Urban Mobility: The Future is Now

Nick Cohn

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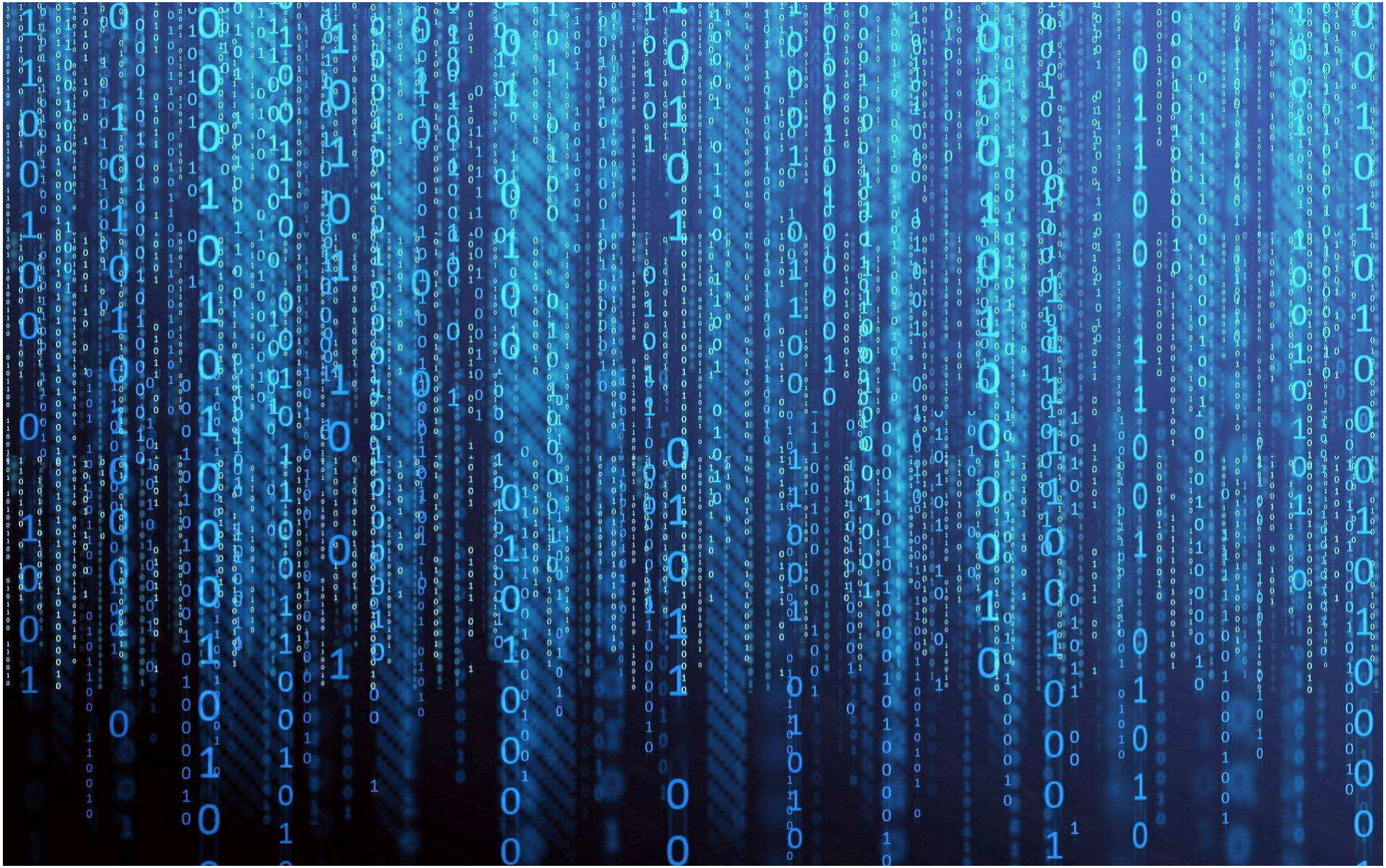
Road vehicle traffic is the largest source of GHG in many countries

Drivers lose several workdays per year in equivalent travel time delays due to traffic

