

H2020 2018-2020 CALL SELECTION ICT DRAFT WP

TOTAL CALLS	CODE	TOPIC/NAME	TYPE OF ACTION	TRL		BUDGET OF CALL	SUGGESTED PROJECT BUDGET	STAGE	OPENING DATE	DEADLINE
				FROM	TO					
11										
	ICT-02	Large Area Electronics (LAE)	RIA		4-5	30	2-4	Single	16 oct 2018	02 Apr 2019
	ICT-03	Photonics Manufacturing Pilot Lines for Photonic Components and Devices	IA			30	8-15	Single	16 oct 2017	17 Apr 2018
	ICT-08	Unconventional Nanoelectronics	RIA		4	30	2-4	Single	16 oct 2018	02 Apr 2019
	ICT-09	Electronic Smart Systems (ESS)	RIA		5	39	8	Single	16 oct 2017	17 Apr 2018
			IA			8	8	Single	16 oct 2017	17 Apr 2018
			CSA			1	8	Single	16 oct 2017	17 Apr 2018
	ICT-17	HPC and Big Data enabled Large-scale Test-beds and Applications	IA			50	12-13	Single	16 oct 2017	17 Apr 2018
			IA			30	15-18	Single	16 oct 2017	17 Apr 2018
	ICT-18	Big Data technologies and extreme-scale analytics	RIA			30	1	Single	16 oct 2017	17 Apr 2018
			CSA			1	1	Single	16 oct 2017	17 Apr 2018
	ICT-38	Startup Europe for Growth and Innovation Radar	IA			10		Single	16 Oct 2018	02 Apr 2019
			CSA			1.5		Single	16 Oct 2018	02 Apr 2019
	DT-ICT-08	Agricultural digital integration platforms	IA			30	15	Single	10 Jul 2018	23 Oct 2018

	DT-ICT-10	Interoperable and smart homes and grids	IA			15	30	Single	10 Jul 2018	23 Oct 2018
			IA			15	30	Single	10 Jul 2018	23 Oct 2018
	DT-ICT-11	Big data solutions for energy	IA			39	10	Single	10 Jul 2018	23 Oct 2018
	EUJ-01	Advanced technologies (Security/Cloud/IoT/BigData) for a hyperconnected society in the context of Smart City	RIA			3	1.5	Single	16 Oct 2017	23 Jan 2018

ICT-02-2019: LARGE AREA ELECTRONICS (LAE)

Scope: To fully exploit the potential of LAE and overcome barriers of manufacturability, challenges need to be addressed, in materials, in processes for large-area fabrication and quality control, in integration technologies, and in demonstrating innovative products for professionals and consumers. This topic will support advances in technology and manufacturing readiness levels (TRL and MRL) of Large Area Electronics.

1. Enhancing manufacturability:

- Advances in combined printed electronics and large area deposition technologies resulting in multi-functional components;
- Equipment and processes for large-scale fabrication and characterisation (R2R, S2S...).

2. Integration technologies:

Development of new concepts for the integration of transducers, energy and data storage elements, logic, as well as new interconnection technologies.

3. Device demonstration:

Demonstrating LAE-enabled prototypes in specific applications of flexible and wearable electronics. Consideration to be given to the integration of electronic devices in connected wearable and portable settings (e.g. textiles, flexible or stretchable substrates), interconnection, compatibility with low-cost manufacturing, efficient energy scavenging and storage, functional performance, and durability/reliability. Privacy and security, liability and free flow of data should also be considered where relevant.

ICT-03-2018: PHOTONICS MANUFACTURING PILOT LINES FOR PHOTONIC COMPONENTS AND DEVICES

Scope: The focus is on Innovation Actions:

Manufacturing Pilot Lines: Actions should provide open access to manufacturing of advanced photonics integrated circuits and offer related services including design and characterization. These pilot lines should offer generic solutions for a wide class of applications. They should cover all stages of manufacturing through to testing, provide a low entry barrier access to low and medium production volumes (beyond multi project wafers) and the processes used should be scalable to high production volumes. Actions should include a validation of the pilot line offer with involvement of external users in pre-commercial production runs. Actions should make use of existing infrastructure and develop close links with on-going European and national initiatives in order to maximise impact. Proposals must present industrially relevant business cases and a credible strategy for future high volume production in Europe

at competitive cost.

