

EXPLORATORY ADVANCED **RESEARCH**



Cyber Physical Systems in Surface Transportation

NSF Transportation CPS

January 23, 2014



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Federal Highway Administration

Presentation Outline

- Government Interests
 - Safety, mobility, environment
- Government orientation
- Need for cooperation



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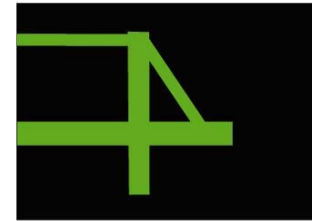
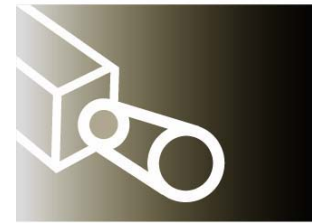
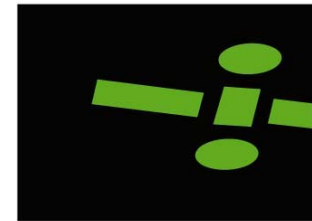
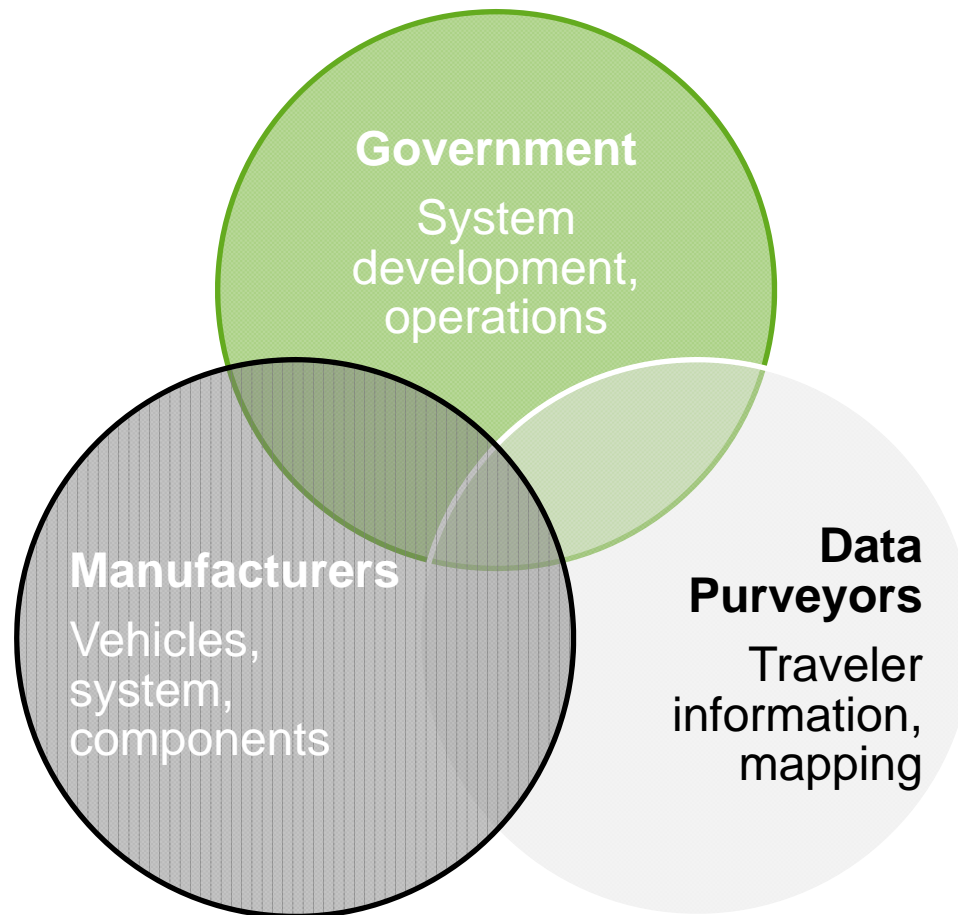
CPS Impact

- Safety
 - Avoid crashes (time between crashes), reduce crash severity
- Mobility
 - Improve system reliability
- Environment
 - Decrease energy, natural resource needs



