location awareness 2020

a long-term view on linking the real and the digital worlds

A project of

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AGI (Rijkswaterstaat)
WINN (Rijkswaterstaat)
WnT (Rijkswaterstaat)

in cooperation with **London School of Economics**, **MIT Boston** and **University Salzburg**

It is increasingly feasible to identify and locate any resource or individual in real time anywhere

We'll become used to know the "who, when, where" of people or things continuously, in real-time

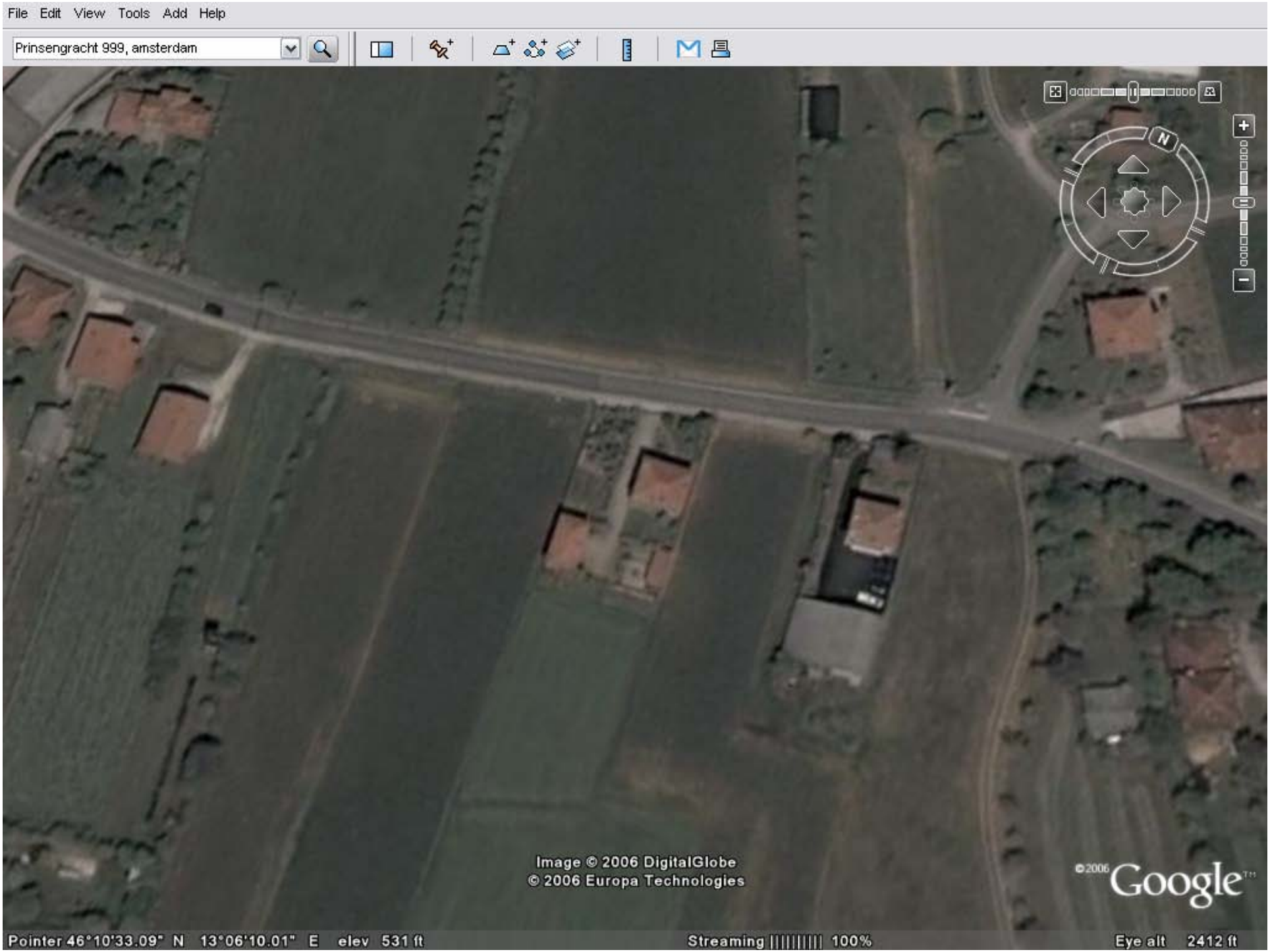
This has a vast potential for changing, business, mobility, safety, personal life and entertainment

