

IoT EUROPEAN LARGE-SCALE PILOTS PROGRAMME

LARGE-SCALE PILOTS PROJECTS



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DEAR READER,

This brochure presents the IoT European Large-Scale Pilots (LSPs), providing an overview of the overarching goals of this initiative, and some facts and figures about each of the 7 EU-funded projects that comprise the Programme.

The IoT LSPs Programme was launched in 2016 with the aim to foster the deployment and evolution of Internet of Things (IoT) solutions through the integration of advanced IoT technologies, from development to testing and integration, and at as close as possible to operational conditions.

Each of the funded projects are applying IoT approaches to specific real-life challenges across different use cases, based on European relevance, technology readiness and socio-economic interest in Europe. With a total funding budget of €100M, these LSPs address five different and specific domain areas, from smart living environments for ageing well, smart farming and food security, wearables for smart ecosystems, reference zones in EU cities and to autonomous vehicles in a connected environment.

To promote and foster the take-up of IoT in Europe and to enable the emergence of an economically sustainable IoT ecosystem, the LSPs are seeking to involve the IoT community across the value chain, from supply side to demand side.

Enjoy your reading!

Kind regards,

IoT European Large-Scale Pilots Programme Team

The IoT European Large-Scale Pilots Programme includes the innovation consortia that are collaborating to foster the deployment of Internet of Things (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.

SPECIFIC PILOT CONSIDERATIONS



Mapping of pilot architecture approaches with validated IoT reference architectures such as IoT-A enabling interoperability across use cases



Contribution to strategic activity groups that were defined by the projects to foster coherent implementation of the different LSPs



Contribution to clustering their results of horizontal nature (interoperability approach, standards, security and privacy approaches, business validation and sustainability, methodologies, metrics, etc)

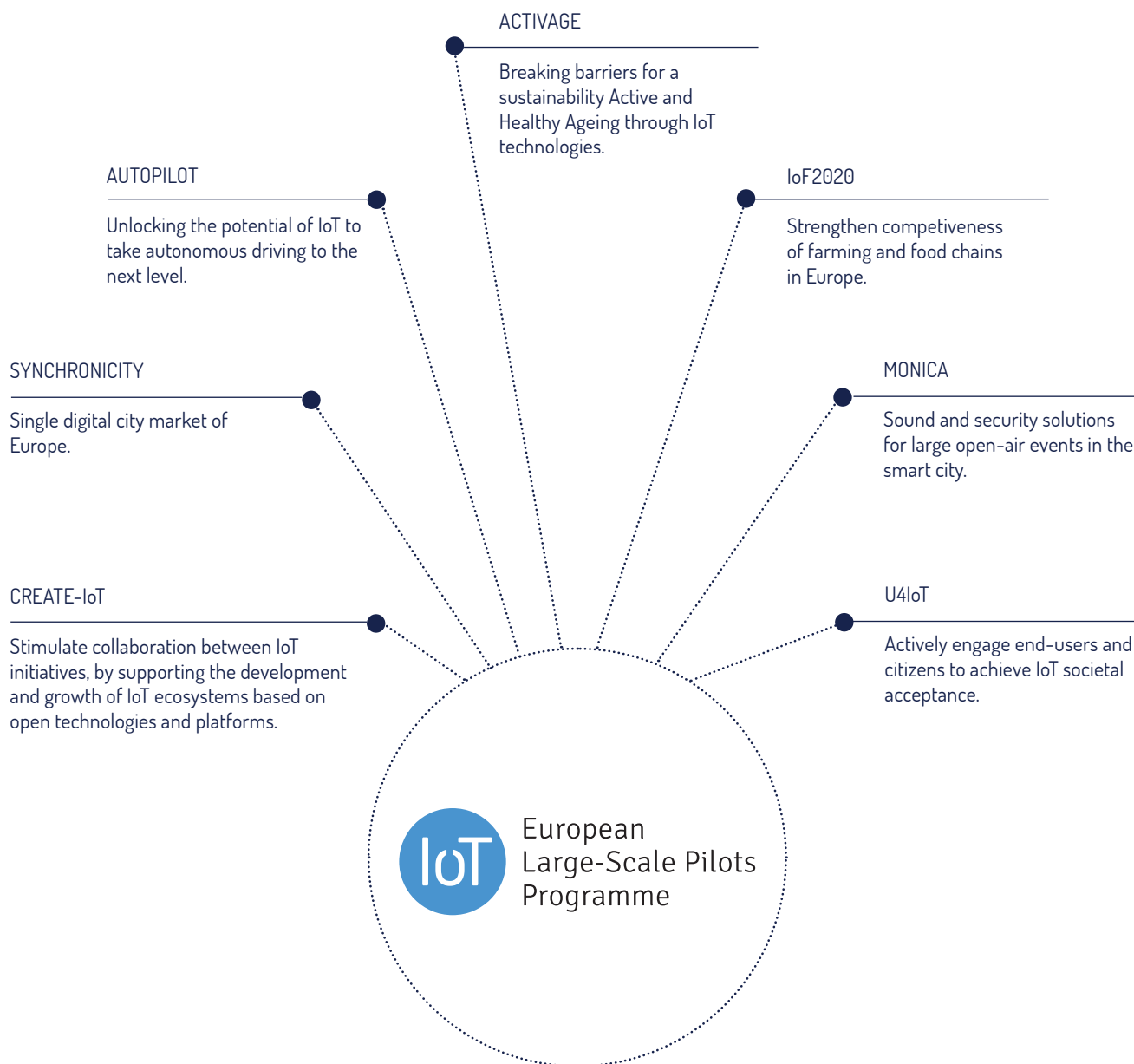
The programme projects are targeted, goal-driven initiatives that propose IoT approaches to specific real-life industrial/societal challenges. They are autonomous entities that involve stakeholders from supply side to demand side, and contain all the technological and innovation elements, the tasks related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

