EUROPEAN ROBOTICS FORUM

Brought to you by SPARC

WORKSHOP DIGEST

22-24 March 2017
Edinburgh - Scotland - UK

www.erf2017.eu

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Welcome !

A warm welcome to the European Robotics Forum 2017 in Edinburgh! The last year was characterised by a large increase in robot sales, the development of outstanding robotics technology and the foundation of many new companies (about 80 start-up producers of robots in Europe!). This was amplified by the EC's Digitising European Industry initiative and by a recommendation of the European Parliament to look at robotics-related issues such as liability, safety and changes in the labour market, which all resulted in a high level of media interest. Therefore, I am very much looking forward to a very active Forum where the European robotics community will discuss not only the recent technological trends, innovation and economic aspects, but also ethical, legal, societal (ELS) issues.

The annual European Robotics Forum (ERF), organised by euRobotics, is the most influential meeting of the European robotics community. Researchers, engineers, decision makers, representatives of various organisations and the European Commission, and a growing number of entrepreneurs and business people from all over Europe come together to discuss topics which have a significant impact on the development of robotics markets and the future of work in Europe. To highlight the recent development, we have to state that the European Union is currently one of the global frontrunners in the race for automation in manufacturing: 65 percent of countries with an above-average number of industrial robots per 10,000 employees are located in the EU.

The time has come to integrate and discuss about technologies coming from several areas closely related to robotics: Artificial Intelligence (AI), the Internet of Things (IoT), or Big Data, just to name a few. Especially AI and robotics will be addressed by a series of workshops. The Forum also addresses specific application areas to which the technologies can be applied to and are likely to bring these fields to a new level of robotisation. These areas include healthcare, maintenance and inspection, the agri-food sector, manufacturing SMEs, logistics, space applications, and many more.

Complementing the European Commission's robotics programme in context of the private-public partnership SPARC, where euRobotics represents the private side, the EC's "Digitising European Industry" (DEI) strategy becomes more and more important to establish links between European, national and regional initiatives. Initiatives pushed by euRobotics, such as lighthouses, will also shape the future of European robotics.

I would like to take the opportunity to thank all participants for turning this forum into a stimulating exchange of ideas by organising and participating in more than 60 workshops. Special thanks go to the local organisers Edinburgh Centre for Robotics and Heriot-Watt University led by David Lane, my colleagues from the Board of Directors and the euRobotics' secretariat for the hard work to making this event happen, and to the European Commission for their continuous support. A big thank you goes as well to our 30 sponsor and exhibitors. Their financial contribution enables the event to be so large and successful – please take your time to see them in the exhibition hall.

I am looking forward to an illuminating experience in Edinburgh, full of fruitful discussions and networking opportunities, across the whole range of what robotics has to offer today and in the future. Please help us to ensure it remains this way by providing feedback on our work – do not hesitate to contact me directly at the Forum.

Dr. Bernd Liepert

euRobotics President

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Forum Information

Where and when?

The European Robotics Forum 2017 takes place in Edinburgh, Scotland, the UK from Wednesday, March 22, 2017 to Friday, March 24, 2017.

DATE:

22-24 March, 2016

VENUE:

EICC, The Exchange
Edinburgh EH3 8EE, UK

Website: www.eicc.co.uk

Opening hours

Days	Exhibition Area	ERF Workshop rooms
Wednesday, 22 March	7:30 am to 6:30 pm	8:30 am to 5:45 pm
Thursday, 23 March	7:30 am to 6:30 pm	8:30 am to 5:45 pm
Friday, 24 March	7:30 am to 5:00 pm	8:30 am to 3:30 pm

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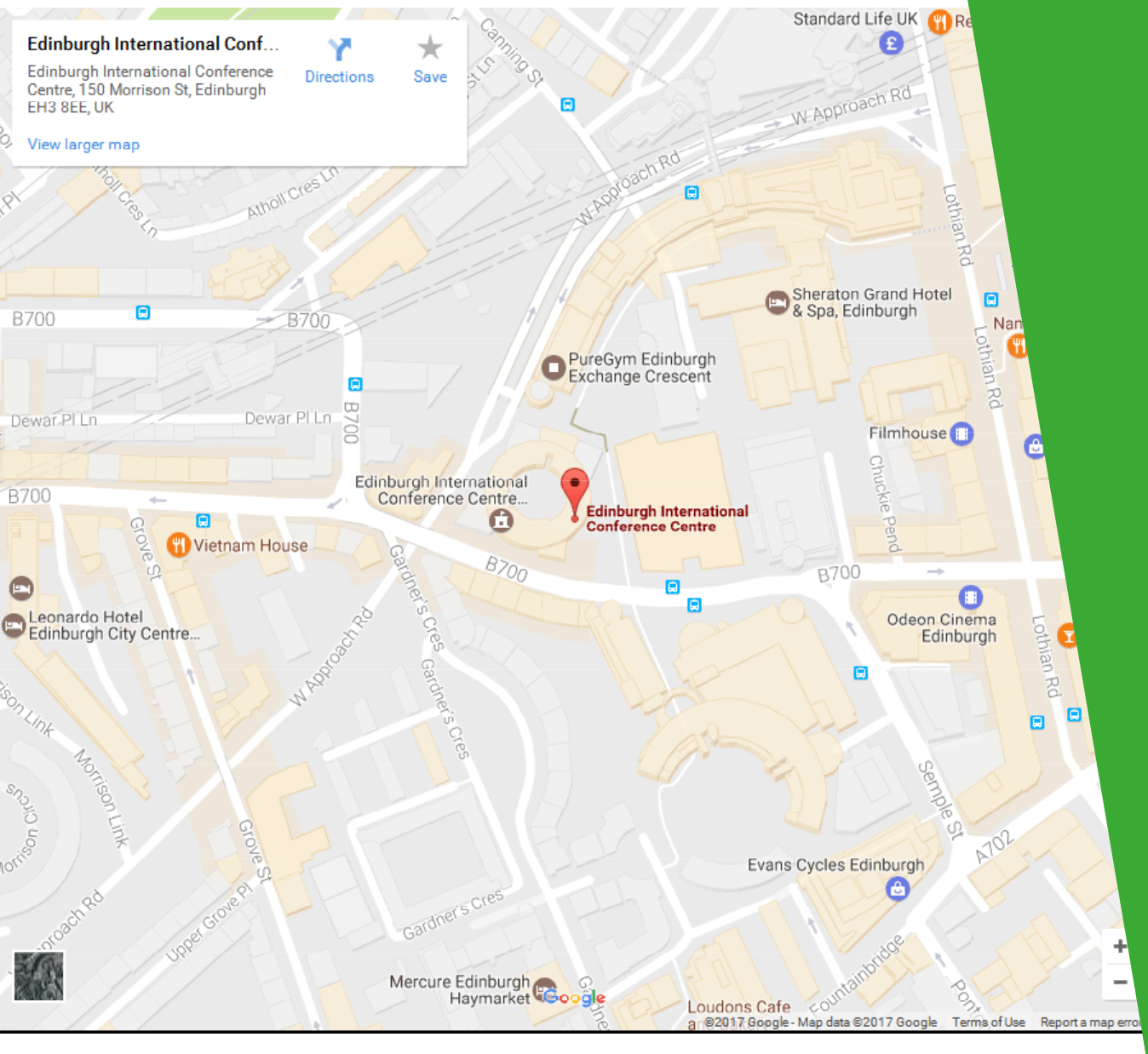
Forum Information

How to get there



How to get to Edinburgh

With excellent air links and rail and road network, getting to Edinburgh and the EICC from overseas or within the UK has never been easier.

AIR

Edinburgh airport is served by more than 40 airlines, travelling to around 130 worldwide destinations. Only 12km from the city centre, it's served by excellent bus, tram and taxi services that link directly to the town. More information from edinburghairport.com

RAIL

Edinburgh station is linked to all the UK's major cities and airports. A high-speed link to London takes just over four hours. The Eurostar service connects to Paris in around eight hours. There are trains to major cities across the UK, as well as to Scotland's favourite tourist destinations. More information from nationalrailenquiries.co.uk

Forum Information

How to get to Edinburgh

ROAD

Edinburgh is easily accessible by a network of motorways and trunk roads, chiefly the M74, A1 and A68 from the south and the M8 from the west. The M9 and M90 head north. Edinburgh's bus station on St Andrews Square connects to all the major cities in Britain. More information on bus services from Nationalexpress.com

Travelling from Airport to City Centre

The Airlink 100 operates a frequent bus service (every 10 minutes at peak times) between Edinburgh Airport and the city centre, with designated stops en-route. The service starts at 04.30 and runs until 00.22 at night, with the journey taking 20 minutes. Tickets cost £4.50 single and £7.50 return. Delegates travelling to EICC directly from the airport are advised to disembark at Haymarket and to follow signs for EICC on foot (5 minute walk).

Buy your Airlink ticket in advance to receive a discount.

The N22 bus also departs from outside the Airport entrance and runs every half an hour through the night until the Airlink service starts again. For more information about these services click here.

Getting around Edinburgh

ON FOOT

Edinburgh is a very compact city and most of the hotels being used for the conference are within walking distance of the EICC and the evening event venues.

BUS

Edinburgh has an excellent local bus service operated by Lothian Buses. Travel from your accommodation to the EICC and other venues can be planned using the journey planner facility on their website. Information about ticket types and prices can be found here. Please note that exact fare is required if purchasing tickets from the driver as no change is given.

TRAM

Edinburgh Trams run between the Airport and York Place every 8-10 minutes Monday to Saturday and every 12-15 minutes on a Sunday. The closest tram stop to the EICC is at Haymarket Station. Please visit Edinburgh Trams website for more details.

TAXI

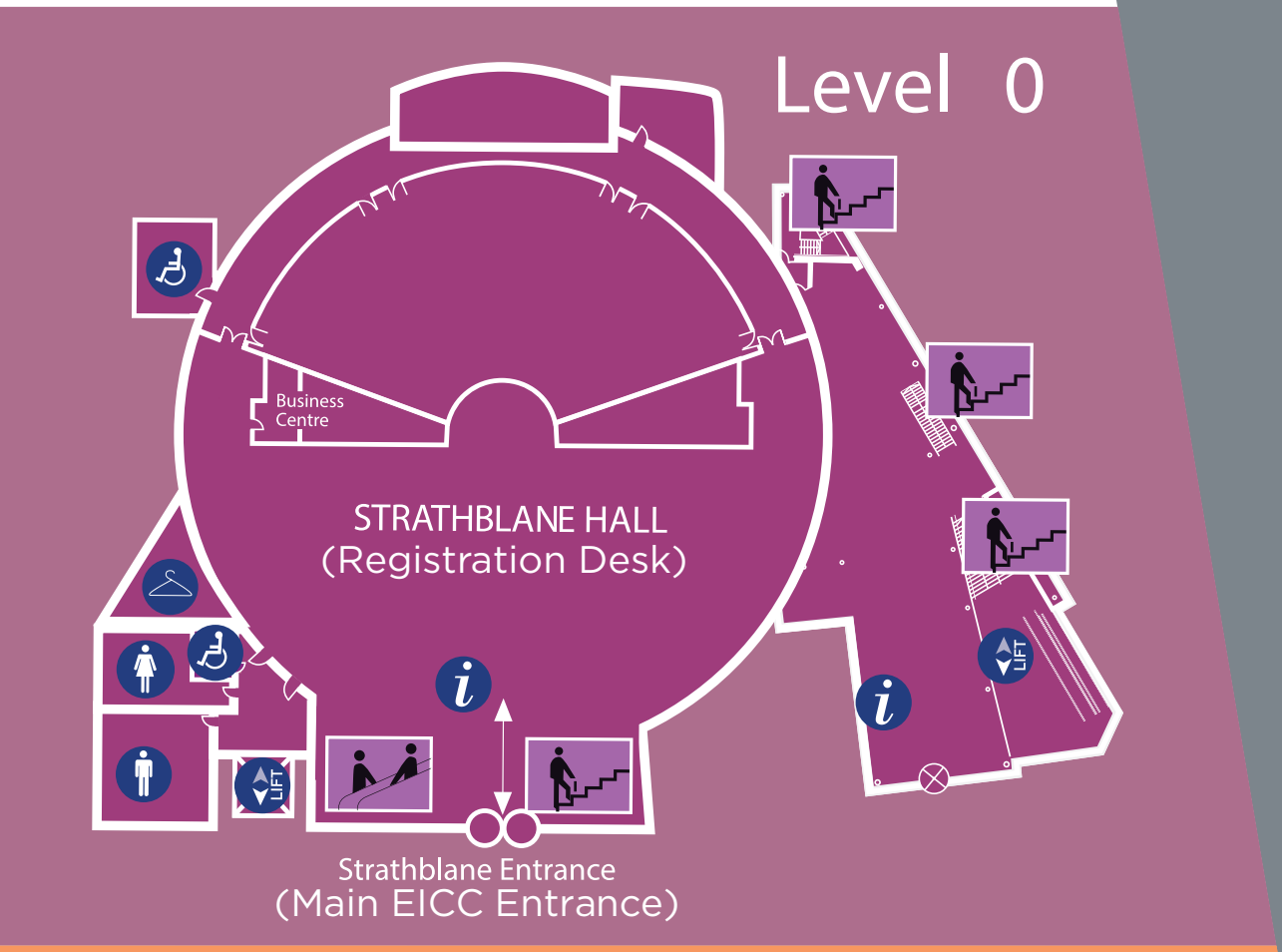
Taxis can be booked in advance by most hotel reception desks or hailed on street if orange light is illuminated. There are also a number of taxi ranks located around the city centre, including at Waverley and Haymarket railway stations.

