

Connecting Cars: Behind the Code

Why is an open connected platform so critical?

28 April 2016



Matt Jones
President GENIVI Alliance

GENIVI Development Platform



The GENIVI Focus: In-Vehicle Infotainment (IVI) and Car Connectivity

Software that performs features like...

Hands-free
Telephone

Driver
Assistance
Alerts

Navigation and
Points of Interest

Car Information

Connection to
Internet-based
services

Email and Text

Entertainment



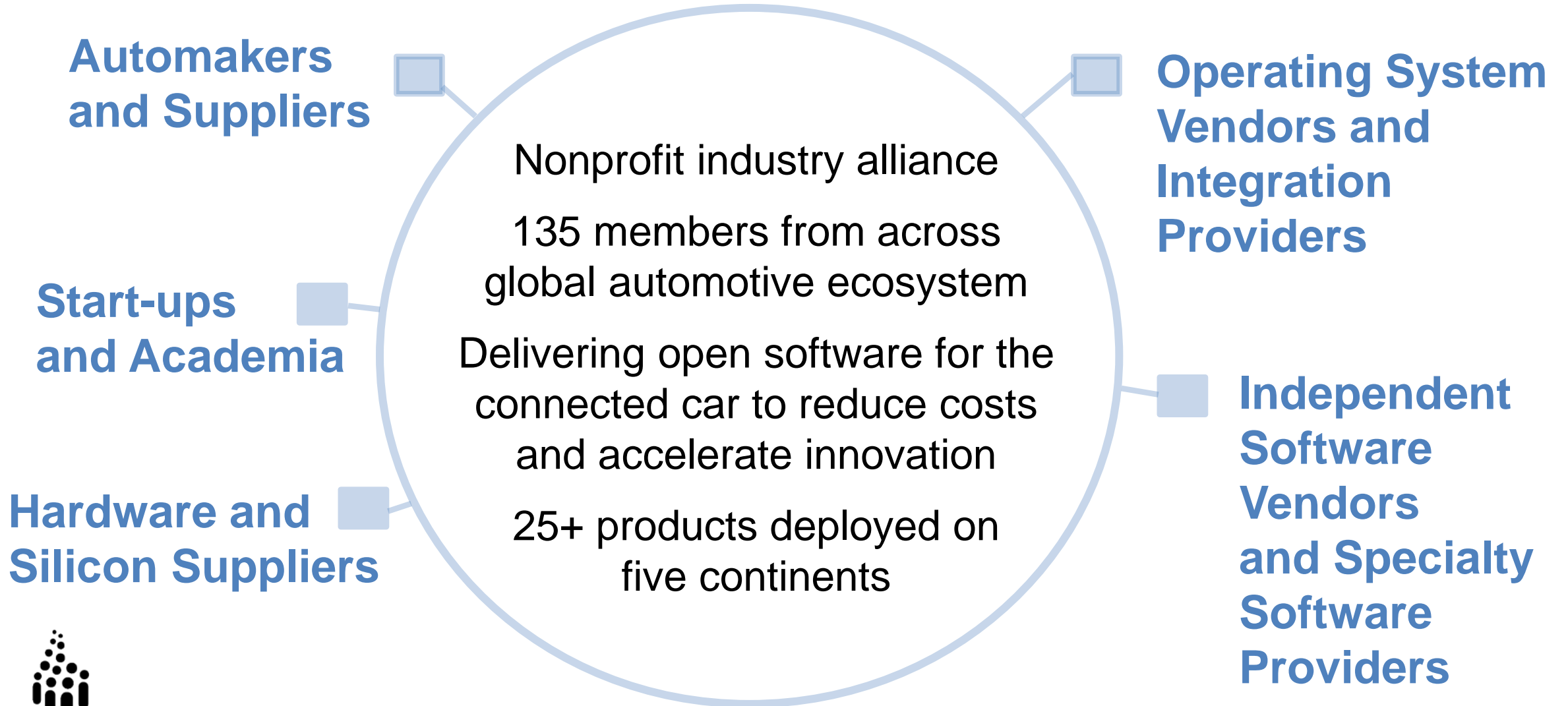
What makes a car go... software

- *“It would be easy to say the modern car is a computer on wheels, but it is more like 30 or more computers on wheels.”*
Bruce Emaus, chairman of SAE International’s Standard Committee
- Some cars have more lines of software code than jet fighter airplanes; some have nearly twice the number of lines as make up the entire logic behind Facebook
- Car software extends your mobile device, your office, your home entertainment, and your **entire digital life** to the car

