

Connected Car Symposium February 18, 2016



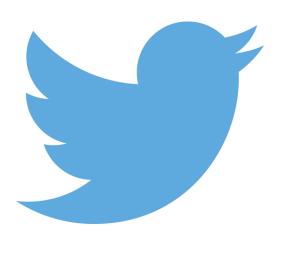




Butzel Long Connected Car Symposium WELCOME!



Engage!



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- #butzelconnectedcar

Agenda

•	8:30 – 9:15 am	Legislative & Regulatory Update: "Connected Cars' Connection to Washington – Regulatory Update" (Steve Goodman - Butzel Long and Greg Krueger - HNTB)
•	9:15 – 10:00 am	Acquisition Planning: "Wheeling and Dealing with the Connected and Autonomous Vehicle" (Kurt Haras - Quarton International, Claudia Rast - Butzel Long and Justin Klimko - Butzel Long)
•	10:00 – 10:15 am	Coffee Break
•	10:15 – 11:00 am	Managing your IP in the Connected Vehicle: "Smart Cars need Smart Protection" (Bill Panagos - Butzel Long and Al Wagner - MB Tech AKKA Group)
•	11:00 am – Noon	Cyber/Communications Panel: "Hacking and Tracking: Data Ownership, Security and Privacy in the Autonomous and Connected Vehicle" (Jen Dukarski - Butzel Long, Michael Ridge - Silent Cyber, McConnell Trapp - Speed Trapp Consulting, Dan Hearsch - Alix Partners and Brian Daugherty - OESA/MEMA)



Connected and Autonomous Cars: A Crash Course

- A part of emerging "Next-Gen" technologies, connected and autonomous cars adopt networking and "cyberphysical features" to create technologies including:
 - Advanced Driver Assistant Systems (ADAS)
 - Advanced Fleet Management
 - Smart Transportation
 - Infotainment
 - Autonomous Driving



Autonomy and SAE's J3016

SAE level	Name	Narrative Definition	Execution of Steering and Acceleration/ Deceleration	Monitoring of Driving Environment	Fallback Performance of Dynamic Driving Task	System Capability (Driving Modes)
Huma	n driver monit	ors the driving environment				
0	No Automation	the full-time performance by the human driver of all aspects of the dynamic driving task, even when enhanced by warning or intervention systems	Human driver	Human driver	Human driver	n/a
1	Driver Assistance	the driving mode-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task	Human driver and system	Human driver	Human driver	Some driving modes
2	Partial Automation	the driving mode-specific execution by one or more driver assistance systems of both steering and acceleration/ deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task	System	Human driver	Human driver	Some driving modes
Autor	nated driving s	ystem ("system") monitors the driving environment				77
3	Conditional Automation	the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task with the expectation that the human driver will respond appropriately to a request to intervene	System	System	Human driver	Some driving modes
4	High Automation	the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task, even if a human driver does not respond appropriately to a request to intervene	System	System	System	Some driving modes
5	Full Automation	the full-time performance by an automated driving system of all aspects of the dynamic driving task under all roadway and environmental conditions that can be managed by a human driver	System	System	System	All driving modes





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CONNECTED CARS' CONNECTION TO WASHINGTON – REGULATORY UPDATE



- Focusing on the "automotive" agencies, things are looking pretty good for connected cars.
- NHTSA 2013 Policy Statement:

"The purpose of the agency's safety programs is to reduce or mitigate motor vehicle crashes and their attendant deaths and injuries. NHTSA is encouraged by the new automated vehicle technologies being developed and implemented by automakers and others. These technologies have the potential to reduce significantly the many thousands of fatalities and injuries that occur each year as a result of motor vehicle crashes. As NHTSA's research and experience develop, NHTSA will determine whether it should encourage and/or require application of the most promising crash avoidance technologies through regulation."

- NHTSA in its 2013 Policy Statement also recognized the tremendous benefits, in addition to crash avoidance, that connected and automated cars can deliver, including:
 - Fuel savings, with resulting reductions in greenhouse gas emissions;
 - More efficient and intelligent routing decisions with real-time consideration of traffic and weather; and
 - Mobility for drivers with a range of disabilities.
 - And while not specifically mentioned by NHTSA -- the benefit for lawyers of being able to do more billable work while the car is driving to or from the office.



- Just last month, there was a Joint announcement from DoT and NHTSA that described the Administration's proposal for a 10-year, nearly \$4 billion investment to accelerate the development and adoption of safe vehicle automation through real-world pilot projects, and an update to the NHTSA 2013 Policy Statement, which includes very supportive language:
- "The agency will work with states to craft and propose model policy guidance that helps policymakers address issues in both the testing and the wider operational deployment of vehicles at advanced stages of automation and offers a nationally consistent approach to autonomous vehicles. For policymakers at all levels, the governing principal should be that technologies with proven, data-supported benefits that would make roads safer should be encouraged. DOT/NHTSA is committing to proposing this model policy within six months."
- "NHTSA will continue its efforts, in concert with other entities within and outside DOT, to incentivize the development and adoption of technologies using vehicleto-vehicle and vehicle-to-infrastructure communications, so that Americans enjoy the full benefits of connected-vehicle safety technology."



- In August, 2014, NHTSA issued an Advanced Notice of Proposed Rulemaking: "to create a new Federal Motor Vehicle Safety Standard (FMVSS), to require V2V communication capability for light vehicles and to create minimum performance requirements for V2V devices and messages."
- Regulatory mandate necessary because otherwise individual manufacturers would not have incentives to deploy the technology without the scale and benefits of widespread adoption.
 - "NHTSA believes that V2V capability will not develop absent regulation, because there
 would not be any immediate safety benefits for consumers who are early adopters of
 V2V."
- NHTSA proposes to rely on market-driven development of specific safety applications.
 - "By mandating V2V technology in all new vehicles, but not requiring specific safety applications, it is NHTSA's belief that such capability will in turn facilitate market-driven development and introduction of a variety of safety applications, as well as mobility and environment-related applications that can potentially save drivers both time and fuel."
- In a parallel proceeding, NHTSA is seeking information on private entity operation of a V2V Security Credential Management System (SCMS).



- Unfortunately, it is not all "blue skies, sunny days and smooth sailing" ahead. The Advanced NPRM recognizes that there are some difficult issues that must be resolved.
- NHTSA considering as part of the Advanced NPRM privacy and communications security issues.
- NHTSA also considering issues of liability in the Advanced NPRM.
- NHTSA did raise in the Advanced NPRM an issue presently before the FCC of possibly sharing the DSRC band.

"The Federal Communication Commission (FCC) has proposed the possibility of sharing the DSRC frequency of 5.9 GHz with other unlicensed devices. What are the possible ramifications of this sharing on current safety applications and future applications that may be developed?"

Federal Entities that could Impact Connected Car Development

- DoT
- NHTSA
- FHWA
- FCC
- DoC
- NTIA
- DoS

- DHS
- FTC
- NTSB
- White House
- Congress
- EPA





















How These Other Federal Entities Can Affect Connected Cars

- Federal Communications Commission (FCC) spectrum for V2V and V2I, and for radars; possibly privacy
- Department of Commerce (DoC) and the National Telecommunications and Information Administration (NTIA) – spectrum for V2V and V2I (and maybe the National Institute for Standards and Technology (NIST) for cybersecurity)
- Department of State international spectrum allocations. WRC-15 put on the agenda for WRC-19 the issue of a globally harmonized allocation for V2V and V2I

How These Other Federal Entities Can Affect Connected Cars

- Department of Homeland Security (DHS) cybersecurity
- Federal Trade Commission (FTC) privacy and cybersecurity
- Federal Highway Administration (FHWA) standards for infrastructure; funding
- National Transportation Safety Board (NTSB)
 - recommendations for requiring safety technology to be deployed in cars



How These Other Federal Entities Can Affect Connected Cars

- Environmental Protection Agency (EPA) regulation of greenhouse gases/mileage requirements
- Congress oversight of agencies; control of the pursestrings; legislation
- White House influences Executive Agencies
- Federal Courts reviews challenges to federal agency actions/rules

It Gets Even More Complicated

- The States also have a role to play
 - Legislation/regulation: traditional role of states in regulating drivers, but the federal government can effectuate policies with "carrots and sticks" and/or preemption
 - To date a handful of states, including Michigan and California, have enacted laws/regulations to allow on-road testing of autonomous vehicles
 - Litigation/liability
 - Funding of infrastructure



- History of DSRC ITSA Petition for Rulemaking in May, 1997, FCC issued an NPRM in June, 1998, and spectrum was allocated by the FCC in an order in October, 1999
- More recent developments Docket 13-49 in connection with reallocating other spectrum in the 5 GHz band for unlicensed use, the FCC found that the DSRC spectrum is very lightly used, and so proposed sharing of the DSRC band with unlicensed services presumably WiFi, but also things like UAVs
- Very complicated proceeding, pitting wireless interests manufacturers and service providers such as Cisco, Qualcomm, Google, Microsoft, cable companies and cellular carriers -- against the automobile industry
- Competing wireless industry proposals -- Cisco vs Qualcomm: rather than sharing the entire 75 MHz allocated to DSRC, as Cisco proposed, Qualcomm's proposal would move safety-of-life DSRC uses —such as crash-avoidance technology—to the upper end of the 5.9 GHz band, walling them off from any interference. The lower portion of the band would be opened up to sharing.

- Rare Bi-partisan effort in the Senate letter from Senators Thune, Booker and Rubio to the heads of DoT, FCC and DoC and their response reflects a consensus: "Each of our agencies shares your commitment to finding the best method to develop, successfully test, and deploy advanced automotive safety systems while working to meet existing and future spectrum demands. ... The DOT test plan's stated overarching goal is to assure 'safe, reliable, and on demand access to 5850-5925 MHz spectrum for DSRC operation.'"
- Next steps to evaluate sharing between DSRC and WiFi:
 - FCC will seek to refresh Docket 13-49
 - FCC will take the lead on extensive testing, based on the DoT Test Plan: Phase I testing at FCC Labs in Columbia, MD; Phase II based on Section 6 of the DoT test plan at a DoT facility; Phase III will be based on Sections 4, 5 and 9 of the DoT test plan, and will occur at a "suitable facility".
 - These three agencies acknowledged that they will need to complete all three phases before being able to conclude that sharing with WiFi in the 5.9 GHz band is safe.