IoT European Large-Scale Pilots Programme includes projects addressing the IoT applications based on European relevance, technology readiness and socio-economic interest in Europe. IoT Large-Scale Pilots make use of the rich portfolio of technologies and tools so far developed and demonstrated in reduced and controlled environments, and extend them to real-life use case scenarios with the goal of validating advanced IoT solutions

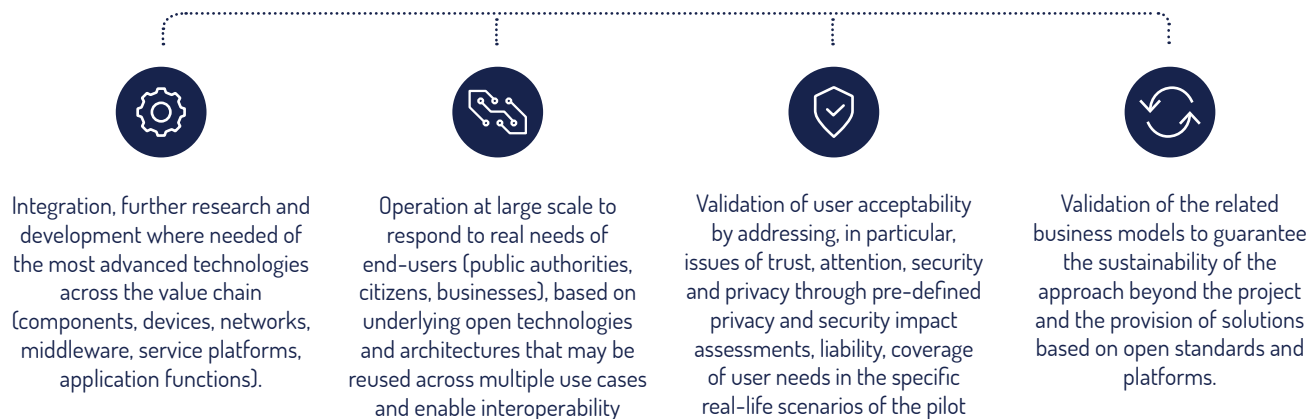
across complete value chains with actual users and proving its socio-economic potential. Support actions provide consistency and linkages between the pilots and complement them by addressing horizontal challenges critically important for the take-up of IoT at the anticipated scale.

