

Map Satellite

ALBERTA

MANITOBA

BRITISH

State: Washington

Type: Executive Order

More Info: [Executive Order 17-02](#) — Gov. Jay Inslee signed an executive order allowing companies to apply with the state Department of Licensing for permission, under pilot programs, to test-drive autonomous vehicles on state roads.

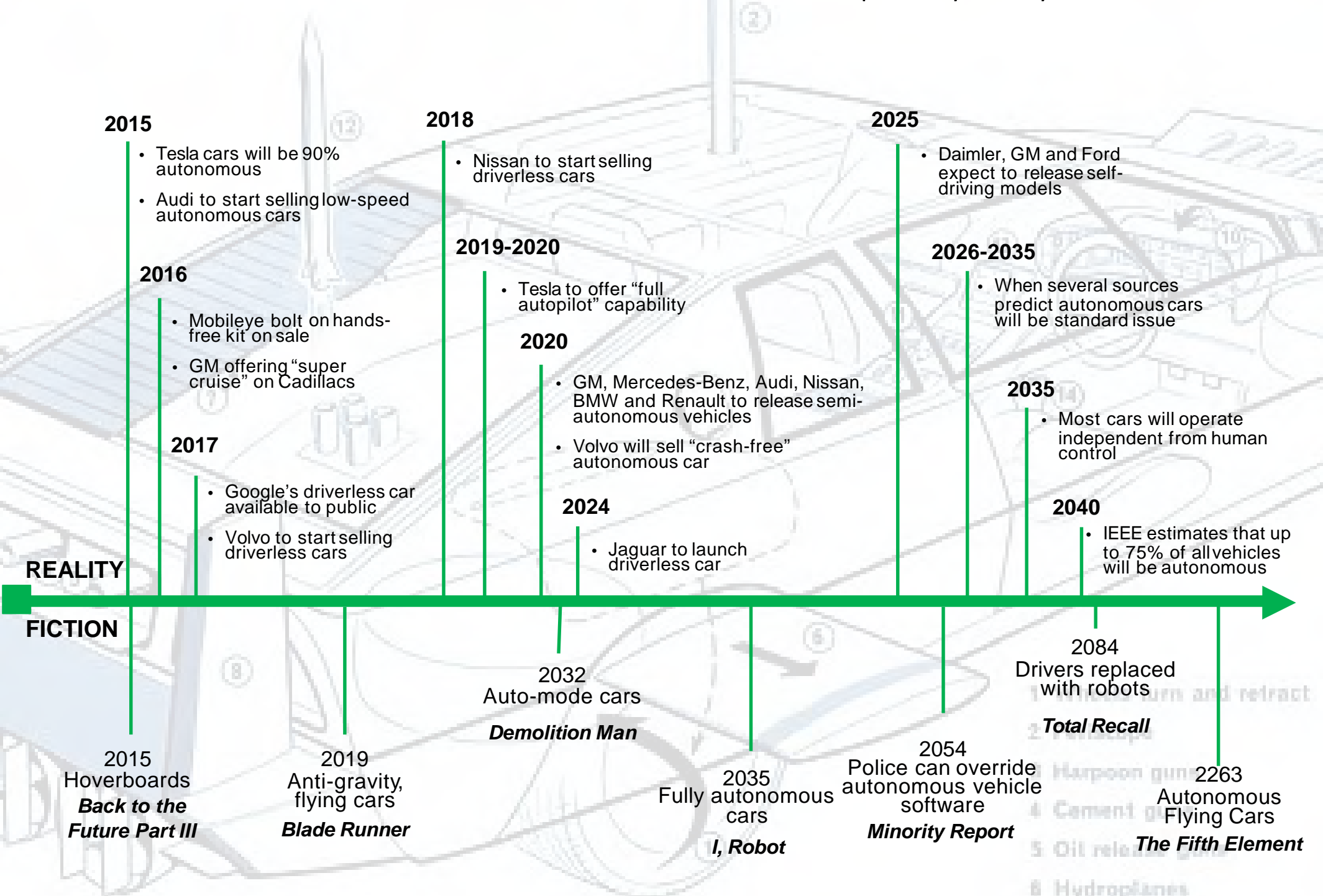
Our Coverage: [Washington Governor Signs Order for Public Autonomous Vehicle Testing](#)



Autonomous Vehicle Overview, Intelligent Traffic Systems & Infrastructure Advisory

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Science Fiction to Science Fact: Autonomous Cars Shaped by Hollywood



Basic Physical Ecosystem of an Autonomous Vehicle

“How does a self-driving car work?”