Actions must address one or both of the following technologies.

- Indium Phosphide:
- Silicon Photonics:

ICT-08-2019: UNCONVENTIONAL NANOELECTRONICS

Scope: Projects will aim at demonstrating the viability of new approaches to computing components. The focus should be on demonstrating new concepts at transistor or circuit level which bring the potential of highly improved performance for generic or specific applications of industrial relevance. This can be based on materials, computing unit architecture (transistor or beyond) as well as at circuit level. Still the focus is on devices and components, as well as related processing technologies.

The concept validation should be addressed in a controlled environment at a limited scale (laboratory, research line) amenable to transfer to larger scale developments in industrial environments (pilot lines, etc.).

Innovative concepts include, but are not limited to, the design, processing and integration of devices based on new approaches, e.g. spintronics, neuromorphic, resulting in computing devices and circuits. Only proposals with clear industrial involvement and on innovative solid-state approaches will be considered within this call.

The scope of the call covers Research & Innovation Actions on

- Energy efficient computation devices beyond the current CMOS paradigm. These can address steep slope devices, quantum bits implemented in solid-state, spintronic-based devices, single electron devices, nanomechanical switches, etc.
- Energy efficient computation circuit architectures. These can be based on the devices above but approaches based on neuromorphic computing or other hardware implementation are relevant.
- Specific technological developments may include (i) promising approaches for 3D stacks, both sequential and monolithic to address challenges of compactness, heat dissipation, reduced interconnect length, and (ii) development of cryogenic electronics to support advances in applications to computing (superconducting, quantum computing) or constraints faced in space. The aim is the demonstration of functionality at circuit level by integrating the adequate functional blocks.
- Design for advanced nanoelectronics technologies. Focus will be on design-technology solutions for energy efficiency, high reliability and robustness. All above topics can be

addressed as well as the issues related to improving the devices and circuits in the advanced technology nodes.

ICT-09 2018: ELECTRONIC SMART SYSTEMS (ESS)

Scope: **Research and Innovation Actions**

Focus is on:

a) Technological breakthroughs for future ESS leading to further miniaturisation, new functionalities, improved power consumption, autonomy and reliability, and secure operation in real environments:

- Development and integration of micro- and nano- sensor and actuator systems in ESS, including sensors exploiting emerging paradigms (e.g. 2D and 1D nanomaterials, spintronics) for ultra-high sensitivity and low power, and MEMS/NEMS-based sensors,
- Demonstrating ESS that brings intelligence to the IoT edge with integration of sensor systems, processors, computing and networking elements with improved energy efficiency and sustainability,
- Advancing comprehensive design, integration and packaging technologies.

It is expected that, while proposed ESS technologies are to be validated via demonstrators operating in laboratory environments (TRL 4), industrial exploitation and application perspectives are clearly identified.

b) Advances in bio-electronics smart systems: Enhancement of the technical capabilities of bio-electronics and connected MNBS (Micro-Nano-Bio Systems) through cost-effective miniaturisation, manufacturing and demonstration, leading to unprecedented performance in specificity/sensitivity, reliability, time to results and manufacturability. This includes modular approaches with integration of standard components and interfaces as well as platforms where material, IT, communications and sensing/analysis modules are interchangeable. Portability, wearability, biocompatibility, and operation in remote and low resource settings should be considered. User needs, markets and business cases should be clearly addressed.

Innovation Actions

c) Innovation Action on Access to Nanoelectronics and Electronics Smart Systems: In the

context of Digital Innovation Hubs (DIH) the goal is to support electronic components, sensors, smart devices and systems, including advanced nanoelectronics and integrated smart systems (e.g. Micro-Nano BioSystems). Focus is on (i) access to advanced design and manufacturing for academia, research institutes and SMEs, and (ii) Rapid prototyping production for SMEs and deployment to market.