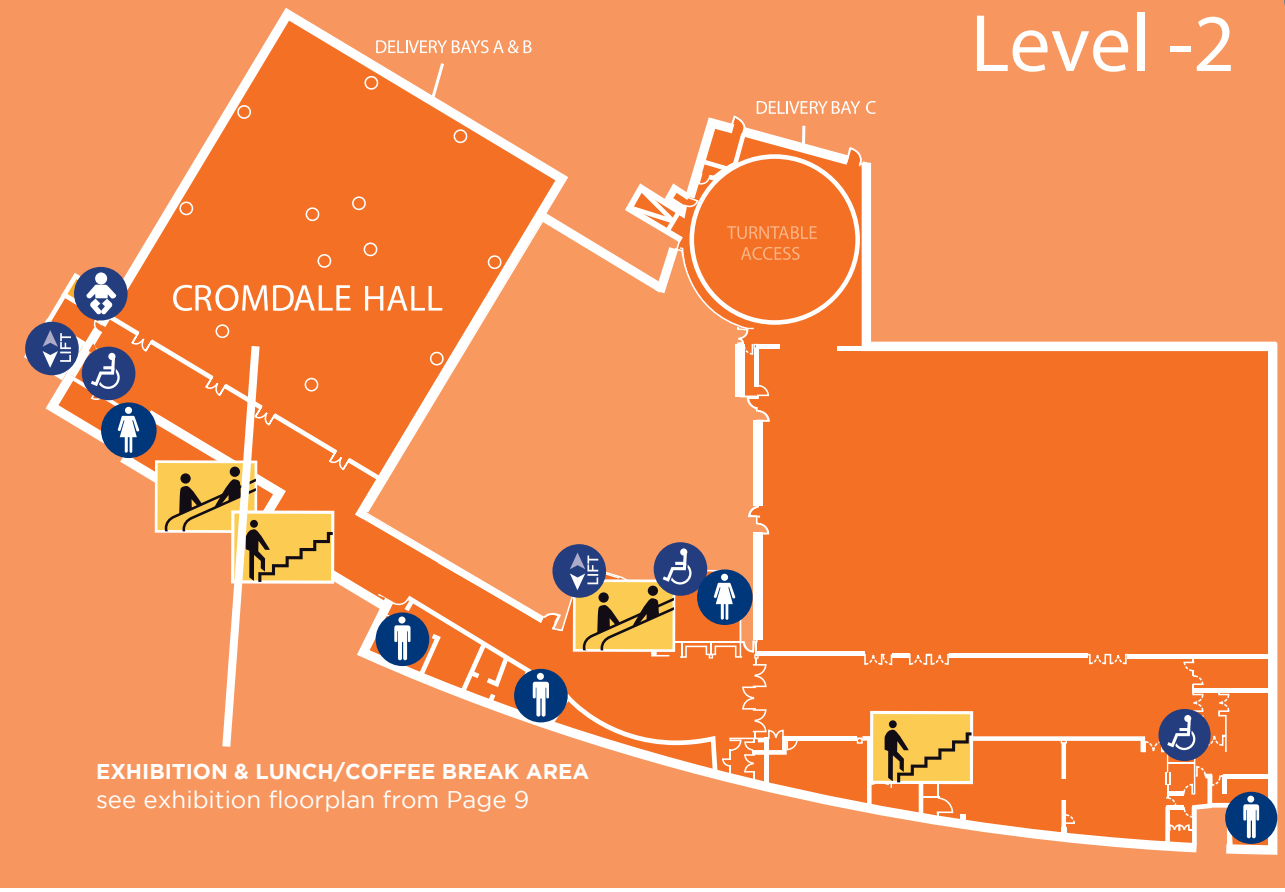
CAR

There are many car parks in close walking distance to the EICC. Please access the following links for further details:

- National Car Parks (NCP) in central Edinburgh
- Sheraton Hotel Car Park located 150 meters from the EICC, with limited accessible parking spaces
- Semple Street Car Park located 300 meters from the EICC

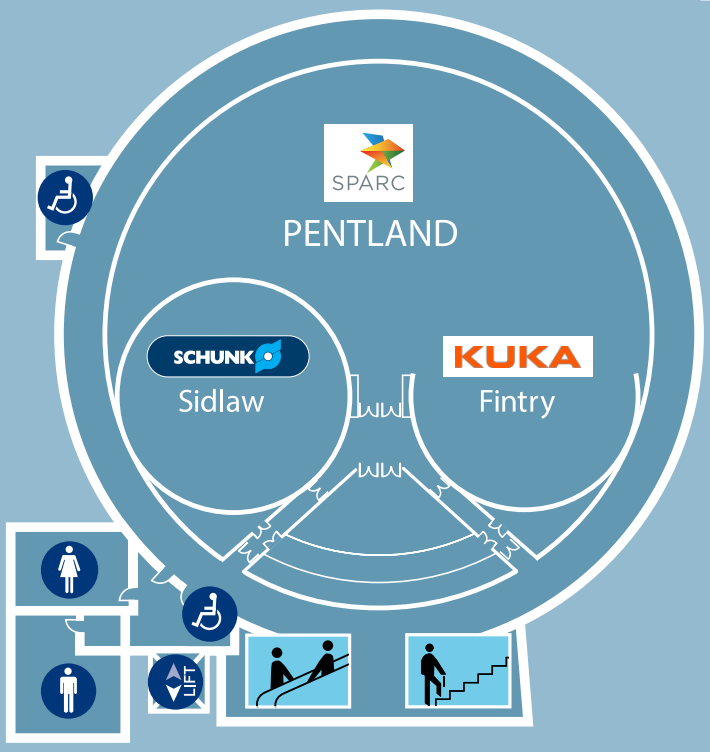
FLOOR PLAN - Conference rooms



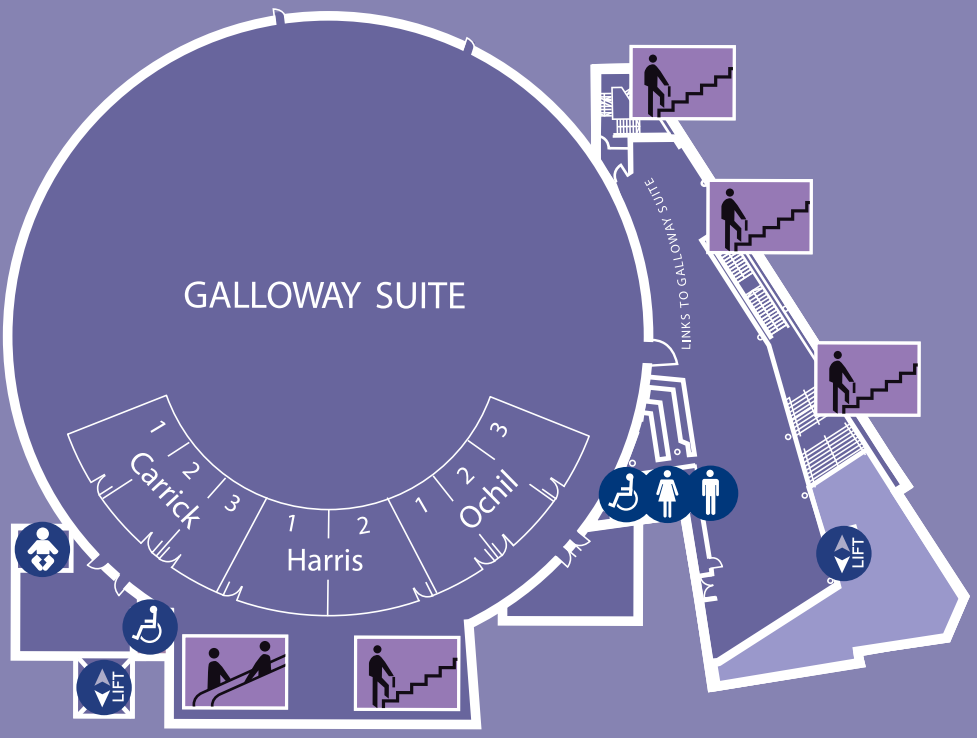


FLOOR PLAN - Conference rooms

Level 3

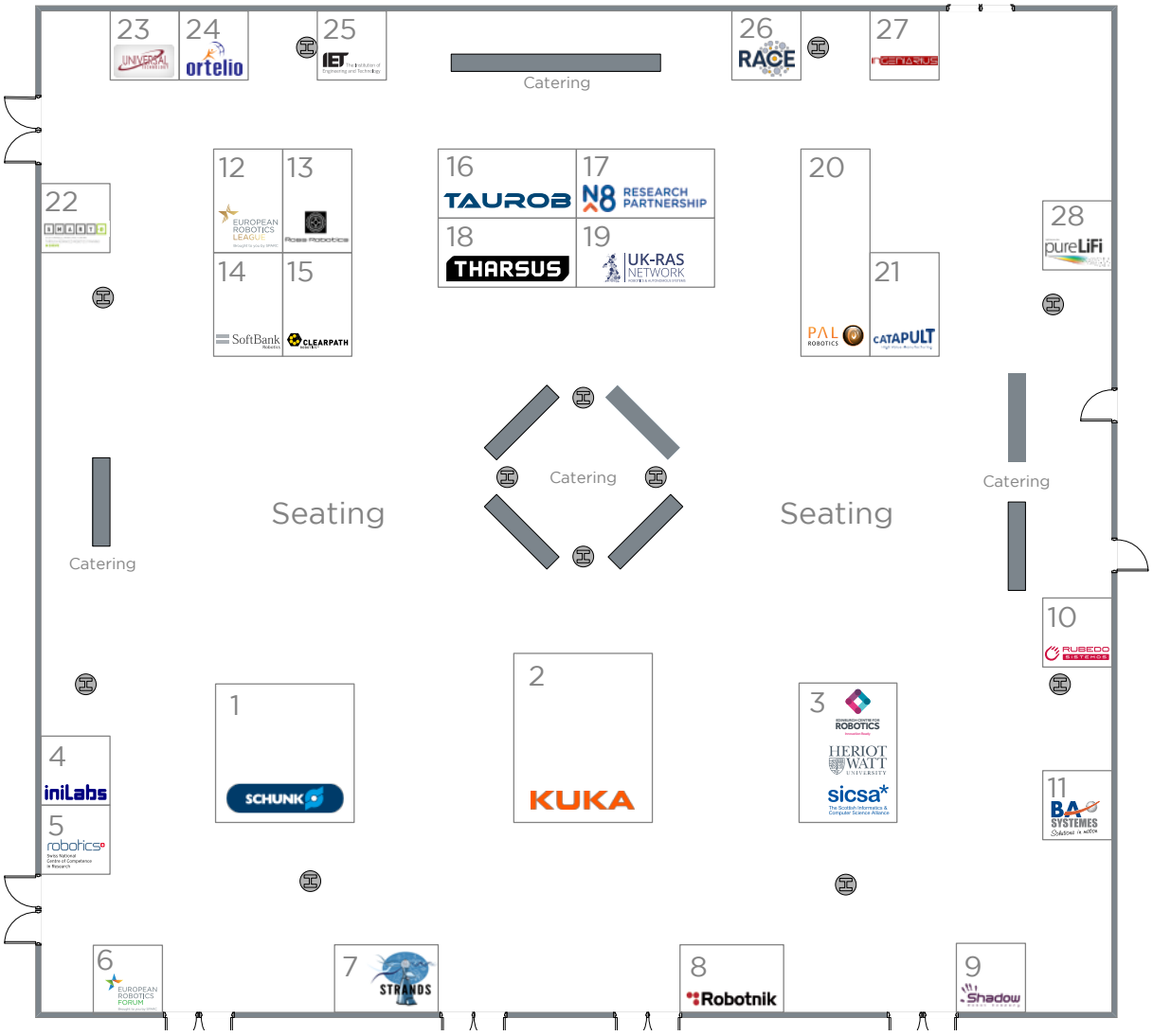


Level 1



FLOOR PLAN - Exhibition layout

Click on each exhibitor to go to the corresponding page. To return to this page click on the arrow.