Signals from **GPS (global positioning system)** satellites are combined with readings from tachometers, altimeters and gyroscopes to provide more accurate positioning than is possible with GPS alone

Lidar (light detection and ranging) sensors bounce pulses of light off the surroundings. These are analysed to identify lane markings and the edges of roads

Video cameras detect traffic lights, read road signs, keep track of the position of other vehicles and look out for pedestrians and obstacles on the road

Radar sensor

Ultrasonic sensors may be used to measure the position of objects very close to the vehicle, such as curbs and other vehicles when parking

The information from all of the sensors is analysed by a **central computer** that manipulates the steering, accelerator and brakes. Its software must understand the rules of the road, both formal and informal

Radar sensors monitor the position of other vehicles nearby. Such sensors are already used in adaptive cruise-control systems

Source: *The Economist*

- Global Positioning System (GPS)
- Light Detection and Ranging (LIDAR)
- Cameras (Video)
- Ultrasonic Sensors
- Central Computer
- Radar Sensors
- Dedicated Short-Range Communications-Based Receiver (not pictured)

Autonomous Car Influencers & Champions

Sergey Brin

Co-Founder of Google &
Leader of Google X

John Leonard

MIT Autonomous
Expert &
Prof. of Mechanical
and Ocean
Engineering

Elon Musk

CEO of Tesla /
Inventor & Investor
in Disruptive Tech

CEO of General Motors

Mary Barra

CEO & Co-Founder
of Udacity

Sebastian Thrun

Co-Founder of
PayPal & Palantir /
Investor

Peter Thiel

Advances Across Industries Surpassing Autonomous Automobiles

Beam Telepresence Robots



TELEPRESENCE

Autonomous Lifteraft



LIFERAFTS

DARPA's Gladiator



UNMANNED TANKS

Amazon Delivery Drones



DRONES

Automated Robots Deliver Food to Hospital Patients



HOSPITAL BOTS

Volvo European Safe Road Trains for the Environment Project



iTRUCKING

Mobile Weather Data Collection Network



TELEMATICS

NOAA Solar Ocean Explorer



SUBMARINES

40

Impact – Reverse Urbanization

3.5 Billion

Global urban-dwelling
population

United Nations

12%

Increase in America's urban
population, 2000-2010

US Census Bureau

Perceptions of distance will change as driverless vehicles will make travel more bearable, if not enjoyable. Many will view the ease of travel as an invitation to move out of urban centers. We can expect suburban areas to sprawl out from cities, and rural communities to thrive.

Property Values Rebound 3-6 Hours Outside Cities



Olympia	103
Tacoma	135
Seattle	168

If getting to and from places is more seamless and enjoyable, then why fly or bother with trains? Mass transit will be threatened. In addition, people will take up weekend homes that are 3-6 hours outside of major urban areas and will sleep overnight in their vehicles. Night road traffic will increase.