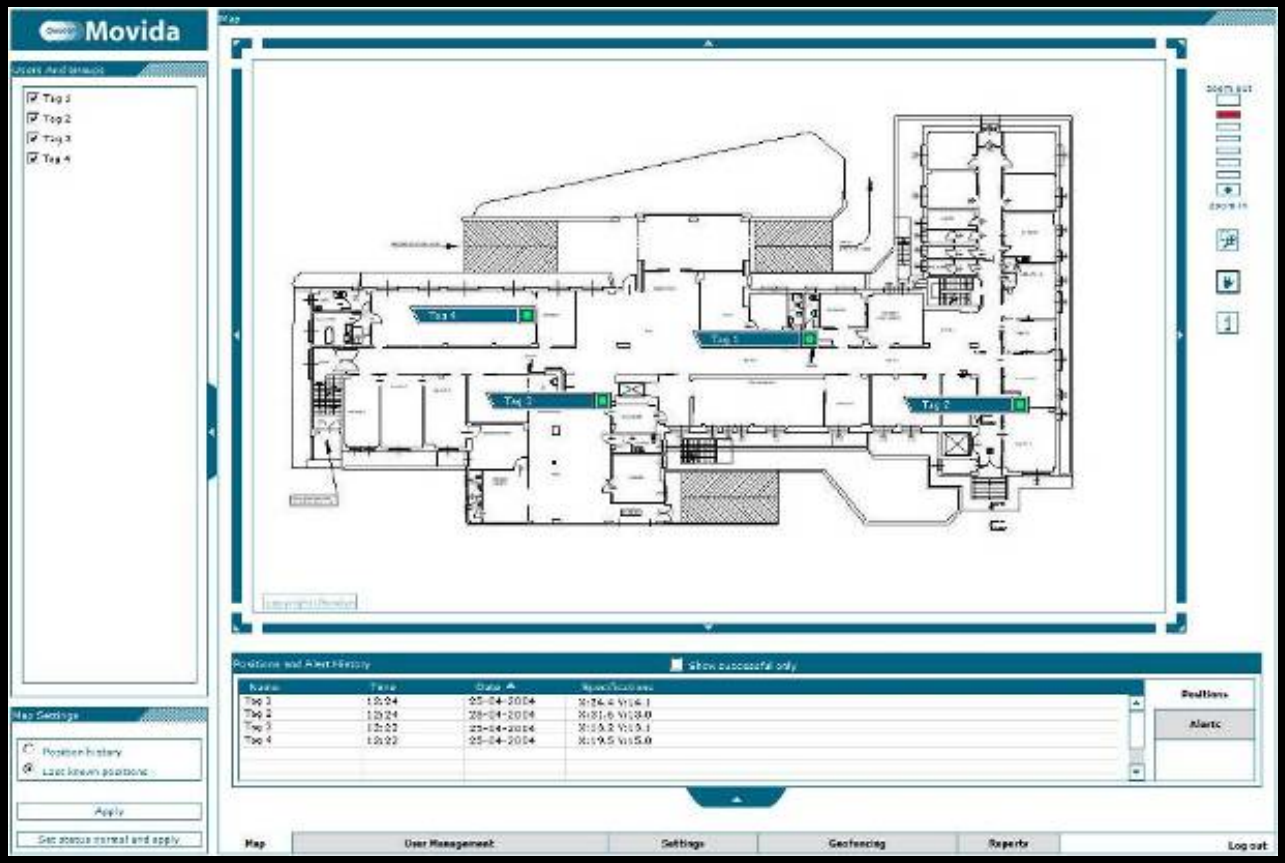
The intimate relationship to personal information raises also multiple ethical and privacy issues

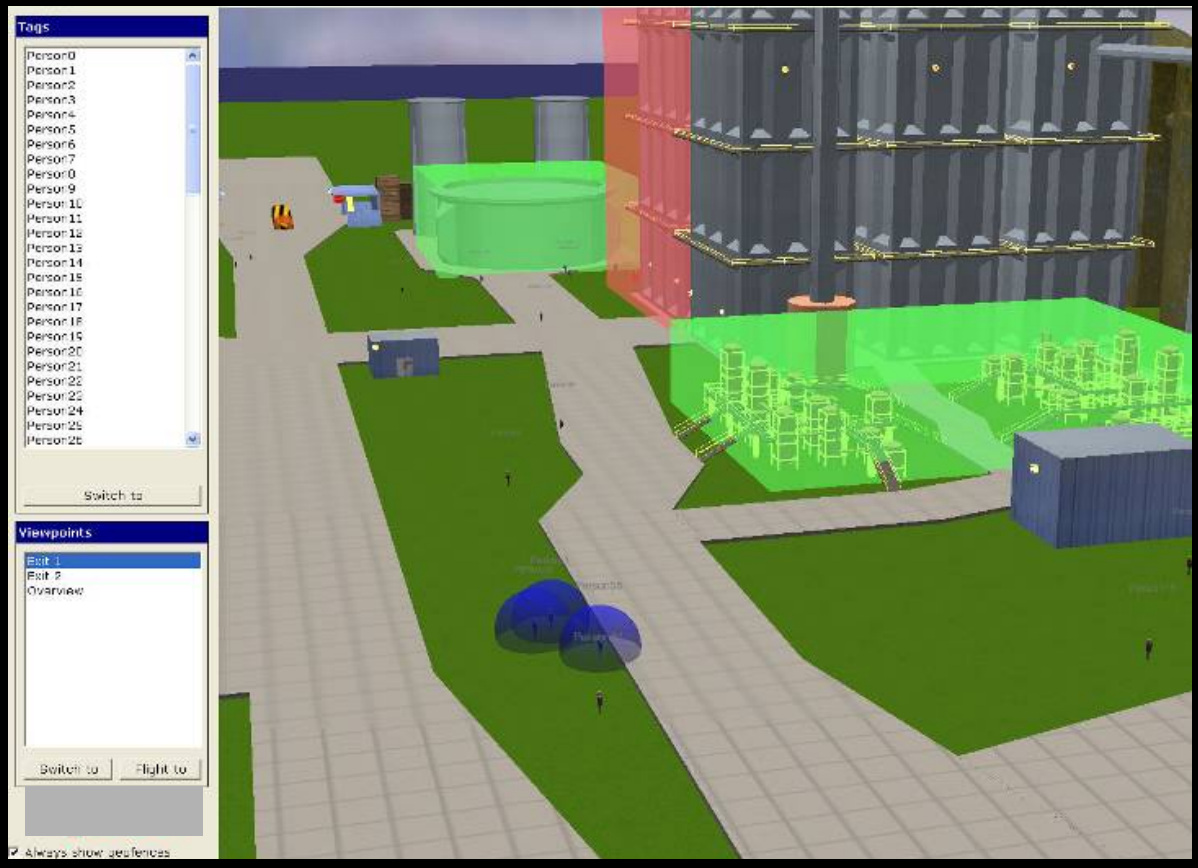
What will shape the evolution of location and context aware services?