MAIN ENTRANCE - Cromdale Hall (Level -2)

01	SCHUNK	15	Clearpath Robotics
02	KUKA AG	16	taurob GmbH
03	Edinburgh Centre for Robotics, Heriot Watt University, SICSA Cyber Physical Systems	17	N8 Research Partnership
04	iniLabs GmbH	18	Tharsus Group
05	NCCR Robotics	19	EPSRC UK-RAS Network
06	European Robotics Forum 2018	20	PAL Robotics
07	The STRANDS Project	21	High Value Manufacturing Catapult
08	Robotnik Automation	22	SMART-E Marie Curie ITN
09	Shadow Robot Company Ltd	23	UT.com
10	Rubedo Sistemos	24	Ortelio
11	BA Systèmes	25	The Institution of Engineering and Technology
12	European Robotics League (ERL)	26	UKAEA RACE
13	Ross Robotics Limited	27	INGENIARIUS
14	Softbank Robotics	28	Pure Li-Fi

This floorplan reflects the status of 16th March 2017.

PROGRAMME OVERVIEW

Click on each workshop to go to the corresponding page. To return to this page click on the arrow.

21 March	14:00 - Sidlaw	euRobotics General Assembly (euRobotics members only)

22 March	SPARC (Pentland)	KUKA (Fintry)	SCHUNK (Sidlaw)	Harris 1	Harris 2	Ochil 1	Ochil 2 + 3
8.30 – 10.00		**Harsh Environments** Robotics for Nuclear Environments *Yasemin Bekiroglu*	**AICoR** AI and Robotics: Communicating the unmet need *Markus Vincze*	**Health** Haptics in practice: How healthcare can benefit! *Helge Wurdemann*	**Standardisation** Reproducibility in social robotics and HRI experiments *Adriana Tapus*	**ELS** A Tool for the Ethical and Legal Assessment of Non-military Drone Design and Deployment *Peter Novitzky*	**Social** Social Human-Robot Interaction in Public Spaces with Naive Users *Mary Ellen Foster*
10.00 – 10.45	Coffee break						
10.45 – 12.15	**Official Opening**						
12.15 – 14.00	Lunch break						
14.00 – 15.30	**Success Stories** The new H2020 robotics projects in the SPARC strategy *Cécile Huet*	**ELS** Ethics - Should society be afraid of robots? *Vincent C. Müller*	**AICoR** Towards Fully Autonomous Robots: Challenges for AI Planning in Robotics *Andrea Orlandini*	**Maintenance and Inspection** The Minimum Viable Product Approach: A way to bridge the valley of death in Inspection & Maintenance Robotics *Aksel Transeth*	**Standardisation** Medico-surgical-rehab robots: safety, standards and regulatory issues *Tamas Haidegger*	**Health** Pushing the boundaries of haptic research for Health: Current challenges *Helge Wurdemann*	**Industrial** Teaching by Demonstration for Industrial Applications *Yasemin Bekiroglu*
15.30 – 16.15	Coffee break						
16.15 – 17.45	**AICoR** AI for Robotics: where are the Fruit and how do we pick them? *Alessandro Saffiotti*	**ELS** Are robots a risk to our economy, esp. our jobs? *Vincent C. Müller*	**Logistics** Towards human robot collaboration in Logistics *Jesús Alfonso de la Riva*	**Neurorobotics** Introduction to the HBP Neurorobotics Platform *Alexander Kuhn*	**Construction** Construction Robotics - beyond industrial robots *Sigrid Brell-Cokcan*	**Health** Successful translation of haptic technology for Healthcare: Towards increasing TRLs *Helge Wurdemann*	**System Engineering** RobMoSys: the next level of a Model Driven Robotic Software Ecosystem *Herman Bruyninckx*
19.30-23.30	**Welcome reception** (National Museum of Scotland)						

PROGRAMME OVERVIEW

Click on each workshop to go to the corresponding page. To return to this page click on the arrow.

23 March	SPARC (Pentland)	KUKA (Fintry)	SCHUNK (Sidlaw)	Harris 1	Harris 2	Ochil 1	Ochil 2 + 3
8.30 – 10.00	**Success Stories** Step Change Results from FP7 Projects *Cécile Huet*	**ELS** Do we need new laws to handle robots? *Vincent C. Müller*	**Industrial** Topic Group Industrial Robotics - Challenges and needs *José Saenz*	**Social** Strategies for Deploying and Delivering Ethical, Sustainable and Acceptable Assistive Robotic Solutions *Praminda Caleb-Solly*	**Space** iBOSS Workshop part 1: Space Robotics and Spacecraft design, production and operation *Joerg Kreisel*	**Underwater** Robocademy - A European Academy for Marine and Underwater Robotics *Thomas Vögele*	**Success Stories** Robots for disaster response *Bruno Siciliano*
10.00 – 10.45	**Coffee break**						
10.45 – 12.15	**ELS** How is law and regulation developing to address robotic technologies? Where we are and where we are heading. *Vik Khurana*	**Awards** Tech Transfer Award Nominees presentations *Martin Haegele*	**Agri-Food** Robotics for Agri-Food: Echord++ Experience *Paolo Dario*	**Industrial** 4th Workshop on Hybrid Production Systems (I) *Ramez Awad*	**Space** iBOSS Workshop part 2: Space Robotics and Spacecraft design, production and operation *Joerg Kreisel*	**Innovation** IPR and patents training (I) *Dimitrios Chrysostomou*	**Social** The contemporary Societal Applications of Social Robots and the Barriers to the Market *Amit Kumar Pandey*
12.15 – 14.00	**Lunch break**						
14.00 – 15.30	**AICoR** AI & Robotics: Delivering platforms and integration tools *Markus Vincze*	**Awards*** Entrepreneurship Workshop : Final Pitch *Jon Agirre Ibarbia*	**Agri-Food** Agri-food robotics: state of the art and future challenges *Gert Kootstra*	**Industrial** 4th Workshop on Hybrid Production Systems (II) *Ramez Awad*	**Space** H2020 SRC Space Robotics Technologies Future Roadmap *Daniel Noelke*	**Innovation** IPR and patents training (II) *Dimitrios Chrysostomou*	**Health** Healthcare Topic Group cluster activities *Christophe Leroux*
15.30 – 16.15	**Coffee break**						
16.15 – 17.45	**Industrial** Collaborative robots in Europe: overcoming current barriers for use in manufacturing *Shirley Elprama*	**ELS** Overview and discussion of the study "European Civil Law Rules in Robotics" *Karin Röhricht*	**Perception** Perception Challenges in Times of Deep Learning and Cognition *Michael Suppa*	**Health** The past, present and future of European service robotics for eldercare and assisted living *Dimitrios Tzovaras*	**Space** H2020 SRC Space Robotics Technologies Preliminary Results and Impacts *Daniel Jones*	**Mining** Robotics in mining - where we are and where we want to be *Piotr Kasza*	**Systems Engineering** Progress in Robot Modeling - Why Modeling is Crucial for Success *Andreas Müller*
19.00 - 23.00	**Banquet & Award Ceremony** (National Museum of Scotland)						

PROGRAMME OVERVIEW

Click on each workshop to go to the corresponding page. To return to this page click on the arrow.

24 March	SPARC (Pentland)	KUKA (Fintry)	SCHUNK (Sidlaw)	Harris 1	Harris 2	Ochil 1	Ochil 2 + 3
8.30 – 10.00	**AICoR** Combining IoT, robotics and AI: where is the added value, where are the challenges? *Mauro Dragone*	**Social** Empathic Human-Robot Interaction: A Joint Industry-Academia Outlook for the Future *Kerstin Dautenhahn*	**Logistics** Robust and long term operation of robotics for Logistics *Jesus Alfonso de la Riva*	**Standardisation** Standards and Standardisation for Robots *Theo Jacobs*	**Competitions** European robotics competitions and challenges: status quo and lessons learned (I) *Agostino De Santis*	**Health** Robotic surgery in the European researchers community *Marta Capiluppi*	
10.00 – 10.45	Coffee break						
10.45 – 12.15	**AICoR** AI for Long-Term Autonomy in Robot Applications *Nick Hawes*	**Health** Ethical, Legal, and Social Aspects of Healthcare Robotics (part 1) *Sanja Dogramadzi*	**Innovation** Development & Learning from Technology Transfer Initiatives Towards Digital Innovation Hubs *Jeremy Hadall*	**Miniaturised** Towards a European open platform on miniaturised robotics (I) *Nicolas Andreff*	**Competitions** European robotics competitions and challenges: status quo and lessons learned (II) *Agostino De Santis*		**Maintenance & Inspection** Aerial Robotics Inspection: from prototypes to industrial applications *Anibal Ollero*
12.15 – 13.30	Lunch break						
13.30 – 14.00	**ERF2017 Feedback Session**						
14.00 – 15.30	**AICoR** Case studies and future needs of long term navigation and reasoning *Markus Vincze*	**Health** Multidisciplinarity in Robotic Exoskeleton Technology *George Nikolakopoulos*	**Competitions** Now coming: Research Reproducibility in Robotics *Fabio Bonsignorio*	**Miniaturised** Towards a European open platform on miniaturised robotics (II) *Nicolas Andreff*	**Systems Engineering** Agile for Robotics *Damien Sallé*		**ELS** Ethical, Legal, and Social Aspects of Healthcare Robotics (part 2) *Eduard Fosch Villaronga*

*** Entrepreneurship Workshop (restricted access) - The first rounds of the Entrepreneurship Workshop with restricted access take place as following:**

22 March	Carrick 1	23 March	Carrick 1
14.00 – 15.30	**Entrepreneurship Workshop: Pitches (restricted access)**	8.30 – 10.00	**Entrepreneurship Workshop: Coaching session (restricted access)**
16.15 – 17.45	**Entrepreneurship Workshop: Pitches (restricted access)**		

Please note that the text included in the ERF2017 Workshop Digest has been provided by our partners. The programme reflects the status as of 7 March 2017. euRobotics assumes no liability or responsibility for any errors, omissions or image copyright in this Digest.

OFFICIAL OPENING

Session title	Welcome and Opening Session
Room	SPARC (Pentland) - EICC Level 3
Hours	10.45 - 12.15
Motivation and objectives	As in all previous annual ERFs, the Opening Session is an opportunity to shed light on "the state of robotics" by forecasting disruptive innovations made possible by scientific developments. The Opening Session will comprise statements from the EC and welcome notes from euRobotics, local organisers and politicians. Two keynotes address technical aspects as well as innovation made possible by the recent scientific and technological progress. One keynote highlights Artificial Intelligence methods applied to robotics, while the second one focuses on entrepreneurship and innovation and is addressing driverless cars. **Keynote Speakers:** • **Raia Hadsell** (Google DeepMind) has worked on deep learning and robotics problems for over 10 years. After completing a PhD with Yann LeCun, which featured a self-supervised deep learning vision system for a mobile robot, her research continued at Carnegie Mellon's Robotics Institute and SRI International, and in early 2014 she joined DeepMind in London to study artificial general intelligence. In her recent research, which focuses on the challenge of continual learning for AI agents and robots, she has proposed neural approaches such as policy distillation and progressive nets to solve the problem of catastrophic forgetting and improve transfer learning. • **Stan Boland** (5AI) will talk about his experiences as a serial tech entrepreneur leading successful venture backed startups, and about his new engagement in the area of driverless cars. Stan Boland is the founding CEO of FiveAI, a UK start-up which is using artificial intelligence (AI) and machine learning (ML) to accelerate the arrival of fully autonomous vehicles, backed by $2.7M of equity funding from Amadeus Capital Partners, Spring Partners and Notion Capital. Previously he co-founded and was CEO of two of Europe's most successful VC-backed communications silicon and software companies: Element 14 Inc. and Icera Inc., bought by Broadcom (NASDAQ: BRCM) and NVIDIA (NASDAQ: NVDA) respectively, for an aggregate value of over $1B. He has previously served as CEO at computer pioneer Acorn and was a member of the board at ARM Holdings plc (LSE: ARM and NASDAQ: ARMH). He is a graduate in Physics from the University of Cambridge.