The projects together form the IoT European Large-Scale Pilots Programme and a coordination body ensures an efficient interplay of the various elements of the IoT-Focus Area and liaise with relevant initiatives at European Union, Member State and international levels. The coordination is implemented by creating activity groups that address topics of common interest across the large-scale pilots. Research and innovation efforts in specific IoT topics ensure the longer-term evolution of the IoT.

PROJECTS OVERVIEW



KEY OBJECTIVES



By 2020 the European IoT Market is expected to reach €200B. Most of EU companies already see IoT as strategic to their business

STRATEGIC 60 %

helps my organization compete more effectively,
reduce costs, improve productivity

TACTICAL 18 %

solves a specific business problem with a single solution

TRANSFORMATIONAL 16 %

helps my organization innovate and generate
additional revenues

The IoT LSPs are addressing the European IoT market in different domains



European wearables market is expected to take a step forward reaching by the end of 2020 approximately **€9B in terms of value** (with a 23.8% CAGR* 2016-2020) and **about 42 B in units**. The bulk of this market is **represented by watches** (about 80% of total spending).

MONICA



EU Government IoT spending to foster IoT-enabled smart city scenarios is expected to **grow with a 14.5% CAGR*** (2016-2020). Among major use cases Environmental Monitoring Detection, Intelligent Transportation Systems, Public Infrastructure Asset Management, Public Safety and Emergency Response emerge.

SYNCHRONICITY



Spending of IoT based solutions and **services supporting smart living environments and personal wellness** (smart home, remote health monitoring, bedside telemetry) in Europe is expected to **grow with a 22% CAGR*** (2016-2020), driven by hardware and services spending.

ACTIVAGE



IoT for **connected vehicles and intelligent transportation systems** is **expected to double** its level by the end of 2020 in Europe, **reaching €14.6 B**. The growth will be mostly driven by German and French markets.

AUTOPILOT



IoT solutions deployed to **foster farming and food chains** in Europe are expected to increase with a 9.7% CAGR* (2016-2020), **reaching €1.9 B by the end of 2020**. Major use cases include animal tagging, food traceability and field monitoring.

IoT2020

IoT ARCHITECTURE LAYERS

LAYER	COMPONENTS	DESCRIPTION
COLLABORATION & PROCESSES	Business System Integration	Enables integration with existing enterprise and other external systems
APPLICATION	Visualization	Presents device data in rich visuals and / or interactive dashboards
SERVICE	Development Environment	Provide integrated development environment to simplify development of apps
	Service Orchestration	Supports mashup of different data streams, analytics and service components
	Advanced Analytics	Allows insights from data to be extracted and more complex data processing to be performed
ABSTRACTION	Event & Action Management	Simple rules engine to allow mapping of low level sensor events to high level events and actions
	Basic Analytics Action	Provides basic data normalization, reformatting, cleansing and simple statistics
STORAGE	Storage / Database	Cloud based storage and database capabilities (not including on premise solutions)
PROCESSING	Device Management	Enables remote maintenance, interaction and management capabilities of devices at the edge
	Edge Analytics	Capabilities to perform processing of IoT data at devices at edge as opposed to cloud
NETWORK & COMMUNICATIONS	Connectivity Network / Modules	Offers connectivity networks/HW modules enabling air interface connectivity
	Edge Gateway (HW based)	Offers IoT gateway devices to bridge connectivity from IoT nodes into the cloud based platform
PHYSICAL / DEVICE LAYER	Operating System	Offers low-level system, SW managing HW / SW and runs applications
	Modules & Drivers	Offers adaptable modules, drivers, source libraries that reduce development and testing time
	MPU / MCU	Offers multi-purpose programmable electronic devices at Microprocessor/Microcontroller level