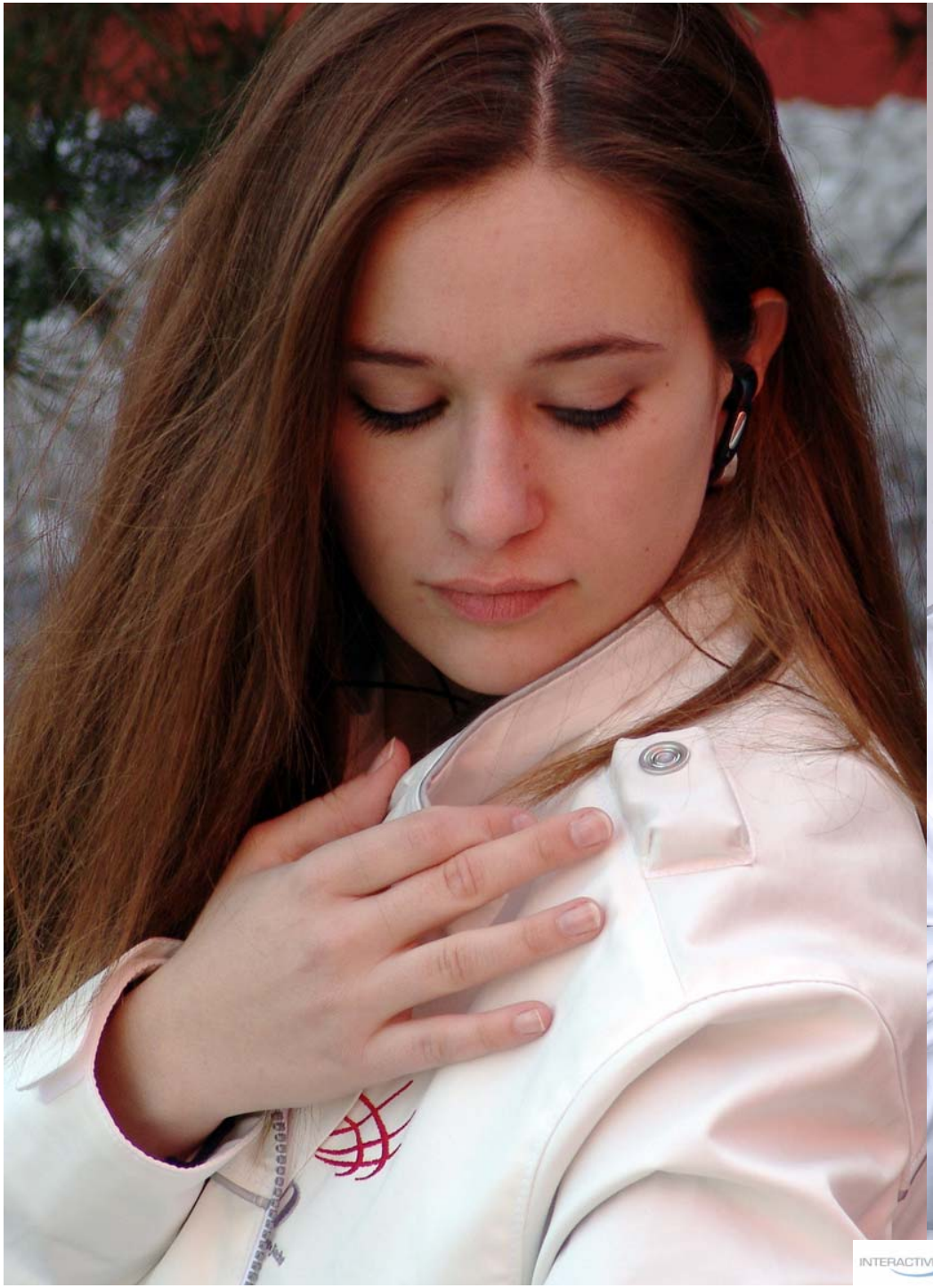
The signals

web 2.0
internet of things
pervasive computing
semantic web
context awareness

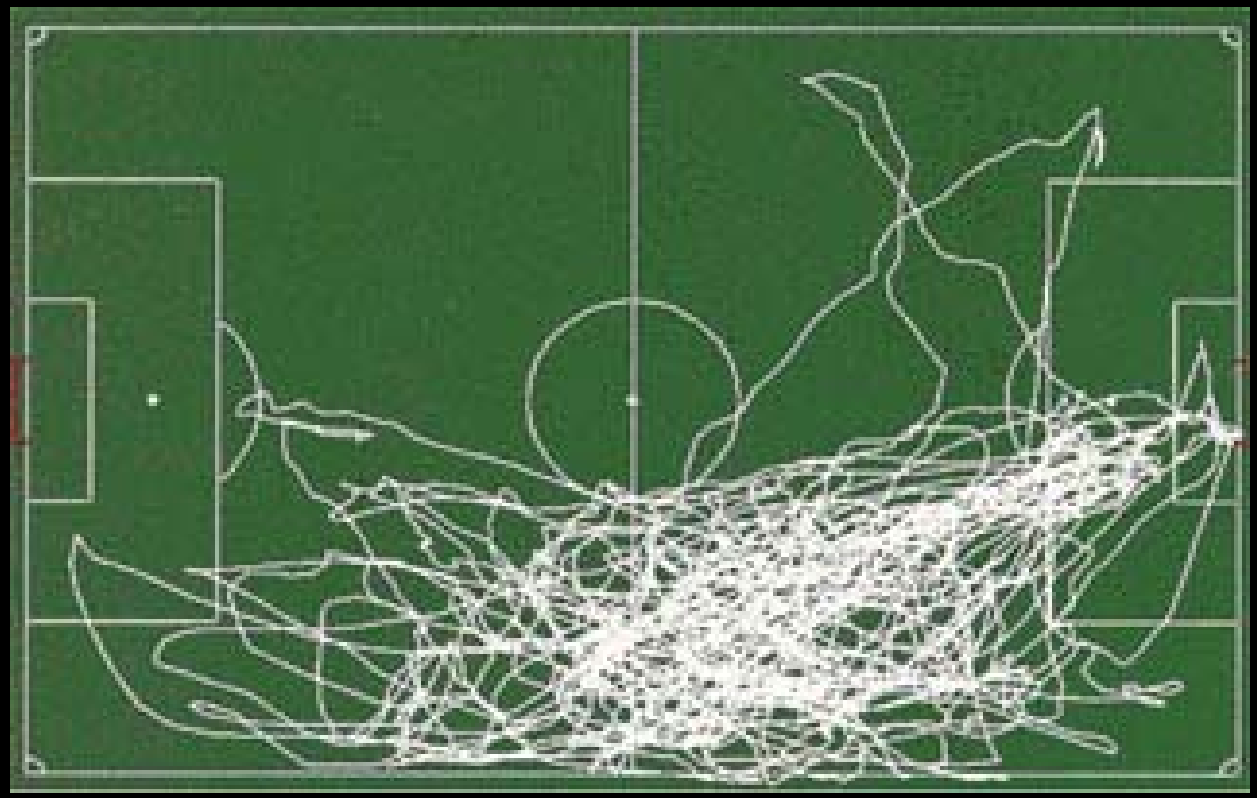

File Edit View Tools Add Help
Prinsengracht 999, amsterdam
N
Image © 2006 DigitalGlobe
© 2006 Europa Technologies
©2006 Google
Pointer 46°10'33.09" N 13°06'10.01" E elev 531 ft
Streaming 100%
Eye alt 2412 ft


Movida
Tag 1
Tag 2
Tag 3
Tag 4
Map Settings
Position history
Last known positions
Apply
Set status normal and apply
Show successful only
Positions
Alerts
Map
User Management
Settings
Geofencing
Reports
Log out


Tags
Person0
Person1
Person2
Person3
Person4
Person5
Person6
Person7
Person8
Person9
Person10
Person11
Person12
Person13
Person14
Person15
Person16
Person17
Person18
Person19
Person20
Person21
Person22
Person23
Person24
Person25
Person26
Switch to
Viewpoints
Exit 1
Exit 2
Overview
Switch to
Flight to
Always show geofences

