Vehicle Technologies Office (VTO)

Office Overview

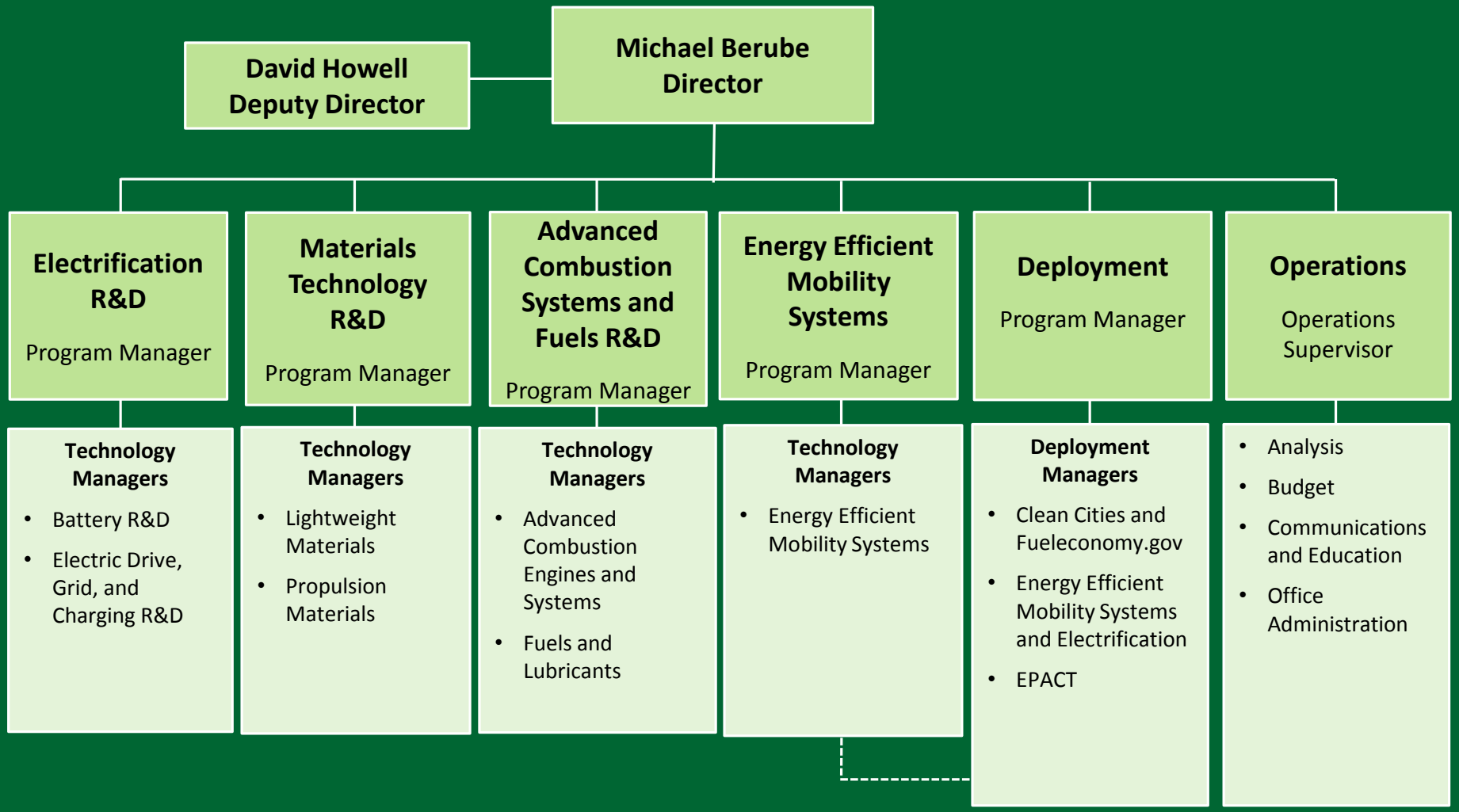
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Michael Berube
Director, VTO
Office of Energy Efficiency and Renewable Energy