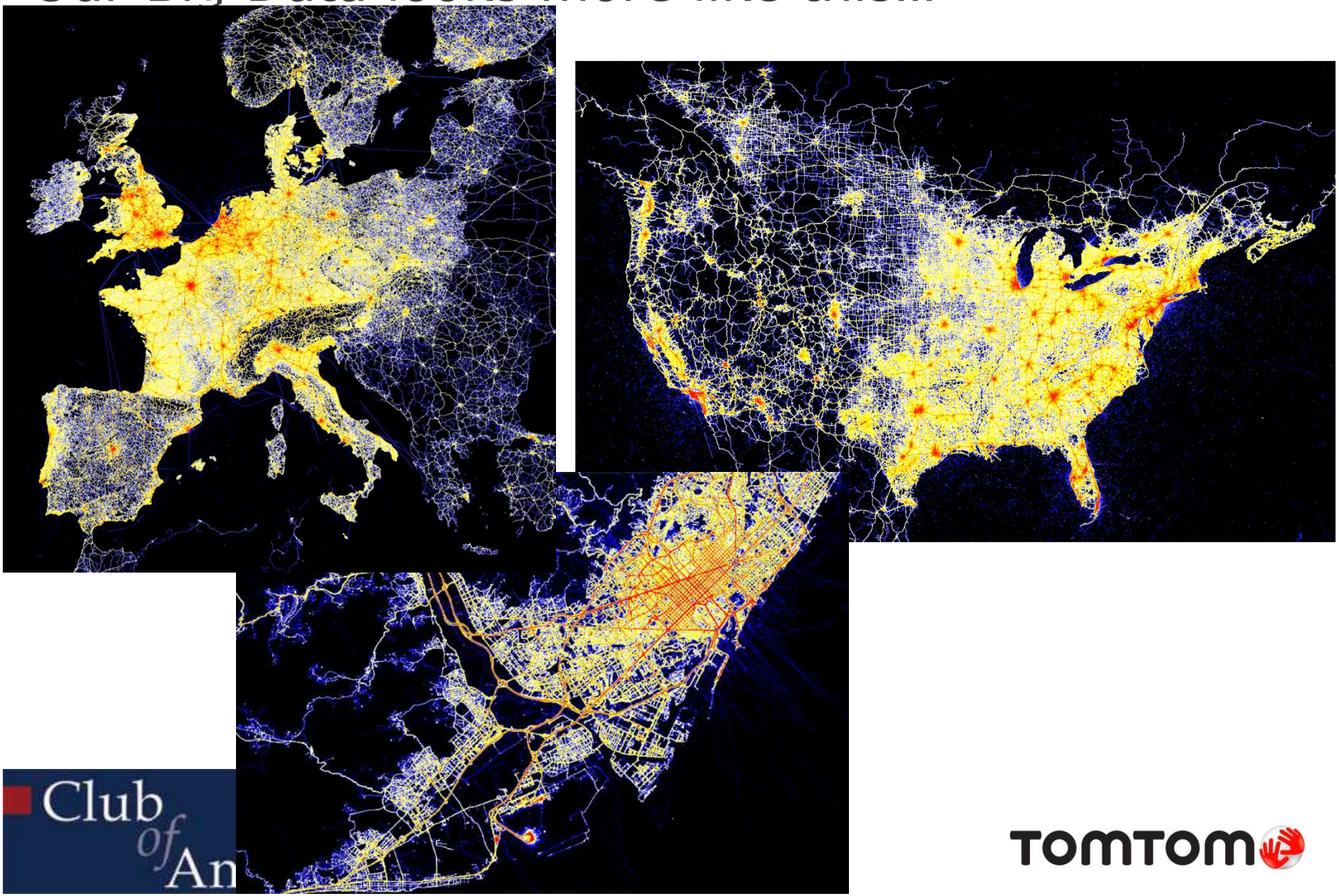
One third of road accidents in Europe are related to rear-end collisions at the back end of traffic jams

High economic costs of environmental damage, lost time and injury

But now we have Big Data…



Our Big Data looks more like this…



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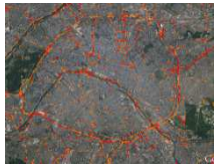
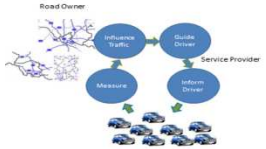
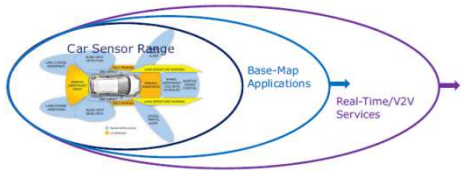
And we know how to use it…

Traffic Index		Planning, investment decisions, traveler awareness
Real-Time traffic		Individual travel time and fuel savings
Traffic Management 2.0		Travel time and fuel savings for all
Jam tail warnings		Accident prevention
Automated driving		All of the above

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Big Data: TomTom Traffic Index

Europe

Top 3 - Increasing congestion

	Previous Congestion	Increase in congestion	Current
Stockholm	30%	6	36%
Copenhagen	17%	4	21%
Lyon	27%	4	31%

Top 3 - Decreasing congestion

	Previous Congestion	Decrease in congestion	Current
Cologne	27%	6	21%
Nottingham	24%	6	18%
Bern	15%	4	11%

Top 10 cities

Rank	CI change	City	Country	Congestion	Morning peak	Evening peak	Highways	Non-Highways
1	▼	Moscow	Russia	65%	114%	133%	63%	66%
2	---	Istanbul	Turkey	57%	81%	127%	59%	55%
3	▼	Warsaw	Poland	44%	89%	95%	40%	49%
4	---	Palermo	Italy	40%	65%	67%	32%	47%
5	▼	Marseille	France	40%	74%	81%	25%	50%
6	▲	Rome	Italy	36%	84%	67%	28%	40%
7	▲	Paris	France	36%	77%	72%	35%	36%
8	▲	Stockholm	Sweden	36%	75%	85%	34%	38%
9	▲	Brussels	Belgium	34%	71%	92%	30%	37%
10	▲	Lyon	France	31%	66%	66%	27%	38%

Comparison per quarter

Americas

Top 3 - Increasing congestion

	Previous Congestion	Increase in congestion	Current
Tucson	16%	4	20%
Edmonton	14%	3	17%
Riverside	15%	3	18%

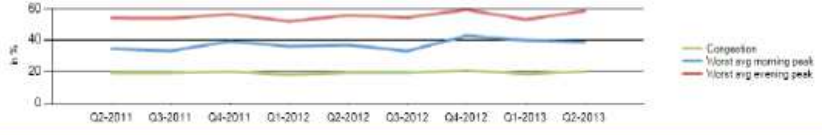
Top 3 - Decreasing congestion

	Previous Congestion	Decrease in congestion	Current
Montreal	28%	3	25%
Salt Lake City	15%	2	13%
Louisville	15%	2	13%

Top 10 cities

Rank	CI change	City	Country	Congestion	Morning peak	Evening peak	Highways	Non-Highways
1	▲	Rio de Janeiro	Brazil	50%	96%	125%	44%	53%
2	▼	São Paulo	Brazil	39%	66%	100%	30%	47%
3	▲	Vancouver	Canada	36%	61%	76%	23%	40%
4	▲	Los Angeles	United States	35%	55%	78%	33%	38%
5	▲	San Francisco	United States	32%	53%	71%	28%	37%
6	▼	Honolulu	United States	28%	36%	59%	19%	36%
7	▲	Seattle	United States	28%	50%	76%	22%	35%
8	▲	San Jose	United States	27%	53%	73%	19%	38%
9	---	Toronto	Canada	27%	54%	72%	21%	34%
10	▲	Washington	United States	27%	49%	66%	20%	34%

Comparison per quarter



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Big Data: TomTom Traffic Index

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Traffic Index

Why and for whom?