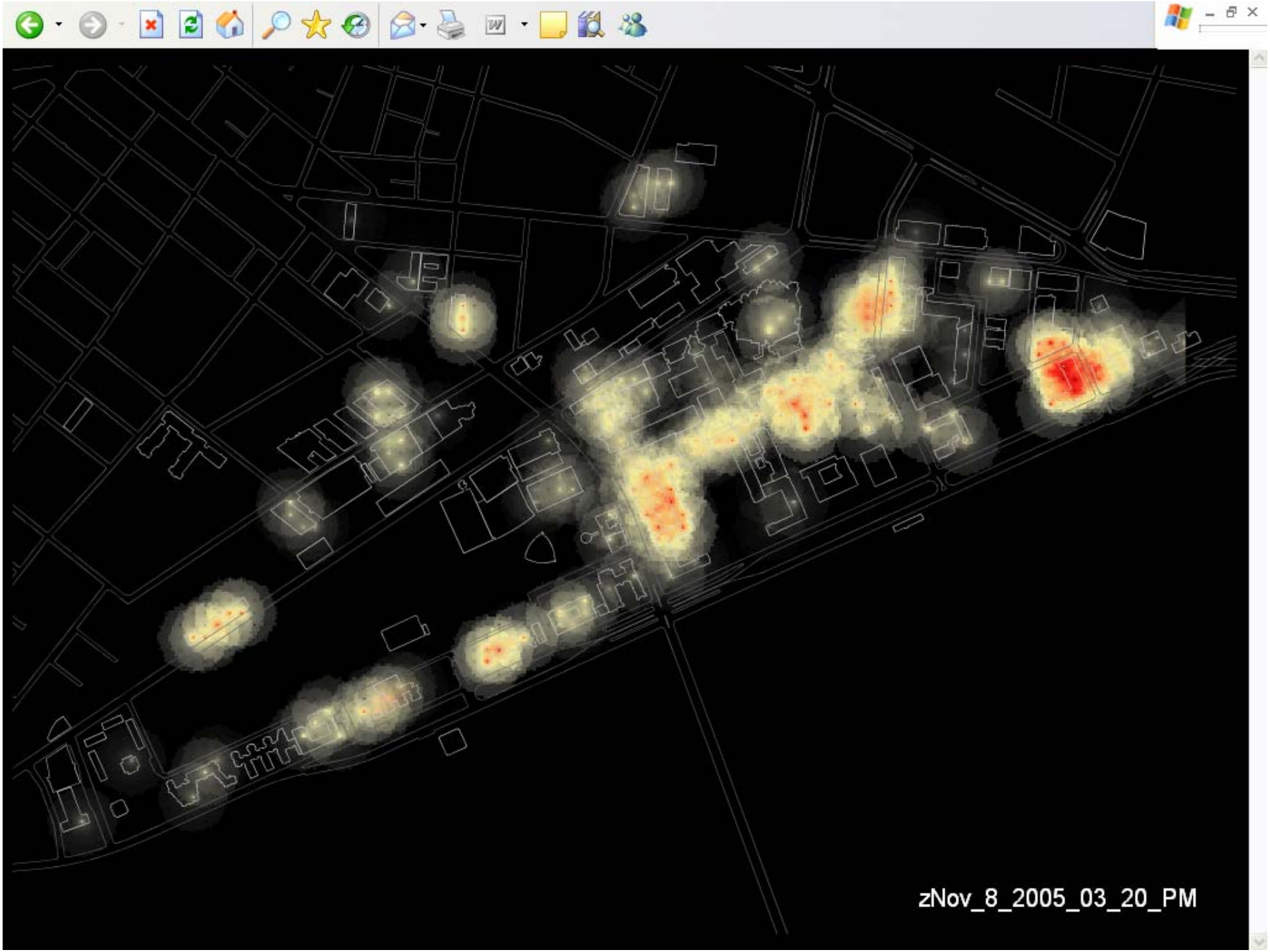


INTERACTIVE WEAR



KT

Rotterdam Emotion Map: 12 participants
Source: biomapping.net


zNov_8_2005_03_20_PM

Source: http://secondlife.blogs.com/photos/nwn/aliens_luv_lessig.jpg

Connect physical and virtual

A sandbox for the physical world

2 revenges and many actors

The revenge of geography

Mar 13th 2003, The Economist

It was naive to imagine that the global reach of the internet would make geography irrelevant. Wireline and wireless technologies have bound the virtual and physical worlds closer than ever

A mobile device linking the real and virtual worlds could change your perception of your surroundings

