

Horizon 2020

Information and Communication Technologies in Work Programme 2016-17

Morten Møller DG CONNECT European Commission

A few reminders on Horizon 2020...

Biggest EU R&I programme ever

€77 billion of EU funding over 2014-2020

~ 27% increase compared to 2007-2013

Core part of Europe 2020's strategy

Smart, sustainable and inclusive growth

Main objectives

- Responding to the economic crisis to invest in future jobs and growth
- Addressing people's concerns about their livelihoods, safety and environment
- Strengthening the EU's global position in research, innovation and technology



A few reminders on Horizon 2020...

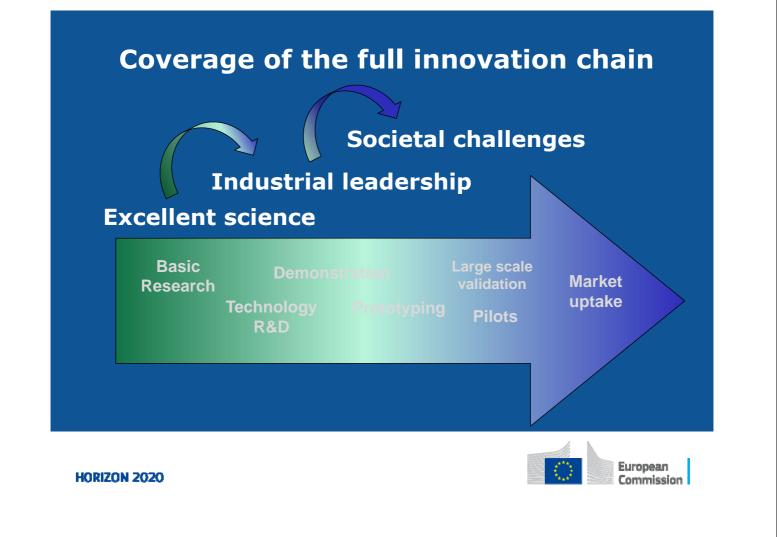
- A single programme bringing together three separate programmes/initiatives*
- Coupling research to innovation from research to retail, all forms of innovation
- Focus on societal challenges facing EU society, e.g. health, clean energy and transport
- Simplified access, for all companies, universities, institutes in all EU countries and beyond
 - The 7th Research Framework Programme (FP7), innovation aspects of Competitiveness and Innovation Framework Programme (CIP), EU contribution to the European Institute of Innovation and Technology (EIT)

3

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Lessons learned from 2014-15 calls... ...Changes for 2016-17

- Increased support to cross-cutting activities
 - Focus areas
- Consolidation and strengthening of the SME instrument
 - Single call grouping all topics across the WP
 - Fewer and broader topics, with higher budget per topic and overall
- Change of **innovative procurement** instruments (PCP/PPI)
 - Move from co-fund to standard grants
 - Increase of funding rates (90%/35%)
- Reinforcement of international cooperation
- Increased use of inducement prizes
- More **precision**, **focus** and **clarity** in the topic descriptions (notably the expected impacts)...while keeping up an open and non-prescriptive approach



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What's

new?

ICT in Horizon 2020



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ICT

Reminder: ICT in H2020 > LEIT-ICT

Excellent Science

Frontier Research (ERC) Future and Emerging Technologies (FET) ICT Skills and career development (Marie Skłodowska-Curie) Research Infrastructures ICT

Industrial Leadership

Leadership in enabling and industrial technologies ICT ICT ICT ICT Nanotech., Materials, Manuf. & Processing Biotechnology Space Access to risk finance Innovation in SMEs ICT

Societal Challenges

Health, demographic change and wellbeing Food security, sustainable agriculture, ICT and the bio-based economy Secure, clean and efficient energy ICT Smart, green and integrated transport ICT Climate action, resource efficiency, ICT and raw materials Inclusive, innovative and reflective societies Secure societies ICT ICT



Public Private Partnerships in ICT

Joint Technology Initiative

- ECSEL (Electronic Components and Systems for European Leadership)
 ✓ 1,215 b€ from EU
 - ✓ 3,6 b€ (out of which 1,2 b€ from Member States) from industry partners and other sources

9

Contractual PPPs

- 5G -> 700m€ indicatively earmarked in H2020
- Photonics -> 700m€
- Robotics -> 700m€
- High Performance Computing -> 700m€
- Factories of the Future (ICT part) -> 450m€
- Green Vehicles (ICT part) -> 80m€
- Big Data -> 500m€ (NEW!)

