Conferenza NEXA su Internet e Società, 18 Dicembre 2017

# ETICA E GOVERNANCE DELL'INTELLIGENZA ARTIFICIALE

## *Etica e Smart Cities*

***Le nuove frontiere dell'Intelligenza Artificiale per la città del futuro***


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cini national lab Smart Cities & Communities

cini consorzio interuniversitario nazionale per l'informatica

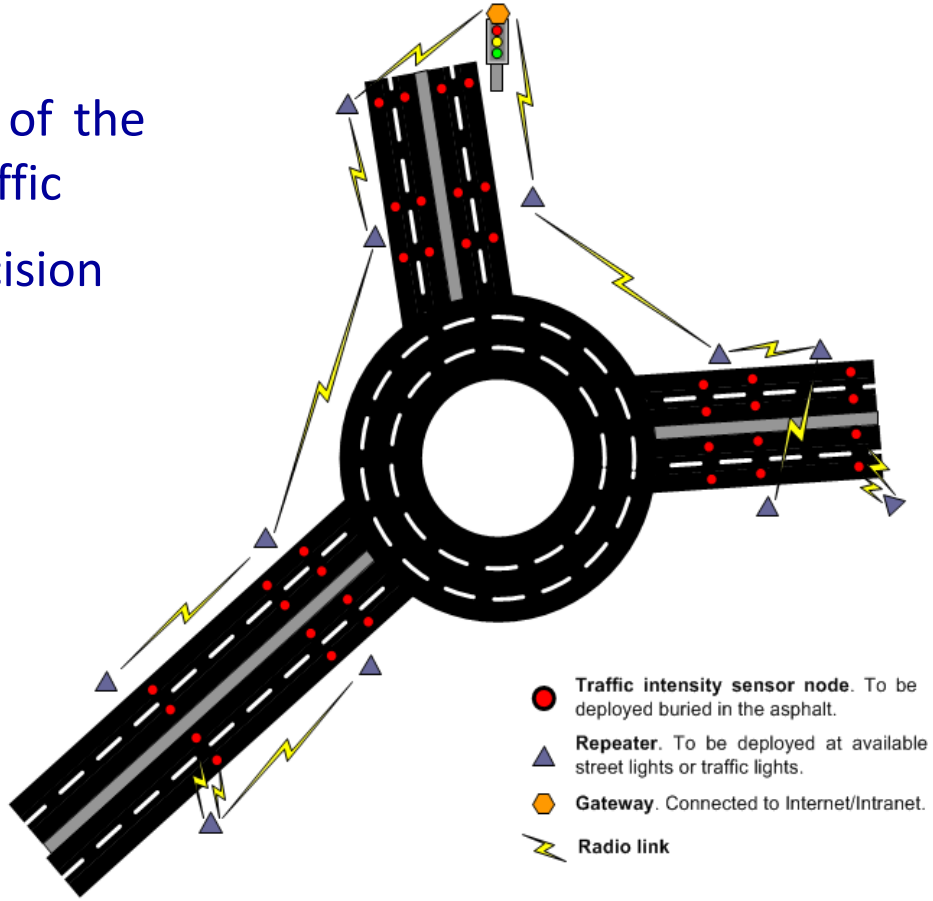
www.consorzio-cini.it

# IoT and Smart Cities

# Smart Mobility

Sensors deployed at the main entrance of the city for real-time monitoring of urban traffic

Allows to take timely and appropriate decision

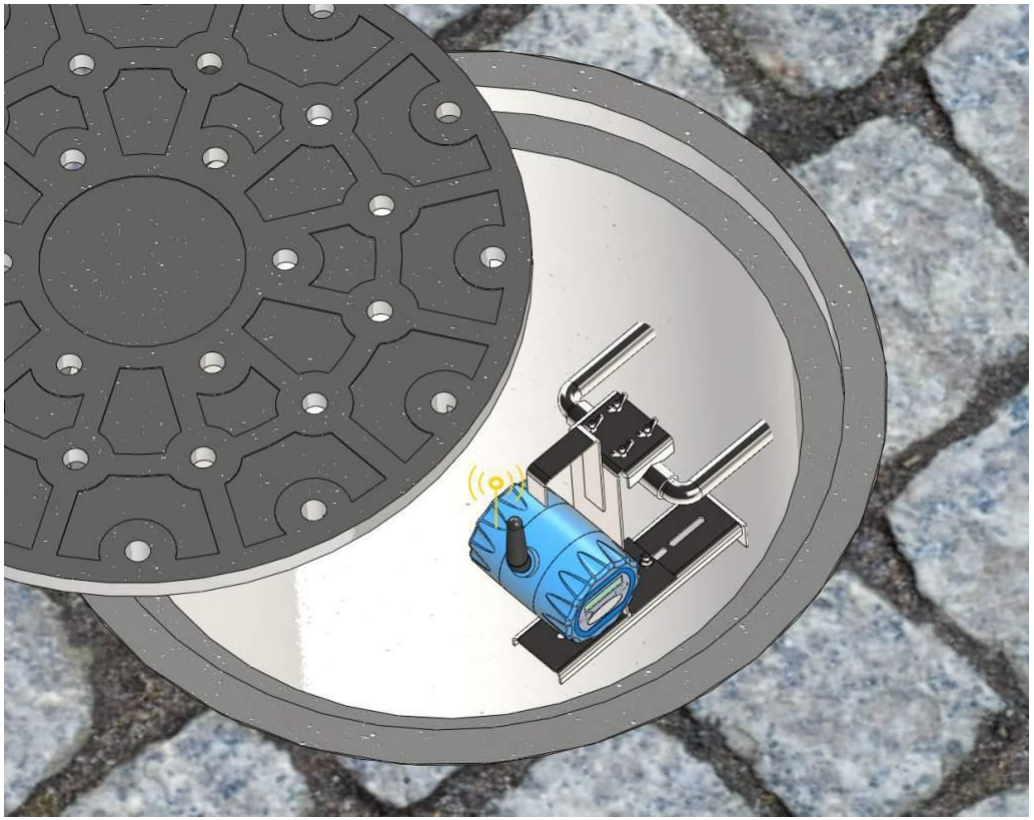


# Smart Parking

Sensors deployed at each parking lot allows to monitor the status of parking lots and send information to a server
Drivers are guided to the closest parking area