Xavier Cortada, Revenge in Green Shoes, 18" x 24", oil on canvas, 1998

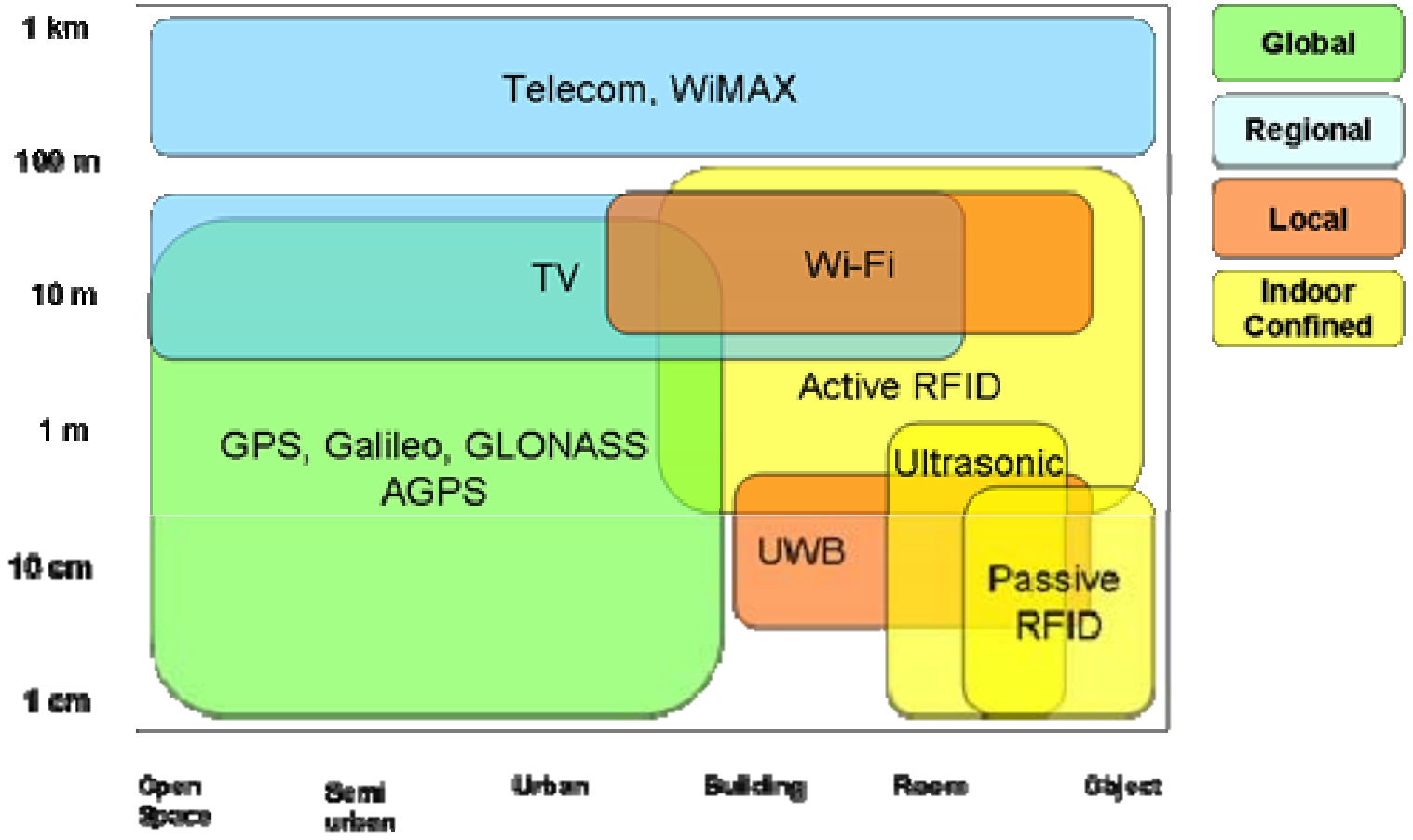
The revenge of Heisenberg

“The more precisely the position is determined, the less precisely the momentum is known”. Heisenberg denies the possibility of causality. The principle of uncertainty shatters the dream of predictability and control of the future.

An RFID tag, linking the real and the IT world, promises a level of visibility and predictability that was impossible to conceive until recently: in the real, not the quantum world.

