European Commission

HORIZON 2020 WP 2016-17

INTERNET OF THINGS FOCUS AREA

DG CONNECT/DG AGRI/DG MOVE/DG RTD
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Internet of Things

As enabler of a future hyper-connected society, the Internet of Things is

set of sensors, actuators, smart objects, data communications and interface technologies

that allow

information to be collected, tracked and processed

across local and global network infrastructures.

The Internet of Things is the next digital revolution

- IoT, Industrial IoT, Internet of Everything
- Everything Connected = Convergence - Physical + Digital + Cyber
- IoT + Cloud Computing + Big Data + Real Time Smart Analytics
- Cyber-physical Systems - Robotics - Augmented Reality
- Smart products and services – Smart Environments
- Research cycle is maturing
- Demand is consolidating
- Leading to innovation and tremendous economic opportunities

Europe has the capacity to lead

- We have all the ingredients (research, players, eco-systems…)
- But there is a big risk of fragmentation and delay in front of international competition

Internet of Things Focus Area

- **Fostering the take-up of IoT** in Europe and enabling the emergence of IoT ecosystems supported by open technologies and platforms.
- **Coordination body** to ensure an efficient interplay of the various elements of the IoT-FA and liaise with relevant initiatives at EU, Member States and international levels
- Research and innovation effort in specific IoT topics will ensure the **longer-term evolution** of the Internet of Things

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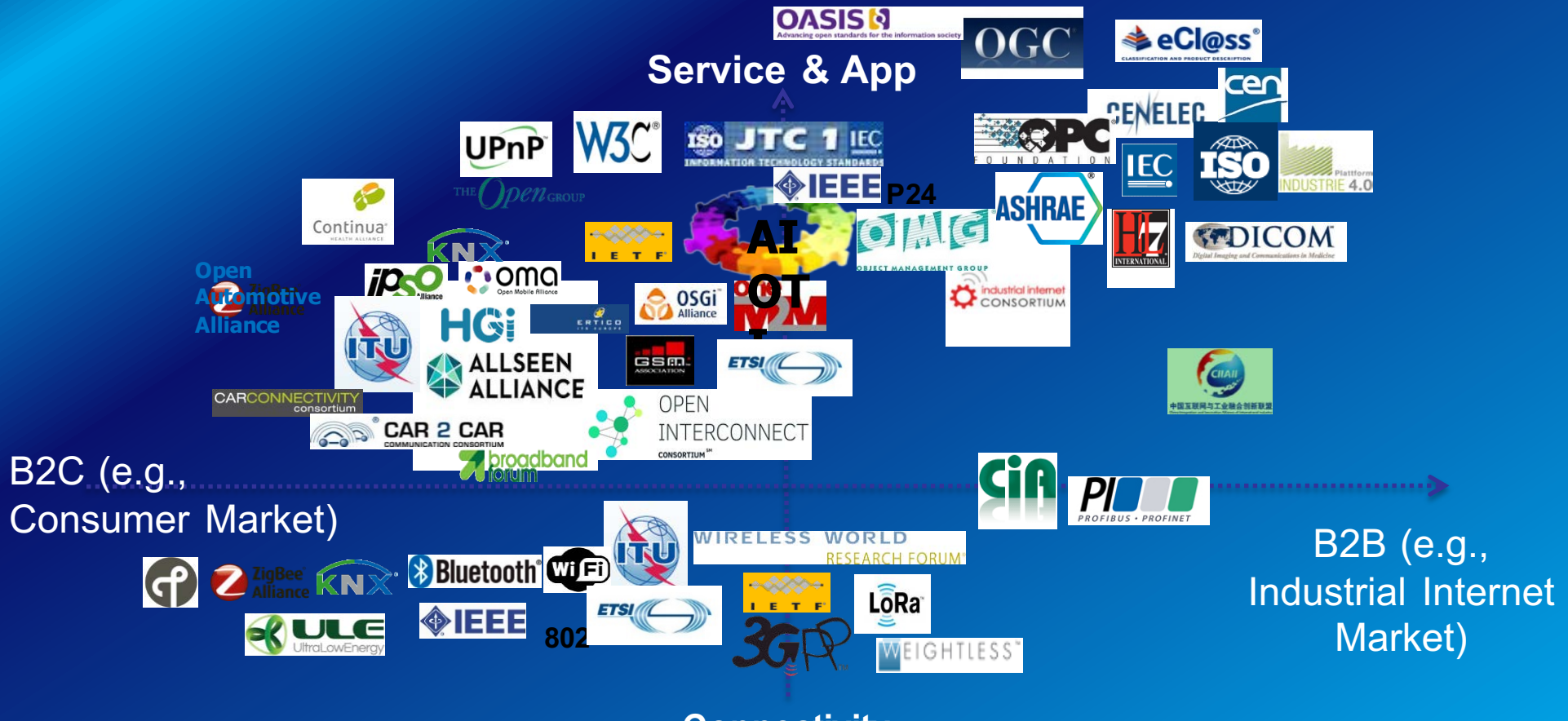
World-wide Alliances related to IoT



Source: AIOTI WG3

IoT Focus Area Calls

IoT Direct Focus Area Calls 2016

- IoT-01-2016: Large Scale Pilots (IA)
- IoT-02-2016: IoT Horizontal activities (CSA)

Dates:

- Call opening: 20th October 2015
- Call deadline: 12th April 2016, 17.00
- Expected starting date: January 2017

Proposal size:

- IoT-01-2016: 70 pages
- IoT-02-2016: 50 pages

Where to apply:

http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/calls/h2020-iot-2016-2017.html#c,topics=callIdentifier/t/H2020-IOT-2016-2017/1/1/1&callStatus/t/Forthcoming/1/1/0&callStatus/t/Open/1/1/0&callStatus/t/Closed/1/1/0&+identifier/desc

IA

IoT-01-2016: Large Scale Pilots

Pilot areas:

- Pilot 1: Smart living environments for ageing well (EU contr. up to 20 MEUR)
- Pilot 2: Smart Farming and Food Security (EU contr. up to 30 MEUR)
- Pilot 3: Wearables for smart ecosystems (EU contr. up to 15MEUR)
- Pilot 4: Reference zones in EU cities (EU contr. up to 15MEUR)
- Pilot 5: Autonomous vehicles in a connected environment (EU contr. up to 20 MEUR)

Instrument and total budget:

- Innovation Action (Funding rate: 70% except for non-profit legal entities, where a rate of 100% applies)
- 100 MEUR

IA

IoT-01-2016: Large Scale Pilots

Specific Challenge:

- Foster the deployment of IoT solutions in Europe through integration of advanced IoT technologies across the value chain, demonstration of multiple IoT applications at scale and in a usage context, and as close as possible to operational conditions. As the Internet of Things value chains are also of a global nature

Scope:

- Pilots are targeted, goal driven initiatives that will propose IoT approaches to specific real-life industrial/societal challenges. Pilots are autonomous entities that involve stakeholders from supply side to demand side, and contain all the technological and innovation elements, the tasks related to the use, application and deployment as well as the development, testing and integration activities

Expected Impact:

- Pilots are expected to have a high impact on citizens, both in the public and private spheres, industry, businesses and public services. Key performance indicators should be identified to measure progress on citizen benefits, economic growth, jobs creation, environment protection, productivity gains, etc., and shall go Pilots' impact should go beyond involved partners

IoT – Large Scale Pilots in 2016

- *IoT LSP: Specific features*
  - Involve all value-chain actors
  - Address business model validation & standardisation
  - Address user validation and acceptability
  - Up-scaling of open platforms like FI-Ware, CRYSTAL, UniversAAL