- Encourage travelers to make smarter decisions using modern technology and information sources
- Help the public understand they should not expect cities to ‘build their way’ out of congestion
- Help authorities identify and diagnose trouble spots in the network and make more informed investment decisions

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Big Data: TomTom Traffic Index

UN Habitat Partnership

Barcelona, 29 November 2013 – TomTom (TOM2) today announced a partnership with UN-Habitat, the United Nations Human Settlements Programme. TomTom's global Traffic Index data will be used by UN-Habitat and its stakeholders around the world to make strategic decisions when tackling urban congestion.

"Urban areas are growing fast; they are now home to half of the world's population and are predicted to reach 6 billion by 2050. How we plan and manage our cities in terms of basic services, mobility or connectivity is going to be essential to ensure better cities. TomTom's data will give us vital insight, providing a more accurate analysis of urban traffic congestion. This will help policy makers and local governments develop sustainable, workable and lasting urban solutions," said Dr. Joan Clos, United Nations Under-Secretary-General and UN-Habitat Executive Director.

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Benefits of Navigation

Safety: fewer accidents, calmer driving style

Travel Time Savings: 5 - 15% depending on local conditions

Fuel Savings: 5 - 15% due to reduction in distance driven, avoidance of slow and congested routes; up to 50% for commercial fleet vehicles with driver feedback

Greenhouse Gas Emissions: 5 - 15%, up to 33% for commercial fleet vehicles with driver feedback

And, with Real-time information, Better Overall Travel Decisions (decision to travel, departure time choice, mode choice, route choice)

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Creating Traffic Information

Range of high-quality real-time data sources

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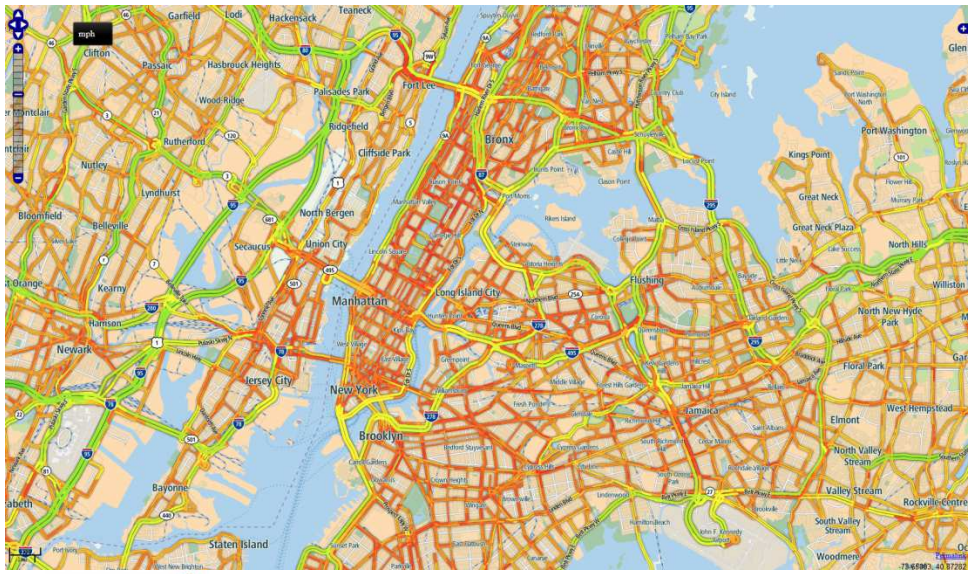
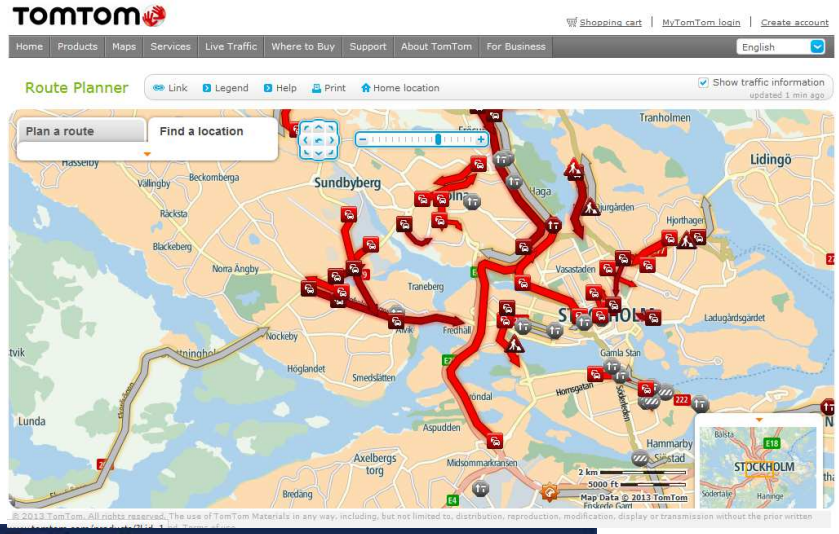
TomTom Traffic