Three Challenges of Automakers

- Increase speed and decrease cost of developing IVI products
 - Mobile devices release in 18 months; Cars in 3-5 years
 - Drivers expect just released smartphones and apps work in the car
 - Over 100 million lines of code in a high-end IVI product ... and growing
- Supplement existing IVI offerings with innovative approaches
 - Automotive ecosystem has been largely self-contained and very proprietary
 - Platform and tooling for experimentation and rapid prototyping are missing
- Take full advantage of the connected car opportunity
 - No technology platform for car-to-*anything* communication
 - Assisting drivers with cloud-based information has huge potential

An Open, IVI Community



Focused on Responding to Consumers



DEFINE

Provides standard open source architectures, tools and software



PARTNER

Supports business model evolution and networking to facilitate innovation



LEVERAGE

Allows flexible definition of IVI systems that fit customers' latest needs



REUSE

Allows reuse of software and re-deployment of solutions, with no royalty fees

Connected Car: A foundation for innovation

Consumers expect a connected lifestyle

- Cars are just another participant in their digital life
 - Everything they can do on a smartphone, they should be able to do in a car...plus more
- Cars are becoming active participants in a peer-to-peer network consisting of...
 - Smart homes
 - Smart cities
 - Smart infrastructure
 - Other smart vehicles

But standards and a car connectivity software platform are missing

- Homes, cities and cars speak different “languages”
- Current automotive standards primarily aimed at safety
- Intelligent transportation solutions are unique to a region
- Solutions from different automakers may not interoperate
- Cellular connectivity does not scale
- Concerns over car security in a connected world

An open infotainment and connectivity platform for the transportation industry - Remote Vehicle Interaction (RVI)

Platform

Specify, Standardize, and Implement Core connectivity protocols and services between the IVI system and remote entities.

Open

Use proven open source technologies to ensure that all protocols and services can be implemented securely and robustly.

Collaborative

Work with existing organizations (OCF, OMA, IEEE, etc) to ensure broad adoption and acceptance, and to avoid duplication and competition.

Rapidly delivering Remote Vehicle Interaction

- Proofs of concept (code) complete for:
 - Car control (e.g. temperature) from smartphone
 - Transferring car data to the cloud (big data uses)
 - Software updates over the air (SOTA)
- Integrated into GENIVI Development Platform(GDP)
- Yesterday: Demonstration of connecting a car and a home (with Open Connectivity Foundation)
- Exploring other “smart connections” (cities, vehicles, etc.)