PROJECTS

ACTIVAGE



ACTIVATING INNOVATIVE IoT SMART LIVING ENVIRONMENTS
FOR AGEING WELL

ACTIVAGE is building the first European interoperable and open IoT ecosystem enabling the deployment, at large scale, of a wide range of Active & Healthy Ageing IoT based solutions and services. To achieve this, ACTIVAGE is integrating thousands of devices to collect and analyse older adults' environmental and lifestyle information, identify their needs, and provide customized solutions, ensuring users' data privacy and security.



49

PARTNERS

9

USE CASES

9

TRIALS

Europe is undergoing major socio-economic changes that make the welfare state's foundations teeter; namely, an increased life expectancy and a drop in birth rate. And the numbers seem to have an upward trend.

Projections indicate that the older population (>65 years) in the European Union will grow from the current 18% up to 28% by 2060. In addition to the above demographic change, the increasing growth of social and health costs jeopardizes the sustainability of the current social and health system models.

The ACTIVAGE project takes base on these arguments, with the primary objective of developing evidence and bringing to life the positive impact of the technologies and solutions that are based on the IoT in order to improve the quality of life, the health and the autonomy of older adults. And all this, with the

aim to ensure the sustainability of social and health systems in Europe.

This large-scale pilot will actively involve nearly 10,000 older persons across nine deployment sites in seven different European Union countries.

It is important to highlight that ACTIVAGE ambition is that end users from the different sites are involved in the piloting of several use cases, in such a way that it is considered a single pilot and not the sum of different pilots with diverged ambitions.

This has been thought intentionally to simulate real conditions that will emerge in an IoT-enabled European society sharing an homogenized offering of interoperable services, in order to maximize the adoption and minimize the effects of market fragmentation.



WEBSITE & SOCIAL MEDIA

www.activageproject.eu

[@ACTIVAGEproject](https://twitter.com/ACTIVAGEproject)

[in ACTIVAGE project](https://www.linkedin.com/company/activage-project)



TOTAL EC FUNDING

€20M



COUNTRIES

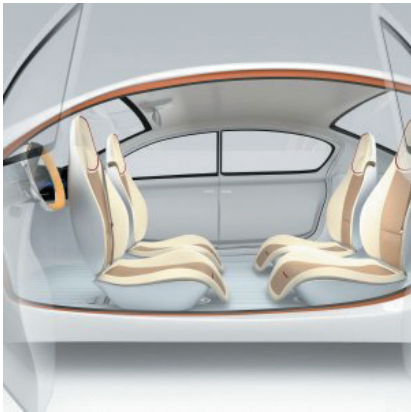
CH, DE, ES, FI, FR, GR, IE, IT, UK



COORDINATOR

Medtronic Ibérica SA (ES)

AUTOPILOT will develop an IoT connected vehicle platform and IoT architecture based on the existing and forthcoming standards, as well as open source and vendor solutions. The IoT ecosystem will accommodate vehicles, road infrastructure and connected IoT objects, with particular attention to safety critical aspects of automated driving.



44

PARTNERS

5

USE CASES

6

TRIALS

Automated driving is expected to increase safety, provide more comfort and create several new business opportunities for mobility services.

The market size is expected to grow, steadily reaching 50% market penetration by 2035. IoT is about enabling connections between objects or “things”. It is about connecting anything, anytime, anyplace, using any service over any network.

There is little doubt that automated vehicles will be part of the IoT revolution. Indeed, connectivity and IoT have the capacity for disruptive impacts on highly and fully automated driving along all value chains towards a global vision of Smart Anything Everywhere.

In order to stay competitive, the European automotive industry is investing in connected and automated driving, with cars becoming moving “objects” in an IoT ecosystem and

eventually participating in BigData for Mobility. AUTOPILOT brings IoT into the automotive world to transform connected vehicles into highly and fully automated vehicles.