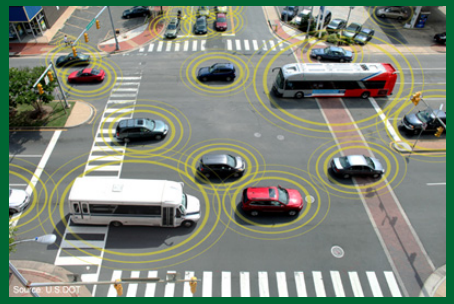
Today

- What's New
- Office Vision and Strategy
- Goals and Successes

VTO Organizational Structure



Why Energy Efficient Mobility Systems (EEMS)?



Connectivity

How can disruption lead to new energy efficiency opportunities?

Automation

Ride-sharing

What are the most promising innovation levers?

Car-sharing

New Powertrains

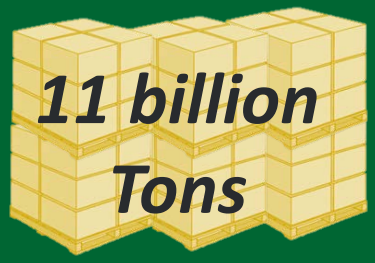
What are the risks to energy use and how can we overcome them?

New Modes

VTO Mission

Growing our Economy Requires Transportation, and Transportation Requires Energy

Annually, transport…



Goods by

Over 3 Trillion Miles

VTO providing **low cost, secure, efficient, and clean** energy technologies to transport people and goods across America

FY 18 Program Focus and Strategy

Early Stage Research that Advances…

Fuel Diversification
Domestic, Diverse, Alternative, Clean Fuels

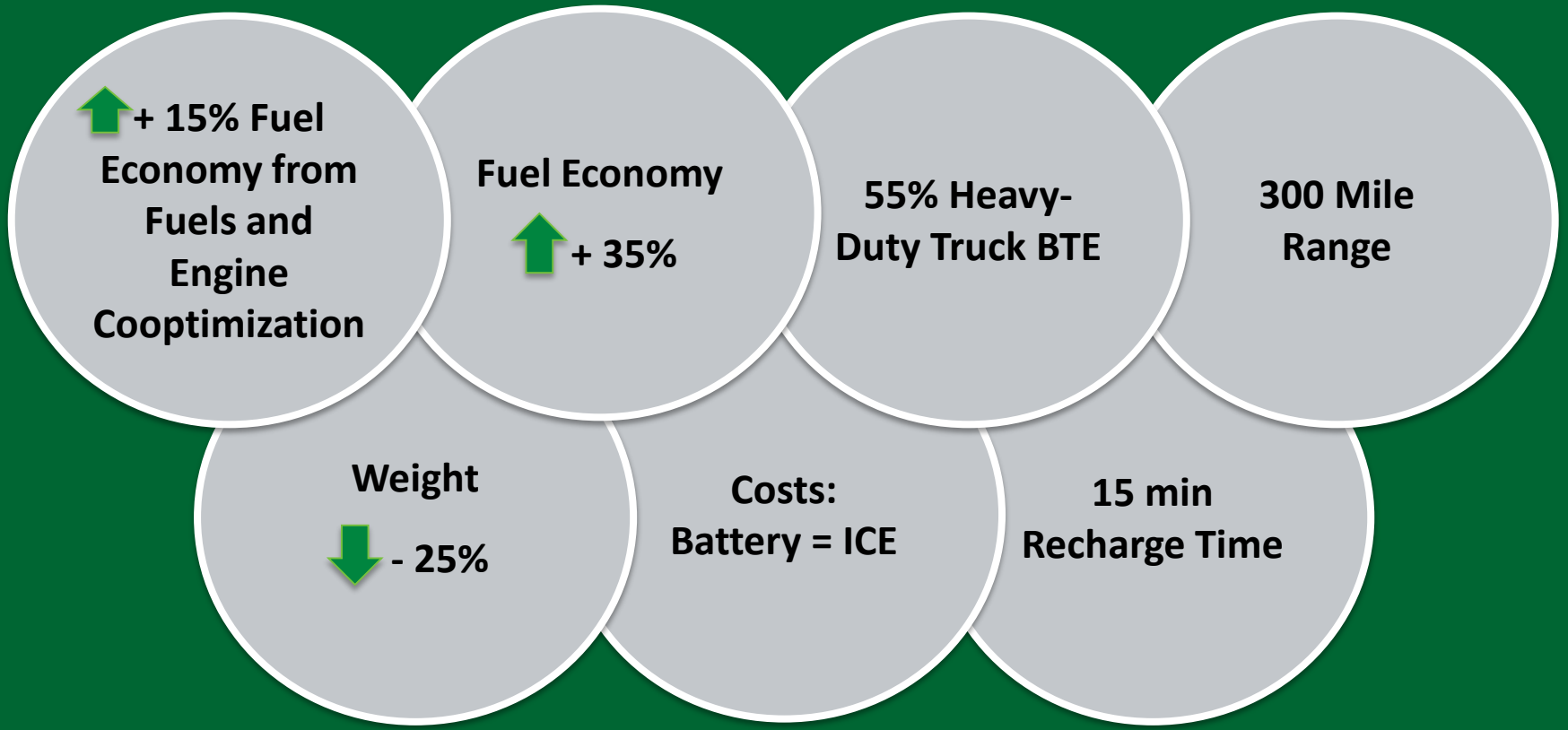
Vehicle Efficiency
Energy Efficient Vehicle Technologies