- *Key Performance Indicators:*
  - Ensure the longer-term evolution of the Internet of Things
  - Critical Mass, leadership
  - Rich portfolio of technologies and tools
  - To guarantee the sustainability of the approach

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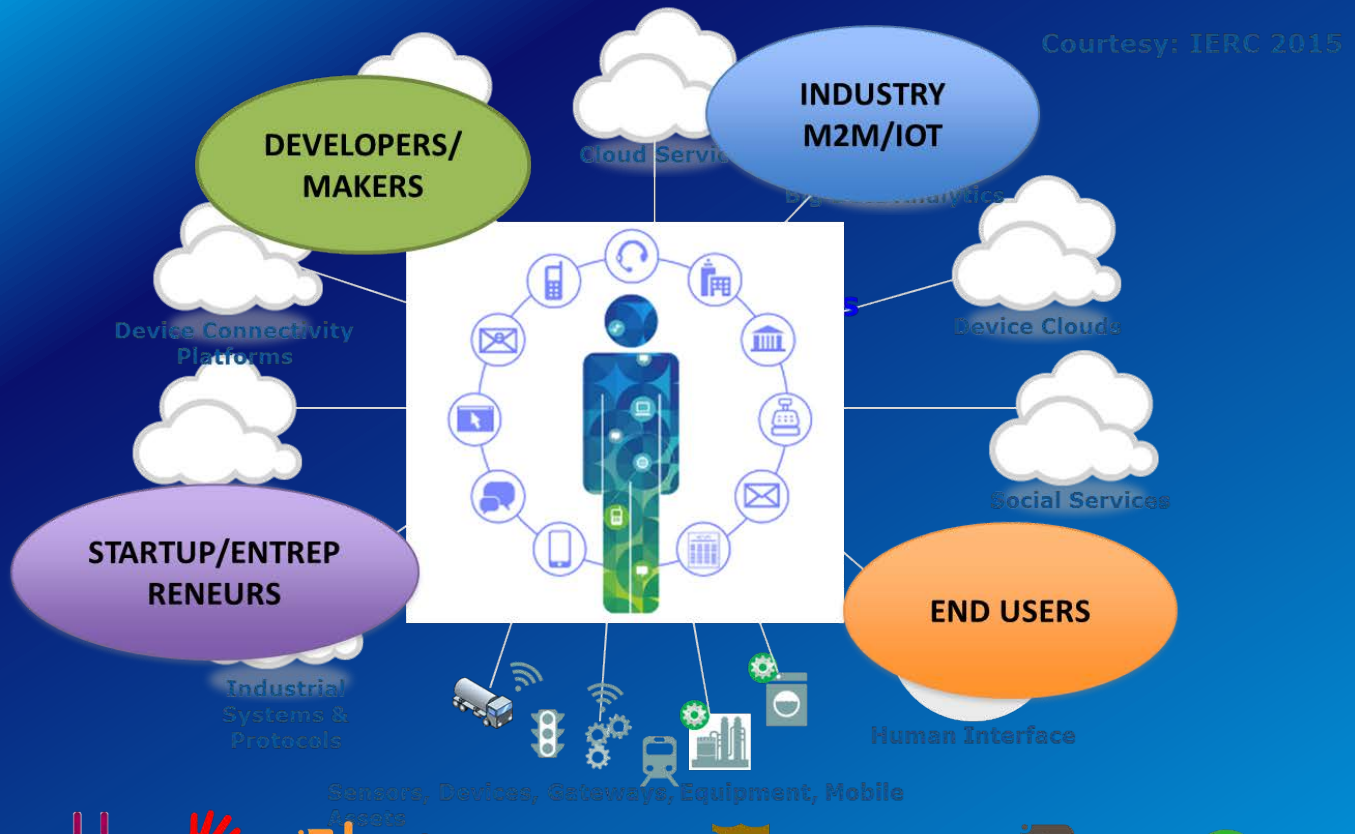
IOT eco system:
Devices, Applications and Business model



Financial support to third parties (a.k.a. "open calls" or "cascading funding")

From General Annexes – K

Proposals […] shall clearly detail the objectives and the results to be obtained and include at least the following elements:

- **a closed list of the different types of activities that qualify for financial support,**
- **the persons or categories of persons which may receive financial support,**
- **the criteria for awarding financial support,**
- **the criteria for calculating the exact amount of the financial support,**
- **the maximum amount to be granted to each third party**

Specific rules for this call

- **maximum amount to be granted can be in the order of EUR 50.000 to 150.000 per party (general rule in H2020: max. 60.000)**
- **total amount to be granted via open calls can be maximum 50% of the project funding**

"The action may involve financial support to third parties"

(this is not mandatory!)

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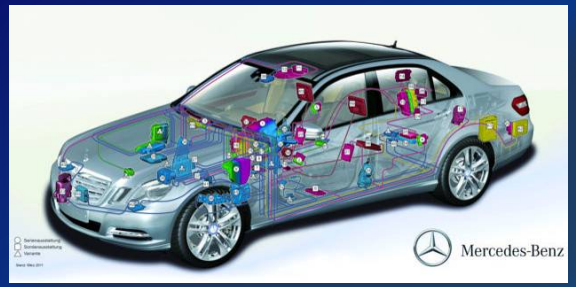
IoT-01-2016: Large Scale Pilots

Pilot areas:

- Pilot 1: Smart living environments for ageing well (EU contr. up to 20 MEUR)
- Pilot 2: Smart Farming and Food Security (EU contr. up to 30 MEUR)
- Pilot 3: Wearables for smart ecosystems (EU contr. up to 15MEUR)
- Pilot 4: Reference zones in EU cities (EU contr. up to 15MEUR)
- Pilot 5: Autonomous vehicles in a connected environment (EU contr. up to 20 MEUR)

Total budget:

- 100 MEUR (funding rate: 70%)



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IoT-01-and IoT-02: Inter-twinning of IoT1-LSP & IoT2-CSA in 2016

IoT1

- Smart living environments for ageing well
- Smart Farming and Food Security
- Wearables for smart ecosystems
- Reference zones in EU cities
- Autonomous vehicles in a connected environment

IoT2

1) Coordination of pilot areas through mapping of pilot architectures; interoperability, standardisation
2) Horizontal support for IoT governance, innovation and creativity
3) Accompaniment for societal, ethical and ecological issues related to the pilots

EXPECTED – IMPACT

- Validation, sustainability and replicability, of architectures, standards, interoperability properties
- New industry business processes and innovative business models
- Significant and measurable contribution to standards or pre-normative activities
- Improvement of citizens' quality of life
- Creation of opportunities for entrepreneurs
- Development of secure and sustainable European IoT ecosystems and contribution to IoT infrastructures

INTERNET OF THINGS
FOCUS AREA

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Large Scale Pilot

CSA

IoT-02-2016: IoT Horizontal activities

Specific Challenge:

- Ensure a sound coherence and exchanges between the various activities of the Focus Area, and notably cross fertilisation of the various pilots use cases for technological and validation issues of common interest
- Issues of horizontal nature and topics of common interest, such as privacy, security, user acceptance, standardisation, creativity, societal and ethical aspects, legal issues and international cooperation, need to be coordinated and consolidated across the pilots to maximise the output and to prepare the ground for the next stages of deployment including pre-commercial or joint public procurement.
- Foster links between communities of IoT users and providers, as well as with Member States' initiatives; connect with other initiatives including contractual Public-Private-Partnerships (e.g. in the area of Big Data, Factories of the Future, 5G-infrastructure), Joint Technology Initiatives (e.g. ECSEL), European Innovation Partnerships (e.g. on Smart Cities), other Focus Areas (e.g. on Autonomous transport), and RRI-SSH issues

Expected Impact:

- Ensure efficient and innovative IoT take-up in Europe, building on the various parts of the initiative (pilots, research, horizontal actions) ; extension and consolidation of the EU IoT community
- Validation of technologies deployment, replicability towards operational deployment; validation in usage context of most promising standards and gap identification

Support Action

CSA

IoT-02-2016: IoT Horizontal activities (cont'd)

Scope:

a) Co-ordination of and support to the IoT Focus Area: through mapping of pilot architecture approaches; interoperability and standards approaches at technical / semantic levels; requirements for legal accompanying measures; common methodologies for design, testing and validation; federation of pilot activities and transfer

Horizontal support: exploitation of security and privacy mechanisms towards best practices and a potential label ("Trusted IoT"); legal support to relevant subjects; contribution to pre-normative activities and to standardization. International cooperation with similar activities. Europe. Exploitation of ICT & Art combination

b) RRI-SSH support to IoT: Pilots shall be citizen-driven with existing / local communities at an early stage. Two entities other than ICT technologies required (e.g. social sciences, psychology, gerontology, economy, art, etc.)