PROGRAMME - 22 March 2017

Session title	Harsh Environments - Robotics for Nuclear Environments
Room	KUKA (Fintry) - EICC Level 3
Hours	8.30 - 10.00
Organiser(s)	• **Yasemin Bekiroglu**, ABB AB Corporate Research Sweden • **Ladislav Vargovcik**, ZTS VVU KOSICE, Slovakia • **Gerhard Neumann**, University of Lincoln, UK • **Ales Leonardis**, University of Birmingham, UK
Motivation and objectives	There are many problems that should be solved relevant to nuclear applications. One main problem is nuclear cleanup which is potentially the biggest and most impactful application for real-world service robots in the coming few years, with huge societal importance. In UK alone, cleanup of legacy waste (accumulated since 1950s) represents the largest environmental remediation project in the whole of Europe, estimated to need £90-220 billion over next 100 years. 20-40% of this work must be done by robots as the materials are too hazardous for humans. Almost every kind of robotics is needed (grasping and manipulation, vehicles, flying robots, snake-bots, SLAM, vision, often in highly unstructured environments). We have successfully organized a workshop on a similar topic last year for the first time which primarily focused on nuclear cleanup. We would like to extend the discussions to address other relevant processes and tasks in this domain in a second workshop such as monitoring, automation, human involvement, required robotic setup in these extreme situations, as there is a great need for development in this area. There will also be discussions on actual achievements and gaps for future research.
Agenda of the workshop	• **Tony Pipe**, The potential for different forms of safe Human-Robot teamwork in nuclear decommissioning. • **Barry Lennox**, Mobile Robots for Nuclear Decommissioning at Sellafield and Fukushima. • **Jae-Hee Kim**, Pole climbing robot working in complex pipe structures. • **Ladislav Vargovcikl**, Examples of Robotic Liquidation of Metal and Sludge RAW at the Decommissioning of NPPs. • **Rustam Stolkin**, H2020 RoMaNS and related nuclear robotics projects. • **Joël Vanden Bosch**, Example of use of Robotics for Nuclear High Level Cell Decommissioning and Inspection of Offshore Assets. • **Ali Muhammad**, Validation of Maintenance Operation for ITER Fusion Reactor. • **Andrew Graham**, Lasersnake 2: Snake-arm Robots for Nuclear Intervention and Decommissioning. • **Matteo Zoppi**, Robotized Sorting of Nuclear Waste Comprising Soft Items. • **Philippe Garrec**, tba
Workshop website link	www.h2020romans.eu/erf2017
Further information	Please see the workshop website for further details.

PROGRAMME - 22 March 2017

Session title	AICoR - AI and Robotics: Communicating the unmet need
Room	SCHUNK (Sidlaw) - EICC Level 3
Hours	8.30 - 10.00
Organiser(s)	• **Markus Vincze**, TU Vienna, Austria • **David Vernon**, University of Skovde, Sweden • **Alessandro Saffiotti**, Örebro University, Sweden • **Cécile Huet**, European Commission
Motivation and objectives	There is a gap between the academic output on AI in Robotics & the take-up in applications. This exists because there is a mismatch between what can be delivered & what is needed: a failure of technology-application alignment, caused by a technical language barrier, by difficulty in scoping problems & by misalignment of problems and solutions. Application developers are often unclear about how to express cognitive requirements & what the future progression path of AI might be, & AI practitioners, working on generic methods, cannot see how to translate & deliver what they can achieve into a form that is comprehensible to application developers. Closing this gap is essential: Europe has extensive expertise in AI and there are many application developers who can integrate a cognitive advantage in the market. How best to achieve this goal? 2 reasons why people might want to use a cognitive robot. 1. cognition allows the robot to work autonomously or semi-autonomously in challenging environments, adapting to changes, and anticipating events and outcomes in preparing its actions. 2. cognition facilitates and fosters interaction with people: humans have a strong propensity for interaction with other cognitive agents and cognition, in turn, provides the robot with the ability to infer the goals and intentions of the human and thereby interact with the human in a safe and helpful manner.
Agenda of the workshop	• 08.30 - 08.40 - Introduction to objectives & methodology: Results of first interviews with industry (Markus Vincze) • 08.40 - 08.55 - Robot user needs: Teaser presentations - **Andrew Graham**, OC Robotics () 7/9/2016 - **Ugo Cupcic**, Shadow Robot Company (*) 12/9/2016 - **Ekkehard Zwicker**, GE Inspection Robotics • 08.55 - 09.00 - Identification of breakout groups • 09.00 - 09.30 - Parallel breakout group discussion • 09.30 - 09.40 - Report-back on result • 09.40 - 10.00 - Moderated brain storming
Workshop website link	workshops.acin.tuwien.ac.at/erf2017_AIcommunicate
Further information	They can prepare by familiarizing themselves with the result of the ROCKeu2 survey. This will be made available on the AI and Cognition (AICoR) Topics group website well in advance of the workshop

PROGRAMME - 22 March 2017

Session title	Health - Haptics in practice: How healthcare can benefit!
Room	Harris 1 - EICC Level 1
Hours	8.30 - 10.00
Organiser(s)	• **Dr Helge Wurdemann**, University College London, UK • **Prof. Kaspar Althoefer**, Queen Mary University of London, UK • **Dr Thrishantha Nanayakkara**, Imperial College London, UK • **Dr Alastair Barrow**, Director at Generic Robotics Ltd. • **Dr Vijay Pawar**, University College London, UK
Motivation and objectives	The field of haptics has made inroads into a number of application areas over the past years. This workshop, however, will focus on identifying future markets and opportunities in healthcare! What are current emerging and prospective applications, what are benefits that haptics can offer for these prospective applications, what are the barriers to market – these are only some of the questions that this workshop will try to find answers to. Get involved in round-table brainstorming discussions and help identify future applications of haptics – shaping a vision!
Agenda of the workshop	Agenda will be available on http://erf2017.softhaptics.website
Workshop website link	http://erf2017.softhaptics.website

Session title	Standardisation - Reproducibility in social robotics and HRI experiments
Room	Harris 2 - EICC Level 1
Hours	8.30 - 10.00
Organiser(s)	• **Adriana Tapus**, ENSTA FRANCE
Motivation and objectives	The scope of this workshop is to bring together experts in social robotics and HRI research areas in order to advance on the widely debated issue of reproducibility of experiments, currently a tenet of scientific research. One of the main discussion topic of the workshop is to what extent it is possible to compare experiments that involve different solutions from differents labs, on different platforms, with different groups of human users.
Agenda of the workshop	• 8.30 - 8.45 - **Paolo Barattini**: presentation of previous activities and workshops results • 8.45 - 9.00 - **invited speaker 1** • 9.00 - 9.15 - **invited speaker 2**
Relation to a Topic Group	TG Standardization

PROGRAMME - 22 March 2017

Session title	ELS - A Tool for the Ethical and Legal Assessment of Non-military Drone Design and Deployment
Room	Ochil 1 - EICC Level 1
Hours	8.30 - 10.00
Organiser(s)	• **Peter Novitzky**, University of Twente, The Netherlands • **Haomiao Du**, University of Twente, The Netherlands • **Lesley Broos**, University of Twente, The Netherlands
Motivation and objectives	The ever-increasing penetration of drone technologies from the military domain into civil, industrial, and commercial domains poses substantial challenges and opportunities for individuals, social structures (e.g. labour, employment, etc.), and societies. We have developed a new ethical and legal analytical tool that supports the assessment of these challenges and opportunities in the research & design, and application of drone technologies in these non-military domains. The tool is aimed at facilitating the provision of practical recommendations that may be made regarding value-sensitive design (VSD) and legitimate deployment of drone technologies. This workshop is aimed at gathering feedback regarding the ethical and legal tool, its validity and utility, and ways in which the tool can be improved. The objective of the workshop is to test the tool for the ethical and legal assessment of non-military drone design and deployment. Therefore, it is intended to be highly interactive, engaging with the audience in group work and discussions.
Agenda of the workshop	• **Introduction** o Workshop objective and format – (5 min) o Ethical part of the tool – (5 min) o Legal part of the tool – (5 min) • **Interactive group work #1** o Ethical tool: exercise 1 of 2 – (10 min) o Ethical tool: exercise 2 of 2 – (10 min) o Ethical tool: presentation and discussion – (15 min) o Legal tool: exercise – (20min) o Legal tool: presentation and discussion – (15 min) • **Interactive group work #2 (after swap)** o Ethical tool: exercise 1 of 2 – (10 min) o Ethical tool: exercise 2 of 2 – (10 min) o Ethical tool: presentation and discussion – (15 min) o Legal tool: exercise – (20 min) o Legal tool: presentation and discussion – (15 min) • **Panel Q&A, feedback – (5 min)** The objective of the workshop is to test the tool for the ethical and legal assessment of non-military drone design and deployment.
Further information	Participants are welcome to bring any publication that they consider important and informative for this session. Requested: DATA projector, flipchart, pen, paper, space for group discussion.

PROGRAMME - 22 March 2017

Session title	Social - Social Human-Robot Interaction in Public Spaces with Naive Users
Room	Ochil 2+3 - EICC Level 1
Hours	8.30 - 10.00
Organiser(s)	• **Mary Ellen Foster**, University of Glasgow, United Kingdom • **Marc Hanheide**, University of Lincoln, United Kingdom • **Luca Iocchi**, Sapienza University of Rome, Italy • **Amol Deshmukh**, University of Glasgow, United Kingdom
Motivation and objectives	More and more robots are going out "into the wild" of public spaces, They are taking on new jobs in order to provide information to ordinary people, to entertain them, or even to simply do a robot's own job while still dealing with humans in their natural habitat. Hence, social interaction between robots and human has gained more and more interest: intuitive interaction and (multi-modal) interface design are key ingredients to be able to effectively and satisfactorily interaction with naive users, who may have very limited experience with not only robots in particular, but also interactive technology in general. With robots leaving the labs, stakeholders outside the robotics community are also becoming more and more involved and are witnessing the impact of robots in environments they are responsible and care for. Consequently, stakeholders such as managers and owners of public spaces that are now shared by robots need to have (i) a better understanding of what today's interactive robots can and cannot do, and (ii) how interaction with the general public can be facilitated. Last but not least, the potential of robots in public spaces has not yet been fully exploited, and new application domains and tasks are still being developed.
Agenda of the workshop	The workshop is divided in three phases. In the first phase, a selected set of contributors, representing a broad range of EU research projects, robotics competitions, and companies and end-users, will present their research as posters and all the participants will attend the poster session. In the second phase, different discussion tables focussing on specific topics will be set up. Both contributors and participants are invited to join the tables and participants can bring their contributions in these tables. Each table will have a moderator who will summarize, in the third phase, the outcome of the discussion.

