

Past, Present and Future

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Washington State
Department of Transportation

Past

Past

- Project Engineer
- State Materials Engineer (14 years)
 - 150 staff
- Director, SR 520 Bridge Pontoon Construction Project
- State Bridge and Structures Engineer
 - 100 staff, 70 professional engineers

Past

- Born in the same year (1956):



Celebrating 60 years

- The Interstate Highway System
- Me
 - (but not until December)!
 - (A great vintage)



Past

- Last Federal gas tax increase was in 1993
- 23 years of no change
- Einstein's definition of insanity
 - “Doing the same thing over and over again and expecting different results”

Present



Present

- Where do we stand today?
 - Our “United” States
 - NTPEP
 - SOM
 - SCOBS
 - WSDOT (Washington State)

Present: Our “United” States

- United States or 50 separate countries with a common currency???
- 52 countries (add DC and Puerto Rico)???
- Does every state do things differently?
- Must every state do things differently?

Present: Proposal

- Standards can exist without tyranny
- The success of the Interstate System relies on standards
- Free markets beat artificially restricted markets
- Rising tide lifts all boats

Present

- What helps? AASHTO
 - NTPEP – states and industry working together to agree on performance criteria and testing
 - SOM: The AASHTO Subcommittee on Materials, working to standardize testing, specifications and acceptance
 - SCOBS: The AASHTO Subcommittee on Bridge and Structures, doing the same

Present: NTPEP

- National Transportation Product Evaluation Program
- Emphasis on “evaluation” (not approval)
- Maturing over time, to list items as “NTPEP Compliant”
- A long path forward to acceptance

Present: NTPEP



May 8-12, 2016
Grand Rapids, Michigan

Present: NTPEP

- Is there a better model???
- Consideration of the European Model:
 - TRL: Transport Research Labs
 - BRE: Building Research Establishment
 - Independent, well respected, private, quasi-governmental, with large boards of directors but no stockholders

Present: Better Model???

- TRL: Transport Research Laboratory
 - TRL provides independent and impartial world-class research, consultancy, testing and certification for all aspects of transport
- BRE: Building Research Establishment
 - Independent of Government ties, BRE certifies and approves products that it has tested
- Nothing like them in the USA – should there be?

Present: SOM

- Subcommittee on Materials
- Produces the “Red Book” on testing, practices and specifications
- Working to standardize materials evaluation
- Harmonizing with ASTM

Present: SCOBS

- Subcommittee on Bridges and Structures
- Produces the AASHTO Bridge Design Specifications
- Works to standardize design methods
- Widespread adoption as the “standard” in the USA
- (I’m on T-13 – Culverts)

Present: WSDOT

- How does WSDOT do it?
- We see a wide variety of pipes in use on our construction contracts – why?

Present: WSDOT

- WSDOT: The Two Part System:
 - Approval – qualifies the product
 - Acceptance – accepts the product as supplied and installed on a project
 - Specifications are based on engineering, physics and chemistry
 - Depth of fill
 - Corrosive soils

Future

Future

- What is the future?
- Not just about approval, or acceptance, or even pipe (no blasphemy intended)
- What if we stop...and think...and think again?

Future?