Total budget:

- a) up to 3 MEUR (funding rate: 100%), b) up to 1 MEUR (funding rate: 100%)

Dates:

- Call opening: 20th October 2015
- Call deadline: 12th April 2016, 17.00
- Expected starting date: January 2017

Contact points

IOT Focus Area – Topic Coordinator(s):

Rolf.Riemenschneider@ec.Europa.eu; Peter.Friess@ec.Europa.eu

Pilot-specific:

Pilot 1: CNECT-ICT4ageing@ec.europa.eu; Ari.Sorsaniemi@ec.Europa.eu

Pilot 2: Ana.Cuadrado-Galvan@ec.Europa.eu; Peter.Friess@ec.Europa.eu

Pilot 3: Andreas.Lymberis@ec.Europa.eu; Rolf.Riemenschneider@ec.Europa.eu

Pilot 4: Georgios.Tselentis@ec.Europa.eu, Peter.Friess@ec.Europa.eu

Pilot 5: Cecile.Huet@ec.Europa.eu, Eric.Gaudillat@ec.Europa.eu

Events:

http://ec.europa.eu/digital-agenda/en/internet-things

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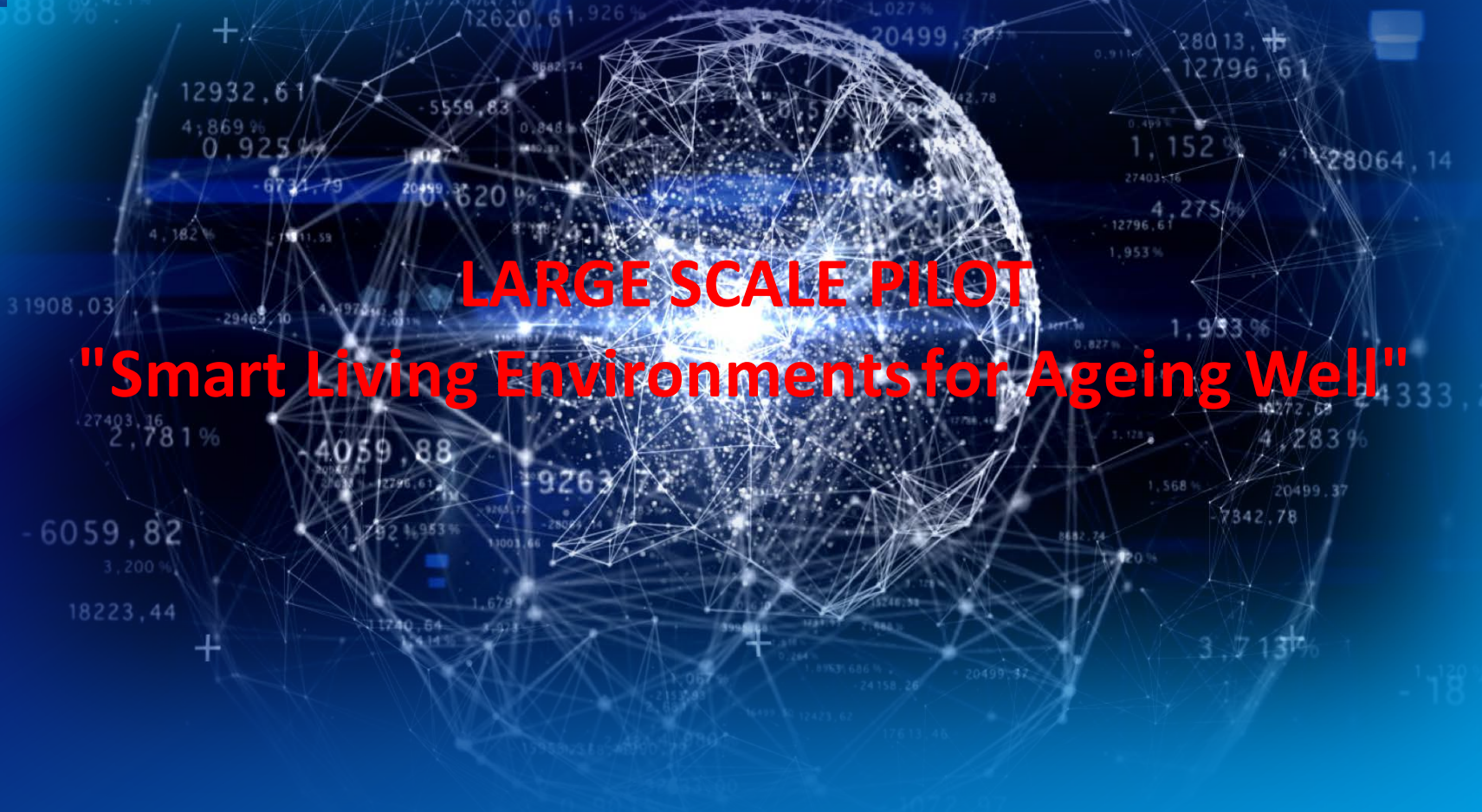

LARGE SCALE PILOT

"Smart Living Environments for Ageing Well"

Cross-Cutting Activities jointly with ICT-LEIT Large Scale IoT Pilots – Innovation Action

Scope

- Targeted, goal driven initiatives that will propose IoT approaches to specific real-life industrial/societal challenges
- Involve stakeholders from supply side to demand side
- Large scale validation (large in terms of … multiple sites, heterogeneous devices and systems, real users)
- Balanced effort devoted to supply and demand for each pilot