PROGRAMME - 22 March 2017

Session title	Success Stories - The new H2020 robotics projects in the SPARC strategy
Room	SPARC (Pentland) - EICC Level 3
Hours	14.00 - 15.30
Organiser(s)	• **Cécile Huet**, European Commission, Luxembourg
Motivation and objectives	Don't miss the official presentation of the new H2020 Robotics projects and their contribution to the SPARC strategy! In 90 minutes you will have the full overview of the newly selected 17 projects and in the accompanying poster session you will have the opportunity to meet with the project representatives for more in-depth information and developing networks and synergies among projects and with the community as a whole.
Agenda of the workshop	**1) Introduction and portfolio overview by the EC** **2) Pitch from each Project representative in 3 slides, 4 minutes:** MY PROJECT WILL MAKE A CHANGE -> AMBITION -> APPROACH -> IMPACT **3) Poster session in the exhibition (location tbd)** After getting the overview of all the projects, the participants are strongly encouraged to discuss with the projects representatives at the poster session to learn more about their projects and experience as participants in H2020 projects.
Relation to a Topic Group	Relavant to most of the Topic Groups
Workshop website link	https://ec.europa.eu/digital-single-market/news-redirect/54131
Further information	More information on https://ec.europa.eu/programmes/horizon2020/en/news/new-horizon-2020-robotics-projects-2016

PROGRAMME - 22 March 2017

Session title	ELS - Ethics - Should society be afraid of robots?
Room	KUKA (Fintry) - EICC Level 3
Hours	14.00 - 15.30
Organiser(s)	• **Vincent C. Müller**, Anatolia College/ACT & U Leeds, Greece & UK
Motivation and objectives	The emergence of new technologies such as robotics and artificial intelligence causes a vast amount of discussion and even fears about the consequences of their usage and appearance. What can we expect from these machines capable of acting, learning and adapting their behaviour? What are the consequences of introducing autonomous machines into our society? This workshop is the first of a serie of three, addressing more specifically the ethical issues, i.e. the observance of values (such as honesty, professional integrity, respect for privacy, ...) and the evaluation of the consequences of our actions (are they for the public good in the long run?). One issue in this regard is the need for verification and validation, to provide assurance of safety and security.
Agenda of the workshop	• **Vincent C. Müller**: "Should we be afraid of robots"? Introduction & presentation of the bibliography on "robot ethics" http://philpapers.org/browse/robot-ethics • **Alan Winfield** (UWE): report on the work of the IEEE initiative in AI/AS ethics: http://standards.ieee.org/news/2016/ieee_autonomous_systems.html • **Maria Bulgheroni/Cathrine Hasse**: Introduction to H2020 project REELER "Responsible Ethical Learning with Robotics", • **Anibal Ollero** (U Seville): Certification and Validation of Remotely Piloted Aircraft Systems (RPAS) Discussion of the ELS position paper on 'ethics' http://www.pt-ai.org/TG-ELS/policy
Relation to a Topic Group	ELS
Workshop website link	http://www.pt-ai.org/TG-ELS/projects
Further information	Read the ELS draft statement on http://www.pt-ai.org/TG-ELS/policy

PROGRAMME - 22 March 2017

Session title	AICoR - Towards Fully Autonomous Robots: Challenges for AI Planning in Robotics
Room	SCHUNK (Sidlaw) - EICC Level 3
Hours	14.00 - 15.30
Organiser(s)	• **Andrea Orlandini**, National Research Council of Italy (CNR-ISTC), Italy • **Alberto Finzi**, Naples University "Federico II", Italy • **Michael Hofbaur**, Johanneum Research, Austria • **Daniele Magazzeni**, King's College London, United Kingdom
Motivation and objectives	Robotics is one of the most appealing and natural application area for the Artificial Intelligence research community. Advances in Automated Planning and Scheduling (P&S) research in Robotics applications are fostering key enabling technologies such as, e.g., decisional and long term autonomy, adaptability, interaction ability, dependability, and (more in general) cognitive abilities in Robotic platforms. In light of the accelerated progress and the growth of economic importance of advanced robotics technology, it is essential for the P&S and Robotics research communities to respond to the challenges that these applications pose and contribute to the advance of intelligent robotics. The aim of this ERF workshop is to bridge the gap between researchers and practitioners in P&S and Robotics, pushing recent technological advancements out of the laboratories for deploying a new generation of Intelligent Robots endowed with flexible, adaptive and goal-oriented behaviors, long-term autonomy, advanced interaction with humans in structured collaborative activities. This ERF Workshop constitutes a follow up of a scientific initiative started within the P&S research community for creating a common long-term forum where researchers from both P&S and Robotics communities can discuss about common interests and efforts, figure out shared challenges and discuss future developments.
Agenda of the workshop	• **14:00-14:15 Session presentation** **= Invited talks =** • 14:10-14:20 Alessandro Saffiotti, Orebro University, Sweden - Planning for robots: case studies from some EU projects • 14:20-14:30 Daniele Nardi, Sapienza University, Italy - Symbiotic Human Robot Planning • 14:30-14:40 Michael Beetz, Bremen University, Germany - Cognition enabled control for everyday manipulation • 14:40-14:50 Amit Kumar Pandey, SoftBank Robotics, France - Planning in Social Human-Robot Interaction: an Industrial Perspective through some commercial use cases **= Projects showcase =** • 15:00-15:05 Nick Hawes, Birmingham University, UK - STRANDS (FP7 - ICT) • 15:05-15:10 Alberto Finzi, Naples University "Federico II", Italy – SHERPA (H2020 – ICT) • 15:10-15:15 Daniele Magazzeni, King's College London, UK – SQUIRREL (FP7 – ICT) • 15:15-15:20 Andrea Orlandini, National Research Council, Italy – FourByThree (H2020 – FoF) • **15:20-15:30 Concluding remarks** *Changes in the agenda may still occur.*
Relation to a Topic Group	Topic Group on AI and Cognitive Robotics
Workshop website link	http://www.istc.cnr.it/eventi/erf-2017-workshop-towards-fully-autonomous-robots-challenges-ai-planning-robotics

PROGRAMME - 22 March 2017

Session title	Maintenance & Inspection - The Minimum Viable Product Approach: A way to bridge the valley of death in Inspection & Maintenance Robotics
Room	Harris 1 - EICC Level 1
Hours	14.00 - 15.30
Organiser(s)	• **Aksel A. Transeth**, SINTEF, Norway • **Ekkehard Zwicker**, GE Inspection Robotics, Switzerland • **Håkon Hilmar Ferkingstad**, Gassco AS, Norway
Motivation and objectives	Inspection & Maintenance is a rather conservative business. Although robotics provides a significant value it is difficult to establish robotics as a common practice, especially in the energy sector (Oil & Gas, Power generation). As a consequence the valley of death for new robotic solutions is bigger and hotter than in other industries. Several actions have been taken to bridge the valley of death (robotic contests, EU funded projects). All with promising results but it will take further time to open the market for robotics. A promising approach seems to the "Minimum Viable Product" (MVP) approach. With the MVP approach the value of robotics can be demonstrated and a common understanding of the robotic capabilities is established – all this with a limited invest for all parties involved. The objective of this workshop is to showcase the MVP approach with views from research, robotic technology provider and end-user and to discuss and brainstorm if and how this approach can be further applied to get faster and more efficient from research to working solutions applied in daily industry life.
Agenda of the workshop	**Agenda:** • 16:15 – 16:25 - Introduction to the session and the MVP approach. • 16:25 – 17:15 - Presentation from different stakeholders. • 17:15 – 17:40 - Brainstorming Session. Golden Question: How can the MVP approach help robotics to bridge the valley of death in a conservative industrial environment? • 17:40 – 17:45 - Summary, conclusions and follow-up **Presenters:** Introduction: Aksel A. Transeth, SINTEF; Ekkehard Zwicker, GE Inspection Robotics **The Asset Owner View** ***Oil&Gas:*** Anders Røyrøy, Statoil; Kris Kydd, Total; Russel Brown, Chevron ***Power Generation and/or Transportation & Infrastructure*** ***Asset owner (rail / road / shipping / power generation)*** (to be announced) ***The Service Provider view:*** Service provider 1 (to be announced); Service provider 2 (to be announced) ***The Robotic Supplier view:*** Ekkehard Zwicker, GE Inspection Robotics; Andrew Graham, OC Robotics ***The Research View:*** Aksel A. Transeth, SINTEF; Marco Hutter, ETH
Relation to a Topic Group	The workshop is arranged by the Maintenance and Inspection topic group, as well as the SPRINT Robotics collaborative.
Workshop website link	http://www.sprintrobotics.org/erf2017/
Further information	Participants are asked to participate in a brainstorming session regarding how the MVP approach can be further applied to get faster and more efficient from research to working industrial solutions.

PROGRAMME - 22 March 2017

Session title	Standardisation - Medico-surgical-rehab robots: safety, standards and regulatory issues
Room	Harris 2 - EICC Level 1
Hours	14.00 - 15.30
Organiser(s)	• **Tamas Haidegger**, Organisation Obuda University • **Paolo Barattini**, Turin, Italy • **Gurvinder Virk**, Innotec UK • **Emanuele Lindo Secco**, Liverpool Hope University, UK
Motivation and objectives	This workshop scope is to bring together experts in medico-surgical-rehabilitation robotics in order to discuss the ongoing issues regarding safety, to provide to the participants insight in the ongoing standardization activities, and to collect their live experience input for safety and standards, and regulatory issues, to criss cross the different point of view to produce valuable inputs of the European experts and projects for the standardization ISO working Groups. The discussion shall include the many aspects related to safety in this robotics area, the regulatory and legal aspects, the possible new approaches to risk assessment, software quality, physical and non physical interfaces, human factors, use cases.
Agenda of the workshop	**Representative of IEC TC 62d committee on Medical Robot Safety** **Representative of IEEE Standardization Association** **Representative of Robotics lab U. of Bristol** **Jan Veneman**, Tecnalia, Spain **Tamas Haidegger**,Obuda University **Emanuele Lindo Secco**, Liverpool Hope University, UK • 30 minutes frontal presentations (6 presentations x 5 minutes) • 30 minute split session in three groups on the three main specific areas of interest emerged during the collective discussion. • 30 minutes rendition ((wrap-up) session to present the theme/issue/ usecase, write the minutes and to plan the way ahead in exploiting the results of the session including
Relation to a Topic Group	TG standardisation TG Health/surgical
Workshop website link	https://clawar.org/events-pastfuture/
Further information	They will be notified of the availability of the minutes and slides of previous workshops through the workshop announcement page on the website of the CLAWAR association.

PROGRAMME - 22 March 2017

Session title	Health - Pushing the boundaries of haptic research for Health: Current challenges
Room	Ochil 1 - EICC Level 1
Hours	14.00 - 15.30
Organiser(s)	• **Dr Helge Wurdemann**, University College London, UK • **Prof. Kaspar Althoefer**, Queen Mary University of London, UK • **Dr Thrishantha Nanayakkara**, Imperial College London, UK • **Dr Alastair Barrow**, Director at Generic Robotics Ltd. • **Dr Vijay Pawar**, University College London, UK
Motivation and objectives	This workshop aims to bring together experts active in new fields of application of haptic interfaces for healthcare systems. We will explore the synergies that will arise from bringing together medical-driven applications and emerging haptic solutions and identify the advantages and challenges that these technologies bring to healthcare. What are the next step changes that we should expect from ongoing research in haptic interfaces? Get involved in round-table brainstorming discussions and help defining future key technology targets for haptic technology!
Agenda of the workshop	Agenda will be available on http://erf2017.softhaptics.website
Workshop website link	http://erf2017.softhaptics.website

Session title	Health - Successful translation of haptic technology for Healthcare: Towards increasing TRLs
Room	Ochil 1 - EICC Level 1
Hours	16.15 - 17.45
Organiser(s)	• **Dr Helge Wurdemann**, University College London, UK • **Prof. Kaspar Althoefer**, Queen Mary University of London, UK • **Dr Thrishantha Nanayakkara**, Imperial College London, UK • **Dr Alastair Barrow**, Director at Generic Robotics Ltd. • **Dr Vijay Pawar**, University College London, UK
Motivation and objectives	This ERF 2017 workshop will provide an insight into successful haptic technologies that have increased in TRL and have now entered the market. We will create a forum for bridging the gap between researchers and entrepreneurs in the field of medically-driven haptic applications. A session of round table discussions will give the audience an opportunity to interact with all speakers and lead to the emergence of novel ideas through brainstorming, as well as facilitating the forging of multi-disciplinary collaborations.
Agenda of the workshop	Agenda will be available on http://erf2017.softhaptics.website
Workshop website link	http://erf2017.softhaptics.website

PROGRAMME - 22 March 2017

Session title	Industrial - Teaching by Demonstration for Industrial Applications
Room	Ochil 2+3 - EICC Level 1
Hours	14.00 - 15.30
Organiser(s)	• **Yasemin Bekiroglu**, ABB AB Corporate Research, Sweden • **Zoe Doulgeri**, Aristotle University of Thessaloniki, Greece • **Jacek Malec**, Lund University, Sweden • **Joseph McIntyre**, Tecnalia, Spain • **Elin A. Topp**, Lund University, Sweden
Motivation and objectives	Although robots have brought remarkable efficiency gains to industrial manufacturers, traditional industrial robots are heavily dependent on hard automation that requires pre-specified fixtures and time-consuming programming and reprogramming performed by experienced software engineers. Besides, applications such as assembly have proven challenging to automate due to e.g., complex materials, precise grasping requirements, part variations, operations requiring high precision, operations requiring special motions and wear and tear of the assembly equipment. While robotic assembly does exist, it has only been applied in a fraction of the potential cases. As a result, nowadays even expensive products produced in fairly large volumes are still assembled manually in low wage countries under harsh conditions. A potential solution to have a smooth transition towards higher level of autonomy is to include human teachers providing feedback through demonstration. The aim of the workshop is to connect researchers from different backgrounds such as neuroscience (perception and motor control) and robotics (perception, planning, control, learning and design) in order to set the basis and define core open problems in this area. Furthermore, we want to discuss advantages, limitations, challenges and progress of different approaches pertaining to the workshop topic.
Agenda of the workshop	• **Naresh Marturi**, Vision-guided state estimation of industrial robots. • **Daniel Braun**, RobDREAM – Achieving decent performance for new robot programming paradigms. • **Paolo Rocco**, Accurate sensorless lead-through programming for lightweight robots in structured environments. • **Aude Billard**, It is as important to teach robots what to do, as what not to do! • **Carl Henrik Ek**, Data driven learning in robotics. • **Yasemin Bekiroglu**, SARAFun: Smart Assembly Robot with Advanced Functionalities. • **Dimitrios Tzovaras**, Developing systems with advanced perception, cognition, and interaction capabilities for learning a robotic assembly in one day. • **Zoe Doulgeri**, Teaching Assembly forces: The case of successful snap assembly detection. • **Jacek Malec**, You can only learn what you already know. • **Joseph McIntyre**, Understanding human motor skills as a key to teaching robots through demonstration. • **Guilherme Maeda**, Learning Interaction Primitives from Demonstration for Future Industrial Applications.
Workshop website link	http://h2020sarafun.eu/erf-2017-tbd-for-industrial-applications/
Further information	Please see the workshop website for further details.