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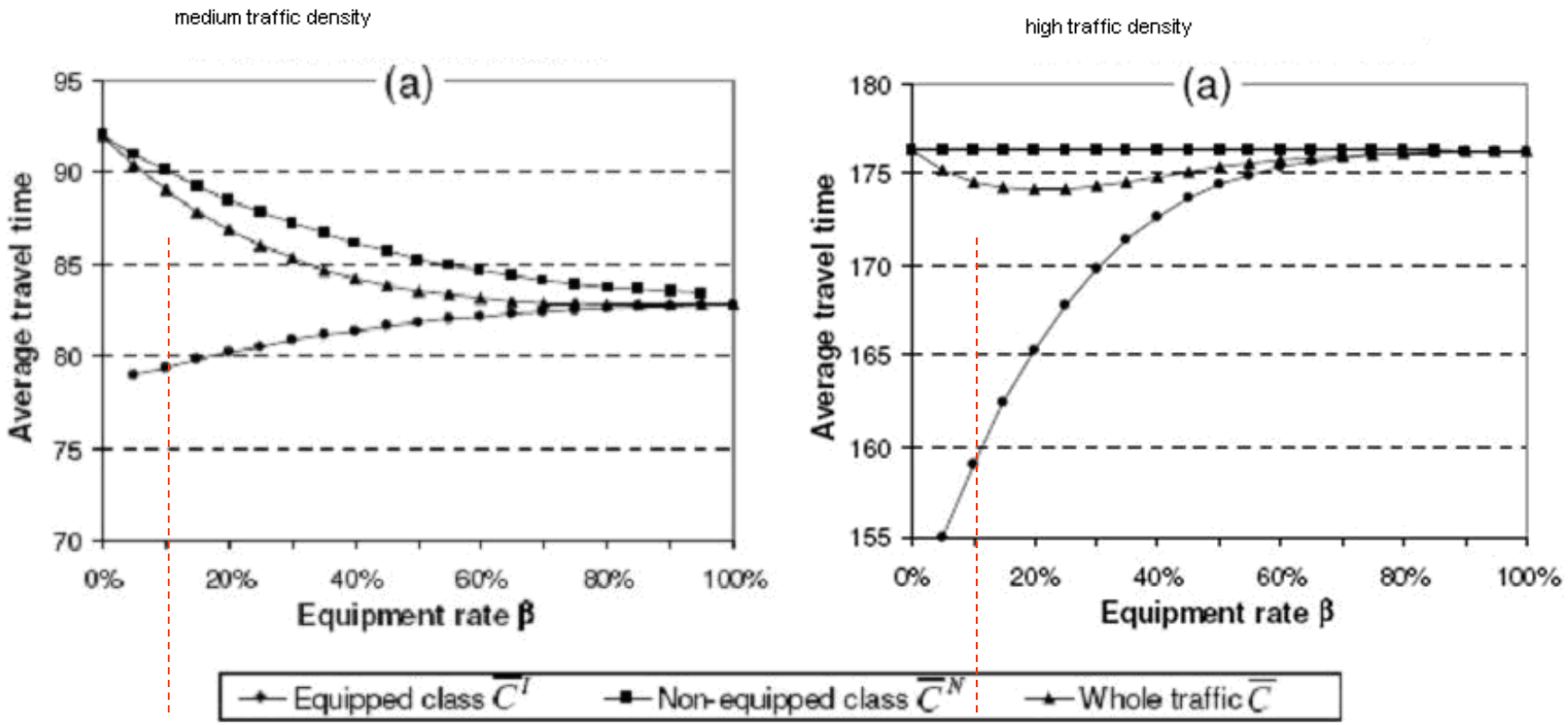
Car-centric Route Guidance – Benefits for ALL