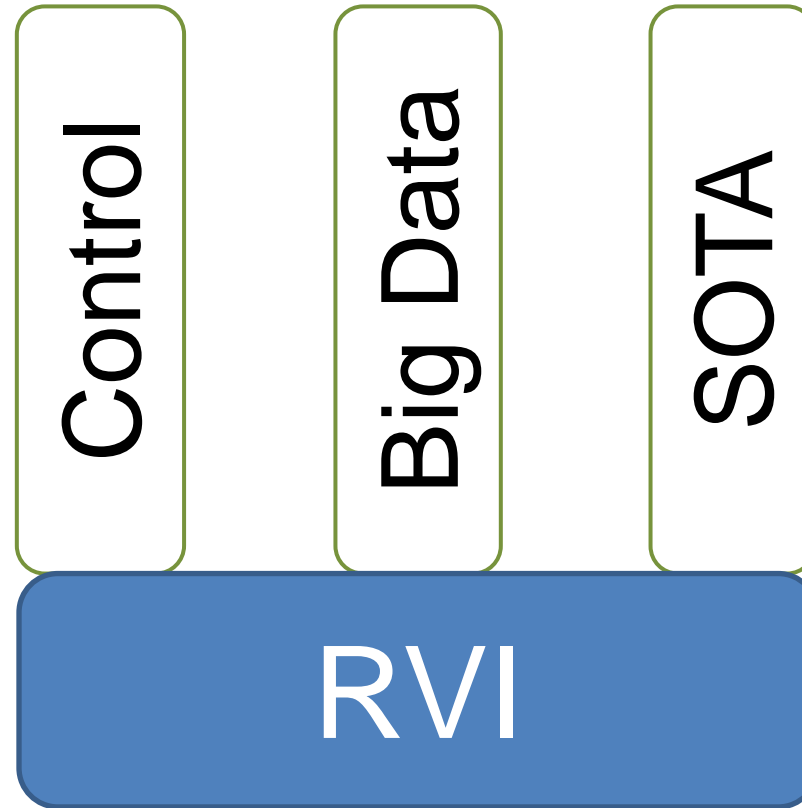
GENIVI Platform Accelerates Innovation



GENIVI
Development
Platform

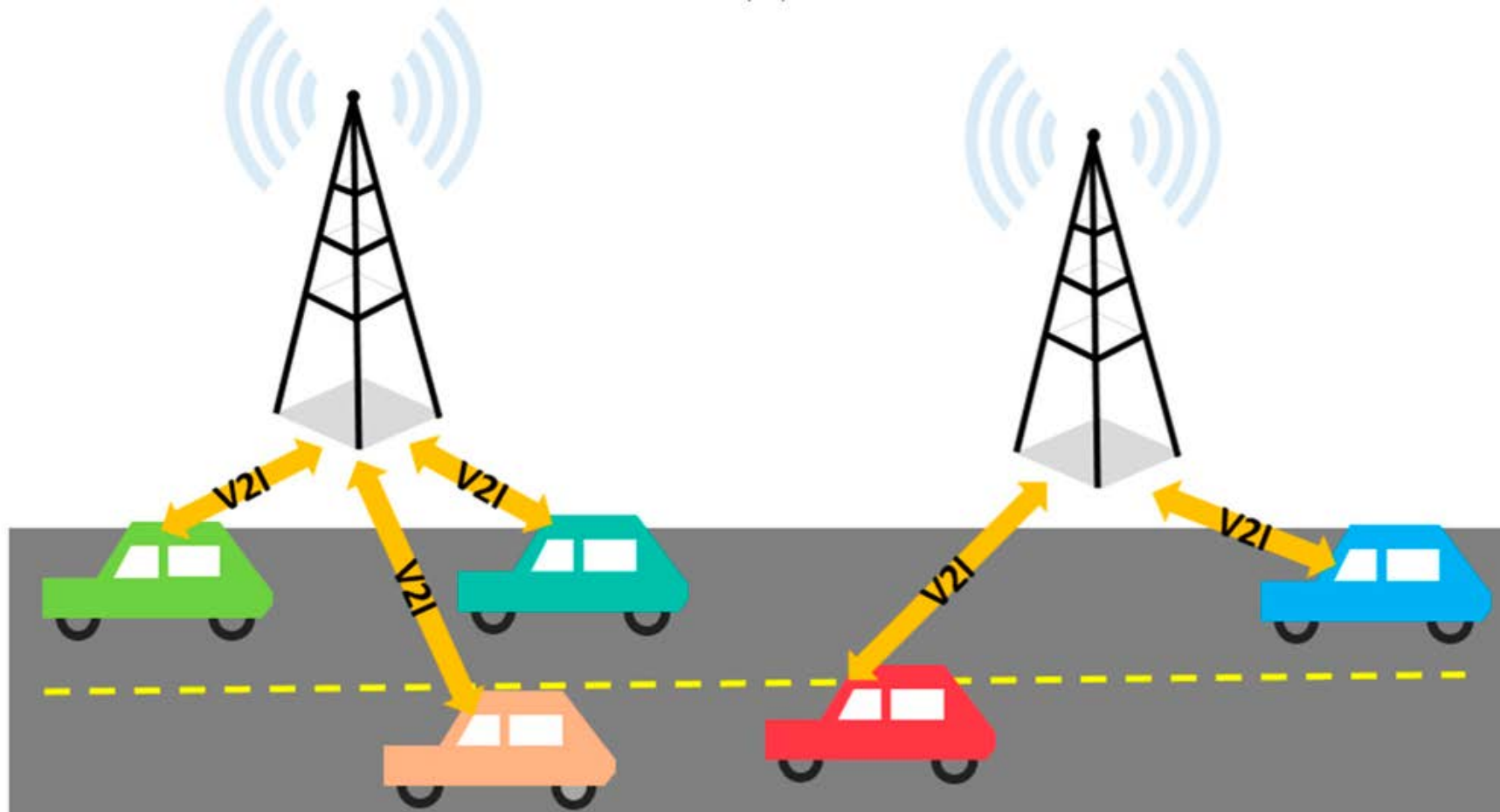
Remote Vehicle
Interaction (RVI)