# Environmental Monitoring

Air Quality Sensors

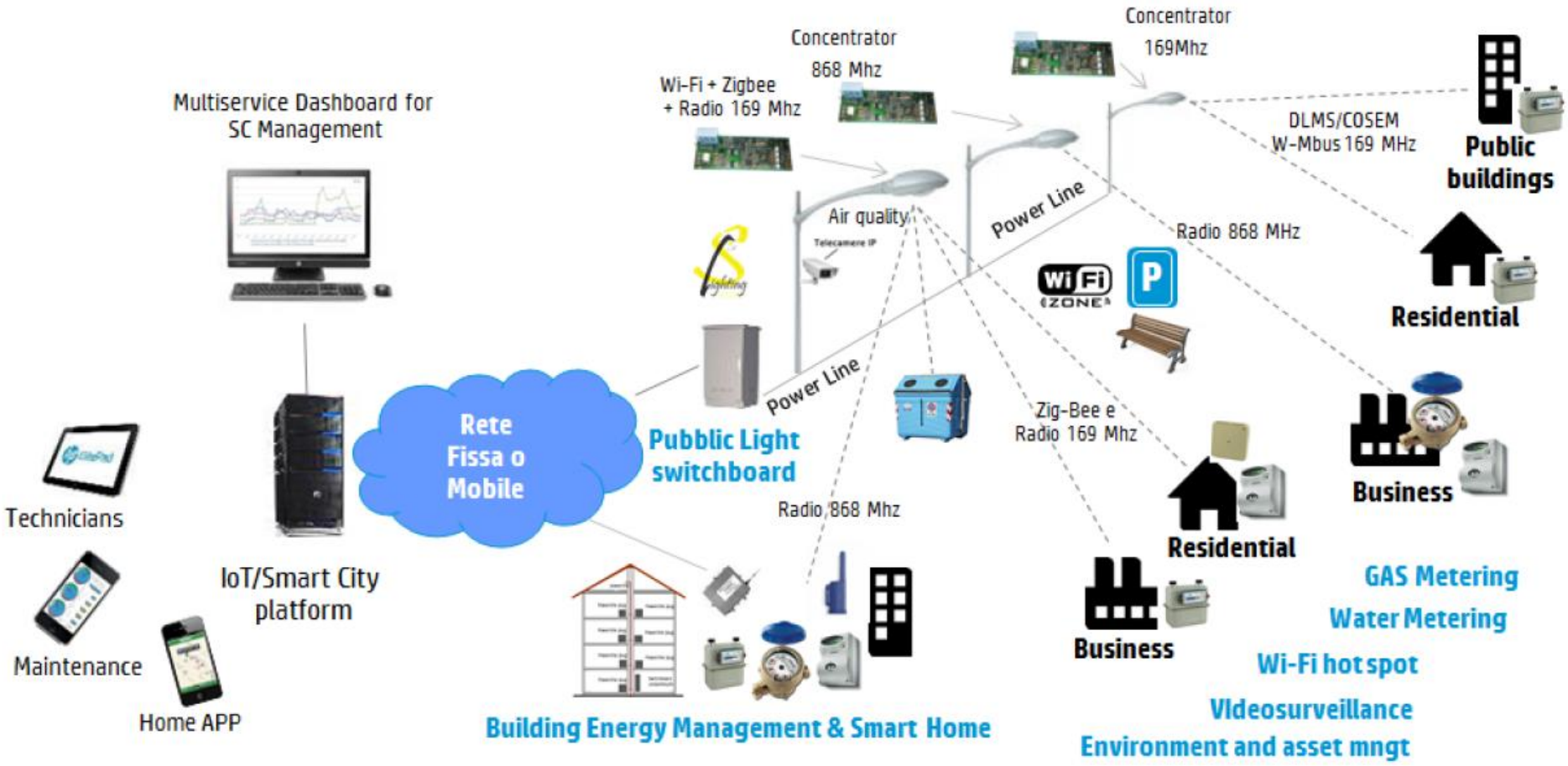


Smart Manhole

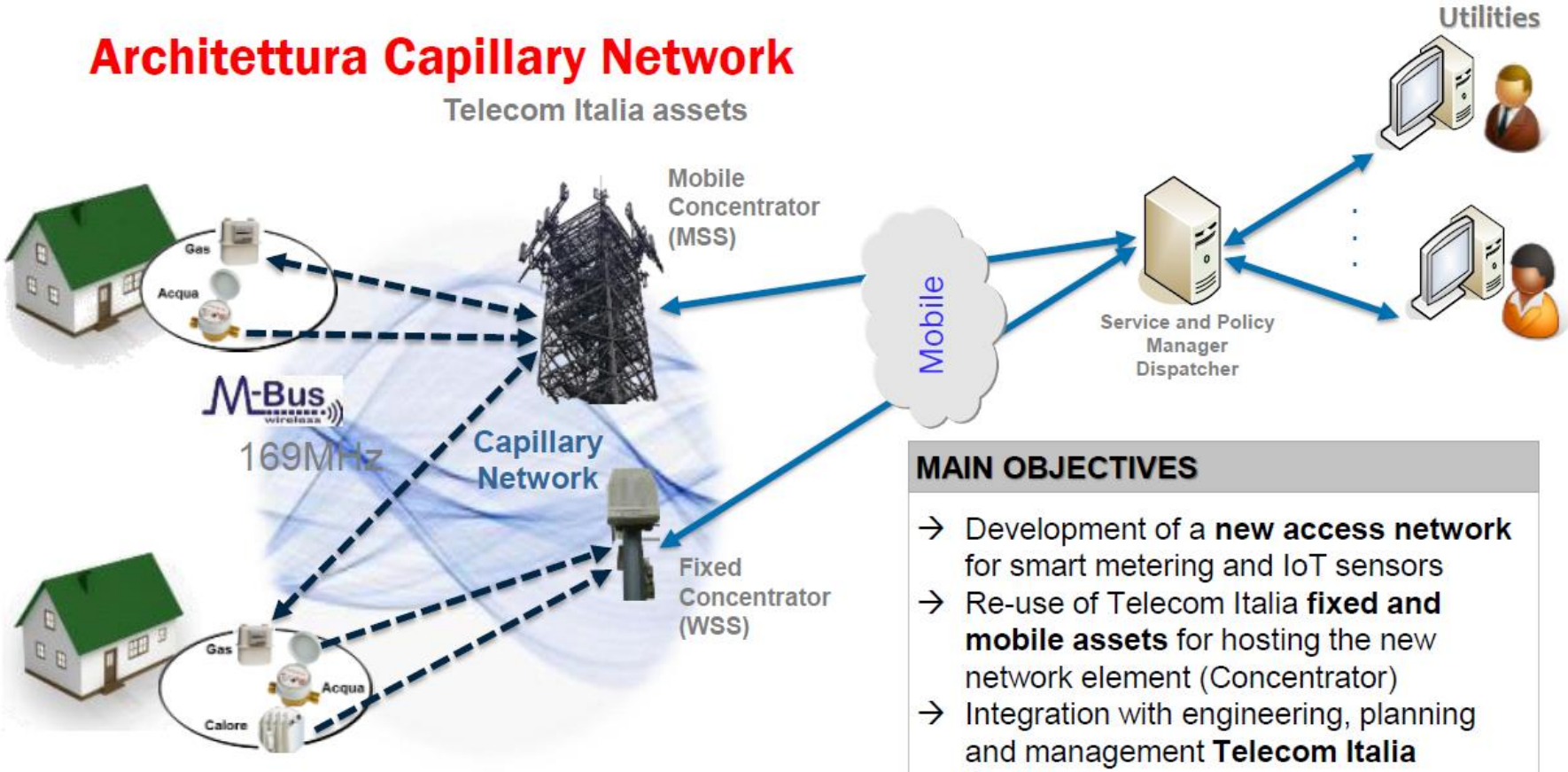
Smart Cities

# Smart Surveillance

# Smart Everything



# Capillary Networks



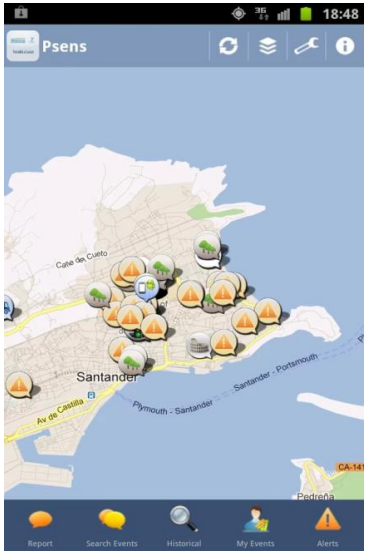

**MAIN OBJECTIVES**

- → Development of a **new access network** for smart metering and IoT sensors
- → Re-use of Telecom Italia **fixed and mobile assets** for hosting the new network element (Concentrator)
- → Integration with engineering, planning and management **Telecom Italia Processes**
- → Adoption of standard RF and protocols to achieve a **multi service network** for utilities (gas, water, waste etc.) enabling the smart urban infrastructure of a smart city

# Participatory Sensing

- Ambient Light
- Proximity
- Gyroscope
- Cameras
- GPS
- Microphones
- Accelerometers
- Compass
- ....

Citizens can use their smartphones to send physical sensing information to a server on the cloud