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Future and Emerging Technologies 2016-17



• **FET Open** (259,5 M€)

- · Still open to all radically new technologies in all areas
- Introduction of **FET Innovation Launchpad** (3 M€)
 - stimulate innovation by initiating entrepreneurial activities around results from FET research projects

• **FET Proactive** (180 M€)

- Boosting **emerging technologies** (95 M€)
 - Introduction of FET ERA-Net cofund actions (generic + specific on Quantum technologies)
- High Performance Computing (85 M€)
 - → Part of HPC PPP / complementary to eInfra and LEIT-ICT activities

• FET Flagships (185 M€)

- Continuation of Graphene and Human Brain Project flagships
- Launch of an **ERA-Net cofund** for partnering projects in both flagships

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Future and Emerging Technologies 2016-17



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• **FET Proactive** (180 M€)

- Boosting emerging technologies (95 M€)
 - Future technologies for societal change (up to 20 M€)
 - Biotech for better life (up to 20 M€)
 - Disruptive information technologies (up to 30 M€)
 - New computing paradigms and their technologies
 - Quantum engineering
 - Hybrid opto-electro-mechanical devices at the nano-scale
 - New technologies for energy and functional materials (up to 20 M€)
- High Performance Computing (85 M€)
 - Co-design of HPC systems and applications (41 M€)
 - Transition to Exascale Computing (40 M€)
 - Exascale HPC ecosystem development (4 M€)



Research Infrastructures 2016-17



- eInfrastructures (122 M€)
 - Support the European policies on open research data, data and computing intensive science, research and education networking, high-performance computing and big data innovation.
 - Integration and consolidation of e-infrastructure platforms
 - **Prototyping** innovative e-infrastructure platforms and services for research and education communities, industry and the citizens at large
- European Open Science Cloud for Research (10 M€)
 - ➔ pilot action that should demonstrate how wide availability of scientific data and data-analysis services for European researchers can be ensured through a cloud infrastructure
- **GEANT** (64 M€)
- Interactive Computing e-infrastructure for the Human Brain Project FET Flagship (25 M€)
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13

Research Infrastructures 2016-17



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• eInfrastructures (122 M€)

- **Integration and consolidation** of e-infrastructure platforms
 - Support to the next implementation phase of Pan-European High Performance Computing infrastructure and services (PRACE) (15 M€)
 - Data and Distributed Computing e-infrastructures for Open Science (40 M€)
- **Prototyping** innovative e-infrastructure platforms and services for research and education communities, industry and the citizens at large
 - Platform-driven e-infrastructure innovation (46 M€)
 - User-driven e-infrastructure innovation (21 M€)

• Support to policies and internal cooperation for e-infrastructures (7,5 M€)





Approach to WP2016-17

- Consolidate the **innovation drive** initiated in 2014-15
 - Supporting core ICT industries through roadmap-based PPPs
 - New cPPP: Big Data
 - Facilitating disruptive innovation
 - Strengthening of **ODI**
 - Continuation of 'Fast Track to Innovation' pilot
 - Introducing new **cross-cutting actions** and reinforcing **large scale piloting** in real world environments
 - IoT and Digital Security focus areas
 - IoT and Big Data large scale pilots

• Ensure the supply of future technological building blocks

- Room for more exploratory research activities within each area
- Reinforce the international dimension of LEIT-ICT
 - Coordinated calls with Brazil, Japan and South Korea

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What's

new?