- Lobbying is critical, since Commissioners and their legal advisors rarely read the comments themselves (but the comments are important in establishing the record for the staff to comb through for supporting their positions and for later Court review.
- Not only is the FCC their "home court," but WiFi folks can walk into the Commissioners offices and demonstrate how they can use this spectrum to download the Encyclopedia Brittanica in one second at the 4 Gbps data rates made possible in the 120 MHz wideband channel that is the aim of expanding the unlicensed allocation into the DSRC band or even virtual reality headsets so they can experience the Super Bowl from the players' perspectives via helmet cams



- FCC Docket 13-49 as of the end of last week, 48 out of 504 "substantive" comments/ex parte notices were from companies/entities seeking to protect DSRC use of the 5.85-5.925 GHz band
- Compare with NHTSA Advanced NPRM 7 out of 69 "substantive" comments were filed by WiFi advocates

Name of Filer	Date Received	Type of Filing
National Cable & Telecommunications Association et al.	02/04/2016	NOTICE OF EXPARTE
Broadcom Corporation	01/27/2016	NOTICE OF EXPARTE
Jon M. Peha	01/27/2016	NOTICE OF EXPARTE
Toyota	01/27/2016	NOTICE OF EXPARTE
Office of Engineering and Technology	12/02/2015	ORDER
Cisco Systems, Inc.	12/23/2015	NOTICE OF EXPARTE
The Alliance of Automobile Manufacturers, the Association of Global Automakers,	12/22/2015	NOTICE OF EXPARTE
Cisco Systems, Inc.	12/22/2015	NOTICE OF EXPARTE
Telecommunications Industry Association	12/22/2015	NOTICE OF EXPARTE
HP Inc.	12/10/2015	NOTICE OF EXPARTE
Open Technology Institute at New America	11/25/2015	NOTICE OF EXPARTE
WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION, ET AL.	11/24/2015	NOTICE OF EXPARTE
Broadcom Corporation	11/18/2015	LETTER
Intel Corporation	11/16/2015	NOTICE OF EXPARTE
Intel	11/13/2015	NOTICE OF EXPARTE
NETGEAR, Inc.	11/12/2015	NOTICE OF EXPARTE
Intel	11/06/2015	NOTICE OF EXPARTE
Wireless Internet Service Providers Association	11/05/2015	PETITION FOR WAIVER
Wireless Internet Service Providers Association Wireless Internet Service Providers Association	11/04/2015	NOTICE OF EXPARTE
THE WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION	10/22/2015	NOTICE OF EXPARTE
Mimosa Networks, Inc.	10/22/2015	NOTICE OF EXPARTE
Mimosa Networks, Inc. Fastback Networks, Inc.	10/08/2015	NOTICE OF EXPARTE NOTICE OF EXPARTE
Fastback Networks, Inc.		NOTICE OF EXPARTE
	09/25/2015	
Fastback Networks, Inc.	08/26/2015	NOTICE OF EXPARTE
Cisco Systems, Inc.	08/21/2015	NOTICE OF EXPARTE
CAMP	07/02/2015	NOTICE OF EXPARTE
Ubiquiti Networks, Inc.	07/02/2015	NOTICE OF EXPARTE
Cablevision Systems Corporation	07/02/2015	NOTICE OF EXPARTE
WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION, ET AL.	06/30/2015	NOTICE OF EXPARTE
The Wireless Internet Service Providers Association	06/26/2015	NOTICE OF EXPARTE
Fastback Networks	06/25/2015	NOTICE OF EXPARTE
Fastback Networks	06/22/2015	NOTICE OF EXPARTE
Office of Engineering and Technology	06/18/2015	LETTER
Office of Engineering and Technology	06/18/2015	LETTER
Office of Engineering and Technology	06/18/2015	LETTER
Deborah Hersman	06/09/2015	COMMENT
Ubiquiti Networks	06/01/2015	NOTICE OF EXPARTE
Office of Engineering and Technology	06/01/2015	ORDER
IEEE 802 LAWMAN Standards	06/01/2015	LETTER
SES Americom, Inc.	05/28/2015	NOTICE OF EXPARTE
Office of Communications and Business Op	05/12/2015	OTHER
Association of Global Automakers	05/06/2015	NOTICE OF EXPARTE
Wi-Fi Alliance	04/30/2015	NOTICE OF EXPARTE
Wi-Fi Alliance	04/30/2015	NOTICE OF EXPARTE
Interisle Consulting Group LLC	04/14/2015	NOTICE OF EXPARTE
WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION, ET AL.	04/14/2015	PETITION FOR WAIVER
Verizon	04/14/2015	NOTICE OF EXPARTE
verizon Ericsson	04/06/2015	NOTICE OF EXPARTE
Cablevision Systems Corporation	04/06/2015	NOTICE OF EXPARTE
	04/03/2015	NOTICE OF EXPARTE
Wireless Internet Service Providers Association		
National Cable & Telecommunications Association	03/30/2015	NOTICE OF EXPARTE
Alliance of Automobile Manufacturers and Association of Global Automakers	03/25/2015	NOTICE OF EXPARTE
Wireless Internet Service Providers Association	03/23/2015	LETTER
Time Warner Cable Inc.	01/26/2015	REPLY
Mimosa Networks, Inc.	01/23/2015	NOTICE OF EXPARTE
Google Inc.	01/20/2015	NOTICE OF EXPARTE
Globalstar, Inc.	01/12/2015	COMMENT
Toyota	12/19/2014	NOTICE OF EXPARTE
Office of Engineering and Technology	12/11/2014	PUBLIC NOTICE
THE WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION AND UTILITIES TELECOM COUNCI	12/05/2014	NOTICE OF EXPARTE
Office of Engineering and Technology	10/08/2014	ERRATA, ERRATUM OR ADDENDUM
Consumer and Governmental Affairs Bureau	08/25/2014	PUBLIC NOTICE
Office of Engineering and Technology	08/25/2014	ORDER
Office of Engineering and Technology	08/20/2014	LETTER
Office of Engineering and Technology	08/20/2014	LETTER
Office of Engineering and Technology	08/20/2014	LETTER
EchoStar Technologies L.L.C.	11/17/2014	NOTICE OF EXPARTE
SES American Inc. and Intelsat Corporation	11/07/2014	NOTICE OF EXPARTE



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National Cable & Telecommunications Association	01/22/2014	NOTICE OF EXPARTE
Microsoft Corporation	01/17/2014	NOTICE OF EXPARTE
National Cable & Telecommunications Association	01/17/2014	NOTICE OF EXPARTE
The Wireless Internet Service Providers Association	01/17/2014	NOTICE OF EXPARTE
Public Interest Spectrum Coalition	12/23/2013	NOTICE OF EXPARTE
Public Interest Spectrum Coalition (PISC)	12/20/2013	NOTICE OF EXPARTE
Broadcom Corporation	12/17/2013	NOTICE OF EXPARTE
Globalstar, Inc.	11/29/2013	OTHER
Globalstar, Inc.	12/13/2013	NOTICE OF EXPARTE
Comcast Corporation	12/12/2013	NOTICE OF EXPARTE
Cisco Systems	12/11/2013	NOTICE OF EXPARTE
Intelligent Transportation Society of America	12/05/2013	NOTICE OF EXPARTE
Globalstar, Inc.	11/29/2013	COMMENT
Globalstar, Inc.	11/22/2013	NOTICE OF EXPARTE
Globalstar, Inc.	11/22/2013	NOTICE OF EXPARTE
Mobile Future	11/15/2013	NOTICE OF EXPARTE
Cisco Systems, Inc.	11/14/2013	NOTICE OF EXPARTE
Wi-Fi Alliance	11/08/2013	NOTICE OF EXPARTE
Wi-Fi Alliance	11/08/2013	NOTICE OF EXPARTE
Wi-Fi Alliance	11/08/2013	NOTICE OF EXPARTE
Wi-Fi Alliance	11/08/2013	NOTICE OF EXPARTE
Intelligent Transportation Society of America	11/08/2013	NOTICE OF EXPARTE
Google Inc.	11/01/2013	NOTICE OF EXPARTE
Fixed Wireless Communications Coalition, Inc.	10/30/2013	NOTICE OF EXPARTE
National Cable & Telecommunications Association	10/28/2013	NOTICE OF EXPARTE
National Cable & Telecommunications Association	10/22/2013	NOTICE OF EXPARTE
National Cable & Telecommunications Association	10/22/2013	NOTICE OF EXPARTE
General Motors Company	10/22/2013	NOTICE OF EXPARTE
General Motors Company	10/21/2013	NOTICE OF EXPARTE
Fastback Netw orks	09/30/2013	NOTICE OF EXPARTE
Cisco Systems	09/27/2013	NOTICE OF EXPARTE
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Fixed Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, inc. and the Association of Global Aut Rublic Interest Organizations FCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph James E. Whedbee Intelligent Transportation Society of America Commant Corporation Cisco Systems, Inc. Baron Services, Inc.	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Fixed Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Wark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Philic Information Communications Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph James E. Whedbee Intelligent Transportation Society of America Comeast Corporation Cosco Systems, Inc. Baron Services, Inc. Baron Services, Inc.	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Rived Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Compast Corporation Utilities Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Public Interest Organizations FCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph James E. Whedbee Intelligent Transportation Society of America Commant Corporation Cisco Systems, Inc. Baron Services, Inc. American Cable Association American Association of State Highway & Transportation Officials	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/17/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Fixed Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Wark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Public Interest Corporated Interest Security of Automobile Manufacturers and the HetNet Forum National Cable & Telecommunications Association Jay Joseph James E, Whedbee Intelligent Transportation Society of America Comeast Corporation Caco Systems, Inc. Baron Services, Inc. American Cable & Secociation American Cable & Secociation American Cable & Secociation American Cable & Secociation American Association of State Highway & Transportation Officials Wireless Internet Service Providers Association	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Rived Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Compast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Public Interest Organizations PCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph James E. Whedbee Intelligent Transportation Society of America Commant Corporation Cisco Systems, Inc. Baron Services, Inc. American Cable Association American Association of State Highway & Transportation Officials Wireless Internet Service Froviders Association Telecommunications Industry Association	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/17/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Fixed Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Public Interest Organizations PCA - The Wireless Infrastructure Association and The HetNet Forum RUCKUS WIRELESS, INC. Ordinate of Automobile Manufacturers, Inc. and the Association of Global Aut Public Interest Organizations PCA - The Wireless Infrastructure Association and The HetNet Forum Ruckus Steppen Ruckus	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Rived Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Hillies Telecom Council Hillies Telecom Council Hillies Telecom Council Hillies Telecom Council Horizon Council Hark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Public hetrest Organizations FCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph James E. Whedbee Intelligent Transportation Society of America Comeast Corporation Cisco Systems, Inc. Baron Services, Inc. American Cable Association American Association of State Highway & Transportation Officials Wireless Internet Service Providers Association Felecommunications Industry Association Shared Spectrum Company Globalstar, Inc.	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Fixed Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Rublic Interest Organizations FCA - The Wireless Infrastructure Association and The HetNet Forun National Cable & Telecommunications Association Jay Joseph Intelligent Transportation Society of America Comeast Corporation Casco Systems, Inc. Baron Services, Inc. Baron Services, Inc. American Cable Association American Association of State Highway & Transportation Officials Wireless Internet Service Providers Association Telecommunications Industry Association Shared Spectrum Company Globalstar, Inc.	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Rived Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Compast Corporation Utilities Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, inc. and the Association of Global Aut Rublic Interest Organizations RCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph Jarmes E, Whedbee Intelligent Transportation Society of America Compast Corporation Cisco Systems, inc. Baron Services, inc. American Cable Association American Association of State Highw ay & Transportation Officials Wireless Internet Service Providers Association Shared Spectrum Company Globalstar, inc. Wi-Fl Alliance Toyota Motor North America, inc.	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Fixed Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Rublic Interest Organizations PCIA - The Wireless Infrastructure Association and The HetNet Forun National Cable & Telecommunications Association Jay Joseph Automatical Cable & Telecommunications Association Commast Corporation Concast Corporation Concast Corporation Concast Corporation Cable Association of State Highway & Transportation Officials Wireless Internet Service Providers Association Telecommunications Industry Association Shared Spectrum Company Globalstar, Inc. Wi-Fi Alliance Toyela Mator North America, Inc. Statellite Industry Association	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Rivate Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Compast Corporation Utilities Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, inc. and the Association of Global Aut Rublic Interest Organizations RCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph Jarmes E, Whedbee Intelligent Transportation Society of America Compast Corporation Cisco Systems, inc. Baron Services, inc. American Cable Association American Association of State Highw ay & Transportation Officials Wireless Internet Service Providers Association Shared Spectrum Company Globalstar, inc. Wi-Fl Alliance Toyota Motor North America, inc. Sate SIBS S.A. and Intelsate S.A.	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Rived Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Wireless Telecom Council Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, inc. and the Association of Global Aut Public Interest Organizations FCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph Jorges E Windbee Wireless Interest Organizations Corporation Concest Corporation Colaco Systems, Inc. Baron Services, Inc. Wireless Internet Service Providers Association Telecommunications Industry Association Telecommunications Industry Association Telecommunications Industry Association Telecommunications Industry Association Sharred Spectrum Company Globalstar, Inc. Wi-Fi Alliance Toyota Mater North America, Inc. Statellite Industry Association SES S.A. and Intelsat S.A. National Public Safety Telecommunications Council	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Rived Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Rublic Interest Organizations PCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph James E, Whedbee Intelligent Transportation Society of America Comeast Corporation Society of America Comeast Corporation Cisco Systems, Inc. Baron Services, Inc. American Cable Association American Association of State Highw ay & Transportation Officials Wireless Internet Service Providers Association Shared Spectrum Company Globalstar, Inc. Wi-Fl Alliance Toyota Motor North America, Inc. Sate Sills A and Intelsats S.A. National Rubiic Safety Telecommunications Council National Rubiic Safety Telecommunications of Broadcasters	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Rived Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, inc. and the Association of Global Aut Public Interest Organizations FCIA - The Wireless Infrastructure Association and The HeliNet Forum National Cable & Telecommunications Association Jay Joseph Jarres E. Whedbee Intelligent Transportation Society of America Comeast Corporation Clesco Systems, Inc. Clesco Systems, Inc. Wireless Internet Service Providens association American Association of State Highway & Transportation Officials Wireless Internet Service Providens Association Telecommunications Industry Association Search Spectrum Company Clobalstar, Inc. Unif. Alliance Toyota Mator North America, Inc. Satellite Industry Association SES S.A. and Intelsat S.A. National Public Sately Telecommunications Council National Public Sately Telecommunications Mobile Satellite Lears Association	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Rived Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, inc. and the Association of Global Aut Public Interest Organizations PCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph James E. Whedbee Intelligent Transportation Society of America Comeast Corporation Cisco Systems, Inc. Baron Services, Inc. American Cable Association American Association of State Highway & Transportation Officials Wireless Internet Service Providers Association Telecommunications Industry Association Shared Spectrum Company Globalstar, Inc. Wi-Fi Alliance Toyota Mator North America, Inc. Satellite Industry Association SES S.A. and Intelsat S.A. National Association of Broadcasters Mobile Satellite Users Association Fixed Wireless Communications to all from the Council National Association of Broadcasters Mobile Satellite Users Association Fixed Wireless Communications Coulition	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Fixed Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Wireless Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Public Interest Organizations PCIA - The Wireless Infrastructure Association and The HelNet Forum National Cable & Telecommunications Association Jay Joseph James E. Whedbee Intelligent Transportation Society of America Comeast Corporation Clace Systems, Inc. Clace Systems, Inc. American Cable Association American Association of State Highway & Transportation Officials Wireless Internet Service Providers Association Telecommunications Industry Association Shared Spectrum Company Clobalstar, Inc. Wi-Fl Alliance Toyota Motor North America, Inc. Satellite Industry Association SES A.A. and Intelsat S.A. National Public Safety Telecommunications Council National Association of Broadcasters Mobile Satellite Users Association Fixed Wireless Communications Coalition Dr. Eli Yablonovitch	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Fixed Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Corneast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Wireless Automatical Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Public Interest Organizations PCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph James E Whedbee Intelligent Transportation Society of America Corneast Corporation Cisco Systems, Inc. Baron Services, Inc. American Cable Association American Association of State Highway & Transportation Officials Wireless Internet Service Providers Association Telecommunications Industry Association Shared Spectrum Company Globalstar, Inc. Wi-Fi Alliance Toyota Motor North America, Inc. Satellite Industry Association SES S.A. and Intelsat S.A. National Association of Broadcasters Mobile Satellite Users Association Fixed Wireless Communications Coalition Dr. Bi Yablonovitch Cable Vision Systems Corporation	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Fixed Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Utilities Telecom Council Wireless Telecom Council Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Rublic Interest Organizations PCIA - The Wireless Infrastructure Association and The HeitNet Forum National Cable & Telecommunications Association Jay Joseph James E. Whedbee Intelligent Transportation Society of America Comeast Corporation Cisco Systems, Inc. Baron Services, Inc. Baron Services, Inc. Marcian Cable Association American Cable Association American Cable Association State Highway & Transportation Officials Wireless Internet Service Providers Association Telecommunications Industry Association Shared Spectrum Company Globalstar, Inc. Wirel Alliance Toyota Motor North America, Inc. Satellite Industry Association SS A. and Intelsat S.A. National Public Safety Telecommunications Council National Association of Broadcasters Mobile Satellite Users Association Fixed Wireless Communications Coalition Cr. Eli Yablonovitch Cablevision Systems Corporation Exat Communications Inc.	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS
Rived Wireless Communications Coalition Alliance of Automobile Manufacturers and Association of Global Automakers Comeast Corporation Utilities Telecom Council Mark Briggs Steve Martin RUCKUS WIRELESS, INC. Office of Engineering and Technology Wisconsin Department of Transportation The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut Public Interest Organizations PCIA - The Wireless Infrastructure Association and The HetNet Forum National Cable & Telecommunications Association Jay Joseph Jarnes E. Whedbee Intelligent Transportation Society of America Comeast Corporation Cisco Systems, Inc. Baron Services, Inc. American Cable Association American Association of State Highway & Transportation Officials Wireless Internet Service Providers Association Telecommunications Industry Association Shared Spectrum Company Globalstar, Inc. Wi-Fi Alliance Toyota Motor North America, Inc. Satellite Industry Association SES S.A. and Intelsat S.A. National Association of Broadcasters Mobile Satellite Users Association Fixed Wireless Communications of Broadcasters Mobile Satellite Users Association Dr. Ell Yablonovitch Cablevision Systems Corporation	09/13/2013 09/13/2013 09/06/2013 08/30/2013 08/30/2013 08/30/2013 06/21/2013 06/21/2013 06/21/2013 06/21/2013 07/24/2013	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE REPLY TO COMMENTS REPLY TO COMMENTS COMMENT COMMENT COMMENT ORDER LETTER REPLY TO COMMENTS