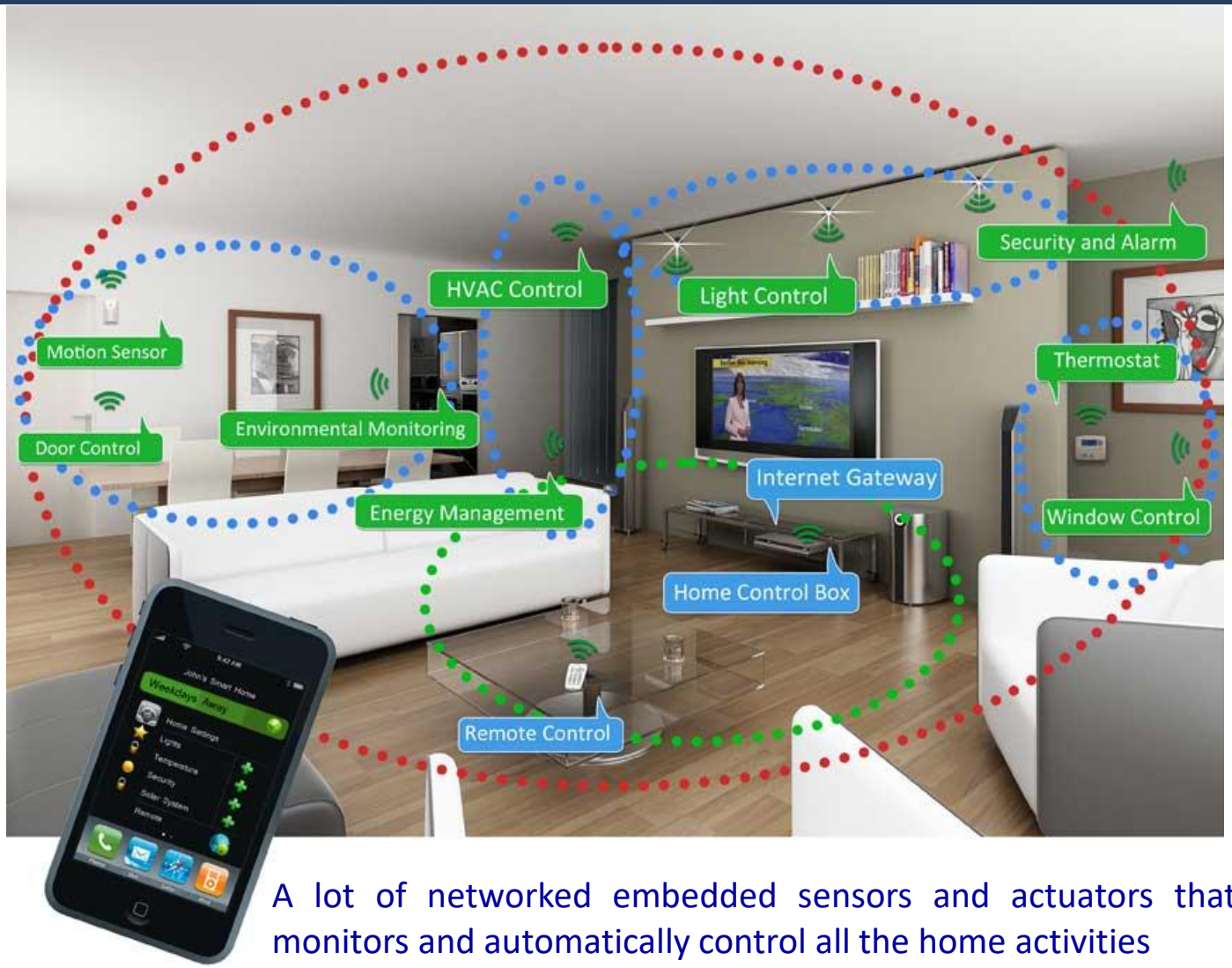


# Social Sensing

Social networks can be viewed as *social sensors*

# Some questions

# Smart Homes/Buildings




A lot of networked embedded sensors and actuators that monitors and automatically control all the home activities