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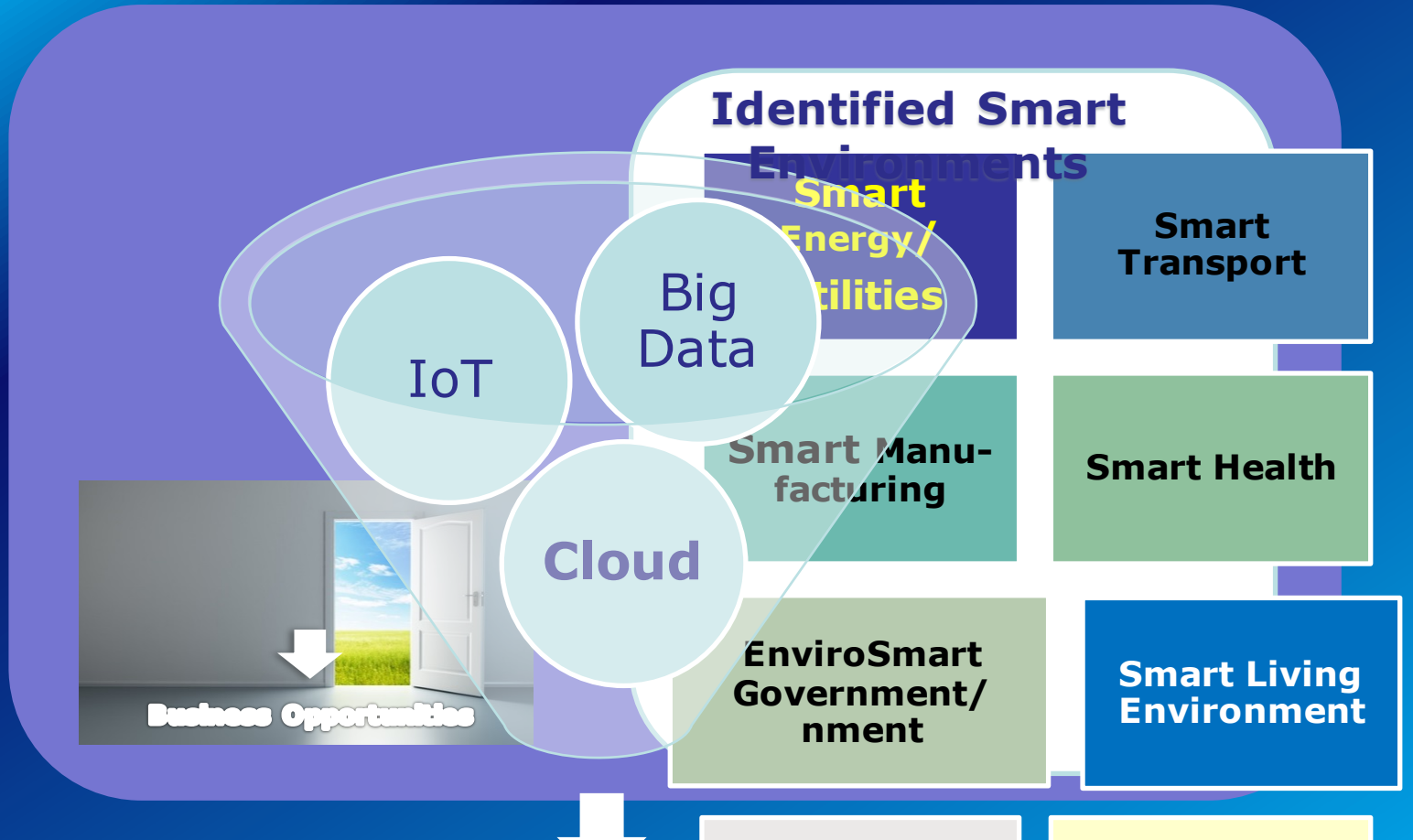
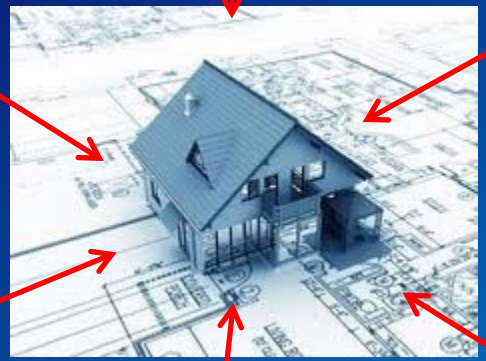
IoT-01-2016: Large Scale Pilots



IoT-01-2016: Large Scale Pilots

Pilot 1: Smart living environments for ageing well



Prevention
Wellbeing

safety &
security

Social
Inclusion

Health/care
monitoring

Daily
living

Fun &
Leasure

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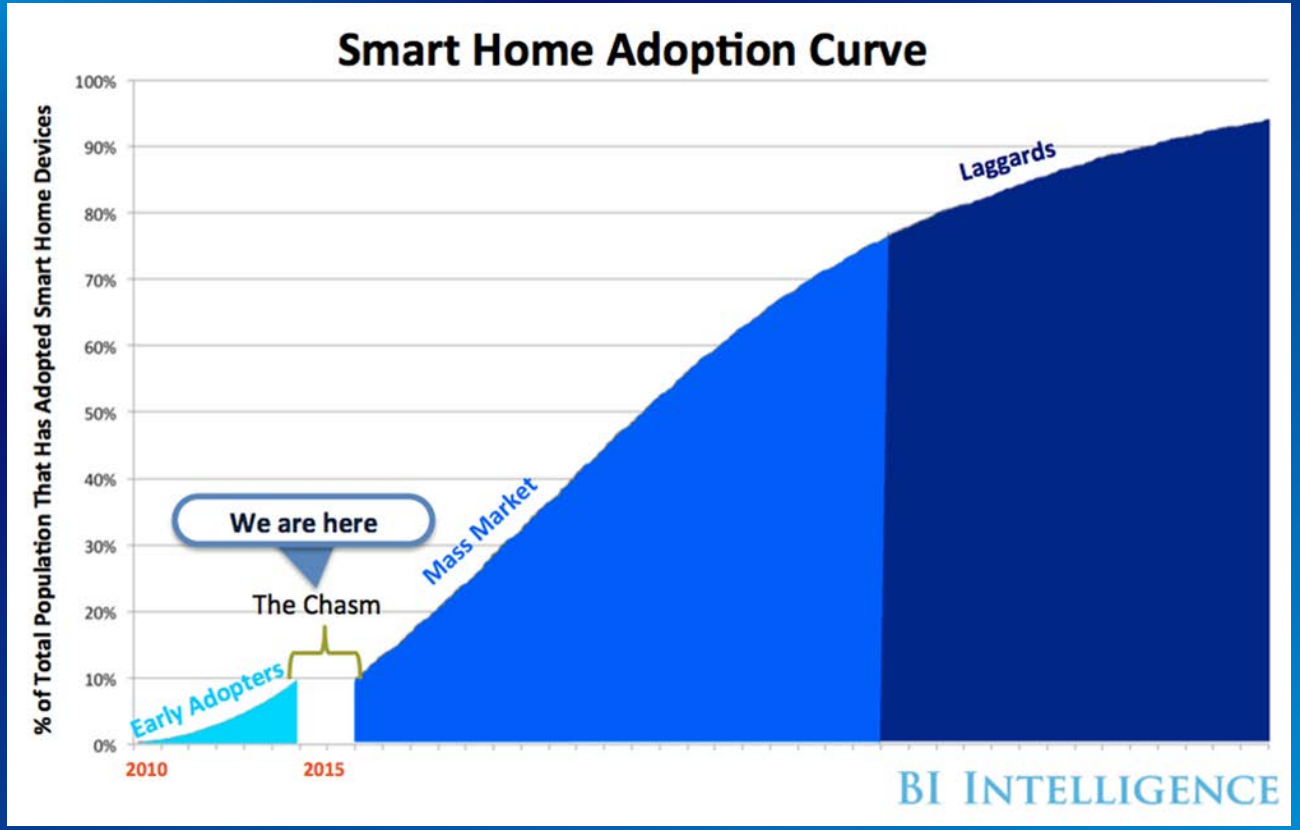
Smart Homes Mass Market?