Name of Filer	Date Received	Type of Filing
oby DeWeese	07/17/2014	COMMENT
ACYS Technology	07/17/2014	COMMENT
iterisle Consulting Group LLC	07/15/2014	COMMENT
ludson Valley Wireless	07/15/2014	COMMENT
disco Systems	07/14/2014	NOTICE OF EXPARTE
eff Burnham	07/11/2014	COMMENT
ade Communications	07/11/2014	COMMENT
ularosa Communications, Inc.	07/11/2014	COMMENT
KWISP Internet	07/10/2014	COMMENT
Aloha Broadband Inc.	07/09/2014	COMMENT
nfoWest, Inc.	07/09/2014	COMMENT
Zirkel Wireless	07/09/2014	COMMENT
CSInet Internet Access Corp.	07/09/2014	COMMENT
Sunby Communications Inc	07/08/2014	COMMENT
David L Giles	07/08/2014	COMMENT
nterstate Wireless, Inc.	07/08/2014	COMMENT
Steve Barnes @ PCS-WIN	07/08/2014	COMMENT
Ethoplex LLC	07/08/2014	COMMENT
he Blue Zone	07/08/2014	COMMENT
im Sheldon	07/08/2014	COMMENT
Dan English	07/08/2014	COMMENT
Convergence Technologies	07/08/2014	LETTER
Skyrunner, Inc.	07/07/2014	COMMENT
Robert Haas	07/07/2014	COMMENT
Robert W. Pensw orth	07/07/2014	COMMENT
Broadband VI	07/07/2014	COMMENT
Roland Houin	07/07/2014	COMMENT
Bspeedy Wireless Inc	07/07/2014	COMMENT
Northw est Ohio Broadband	07/07/2014	COMMENT
Brett Woollum	07/03/2014	COMMENT
Roland Houin	07/03/2014	COMMENT
Anthony Pierro	07/03/2014	COMMENT
Joseph Cracchiolo	07/03/2014	COMMENT
Cox Communications	07/02/2014	PETITION FOR WAIVER
Nathan Geipel	07/03/2014	COMMENT
ew is Bergman	07/03/2014	COMMENT
Nick Riedman	07/03/2014	COMMENT
lime Warner Cable Inc	07/03/2014	WAIVER
Time Warner Cable Inc.	07/01/2014	WAIVER
National Cable and Telecommunications Association	06/27/2014	NOTICE OF EXPARTE
The Wireless Internet Service Providers Association	06/23/2014	NOTICE OF EXPARTE
The Wireless Internet Service Providers Association	06/23/2014	NOTICE OF EXPARTE
GV EC.net	06/20/2014	COMMENT
/imosa Networks, Inc.	06/16/2014	NOTICE OF EXPARTE
loseph Miller	06/12/2014	COMMENT
Excel.Net, Inc.	06/12/2014	COMMENT
Rainer Gleinig	06/12/2014	COMMENT
y Featherling	06/11/2014	COMMENT
Richard Pedersen	06/10/2014	COMMENT
National Cable & Telecommunications Association	06/12/2014	NOTICE OF EXPARTE
Proxim Wireless Corporation	06/04/2014	NOTICE OF EXPARTE
Actorola Solutions, Inc.	06/02/2014	PETITION FOR RECONSIDERATION
/imosa Networks. Inc.	06/02/2014	PETITION FOR RECONSIDERATION
The Wireless Internet Service Providers Association	06/02/2014	PETITION FOR RECONSIDERATION
		PETITION FOR RECONSIDERATION PETITION FOR RECONSIDERATION
AB Wireless, Inc.	06/02/2014	PETITION FOR RECONSIDERATION PETITION FOR RECONSIDERATION
choStar Technologies L.L.C.	06/02/2014	
Cambium Netw orks, Ltd.	06/02/2014	PETITION FOR RECONSIDERATION
state of Maryland, Gov O'Malley	05/30/2014	COMMENT
he Wireless Internet Service Providers Association	05/02/2014	NOTICE OF EXPARTE
ssociation of Global Automakers, Inc	05/01/2014	PETITION FOR RECONSIDERATION
pectrum Bridge Inc	04/30/2014	COMMENT
American Library Association	04/14/2014	NOTICE OF EXPARTE
SHLB Coalition	04/11/2014	NOTICE OF EXPARTE
DmniAir Consortium	04/09/2014	NOTICE OF EXPARTE
Boogle Inc.	04/07/2014	NOTICE OF EXPARTE
Office of Engineering and Technology	03/31/2014	OTHER
Vational Cable & Telecommunications Association	03/25/2014	NOTICE OF EXPARTE
Fastback Networks	03/24/2014	LETTER