Mobility Systems
Energy Efficient Transport Systems

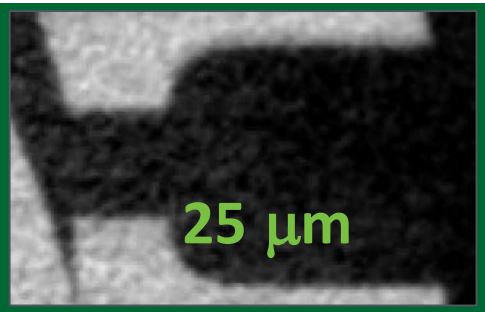
VTO Budget

FY 18 Budget Structure	FY 17 Enacted ($K)	FY 18 Request ($K)
Battery and Electrification Technologies	$140,530	$36,300
Energy Efficient Mobility Systems	$16,385	$12,200
Advanced Engine and Fuel Technologies	$83,979	$22,000
Materials Technologies	$23,565	$7,500
Outreach	$37,400	$2,000
Analysis	$5,100	$2,000
TOTAL	**$306,959**	**$82,000**

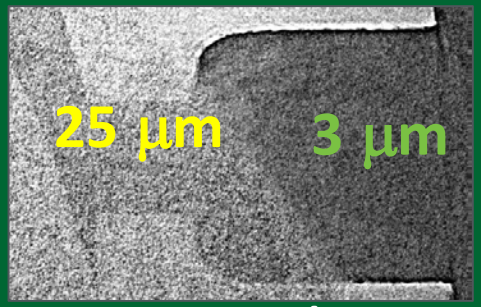
Ambitious Goals



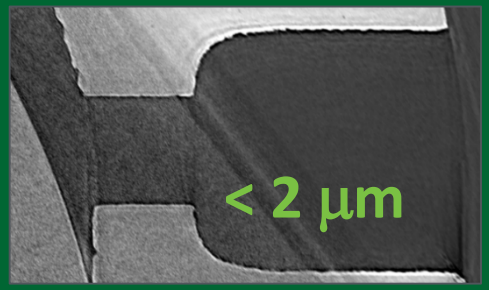
All New Fuel Injector Visualization



Commercial Service



European Synchrotron



Argonne

World-class spatial resolution

High Precision has been Achieved in Nozzle Geometry Visualization

Fuel Injector Nozzle Geometry

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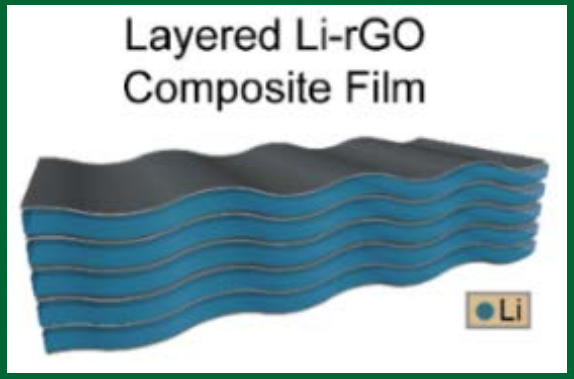
New Concept to Enable Lithium Metal Anodes