IoT-01-2016: Large Scale Pilots



Source: http://uk.businessinsider.com/the-us-smart-home-market-report-adoption-forecasts-top-products-and-the-cost-and-fragmentation-problems-that-could-hinder-growth-2015-9?r=US&IR=T

Pilot 1: Smart living environments for ageing well
Scope & Expected Impact

- User-led pilot projects capable of supporting and extending independent living at home for older adults using advanced IoT technologies, tools and services
- User-friendly configuration and management of connected technologies for homes and outside
- Active user engagement and a multi-disciplinary approach
- To validate IoT solutions and prove their socio-economic potential and to foster their deployment in Europe through integration of advanced IoT technologies across the value chain and with other relevant application domains

Pilot 1: Smart living environments for ageing well
Scope & Expected Impact 2/2

- Minimum of 4 pilot sites in 4 countries
  Demonstration to operate the system across multiple sites, scalability to large amount of heterogeneous devices and systems, as well as with large amount of real users

  - Clear methodology for socio-economic impact assessment
  - Clear evidence of the benefits of the proposed solutions for active and independent living and quality of life of older persons

Implementation

- Submission Deadline: 12 April 2016, 17:00:00 (Brussels local time)
- Budget: EUR 20 million jointly funded by ICT-LEIT and SC1
- Innovation Action: funding rate: 70%
- Cumulative threshold: 10 (3/3/3)
- Evaluation by external experts representing supply and demand
- 1-2 large scale pilots expected

Link to Participant Portal:
http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/2223-iot-01-2016.html

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IoT-01-2016: Large Scale Pilots

Q: Under call H2020-IOT-2016-2017, how important is it to use the suggested platforms (FIWare, Crystal, universAAL) for topic IoT-1 pilot 1? Would a project using none of these be at a significant disadvantage?

A: Pilots are encouraged to exploit previous work in this area both in terms of previous pilots implemented and existing technology platforms, including but not limited to FIWare, Crystal, universAAL. Generally, applicants should select the most promising platform(s) available for implementing the proposal's needs and reaching the expected impact, if successful.

The proposal should convincingly argue the merits of the selected platforms, thus it is recommended to make reference to at least some of the above platforms to differentiate the proposal's approach. For pilot 1 "Smart living environments for ageing well" the solutions should use and extend available open service platforms.

Q: In the IoT-01-2016 topic, Pilot 1, it is said that "The number of users involved and duration of pilot services should be sufficient to ensure statistical significance in impact analysis, with a minimum of 4 pilot sites in 4 countries." Is it mandatory that the exact same technologies are tested in different places? Should the 4 pilots be exactly the same apart from the geographical location and the inherent differences?

A: While it's preferable for the sake of comparability to have exactly the same technologies (and related services), it might not always be possible because other constraints will also influence the set-up of pilot sites (e.g., user-specific requirements, country-/region-specific conditions and infrastructure). The services can be implemented using similar or different technology solutions, but where using different technologies, interoperability is essential. However, comparability of services is necessary in order to enable a reliable impact analysis. For IoT-01-2016 Pilot 1 the proposal need to argue that the set-up of the different pilot sites will ensure statistical significance in the impact analysis of the pilot services for a minimum of 4 countries.

Q: We saw a few interesting documents by the AIOTI and the AAliance2, which have generated doubts as to the expectations of the Commission on large scale pilots in IoT-1. Are those documents considered as guidelines for project proposals on this subject?

A: No, only the call text as published in the Work Programme specifies the expected proposals. Any other documents, such as the two examples you list below, cannot be considered as guidelines. Such documents, just like any work on IoT for Active and Healthy Ageing and Independent Living, could be explored in the context of the state-of-the-art analysis, if relevant to your proposal.

Q: Would it be OK for different pilots within the group to use different platforms (perhaps even including some commercial ones), with one of the results of the project being a comparison of the different platforms?

A: The set-up of the different pilots should ensure statistical significance in the impact analysis. Depending on the number, size and features of the pilots, more than one platform can be selected, if well justified by the proposal in terms of the call text. Generally speaking a platform is assumed to link to a set of APIs, standards and specific ecosystems with appropriate coherence across pilots.

For pilot 1 "Smart living environments for ageing well" the solutions should use and extend available open service platforms meaning software systems which are based on open standards, such as published and fully documented external application programming interfaces (APIs) enabling integration of additional functionality without requiring modification of the platform's source code. An open platform does not necessarily need to be open source, however most open platforms have multiple implementations of APIs. The open service platform could be commercial or non-commercial.

Q: Are partners from the US eligible for funding under the IoT-01 topic?

A: The topic IoT-01-2016 topic does not foresee funding for partners from the USA. More information about the countries eligible for funding and rules for third countries are available in the General Annex of the Work Programme 2016/2017 (http://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2016-2017/annexes/h2020-wp1617-annex-ga_en.pdf).

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LARGE SCALE PILOT
"SMART FARMING AND FOOD SECURITY"

European Commission

Internet of Things

The introduction of the IoT scenario would allow to monitor and control plant and animal products from farm to fork.

The challenge is to design IoT architectures to "program" or track each object for optimal behavior, according to its role in the agro-food chain, contributing to meet the challenges that the sector is facing in terms of productivity and sustainability.

Innovation Action

30 MEUR (funding rate: 70%)

Call deadline: 12th April 2016, 17.00

Expected Impact

- Validation, sustainability and replicability, of architectures, standards, interoperability properties, of key characteristics such as security and privacy
- New industry and business processes and innovative business models
- Significant and measureable contribution to standards or pre-normative activities
- Improvement of citizens' quality of life, in the public and private spheres, in terms of autonomy, convenience and comfort, participatory approaches, health and lifestyle, and access to services
- Creation of opportunities for entrepreneurs, expanding local businesses to European scale, etc.
- Development of secure and sustainable European IoT ecosystems and contribution to IoT infrastructures viable beyond the duration of the Pilot

Proposals should include:

- Combination of different farms to ensure that the deployment of the technology is adapted to the needs of different types and sizes of farms across Europe.
- Activities should allow for a wide geographic coverage within Europe and benefit both conventional and organic agro-food chains.
- At least three sub-sectors (e.g.- arable crops, livestock, vegetable and fruit production).

Proposals should fall under the concept of **multi-actor approach**

(***please refer to the Introduction to SC2 Work Programme***)

Multi-actor projects in WP 2016-2017

The SC2 Work programme **defines the multi-actor approach:**

Collaboration between various actors to make best use of complementary types of knowledge (scientific, practical, organisational, etc) in view of co-creation and diffusion of solutions/opportunities ready to implement in practice.

IMPACT! Multi-actor projects in WP 2016-2017

A multi-actor project needs to demonstrate:

- how the project proposal's objectives and planning are targeted to needs / problems and opportunities of end-users
- complementarity with existing research and best practices: project's added value
- sufficient involvement of key actors with complementary types of knowledge (scientific and practical) should be reflected in the composition of the project consortium to reach the project objectives and make its results broadly implemented.

A multi-actor project:

- As a minimum, should result in substantial easily understandable practical knowledge for broad dissemination in the common EIP format
- Facilitation/mediation between actors and involving for instance RD operational groups, are strongly recommended

Where can I find info?