# What about privacy?

Sayings such as

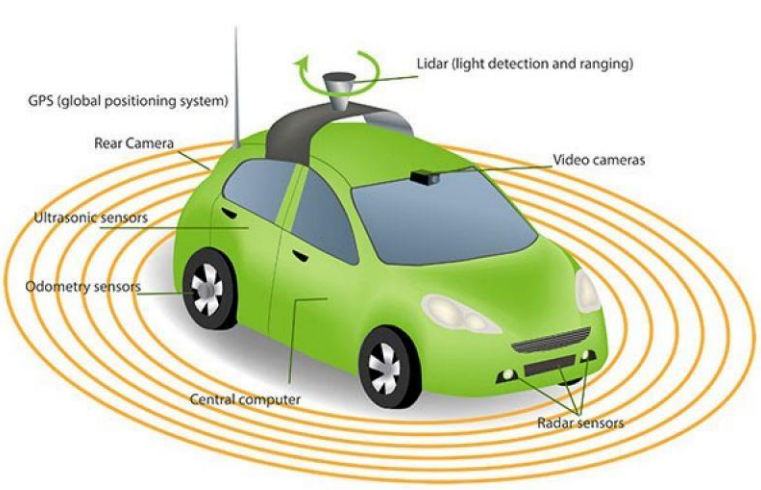
*the walls have ears …*

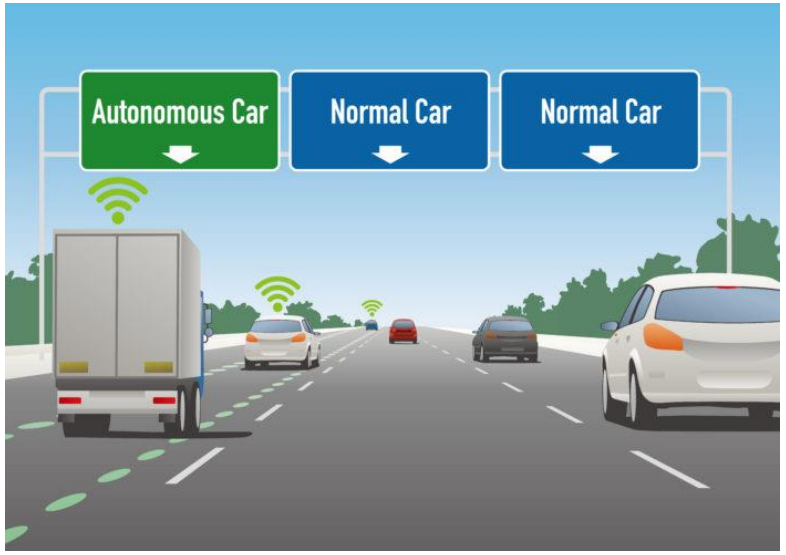
*if these walls could talk …*

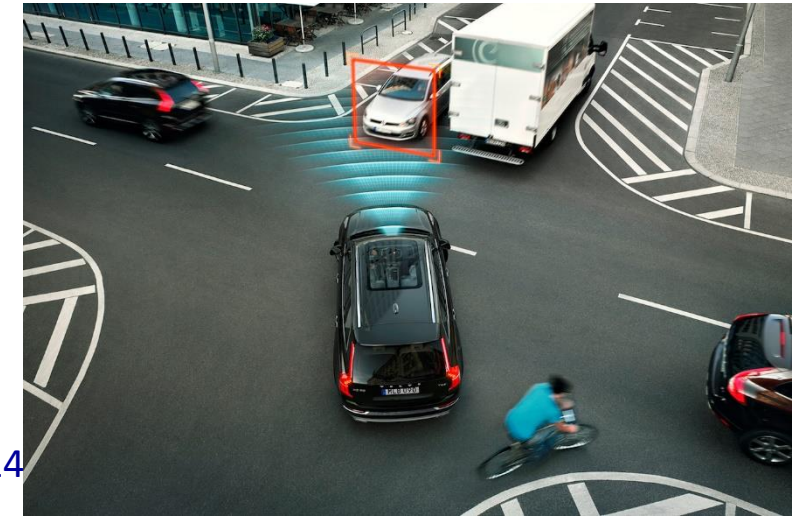
*…*

have become a reality!!

# Autonomous Cars



# Autonomous Vehicles

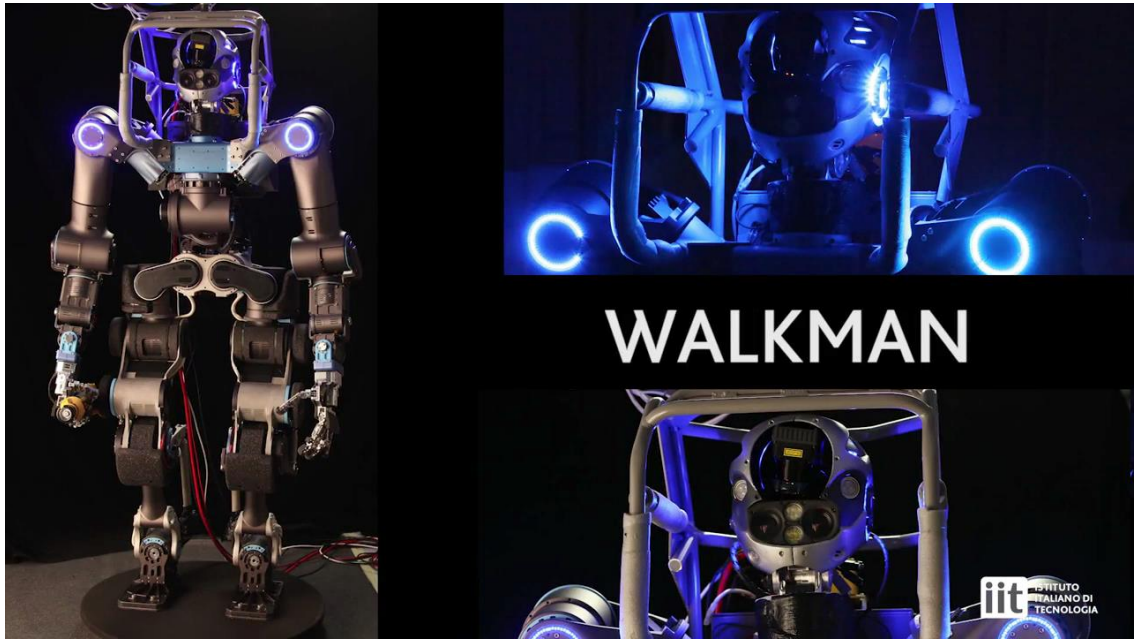
Robots replacing humans in hazardous environments

# Walk-Man

ISTITUTO ITALIANO DI TECNOLOGIA