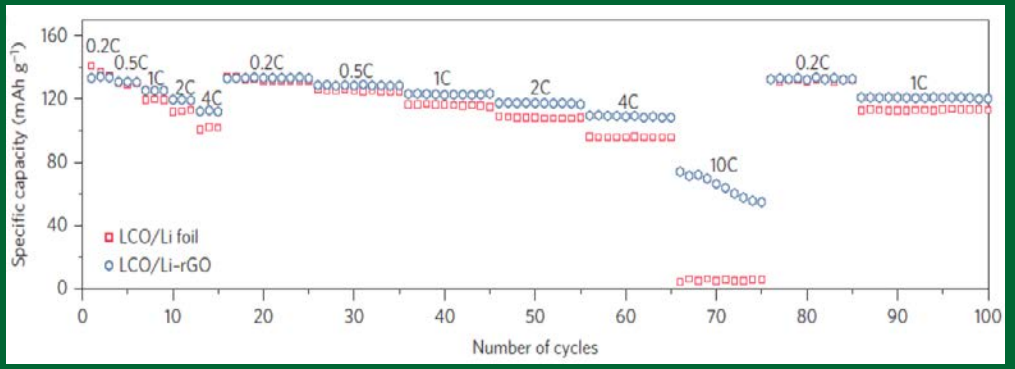
STANFORD UNIVERSITY



Reduced Graphene Oxide (GO) with Nanoscale Interlayer Gaps as Stable Host for Li Metal