Smart Streets for Smart Cars

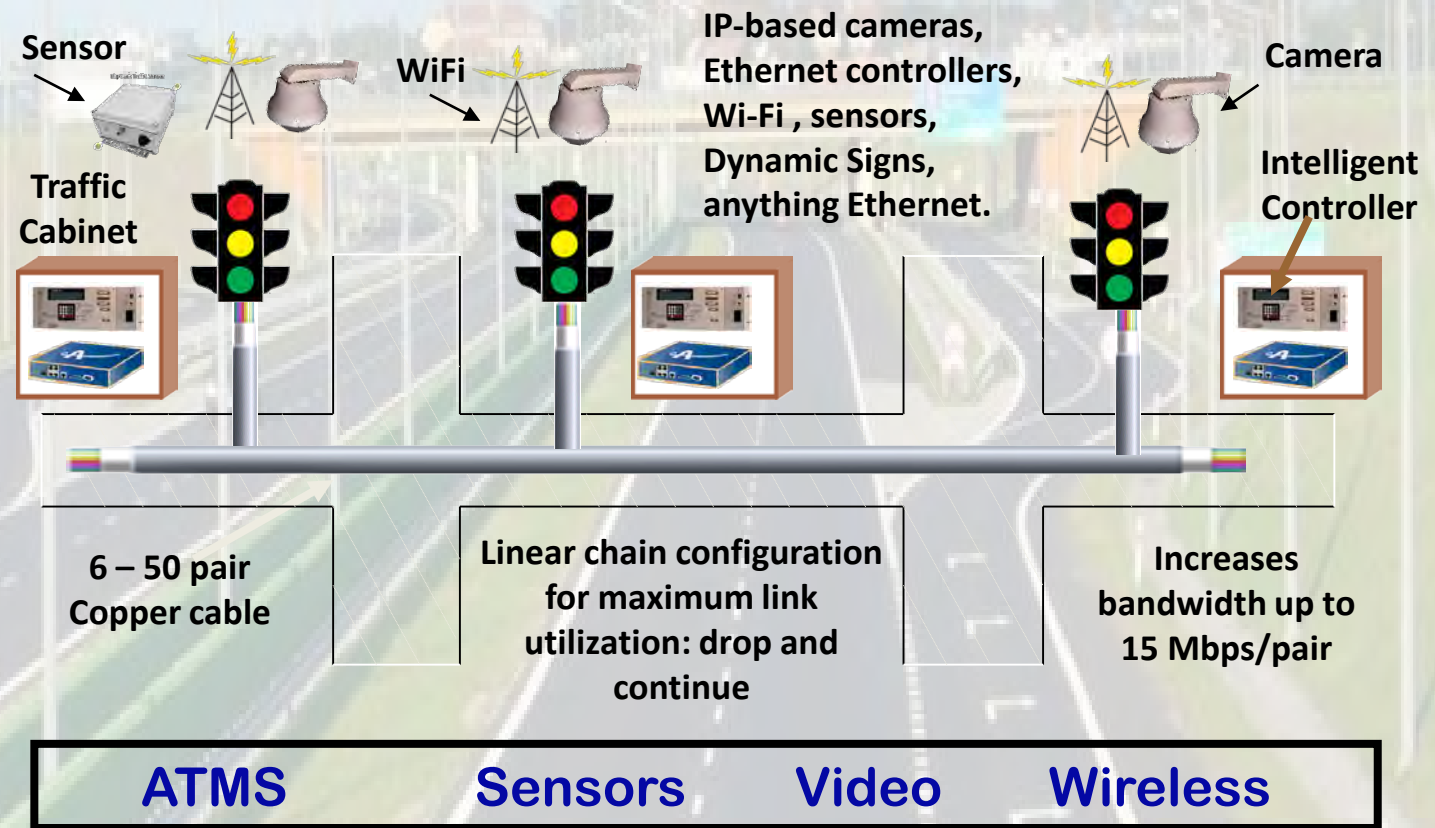
Intelligent Traffic Systems (ITS) are one of the important aspects for success.

Traffic dictates flow, promotes commerce, drives safety, and environmental impact.

IoT enabled ITS provides better service by deploying traffic updates instantly.

In many cities across the US, to support “connected vehicles, low cost vehicle detecting sensors will be deployed on roads for every 1500 feet.”