CENTRO "E. PIAGGIO" UNIVERSITA' DI PISA

DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE




A robotic platform (of an anthropomorphic form) which can operate outside the laboratory space in unstructured environments and work spaces as a result of natural and man-made disasters.

# Collaborative Robots (Cobots)

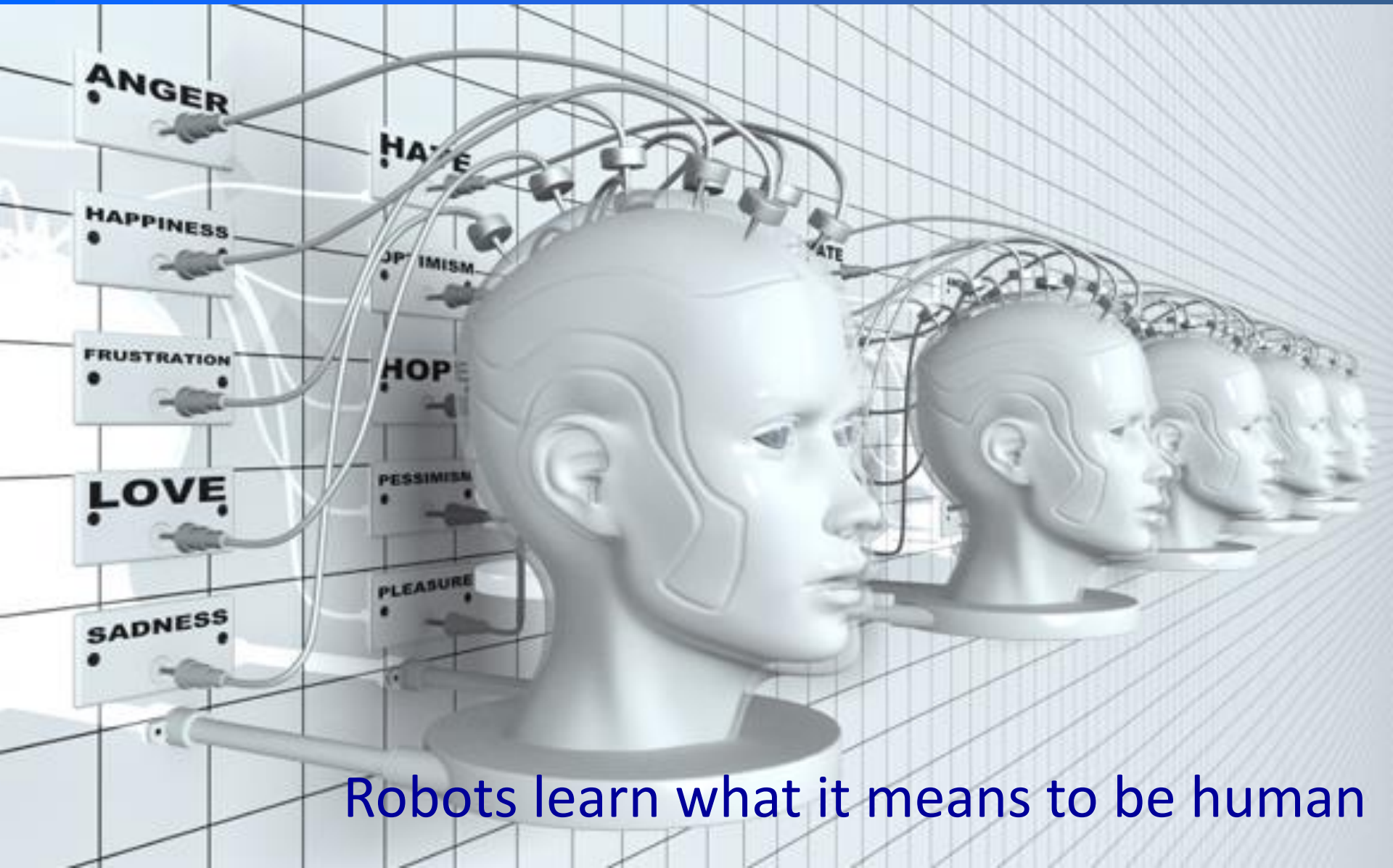
**Autonomous Agents will help more and more in our activities …**