Name of Filer	Date Received	T 4 EU
Name or Filer Cisco Systems	03/21/2014	Type of Filing NOTICE OF EXPARTE
Lisco Systems The Wireless Internet Service Providers Association	03/21/2014	NOTICE OF EXPARTE
Telecommunications Industry Association	03/21/2014	NOTICE OF EXPARTE
The Wireless Internet Service Providers Association	03/20/2014	NOTICE OF EXPARTE
SES American Inc. and Intelsat License LLC	03/20/2014	NOTICE OF EXPARTE
National Cable & Telecommunications Association	03/20/2014	NOTICE OF EXPARTE
Intelligent Transportation Society of America	03/19/2014	NOTICE OF EXPARTE
Wi-Fi Alliance	03/18/2014	NOTICE OF EXPARTE
Public Know ledge	03/18/2014	NOTICE OF EXPARTE
National Cable & Telecommunications Association	03/18/2014	NOTICE OF EXPARTE
Globalstar, Inc.	03/18/2014	NOTICE OF EXPARTE
Cisco Systems, Inc.	03/18/2014	NOTICE OF EXPARTE
Hospital Council of Northwest Ohio	03/11/2014	NOTICE OF EXPARTE
Globalstar, Inc.	03/14/2014	NOTICE OF EXPARTE
Dynamic Spectrum Alliance	03/18/2014	NOTICE OF EXPARTE
Public Know ledge	03/14/2014	NOTICE OF EXPARTE
U.S. Department of Transportation	03/13/2014	NOTICE OF EXPARTE
NCTA	03/12/2014	NOTICE OF EXPARTE
Public Interest Spectrum Coalition	03/11/2014	NOTICE OF EXPARTE
Public Know ledge	03/11/2014	NOTICE OF EXPARTE
Cisco Systems	03/11/2014	NOTICE OF EXPARTE
Public Interest Spectrum Coalition	03/10/2014	NOTICE OF EXPARTE
Globalstar, Inc.	03/07/2014	NOTICE OF EXPARTE
Cisco Systems, Inc.	03/07/2014	NOTICE OF EXPARTE
Broadcom Corporation	03/07/2014	NOTICE OF EXPARTE
Ruckus Wireless, Inc.	03/07/2014	LETTER
Global Satellite Communications	02/27/2014	NOTICE OF EXPARTE
The Hospital Council of Northwest Ohio	03/06/2014	NOTICE OF EXPARTE
Globalstar, Inc.	03/06/2014	NOTICE OF EXPARTE
National Cable & Telecommunications Association	03/04/2014	NOTICE OF EXPARTE
ADS-B Technologies, LLC	03/04/2014	NOTICE OF EXPARTE
National Cable & Telecommunications Association	02/28/2014	NOTICE OF EXPARTE
Globalstar, Inc.	02/27/2014	NOTICE OF EXPARTE
GeoSonics Inc.	02/27/2014	NOTICE OF EXPARTE
National Cable & Telecommunications Association	02/26/2014	NOTICE OF EXPARTE
Globalstar, Inc.	02/26/2014	NOTICE OF EXPARTE
Eagle Eye Fishing Corp. et al.	02/27/2014	NOTICE OF EXPARTE
National Cable & Telecommunications Association	02/26/2014	NOTICE OF EXPARTE
Openity, LLC	02/25/2014	NOTICE OF EXPARTE
Globalstar	02/25/2014	LETTER
Globalstar	02/25/2014	NOTICE OF EXPARTE
Geochemical and Environmental Research Group, Texas AT&M University	02/25/2014	NOTICE OF EXPARTE
Custom Cellular Concepts Corporation	02/25/2014	NOTICE OF EXPARTE
Coastal Communications Consultants, Inc	02/25/2014	NOTICE OF EXPARTE
Globalstar, Inc.	02/24/2014	NOTICE OF EXPARTE
Snodgrass, Inc.	02/21/2014	NOTICE OF EXPARTE
Global Satellite Communications	02/21/2014	NOTICE OF EXPARTE
Compast Corporation	02/21/2014	NOTICE OF EXPARTE
Public Interest Spectrum Coalition	02/21/2014	NOTICE OF EXPARTE
Satellite Phone Solutions LLC	02/20/2014	NOTICE OF EXPARTE
Globalstar, Inc.	02/20/2014	NOTICE OF EXPARTE
Globalstar, Inc.	02/14/2014	NOTICE OF EXPARTE
Public Interest Spectrum Coalition	02/12/2014	NOTICE OF EXPARTE
Public Interest Spectrum Coalition	02/12/2014	NOTICE OF EXPARTE
Fastback Networks	02/12/2014	NOTICE OF EXPARTE
New America Foundation	02/11/2014	NOTICE OF EXPARTE
Public Interest Spectrum Coalition	02/07/2014	NOTICE OF EXPARTE
Public Interest Organizations	02/07/2014	NOTICE OF EXPARTE
Globalstar, Inc.	02/07/2014	NOTICE OF EXPARTE
Alliance of Automobile Manufacturers and Association of Global Automakers	02/05/2014	NOTICE OF EXPARTE
Comcast Corporation	02/04/2014	NOTICE OF EXPARTE
	02/03/2014	NOTICE OF EXPARTE
National Cable & Telecommunications Association		
National Cable & Telecommunications Association American Motorcyclist Association	05/29/2013	COMMENT
American Motorcyclist Association	05/29/2013 02/03/2014	NOTICE OF EXPARTE
American Motorcyclist Association		
American Motorcyclist Association WI-FI Alliance Globalstar Investors	02/03/2014	NOTICE OF EXPARTE
American Motorcyclist Association Wi-Fi Alliance	02/03/2014 01/31/2014	NOTICE OF EXPARTE NOTICE OF EXPARTE
American Motorcyclist Association Wi-Fi Alliance Globalstar Investors Globalstar, Inc.	02/03/2014 01/31/2014 01/28/2014	NOTICE OF EXPARTE NOTICE OF EXPARTE NOTICE OF EXPARTE



Name of Filer	Date Received	
Name of Filer WI-FI Alliance	11/03/2014	Type of Filing NOTICE OF EXPARTE
Wil-Fr Alliance The Alliance of Automobile Manufacturers	10/30/2014	NOTICE OF EXPARTE
Cambium Networks, Ltd.	10/30/2014	NOTICE OF EXPARTE
EchoStar Technologies LLC	10/22/2014	NOTICE OF EXPARTE
Wireless Internet Service Providers Association	10/09/2014	NOTICE OF EXPARTE
Mimosa Networks, Inc.	10/14/2014	NOTICE OF EXPARTE
Industry Representatives	10/09/2014	NOTICE OF EXPARTE
Association of Global Automakers	09/08/2014	NOTICE OF EXPARTE
Association of Global Automakers	09/02/2014	REPLY TO OPPOSITION TO PETITION FOR RECONSIDERA
Motorola Solutions, Inc.	09/02/2014	REPLY TO OPPOSITION TO PETITION FOR RECONSIDERA
The Wireless Internet Service Providers Association	09/02/2014	REPLY
Mimosa Networks, Inc.	09/02/2014	REPLY TO COMMENTS
Cambium Netw orks, Ltd.	09/02/2014	REPLY TO OPPOSITION TO PETITION FOR RECONSIDERA
EchoStar Technologies L.L.C.	08/25/2014	REPLY
Utilities Telecom Council	08/25/2014	REPLY TO COMMENTS
Cambium Netw orks, Ltd.	08/22/2014	NOTICE OF EXPARTE
Haug Communications, Inc.	08/20/2014	COMMENT
THE WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION	08/22/2014	NOTICE OF EXPARTE
Bland County Wireless Authority	08/18/2014	LETTER
Bland County Wireless Authority	08/18/2014	LETTER
Interisle Consulting Group LLC	08/21/2014	REPLY TO COMMENTS
Association of Global Automakers	08/20/2014	REQUEST FOR EXTENSION OF TIME
Don Brabb	08/19/2014	COMMENT
Fixed Wireless Communications Coalition	08/14/2014	COMMENT
STE Wireless, Inc. Time Warner Cable	08/14/2014 07/01/2014	OTHER OTHER
Time Warner Cable	07/01/2014	OTHER COMMENT
Joink, LLC Robert Ores	08/15/2014	COMMENT
Robert Gres Black Mesa Wireless LLC	08/15/2014	NOTICE OF EXPARTE
Intelligent Computing Solutions	08/15/2014	COMMENT
Veloxnet Incorporated	08/14/2014	COMMENT
Veidotiet interiproduccii	08/14/2014	COMMENT
Avolutia, LLC dba Shelby Broadband	08/14/2014	COMMENT
WVVA.net Inc.	08/14/2014	COMMENT
Richard Harnish	08/14/2014	COMMENT
SmarterBroadband, Inc.	08/14/2014	COMMENT
Clay Stewart	08/14/2014	COMMENT
Josh Luthman	08/14/2014	COMMENT
Wi-Fi Alliance	08/14/2014	COMMENT
Row e Wireless Networks LLC	08/14/2014	COMMENT
TechAmerica	08/14/2014	COMMENT
Internet America, Inc.	08/14/2014	COMMENT
Information Technology Industry Council	08/14/2014	REPLY TO PETITION FOR RECONSIDERATION
National Cable & Telecommunications Association	08/14/2014	OPPOSITION TO PETITION FOR RECONSIDERATION
Cyber Broadband Inc	08/14/2014	NOTICE OF EXPARTE
Rebekah Brown	08/14/2014	COMMENT
Motorola Solutions, Inc.	08/14/2014	REPLY TO PETITION FOR RECONSIDERATION
WVVA.net Inc.	08/14/2014	COMMENT
Fixed Wireless Communications Coalition	08/14/2014	COMMENT
New Wave Net Corp	08/14/2014	COMMENT
Telecommunications Industry Association	08/14/2014	OPPOSITION TO PETITION FOR RECONSIDERATION
FreeWave Technologies, Inc.	08/14/2014	OTHER
Jon P Kelley	08/14/2014	COMMENT
Computer Sales and Services, Inc.	08/14/2014	COMMENT
Virginia Everywhere, LLC	08/14/2014	COMMENT
Time Warner Cable Inc.	07/01/2014	REQUEST
Michael Jones	08/14/2014	COMMENT
Cherry Capital Connection, LLC	08/14/2014	LETTER
Outback Internet LLC	08/14/2014	COMMENT
The Wireless Internet Service Providers Association	08/14/2014	OPPOSITION TO PETITION FOR RECONSIDERATION
Cisco Systems, Inc.	08/14/2014	REPLY TO PETITION FOR RECONSIDERATION
Bertram Wireless	08/14/2014	COMMENT
Tyler Loftis	08/14/2014	COMMENT
Dean G Malone	08/14/2014	COMMENT
Lisa Bow man	08/14/2014	COMMENT
Patty Flanagan	08/14/2014	COMMENT
Seth Johannesen	08/14/2014	COMMENT
Mike Lyon / Ridge Wireless Flizabeth Trotter	08/13/2014	COMMENT
EIZADETH FROTTER	08/13/2014	COIVINENT