ROCKY XX

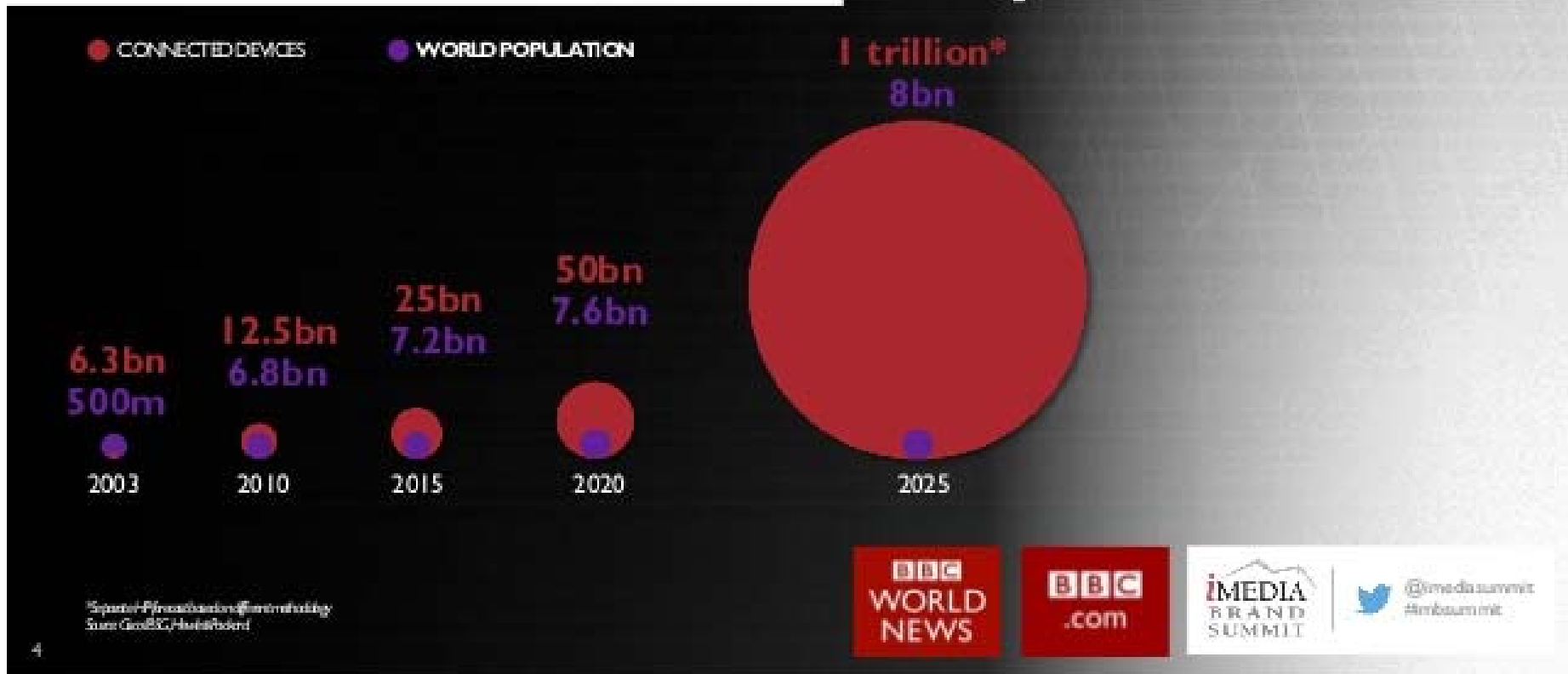


Future?