# Social Robots

**… and will interact more and more with people**

Our EGO Robot at Maker Faire Rome, December 1-3, 2017

# SOCIAL and EMOTIONAL Robots

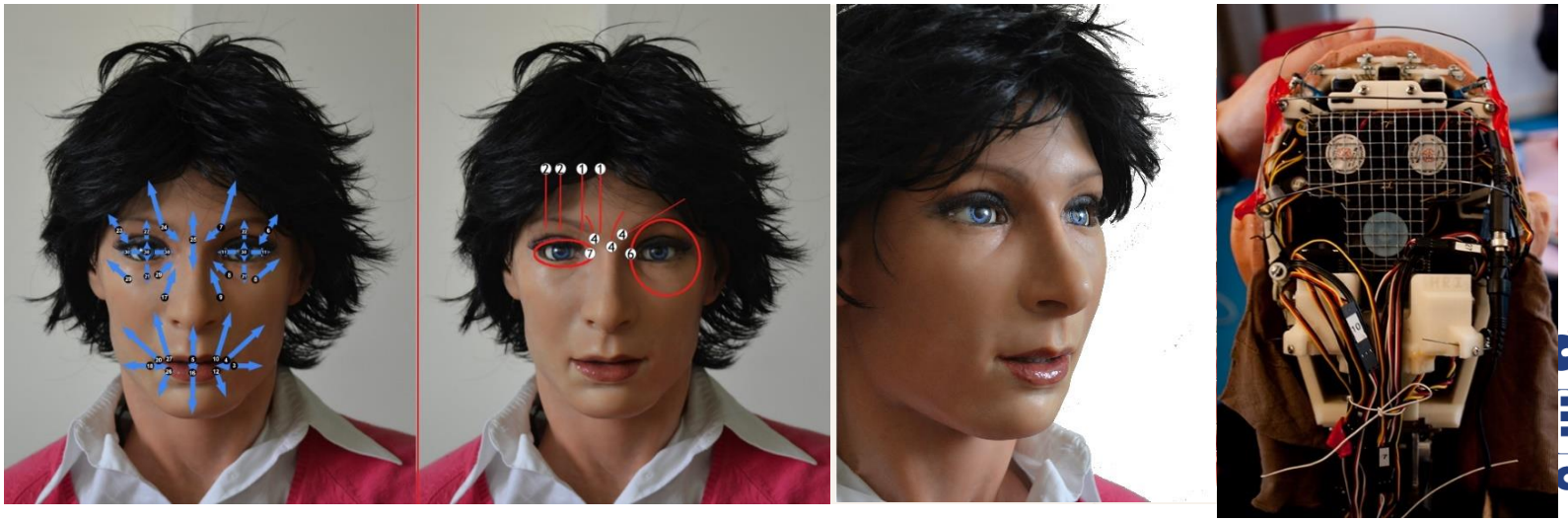



Robots learn what it means to be human

# FACE: Facial Automation for Conveying Emotions

FACE presents emotional information through facial expressions

- collects synchronized information from different sensors
  - physiological data
  - behavioral data
- and responds accordingly



# FACE Applications

# Face Applications

# Some major Issues

- Security
- Privacy: citizens as “non-users”
  - As the IoT become more pervasive, personal information will become available to a diverse set of actors
    - Organizations
    - Individuals
    - Autonomous systems capable of making decisions about you.
- Responsibility
  - Who is accountable for decisions made by autonomous systems?
  - Shall we need to incorporate “artificial ethics” into an automated system? If so, which ethics?
- Social behavior and appropriate use