PROGRAMME - 22 March 2017

Session title	AICoR - AI for Robotics: where are the Fruit and how do we pick them?
Room	SPARC (Pentland) - EICC Level 3
Hours	16.15 - 17.45
Organiser(s)	• **Alessandro Saffiotti**, Örebro University, Sweden • **Cécile Huet**, European Commission, Belgium • **David Vernon**, University of Skövde, Sweden • **Markus Vincze**, Technische Universität Wien, Austria
Motivation and objectives	It is increasingly evident that, in order to enter new markets, robots will need to possess cognitive capabilities such as understanding, planning, learning, anticipating, adaptation, and natural human-robot interaction. Realizing these capabilities has been the focus of AI research for 60 years, leading to the development of a wide set of theories, methodologies and algorithms. It is therefore natural to ask: • What are the specific cognitive capabilities that will make a difference in future robots? • Do we have tools in AI that are sufficiently mature and usable to realize those capabilities? • What further research is needed in order to make those tools applicable to robotics? • What critical tools do we miss? Answering these questions will help the robotics community to map the landscape of relevant AI tools, and to identify the research problems that need to be solved in order to make those tools actually usable. The objective of this workshop is to provide initial answers to these questions through discussion between researchers, developers and end-users of robotic systems on one hand, who are aware of the challenges, opportunities and priorities in their areas; and on the other hand experts from the AI field, who are aware of the capabilities, limitations and possible extensions of AI technologies.
Agenda of the workshop	• 16:15 – Introduction by the organizers • 16:20 – Statements on challenges from industry, academia and end-users: **Amit Kumar Pandey** (Softbank Robotics), **Georg von Wichert** (Siemens), **Daniel Wäppling** (ABB), **Thilo Steckel** (CLAAS, possibly remotely) • 16:40 – Statements on AI technologies: **Joachim Hertzberg** (Osnabrück University), **Alan Bundy** (University Edinburgh) • 16:50 – Parallel round table discussions • 17:30 – Presentation of the outcome by each table moderator • 17:40 – Summary and plans for next steps • 17:45 – End of workshop
Workshop website link	http://aass.oru.se/Agora/ERF2017/
Further information	Speakers will be given a set of questions, published on the workshop web site two weeks before ERF. All attendants are expected to read these and to contribute to the parallel round-table discussions.

PROGRAMME - 22 March 2017

Session title	ELS - Are robots a risk to our economy, especially our jobs?
Room	KUKA (Fintry) - EICC Level 3
Hours	16.15 - 17.45
Organiser(s)	• **Vincent C. Müller,** Anatolia College/ACT & U Leeds, Greece & UK
Motivation and objectives	The emergence of new technologies such as robotics and artificial intelligence usually causes a vast amount of discussion and even fears about the consequences of their usage and appearance. What can we expect from these machines capable of understanding, acting, learning and adapting their behaviour? What are the consequences of introducing autonomous machines into our society? What effects does robotics have on the job market? This workshop is the third of a series of three, addressing the social and economic issues. Following the emergence of robots in the working life, the human labour landscape will be drastically re-shaped, with a significant percentage of jobs having the potential to be automated, depending on the sector. Numerous studies exist on the employment effects of Robotics and AI, with varyingly negative or positive predictions, however the net effect is not known. The question is also on how to prepare our society and workforce for the robotics and AI revolution and era.
Agenda of the workshop	• **Ekkehard Ernst** (International Labour Organization, Chief Job-friendly macroeconomic policies unit): TBA • **Emilie Rademakers** (KULeuven): Why are there still so many jobs? The impact of robotics and AI on the job market. • **Christophe Leroux & RockEU**: The literature on the employment effects of technological change: policy implications and open research questions • **Thilo Zimmermann** (Fraunhofer-IPA): Lifelong learning and the job market Discussion of the ELS position paper on 'socio-economic' http://www.pt-ai.org/TG-ELS/policy
Relation to a Topic Group	ELS
Workshop website link	http://www.pt-ai.org/TG-ELS/projects
Further information	Read the ELS draft statement on http://www.pt-ai.org/TG-ELS/policy

PROGRAMME - 22 March 2017

Session title	Logistics - Towards human robot collaboration in Logistics
Room	SCHUNK (Sidlaw) - EICC Level 3
Hours	16.15 - 17.45
Organiser(s)	• **Jesús Alfonso de la Riva**, Instituto Tecnológico de Aragón, Spain • **Martin Magnusson**, Örebro University, Sweden • **Achim Lilienthal**, Örebro University, Sweden • **Sören Kerner**, IML Fraunhofer, Germany • **Libor Preucil**, Czech Technical University in Prague, Czech Republic • **Marc Hanheide**, University of Lincoln, United Kingdom
Motivation and objectives	This workshop is being organised by the euRobotics Topic Group for robots in logistics and transport in close collaboration with consortium members of projects STRANDS and Safelog. The main objective is to bring together researchers from academia and industry, in order to discuss the major challenges and opportunities for Robotics in Logistics and Transport. The workshop consist in two sections; Flash presentations from selected speakers and a round table. During the round table, we will discuss about content of presentations and collaboration and human-robot interaction in logistics use cases. In order to interactively engage the audience and to allow them to contribute and share their view in a structured way, the workshop will use an online voting tool, that participants will be using on their mobile devices (phone, tablets, laptops) with a standard internet connection. Details can be found at https://github.com/marc-hanheide/QuickVote/wiki
Agenda of the workshop	• 16:15 – 16:20 - Introduction • 16:20 – 17:15 - Invited contributions from industry and academia - **Sören Kerner**, (Fraunhofer IML) “Selforganizing Logistic Systems” - **Frederik Brantner** (Magazino) “Pick-by-robot: item specific picking directly out of the shelf” - **Libor Preucil** (Czech Technical University in Prague) “Safe Log – Safe human-robot interaction in logistic applications for highly flexible warehouses – a project overview” - **Francesco Ferro** (PAL Robotics) “PAL Robotics logistics applications: StockBot” - **Wolfgang Echelmeyer** (Reutlingen University) “Analyzing effectiveness and efficiency of HRI in logistic processes” - **Christian Fischer** (Still) “iGo neo: man and robotics collaboration leads to successful teamplay” - **Gregor Lebernegg** (KNAPP AG) “Automated guided vehicles as the key to modern warehouses” - **Björn Hein** (KIT) “Proximity sensing - closing the perception gap” • 17:15 – 17:45 - Round Table: (Moderator **Sören Kerner**) Robotics for logistics and transport: Collaborative or not?
Relation to a Topic Group	This workshop is organized by “Logistics and Transport” topic group
Workshop website link	http://web.itainnova.es/eurobotics/
Further information	We will use an online voting tool, so bring your mobile device fully charge.

PROGRAMME - 22 March 2017

Session title	Neurorobotics - Introduction to the HBP Neurorobotics Platform
Room	Harris 1 - EICC Level 1
Hours	16.15 - 17.45
Organiser(s)	• **Alexander Kuhn**, TUM, Germany
Motivation and objectives	Neurorobotics is quite a young discipline that applies insights from research in computational neuroscience and medicine to robotics. The benefits from this interdisciplinary approach are two-fold. On the one hand, robotics provides embodiments that can be used to develop principles for and evaluate functional neural circuits or even models of whole brains. On the other hand, robotics research will also greatly benefit from neuroscience with respect to creating adaptive and robust control and perception principles. To deal with this problem, the Neurorobotics Platform (NRP) in the subproject "Neurorobotics" of the Human Brain Project has been developed and released to the public earlier this year. It provides access to state-of-the-art tools such as robot and brain simulators, designers for creating experiments, environments, and brain and robot models. Researchers can define and run closed-loop experiments in a web-based application, running on high-performance clusters. This workshop aims at presenting the topic of (virtual) neurorobotics, the related research in the HBP, and the NRP research infrastructure to a broader audience and gather recommendation, critique and general feedback from the participants. This feedback will influence the further development to ultimately create a highly valuable research infrastructure for the robotics and neuroscientific communities.
Agenda of the workshop	• **Alexander Kuhn**: Neurorobotics: A strategic pillar of the Human Brain Project • **Dr. Egidio Falotico**: A comprehensive framework for connecting simulated robots to artificial brains: The Neurorobotics Platform • **Susie Murphy**: Using the Neurorobotics Platform to its full potential
Workshop website link	http://neurorobotics.net/
Further information	User preparation, although not required, could include a superficial understanding of computation with spiking neural networks, robot simulation and control.

PROGRAMME - 22 March 2017

Session title	Construction - Construction Robotics - beyond industrial robots
Room	Harris 2 - EICC Level 1
Hours	16.15 - 17.45
Organiser(s)	• **Sigrid Brell-Cokcan**, Chair for Individualized Production in Architecture/ RWTH Aachen University, Association for Robots in Architecture, Germany
Motivation and objectives	Over the last decade robotics has captured the minds of architects as industrial robots became accessible intuitive tools for the creative industry. Now the ongoing technical advances are putting large scale and on-site construction robotics in our reach. The young euRobotics topic group for Construction Robotics is organising this workshop as a panel discussion to give interested stakeholders an overview of the state of the art and create insights into the needs and next, critical steps for this new domain. Six panellists from various backgrounds ranging from politics, end-users, education and research will discuss the hotspots within the construction sector that are most relevant for potential robotic solutions, to identify the main obstacles (technological, legal), to consolidate the relevant technology and due adaptation/specialisation/combination for this new domain of construction robotics followed by an open round table with the audiance. As the Construction Robotics Topic Group is engaged in the preparation of the European Robotics Roadmap, the outcome of the workshop will provide further input for the roadmap.
Agenda of the workshop	Panelists in conversation with **Prof. Sigrid Brell-Cokcan** Director for Individualized Production in Architecture / RWTH Aachen University/ President of the Association for Robots in Architecture and **Prof. Andreas Müller** Head of the Institute of Robotics Johannes Kepler University Linz/ Austria: • **Catherine Stihler** MEP Labour MEP for Scotland • **Ronny Andersson** Head Research and Innovation Cementa AB, Prof. Lund University and Chairman of the national Strategic Innovations Program Smart Built.se Cementa AB/ Sweden • **Philipp Müller**, Dipl.-Ing. Program Manager AEC, EMEA Autodesk Education Experiences (AEX)/ Germany • **Prof. Thomas Bock** Chair for Building Realisation and Robotics Technische Universität München/ Germany • **Prof. Carlos Balaguer** RoboticsLab Universidad Carlos III de Madrid/ Spain • **Prof. Andreas Müller** Head of the Institute of Robotics Johannes Kepler University Linz/ Austria • **Prof. Marco Hutter**, Head of the Robotic Systems LAB at ETH Zurich and PI of NCCR Digital Fabrication (dfab), Switzerland
Relation to a Topic Group	Construction Robotics
Workshop website link	https://www.construction-robotics.eu/
Further information	Participants shall prepare points on where they see 1) the need, 2) the obstacles, 3) the potential technological/legal/policy issues, and 4) short and medium term solutions for construction robotics.

