Connected Vehicles

The rise of safety innovations and intelligent mobility
Between now and **2050** the global population is expected to increase from 6.9 billion to more than **9 billion**, with **98%** of this growth happening in **cities** and in the **developing and emerging world**.
Global Trends – Urbanisation

**MEGACITY**
City with a minimum population of 10 million

24 megacities today, 37 megacities by 2025

More than 60% of the population will live in cities by 2025
Impact on mobility
City restrictions and smarter infrastructure will increase the popularity of multimodality.
Commuter Trends – Smart Urban Planning

Smart Energy

Smart Water

Smart Buildings

Smart Integration

Smart Public Services

Smart Mobility

DO THE RIGHT MIX

TOYOTA
OEM Challenge – Changing role

OEM’s need to adapt to changing situation
The Connected Car
# Telematics - Present and Future

|------|------|------|------|------|------|------|------|------|------|------|------|

## Connected Navigation Era
Create demand, learn how to

## eCall Era
100% cars connected, effortless value for customer

## Automated Driving Era
Highway Urban
Customers’ expectations are increasing. Telematics – V2X

The EU announced on 12/02/2014 that ETSI and CEN completed the work on the basic set of standards needed to make connected cars a reality.

V2X is the ability of vehicles to connect with their surroundings.

- **V2G** Vehicle-to-Grid
- **V2C** Vehicle-to-Cloud
- **V2V** Vehicle-to-Vehicle
- **V2P** Vehicle-to-Pedestrian
- **V2I** Vehicle-to-Infrastructure

**Benefits:**
- Safer Mobility
- Greener Mobility
- Convenient Mobility
Safer Mobility
Our Ultimate Goal - **Zero Casualties**
Safety – New legislation

**eCall 🌍/ ERA GLONASS 🇷🇺**
Regulations to use telematics to reduce fatalities after an accident (as of 2015)

<table>
<thead>
<tr>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>RU draft regulation</td>
<td></td>
<td>Jan Live (TBC)</td>
<td></td>
<td>Jan Live All New Vehicles</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>New Types</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU draft regulation</td>
<td></td>
<td>Oct Live (TBC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>New Types</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Russia Issue**
eraGlonass specs not clear yet even if expected to go live in only 1 year

2. **EU Issue**
eCall regulation not approved yet by EU Parliament
Safety - Integrated Safety Management

- Integrating systems effectively to support improved safety.
- From helping park your vehicle to raising an e-call in case of an accident.
Safety - Reducing casualties

- By integrating systems we believe we can reduce road casualties.
Safety – Toyota’s Cooperative Intelligent Transport System

Example of research Toyota is conducting in Japan

Unlikely adoption in the EU even in the mid-long term

- “Day 1” problem – Which OEM / road authority will invest before the others?
- EU mandatory process is busy with eCall. (US is discussing mandatory fitment.)

Key Message: Know that TMC is one of the leading C-ITS researchers, but that commercial deployment in Europe is unlikely.
Greener Mobility
Fuel efficient vehicles are at the heart of any low carbon transport systems.

Toyota has a long history in innovation and creating fuel efficient vehicles.

Our next generation vehicles include hybrids, plug-in hybrids, electric cars, and hydrogen fuel cells.

Over 6 million hybrid vehicles sold to date.
Environmental – Smart Grid

- A new future where cars, homes and people are linked
Environmental – Building a low carbon transport system

Promoting the introduction of next-generation automobiles

Promoting the use of mass transit

Reducing congestion and promoting eco-friendly driving using ITS

Traffic Data Center
Recommendation of optimal transportation means

Transportation and driving data
Guidance and information

Car sharing
Parking & Rides

ITD

EV
PHV

CHV bus
PHV demand bus

Hydrogen station
FCHV bus

Charging station with solar panel

Toyota City Station

Smart parking

Charging Power Supply

Toyota City Hall
Offer a first/last mile mobility solution not covered by public transport (PT) using a small EV car-sharing system connected to PT

1. Reserve and user whenever you need
2. Leave the vehicle at the station that you choose
3. Parking & payment connected to PT

Traffic data manag. System (TDMS)
- Manage station
- Manage offer/demand
- Manage charging
- Connection to TDMS

Grenoble was selected as an ideal experimental location for demonstrating, optimizing and validating Toyota’s mobility service solution
## Grenoble Trial - Vehicles

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>COMS (Monoplace)</th>
<th>i-Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructor</td>
<td>Toyota Auto Body</td>
<td>Toyota Motor Corporation</td>
</tr>
<tr>
<td>Size (L x W x H) mm</td>
<td>2,395 x 1,095 x 1,500</td>
<td>2,350 x 850 x 1,445</td>
</tr>
<tr>
<td>Battery and recharge time</td>
<td>Lead 4 hours</td>
<td>Lithium-ion 3 hours</td>
</tr>
<tr>
<td>Range</td>
<td>~ 50km</td>
<td>~ 50km</td>
</tr>
<tr>
<td>Maximum Speed</td>
<td></td>
<td>Possibility to limit to 45km/h</td>
</tr>
<tr>
<td>Number of vehicles</td>
<td></td>
<td>~ 70</td>
</tr>
</tbody>
</table>
Convenient Mobility
Top 5 of connected services are available on Toyota’s Touch 2 with Go platform!
## Connected Services on Toyota Touch 2 with Go

<table>
<thead>
<tr>
<th>Connected Services</th>
<th>Apps (Toyota Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Places</td>
<td>Fuel Prices</td>
</tr>
<tr>
<td>Yandex</td>
<td>Parking</td>
</tr>
<tr>
<td>TomTom Places</td>
<td>Park &amp; Go</td>
</tr>
<tr>
<td>Nokia Places</td>
<td>Twitter</td>
</tr>
<tr>
<td>Panoramio</td>
<td>Weather</td>
</tr>
<tr>
<td>StreetView</td>
<td>Glass of Water</td>
</tr>
<tr>
<td>TomTom Traffic (Toyota)</td>
<td>Speed Cam Service (upcoming)</td>
</tr>
<tr>
<td>Inrix Traffic (Lexus)</td>
<td>Music Streaming Service (upcoming)</td>
</tr>
</tbody>
</table>
Connected Services - Real-time traffic

Real-time traffic has a positive impact on...

• Safety: less accidents by avoiding congested areas
• Environment: reduces CO2 emissions
• Convenience: spend less time in the car
Summary & Reflection
Summary

- The world population is growing
- The number of megacities is growing
- The way we look at mobility will need to change
- Car manufacturers will need to adopt to this change
- The connected car is key in facing this challenge
- The connected car will help create...
  - Safer mobility
  - Greener mobility
  - Convenient mobility
Personal Reflection / Challenges

Reflection
• Telematics brings IS closer to the product

Challenges
• Everybody has an opinion on Telematics
• ... but the opinion is based on personal position
• A successful telematics project requires...
  • a multi-discipline team
  • a multi-company view
• What is a suitable business model for Telematics?
• How to handle the big data coming from Telematics?
Thank you!