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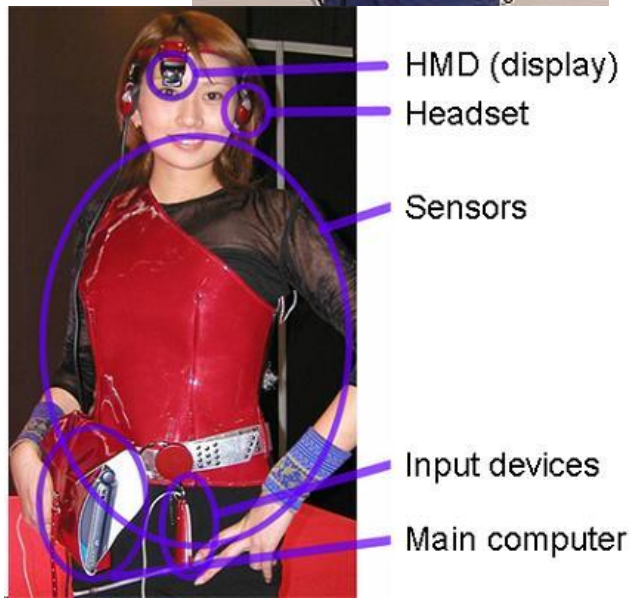
# Humans or Robots?



THANK
YOU

# THE SCENARIO

- Big data/ data management
- M2M communication
- Physical human-robot interaction
- Human-robot social and emotional interaction

**Technology is evolving faster than the legal and moral frameworks needed to manage it**

- A legal framework for determining appropriate behavior of autonomous IoT entities, responsible and accountable parties for that behavior, and determination of who can enforce compliance, how, and on what grounds.
- Focus on human rights and ethical behavior in the IoT, including a sense of how these would be enforced. This gets to the heart of the need for the IoT to promote human well-being and contribute to the advancement of society.

We need to be thinking deeply now about broad IoT use and deployment, and how it can help create a more enlightened and civilized society.

(Francine Berman and Vinton G. Cerf - Social and ethical behavior in the internet of things, Communication pf the ACM, Vo. 60, issue 2, Feb 2017

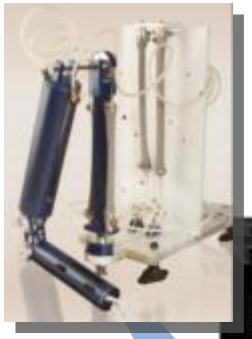
# Thank you!

Centro E. Piaggio
bioengineering and robotics research center
Università di Pisa
Dialogo italiano
Italian dialogue