Werner Karl Heisenberg: 1901-1976

Location and identification technologies



Identification and location devices

Patient

Patient

Children

Inmate

Badge

Label

Tag

Car box

AGPS phone

Navigators

Camera

WiFi tag

The long-term view: year 2020

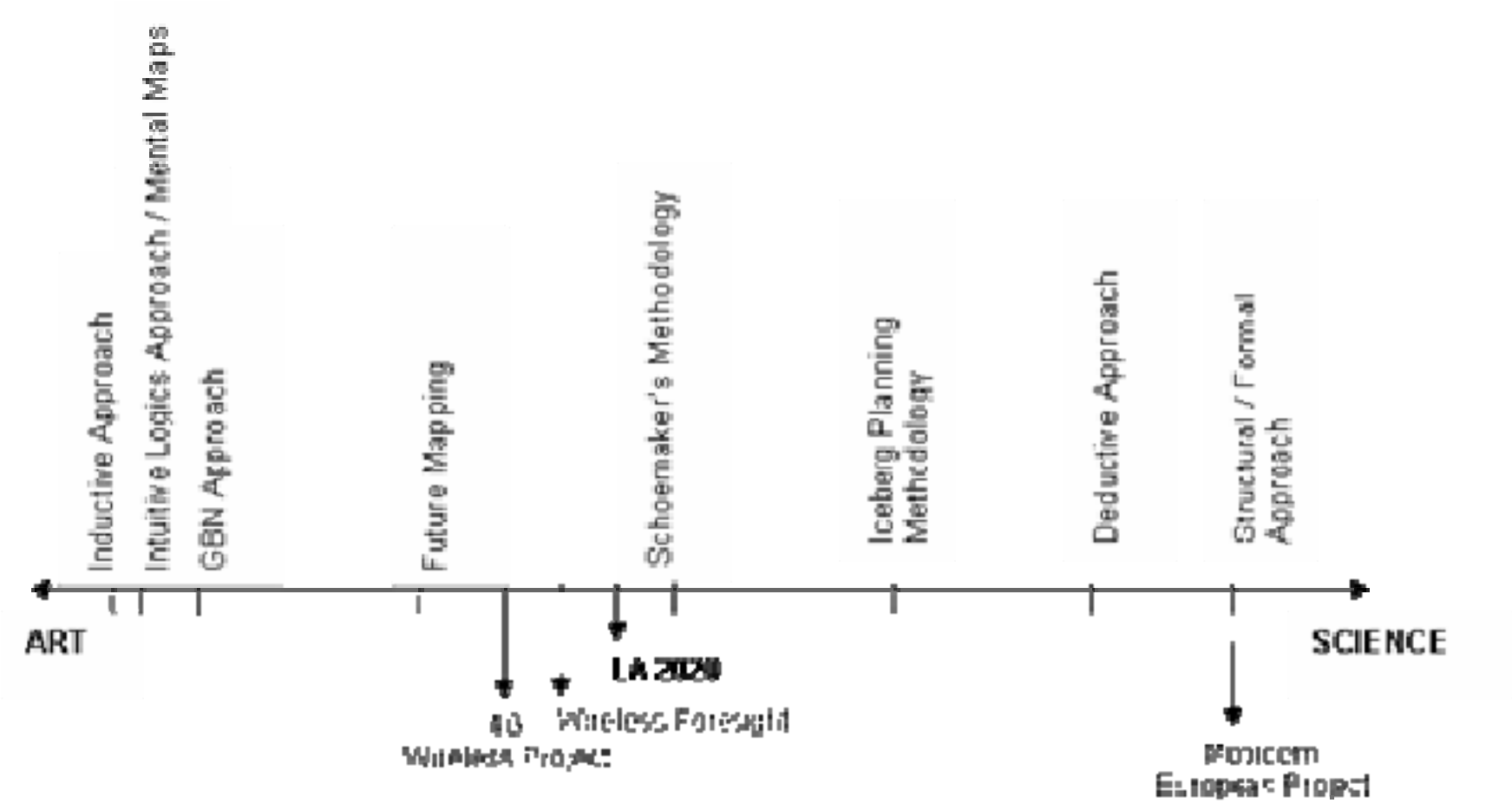
Forecasts are impossible

Understanding drivers, trends and uncertainty is essential

Scenarios are a useful tool for strategic conversations

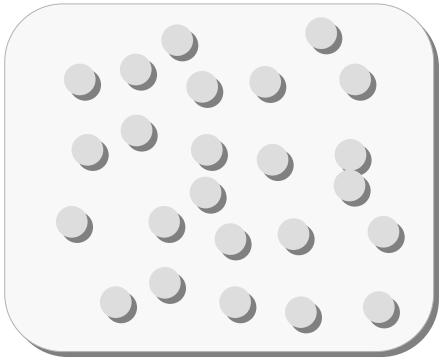
Phase 1 - Location Awareness 2020

Phase 2 – Implications for Rijkswaterstaat

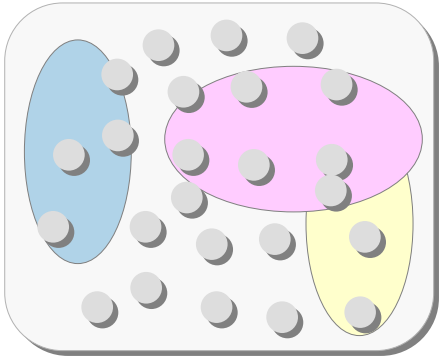

Inductive Approach
Intuitive Logics Approach / Mental Maps
GBN Approach
Future Mapping
Schoemaker's Methodology
Iceberg Planning Methodology
Deductive Approach
