



# Robotics in Horizon 2020 ICT Work Programme 2018 – 2020

Leadership in Enabling and Industrial Technologies (LEIT)  
Information and Communication Technologies (ICT)  
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Robotics PPP: Developing robotics core technology

## ▶ Robotics, terms

### 4 Focus Application Areas (FAAs)

- ▶ Healthcare,
- ▶ Inspection and Maintenance of Infrastructure,
- ▶ Agri-food,
- ▶ Industrial SME use of robotics in production

### 4 Core Technologies => Call ICT-17,

- ▶ Artificial Intelligence (AI) and cognition,
- ▶ Cognitive mechatronics,
- ▶ Socially cooperative human robot interaction
- ▶ Model based design and configuration tools

### Objectives

- ▶ overcome market barriers
- ▶ significantly accelerate development and deployment

## ▶ Robotics, terms

- ▶ In each of the Focus Application Areas (FAAs), development of
  - ▶ system (technology) platforms => **Digital Innovation Hubs (DIH)**
  - ▶ application platforms           => **Pilots**
  
- ▶ Platforms / Pilots should
  - ▶ be based on open access
  - ▶ create common infrastructure, data and knowledge exchange
  - ▶ be built around open, industry led (de facto) standards
  
- ▶ Platforms / Pilots should have connections to
  - ▶ Big Data
  - ▶ Internet of Things (IoT)

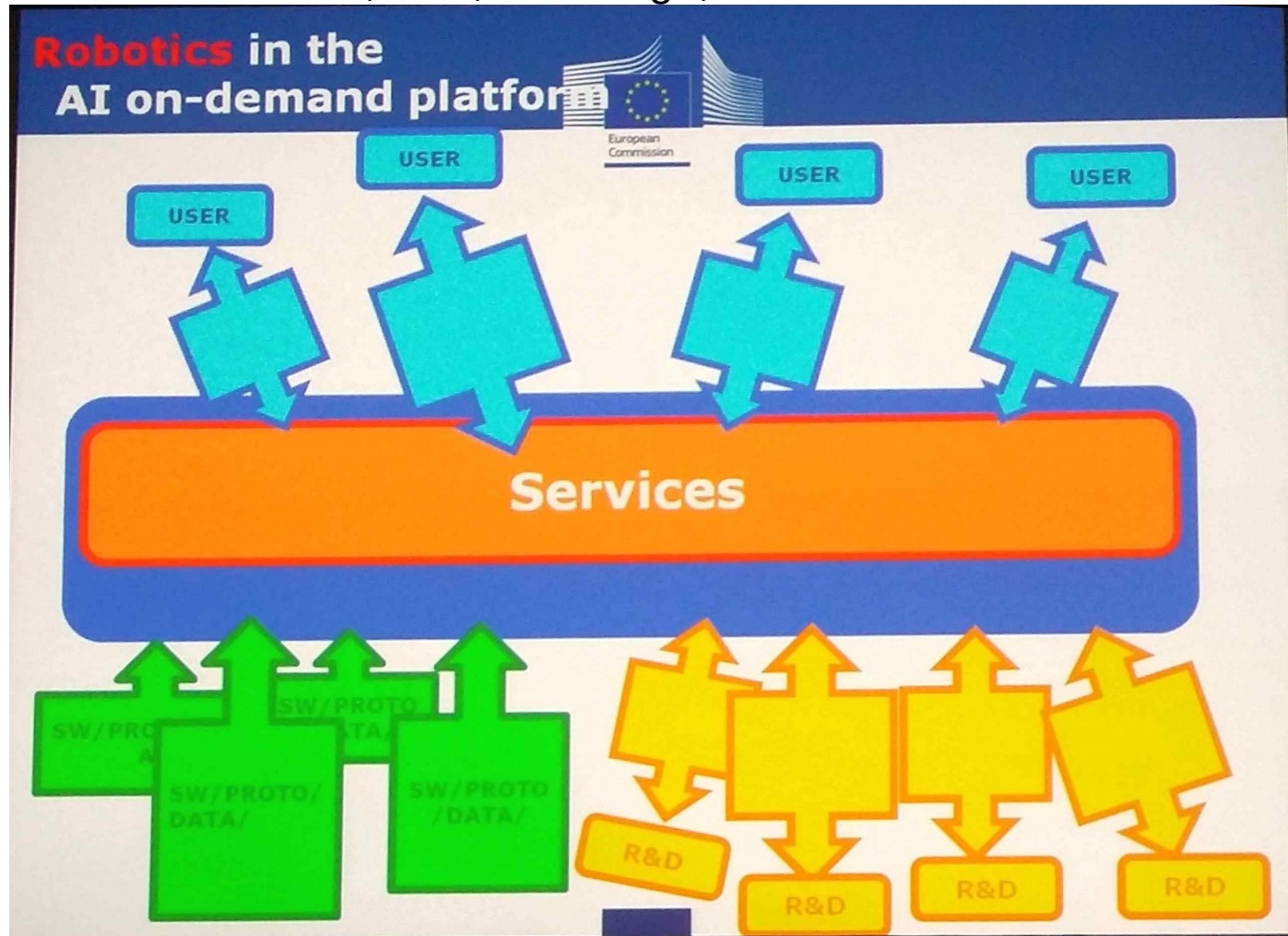
## ▶ Robotics, Platforms

### ▶ **Platforms** (technology oriented)

- ▶ “multi-sided market gateways creating value by enabling interactions between several groups of economic actors”, or
- ▶ “agreements on functions and interfaces between industry players that create markets and market opportunities leading to ecosystems and standards”
- ▶ reference architectures
- ▶ interaction protocols
- ▶ interoperability frameworks