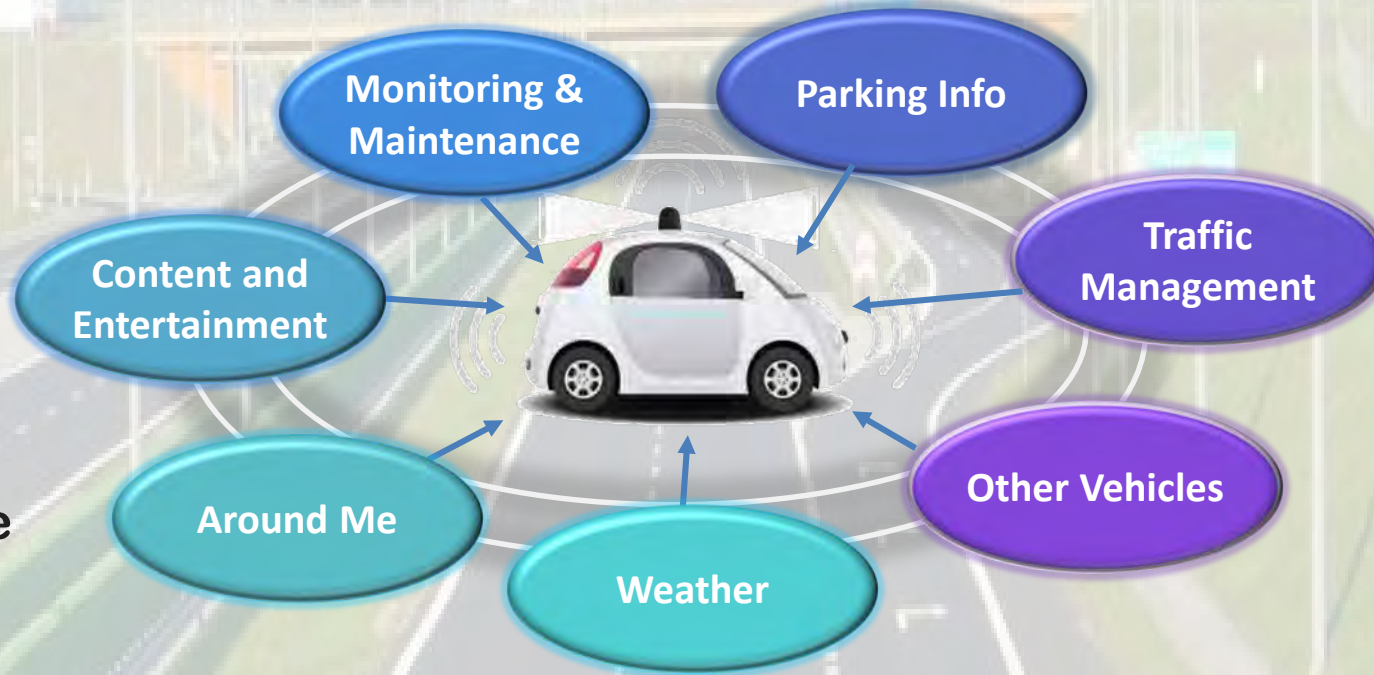
There is no artificial substitute for reliable network infrastructure.



“Data is Becoming the New Oil”

- The on-board systems must be able to share information with a range of external systems for tasks such as emergency response, traffic management or fuel supply.
- Fast, reliable, Omnipresent Connectivity be the backbone of the future mobility ecosystem.”
- “A parallel digital infrastructure ... that will be every bit as critical as roads and bridges.”

Ubiquitous Connectivity



<https://www2.deloitte.com/insights/us/en/focus/future-of-mobility/role-of-telecommunications-in-new-mobility-ecosystem.html>
https://www2.deloitte.com/insights/us/en/focus/future-of-mobility/overview.html?id=us:2ps:3gl::eng::102218:nonem:na:F5tmf2fU:1124733069:315108288693:b:RLSA_Future_of_Mobility:Future_of_Mobility_BMM:

Change in Communication Patterns More Symmetrical

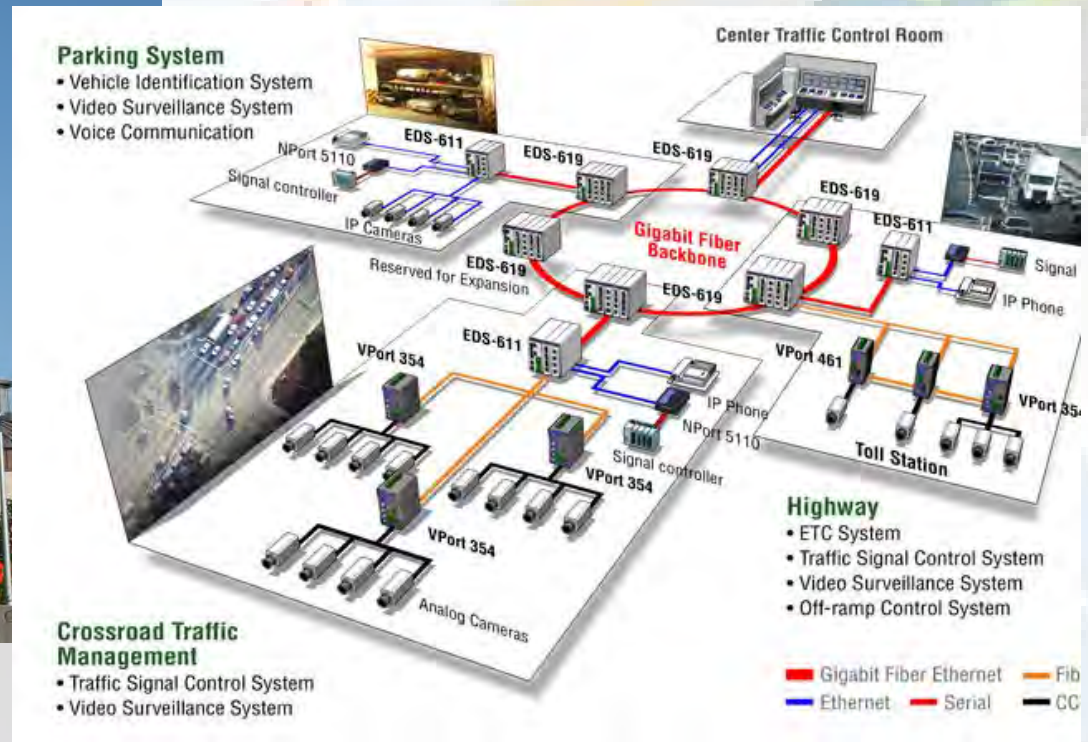
PUSH Info
Distribute a lot of information to the smart car and to a lot of devices and smart cars around it