- **Ongoing multi-actor projects:**
  - http://ec.europa.eu/agriculture/research-innovation/projects/index_en.htm
  - http://cordis.europa.eu/projects/home_en.html
- **EIP – Network**
- **http://ec.europa.eu/eip/agriculture/**
- **EIP common format for practice abstracts**
  - https://ec.europa.eu/eip/agriculture/en/content/eip-agri-common-format
- **Links to NRNs:** National Rural Networks can help in partner search for EIP Operational Groups
  - http://enrd.ec.europa.eu/enrd-static/networks-and-networking/nrn-information/en/nrn-information_en.html
- **Link to the workshop on multi-actor approach and thematic networks (24 november 2015)**
  - http://ec.europa.eu/programmes/horizon2020/en/news/interactive-innovation-motion-multi-actor-projects-and-thematic-networks-under-horizon-2020

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LARGE SCALE PILOT
"WEARABLES FOR SMART ECOSYSTEMS"

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IoT-01-2016: Pilot 3: Wearables for Smart Ecosystems

Scope

- Demonstration of **wearable solutions** and services integrated in interoperable IoT ecosystems.
- **Bring new functionalities into clothes, fabrics, patches, watches or other body-mounted devices**.
- **Assist humans** in monitoring, situational awareness and decision making.
- Particular attention to actuating functions providing, whenever feasible, closed-loop solutions.
- **Prototype development and demonstration expected for healthcare, well-being, safety, security and infotainment applications**.
- **Driven by concrete business cases**, open design approaches and **user requirements**, taking into account **data protection and liability concerns**.
- Involve **actors of the entire innovation value chain**, potentially including creative & artistic actors

EU contribution:

- up to 15 MEUR

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IoT-01-2016: Pilot 3: Wearables for Smart Ecosystems

Implementation

- Majority of effort should be on piloting;
- **Building blocks should be proven**;
  May include **limited research** and development activities
- Effort devoted to supply (technologies) and demand (users) should be balanced
- ***Important elements of supply side***:
  - Management and adaptation of involved **sensing**, actuating, processing, **energy supply**, storage technologies at node level
  - Integration of devices, objects and systems in an IoT environment
  - Approaches to **interoperability** and openness
  - **Security and privacy** approaches
- ***Important elements of demand side***:
  - Design, implementation and **testing of multiple use-case scenarios**
  - Interoperability needs and testing
  - Security and privacy needs
  - Feedback to IoT supplier for **technology optimisation**
  - **User**s/citizen awareness, involvement and **acceptance**
  - Impact, added value and affordability assessment

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IoT-01-2016: Pilot 3: Wearables for Smart Ecosystems

Key technologies to be integrated?

Micro-Nano electronics
Sensing/actuating
Energy scavenging & management
Wireless communication
Low-power computing
TOLAE, e-textile, smart fabrics

Embedded distributed Intelligence
Data management for privacy & security

→

Manufacturing:

System integration (SSI)

Integration in Wearable Solutions

→

Solutions and Services

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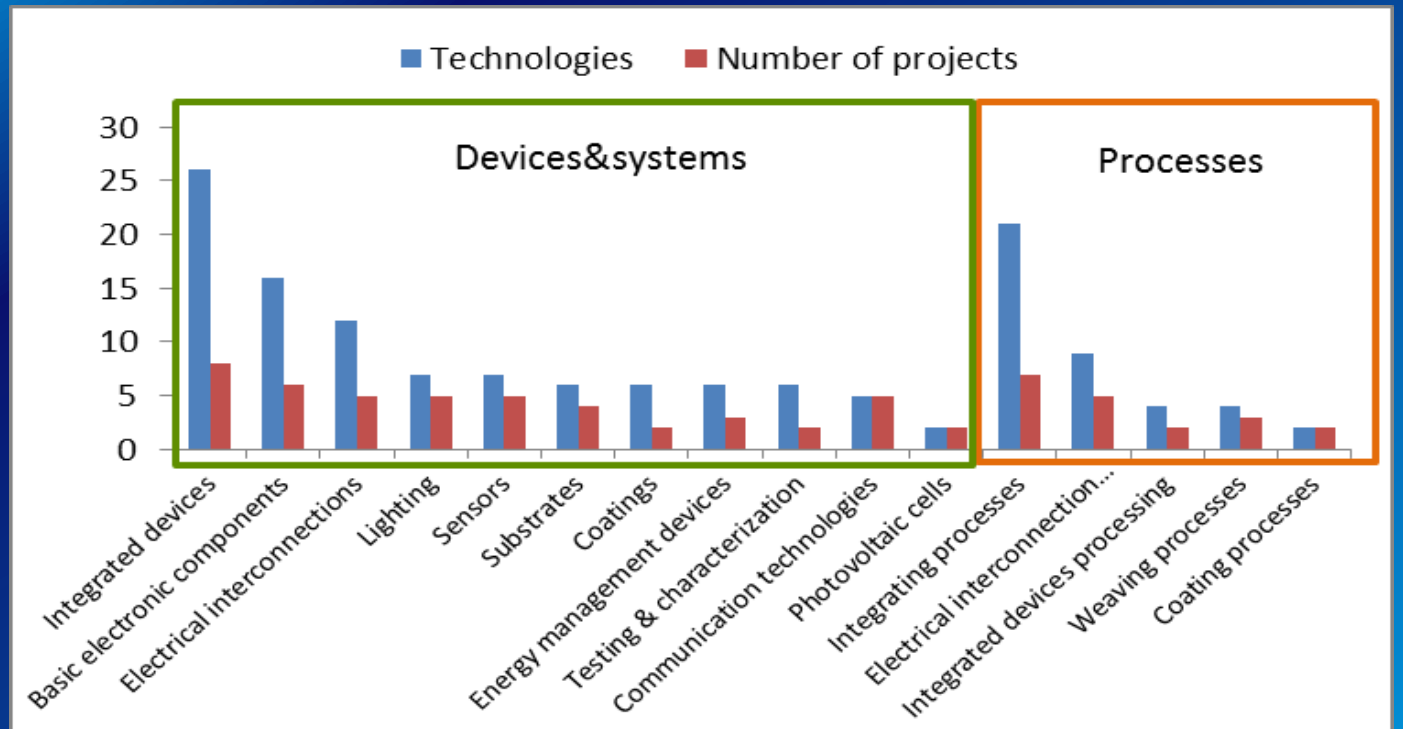
IoT-01-2016: Pilot 3: Wearables for Smart Ecosystems

- **FP7 Cluster: 10 projects, 43,5 M€**
- **Wide variety of devices and systems developed**
- **Great effort related to fabrication processes**



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Large Scale Pilot

IA

IoT-01-2016: Pilot 3: Wearables for Smart Ecosystems

Who are the main actors to be involved in the pilot?

Suppliers → Users

Hardware →

Materials:
Fabrics, e-textile
Organic, Nanowires…)

MEMS, NEMS
Sensors / Actuators
TOLAE
Wireless communication
Power supply / Scavenging

Integrators

Wearable System integrator

Wearable "solutions"

Public authorities (payers, regulators)

Consumers
- Well-being / lifestyle
- Elderly

Professionals:

Safety/Security
Law enforcement officer, firefighters, professional sports

Healthcare
(Hospitals, Medical offices..)

Patients

Software and services →

IT / Telecom / Data providers

Apps providers - Designers

Creativity & Art

Design, Fashion, life style, Entertainment, Digital Art

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LARGE SCALE PILOT

"Reference zones in EU cities"

Cities as an ideal reference zone for IoT enabled services

A fast growing percentage (currently 72%) of EU population lives in urban areas

What makes a city smart, intelligent, agile…?