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CPS Orientation

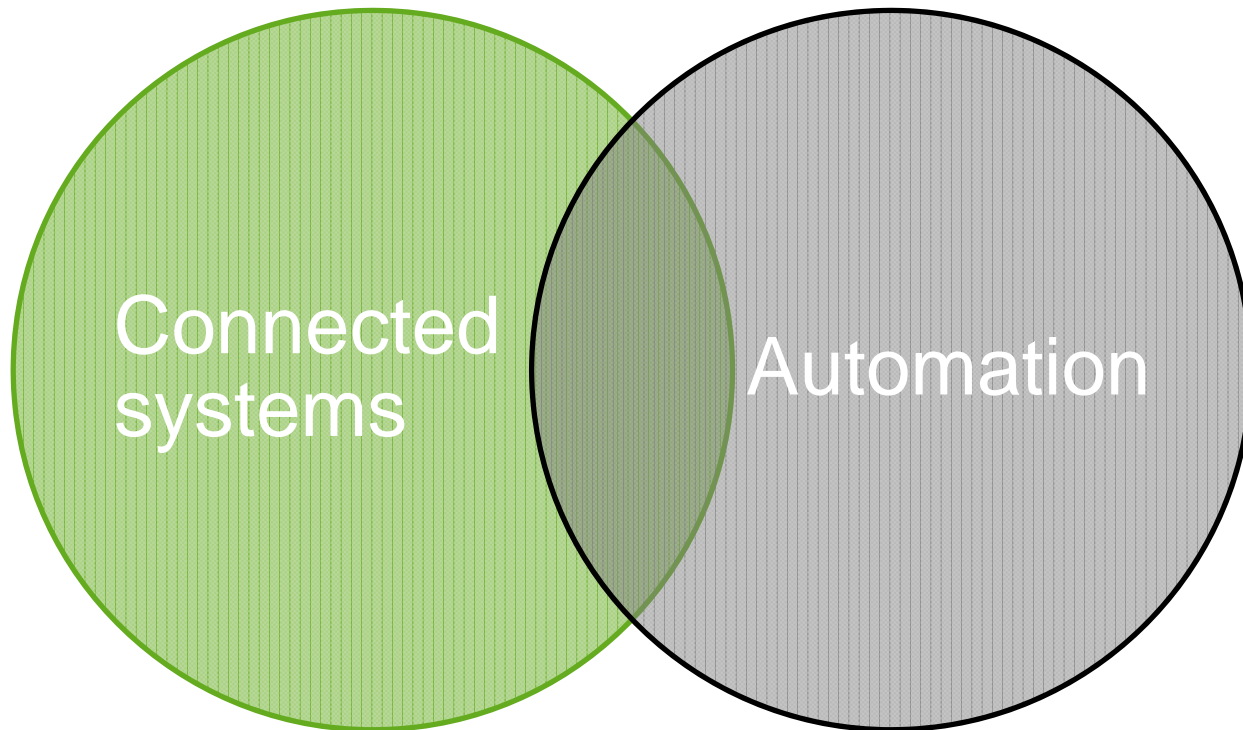


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CPS Paths



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Connected Systems

- New Data
- New Communications
 - V2X, V2V
 - DSRC, Cellular, etc.
- Enabling Technologies
 - Localization and mapping
 - Extended situational awareness



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Assessing Performance

- Massive New Data
 - Roadside sensors
 - Vehicle based sensors
- Predictive Modeling
 - Actionable information
- Control
 - From macro to micro



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Human Behavior

- Shared Control
 - Human-in-the-loop
 - Driver monitoring
- Test beds
 - Driving simulators
 - Controlled courses
 - Naturalistic driving
 - Hybrid



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Government Research

- Continued Focus on Connected Infrastructure and Vehicle Systems
 - Enabling technologies
 - Scaling cyber physical systems
 - Testing and evaluation
- Future Focus on Systems for Assessing Performance
 - Infrastructure asset monitoring and control



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Thank You

FHWA EAR Program

www.fhwa.dot.gov/advancedresearch

FHWA Saxton Transportation Operations Laboratory

www.fhwa.dot.gov/research/tfhrc/labs/operations/

USDOT ITS JPO

www.its.dot.gov/testbed.htm

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