Name of Filer	Date Received	Type of Filing
Netw ork Tool and Die Company, Inc.	08/13/2014	LETTER
Eden Recor Grand County Internet Services	08/13/2014	COMMENT
First Step Internet, LLC	08/13/2014	COMMENT
NexGenAccess Inc.	08/13/2014	COMMENT
Jo-Carroll Energy, Inc. (NFP)	08/13/2014	COMMENT
James Smutniak	08/13/2014	COMMENT
David Milholen	08/13/2014	COMMENT
		COMMENT
Webjogger Internet Services	08/13/2014	
Deliberant, Inc	08/12/2014	COMMENT
Cal.net, Inc.	08/13/2014	COMMENT
CV Wireless LLC	08/05/2014	LETTER
Mike Cavazzini	08/12/2014	COMMENT
In the Stix Broadband	08/12/2014	COMMENT
Royell Communications, Inc.	08/11/2014	COMMENT
NGL Connection	08/04/2014	COMMENT
Community Broadband	08/04/2014	COMMENT
Comcast	08/07/2014	LETTER
Comcast	08/07/2014	LETTER
Comcast	08/07/2014	LETTER
Comeast	08/07/2014	LETTER
Jess Kemp	08/06/2014	COMMENT
Beth Hord	08/06/2014	COMPLAINT
Frank S Farrington II	08/06/2014	COMMENT
Kerry Fountain	08/05/2014	COMMENT
DONALD GORDON	08/05/2014	PETITION
Cox Communications, Inc.	07/02/2014	OTHER
Cox Communications, Inc.	07/02/2014	OTHER
Cox Communications, Inc.	07/02/2014	OTHER
Michael Steen	08/05/2014	COMMENT
Michael Steeli Sheldon Rhodes	08/04/2014	COMMENT
Fastback Netw orks	08/04/2014	LETTER
Wired or Wireless, Inc	08/04/2014	LETTER
Bolt Internet	08/04/2014	COMMENT
Doug Koehn	08/04/2014	COMMENT
Consumer Electronics Association	08/04/2014	NOTICE OF EXPARTE
Time Warner Cable Inc.	07/01/2014	OTHER
rNetworks LLC - WISP	08/01/2014	LETTER
James Phillips	08/01/2014	COMMENT
James Phillips Casev Corr		
Casey Corr	08/01/2014	COMMENT
Casey Corr TELE-PAGE, Inc	08/01/2014 08/01/2014	COMMENT COMMENT
Casey Corr TELE-PAGE, Inc G Wireless LLC	08/01/2014 08/01/2014 08/01/2014	COMMENT COMMENT COMMENT
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Casey Corr TELE-PAGE, Inc Q Wireless LLC ALTIUS Communications Thet Broadband Internet, LLC	08/01/2014 08/01/2014 08/01/2014 07/31/2014 07/31/2014	COMMENT COMMENT COMMENT COMMENT COMMENT
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Casey Corr TELE-PAGE, Inc Q Wireless LLC ALTIUS Communications Tnet Broadband Internet, LLC New River Valley Unw ired, LLC North Coast Wireless Communications, LLC ALSAT Wireless PEAK Internet, LLC Paul Nicksich Matt Larsen	08/01/2014 08/01/2014 08/01/2014 07/31/2014 07/31/2014 07/31/2014 07/31/2014 07/30/2014 07/30/2014	COMMENT
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Casey Corr TELE-PAGE, Inc Q Wireless LLC ALTIUS Communications Thet Broadband Internet, LLC New River Valley Unwired, LLC North Coast Wireless Communications, LLC ALSAT Wireless PEAK Internet, LLC Paul Nicksich Matt Larsen ICO Technologies Inc. ICO Access, LLC	08/01/2014 08/01/2014 08/01/2014 07/31/2014 07/31/2014 07/31/2014 07/31/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014	COMMENT
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Casey Corr TELE-PAGE, Inc Q Wireless LLC ALTIUS Communications Thet Broadband Internet, LLC New River Valley Unwired, LLC North Coast Wireless Communications, LLC ALSAT Wireless PEAK Internet, LLC Paul Nicksich Matt Larsen ICON Technologies Inc. DC Access, LLC Multi-Path Netw orks, Inc. Ubiquiti Networks michael sanders Comeast Corporation Comeast Corporation John D. Batis Caroly C. Sutherland LiteVire Internet Services, Inc. Anthony Iscopi Jade Communications, LLC Amplex Bectric, Inc. Elizabeth Bow Ies Wavelinc Communications	08/01/2014 08/01/2014 08/01/2014 07/31/2014 07/31/2014 07/31/2014 07/31/2014 07/31/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/30/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014 07/29/2014	COMMENT
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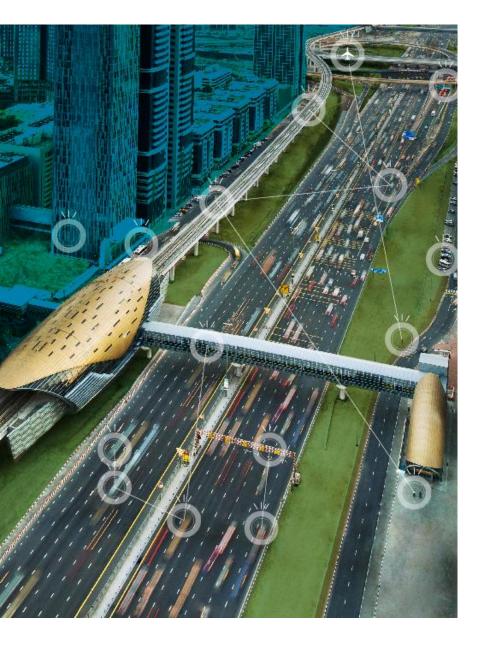


Name of Filer SAE International	07/23/2013	Type of Filing REPLY TO COMMENTS
SAE International IEEE 802 LMSC	07/23/2013	REPLY TO COMMENTS
	07/23/2013	LETTER
European Automobile Manufacturers Association Google Inc.	07/12/2013	NOTICE OF EXPARTE
Wireless Internet Service Providers Association	07/12/2013	NOTICE OF EXPARTE
Broadcom Corporation	06/28/2013	NOTICE OF EXPARTE
Joe Caprara	06/24/2013	COMMENT
W-FI Alliance	06/21/2013	NOTICE OF EXPARTE
Arizona Department of Transportation	06/19/2013	LETTER
National Telecommunications and Information Administration	06/11/2013	LETTER
Wi-Fi Alliance	06/06/2013	MOTION FOR EXTENSION OF TIME
EEE 802 LMSC	06/04/2013	REQUEST FOR EXTENSION OF TIME
Spectrum Bridge	05/31/2013	COMMENT
California Department of Transportation	05/28/2013	LETTER
SAE International	05/28/2013	COMMENT
Ford Motor Company	05/28/2013	COMMENT
National Transportation Safety Board	05/28/2013	NOTICE OF PROPOSED RULEMAKING
Wi-Fi Alliance	05/30/2013	NOTICE OF EXPARTE
Aobile Future	05/30/2013	NOTICE OF EXPARTE
Wireless Internet Service Providers Association	05/28/2013	COMMENT
Foyota Motor North America, Inc.	05/28/2013	COMMENT
ime Warner Cable Inc.	05/28/2013	COMMENT
Thomas Zorn	05/28/2013	COMMENT
Tionals 2011 The Alliance of Automobile Manufacturers, Inc. and the Association of Global Aut	05/28/2013	COMMENT
Telecommunications Industry Association	05/28/2013	COMMENT
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Shared Spectrum Company Savari, Inc.	05/28/2013 05/28/2013	COMMENT
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SPTW SPOTS, Inc. SES S.A. and Intelsat S.A.	05/28/2013	COMMENT
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SAE International	05/28/2013	COMMENT
Ruckus Wireless, Inc.	05/28/2013 05/28/2013	COMMENT
QUALCOMM Incorporated		
EEE 802 LMSC	05/28/2013	COMMENT
OmniAir Consortium	05/28/2013	NOTICE OF EXPARTE
National Cable & Telecommunications Association	05/28/2013	COMMENT
National Association of Broadcasters (NAB)	05/28/2013	COMMENT
Motorola Solutions, Inc.	05/28/2013	COMMENT
Motorola Mobility LLC	05/28/2013	COMMENT
Mercedes-Benz USA, LLC	05/28/2013	COMMENT
Cambium Netw orks Ltd	05/28/2013	COMMENT
Intelligent Transportation Society of America	05/28/2013	COMMENT
Information Technology Industry Council	05/28/2013	COMMENT
Hubbard Broadcasting, Inc.	05/28/2013	COMMENT
Hans Klein	05/28/2013	COMMENT
Greg Larson	05/28/2013	COMMENT
Google Inc. and Microsoft Corporation	05/28/2013	COMMENT
Slobalstar, Inc.	05/28/2013	COMMENT
	05/28/2013	COMMENT
First Step Internet, LLC	05/28/2013 05/28/2013	COMMENT
First Step Internet, LLC Fastback Networks	05/28/2013 05/28/2013 05/28/2013	COMMENT COMMENT COMMENT
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The FCC as a Case Study – What the Auto Industry Must Do

- File comments/replies in the FCC Docket 13-49 "refresh."
- But equally important, figure out how to get the Commissioners and their staff out to the test facilities in Michigan so they can experience the benefits of DSRC first-hand.
- Make sure the testing that will occur under the auspices of the FCC is adequate. Need to have your RF engineers review test plan to make sure that contemplated testing will capture potential interference issues related to your company's proposed DSRC devices (sensitivities, power levels, etc.).



INFRASTRUCTURE DEPLOYMENT CONSIDERATIONS FOR CONNECTED-AUTOMATION

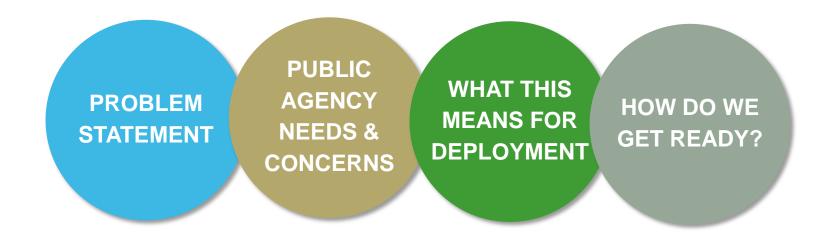
Greg Krueger, P.E.

HNTB Associate Vice President Intelligent Transportation Systems Director of Emerging Technologies

