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Connected Car a solution for environment ?

4!iCOM

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ISO IEC ITU International Telecommunication Union

Human needs for Mobility

- Freedom of moving is fundamental
- No human activity possible without moving
- To progress human needs to move and meet other people
- But mobility still creates problems
  - The phenomena is not new : 45 years BJC circulation was forbidden in Roma during daylight “Lex Julia municipalis”

Transports and pollution

- Vehicles with thermal engines reject in atmosphere CO^2, CO, Nox…
- The major part of power comes from fossil energy : Petroleum
- The petroleum stock is not infinite
- The poisoning polluting components can be reduced (CO^2, Nox …)
- The CO^2 is a normal result of Hydrocarbon combustion

World wide CO^2 production

- Motorcycle 150 million = 40 million tons
- Car 580 million = 450 million tons
- Truck/Bus 210 million = 300 million tons
- Railways = 175 million tons
- Aircraft 0,3 million = 220 million tons
- On 100 tons CO^2
  - 37 Power production Electricity and Heat
  - 18 Transportation (Road)
  - 23 Industry
  - 14 Residential
  - 7 Transportation (Flight)

Total CO^2 production 2003

- Europe 15 = 3347 Million tons
- USA = 5841 Million tons
- Japan = 1259 Million tons
- Canada = 586 Million tons
- China = 4300 Million tons
- India = 1100 Million tons
  - As CO^2 is undoubtedly responsible of earth temperature increase ; we must reduce CO^2 emissions as soon as possible

Forecast and Future trends for Petroleum

- If nothing change the major part of usage will be for road transportation
- From 2007 to 2030 Petroleum needs will increase twofold
- If all countries have the same proportion of equipments than EU and USA … car park would increase 2.6 times
  - That is to say the 6.3 Md people needs will increase from 1800 Mtep to 4700 Mtep
  - The difficulty with forecast is because it concerns future!!!

Battle against pollution

- A lot of regulations has fostered car industry to make progress for 30 years
- Between 1993 (Euro 3) and 2005 (Euro 4), reduction versus type of poisoning components : 5 to 10 times
- Between 1995 and 2005, CO^2 decrease from:
  - 190g/km to 160 for gas engine
  - 175 to 150 for Diesel
- Target < 130g/km circa 2015 in EU

How consumption reduction is made

- Improve combustion and efficiency
  - Electronic injection and firing
  - Catalytic exhaust
- Better usage of power
  - Smart drive of air conditioning
  - Starter Generator with stop and start
- New technology for engine
  - Electronic valves
  - Hybrid vehicles
- Electric car
    - All that in respect of Carnot law !!!

Alternative solutions

- No utilization of private cars or trucks
  - Forget it : part of the world is waiting to have high way of life
- Use of public transportation
  - An example : in France TGV 1 billion of travels in 20 years, same as on motorways in one year
  - Need strong public investments
- Development of new technologies
  - Hydrogen engine
  - Long life- low cost Battery

And about ITS ?

- What can do ITS and Telematics?
  - Probably not a massive economy of fuel
  - But reaching chemical/physical limits, we need to use each possibility :
    - New technology for engine
    - Bio fuel
    - Better management of power usage in the car
    - Better and more economical use of car
    - Imagine new transport systems
- ITS and Telematics can help

Definitions: Telematics and ITS

- Telematics
  - Data transmission between two distant points
    - Car to infrastructure and vice versa, Car to Car
    - Define communication channel, radio satellite Telephone, IR, DSRC,
    - Define, sometimes, packaging of Data
  - Not involved by data contains or services
- ITS Intelligent transportation systems and services
    - Union of information & communications technologies and vehicles which move people and goods

Others ways for Oil economy

- Adopt a new driving style – Eco-driving
- Efficient use of road infrastructure
- Foster Multimodal transport
  - These three points that change the behavior of drivers can bring 10% to 50% of fuel economy

ECO-Driving

- Driver's behavior modification
  - Avoid nervous driving style -20%
  - Beginning of travel (5km) Slow -50%
  - Good adaptation on gear box ratio.-30%
  - Engine in good health -5°%
  - No Climatisation (-20% in town) -5%
  - Good tyre pressure -3%

ECO-Driving (2)

- Drivers must be educated
  - Comparison of his performance with a theoretical model
    - Data monitoring (speed, geolocalisation, RPM gearbox, Temperature…)
    - Data collected and sent to central Comparison with best behavior Taking into account road weather conditions speed …
    - Result sent back to driver with advices
  - The driver is in the loop and learns how to be an Eco-driver

ECO-Driving (3)
Some experiments

- The Dutch national ecodriving program
- Le programme éco-flotte Canada
- Easy Rider Finland
- Quality Alliance Eco-drive Swiss
- GERICO France
- ECO-DRIVING Europe Consortium
  Austria,Belgium,Czech,France,Finland, Greece,Nederhlands, Poland,UK
- Impacts on last 4 past years: -15% for car and -35% for truck