Novel Structure as Host for Storing Metallic Lithium

Could lead to ↕ **Range** / **Cost**

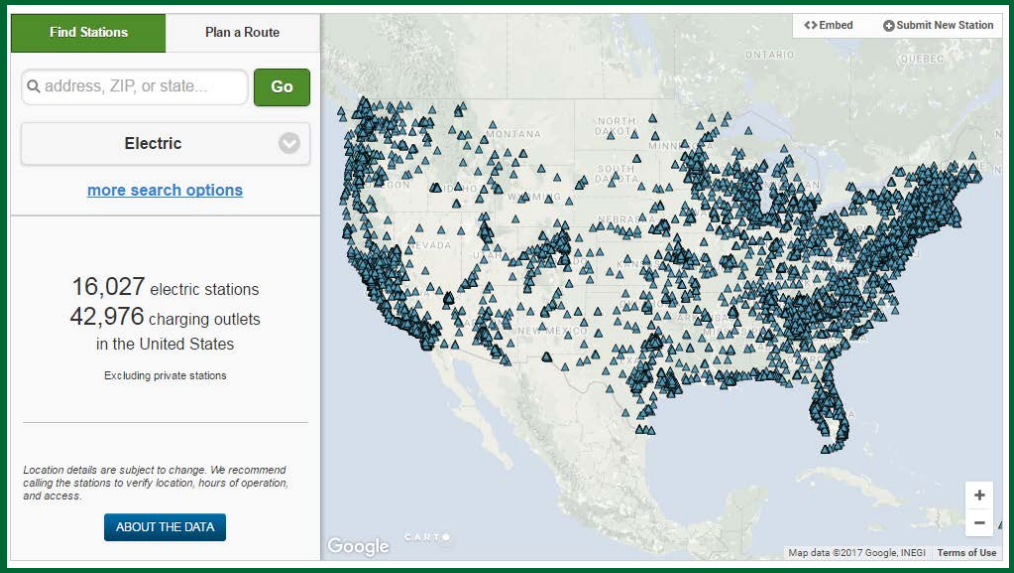


Y. Cui group, *Nature Nanotechnology* (2016)

Cycling of Li–Reduced Graphene Oxide Electrodes

Analysis of Consumer Trips to Understand Charging Needs

Heat map of Columbus trip destination frequency derived from INRIX data set



Map of Electric Charging Stations from the Alternative Fuels Data Center

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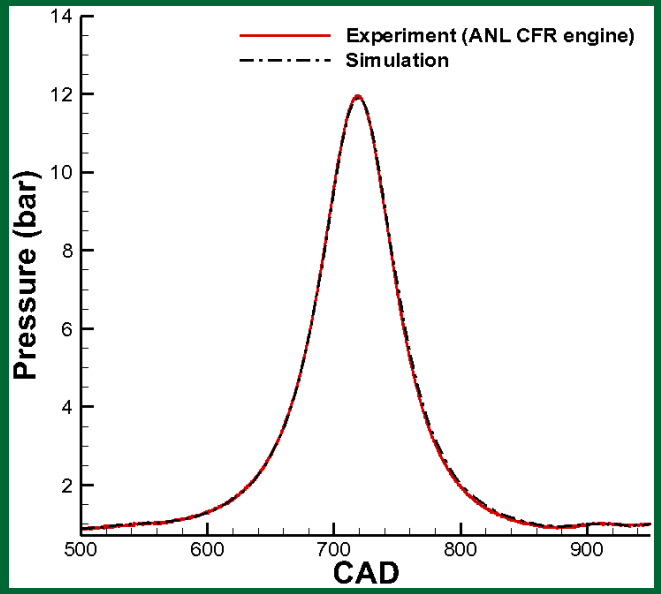
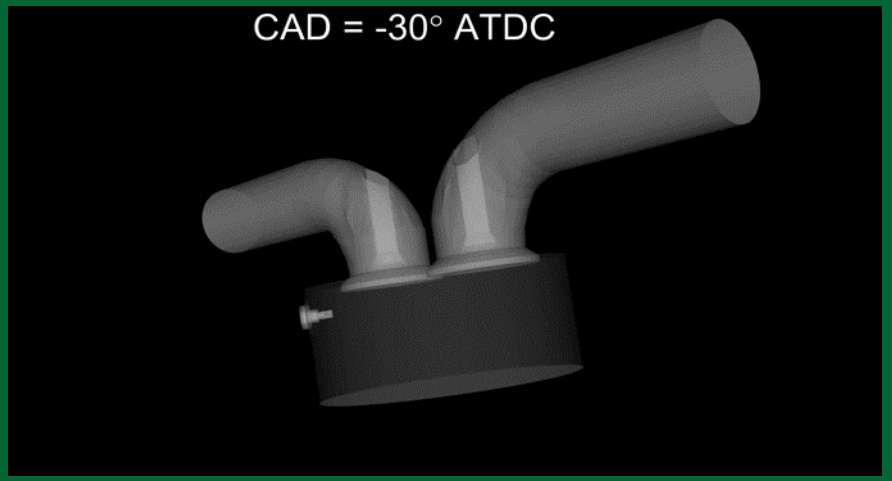
Ability to Derive Knock Computationally



Knock visualization in CFR



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Atomic Level Observation Reducing Magnesium Corrosion