Coordination and Support Actions

d) Support Action on Electronics

- Reinforced collaboration & cross-fertilisation between projects and experts groups supported under the Electronics topics, namely (i) Nanoelectronics, (ii) Electronics Smart Systems and (iii) Large Area Electronics,
- Increased outreach of these actions across Europe, their industrial perspective and technology (and manufacturing) readiness levels,
- Establishing of International cooperation in the field,
- Monitoring of technology advances and developments in the field and analysing the European ecosystems (available research infrastructures, competence centres, education, public procurement...) to determine the strengths and possible gaps

ICT-17-2018-19: HPC AND BIG DATA ENABLED LARGE-SCALE TEST-BEDS AND APPLICATIONS

Scope: a) **Innovation Actions (2018 call)** targeting the development of large-scale HPC-enabled pilot test-beds supporting big data applications and services by combining and/or adapting existing relevant technologies (HPC / BD / cloud) in order to handle and optimize the specific features of processing very large data sets. The test-beds should handle massive amounts of diverse types of big data coming from a multitude of players and sources for enabling value creation. The data assets available to the test-beds should be described in the proposal. Pilot test-beds should also aim to provide, via the cloud, simple secure access and secure service provisioning of highly demanding data use cases for companies and especially SMEs.

b) **Innovation Actions (2019 call)** targeting the development of large-scale IoT/Cloud-enabled pilot test-beds for big data applications by combining and taking advantage of relevant technologies (Big Data, IoT, cloud and edge computing, etc.). The aim is to develop pilot test-beds addressing data flows from a very large number of distributed sources (such as sensors or IoT applications/infrastructures and/or involving remote data storage/processing locations) for enabling value creation from such data assets. The pilot test-beds shall also address the relevant networking connectivity and large-scale data collection and management

issues. The data assets available to the test-beds should be described in the proposal. Pilot test-beds should also aim to provide, via the cloud, simple secure access and secure service provisioning of highly demanding data use cases for companies and especially SMEs.

ICT-18 2018-2020: Big Data technologies and extreme-scale analytics

Scope: a) **Research and Innovation Actions** developing new big data analytics methodologies and engineering solutions addressing industrial and/or societal challenges. Proposals may cover (but are not limited to): architectures for collecting and managing vast amounts of data; system engineering/tools to contribute to the co-design of federated/distributed systems (to involve all stakeholders/technology areas); new methods for extreme-scale analytics, deep analysis, precise predictions and decision making support; novel visualization techniques; standardized interconnection methods for efficient sharing of heterogeneous data pools, seamlessly using distributed tools and services. The data assets should be available to the project and described in the proposal. The Commission considers that proposals requesting a contribution from the EU of between EUR 3 and 6 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

b) **One CSA** to ensure coordination between the different existing activities in HPC/BD/Cloud technologies, including Public-Private Partnerships, digital innovation hubs, and relevant national and regional initiatives, in particular the European Network of National Big Data Centres of Excellence.

ICT-38-2019: STARTUP EUROPE FOR GROWTH AND INNOVATION RADAR

Scope: Actions should help startups and scaleups achieve market success and mature the innovation excellence of high potential innovators. Actions should support the creation of new jobs and high growth businesses and support their growth on a pan-European and international level. Innovators identified, promoted and supported by the Innovation Radar are expected to enrich and benefit from the Startup Europe ecosystem.

a. Innovation actions

Connecting local tech ecosystems and supporting cross-border activities: among the 4-5 hubs connected by each project, at least half of them will be located in less developed ecosystems. The project should develop a single online entry point to each one of the ecosystems and connect them to the **Startup Europe one-stop-shop**. Cross-border activities will include: connecting tech entrepreneurs with e.g. potential investors, business partners, accessing skills and services helping startups soft land in new international markets. Particular focus will be placed on stimulating partnerships between scaleups and corporates with a view to

procurement, mergers or acquisitions. Similar attention will be placed to support SMEs, startups and scaleups, wherever situated in Europe, to access public procurement opportunities across borders.