- **Interconnected infrastructures**
- **Interoperable services**
- **Spaces for co-creation and innovation**
- **Citizen's involvement**

City awareness and action through IoT

IoT technologies can create the necessary awareness of city functions and city state in many domains: energy, transport, business, entertainment, safety, culture,…

Data received from IoT are then:

- Combined
- Analysed

and translated to city/citizens functions and influence future operations and design

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City reference zone design

Architectural reference model definition

Specification and design

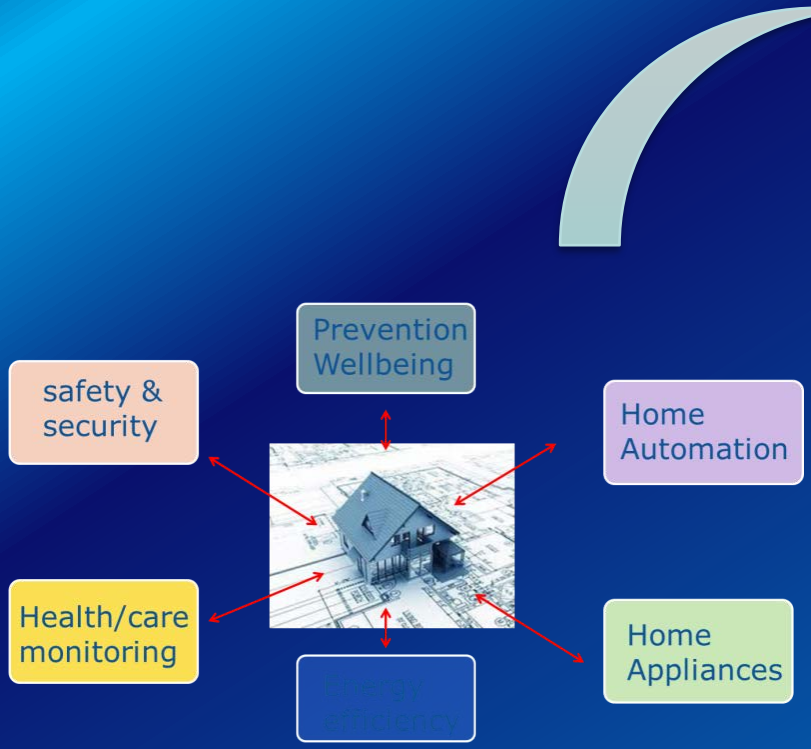
Implementation of the system

Interoperable infrastructure deployment

Creativity hubs for new services & solutions: fablabs, co-working spaces end-users' acceptance

Business models and sustainable exploitation

Integration of home in a Smart City context



IoT-01-2016: Pilot 4: Reference zones in EU cities

Pilot scope:

Call text "*A large scale pilot will cover a series of cities to operate as reference zones for showcasing and experimenting* ***new citizen-centred IoT services***."

Large scale: 15m€ minimum 4 pilot sites in 4 countries

Necessary size to get statistically significant results

Federation between sites is a possible way to increase scale

(see relevant platforms e.g. FIWARE, FED4FIRE)

IoT-01-2016: Pilot 4: Reference zones in EU cities

Call text "*Advanced solutions for: traditional services' provisioning e.g. water management, lighting, waste collection etc.*"

Solutions may exist but

what brings a Large scale IoT pilot?

Interconnection

Interoperability

Large amount of data (Real time)

…

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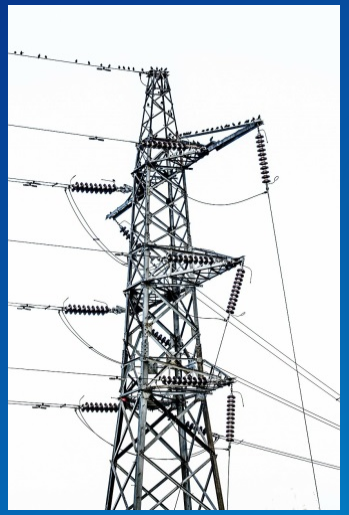
IoT-01-2016: Pilot 4: Reference zones in EU cities

Call text "*Advanced solutions for: traditional services' provisioning e.g. water management, lighting, waste collection etc.*"

But also solutions that are at the edge of authorised business practices or regulation (ex: sharing of electricity, autonomous vehicles) and thus require dedicated testing zones.

Validation will happen as close as possible to real operational conditions



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IoT-01-2016: Pilot 4: Reference zones in EU cities

"*Experiment and test similar new services and solutions, also through* ***involvement of creativity hubs such as fablabs, co-working spaces****, and gather experience at scale and evaluate citizens' acceptability and endorsement.* "

- Innovation loop between IoT solution and user acceptance
- Avoid sterile technology push
- Large Scale/real conditions reveal hidden challenges for technology
- From controlled (lab environment) to realistic conditions

IoT-01-2016: Pilot 4: Reference zones in EU cities

Authorised business practices or regulation

Demonstration requirements (i.e. reference zones)

New citizen-centered IoT services

Creativity hubs

Citizens' acceptability and endorsement

- Novel ways to attain interoperability to avoid vendor lock-in and reach added value proposals by combining the available options
- New ways to exploit the high amount of data provided by the IoT infrastructure in order to create greater opportunities to innovate
- Stakeholders of the Smart City to participate and to become part of the IoT ecosystem

FAQ

- *Is city XYZ the ideal candidate to be a reference zone?*
- *What is considered as large scale?*
- *What are best ways of cascading funding for municipalities?*
- *How to federate?*

Useful links

The Alliance of Internet of Things Innovation AIOTI

- http://www.AIOTI.eu

IERC – Internet of Things European Research Cluster
http://www.internet-of-things-research.eu/

Webinar streaming: https://scic.ec.europa.eu/streaming/internet-of-things-webinarIsp4

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HORIZON 2020 WP 2016-17

LARGE SCALE PILOT

"AUTONOMOUS VEHICLES IN A CONNECTED ENVIRONMENT"

EUROPEAN COMMISSION
DG CONNECT
Robotics Unit
CécileHuet

European Commission

Large Scale Pilot

IA IoT-01-2016: Pilot 5: Autonomous vehicles in a connected environment

Pilot scope:

- **The pilot addresses the added value and the potential of applying IoT for autonomous vehicles in a connected environment.**
- The pilot shall test scenarios of deployment of safe and **highly** and **fully autonomous vehicles** (up to SAE international level 5, full automation).
- **Core technologies** include reliable and real-time platforms managing mixed criticality car services, advanced sensors and Internet information sources around which value-added apps may be constructed, efficient navigation and improved decision-making technology, interconnectivity between vehicles, vehicle to infrastructure communication.
- The **selected scenarios**, for instance on the highways or in urban congested environment, either on dedicated lanes or mixing autonomous connected vehicles and legacy vehicles.
- These evolutions are expected to be supported by **an open service platform** which may have access to all in vehicle embedded information sources and to car surrounding information, in view of providing value-added apps e.g. intelligent maintenance.
- **Key barriers to the deployment** such as robustness, user acceptance, as well as economic, ethical, legal and regulatory issues.

EU contribution:

- up to 20 MEUR

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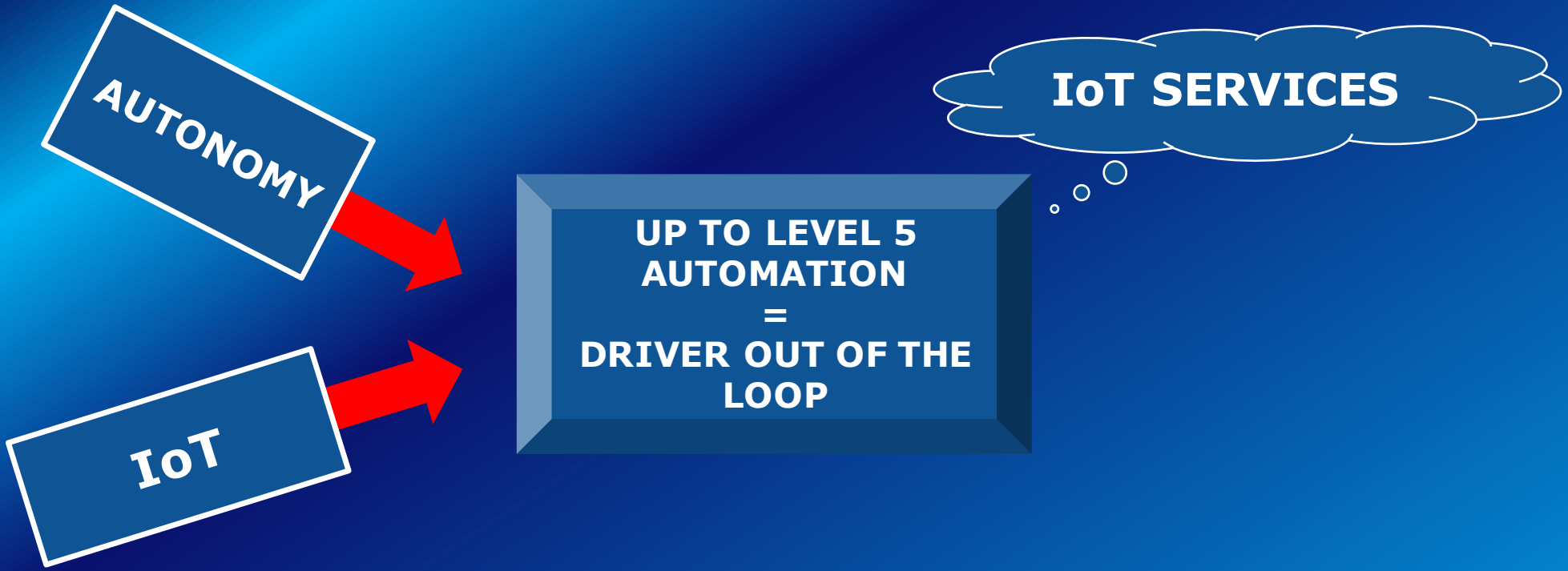
Large Scale Pilot