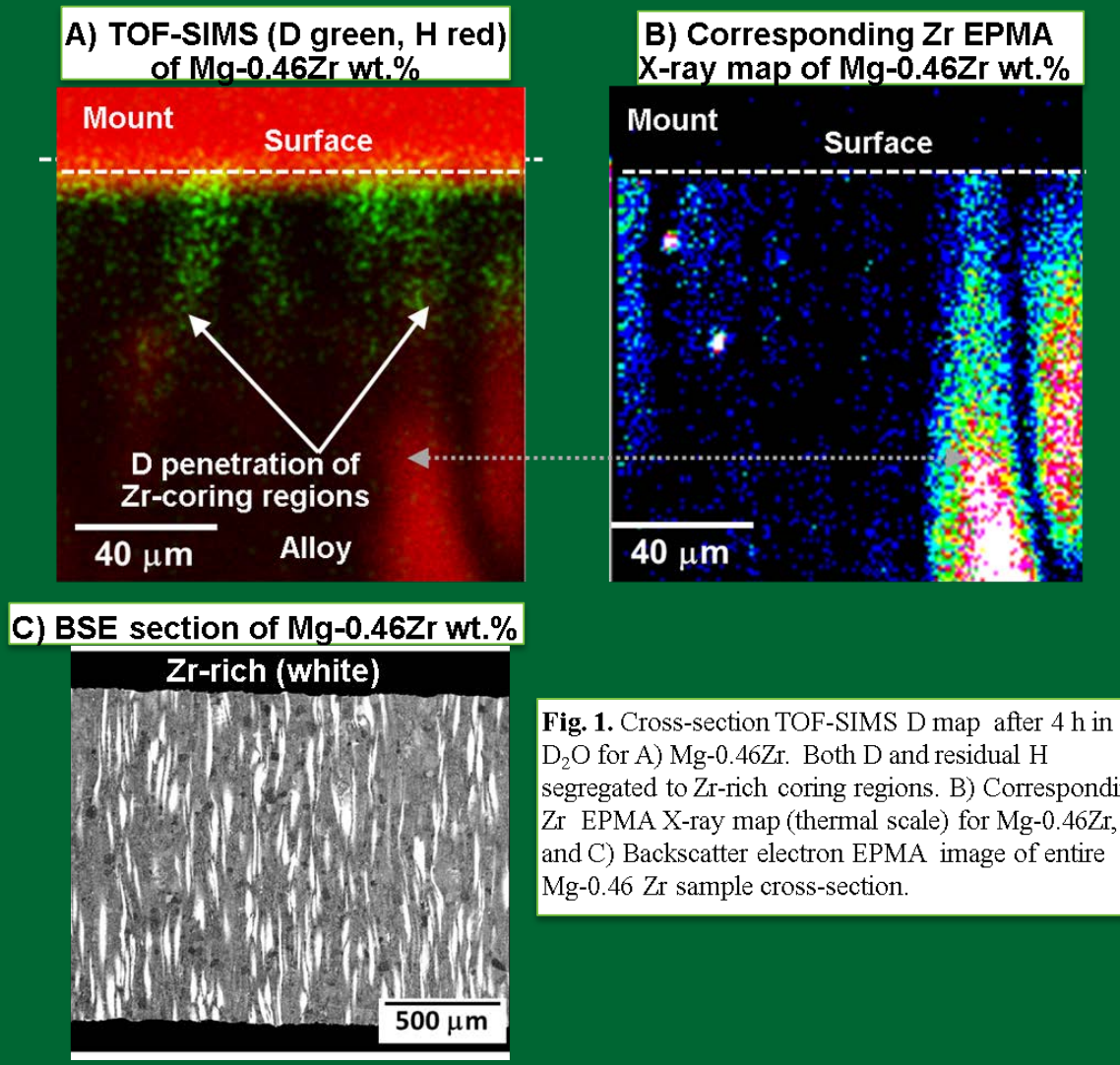

Fig. 1. Cross-section TOF-SIMS D map after 4 h in D_2O for A) Mg-0.46Zr. Both D and residual H segregated to Zr-rich coring regions. B) Corresponding Zr EPMA X-ray map (thermal scale) for Mg-0.46Zr, and C) Backscatter electron EPMA image of entire Mg-0.46 Zr sample cross-section.