16

Industrial Leadership - ICT



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• A new generation of <u>components and systems</u>:

engineering of advanced embedded and resource efficient components and systems

Next generation <u>computing</u>:

 advanced and secure computing systems and technologies, including cloud computing

Future Internet:

• software, hardware, infrastructures, technologies and services

<u>Content technologies</u> and <u>information management</u>:

• ICT for digital content, cultural and creative industries

Advanced <u>interfaces</u> and <u>robots</u>:

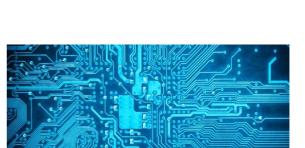
robotics and smart spaces

Micro- and nanoelectronics and photonics:

key enabling technologies

17

Components and systems 2016-2017





- Cover systemic integration from smart integrated components to cyber-physical systems
- Complementary to the JTI Electronic Components and Systems (ECSEL)
- Organised in four topics:
 - Smart cyber-physical systems (20 M€)
 Next generation embedded and connected systems
 - Thin, Organic and Large Area Electronics (20 M€)
 - Smart system integration (18,5 M€)
 - Integration of heterogeneous micro- and nanotechnologies into smart systems
 - Smart Anything Everywhere initiative (25,5 M€)



Advanced Computing and Cloud Computing 2016-2017





- Reinforce and expand Europe's industrial and technology strengths in **low-power ICT**
- Foster the evolution of Cloud technology to increase its uptake
- Complementary to the work in the Excellent Science pillar under Research Infrastructures and FET (on High Performance Computing)
- Organised in two topics:
 - Customised and low energy computing (26 M€)
 - Cloud Computing (45 M€)



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19







 Integrated response to technology challenges and innovation needs of the future Internet

• Organised in seven topics:

- 5G PPP Research and Validation of critical technologies and
- **5G PPP** systems (103 M€)
- (148 M€) L• 5G PPP Convergent Technologies (45 M€)
 - Networking research beyond 5G (18 M€)
 - Software Technologies (31 M€)
 - Future Internet Experimentation Building a European experimental Infrastructure (26 M€)
 - Collective Awareness Platforms for Sustainability and Social Innovation (10 M€)
 - Net Innovation Initiative (20 M€)



Content technologies 2016-2017

• Improve access, creation, management and use of data and content through advances along the data, content and knowledge value chains.

278 M€

• Organised in eleven topics (+ one prize):

• Big data PPP (153 M€)

- Cross-sectorial and cross-lingual data integration and experimentation (54 M€)
- Large scale pilots in sectors best benefitting from data-driven innovation (50 ${\rm M}{\in})$
- Research addressing main technology challenges of the data economy (31 $\mathrm{M}{\in})$
- Support, industrial skills, benchmarking and evaluation (7 M€)
- Privacy-preserving big data technologies (9 M€)
- Big Data inducement prize (2 M€)
- Media and content convergence (39 M€)
- Tools for smart digital content in the creative industries (17 M€)

21

- Support technology transfer to the creative industries (14 M€)
- Technologies for Learning and Skills (31 M€)
- Interfaces for **accessibility** (12 M€)
- Gaming and gamification (12 M€)

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Robotics and autonomous systems 2016-2017

- Technology-driven actions to keep EU at the cutting edge of research + market-driven actions to accelerate take-up and deployment of robots
- Roadmap-based approach
 → Robotics PPP
- Organised in four topics in LEIT-ICT + one topic in SC2:
 - Advanced robot capabilities research and take-up (64 M€)
 - System abilities, development and pilot installations (42 M€)
 - System abilities, SME & benchmarking actions, safety certification (46 M€)
 - **Robotics competition**, coordination and support (5 M€)

22

• Robotics Advances for Precision Farming (7 M€) (SC2)











ICT key enabling technologies 2016-2017



- Translate Europe's S&T excellence in photonics and micro- and nano-electronics into strengthened competitiveness and market leadership
- Address the whole research and innovation value chain in photonics technology: from materials to manufacturing, products and services, through equipment and devices – from advanced R&D to pilot lines
 - → Photonics PPP (153 M€)
 - → Complemented by activities of LEIT-NMBP and FoF PPP
- Cover generic technology developments on micro- and nanoelectronics focused on exploratory research and lower Technology Readiness Levels (TRLs) (23 M€)
 - Complementary to the JTI Electronic Components and Systems
- Organised in three topics in LEIT-ICT + one in LEIT-NMBP + one in FoF

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ICT for the Factories of the Future 2016-2017