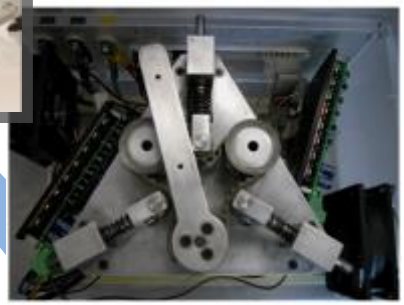
# Human can work safely

Smart Cities

# Muscles for Soft Robots: a technology born in Pisa



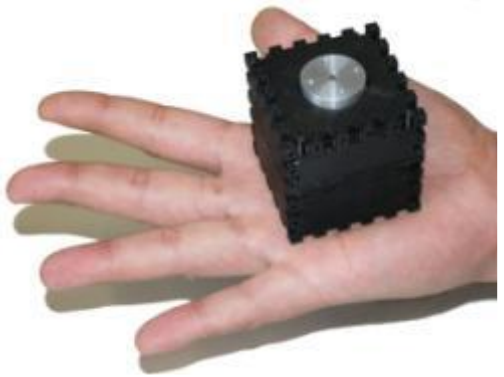
Soft Arm: 2000



VSA I: 2003

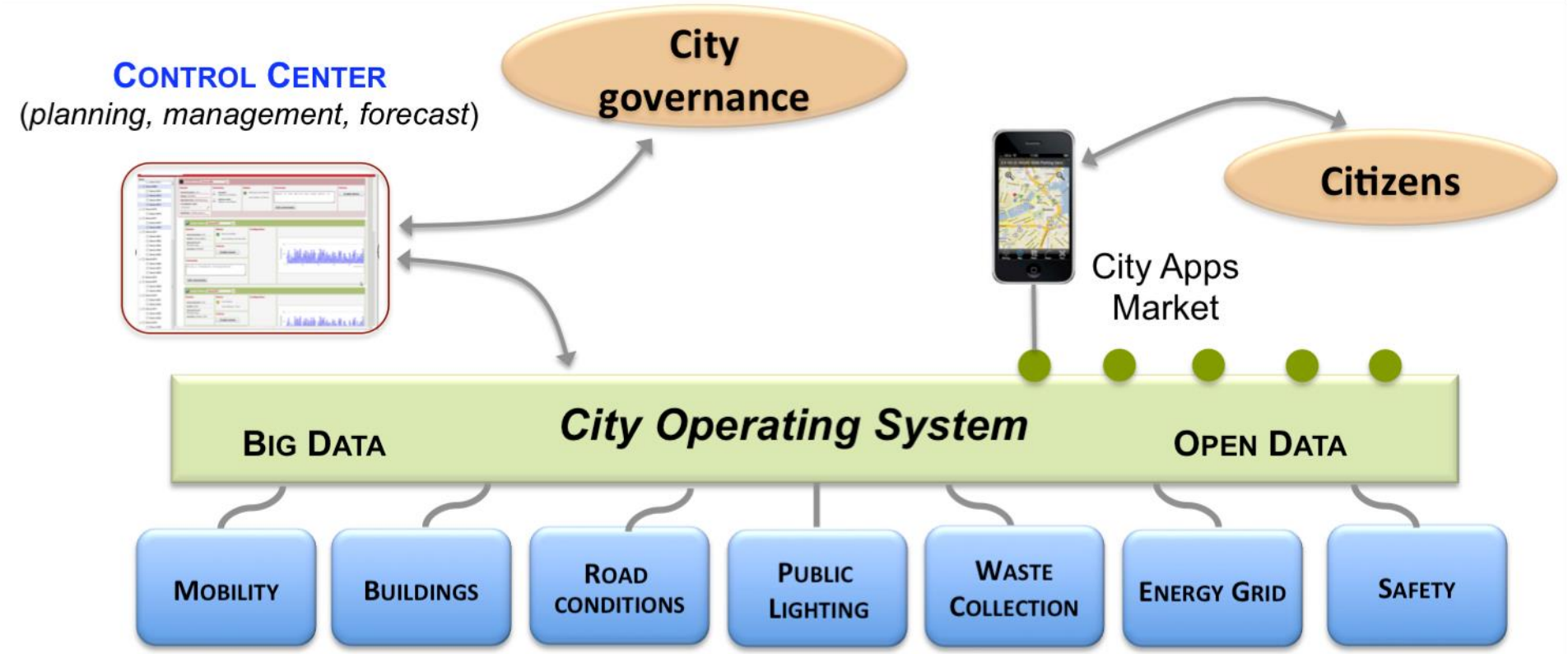
VSA II: 2008

VSA HD: 2010

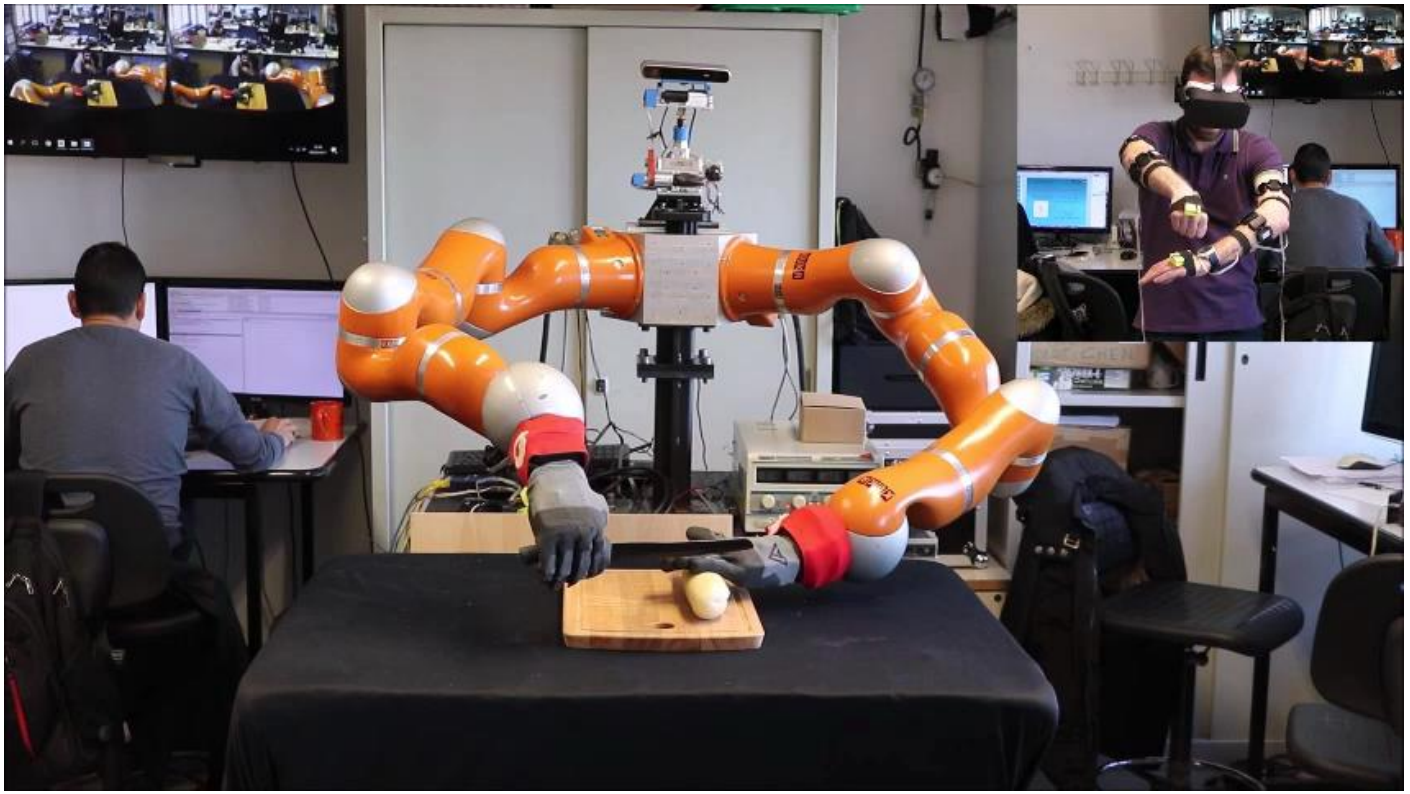


QBots: TODAY

# Smart Cities



# Robots in teleoperation, as avatars



# 2d Printable Electronics

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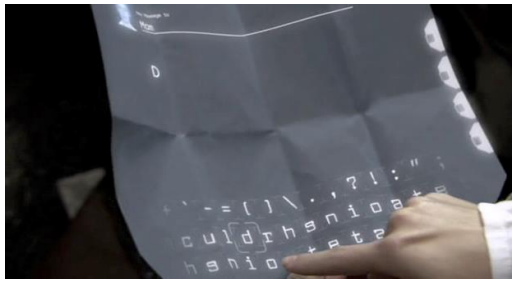
Electronic circuits printed on flexible substrates

- E.g., Paper, glass, …
- Through two-dimensional materials such as graphene

Printed Devices

- 2D smart labels
- Sensors
- smart biomedical devices
- …

Rigid
Produced in series - Not customizable
Designed by somebody else than the user



Flexible, foldable
Fully customized
Designed and fabricated by the user
Cheaper
Low environmental impact