehicles with electric propulsion and increased use of telematics to enhance public transportation has the potential to accelerate the acceptance and use of these technologies.

Based on research funded by the Graham Environmental Sustainability Institute at the University of Michigan, our assessment of potentials has led us to the importance of CATES working with government policymakers to describe and demonstrate the merger of development in vehicle automation with the emergence of practical and commercially viable electric vehicles. We seek to also understand the costs and benefits, opportunities and challenges, that come with connecting vehicles via wireless to the Internet, other vehicles, infrastructure, data, and computing applications.

Other research has found that air emissions kill as many people as car crashes, and significant emissions still come from petroleum-fueled cars despite decades of effort. CATES is working with Washington State policymakers on policies to reduce the reliance on oil for vehicle propulsion by increasing the use of Washington's mostly carbon-free electricity. A significant reduction of carbon emissions is a mandated Washington State policy goal, in addition to local clean air goals.

At the same time, reduction of traffic fatalities and serious injuries down to zero are also goals of Washington state policy—all of which must be done at low or no cost to the state economy. Our partner safety specialists are the Washington State Traffic Safety Commission and the Liberty Mutual Research Institute for Safety.

CATES is also working with Washington State's regional transportation planners on telematics connectivity to increase use of public transportation options including more frequent and flexible carpools and vanpools, increased deployment of private sector transit options, more ride sharing and car sharing options, as well as better connections to increase traditional train and bus use in high-volume travel corridors. These agencies are the two MPOs -- Puget Sound Regional Council and the Thurston Regional Planning Council -- and the Washington State Transportation Commission.

Our work points to the importance of real-world demonstrations of vehicle technology benefits and costs in a controlled, real-world setting, which has led to our planning for a large-scale demonstration at Washington State's largest military base.

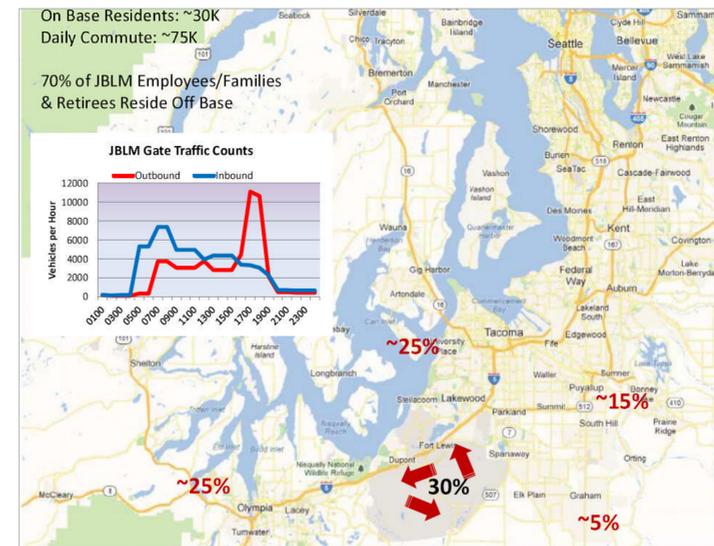
Nissan Leaf used as electric vanpool



Joint Base Lewis McChord (JBLM) in Washington State between the cities of Tacoma and Olympia has unique and favorable attributes for testing the emerging vehicle technologies and associated systems:

- The power supplied to the base by Tacoma Power is over 95 percent carbon-free hydroelectric, wind, solar and nuclear power;
- The portion of the Interstate 5 highway running through the base is the most congested road segment on the West Coast and needs cost-effective solutions;
- JBLM has an existing vanpool program that can be expanded and used for experiments in smart, connected, increasingly autonomous, electric vehicles;
- JBLM is an award winning leader among U.S. military bases for its strong commitment to environmental sustainability as well as livable community design;
- The base has strong civilian support at the local and state level through the South Sound Military & Communities Partnership and through new state level initiatives;
- Innovative companies located nearby are leaders in different aspects of the emerging technologies pertinent to improved mobility. These firms include Google, Microsoft, INRIX, Airbiquity, VoiceBox, Amazon, PACCAR, and Boeing;
- Citizens of Western Washington have historically been early adopters of technology that improves the environment and the sustainability of communities.

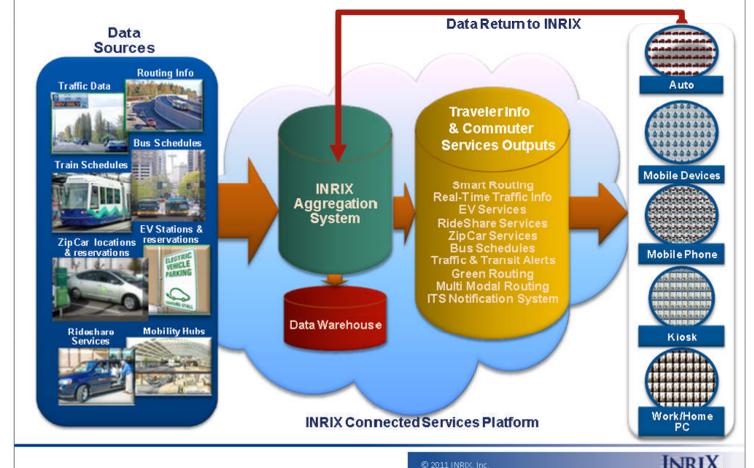
JBLM Demonstration Site



The integrated, large-scale testing at JBLM would include the following elements:

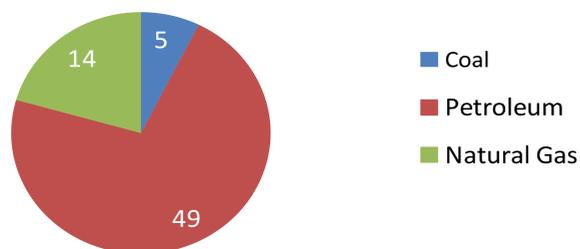
- Incorporation of a new petroleum and CO₂ reduction goal into the existing Department of Defense program of Net Zero energy;
- Implementation of smart, connected electric vanpools for troops as well as contractors for commuting to and from the base;
- Implementation of an on-base EV shuttle system to move transit commuters inside the base, and having growing autonomous capabilities;
- Testing of driverless and platooned vehicles along I-5 and I-90 from JBLM to the Yakima Firing Range in central Washington State;
- Testing of information protocols and standards in applications linking vehicles to infrastructure and data;
- Creation of connected transportation hubs north and south of the base to allow for reserved parking, flexible car pools, and vanpools;
- Creation of incentives for military and civilian base employees to purchase electric vehicles or to use transit;
- Testing of used vehicle batteries as back-up power sources for mission critical circuits;
- Testing of bi-directional power supplies for EVs that are capable of providing back up power and ancillary power services.

Overview of INRIX's Potential Role in Project

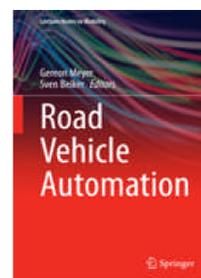


Washington State Fossil Fuel Use in 2011

Millions of Metric Tons of CO₂



Descriptions adapted from our chapter "Synergies Between Vehicle Automation, Telematics Connectivity, and Electric Propulsion" in this 2014 book from Springer:



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