PROGRAMME - 22 March 2017

Session title	System Engineering - RobMoSys: the next level of a Model Driven Robotic Software Ecosystem
Room	Ochil 2+3 - EICC Level 1
Hours	16.15 - 17.45
Organiser(s)	• **Herman Bruyninckx**, KULeuven, Belgium
Motivation and objectives	RobMoSys is a newly funded European Research and Innovation project within the Horizon 2020 Framework (H2020 ICT-26 c with cascaded funding), which envisions a model-driven approach built around the current code-centric robotic system integration. The objective of this workshop is to involve the software and robotics community into designing a new software engineering landscape. The RobMoSys project team will be involving the robotics and software community to harmonise robotics model specifications, establish a common open methodology for software development, improve tools and foster interoperability by model interchange and composability. The project's aim is to improve the quality of any such software project by formalising its design and programming documentation into models, from which code (provided by the frameworks) can be generated, runtime composition of two or more robot controllers can be realised, consistency or correctness of system designs or robot task programs can be assessed formally, etc. The seamless integration of diverse partners requires early involvement of experts of industry and academia, therefore the participants of the workshop are invited to discuss and contribute to the community needs, establishing specifications for the common robot functionalities.
Agenda of the workshop	30 mins presentations: Overview of the project, open calls ideas explained, Speakers: **Herman Bruyninckx**, KU Leuven & **Christian Schlegel**, HSUlm followed by 60 mins community interaction
Relation to a Topic Group	Software Engineering, System Integration, System Engineering
Workshop website link	www.robmosys.eu/erf2017
Further information	Participants benefit most by sharing their expectations from a model-driven method and tools for engineering robotics system-of-systems.

PROGRAMME - 23 March 2017

Session title	Success Stories - Step Change Results from FP7 Projects
Room	SPARC (Pentland) - EICC Level 3
Hours	8.30 - 10.00
Organiser(s)	• **Cécile Huet**, European Commission, Luxembourg
Motivation and objectives	**The objectives of the session are:** 1) To demonstrate how the European Union investment through its programme contributes to the field of Robotics. 2) To foster the dissemination and re-use of the projects results. The format is different from a standard project presentation: each project will be given about 10 minutes to pitch its unique contribution - what difference it has made - and what concrete impact it will have - from the direct use of the project results to future perspectives. Each project will be presented by a tandem: 1) the coordinator (or representative) will pitch the project results, its unique contribution to the technology (step change) and how the results will be exploited and re-used, and possibly how the audience can build on them 2) each project was also asked to invite potential user(s) of their results, to present how they will exploit the project results and their perspectives on the impact of the project in their application domains
Agenda of the workshop	Introduction - EC (5') 1) FUTURA (10') - http://www.futuraproject.eu/ FOCUSED ULTRASOUND THERAPY USING ROBOTIC APPROACHES 2) PETROBOT (10') - http://petrobotproject.eu/ USE CASES FOR INSPECTION ROBOTS OPENING UP THE OIL-, GAS- AND PETROCHEMICAL MARKETS 3) sFly (10') - http://www.sfly.org/ SWARM OF MICRO FLYING ROBOTS 4) SMErobotics (10') - http://www.smerobotics.org/ THE EUROPEAN ROBOTICS INITIATIVE FOR STRENGTHENING THE COMPETITIVENESS OF SMES IN MANUFACTURING BY INTEGRATING ASPECTS OF COGNITIVE SYSTEMS 5) STRANDS (10') - http://strands.acin.tuwien.ac.at/ SPATIO-TEMPORAL REPRESENTATIONS AND ACTIVITIES FOR COGNITIVE CONTROL IN LONG-TERM SCENARIOS 6) WEARHAP (10') - http://www.wearhap.eu/ WEARABLE HAPTICS FOR HUMANS AND ROBOTS 7) Xperience (10') - http://www.xperience.org/ ROBOTS BOOTSTRAPPED THROUGH LEARNING FROM EXPERIENCE Discussion: Lessons learned - how to maximise the impact of EU projects? nb: the name of the speakers are on the workshop website
Relation to a Topic Group	Of interest for most of the topic groups
Workshop website link	https://ec.europa.eu/digital-single-market/news-redirect/54132

PROGRAMME - 23 March 2017

Session title	ELS - Do we need new laws to handle robots?
Room	KUKA (Fintry) - EICC Level 3
Hours	8.30 - 10.00
Organiser(s)	• **Vincent C. Müller**, Anatolia College/ACT & U Leeds, Greece & UK
Motivation and objectives	The emergence of new technologies such as robotics and artificial intelligence usually causes a vast amount of discussion and even fears about the consequences of their usage and appearance. What can we expect from these machines capable of understanding, acting, learning and adapting their behaviour? What are the consequences of introducing autonomous machines into our society? What effects does robotics have on the job market? This workshop is the second of a serie of three, addressing the legal issues. Smart regulation for smart products is needed to ensure continued innovation underpinning Europe's competitiveness in the area. For example, the recently launched Digitising European Industry strategy identifies and addresses the new legal challenges related to robots, autonomous and AI-based systems. These challenges concern, in particular, the protection and ownership of data generated by the multitude of smarter products, the liability issues resulting from more autonomous systems, and safety in the context of increasing autonomy and interaction.
Agenda of the workshop	Introduction: **Vincent C. Müller** (Chair, topics group ELS), **Anne Bajart** (DG-CONNECT), **Victor Negrescu** (MEP) • **Lieve Van Woensel** (Head of the Scientific Foresight Service at the European Parliamentary Research Service): New EU legislation on robotics & AI "REPORT with recommendations to the Commission on Civil Law Rules on Robotics", 27.01.2017, A8-0005/2017 & Science and Technology Options Assessment STOA Policy Briefing "Legal and ethical reflections concerning robotics" 06-2016. • **Renaud Champion** (euRobotics) & **Khalil Rouhana** (director "digital industry", DG CONNECT) "Robotics in current legal framework", presentation of SYMOP white paper (October 2016) http://www.symop.com/droit-de-la-robotique-le-symop-publie-son-livre-blanc • **Presentation of the ELS position paper on 'legal'** http://www.pt-ai.org/TG-ELS/policy • **Panel with the speakers & Uwe Haass** (Roboconsult, former Secretary General of euRobotics AISBL) & **Bjoern Juretzki** (DG CONNECT, Assistant to the Director - TBC)
Relation to a Topic Group	ELS
Workshop website link	http://www.pt-ai.org/TG-ELS/projects
Further information	Read the ELS draft statement on http://www.pt-ai.org/TG-ELS/policy

PROGRAMME - 23 March 2017

Session title	Industrial - Topic Group Industrial Robotics - Challenges and needs
Room	SCHUNK (Sidlaw) - EICC Level 3
Hours	8.30 - 10.00
Organiser(s)	• **José Saenz**, Fraunhofer IFF, Germany • **Federico Vicentini**, CNR-ITIA, Italy
Motivation and objectives	Industrial Robotics is one of the largest Topic Groups within SPARC and is viewed within the SPARC community as one of the most important. This reflects on the perceived importance of industry, manufacturing, and production in the EU. Furthermore, a wide range of individual technologies and abilities (from other TGs) are also addressed here, with an overarching goal of increasing the usage of industrial robots in new industries and new applications. The main tasks of the Topic Groups are to identify the current state of the art, and explain and prioritize what needs to happen (i.e. what technologies and abilities are needed) to reach future robotics goals. In this workshop we will seek to foster this discussion and work towards defining our priorities. Some of the main questions we will discuss include: • What does industry need now and in the near future (technologies / abilities)? • What are current barriers to more widespread robot usage? • How relevant is AI for industrial robotics now and in the near future? • Is human-robot safety still a challenge? Have all issues for collaborative robots been solved from the industrial perspective? What issues remain open?
Agenda of the workshop	1) Short presentations by selected speakers (total time: 40 minutes) • "What the automotive industry needs from robotics in the near future": **Gloria Pellischek**, Continental • "FMCG companies approach & challenges to Robot Adoption": **Geoff Kerr**, Procter & Gamble • "The future of aerospace through robotics": **Julie de Martres** and **Aurélie De Luca**, **Thales Alenia Space** • "Robot machining: relevance for industry, needs, perspectives, technology": **Enrico Villagrossi**, CNR-ITIA • "Beyond technical requirements on industrial robots - influences on human beings": **Elisabeth Schärtl**, KUKA • "The ISO15066 is out, are all safety issues now answered?": **José Saenz**, Fraunhofer IFF 2) World Cafe Group Work with all workshop participants focusing on three questions (total time 30 minutes): • defining new applications, • mapping technologies and abilities to these, • prioritizing in order of importance 3) Presentation of the outcome by each table moderator (15 minutes)
Workshop website link	To be announced
Further information	Attendees can consider the questions into the motivation and review the TG-IR Description document (to be available on the website and per e-mail upon request) to prepare.

PROGRAMME - 23 March 2017

Session title	Social - Strategies for Deploying and Delivering Ethical, Sustainable and Acceptable Assistive Robotic Solutions
Room	Harris 1 - EICC Level 1
Hours	8.30 - 10.00
Organiser(s)	• **Praminda Caleb-Solly**, Bristol Robotics Laboratory UWE, UK • **Jobeda Ali**; Three Sisters Care, UK • **Aleksandar Jevtić** and **Carme Torras**, Institut de Robòtica i Informàtica Industrial (CSIC-UPC), Spain • **Nigel Harris**; Designability, UK
Motivation and objectives	Providing cost-effective and high-quality support for an ageing population is a high priority issue. Assistive robots hold the promise of providing autonomous assistive care solutions however there are considerable challenges in taking the technology into the real world. In addition to technical challenges, key barriers are costs, user acceptance, getting buy-in from health and social care and service providers, safety, reliability and legal certification by regulatory bodies. These challenges are complex and require creative solutions and responses.This workshops brings together a multidisciplinary panel of experts, key stakeholders in the Assistive Technologies domain such as care providers, deployment experts, commercial developers and assistive roboticists. They will set the context, examining strategies to address these barriers. This will enable workshop participants to better understand the nature the barriers and identify solutions for getting assistive robotics products and services to end-users. The aim is to provide a unique experience to robotics' researchers and SMEs' in understanding and discussing issues that will help them be more strategic in considering and designing solutions that are more responsive to real-world deployment demands, including commercial sustainability, emerging ethical, legal and social requirements, policies and standards.
Agenda of the workshop	**Workshop will be run as a Knowledge Cafe.** Speakers: • **Jackie Marshall-Cyrus**, Director of Innovation Strategy Needs of the Ageing Population – Social and Economic Issues • **Madeleine Starr**, Director of Business Development and Innovation, CarersUK Needs of Formal and Informal Carers – Training, Resources and Responsibilities • **Kerstin Dautenhahn**, Prof of AI, Hertfordshire Ethical and Social Issues concerning Assistive Robotics • **Dan Lyus**, Director of Development, We Care and Repair UK Deploying Sustainable Assistive Solutions • **Jobeda Ali**, CEO, Three Sisters Care Needs of Formal Carers and Customers - Social and Business Imperatives • **Stephen Hope**, Business Development Manager and Teleco Consultant, Docobo Ltd, Developing Assistive Solutions – Imperative for Open Standards • **Nigel Harris**, Director, Designability Needs of the Ageing Population – Physical and Emotional Issues Following brief talks an interactive session will explore questions raised and strategies to address the issues.
Relation to a Topic Group	Health and Social Care Robotics
Workshop website link	https://chiron.org.uk/events/ERF2017workshop
Further information	Participants should identify key questions relating to speaker topics and submit these via a brief online survey form on the workshop website. The questions will be addressed in the discussions.