PULL Info
Accumulate, gather information from the smart car and a lot of devices around it

This is true for all communication channels not only smart cars

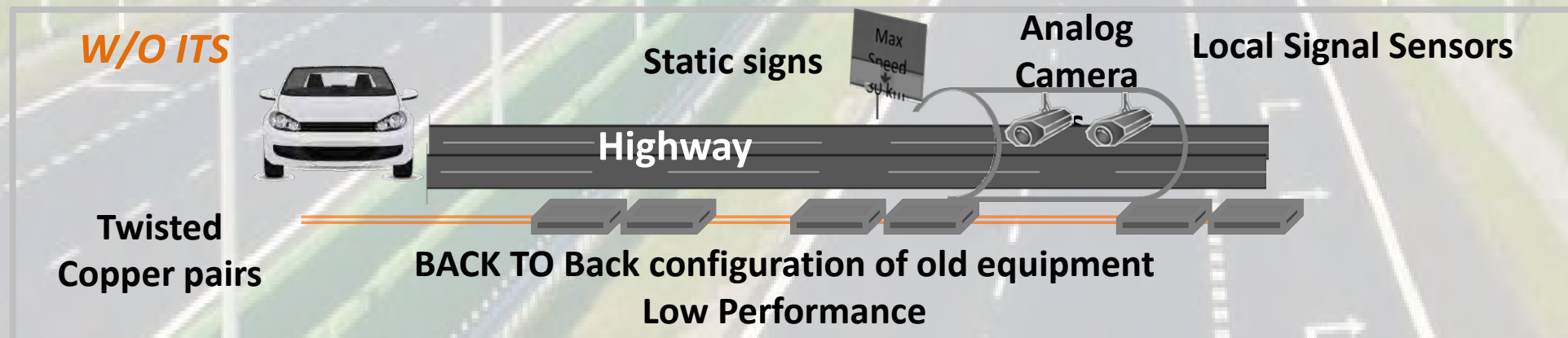
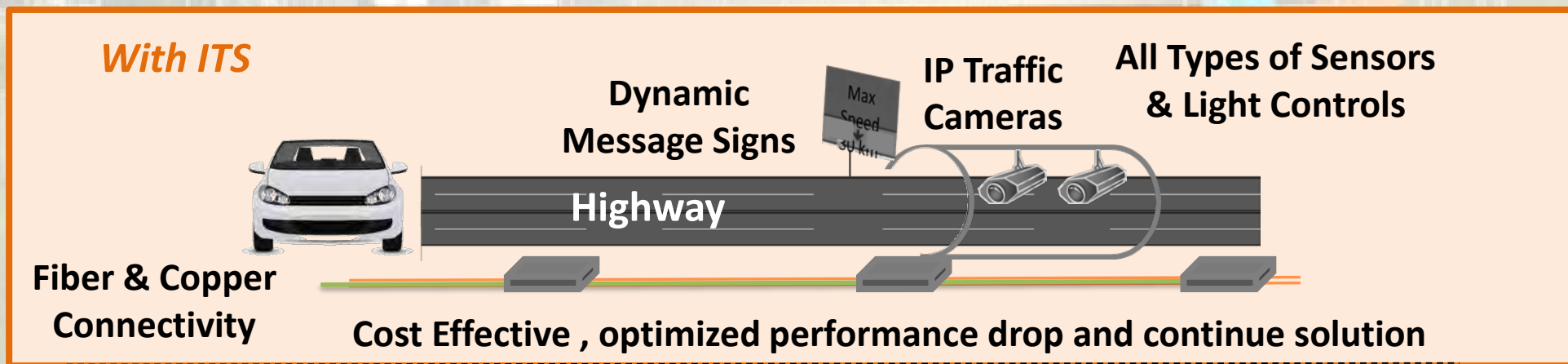
Use of Smart Sensors and Monitoring applications