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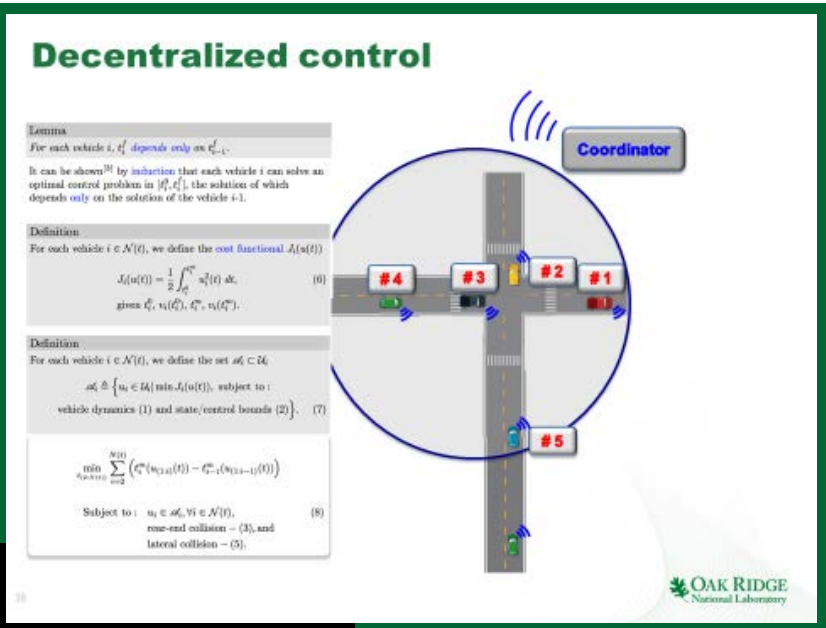
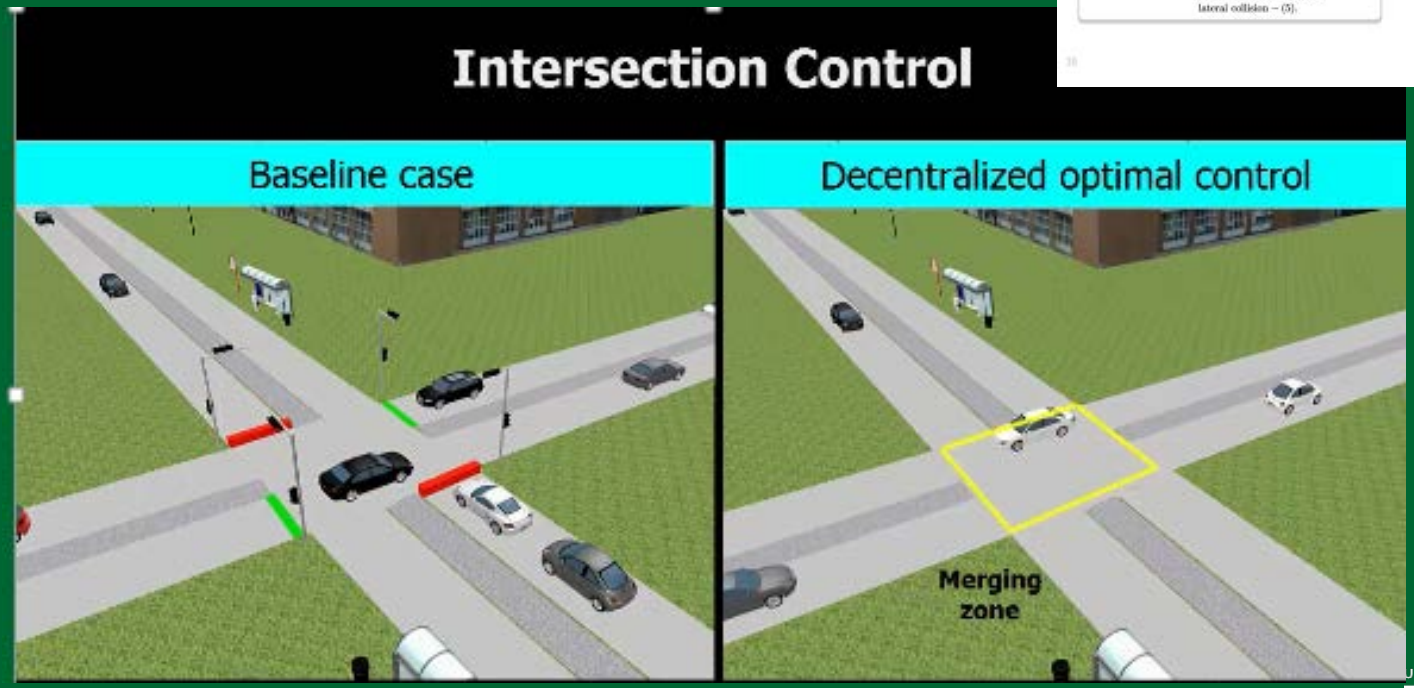
New Math Based Models to Control Intersections