Structural / Formal Approach
ART
SCIENCE
LA 2020
4G Wireless Project
Wireless Foresight
Motocom European Project

The scenario components

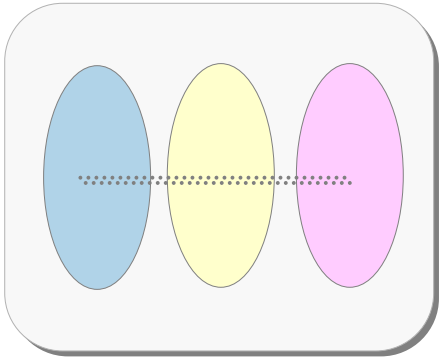
DRIVERS (or driving forces)
The single elements and developments that move the plot of a scenario, that determine the story's outcome. They can be segmented into Economic, Social, Cultural, Ecological and Technological drivers. Drivers are may also be predetermined. Some drivers represent key uncertainties.



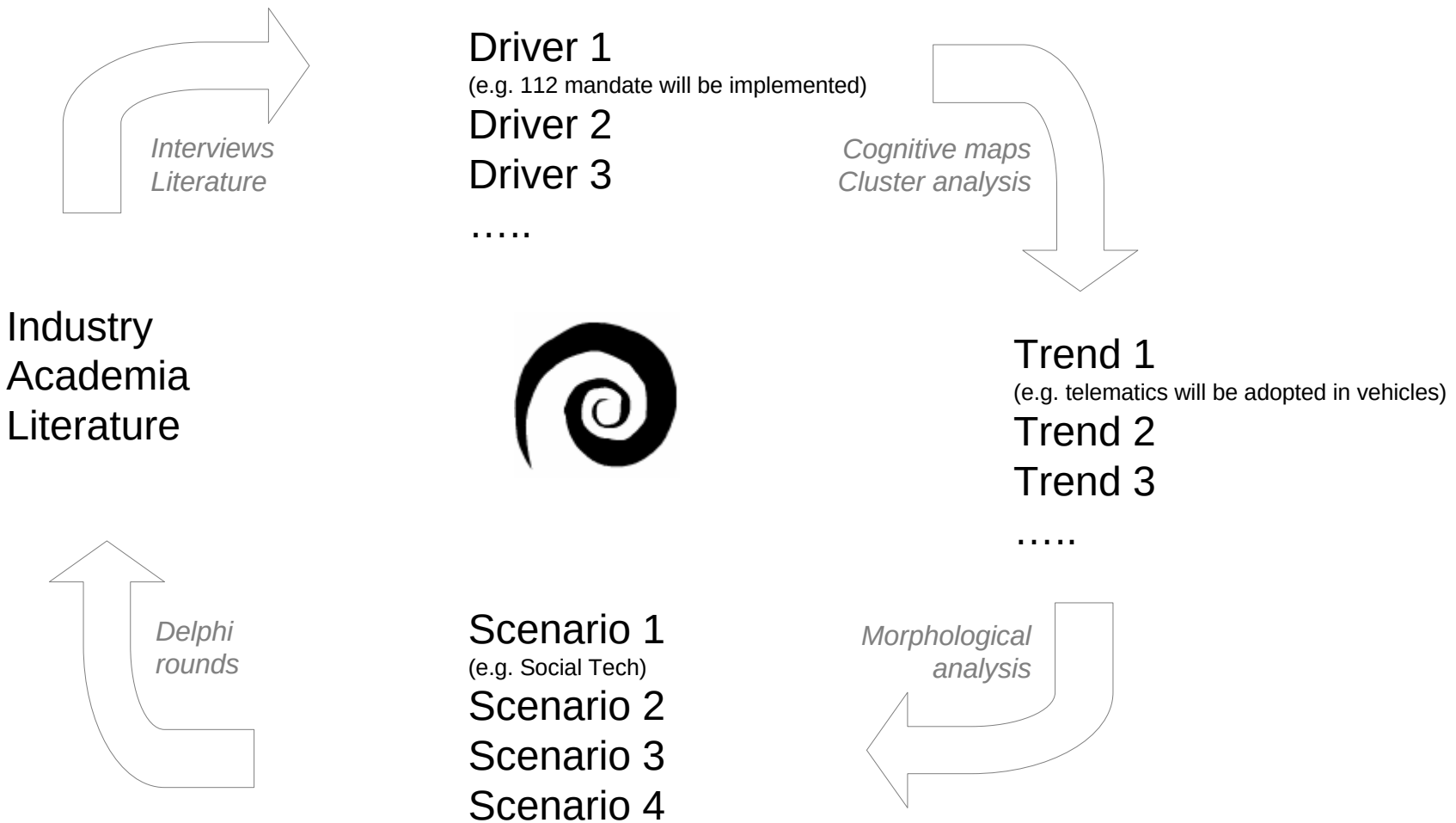
TRENDS
Trends are clusters of drivers that indicate an (internally coherent) direction of development. Trends may be characterized by one or several levels, where a level represents the degree to which the trend is realized.