AUTOPILOT will develop a range of services combining autonomous driving and IoT, such as car sharing, autonomous valet parking, and better digital maps for autonomous vehicles.

AUTOPILOT IoT-enabled autonomous driving services will be tested in real conditions at large-scale pilot sites in the Netherlands, Italy, France, Finland, Spain and South Korea.

The test results will allow multi-criteria evaluations (technical, user, business, legal) of the IoT impact on advancing the level of autonomous driving.



WEBSITE & SOCIAL MEDIA

www.autopilot-project.eu

 AUTOPILOT Project EU

 @AUTOPILOT_EU



TOTAL EC FUNDING

€20M



COUNTRIES

BE, CH, CZ, DE, ES, FI, FR, GR, IE, IT, KR, NL, NO, SE, UK



COORDINATOR

ERTICO - ITS Europe (BE)

IoF2020 is dedicated to accelerating the uptake of IoT technologies in the European farming and food chains and ultimately strengthening their competitiveness and sustainability. How? By demonstrating, together with end-users, the use of IoT in 19 use-cases spread throughout Europe, and focusing on 5 areas: dairy, meat, arable crops, fruits and vegetables.



70+

PARTNERS

19

USE CASES

5

TRIALS

The IoF2020 consortium gathers more than 70 partners, under the leadership of Wageningen University & Research.

The project builds on and leverages the ecosystem of previous key projects (e.g. FIWARE, IoT-A) to foster the end-user acceptance and adoption of IoT Solutions in agriculture.

At the heart of the project, 19 use-cases distributed in 5 trials: Arable, Dairy, Fruit, Vegetables and Meat. Under each trial, IoT integrators will make the business case for innovative IoT solutions applied to a large number of areas.

A lean multi-actor approach focusing on user acceptance, stakeholder engagement and the development of sustainable business models will boost technology and market readiness levels and push end-user adoption to the next stage.

This development will be enhanced by an open IoT architecture and infrastructure of reusable components based on existing standards and a security and privacy framework.

Anticipating technological developments and emerging challenges for the farming and food industry, a €5M mid-term open call will allow to test intermediate results and extend the project to new technical solutions and test sites.

IoF2020 is designed to generate maximum impact right from the outset and in the long-run, bringing closer together and integrating the supply and demand sides of IoT technologies in the agri-food sector.

IoF2020 will pave the way for data-driven farming, autonomous operations, virtual food chains and personalized nutrition for European citizens.



WEBSITE & SOCIAL MEDIA

www.iof2020.eu

 @IoF2020

 @IoF2020



TOTAL EC FUNDING

€30M



COUNTRIES

AT, BE, CZ, DE, DK, ES, FR, GR, IT, KR, NL, NO, PT, RS, SE, UK



COORDINATOR

Stichting Wageningen Research (NL)

MANAGEMENT OF NETWORKED IoT WEARABLES – VERY LARGE-SCALE DEMONSTRATION OF CULTURAL AND SOCIETAL APPLICATIONS

MONICA is a large-scale demonstration of how cities can use existing and new IoT solutions to meet sound, noise and security challenges at big open-air cultural and sports events, which attract and affect many people. Innovations include the establishment of sound zones at outdoor concerts for noise mitigation as well as security measures improving crowd information and management.



29

PARTNERS

6

CITIES

20+

USE CASES

Several sound, security and user experience applications are deployed at large events in six European cities, involving more than 100,000 application users in total.

The applications are based on the use of IoT-enabled devices such as smart wristbands, video cameras, loudspeakers, smart glasses, airships and smartphones.

The applications offer enhanced monitoring and management of sound levels and crowds as well as value-added functionality for customers, crowds and citizens. To support the applications, MONICA deploys a cloud-based IoT platform, wirelessly connecting and handling the devices, whether fixed, worn or moved around.

