International Brokerage Event
Brussels, 26-27/10/2017

CITIES OF THE FUTURE
BRUSSELS 2017

National Research Council of Italy

Diego Liberati

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CNR: the National Research Council of Italy

- National Research Council of Italy is the main national public research body, with thousands of scientists in every discipline
- Extensive experience in European Union granted research both as Coordinator and Partners
- Within the Engineering Department, IEIIT Institute deals with ICT applications to a variety of problems
- Mathematical Modeling and Control Theory are one of our main pervasive approach to abstract problems and identify solutions
- Dr Liberati, research director, has been recently personally granted the project ROBO MD in the Innovation 4 Welfare framework, aiming at monitoring and assist elderly alone at home

Dr Liberati's group main research interests

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- Dr Liberati's team deals with mathematical modeling of physical problems, aiming to reconduct them to an abstract level easy to be dealt with Control Theory techniques. ICT implementation in the very physical context thus allow to approach desired performances
- We span over many fields of appication, from personalised medicine, to intelligent transports, to cogeneration optimisation in energy, to domotics: we believe that our approach is quite general and can be fruitful in most domains provided a deep interaction with domain experts
- We leverage on interactions with University Professors associate to us, as well as industrial interactions on field
- Artificial Intelligence and Robotics tools are used together with more traditional data mining and signal processing in order to achieve goals

Mobility for Growth & Automated Road Transport
Intelligent Driver-Fleet-Vehicle Cooperation (1)

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- Objectives:
  - to keep track of the unmanned vehicle position when GPS is lost for autonomous short term control embedded in a medium term fleet partially decentralized control under the long term, besides sudden needs, human supervision, in order to:
  - **increase safety in evolving road mobility environment** *MG-2-7-2019*
  - **test validation and certification procedures for highly automated driving functions under various traffic scenarios based on pilot test data** *DT-ART-01-2018*
  - **support for networking activity and impact assessment for road automation** *DT-ART-02-2018*
  - **develop and test shared connected and cooperative automated vehicle fleets in urban areas for the mobility** *DT-ART-04-2019*

- Expected results
  - By joint use of machine learning and Kalman filtering we aim to provide cheaper solution than obvious use of expensive instrumentation
  - Easy to be integrated in a distributed and supervised control design

Mobility for Growth & Automated Road Transport
Intelligent Driver-Fleet-Vehicle Cooperation (2)

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- Objectives:
  - Monitoring and integrating the driver behaviour and acceptance of connected and cooperative automated transport in order to improve:
  - **Human centred design for new driver role in highly automated vehicles** *DT-ART-03-2019*
  - **Understanding and taking advantage of Human Factors in Transport Safety** *MG-2-1-2018*

- Expected results
  - Stress monitoring via Hearth Rate Variability analysis (Circulation 1991)
  - Brain Computer interfacing in order to improve control also in disadvantaged (Computers and Biomedical Research 2000)

Mobility for Growth & Automated Road Transport
Intelligent Driver-Fleet-Vehicle Cooperation (3)

- Objectives:
  - **Logistic solutions dealing with on demand shared-connected requirements** *DT-ART-04-2019*
  - **Autonomous Ship** *MG-BG-01-2018*
- Expected results
  - Optimisation of the rented vehicle fleet management
  - Hybrid integration of harvested sources of energy like wind, oscillations, vibrations and motor inversion with traditional fuels (Fincantieri Anchor).

Consortium - required partners for each project

No	Expertise	Type	Country	Role in the project
01	Communication & Control	RTD	preferably not Italy	Cooperating partner in designing algorithms
02	Implementing Navigation Tools	SME	preferably not Italy nor as above	Partner implementing the solutions
03	Autonomous Vehicle	IND	Preferably not Italy nor as above	Field testing partner providing specifications

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