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- Part of the **'Industry 2020 in the Circular Economy'** crosscutting focus area
- Focus on ICT components of innovative production systems in all sectors (for a more personalised, diversified and massproduced product portfolio and for rapid and flexible reaction to market changes)
- Implementation of the FoF PPP
- Organised in three topics:
 - Digital automation (53 M€)
 - ICT Innovation for Manufacturing SMEs (I4MS) (33 M€)
 - Photonics laser-based production (30 M€)



Internet of Things 2016-2017



- Cross-cutting focus area
 - Contributions from SC1 and SC2
- Increased support with the ambition to foster the take-up of IoT in Europe and to enable the emergence of IoT ecosystems supported by open technologies and platforms
- Organised in three topics:
 - Large scale pilots (100 M€)
 - Smart living environment for ageing well
 - Smart farming and food security
 - Wearables for smart ecosystems
 - Reference zones in EU cities
 - Autonomous vehicles in a connected environment
 - IoT Horizontal activities (4 M€)
 - R&I on IoT integration and platforms (35 M€)





Digital Security 2016-2017





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• Focus area

- Combining contributions from LEIT-ICT, SC1 and SC7
- Grouping the main R&D&I activities in digital security, from enabling technologies to specific use cases

• Organised in eight topics:

- Cryptography (18,5 M€)
- Assurance and Certification for Trustworthy and Secure ICT systems, services and components (23,5 M€)
- Addressing Advanced Cyber Security Threats and Threat Actors (18 M€)
- Privacy, Data Protection, Digital Identities (18 M€)
- Cyber Security for SMEs, local public admin. and individuals (22 ${\rm M}{\in})$
- Economics of Cybersecurity (4 M€)
- **EU Cooperation and International Dialogues** in Cybersecurity and Privacy Research and Innovation (3 M€)
- Increasing digital security of health related data on a systemic level (11 M€)





Innovation and Entrepreneurship support 2016-2017

- Reinforce the involvement of users in R&D&I
- Support digital entrepreneurship
- Strengthen the **support to start-ups** and **SMEs**
- Facilitate the meeting between investors and start-ups
- Increase the entrepreneurial skills
- Organised in five topics + inducement prizes:
 - Startup Europe for growth and Innovation Radar (12 M€)
 - Innovation procurement networks (4 M€)
 - Pre-commercial procurement open (4 $\mathrm{M}{\in})$
 - Open Disruptive Innovation scheme SME instrument (126 M€)
 - Fast Track to Innovation (100 M€ for all fields of LEIT and SCs)
 - ICT Horizon prizes (10 M€)

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27

Responsibility and creativity 2016-2017

- Cross-cutting activities supporting the **nexus between** technology, social sciences, humanities and arts.
- Foster collaboration with SSH on responsible research and innovation.
- Engage with artists in innovation process to foster **creativity** and help enhance **user acceptance**.
- Two dedicated topics:
 - Enabling responsible ICT-related research and innovation $(7\ \text{M}{\in})$
 - Boost synergies between artists, creative people and technologists

 (8 M€)
- ...Complemented by other activities embedded in technical topics and a large hub supported through SC6.



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15+ M€

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156+ M€

International cooperation (

• International partnership building in low and middle income countries (13,8 M€) / Target: sub-Saharan Africa and ASEAN

Coordinated calls

- **EU-Brazil** (7 M€)
 - Cloud computing
 - IoT pilots
- **EU-Japan** (7 M€)
 - 5G Next Generation Communication Networks
 - IoT/Cloud/Big Data platforms in social application contexts
 - Experimental testbeds on Information-Centric Networking
- EU-South Korea (6 M€)
 - 5G Next Generation Communication Networks
 - IoT joint research



40.8 M€

Other international cooperation activities

- China: Collaboration on Future Internet (1 M€)
- Mexico: Collaboration on ICT (with a focus on FIWARE) (1 M€)

29

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Societal Challenges



- 1. Health, demographic change and wellbeing
- 2. Food security, sustainable agriculture, and forestry, marine, maritime and inland water research, and the bio-economy
- 3. Secure, clean and efficient energy
- 4. Smart, green and integrated transport
- 5. Climate action, environment, resource efficiency and raw materials
- 6. Europe in a changing world inclusive, innovative and reflective societies
- 7. Secure societies protecting freedom and security of Europe and its citizens

31

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What's

new?