SCENARIOS
Scenarios are coherent views of plausible futures. They are profiles of trends. Usually only four of all possible combinations of trend levels are described. A scenario is presented as a storyline.



The scenario method



DRIVER

Food monitoring.

Consumers and policy makers increasingly require full and detailed information on the source, treatment and processing of food and its components, implying the availability of food tracking on the global supply chain.

► *Food and animal tagging will represent one of the areas where diffusion of end-to-end visibility will be virtually complete within 10 years.*

DRIVER

Emergency location mandate for telecom operators and VoIP. The FCC[1] mandate and the European recommendation[2] require all telecom operators (thus including VoIP) to detect caller location in support of emergency operations. Other specific initiatives, such as eCall (see below in Business Drivers) has similar requirements.

► *The effect is a push towards the widespread adoption of location capabilities that can be used in other ways once available. Everybody will carry a device which has geo-location capabilities.*

Technology drivers	*Society drivers*	*Business drivers*
True (data) mobility	Attention for food quality	RFID in retail, supply chain and distribution networks
Emergency location mandate for telecom operators and VoIP.	Health care adopts sophisticated ICT	Data synchronization services
Standardization of sensors, identification and location technologies	The risk of epidemics on a global scale	eCall platform in Europe
Electronics is embedded in clothes	Environment and global change	Mobile payments
Electronics is embedded in cars and transportation infrastructures	Energy dependence and alternative energy sources	Content availability and bottom-up services
Electronics is embedded in homes and appliances	Counter movements to the market economy	
Availability of service such as presence, location, authentication, payment	Terrorism and global crime	
Micro sensors provide essential information on infrastructures, environments and networks	Blogs, bottom-up information services	
Precise location determination is available as standard feature of communication networks	Peer-to-peer and networked societies	
Multiple location and identification systems	Individualism	
The semantic web	Post-modern nomadism	
Open Source and common-based peer-production	Road and congestion charging	
	Personal safety and security	

TREND

Increased availability of intelligent infrastructures for public services, business and personal use.

Range of outcomes for “Intelligent infrastructures (transportation, energy, common spaces, yards) are available”	
Selected and sector implementation	Broad and deep implementation
Selected sectors implement intelligent infrastructures, mainly transportation and distribution. Systems partly interoperate. Some players may achieve a dominant market role in their market segment.	Widespread, interoperable intelligent infrastructures. Mandates for emergency calls and traffic information are enforced. EPC global adoption will be extensive. Many players compete in an open market.

TREND

Dataveillance is a social topic

Range of outcomes for: Dataveillance is a social concern	
Managed concern	Opposition to invading technologies
Widespread concern. Companies and governments proactively debate the issue and involve all stakeholders in choices of public interest.	Strong concerned voiced by powerful NGOs. Affects the choice of players, services and places. Players and governments adopt a defensive stance. The concern affects technology choices and deployments beyond the actual balance between risks and benefits.

> Intelligent infrastructures for public services, business and personal life

> Virtual digital communities are pillars of social structures

> Personalized and auto-adaptive services are common

> **Business and community values compete for development guidance**

> **ICT, communication and sensors interoperate**

> Privacy-enhancing technologies and privacy services are available

> Lifecycle visibility for goods and people are common

> Dataveillance is a social topic

> Governments regulate location and sensor services

> Essential public and business services require automatic location and identification

system federations

business drives

community drivers

free play

standardization, ubiquitous interoperable systems, many players of all sizes

individual values, economic and political liberalism , growth, materialism

social tech

standardization, ubiquitous interoperable systems, many players of all sizes

community ethics, social networks and responsibilities, cohesion, sustainability

big boys

multiple competing standards, non-interoperable technologies, few large players

individual values, economic and political liberalism , growth, materialism

step aside

multiple competing standards, non-interoperable technologies, few large players

community ethics, social networks and responsibilities, cohesion, sustainability

system islands

- *gravity*-type development

but

- a people, not a technology or business issue
- radical impact areas such as transportation, mobility, supply-chain
- peer-to-peer vs. hub-and-spoke
- retrofitting is not feasible
- is opting-out a possibility ?

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