b. Coordination and support actions

- Provide targeted and tailored support to SMEs, startups, scaleups, spinoffs and market-oriented researchers planning to launch a spin-off, who are supported by EU funded ICT projects and are delivering market-creating innovations that have scale-up potential.
- Insight and intelligence from the Innovation Radar is to be used to detect EU-funded innovators who face the biggest market opportunities (enhancement of Innovation Radar data by merging with relevant 3 party data sources is welcomed).
- Support is expected to include mentoring, coaching, investor readiness training, coaching on how to bid for public procurement sales opportunities, connecting innovators with potential customers, business partners and investors (Business Angels, Venture Capital, Crowdfunding and other relevant forms of financing).

DT-ICT-08-2019: AGRICULTURAL DIGITAL INTEGRATION PLATFORMS

Scope: Pilots should address:

Building platforms integrating different technologies like IoT devices, cloud, photonics, networks and robotics combined with applications based on data analytics and knowledge management. There is a need for a new level of interoperability to ensure that all connected systems can all talk to each other, allowing the farmers to pick and choose the most appropriate combination of tools from different suppliers. Pilot will validate the means to achieve high level of interoperability of different systems through reference architecture, semantics technologies and standardisation framework that demonstrate communication exchange of data across different systems and platforms.

Sharing data and generating knowledge via capturing and translating more and precise information. High precision data capturing and a high degree of data sharing should serve as basis for Decision Support Systems delivering tailored advice at farm level, complementing and/or extending advisory services. The core technical enablers for analysing the amounts of data will be Artificial Intelligence and semantics technologies. These services should include direct and detailed feedback to the farmers on appropriate practices and management strategies.

The decision support systems will include, but are not restricted to, a benchmarking system on the productivity and sustainability performance of farms, services, technologies and practices.

For this purpose data models and semantic standards need to be defined to elicit performance indicators and derive decision making, as well as allowing sharing the data from the different farms.

The platforms will support a digital innovation space for farmers and innovators, based on a network of farms and in close cooperation with existing agricultural knowledge and innovation infrastructure of the different Member States and regions. For farmers, the platforms should have a mass-tailored advisory and knowledge dissemination service, including economic and technical benchmarking. It shall cover a large number of farms, including small farms. Advisory services based on local eco-systems should be investigated and linked in the pilots. For innovators, the platforms should work as test-bed, testing and benchmarking new technologies and services. This should be made possible by allowing for recruiting pilot farms and/or making available the necessary data.

Proposals should fall under the concept of multi-actor approach and allow for strong involvement of the farming sector in the proposed activities. Projects are required to develop adequate data governance model(s) defining the terms for access to data owned by another party. Activities should allow for a wide geographic coverage within Europe. In addition, proposals shall cover at least three sub-sectors (e.g. arable crops, livestock, vegetable and fruit production).

DT-ICT-10-2019: INTEROPERABLE AND SMART HOMES AND GRIDS

Scope: The aim of the pilot is to exploit IoT reference architectures models that allow for combining services for home or building comfort and energy management, based on platforms that enable the integration of relevant digital technologies like IoT, AI, cloud and big data services. Energy services, where appropriate, can be combined with additional nonenergy services and foster the take-up of smart energy communities (in particular peer to-peer energy markets). The aim is also to demonstrate these platforms under real-life conditions in interaction with the electricity system, and to demonstrate the benefits of energy management through IoT application and services. The envisaged architecture should allow for third party contributions that may lead to new value added services both in energy and the home domain.

The scope is to develop interoperability and seamless data sharing across the devices and

systems to enable innovative building energy management services; with the aim to save costs to consumers, to facilitate the integration of renewable energy from distributed intermittent sources and to support energy efficiency. The pilot needs to demonstrate plug-and-play energy management solutions, by taking into account legacy of existing smart home or building solutions, mapping their approach to common architecture models and implementing relevant standards (such as SAREF) within the home and towards the grid. Pilots need to ensure interoperability in the communication interfaces between smart devices and from the smart device to the gateway/energy manager and/or to the cloud, i.e. a service provider that uses the data generated from the device. Selected pilots should promote the use of these interoperable solutions as widely as possible involving many different types of appliances (e.g. including white-goods, heating, cooling and ventilation, home & building automation energy management and control, batteries, PV panels, charging for electric vehicles), and explore the need for further standardisation and legislation.