Efficient use of the road-Traffic fluidity

- If it is impossible to forbid use of Cars, Trucks and Bus …the best way to make economy is to have a fluid traffic
- The less Cars, Trucks and Buses are on the road, the less they burn fuel
- To obtain fluidity:
  - Navigation system
  - Traffic information
  - Trip management on line
  - Dynamic traffic management

Traffic fluidity (1)

- Increase fluidity
  - Remove bottleneck
  - Automatic data collect
  - Reduction of road closures
  - Diagnostic and testing
- An example
  - Navigation system reduce delay -18% and km -16%

Traffic fluidity (2)

- Road charging to fight congestion:
  - For instance, in an urban area, congestion pricing together with transit services can have real societal benefits:
    - **Stockholm**: Downtown cordon pricing has reduced traffic in the downtown area by 25%, creating free flow highway conditions virtually every day for 7 months. It has also increased transit ridership by 5% and reduced vehicle emissions by 14%. (after the trial in 2006)
    - **London**: Downtown cordon pricing has increased vehicle speed by 37%, reduced delays by 30% (as of May 2007)

Multimodal

- In a same trip usage of Car public transportation car sharing , truck on the train …
- To obtain adoption multimodal travel must be easy to choose
- …..must be so efficient than private system
- ITS play a big role of communication to inform real-time the traveler of all possibilities : parking, waiting time to train or bus, reservation , ticketing ….

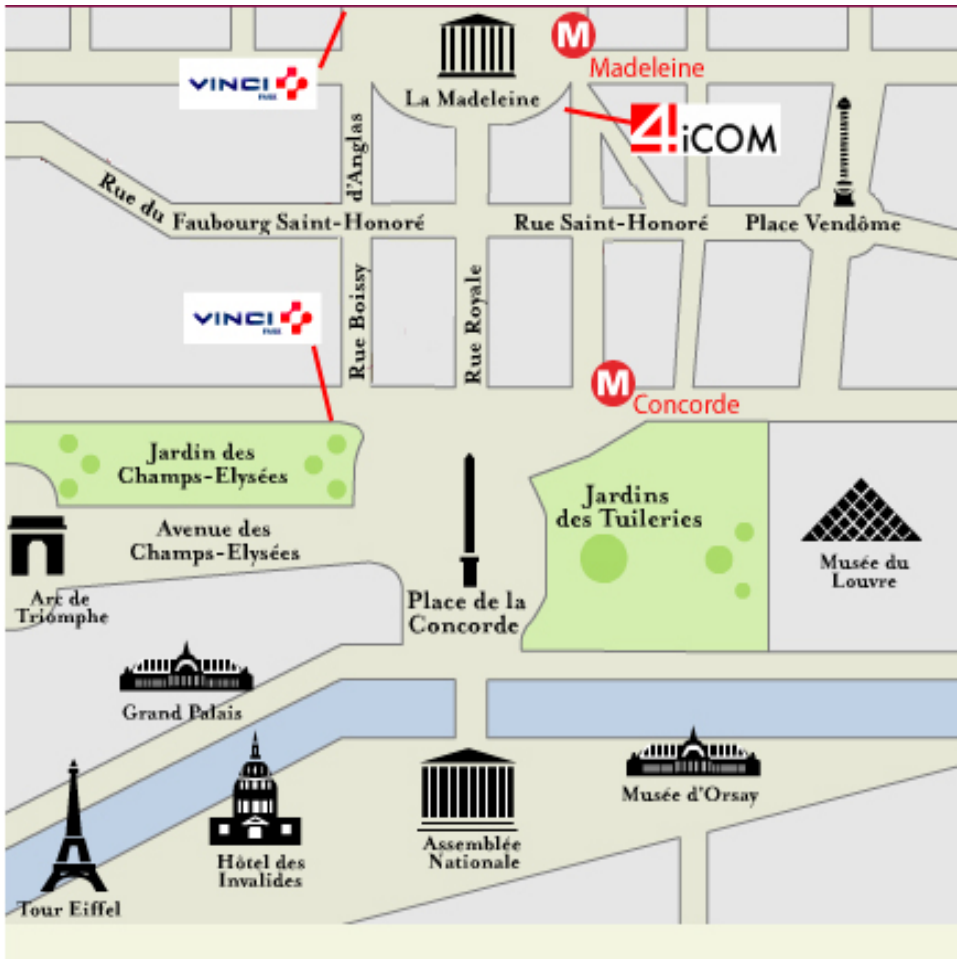
Constraints on Telematics

- All functions shown must be interoperable
- Need standards on:
  - Communication
  - Telecom architecture
  - Data packaging and collect
- Please look at ISO TC204 and CEN TC278
  - Calm architecture
  - Probe data
  - Nomadic devices use
  - ....

Conclusion

- 20 to 50 % of energy can be saved
  - Infrastructure must be built or adapted
- Education of people must be done
  - ITS and telematics can transport the service
- Standardization of process can be adopted by all

Contact



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