Objective:

Autonomous vehicles in a connected environment: optimal combination of local & distributed information and intelligence

CRITICAL: strong use case & business case & strong commitment from the pilot host(s) **-> Maximise impact**

Clarification on the Call text: Level of Autonomy

"It should **test scenarios of deployment** of safe and **highly** and **fully** autonomous vehicles (up to SAE38 international level 5, full automation) in various representative use case scenarios, exploiting local and distributed information and intelligence"

SAE Level	SAE name	SAE narrative definition	Execution of steering and acceleration/ deceleration	Monitoring of driving environment	Fall-back performance of dynamic driving task	System capability (driving mode)
Automated driving system ("system") monitors the driving environment			System	System	~~Human driver~~	Some driving modes
3	Conditional Automation	the *driving mode*-specific performance by an *automated driving system* of all aspects of the *dynamic driving task* with the expectation that the *human driver* will respond appropriately to a request to intervene				
4	High Automation	the *driving mode*-specific performance by an *automated driving system* of all aspects of the *dynamic driving task*, even if a *human driver* does not respond appropriately to a request to intervene	System	System	System	Some driving modes
5	Full Automation	the full-time performance by an *automated driving system* of all aspects of the *dynamic driving task* under all roadway and environmental conditions that can be managed by a *human driver*	System	System	System	All driving modes

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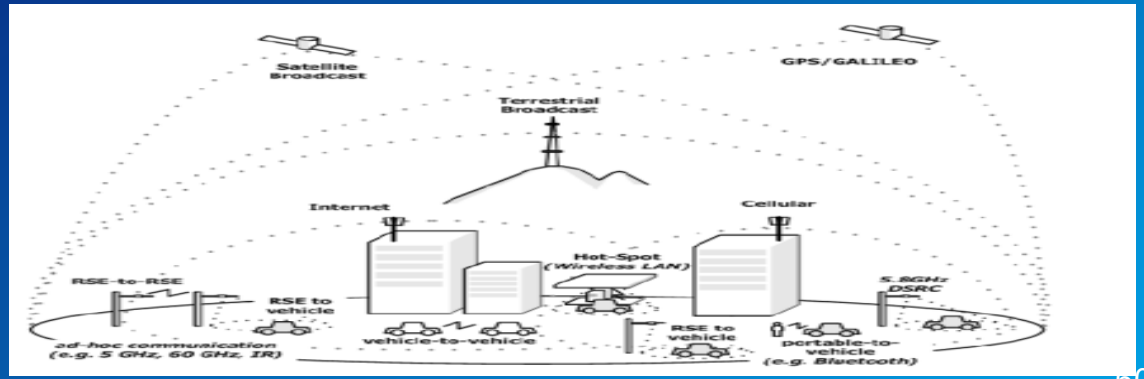
Connected environment

"Using advanced technology for connectivity seen as an asset": explore the merits of 4G (3GPP LTE-V) and IEEE 802.11p

Ecosystem of vehicles and infrastructures

- **Open platform for a mobility ecosystem to share information and intelligence**
- **Full chain involving sensors, data storage, dynamic processing, format transformation, horizontal platform-to-platform export, open APIs.**



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Foster deployment in real traffic

Sustainable pilots & Permanent installations

- **Requires commitment from the pilot hosts, authorities, etc.**

Demonstrate Technical performances in real environment

- **Dependability (incl. safety), robustness and resilience, usability**

Address non-technical aspects

- **Maximise added value to users**
  - scenario: urban, highway, dedicated lanes or mixed environment, etc.
- **User acceptance and User behaviour**
- **Economic, legal, regulatory and ethical issues**

IA

IoT-01-2016: Pilot 5: Core Technologies

- Reliable and real-time platforms managing mixed criticality car services,
- Efficient navigation
- Improved decision-making algorithms
- Interconnectivity between vehicles, vehicle to infrastructure communication
- Supported by an open service platform

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Structure

Essential:

- **Pilot driven by strong use and business case -> requires representatives from user side, vehicle industry, expert in ELSE** (ethical / legal / socio-economic aspects) representative insurance companies (as appropriate)
- **Innovative Services** (in particular pushing the limits of automation)
- **Strong commitment from the pilot host(s)** -> local authorities, public bodies, political support

How would the ideal consortium look like?

- **TECH**
- **INDUSTRY: running business around it – economic beneficiaries**
- **PILOT HOSTS**
- **USERS**
- **Experts in non-technical issues (ELSE, perception, trust, etc.)**

→ optimize the constellation and balance as required by the pilot

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Advices

- Maximise the impact: focus the efforts on pushing the limits of automation (driver out of the loop) exploiting the state of the art both from IoT and autonomy
- Goal is not on developing zillions of services -> un-focused. The intention is rather to provide a platform on which services can be developed.
  Given the objective of this pilot, the services developed within the pilot should preferably contribute to reaching high level of automation, but they should also serve to demonstrate the interoperability of the platform with third-party developers.
- Need to bring the right balance of stakeholders: IoT/connectivity/vehicle industry/robotics + non-tech
- Differentiate wrt. all the demos we have seen so far – this is why we need sustainable pilot installation
- Maximise impact of this relatively low budget (as compared to investment by the car industry) – build and add value to their investment
- To ensure critical mass and maximise the impact – 1 big pilot up to 20 M€ funding

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Some possible use case scenarios

Call text: "It should test scenarios of deployment of safe and highly and fully autonomous vehicles (up to SAE38 international level 5, full automation) in various representative use case scenarios, exploiting local and distributed information and intelligence."

Next slides: some possible use case scenarios

These are only given as some illustrative examples to show the expected level of ambition. They are not meant to be limitative nor exclusive !

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Pilot 5 Possible use-case scenarios: morning journey (1/2)

DRIVER IN CONTROL

DRIVER OUT OF THE LOOP

DRIVER IN CONTROL

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Pilot 5 Possible use-case scenarios: morning journey (2/2)

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Information Day - 03 December 2015

Internet of Things Large Scale Pilot 5
"Autonomous vehicles in a connected environment"

Web streaming

and

presentations of competencies and projects ideas:

http://ec.europa.eu/digital-agenda/en/news/infoday-internet-things-large-scale-pilot-call-autonomous-vehicles