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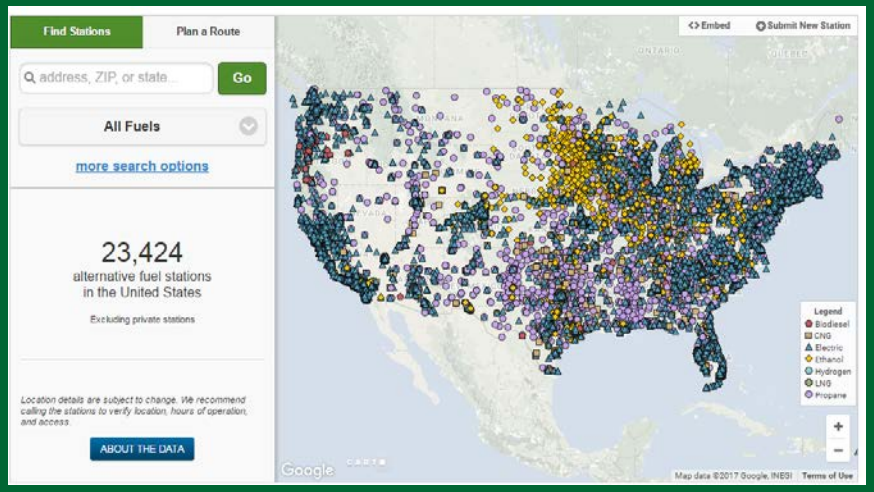
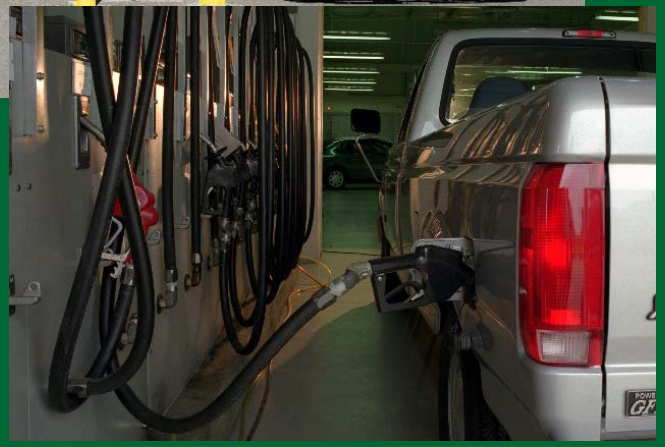
Vehicle Technologies in Use

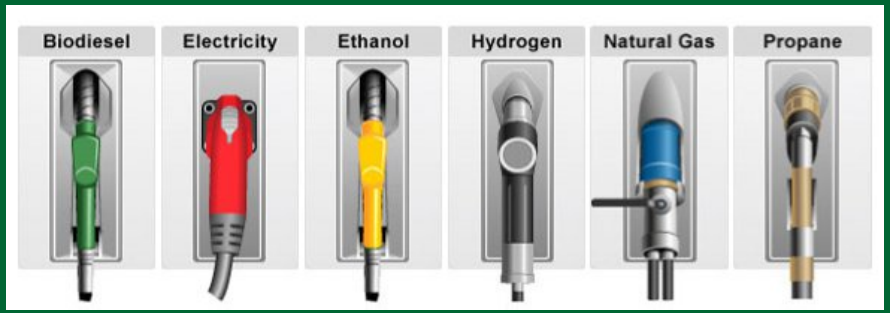
www.fueleconomy.gov
the official U.S. government source for fuel economy information

Clean Cities
U. S. Department of Energy

EEMS Living Labs







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Keys for a Successful VTO

Thank You