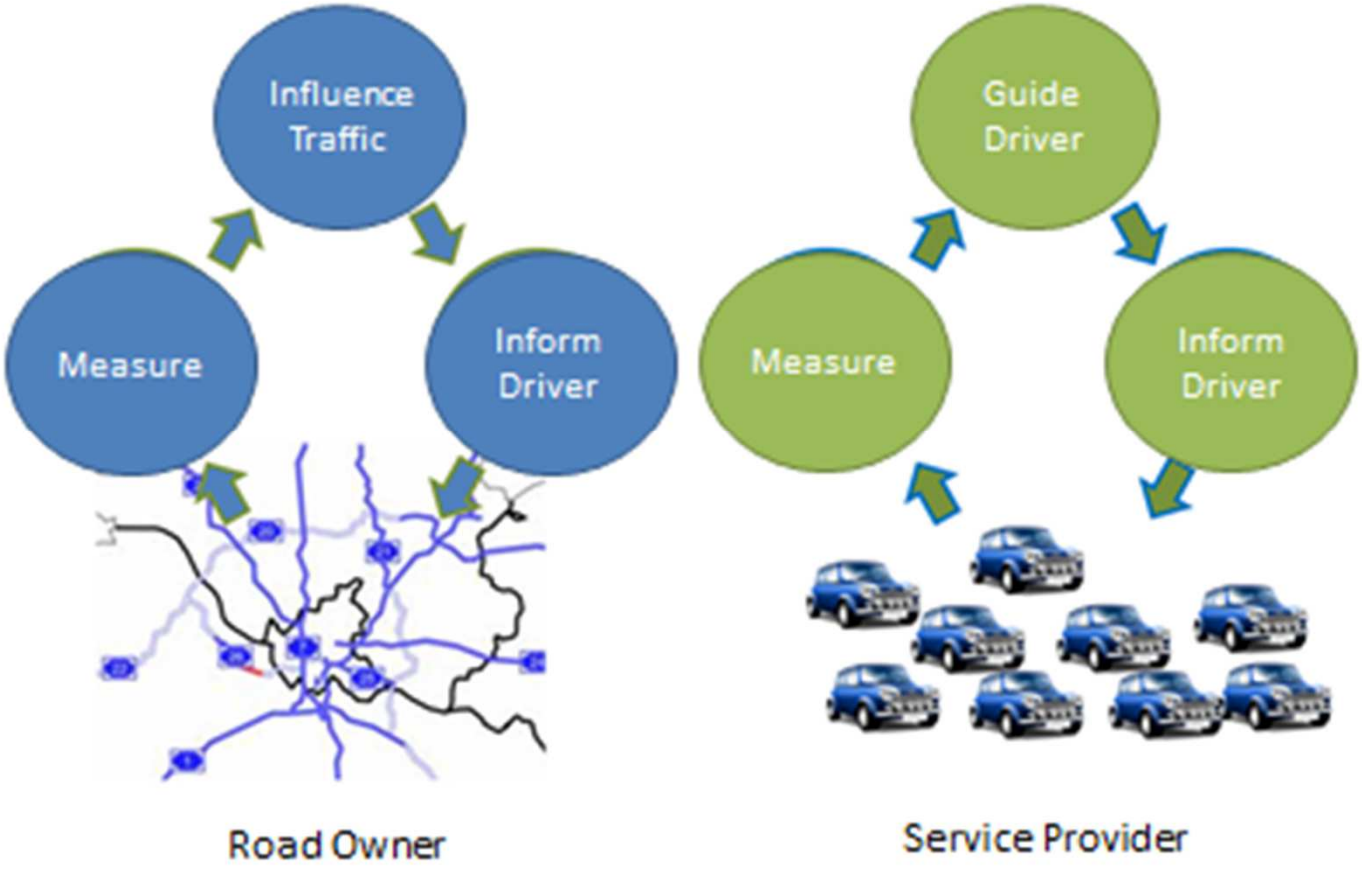
10%

10%

Source: F. Leurent, T. Nguyen, TRB 2010.

Traffic Management: Traditional Situation

Road owners **VS** service providers



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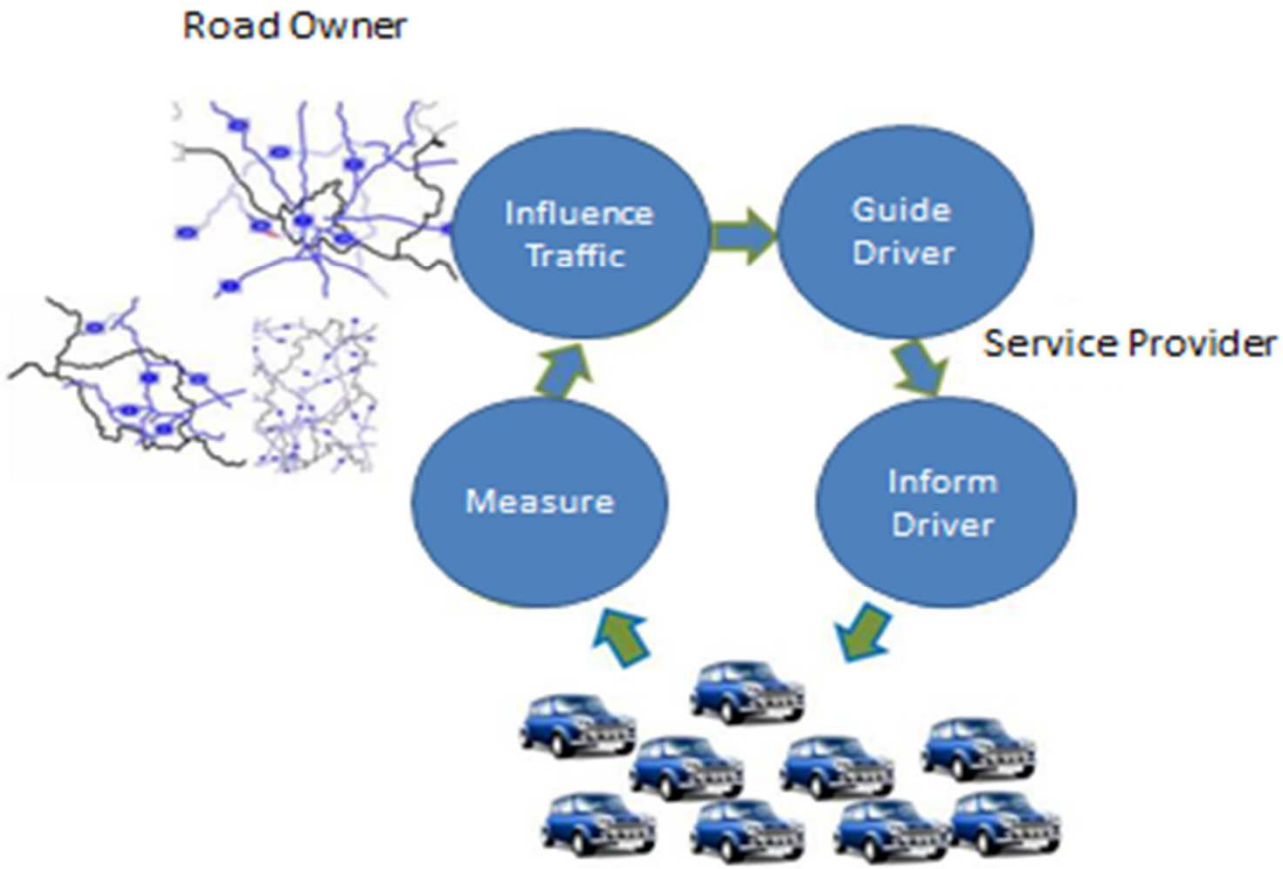
Traffic Management 2.0