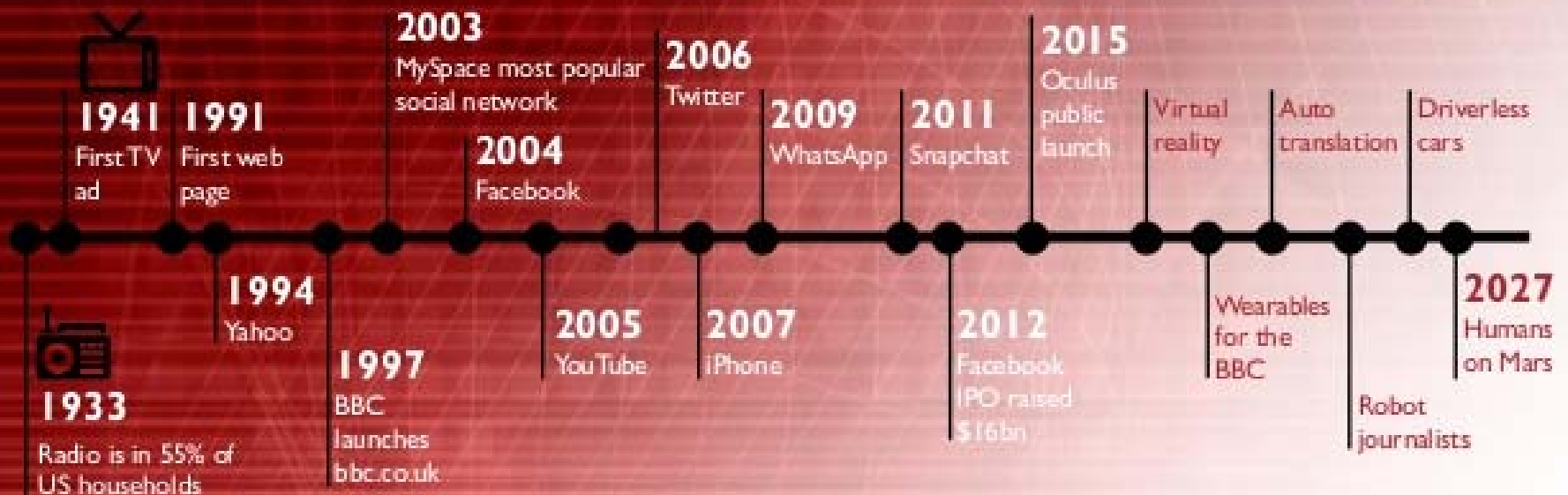
Future? 1 Trillion Connected Devices

The innovation imperative



Future: 2027 ten years away

The innovation imperative



5

Future

- We are at a turning point of a new technology, which will change us as much as the automobile changed the 20th century
- 19th century: horse driven, agrarian, low density
- 20th century: car driven, city based, high density, huge population increase

The Future



Autonomous
Automobiles

Auto Auto = Auto ²



The Future

- VentureBeat.com: Google's self-driving cars have autonomously driven over 1 million miles
- 75 years of typical U.S. adult driving
- At the time, Google also said that over the six years, its cars saw 11 minor accidents ("light damage, no injuries") during those 1.7 million miles and **the self-driving car was never the cause**. Today, co-founder Sergey Brin said during the company's annual shareholder meeting that a 12th accident had occurred: the self-driving car was stopped at a traffic light and was rear-ended by another driver.

The Future

- The self-driving team released a few more interesting figures today. Google self-driving cars have now navigated several thousand traffic cones, more than 200,000 stop signs, and 600,000 traffic lights, and seen 180 million vehicles. They even had to deal with “fluttering plastic shopping bags and a rogue duck thrown in for good measure.”

The Future

- The 21st century will be shaped by autonomous automobiles and trucks
- What will this mean for us?

This Future: Humans Are The Problem

- Humans cause accidents!
- There are no accidents!
- Humans cause car crashes!
- Conclusion:
 - Humans are too dangerous to drive!
- Solution:
 - Take the humans out of driving the cars and trucks

This Future: What do you get?

- Phones OK
- Texting OK
- Games OK
- TV OK
- Sleeping OK
- Eating OK
- Drinking OK

**Cellphone crackdown: Distraction
ups crash risk by 23 times**

This Future: What do you get?

- No accidents
- No car insurance
- No autobody shops?
- No giant wrecking yards full of crashed cars?
- No driving schools?
- No drivers education in schools?

Cellphone crackdown: Distraction ups crash risk by 23 times

This Future: What do you get?

- No cab drivers
- No Uber/Lyft
- No Amtrak?
- Decreased transit
- No bus drivers?
- No truck drivers (what does this do to diners and such?)
- What else disappears?