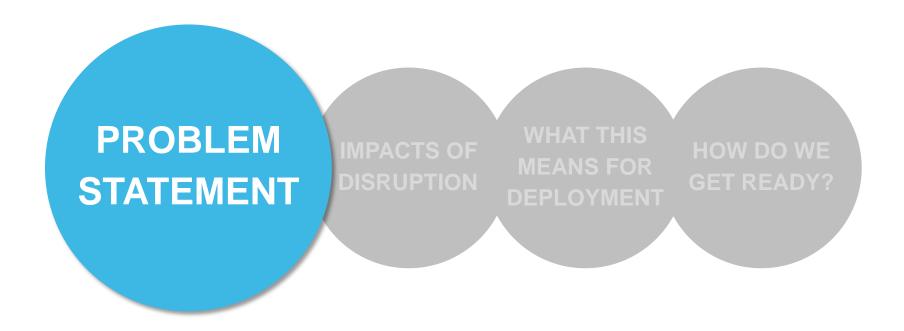
February 18, 2016



DEPLOYMENT CONSIDERATIONS FOR CONNECTED AUTOMATION



REINVENTING TRANSPORTATION

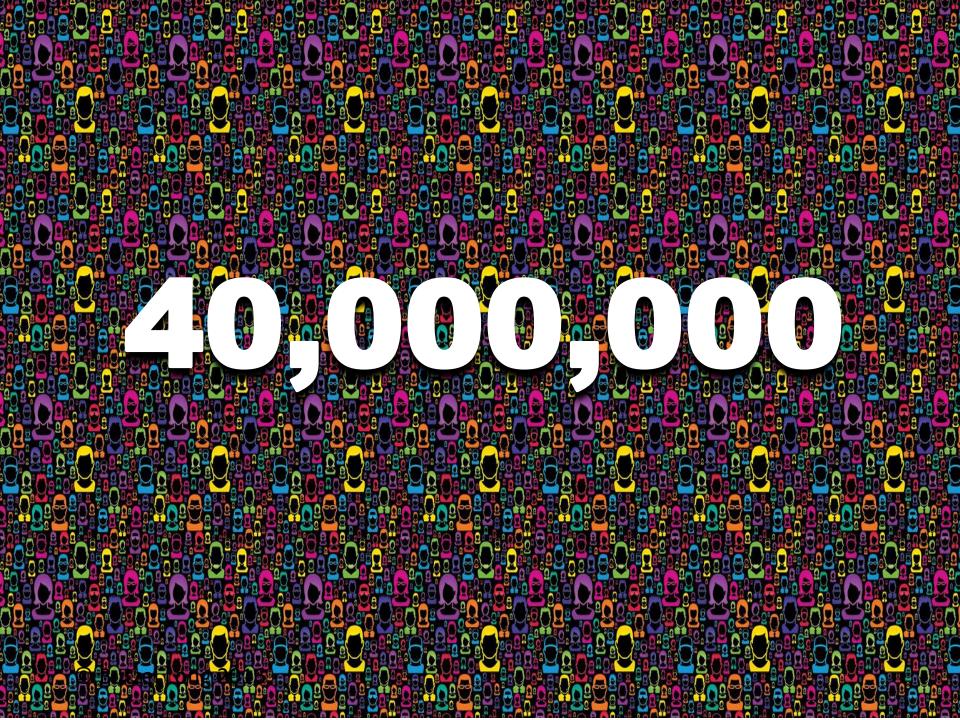




1,000,000

will die in traffic crashes



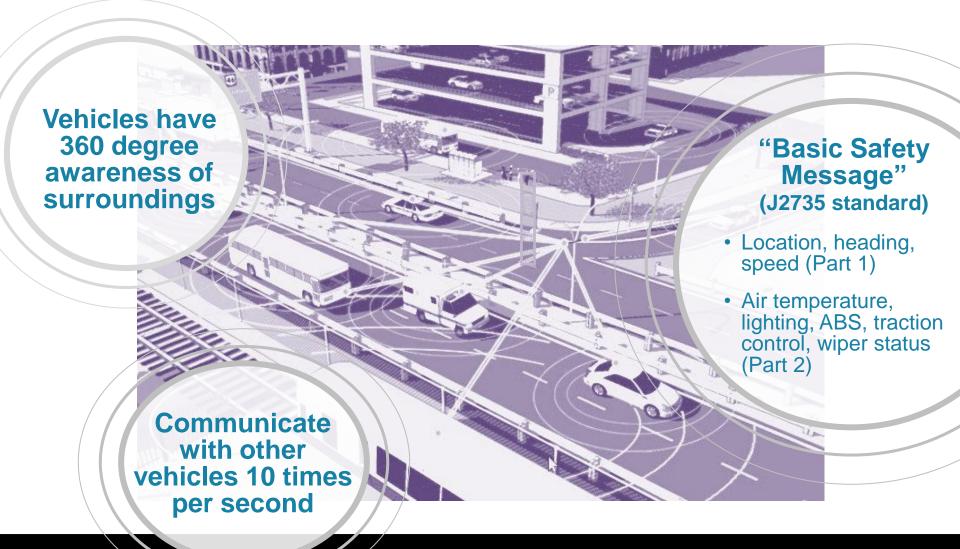




CONNECTED VEHICLES



CONNECTED VEHICLES

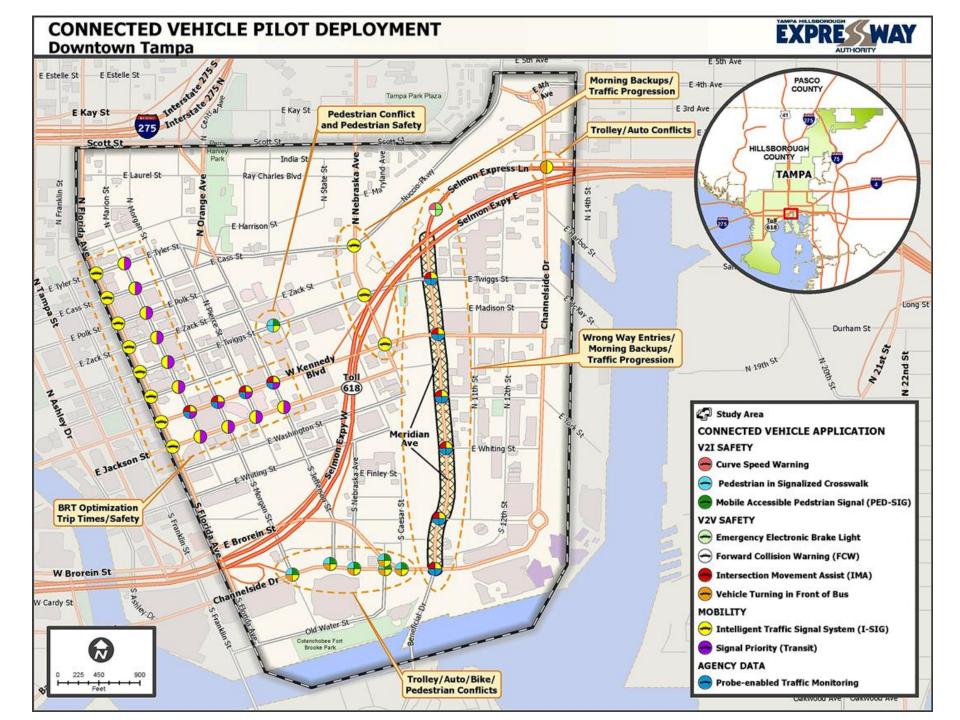


CONNECTED VEHICLES: CURRENT STATE



- Advance notice of proposed rulemaking on August 18, 2014
- Final rule on V2V expected this year
- AASHTO "Footprint Analysis" for infrastructure applications
- GM announced they would offer connected vehicles in the 2017 model year (later this year)
- Connected Vehicle Pilot Deployment program





AUTOMATED VEHICLES



- Research Focus of USDOT ITS Strategic Plan
- Auto companies introducing automated features on vehicles
 - Lane tracking
 - Adaptive cruise control
 - Automated braking
 - Park assist & automated valet
- Platooning technology
- Chaotic Industry
 - Traditional vs. Technology
 - Stave vs. State



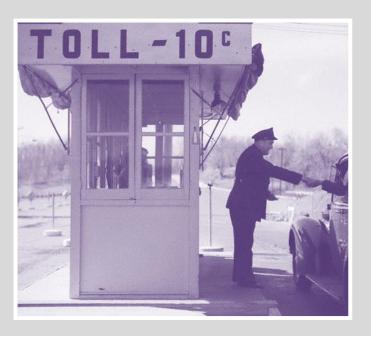
DISRUPTIVE FORCES AT WORK



We're on the cusp of a transformation in transportation, driven by advances in connectivity and automation. The changes will be disruptive.

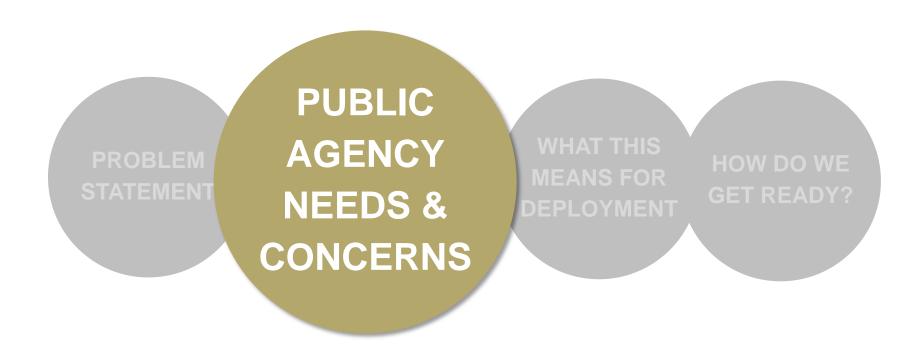
EXAMPLES OF DISRUPTIONS IN TRANSPORTATION





Government financed 511 traveler information systems displaced by private traveler

Toll booth personnel displaced by ETC



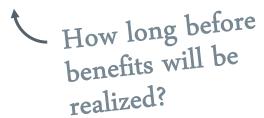




SAFETY RULES

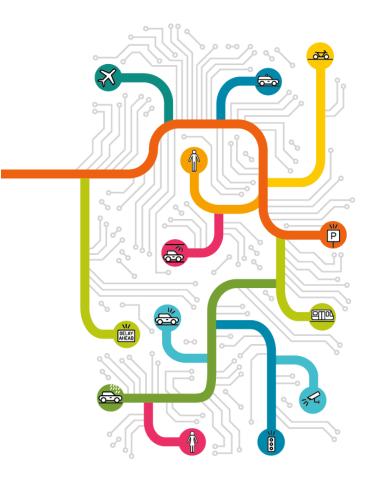
Safety is at the top of the list of benefits for connected and automated vehicle technology deployment

- Confirmed by recent America THINKS survey conducted by HNTB
- Safety benefits will increase as the number of connected and automated vehicles increases





SYSTEM PERFORMANCE DATA FROM CONNECTED VEHICLES

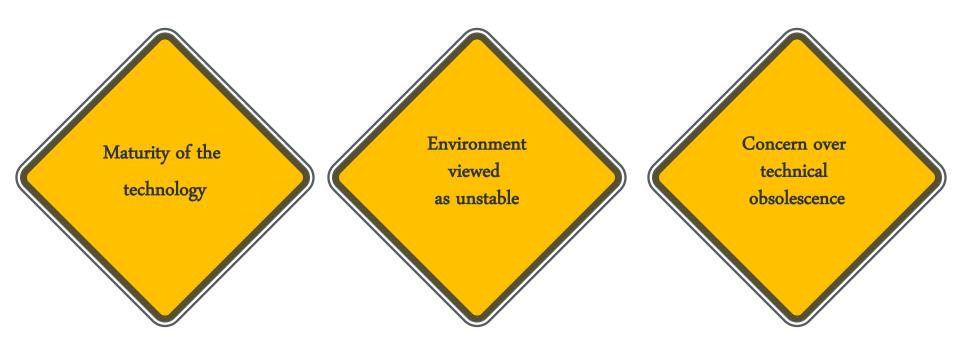


Most public agencies want basic vehicle probe information for improved system performance

- Real-time data for:
 - Traffic signal control strategies
 - Corridor management
 - Active traffic management
 - Weather and event management



TECHNICAL CONCERNS



Are the technologies "street-ready?"

Rapidly advancing technologies will continue to disrupt the environment

Deployment timeframe is long enough to suggest that other, more robust or advanced technologies may emerge



TECHNICAL CHALLENGES

- Interoperability and standards
- Implementation of specific applications
- Applications support
- Data management
- Data privacy
- Communications and network management
- Security management
- Local network security



INSTITUTIONAL CHALLENGES



- 1. Funding shortfalls that impact their ability to deploy
- 2. Lack of staff with necessary technical skills
- 3. Lack of benefit and cost information to support deployment decisions
- 4. Data how to access it, who owns it, how do they support it
- 5. Agencies have no control over what auto manufacturers do
- 6. Not enough information to build a business case for deployment



PROBLEM STATEMENT

PUBLIC AGENCY NEEDS & CONCERNS

CONCERNS

CONCERNS

CONCERNS

WHAT THIS MEANS FOR DEPLOYMENT

HOW DO WE GET READY?









Transitioning

- Think about "managed lanes" in a new context
- Should we separate automated vehicles from others to generate the most benefits?
- If 20-25% of the fleet is automated, should we dedicate a lane?
- Incrementally increase the number of automated vehicle lanes as the fleet turns over





Purpose-Built Automation

- Intermodal facilities – first and last mile opportunities
- Residential and campus applications
- Highway maintenance operations









Empowering the Machine

- Traffic signalization impacts
- Signage
- Tolling and road user charges
- Seamless travel between roads and modes





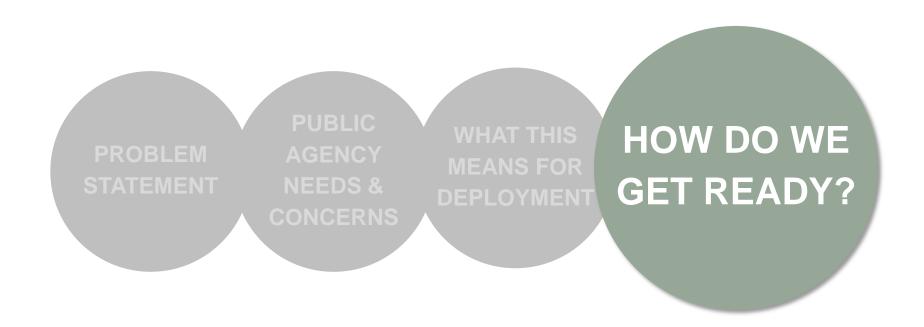


if

CARS

don't

CRASH





PREPARING FOR DISRUPTION

- Focus on TSM&O
 - Active Traffic & Demand Management
 - Integrated Corridor Management
 - Managed lanes
 - Multimodal solutions involving freight and transit
 - Intermodal connectivity
 - Traffic incident and special event management
- Big Data and mobile applications are empowering the traveler, but also transportation agencies
- Integration of new operational solutions into the current traffic management environment





GETTING READY

- Be systematic in your approach
 - Pilot projects
 - Employ systems engineering principles
- Ready your resources
 - —Improve signs and markings
 - Robust communications
 - Strengthen data management capabilities (collect, transmit, store, aggregate, analyze, disseminate, report)
 - Strengthen technical capabilities of staff
- Evaluate planning, policies and organizational impacts
- Work with industry to understand or even influence direction of change
- Educate internal and external stakeholders



REMAINING QUESTIONS

- Will the spectrum survive the myriad challenges?
- How to assess investment decisions regarding these emerging technologies and applications without experiential data?
- At what point should public agencies begin to invest in infrastructure changes?
- How do we amend traffic models and forecasting tools for an uncertain future?
- What are the unaddressed data needs of public agencies?
- What new highway design standards will be required and when?
- What new, disruptive technologies will emerge in the future to render current thinking obsolete?