Road owners & service providers



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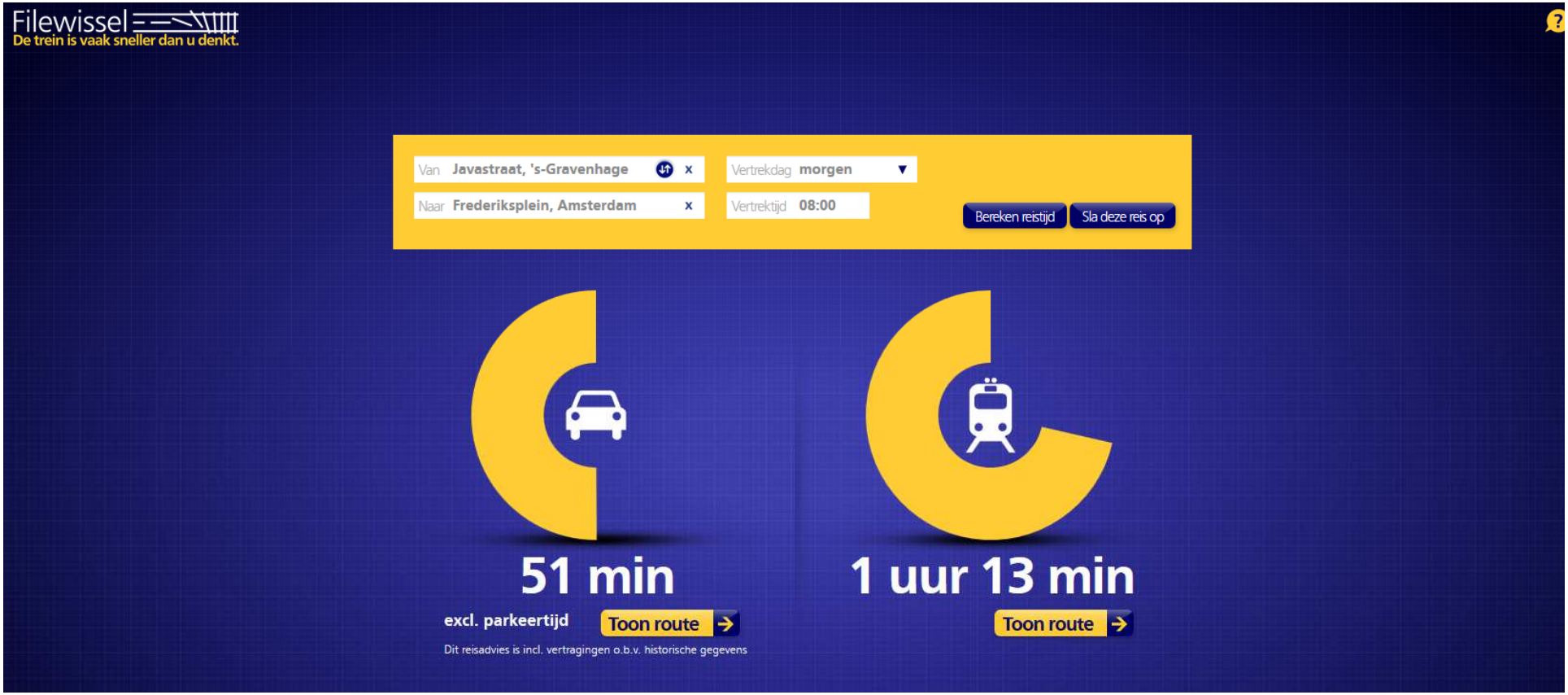
Better Choices



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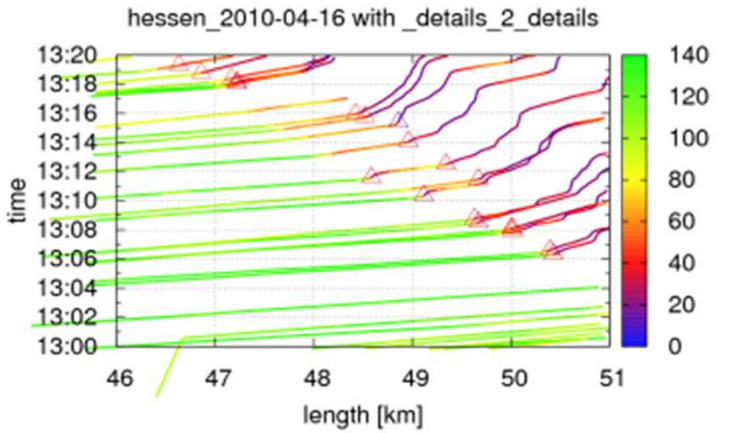
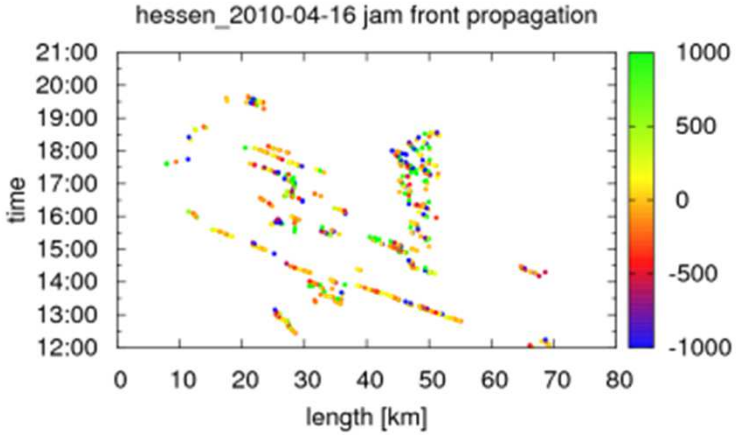
Jam Ahead Warning

Detection of jam tails for a safety warning in the navigation unit





- Over 35% of drivers have admitted to experiencing an accident caused by sudden or unexpected traffic holdups
- Jam ahead warning messages in traffic output can be used to create these safety messages with great accuracy