GENIVI RVI reference

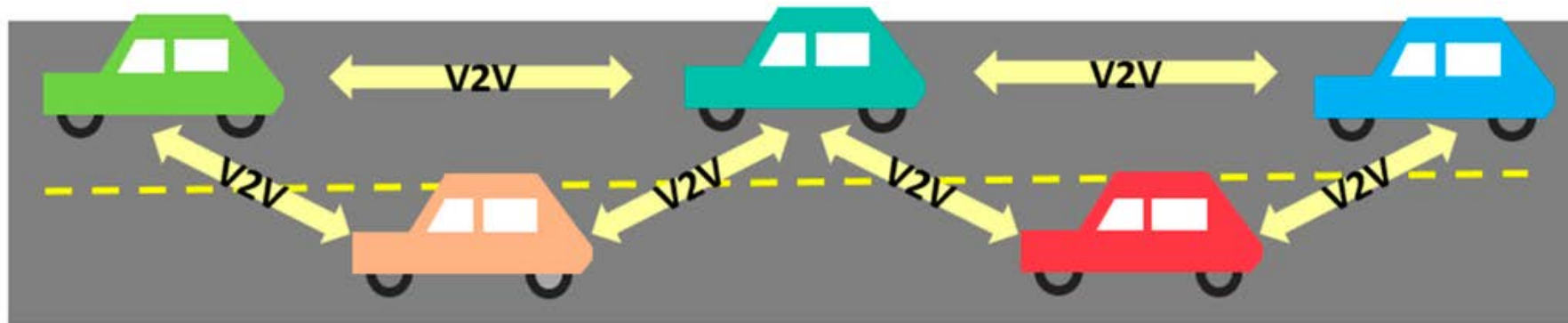


Connected Car: A vision for the future

V2I



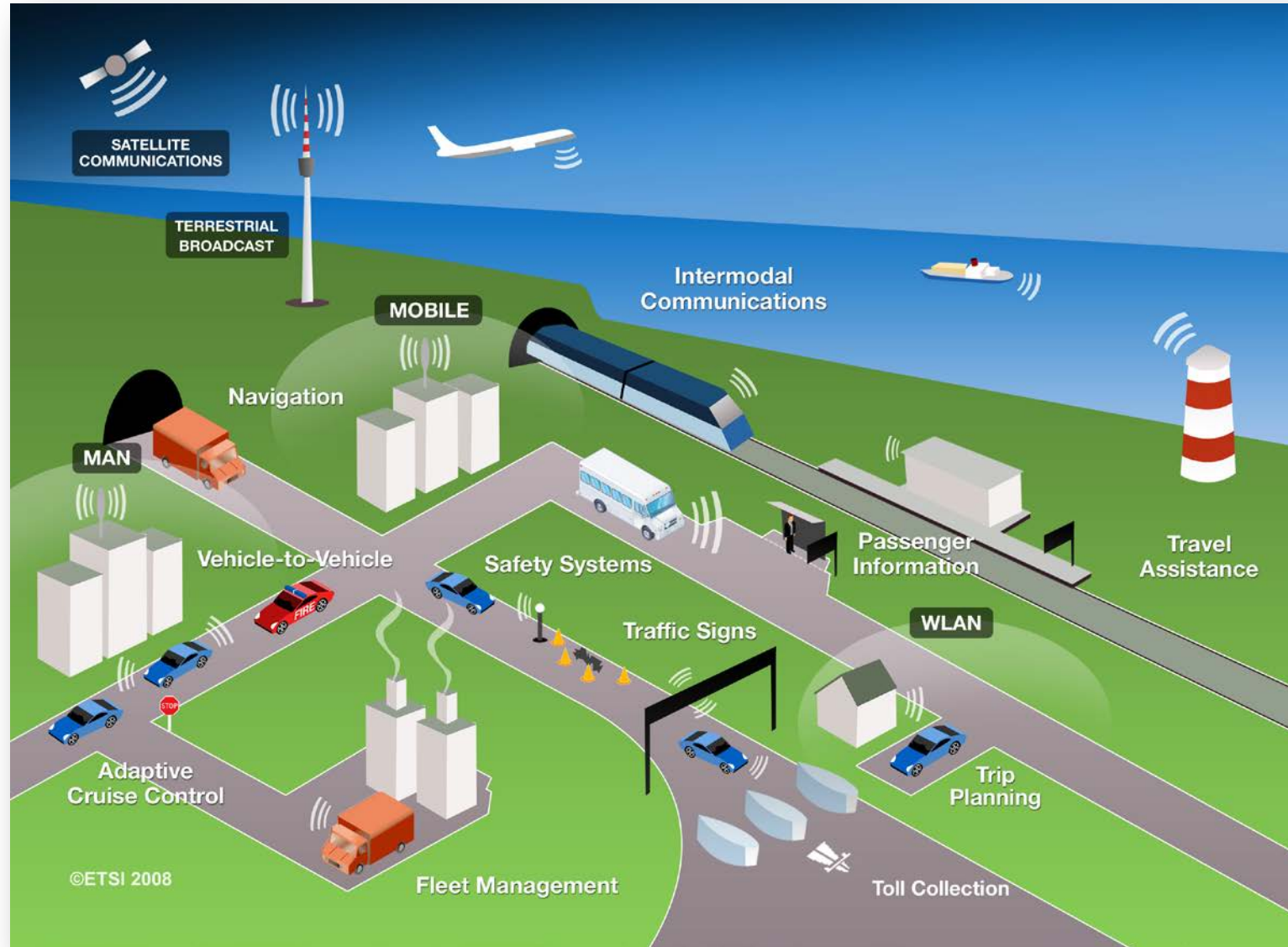
V2V



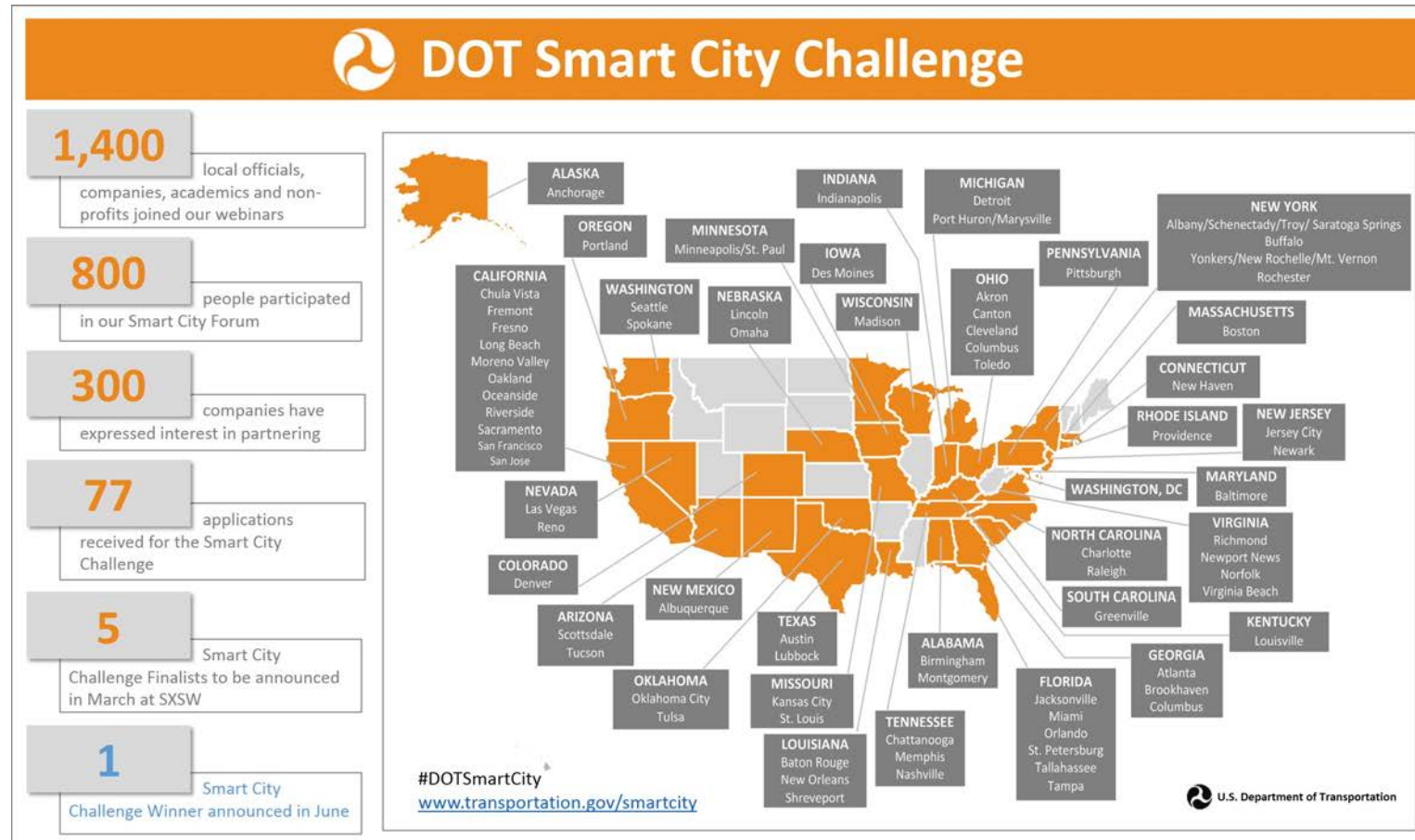
V2I + V2V



Smart Cities



US DOT Smart Cities Challenge



Today's Use Cases

JAGUAR XE BENEATH THE SKIN - PART 3 OF 4
IN-CAR TECHNOLOGY

Heads-Up Display
Laser HUD projects sharp, high-contrast color images into the driver's line of sight, intuitively conveying vital vehicle, road and navigation information.

InControl Apps
Seamless access to iOS® and Android® smartphone apps through the touchscreen, for everything from parking information to hotel bookings. Multiple devices can also connect to the web through an optional in-car Wi-Fi hotspot.

InControl Remote
Remotely program your XE up to seven days in advance to pre-heat or cool your cabin; start the engine; lock or unlock the doors; or locate the car in a parking lot - all through a secure smartphone app.

InControl Secure
Enhances security by providing pro-active vehicle monitoring. Should the XE be stolen, the tracking service can work with law enforcement agencies to locate and recover the car.

How can we accelerate?

Drive Time Metrics



How to get involved

- **Technical:**
 - Engage with the RVI Expert Group within GENIVI
 - Contribute code
 - Build future concepts on the common platform
- **Business:**
 - Discuss future needs with customers and partners
 - Contribute use cases to the Expert Group
 - Encourage others to join GENIVI

We can learn a lot from each other!

Thank you!