Early Deployment Opportunities

- USDOT Connected Vehicle Pilot Program
 - Round 1 in 2015
 - Round 2 in 2017?
- USDOT Smart Cities Challenge
- FAST-ACT
 - Mainstreams V2I deployment
 - Grant Programs
 - 6002, 6003 and 6004
- Local agency funding
- State Competition





CONNECTED AUTOMATION

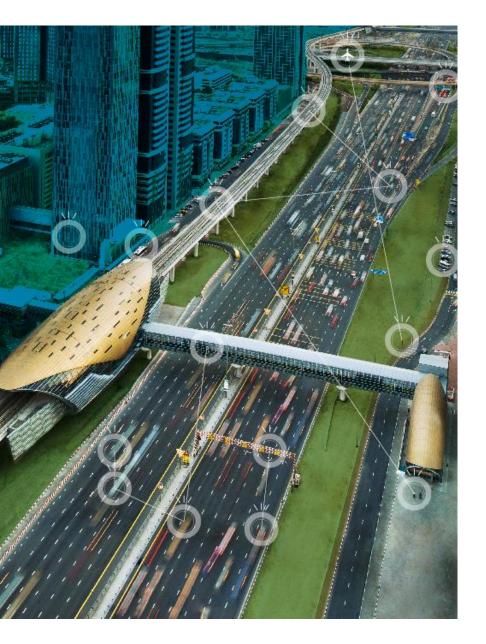
- This will be a game-changer
- Integration of connected and automated vehicle technologies into the existing operations environment will be challenging and disruptive to current paradigms
- Engineering and operational concepts, performance measures, algorithms, the transportation workforce, design standards, traffic control systems, and policies will be transformed

The book must be rewritten.









INFRASTRUCTURE DEPLOYMENT CONSIDERATIONS FOR CONNECTED-AUTOMATION

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WHEELING AND DEALING WITH THE CONNECTED AND AUTONOMOUS VEHICLE











"I thought I was on to something but I can't figure out how to move it."

The Impact of Emerging and Disruptive Technologies





Addressing Data Concerns: Asking the Right Questions

- What types of data exist?
 - Geo-location
 - Vehicle behavioral data
 - Event Data Recorder ("EDR")
- How is it generated?
 - Automatically (EDR)
 - Opt In (Apple Play)
- Where is it kept?
 - Locally (the vehicle)
 - The "Cloud"
 - Data Centers (foreign and domestic)







Deal Issues: Data Ownership

Diligence

- What data is generated by a target's products and where/how it is stored?
- Who else may try to claim ownership?
- How can ownership be effectively conveyed?

Deal

- Can data ownership be valued as an element of transaction price?
- Is there a recurring revenue model already in-place?
- Can data ownership serve as collateral for deal financing?

Documentation

- Reps and warranties regarding type of information generated, how stored, how retrieved
- Rep regarding lack of previous security breaches
- Rep that no other parties have rights in the data
- Covenants against transfer of data rights pending transaction





Evolution of V2V Security/Privacy

Fall 2012

proposed cybersecurity legislation failed to pass

Feb 2013

 Executive Order requiring DHS to address cybersecurity risks within 16 critical infrastructure sectors including vehicle manufacturing

 Secretary of Commerce ordered to direct the National Institute of Standards and Technology (NIST) to develop an applicable, flexible, and scalable framework to address cyber threats to the critical infrastructure sector

Feb 2014

NIST Cybersecurity Framework issued

Feb 2016

 Auto Alliance issues Framework for Automotive Cybersecurity Best Practices





Deal Issues: Privacy and Security

Diligence

- Who is responsible for privacy compliance?
- Will the 2016 Framework become an accepted standard? Has the target complied?
- What data security practices or protections have been designed?
- Who is likely to make a claim for damage from security/privacy breach? Have there been any claims?

Deal

- Is insurance available/in place?
- Holdback/escrow for possible breach claims?

Documentation

- Buyer's access to data and maintaining privacy
- Reps and warranties as to compliance with security/privacy requirements and absence of claims
- Indemnity for breaches discovered post-closing, potentially subject to different survival periods, baskets and caps





"Free & Clear" Technology

- Most contracts require the transfer (or ability to transfer) of IP free and clear of any encumbrances.
- This is challenging for many High Tech companies:
 - Rights often vest in multiple owners, investors or inventors
 - Technology may require underlying IP or software with ownership rights vesting in a third party





Royalties & Untested Technology

- In monetizing the unknown and untested, the following considerations are key:
 - Leaving enough "pass-through" royalties to assure the IP asset owner is adequately compensated
 - Understanding the history of similar technologies in the past and the distinctions of the new technology
 - Use the traditional business factors: importance, uniqueness, stage of development, risk and profit margin





Securing & Using Data: How Can We Protect Digital Tech?

- Software can be protected under Copyright law and maybe Patents (Mayo and Alice)
- But what about the data generated?
 - IP protects the fruits of intellectual labor" that "are founded in the creative powers of the mind." Trade-Mark Cases, 100 U.S. 82, 94 (1879)
 - The Copyright Office "will not register works produced by a machine or mere mechanical process that operates randomly or automatically with any creative input or intervention from a human author." Section 313.2, Compendium of the U.S. Copyright Office Practices, 3d Edition





A Potential Game Changer: Open Source Patents

- "All our patents belong to you."
 - Taking Tesla's lead, Ford, Toyota, and Apple offer open sourcing patents
 - Technologies covered include: electric vehicles, connected technology, regenerative braking and carbon emissions
- Disrupts revenue stream and potential royalties
- Could lower the threshold for entry for new suppliers





Deal Issues: Technology

Diligence

- How was the technology developed, and who else may claim rights?
- How close to finalization/commercialization is it?
- What patents or copyrights exist?

Deal

- Remaining cost to commercialize the technology?
- How to value open source technology?

Documentation

- Reps and warranties regarding ownership of technology and lack of competing claims
- Indemnity/escrow for risk of non-commercialization?





Risks in the Subcontracting Chain

- Traditionally, subcontracting technology can be a dicey topic. Although a tiered supplier has some control over its supply chain, "known" technologies have less risk of requiring last-minute re-sourcing due to commercialization failures
- Example: A Tier 2 sensor supplier couldn't pass a proof of concept, jeopardizing the program...





Deal Issues: Supply Chain

Diligence

- Understanding the supplier relationships where are the weak points in the supply chain?
- Can you get sufficient access to suppliers?
- What are alternate sources if re-sourcing required?

Deal

 Holdback/contingent payments based on proof of untested technologies?

Documentation

Closing condition based on subcontractor performance?





As Time Goes By... The Impact of Law and Regulation



- 17 states currently regulate automotive data privacy
- Senator Markey's "Tracking & Hacking" report highlights the potential for federal involvement



- Mid September: Congress called on DOT, DOC and the FCC to open up the 5.9 GHz for unlicensed use
- FCC has established a framework to ensure sharing doesn't cause harmful interference to vehicles



- Fuel Agnostic Carbon Emission Standards
- High Tech Poaching: Non-Solicitation and Non-Compete





Deal Issues: Regulation

Diligence

- What laws apply, and in what jurisdictions?
- What is the existing compliance program or regime?
- Have there been/are there any proceedings alleging violation?

Deal

• How to deal with possibility of a change in the liability paradigm, where manufacturers rather than drivers may become liable for automobile injuries?

Documentation

 Reps, warranties and schedules tied to specific laws and regulations





The Road Ahead

- A vehicle becomes one large mobile device receiving and transmitting data whether it is running or not, just like our smart phones
- V2V will be operated by private entities (with commercial interests in using data)
- V2V systems will enroll V2V enabled vehicles automatically
- NHTSA and OEM's can locate production runs of potentially defective V2V equipment without use of VIN numbers
- Data is unencrypted
- Location tracking is constant (even when engine is off)







Connected Car Symposium February 18, 2016







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MANAGING YOUR IP IN CONNECTED CARS- SMART CARS NEED PROTECTION



ALICE v. CLS BANK (a faux issue?)





- Title 35 USC §101
 - "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."

Exceptions to patent eligibility

- Abstract Ideas
- Laws of Nature
- Natural Phenomenon



Diamond v Chakrabarty (S. Ct. 1980)

 Congress intended statutory subject matter to include anything under the sun that is invented by man



- LabCorp v Metabolite (S. Ct. 2006)
 - Claimed correlation between levels of homocysteine and B6 and B12 vitamins
 - LabCorp argued correlation is a principle of nature, and patent should not have issued
 - Bryer dissent:
 - [Even if the claim] meets certain general definitions of process patentability, however, it still fails the one issue here; the requirement that it not amount to a simple natural correlation, i.e., a 'natural phenomenon"



- Bilski v Kappos (S. Ct. 2010)
 - See if claims recite an abstract idea
 - "Machine or transformation" test is useful for determining whether inventions are eligible
 - Not the <u>sole</u> test for deciding whether an invention is patent eligible

- Mayo v Prometheus (S. Ct. 2012)
 - What is an application of a law of nature or a natural phenomenon?
 - Consider whether additional steps consist of well understood, routine, conventional activity already engaged in by scientific community, and if those steps, taken as a whole add nothing significant beyond the sum of their parts taken separately, the invention is not patent eligible

- Molecular Pathology v Myriad (S. Ct. 2013)
 - Is newly discovered law of nature patentable?
 - Isolated DNA (purification of DNA from sample using a combination of physical and chemical methods) is naturally occurring DNA; it is a product of nature
 - cDNA (a DNA copy synthesized from mRNA)is patentable; not naturally occurring
 - Must use more than known techniques-must show significant additional innovation



- Claims included system, computer and method claims
 - Tried to avoid Bilski issues
- Court held claims were directed to financial matters and risk management; these are "abstract ideas" and unanimously held patent ineligible

- Court declined to explain limits of "abstract idea"
- Examples:
 - An idea by itself
 - Mathematical relationships and formulas
 - Fundamental economic practices
 - Certain methods of organizing human activity

- Determine patent eligibility before patentability
 - Two step process
 - Determine if claimed invention is directed to patent ineligible concept (law of nature, natural phenomenon, abstract idea)
 - Search for inventive concept to transform claimed invention into patent eligible subject matter

- Title 35 USC §101
 - "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title provided the invention is not a law of nature, natural phenomenon or abstract idea without significantly more."