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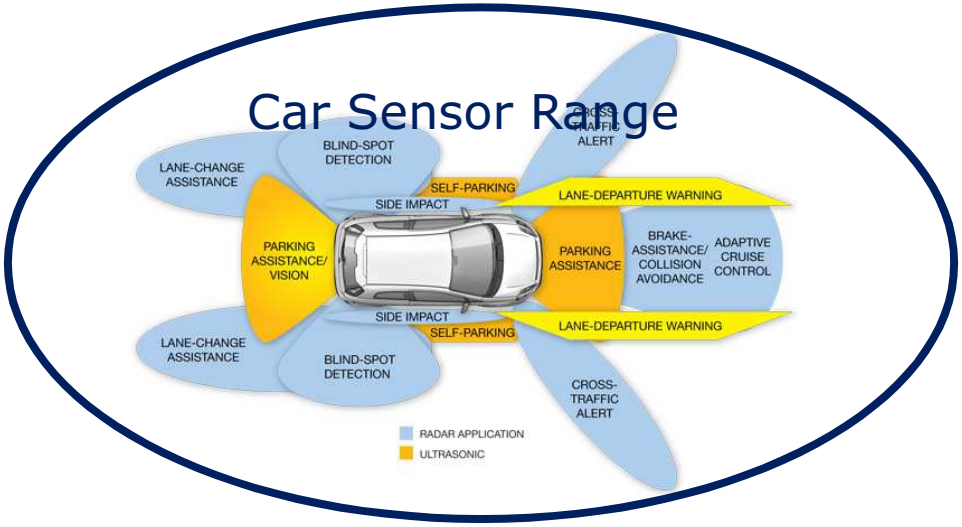
Map and Traffic Data in Vehicle Automation

Looking farther ahead in distance and time



Car Sensor Applications

- Adaptive Cruise Control
- Blind-Spot Detection
- Lane-Change Assistance
- Cross-Traffic Alert
- Lane-Departure Warning
- Self-Parking
- Collision Avoidance
- Parking Assistance

1. http://www.edn.com/design/automotive/4368069/Automobile-sensors-may-usher-in-self-driving-cars
2. BMW, Mini, Rolls-Royce and Continental.

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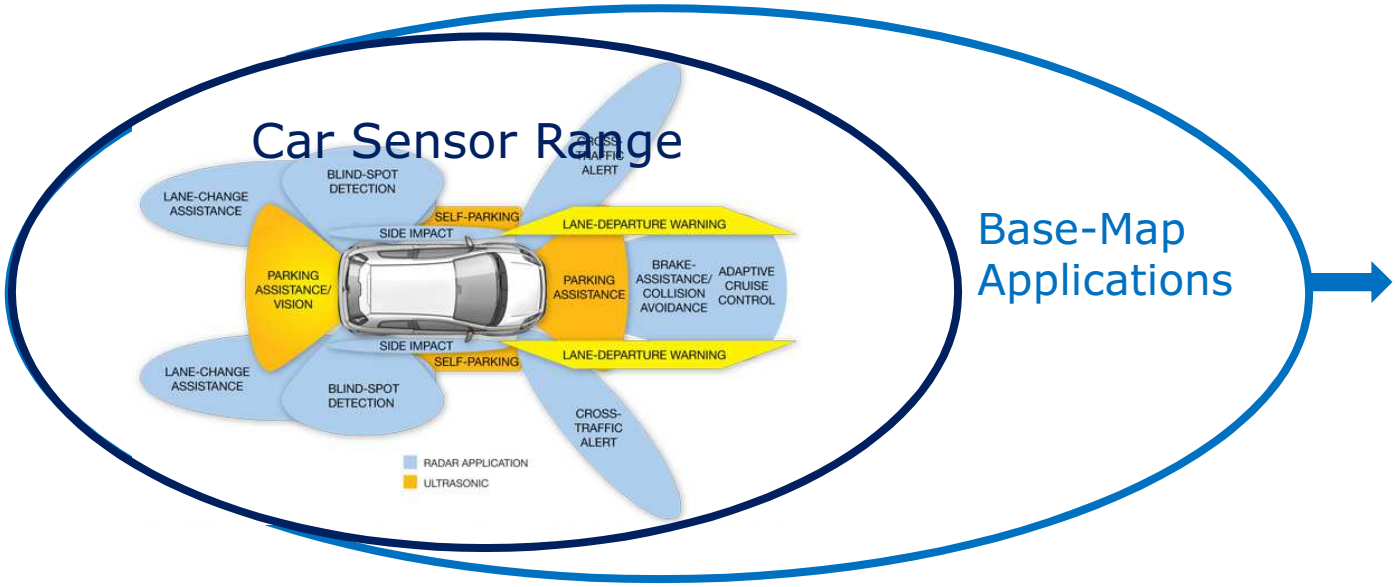

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- Collision Avoidance
- Overtaking Assistance

Base-Map Applications

- Adaptive Cruise Control
- Predictive Powertrain
- Curve Control
- Curve Warning
- Overtaking assistance
- Intersection Warnings

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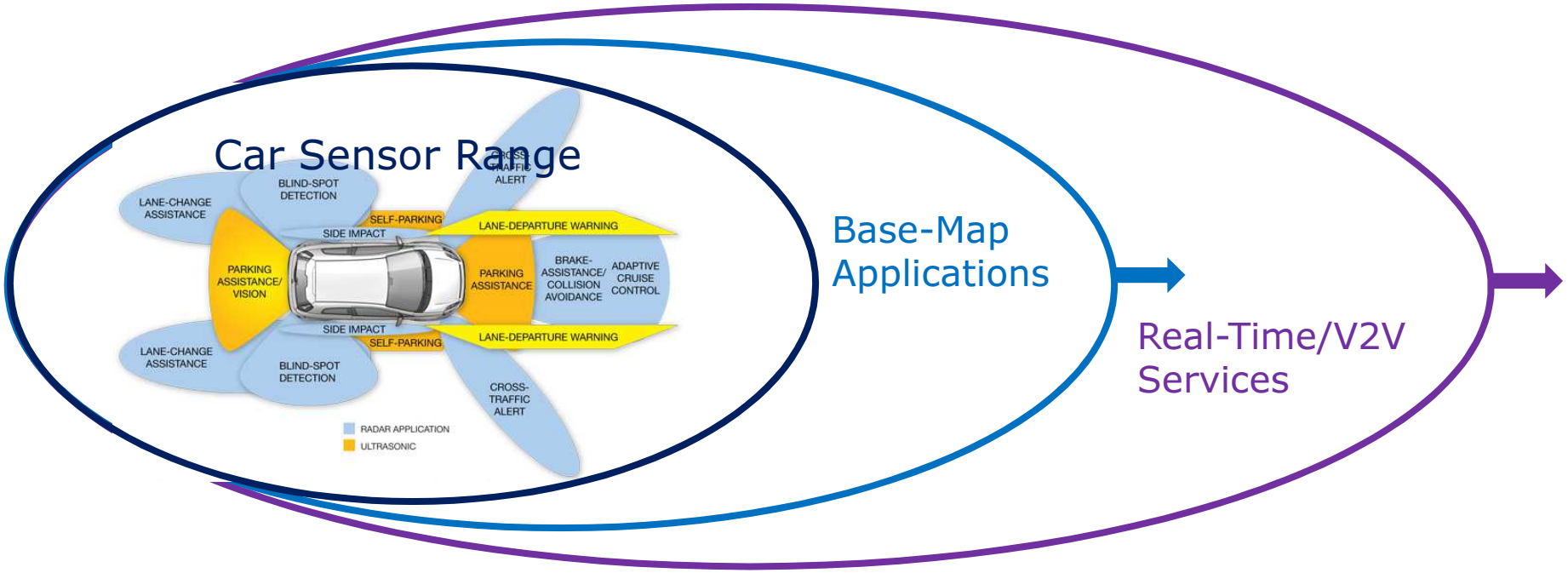