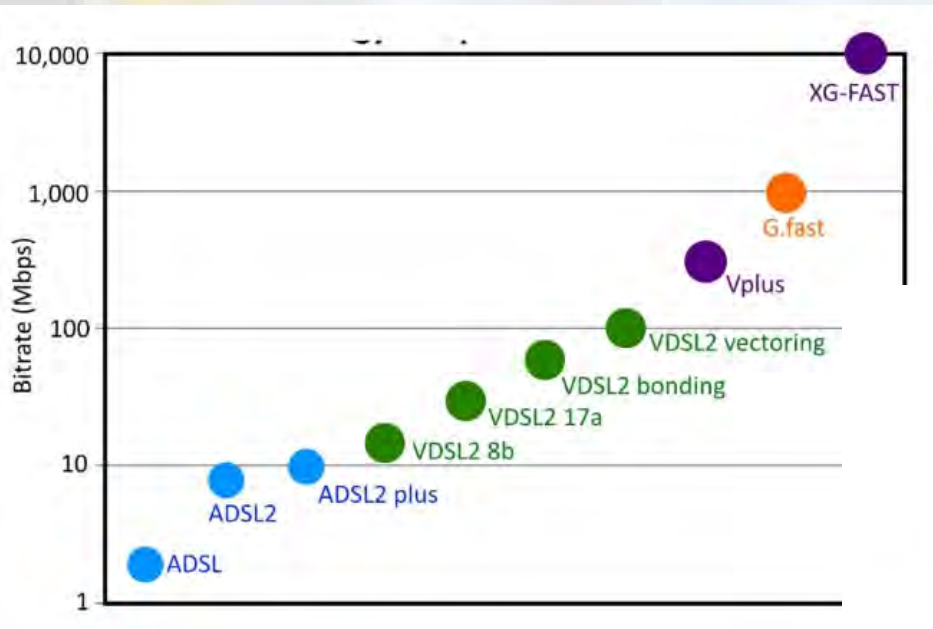
Collecting Essential Information from Multiple cameras and smart sensor for Monitoring, real time analytics is Essential

Required Infrastructure Features for Intelligent Traffic Management Systems

Reliability, Low latency and Jitter, Drop and Continue, Managed System & Ubiquitous Deployment



No Need for Revolution Just Evolution



Copper, Wireless, Fiber, LAN technologies have all gone through major evolutions

<https://www.nbnco.com.au/content/dam/nbnco2/documents/Gigabit Networks - G Fast%20 XG FAST.pdf>

Enabling Higher Speed ,
Higher Security,
Higher Reliability

Evolution of wireless communication



Ubiquitous Connectivity

No Single Technology Stands Alone , You Need Them All

Connectivity = Communication + Power

- Ubiquitous Communication requires a **TOOL BOX** of solutions for Cost Savings and Shorter Time to Deploy
- Take advantage of the existing infrastructure, already available across all transportation roads, highways... to deliver high speed reliable communication
 - Infrastructures: ITS as well as Telephony, Mobile
 - Offering: Fiber, Wireless, WiFi, Copper
- Take advantage of the existing **COPPER** infrastructure to deliver **POWER**.
 - Deliver remote power capabilities along with data over the same infrastructure
 - Deliver PoE and Line powering (Heavy Reading).



Features Required on Advanced ITS Devices For All Implemented Technologies

- **Aggregator with Full Carrier Ethernet capabilities (CE 2.0 Layer 2)**
- **Optimized Performance, low latency and Jitter**
- **Powering, Line powering (only on copper)**
- **Compact and Ruggedized**
- **High Reliability and Availability**
- **Management**
- **Mix of Technologies - Copper and Fiber SFP; VDSL / G.fast / Fiber**
- **10/100/1G/10G Ethernet**
- **POE, Terminal Adaptor, media converter “ALL In One”**

Thank You!

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