As a first mover, MONICA will demonstrate how it is possible to securely operate a very dense cloud of different IoT-enabled devices

and networks with a low probability of interference.

Six pilot sites will demonstrate the technology solutions at concerts, festivals, sports events and city happenings, which attract millions of people. Each of the sites will choose a number of relevant applications that they wish to deploy. Whereas some cities emphasise optimal concert sound and enhanced noise control, and others security and service, all pilots will actively involve their end users, engaging more than 10,000 people in the evaluation process.

Central to the project is the involvement of multiple stakeholders in the design, deployment and evaluation of the applications. Additionally, several innovation tools are made available in terms of open data, development kits, entrepreneurship packages and business models.



WEBSITE & SOCIAL MEDIA

www.monica-project.eu

 @MonicaloTforCities

 @MonicaProject



TOTAL EC FUNDING

€15M



COUNTRIES

DE, DK, FR, GR, IT, NL, SE, SK, UK



COORDINATOR

Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (DE)

SynchroniCity

SYNCHRONICITY

DELIVERING AN IoT-ENABLED DIGITAL SINGLE MARKET
FOR EUROPE AND BEYOND

The SynchroniCity consortium brings together 39 partners with worldwide outreach. The project represents the first attempt to deliver a digital single market for IoT-enabled urban services in Europe and beyond - in 8 European cities and more worldwide - connecting 39 partners from 13 countries over 3 continents.



39

PARTNERS

3

USE CASES

20

OPEN CALLS

Building upon a mature European knowledge base, derived from initiatives such as OASC, FIWARE, EIP-SCC, FIRE, and including partners with leading roles in standardization bodies, e.g. IETSI, SF-SSCC, ITU, OMA, IETF, SynchroniCity will deliver a harmonized ecosystem for IoT-enabled smart city solutions where IoT device manufacturers, system integrators and solution providers can innovate and openly compete.

With an already emerging foundation, based on OASC Minimal Interoperability Mechanism (MIMs), SynchroniCity will establish a reference architecture model for the envisioned IoT-enabled city market place with identified interoperability points and interfaces and data models for different verticals. This will include tools for co-creation and integration of legacy platforms and IoT devices for urban services and enablers for data discovery, access and licensing lowering the barriers for participation on the market.

SynchroniCity will pilot these foundations in the cities together with a set of citizen-centered services in three high-impact areas, showing the value to cities, businesses and citizens involved, linked directly to the global market.

With a running start, SynchroniCity will serve as frontrunner initiative to inspire others to join the established ecosystem and contribute to the emerging market place. SynchroniCity takes an inclusive approach to growing the ecosystem by inviting businesses and cities to join through an open call, allowing them to participate on the pioneering market place enabling a second wave of successful pilots. They will strengthen the ecosystem by creating a positive ripple effect throughout Europe, and globally, to establish a momentum and critical mass for a strong European presence in a global digital single market of IoT-enabled urban services.



WEBSITE & SOCIAL MEDIA

www.synchronicity-iot.eu

[f](#) @SynchroniCityIoT

[t](#) @SyncCityIoT



TOTAL EC FUNDING

€15M



COUNTRIES

BE, CH, DK, ES, FI, IT, KR, NL, PT, UK



COORDINATOR

Aarhus University (DK)

CROSS FERTILISATION THROUGH ALIGNMENT,
SYNCHRONISATION AND EXCHANGES FOR IoT

CREATE-IoT's aim is to stimulate collaboration between IoT initiatives, foster the take up of IoT in Europe and support the development and growth of IoT ecosystems based on open technologies and platforms. This requires synchronisation and alignment on strategic and operational terms through frequent, multi-directional exchanges between the various activities under the IoT Focus Areas.



19

PARTNERS

8

USE CASES

CREATE-IoT aligns the activities with the Alliance for Internet of Things Innovation (AIOTI) and coordinates and supports the upcoming LSPs in sustaining the ecosystems developed during those projects through mapping the pilot architecture approaches, address interoperability and standards approaches at technical and semantic levels for object connectivity, protocols, data formats, privacy, security, trusted IoT, open APIs and share the road-mapping with international initiatives.