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- Curve Warning
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- Intersection Warnings

Real-Time/V2V

- Entire route
- Real-time map changes
- Jam-tail warnings
- Road conditions
- Weather conditions
- Dynamic re-routing

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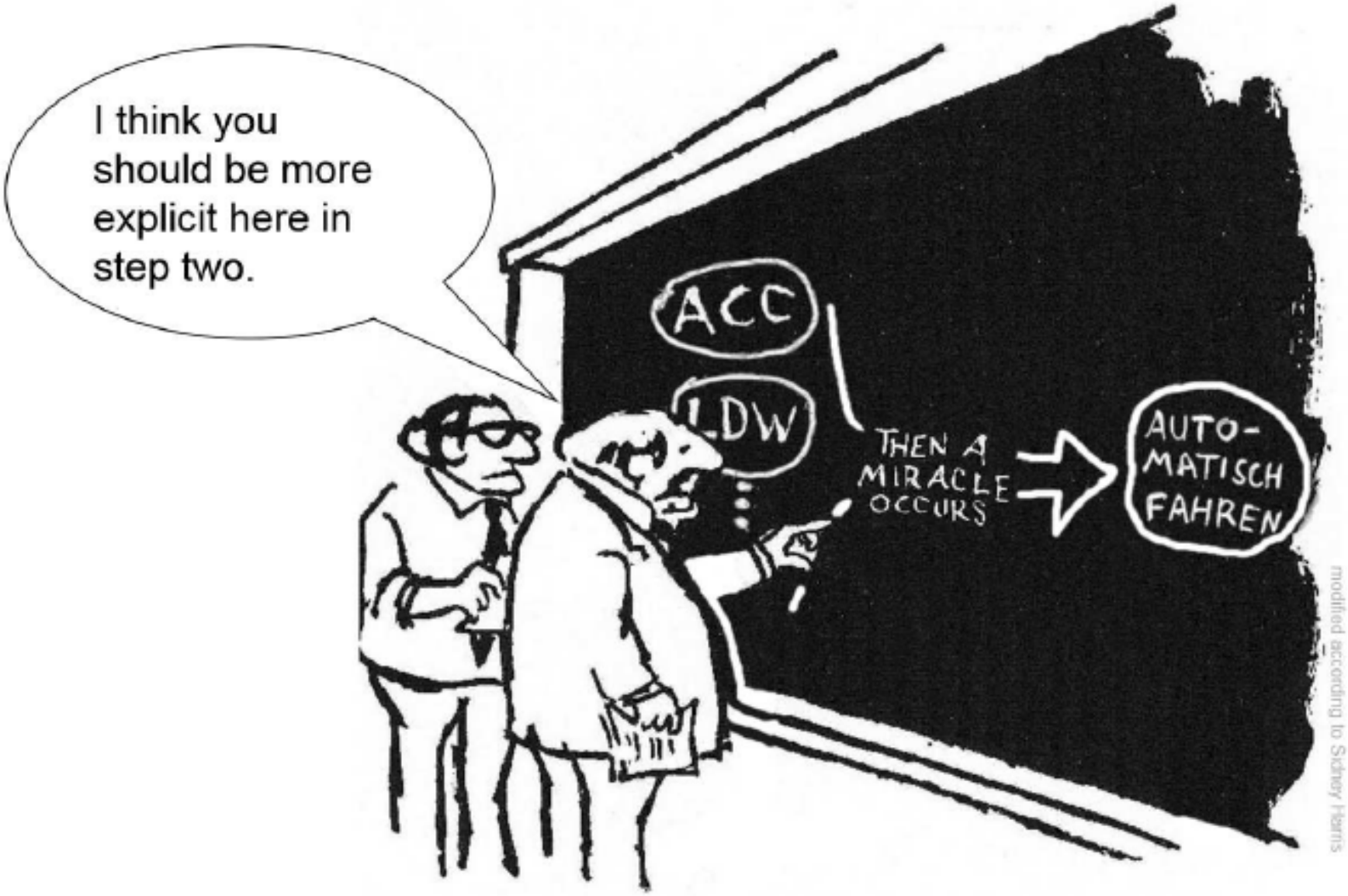

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Automated Driving and Urban Mobility

Carnegie Mellon University

- Better use of urban space
- Cut down parking search traffic
- Improve safety/fewer accidents
- Reduce GHG and fuel use
- Sleeping on the way to work
- Automated delivery systems
- Automated taxis (real PRT)

But:

- Increase in commuting trip lengths
- Increase in car use
- Increase in car mode share
- Congestion not eliminated

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