The selected large-scale pilot shall in particular address all of the following issues:

- demonstrate scalability and stimulate spill-over effects; demonstrate that such platforms lead to a marketplace for new services in EU homes and buildings;
- make use of cascading funds: for the incorporation of users of the pilots, developers of additional applications, replication of the pilot through new sites or new connected devices, and complementary assessment of the acceptability of the use case where appropriate;
- the consortia should cover the whole value chain for IoT-based services: appliance manufacturers and technology providers, ICT suppliers, energy sector (energy suppliers, aggregators, ESCOs, TSOs and DSOs);
- cooperate with other Large-Scale Pilots under the IoT Call and Big Data for Energy Call [Ref]; a duration up to 4 years should be considered allowing the project to contribute to CSA under the call DT-13-2019 and in the BRIDGE project;
- link with Member States' initiatives in this area, as outlined in the Strategic Energy Technology Plan Communication of 15 September 2015 (in particular Action 3 on smart solutions for consumers)[Ref].

DT-ICT-11-2019: BIG DATA SOLUTIONS FOR ENERGY

Scope: **Innovation Actions** targeting large-scale pilot test-beds for big data application in the electricity sector. The aim is to develop/pilot and deploy a reference architecture for largescale data exchange, management and processing in the electricity sector and to translate this reference architecture into an open, modular data analytics toolbox for the safe and effective operation of grids and provision of innovative energy services. The reference architecture should ensure compatibility with legacy formats, interfaces and operating systems of the energy system, allow replication and scale-up, be compliant with applicable EU

standards, and should enable the integration of relevant digital technologies like IoT, AI, cloud and big data services. The analytics toolbox shall be able to handle a wide variety of data and support the development of a wide range of energy services, at least to increase the efficiency and reliability of the operation of the electricity network, to optimize the management of assets connected to the grid (in particular small-scale generation and those used for demand response), to increase the efficiency and comfort of buildings, and to de-risk investments in energy efficiency (e.g. by reliably predicting and monitoring energy savings). Proposers must demonstrate that they have access to appropriate large-scale and realistic datasets, and shall involve TSOs, DSOs, suppliers, aggregators, ESCO's, building management and renovation sectors, software integrators/developers, analytics, simulation, prediction, cloud computing, as appropriate. Projects shall collaborate with the Bridge project (SC3).

EUJ-01-2018: ADVANCED TECHNOLOGIES (SECURITY/CLOUD/IOT/BIGDATA) FOR A HYPERCONNECTED SOCIETY IN THE CONTEXT OF SMART CITY

Scope: The proposals should address one of the two following areas:

1) Advanced technologies combining Security, IoT, Cloud and Big data for a hyperconnected society

The focus is to research, develop and test advanced technologies combining Security, IoT, Cloud and Big data. The following technologies are expected for research and development: agility against emerging threats; automatic vulnerability discovery and patching; opensourcing of security tools; IoT security; cloud security; data security; privacy protection; data anonymization; blockchain in the context of IoT/Cloud; critical information infrastructure protection, cross border application demonstrations; etc.

2) Interoperable technologies of IoT devices/platforms in the context of Smart Cities

The focus is to research, develop and test interoperable technologies of IoT devices/platforms in the context of Smart Cities. The following technologies are expected for research and development: edge/fog/cloud computing; low power; scalability; open-standards-based platforms; system and reference architectures; open application programming interfaces (API); data sharing among cross-market/cultural platforms; managing distributed data among different communities and regions; bridging different standardizations; technical verification; cross border application demonstrations; energy management; transportation systems; maintenance systems for life infrastructure; etc. A further objective is to contribute to standardization activities under the cooperation of EU-JP research institutes and IoT-related consortia (e.g. the Alliance for IoT Innovation (AIOTI) and IoT Acceleration Consortium), and promote a global expansion of research results in Smart Cities.