- "Significantly more" may include
 - Improvement in another technology
 - Improving function of car?
 - Meaningful limitations beyond implementing the "abstract idea" via a computer
- Cannot be found in Prior Art
- May mean that it cannot be performed without a computer
- Alice <u>does not mean software</u> is always patent ineligible



- Patents for Software in Connected Car still available and valuable
- Review disclosures for patent eligibility
- Review for patentability
- Adopt claim strategy with steps that recite "significantly more"
- Space more directed to Internet of Things (IoT)



Trade Secret



Trade Secret

- Where might they be?
 - What has value from remaining secret?
 - E.g., Compiled software
- How to Protect?
 - Reasonable efforts to maintain secrecy
 - Agreements
 - Controlled access to facilities, servers, source code, etc.
 - Exit interviews
- Back-up Plan?
 - Once the secret is out, trade secret is lost
 - Contractual provisions!



Trade Secret

- What's coming next?
 - "Defend Trade Secret Act" pending in Congress
 - Federal court actions for trade secret misappropriation
 - Consistent civil remedies



Copyright (or is it Copyleft?)



Copyright

- Protects the manner in which an idea is expressed, not the idea
- Software code is copyrightable
 - Consider derivative works
- Ensure development contracts include "Work for Hire" provision

Copyright

- The Digital Millennium Copyright Act (DMCA) restricts the ability to make, sell, or distribute devices which circumvent (or get around) copyright protection
- Cannot make or use programs that allow users to get by any technical measures that control access to a copyrighted work

Copyright

- Connected Cars not merely transportation
- Connected Cars are mobility platforms
- IoT Service Providers are likely to be main beneficiaries of technology
- May require extensive cross licensing for each application in complex networks

LICENSING ISSUES



- Open Source source code available
 - Free Redistribution
 - Access to Source Code
 - Derived Work distributed under same license
 - Integrity of Author's Source Code
 - No discrimination against persons or endeavor
 - Distribution of License
 - License not product specific; does not contaminate other software



- Free software
 - Free to operate for any purpose
 - Free to study how program works
 - Free to redistribute copies
 - Free to improve; access to code is pre-condition
- Freedoms must be irrevocable as long you do not violate agreement

- Copyleft license requires redistributed copies and derivative works to be under the same license
- User can share and modify
- Any resultant works must be distributed under same license
- Copyleft licenses include
 - GNU General Public License (GPL)2
 - GNU Affero General Public License (AGPL)3 and others

- A "non-copyleft" license is simply one that permits the code to be incorporated in a program that is distributed under another license – even a proprietary one
- Sometimes called "permissive" licenses
- Examples are the MIT license4, the BSD5 license family, and the Apache License 2.06

- Copyleft attribute of free software license places restrictions on redistribution
- Prevents subsequent party from placing restrictions on redistribution
- To maintain "free" nature of the software, provision forces inclusion of new developments within the terms of the free license

- Copyleft may create compatibility risks
 - two or more licenses that mandate different and incompatible actions
- May be impossible to comply with both licenses
- Incompatibility should be avoided where possible
- Consult with legal counsel first!



- Legal Context
 - Initial Developers
 - If commercial, may opt out
 - Use dual licensing and proprietary license(s)
 - Secondary Developers or Distributors
 - May use FSOS software in own product, after adding value
 - Copyleft may contaminate licensing
 - End Users



- Enforceability of license
 - May be non-contractual restrictive copyright notices (may be unenforceable)
 - May be no more than unilateral permission to use property (may be unenforceable)
 - May be non-contractual releases (may be enforceable)
 - Enforceability of non-contractual IP conditions
 - Expand rights enforceable
 - Withdraw IP rights unenforceable



- Ownership of IP
 - Copyright rests with the author/developer
 - Collective or Compilation
 - Derivation
 - Joint Work
- Include assignment of IP
 - Grants standing to enforce
 - Make certain IP rights not already in FSOS



Licensing and Entitlement Management Solutions



- IoT is turning many manufacturers of "things" into first-time software vendors
- Shifting product value from hardware to the software running on the device requires an appropriate licensing strategy to maximize revenue potential
- Estimated that by 2020, a failure to put in place a LEM system may result in a 20% drop in potential revenue generated from software for device manufacturers connecting to the IoT



- By monetizing the software on their devices, vendors may be able to increase and drive recurring revenue streams, creating billions in additional value
- With an estimated 25 billion 'things' in the marketplace by 2020; an average of \$2-\$5 for software from each of these installed units translates to additional \$50-\$125B

- Understand LEM best practices before beginning a design
- Have a framework to analyze LEM issues
- Increase the value of LEM deployment by understanding options available to design a solution
- Have a clear understanding of solutions for problems posed by trends like virtualization, cloud computing, SaaS, etc
- Make informed decisions about project goals, timeframes and results



- IoT will drive business transformation for many device manufacturers, enabling them to use software to differentiate product and solution offerings
- Software vendors and device manufacturers need to protect and monetize the IP
- Adopt LEM systems that control access to your Internet-connected device, its functions & its features
- Adopt flexible pricing and packaging to permit bundled product features, ensure payment, provide verified upgrade paths and create new revenue streams









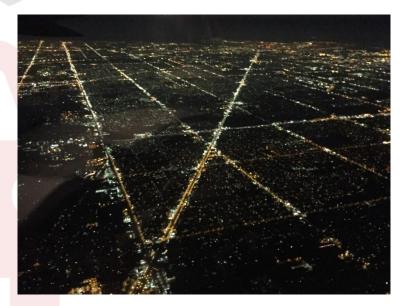
Jennifer A. Dukarski, dukarski@butzel.com @JDukarski

HACKING AND TRACKING: DATA OWNERSHIP, SECURITY AND PRIVACY IN THE AUTONOMOUS AND CONNECTED VEHICLE



Emerging Issues: Connectivity and the Legal Landscape

- Merger and Acquisition, Contracting, Regulatory and Intellectual Property
- Recruiting and Retaining Talent:
 - Immigration
 - Trade Secrets
 - Employment and Labor
- Downstream Liability
 - Warranty
 - Recall
 - Accidents





The Age of Connectivity Has Arrived!

- The number of cars connecting to the internet is expected to grow to 152 million by 2020
- CES has become an integral part of the automotive circuit



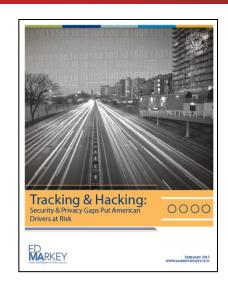






Emerging Issues: Tracking and Hacking

Tracking: In February, Senator Ed Markey (D-Mass) issued a report titled "Tracking & Hacking: Security & Privacy Gaps Put American Drivers at Risk" which accused the industry of "lax" privacy practices and "haphazard" data collection



Hacking: Wired Magazine demonstrated a remote hack on a Jeep, the latest in a series of widely publicized attacks



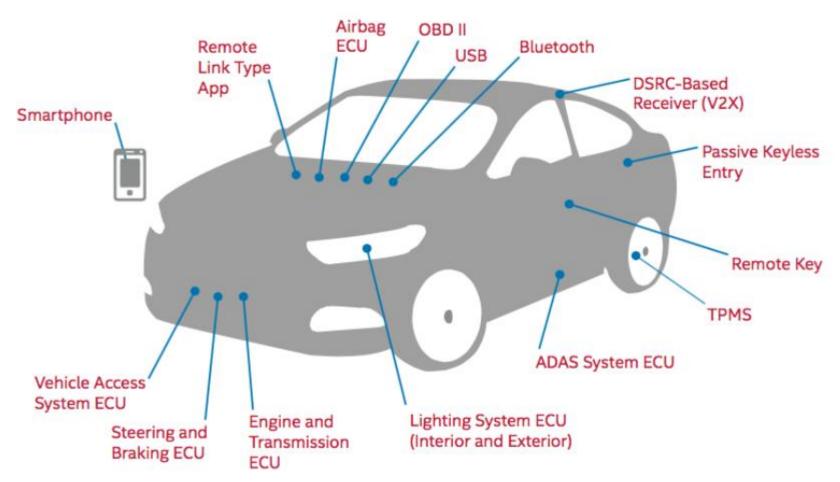


Hacking: The Security Side

- Tesla Model S (Qihoo)
- Toyota Prius
- Ford Escape
- Battelle Cyber Challenge 14 year old hacker with \$15 of Radio Shack Parts
- Leslie Stahl and 60 Minutes
- Miller & Valasek
- "Jeep Hack" resulted in the recall of 1.4 million
 Jeep, Chrysler, Dodge and Ram vehicles



Hackable and Exposed Surfaces





NHTSA Call to Action

- NHTSA currently provides little guidance on the roughly 100 million lines of software code used to power modern cars.
- Director Mark Rosekind: "I don't know if there's going to be regulation or standards, or what that's going to look like, but I don't think there's any question that we have to get action on cybersecurity this year."

NHTSA and Manufacturers agree to "Enhance Automotive Cybersecurity"

Develop suggested best practices that reflect lessons learned within and outside of the auto industry to foster enhanced cyber resiliency and effective remediation.

Develop appropriate means for engaging with cybersecurity researchers as an additional tool for cyber threat identification and remedy.



NHTSA and Manufacturers agree to "Enhance Automotive Cybersecurity"

Support and evolve the auto industry's information sharing and analysis center (Auto–ISAC) through the following:

Promote continued voluntary sharing of cybersecurity threat and vulnerability information through the Auto-ISAC and its members.

Enhance the Auto-ISAC to include sharing of common/generic countermeasures used to address common threats and vulnerabilities.

Expand the membership of the Auto-ISAC to include members of the automotive supplier community and other participants in the connected vehicle ecosystem.



SAE J3061: Cybersecurity Guidebook for Cyber-Physical Vehicle Systems

- Know your system's potential
- Understand key principles
- Consider the vehicle owner's use of the system
- Implement cybersecurity in concept and design phases
- Implement cybersecurity in development and validation
- Implement cybersecurity in incident response
- Consider cybersecurity when ownership changes





SURFACE VEHICLE RECOMMENDED PRACTICE	J3061™		JAN2016	
	Issued	2016-01		
Cybersecurity Guidebook for Cyber-Physical Vehicle Systems				

RATIONALE

To provide a cybersecurity process framework and guidance to help organizations identify and assess cybersecurity threats and design cybersecurity into cyber-physical vehicle systems throughout the entire development lifecycle process.

- Defines a complete lifecycle process framework that can be tailored and utilized within each organization's development processes to incorporate ophersecurity into cyber-physical vehicle systems from concept phase through production, operation, service, and decommissioning.
- Provides high-level guiding principles
- · Provides information on existing tools and methods.
- Provides the foundation for further standards development.

TABLE OF CONTENTS

1. 1.1 1.2	SCOPE	5 6 6
2.	REFERENCES	6
3.	DEFINITIONS AND ACRONYMS	8
4. 4.1 4.2	RELATIONSHIP BETWEEN SYSTEM SAFETY AND SYSTEM CYBERSECURITY	7 8 8
5. 5.1 5.2	GUIDING PRINCIPLES ON CYBERSECURITY FOR CYBER-PHYSICAL VEHICLE SYSTEMS (CPS)	0
5.4 5.5 5.6 5.7	Unplement Cybersecurity in Concept and Design Phases. 2 Implement Cybersecurity in Concept and Design Phases. 2 Implement Cybersecurity in Development & Validation. 2 Implement Cybersecurity in Incident Response. 2 Cybersecurity Considerations When the Vehicle Owner Changes 2	11

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Our Panel

- Jennifer Dukarski, Butzel Long, moderator
- Brian Daugherty, Chief Technical Officer,
 Motor Vehicle and Equipment Manufacturers
 Association (MEMA)
- Dan Hearsch, Director, AlixPartners
- Michael Ridge, President, Silent Cyber
- McConnell Trapp, President and "White Hat Hacker," Speed Trapp Consulting





Connected Car Symposium February 18, 2016