Approach to WP2016-17

- Stronger integration of ICT with other disciplines within SC calls
 - Joint calls
 - Multidisciplinarity

• Increased support to activities cutting across SCs and LEIT-ICT

- Focus areas
 - Internet of Things
 - Digital Security
- Other cross-cutting topics
 - Big Data supporting Public Health policies (SC1)
 - Policy-making in the age of Big Data (SC6)
- Consolidation and strengthening of the SME instrument



Health, demographic change and wellbeing 2016-2017

• Continuity with WP2014-15, FP7 and CIP

- Active and healthy ageing
- Personalization of healthcare and patient empowerment

• Contribution to other major WP initiatives in ICT

- Digital Security
- **IoT**
- Big Data



- Introduction of specific SME-instrument topic
- Innovative public procurement actions
- International cooperation with US and Japan
- Contribution to the AAL programme

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Health, demographic change and wellbeing 2016-2017

• **Personalized Medicine** (114,5 M€)



- Active ageing and self-management of health (58,5 M€)
 - PCP eHealth innovation in empowering the hospitalised patient (18 $\mathrm{M}{\ensuremath{\in}})$
 - PPI for deployment and scaling up of ICT solutions for active and healthy ageing (10,5 M€)
 - EU-Japan cooperation on novel ICT Robotics based solutions for active and healthy ageing at home or in care facilities (5 M€)
 - Personalised coaching for well-being of older persons (25 ${\rm M}{\rm {\ensuremath{\in}}}$)
- Methods and data (56 M€)
 - In-silico trials for developing and assessing biomedical products (19 M€)
 - Personalised computer models and in-silico systems for well-being (19 M€)
 - Big Data supporting Public Health policies (10 M€)
 - PPI for uptake of standards for the exchange of digitalised healthcare records (8 M€)
- Coordination activities (9,5 M€)



Food security and sustainable use of natural resources 2016-2017

- Contribution from LEIT-ICT to the focus area 'Sustainable Food Security – Resilient and resource-efficient value chains'
 - **Robot-based precision farming** (7 M€)

Contribution from SC2 to the IoT focus area

 Large-scale pilot on 'Smart farming and food security' (30 M€)



35

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Energy 2016-2017

• Three calls (all focus areas)

- Energy-efficiency (194 M€ overall)
 - Behavioural change toward energy efficiency through ICT
 - Bringing to market more energy efficient and integrated data centres
- Competitive low-carbon energy (725 M€ overall)
 - Smart grids, storage and energy system integration technologies (4 topics – 182 M€)
 - Tools and technologies for coordination and integration of the European energy system (28 M€)
- Smart cities and communities (231 M€ overall)
 - → part of **smart and sustainable cities** cross-cutting focus area
 - Smart Cities and Communities lighthouse projects (131,5 M€)



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Transport 2016-2017



Three calls

- Mobility for growth (436 M€ overall)
 - Innovative ICT solutions for future logistics operations
 - Intelligent Transport Systems (3 topics)
 - Increasing the take up and scale-up of innovative solutions to achieve sustainable mobility in urban areas
- Automated road transport (114 M€ overall)
 - ICT infrastructure to enable the transition towards road transport automation
- European green vehicle initiative (206 M€ overall)
 - Demonstration (pilots) for integration of electrified L-category vehicles in the urban transport system



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37

Climate and environment 2016-2017

One generic SC5 call

+ contributions to three focus areas

- Industry 2020 in the circular economy
- Blue growth
- Smart and sustainable cities

• Opportunities for ICT contributions

- Water management
- Climate and water resilience in cities
- Business models for the circular economy
- European data hub for the GEOSS information system



Inclusive, innovative and reflective societies 2016-2017

• Four calls

- Co-creation for growth and inclusion (ICT: 30,5 M€)
 - Applied co-creation to deliver public services (10 M€)
 - Policy-development in the age of Big Data (11,5 M€)
 - Once-only principle (9M€)
- Reversing inequalities and promoting fairness (ICT: 4 M€)
 - Multi-stakeholder platform for enhancing youth digital opportunities (1 M€)
 - Boosting inclusiveness of ICT-enabled research and innovation (3 $\ensuremath{\mathsf{M}}\xspace{\varepsilon}$
- Understanding Europe (ICT: 35,5 M€)
 - Virtual museums and social platform on European digital heritage, memory, identity and cultural interaction (11 M€)
 - European cultural heritage, access and analysis for a richer interpretation of the past (9 M€)
 - Understanding the transformation of European public administrations (15,5 M€)
- Engaging together globally