# Robotics, Platforms

- ▶ **Platforms:** Slide from Cecile Huet, ERF, Edinburgh, 22.03.2017



## Robotics, Pilots

- ▶ **Pilots** (application oriented)
  - ▶ Validation of platforms in (near) real operating environments
  - ▶ Prototype applications
  - ▶ Built around open platforms and industry led standards
  - ▶ High socio-economic impact relevant to the Focus Application Areas (FAA)

## Robotics Calls: ICT 14

- ▶ ICT-14-[2018]:

### **Robotics - Establishing Digital Hubs, System Platforms and Focus Application Areas**

- ▶ *Specific Challenge:*

establish Digital Innovation Hubs (= system platforms) to help companies become more competitive by improving their business/production processes as well as products (and services) by means of digital technology.



## Robotics Calls: ICT - 14

### ▶ ICT-14-[2018]:

### Robotics - Establishing Digital Hubs, System Platforms and Focus Application Areas

#### ▶ *Expected Impact:*

- ▶ Increased **deployment** of robotics in each FAA
- ▶ Formation of **supply chains** around platforms and modules for each FAA
- ▶ Introduction of cross industry based **standards** for modules and systems
- ▶ Improved technology **transfer** in each FAA
- ▶ Greater awareness of **autonomy** and its benefits in each FAA
- ▶ Greater **coherence** of stakeholder communities around each FAA
- ▶ Generation of new **businesses** based around platform supply
- ▶ Demonstration of platforms within each FAA at **TRL 5** or greater
- ▶ Increased competitiveness and efficiency within each FAA
- ▶ Leveraging effect on other sources of funding, in particular regional and national funding

TRL 5 – technology validated in relevant environment

## ▶ Robotics Calls: ICT - 15

### ▶ ICT-15-[2019]:

### **Robotics Establishing Focus Application Area Pilots**

#### ▶ *Specific Challenge:*

demonstrate, through large scale pilots, how robotics can impact at scale either within existing business models or disruptively. ...

#### ▶ *Scope:*

- ▶ Innovation Actions in Robotics; large scale pilots in
  - ▶ The inspection and maintenance of infrastructure
  - ▶ In the SME industrial sector
- ▶ Coordination and Support Action in Robotics

## ▶ Robotics Calls: ICT - 15

### ▶ ICT–15-[2019]:

### Robotics Establishing Focus Application Area Pilots

#### ▶ *Expected Impact:*

##### ▶ *Innovation Action:*

- ▶ The demonstration of the **potential** for robotics to impact at scale in the chosen FAA
- ▶ The reduction of technical and commercial **risk** in the deployment of services based on robotic actors within the FAA.
- ▶ Greater **understanding** within existing FAA organisations of the potential for deploying robotics.
- ▶ Demonstration of **standards** and platforms operating over extended time periods in near realistic **environments**.

##### ▶ *Coordination and Support Action:*

- ▶ Greater public exposure to actual robotics capability.
- ▶ Greater engagement with competitions from FAA commercial organisations.

## ▶ Robotics Calls: ICT - 16

### ▶ ICT-16-[2020]:

#### **Robotics - Establishing Focus Application Area Pilots**

### ▶ *Specific Challenge* (same as ICT-15):

demonstrate, through large scale pilots, how robotics can impact at scale either within existing business models or disruptively. ...

### ▶ *Scope:*

#### ▶ Innovation Actions in Robotics; large scale pilots in

- ▶ In the Agri-Food sector from farming to processing and distribution

#### ▶ Coordination and Support Action in Robotics

## Robotics Calls: ICT - 16

### ▶ ICT-16-[2020]:

### Robotics - Establishing Focus Application Area Pilots

#### ▶ *Expected Impact:*

##### ▶ *Innovation Action:*

- ▶ Improved **competitiveness** in FAA
- ▶ Greater **levels** of robotics use within FAA
- ▶ Higher levels of **investment** for robotics in FAA.
- ▶ The reduction of technical and commercial **risk** in the deployment of services based on robotic actors within the FAA.

##### ▶ *Coordination and Support Action:*

- ▶ Effective **dissemination** of knowledge surrounding non-technical aspects of robot deployment.
- ▶ Greater **awareness** of robotics among key stakeholders and policy makers.
- ▶ Improved understanding of **legal, socio-economic and ethical issues** and their impact on robotics deployment.

## Robotics Calls: ICT - 17

### ▶ ICT-17-[2018-2019-2020]

#### **Robotics PPP: Developing robotics core technology**

#### ▶ *Specific Challenge* towards autonomy in robotic systems:

##### ▶ Artificial Intelligence and Cognition

cognitive systems; robots to interact, learn, categorise, make decisions, derive knowledge

##### ▶ Cognitive Mechatronics

coupled sensing and actuation; improved control, motion, interaction adaptation, learning;

##### ▶ Socially cooperative human robot interaction

passing tools to a worker; holding a ladder; exo-skeletons providing sympathetic motion

##### ▶ Model based design and configuration tools

sharing of knowledge between tools; standardization

## Robotics Calls: ICT - 17

### ▶ ICT-17-[2018-2019-2020]

#### **Robotics PPP: Developing robotics core technology**

#### ▶ *Expected Impact:*

- ▶ Improved technical capability in each of the core technologies over the current state of the art.
- ▶ A greater range of applications in the FAA that can be demonstrated at **TRL 3** and above.
- ▶ The lowering of technical barriers within FAA applications.

TRL 3 – experimental proof of concept