Cellphone crackdown: Distraction ups crash risk by 23 times

This Future

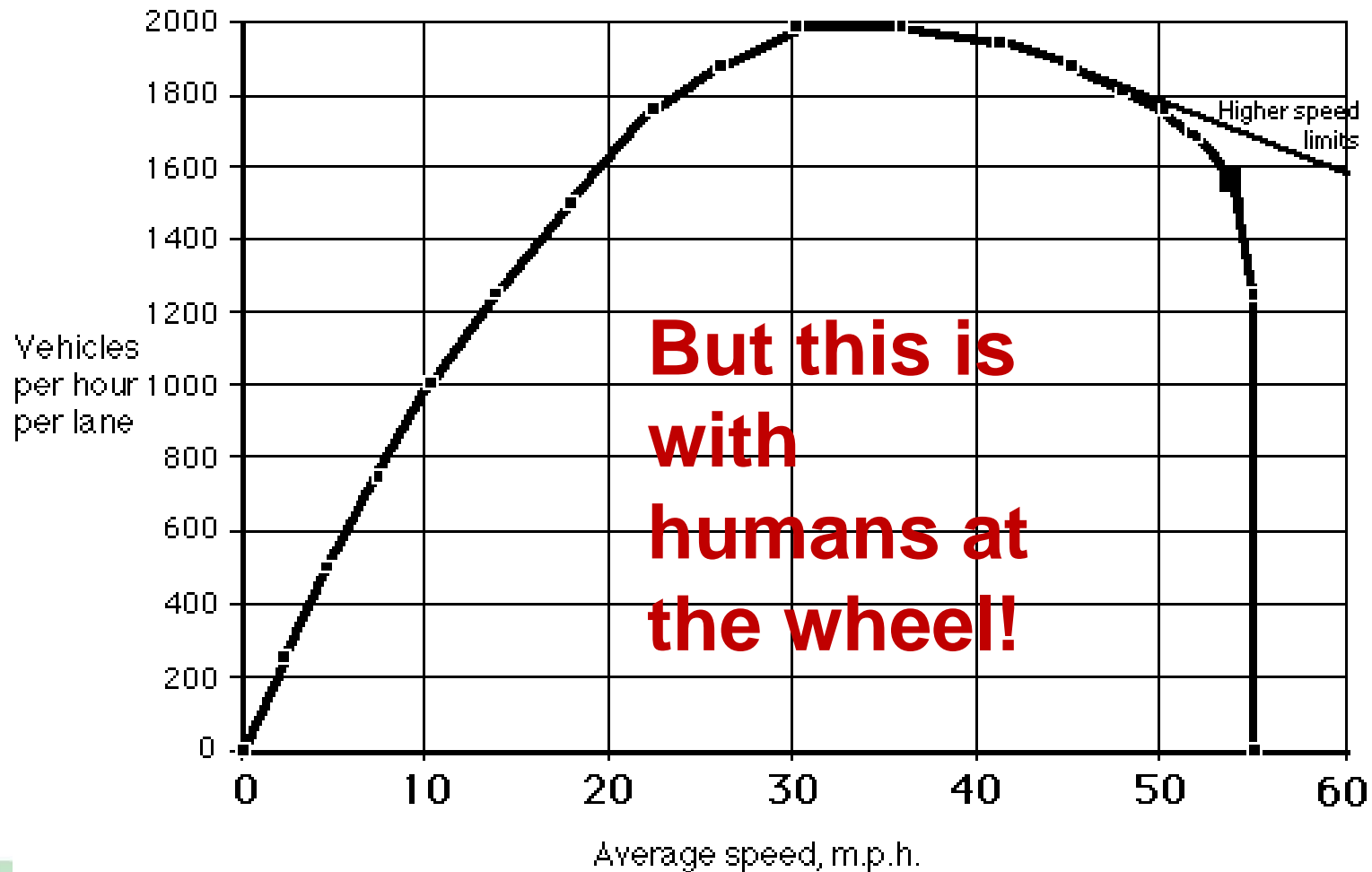
- Who will be the buggy whip manufacturers of the 21st century?
- Who will create and lead this new industry?
- Google?
- Apple?
- Car Manufacturers?

What Might This Mean for Highways???

- More highway capacity – for free
- Elimination of traffic jams (“jams” will become archaic)
- More free time
- Easier commutes
- More business, more connection
- Decreased health care costs?

This Future?

At 40 mph, the capacity of a freeway is double that of stop-and-go, 10 mph traffic, and it takes 1/4 the travel time.



This Future

- Pelotons



This Future

- New Pelotons!



New Pelotons



This Future

- Build fewer, all new highways just for capacity
- Rebuild our current highways and roads instead!
- Maybe build new access in new locations (narrower, but safer)

This Future

- Volvo
- Ford
- General Motors
- Tesla
- All working on Autonomous Vehicles
- Can they all be wrong?
- Volvo and China and trucks...

Future: Toyota

- Toyota has three centers working on autonomous vehicles:
- PC Mag:
 - “Toyota Eyes Completely Autonomous Cars With Mich. Research Center”
 - will focus on what he calls the "chauffeur" style of autonomous cars, which take complete control and require no input.
 - last year, Toyota announced it would invest \$1 billion in artificial intelligence and robotics, much of that for autonomous vehicle technology.

Thank You

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