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Security 2016-2017

- Digital Security focus area (118 M€)
 - **Privacy and Data Protection** (18 M€)
 - Addressing Advanced Cyber Security Threats and Threat Actors (18 M€)
 - Cyber Security for SMEs, local public administration and Individuals (22 M€)
 - Economics of Cybersecurity (4 M€)
 - EU Cooperation and International Dialogues in Cybersecurity and Privacy Research and Innovation (3 M€)
 - Increasing digital security of health related data on a systemic level (SC1) (11 M€)
 - Assurance and Certification for Trustworthy and Secure ICT systems, services and components (LEIT-ICT) (23,5 M€)
 - Cryptography (LEIT-ICT) (18,5 M€)
- Critical infrastructure protection (40 M€)
 - Prevention, detection, response and mitigation of the combination of physical and cyber threats to the critical infrastructure of Europe (40 M€)



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SME Instrument



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SME Instrument – ICT 2016-2017

• SME Instrument dedicated call (739 M€ overall)

- Open Disruptive Innovation Scheme (126 M€)
- Accelerating the uptake of nanotechnologies advanced materials or advanced manufacturing and processing technologies by SMEs (67 M€)
- Accelerating market introduction of ICT solutions for Health, Well-Being and Ageing Well (30,5 M€)
- Stimulating the innovation potential of SMEs for a low carbon and efficient energy system (96 M€)
- Small business innovation research for Transport and Smart Cities Mobility (119 M€)
- New business models for inclusive, innovative and reflective societies (22 M€)
- Engaging SMEs in security research and development (30 M€)





More information...





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Call planning – 2016 (1/2)

FET

- FET Open: 11 May, 29 Sept
- FET Proactive: 12 April, 27 Sept

Research Infrastructures: 30 March, 22 June, 20 Sept

LEIT

- EU-Japan, EU-South Korea: 19 Jan
- Main ICT call: 12 April, 8 Nov

SC1 (Health):

- EU-Japan coop on Robotics: 12 Apr
- Other topics from SC1 call: 16 Feb

SC3 (Energy)

- Energy-efficiency: 21 Jan, 15 Sept
- Competitive Low Carbon Energy: 5 April
- SC4 (Transport): 20 Jan, 26 Jan



Call planning – 2016 (2/2)

SC6 (Europe in a changing world)

- Co-creation: 24 May
- Reversing inequalities: 4 Feb
- Understanding Europe: 4 Feb

SC7 (Security)

- Digital security of health data: 16 Feb
- Assurance and certification: 12 April
- Other topics (CIP+DS): 25 August

Cross-cutting activities

- ICT for FoF: 21 Jan
- IoT: 12 April
- Smart Cities: 8 March, 5 April

SME instrument

- Phase 1: 24 Feb, 3 May, 7 Sept, 9 Nov
- Phase 2: 3 Feb, 14 April, 15 June, 13 Oct

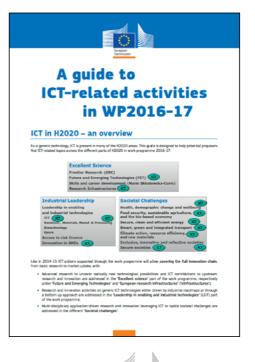
Fast Track to Innovation: 15 March, 1 June, 25 Oct HORIZON 2020





Guide to ICT-related activities in WP2016-17

- Comprehensive coverage of the three H2020 pillars
- Detailed list of calls and topics
- Available on H2020 website





Find out more

Horizon2020 web site

✓ http://ec.europa.eu/programmes/horizon2020

• Participants portal

- ✓ http://ec.europa.eu/research/participants/portal
- H2020 Helpdesk, including FAQ
 - ✓ http://ec.europa.eu/research/index.cfm?pg=enquiries
- National Contact Points
 - http://ec.europa.eu/research/participants/portal/desktop/en/support/nati onal_contact_points.html

47

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Thank you for your attention!



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