The project fosters the exchange on requirements for legal accompanying measures, development of common methodologies and KPI for design, testing and validation and for success and impact measurement, federation of pilot activities and transfer to other pilot areas, facilitating the access for IoT entrepreneurs/API developers/makers, SMEs, including combination of ICT and Art. CREATE-IoT builds strong connections with Member

States' initiatives and transfers learning points to the broader IoT policy framework in a coordinated effort in Europe to accelerate the development and deployment of IoT technologies and applications.

The project collaborates and coordinates the activities with contractual PPPs (e.g. Big Data, Factories of the Future, 5G-infrastructure), Joint Technology Initiatives (e.g. ECSEL – Electronic Components and Systems for European Leadership Joint Technology Initiative), European Innovation Partnerships (e.g. on Smart Cities) as well as with other FAs (e.g. on Autonomous transport).

The project maintains a coordinated working relationship with U4IoT that is addressing the Responsible Research and Innovation – Social Sciences and Humanities (RRISSH).



WEBSITE & SOCIAL MEDIA

www.create-iot.eu

 @CREATE-IoT

 @CreateloT_eu



TOTAL EC FUNDING

€3M



COUNTRIES

BE, CH, ES, FR, IE, IT, NL, NO, PT, UK

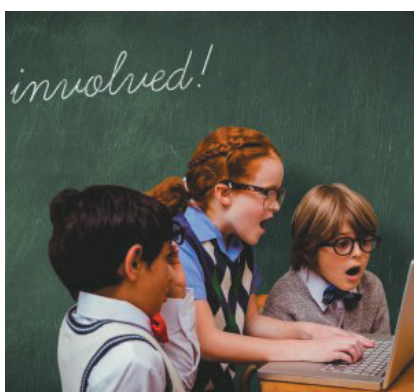


COORDINATOR

SINTEF AS (NO)

USER ENGAGEMENT FOR LARGE SCALE PILOTS IN THE INTERNET OF THINGS

End-user and societal acceptance is critical to the success of the IoT large-scale pilots. U4IoT combines complementary RRI-SSH expertise encompassing social and economic sciences, communication, crowdsourcing, living labs, co-creative workshops, meetups, and personal data protection to actively engage end-users and citizens in the large scale pilots.



8

PARTNERS

4

USE CASES

U4IoT develops a toolkit for LSPs end-user engagement and adoption, including online resources, privacy-compliant crowdsourcing tools, guidelines and an innovative privacy game for personal data protection risk assessment and awareness, online training modules.

The partners provide direct support to mobilize end-user engagement with co-creative workshops and meetups, trainings, Living Labs support, and an online pool of experts to address LSPs specific questions.

U4IoT enables a citizen-driven process by combining multidisciplinary expertise and complementary mechanisms from the European state-of-the-art.

The project analyses societal, ethical and ecological issues and adoption barriers related to the pilots with end-users and make recommendations for tackling IoT

adoption barriers, including educational needs and sustainability models for LSPs and future IoT pilots' deployment in Europe.

The activities are supporting communication, knowledge sharing and dissemination with an online portal and interactive knowledge base gathering the lessons learned, FAQ, tools, solutions and end-user feedbacks.

U4IoT encompasses the whole lifecycle of end-user engagement in LSPs.

This means that support for end-user engagement from the early stages of need-finding, co-creative design, real world implementations and tests, and exploitation and assessment will be offered. Privacy-friendly crowdsourcing and survey tools enable to monitor the end-user perception and acceptance of IoT applications.



WEBSITE & SOCIAL MEDIA

www.u4iot.eu

U4IoT

@U4IoT



TOTAL EC FUNDING

€1M



COUNTRIES

BE, CH, NL, RS, SE



COORDINATOR

Lulea Tekniska Universitet (SE)