PROGRAMME - 23 March 2017

Session title	Space - iBOSS Workshop part 1: Space Robotics and Spacecraft design, production and operation
Room	Harris 2 - EICC Level 1
Hours	8.30 - 10.00
Organiser(s)	• **Joerg Kreisel**, JKIC, Germany
Motivation and objectives	Space Robotics, modular and reconfigurable satellite design as well as key concepts of terrestrial robotics and Industry 4.0 principles go together very well. This workshop aims at identifying synergetic effects in the joint development and targets applications both in space and terrestrial sectors. This workshop -consisting of two parts- will give SMEs and research institutions the possibility, to contribute with their products (COTS, etc.), technology developments and ideas to a building set based on the iBOSS concept (intelligent Building Blocks for On-Orbit Satellite Servicing and Assembling). Those functional building blocks (imagine Lego® in Space) can be combined to building block chains fulfilling certain tasks in Space. Aim is to increase the degree of automation in Space laying the foundation of efficient robotics brought from Earth into Space. The iBOSS concept is developed for the Space sector but its systematics can be transferred easily to terrestrial sectors which will be addressed in a presentation.
Agenda of the workshop	• 1 - Introduction and Workflow Outline by the Moderator + iBOSS Programme Manager of German Aerospace Center DLR Space Administration (20 mins) • 2 - Direct Poll: Interest + Opportunity Mapping (20 mins) • 3 - Idea Generation by Participants/Groups (30mins) • 4 - Discussion of Ideas and Harmonization of Results (15 mins) • 5 - Summary of Output (5 mins)
Relation to a Topic Group	Standardization, Space Robotics, Logistics and Transport, Entrepreneurship, Construction Robots, Software Engineering Systems integration Systems Engineering
Workshop website link	www.iboss-satellites.com AND www.youtube.com/watch?v=uvEoC0ifz7Y
Further information	Familiarize with the iBOSS concept (i.e. weblinks, public domain, etc.) and brainstorm potential Earth-to-Space technology transfer possibilities as well as the use of COTS or new iBLOCKS.

PROGRAMME - 23 March 2017

Session title	Underwater - Robocademy - A European Academy for Marine and Underwater Robotics
Room	Ochil 1 - EICC Level 1
Hours	8.30 - 10.00
Organiser(s)	• **Thomas Vögele**, DFKI Robotics Innovation Center, Germany
Motivation and objectives	The workshop will discuss the future of underwater robotics both from a technological, educational and business point of view. • How will the markets for underwater robotics develop? • Which are the most promising application areas and customers ? • What technologies and system capabilities are needed ? • Which expertise and qualitifacions are needed in the future? • Which educational programs are needed in the future? The workshop is organized as a cooperation of TG UW Robotics and ROBOCADEMY, a European Marie-Curie ITN for Education in Underwater Robotics.
Agenda of the workshop	• **08:30 - 08:45** - Introduction Robocademy **Dr. Thomas Vögele, DFKI** • **08:45 - 09:00** - Position statement Business and Markets: **Dr. Jakob Schwendner**, KRAKEN GmbH • **09:00 - 09:15 -** Position statement Science & Education: **Prof. David Lane**, HWU • **09:15 - 09:30** - Position statement TG UW Robotics: **Gianluca Antonelli**, Universita` di Cassino e Lazio Meridionale • **09:30 - 09:50** - Panel Discussion • **09:50 - 10:00** - Summary & Wrap-Up
Relation to a Topic Group	TG Underwater Robotics
Workshop website link	http://www.robocademy.eu/en/startpage/news/entry/ERF2017-UW-WS.html

PROGRAMME - 23 March 2017

Session title	Success Stories - Robots for disaster response
Room	Ochil 2+3 - EICC Level 1
Hours	8.30 - 10.00
Organiser(s)	• **Igor Gilitschenski**, ETH Zurich, Switzerland • **Lorenzo Marconi**, University of Bologna, Italy • **Bruno Siciliano**, University of Naples, Italy
Motivation and objectives	The goal of this workshop is to bring together European researchers working in the field of S&R robotics. Motivated by extraordinary natural disasters happened around the world in the last decades in which robotic technologies didn't show to be effective in handling emergencies, in the recent years this topic has been the subject of or at least related to several large-scale FP7 and H2020 research projects including SHERPA, ICARUS, TRADR, CENTAURO and WALK MEN. The peculiar features of disaster scenarios (in terms of operative conditions, tasks to be accomplished, robustness standard, operability) has also motivated the establishment of ad-hoc benchmarks that have been proposed to test and compare technologies, control solution and cognitive abilities in S&R-related environments. In this respect, the activity of the SPARC Topic Group in "benchmarking and competitions" is relevant. Moreover, following this trend, many research centers in Europe invested time and resources to set up ad-hoc lab facilities. Within this rich context, the main goal of this workshop is discussing the current state of S&R Robotics, the main needs of the end-users resulting in peculiar research activities and technology requirements, what steps need to be taken in order to make this technology commercially available, by involving relevant actors that have been active in the recent period in the field.
Agenda of the workshop	The workshop is mainly centered around a round table in which scientists that have been involved in S&R research activity share problems, solutions and ideas. The round table is preceded by short presentations of the coordinators of some selected EU FP7 and H2020 projects dealing with Search and Rescue that set relevant end-user problems/requirements and frameworks where the research has been conducted in the last years. The round table is then followed by a poster session in which relevant research activities developed in the EU projects that have been presented in the workshop are shown. **Agenda** • 8:30 - 8:35 - Introduction by the Organizers • 8:35 - 9:15 - Project short presentations 8:35 - 8:45 - Project 1 SHERPA 8:45 - 8:55 - Project 2 TRADR 8:55 - 9:05 - Project 3 CENTAURO 9:05 - 9:15 - Project 4 WALK-MEN • 9:15 – 10:00 - Round Table with the invited guests. Poster session organised as follow-up during the coffee break with relevant research activity carried out in S&R
Relation to a Topic Group	Benchmarking and competitions
Workshop website link	http://www.sherpa-project.eu/sherpa/workshop-SR-2017

PROGRAMME - 23 March 2017

Session title	**ELS - How is law and regulation developing to address robotic technologies? Where we are and where we are heading.**
Room	SPARC (Pentland) - EICC Level 3
Hours	10.45 - 12.15
Organiser(s)	• **Chris Holder**, Bristows LLP, UK • **Vik Khurana**, Bristows LLP, UK
Motivation and objectives	The legal and regulatory regime is and will be a key aspect of the overall environment in which robotic technologies operate. The approach to regulating robotics will have a key role in determining the ability of the robotics industry to flourish and achieve high levels of user take-up by consumers and businesses. It is increasingly important, therefore, for the robotics industry to ensure it is part of the debate about how they are regulated and how legal risks and issues arising from these technologies will be addressed going forward. We would like to help drive forward this important discussion by hosting an interactive workshop presented by lawyers who have a particular focus on the intersection of new technologies and law. This workshop has direct relevance to the SPARC Topic Group: Ethical-Legal-Socio-Economic Issues (ELS).
Agenda of the workshop	The workshop will start with an overview of legal developments in this area; each speaker will then provide a short case study on the intersection of law and a particular robotic technology; the workshop will conclude with an overview of how the law will continue to develop in this area and a debate on how the law should develop to address the concerns of regulators without unduly stifling innovation. **Agenda:** 1. Overview of recent developments in law and robotics – short presentation (Vik Khurana) 2. Case study: Autonomous vehicles – short presentation (Lucy McCormick) 3. Case study: Drones – short presentation (Peter Lee) 4. Case study: Care robots – short presentation 5. Where is the law heading and how should it develop – short presentation (Chris Holder) 6. Q&A and panel discussion
Further information	• http://www.bristowscookiejar.com/trends/?topic=12 • http://www.sciencedirect.com/science/article/pii/S0267364916300358 • http://www.sciencedirect.com/science/article/pii/S0267364916300899

PROGRAMME - 23 March 2017

Session title	Awards - The 2017 euRobotics Technology Transfer Award
Room	KUKA (Fintry) - EICC Level 3
Hours	10.45 - 12.15
Organiser(s)	• **Martin Haegele**, Head of Department Robot and Assistive Systems, Fraunhofer IPA, Stuttgart
Motivation and objectives	The euRobotics Technology Transfer Award, now in its 14th edition, is seen as one of the ERF's most prominent activities. Successful technology transfer describes the process of converting scientific findings from research laboratories into innovative products, processes and services by the commercial sector. Resulting from the Call for Application that ended 6 February 2017 four finalists will present their examples of successful technology transfer in robot technology and automation that result from cooperative efforts between research and industry. A jury composed of representatives from industry and research will determine the winners of the "2017 euRobotics Technology Transfer Award". The winners will be announced and the award given during the "Awards ceremony and Banquet" evening on 23 March.
Agenda of the workshop	• 14.00 – 14:10 - Introduction and Overview on Submissions, intro of Jury **Martin Haegele** • 14.10 – 14:30 - Finalist 1 presentation (each 15 min), Q&A • 14:30 – 14:50 - Finalist 2 presentation • 14:50 – 15:10 - Finalist 3 presentation • 15:10 – 15:30 - Finalist 4 presentation Note: The finalists will become known only after the selection process is completed.
Further information	The finalists will each have worked out a presentation following a suggested structure: Motivation and goals of the research and development effort, state of the art, concise project approach, results of research and development, achieved innovation and commercial impact, cooperation between research and industry, IPR.

PROGRAMME - 23 March 2017

Session title	Agri-Food - Robotics for Agri-Food: Echord++ Experience
Room	SCHUNK (Sidlaw) - EICC Level 3
Hours	10.45 - 12.15
Organiser(s)	• **Paolo Dario**, Scuola Superiore Sant'Anna, Italy • **Fabio Bonsignorio**, Scuola Superiore Sant'Anna, Italy • **Alberto Sanfeliu**, Universitat Politecnica de Catalunya, Spain
Motivation and objectives	With the world population ever increasing and the area of arable land limited, it is of paramount importance for the survival of mankind to improve farming efficiency and food security – from "farm to fork". The typical environment of farming from large-scale to small family farms, are loosely structured – therefore, it lends itself to the stepwise application of cognitive and robotics technologies and suggesting an holistic change of agricultural practices. In the medium-term, robust and adaptive autonomous systems will revolutionize the way the farming industry can be run. The technologies developed in Industry 4.0 will naturally spread to Precision Agriculture and Food Processing industry, and let us envision AgriFood 4.0. But agricultural robotics is not restricted to farming – robotics can change the entire homestead or agricultural facility and the food supply chain. Echord++ is financing 31 robotic experiments of which five are being developed in Agricultural scenario and that will bring pre commercial prototypes to the market during the next years. GAROTICS - MARS – CATCH – GRAPE – and SAGA. Echord++ Workshop aims to share the knowledge of the various approaches developed by these experiments and to be a forum for discussion in the field of robotics in Agriculture and Foods based on real world experiments and facts.
Agenda of the workshop	• **10:45 - 10:50** - Introduction to Echord++ project. **Alberto Sanfeliu** • **10:50 - 11:00** - Agriculture Robotics at CEA- **Frederic Colledani** • **11:00 - 11:40 -** Presentations of four ECHORD++ Experiments. Coordinator: **Paolo Dario** - MARS: **Timo Blender**, Hochschule Ulm - GRAPE: **Daniel Serrano**, Head of Unmanned Systems Group of Eurecat, Eurecat - SAGA: **Joris IJsselmuiden**, WUR - CATCH: **Dragoljub Surdilovic**, Fraunhofer-Institute for Production Systems and Design Technology • **11:40 – 12:05** - Round Table Discussion. Moderators: **Paolo Dario** and **Alberto Sanfeliu** • **12:05 - 12:15 -** Conclusions for the roadmapping process under SPARC/ Horizon2020
Relation to a Topic Group	Robot Companions and Benchmarking and competitions.

PROGRAMME - 23 March 2017

Session title	Industrial - 4th Workshop on Hybrid Production Systems (I)
Room	Harris 1 - EICC Level 1
Hours	10.45 - 12.15
Organiser(s)	• **Sotiris Makris**, LMS - University of Patras, Greece • **George Michalos**, LMS - University of Patras; Greece • **Iñaki Maurtua**, IK4-TEKNIKER, Spain • **Ramez Awad**, Fraunhofer IPA, Germany
Motivation and objectives	This workshop is dedicated to presenting the latest technologies, research results facilitating Human Robot Collaboration (HRC) in an industrial setting, e.g. Applications of augmented reality and wearables, Safety, Interaction, Planning, Simulation, Tele-Operation, etc. In the first quarter of the workshop early results from ongoing research projects are introduced. Early results are characterized as being developed within the first year of the project and as having been validated as a simple proof of concept in the lab (TRL3). The purpose is to give the researcher/inventor feedback w.r.t. to her/his results, e.g. potential enablers, multiplicators, restrictions, etc. The second and third quarter of the workshop are dedicated respectively to elaborating developed technologies (TRL 5/6) for intuitive and safe human robot interaction, with a short interlope of actual industrial applications of HRC in between. The purpose is to inform the community of emerging technologies that may soon be available on the market. Finally, the last quarter will be spent on discussing a joint technology report about the technologies to be submitted to the EC, as part of the joint dissemination effort of the Factories-of-the-Future Cluster on Human-Robot-Collaboration.
Agenda of the workshop	**Early Results** • **Loris Roveda** (ITIA-CNR): Empowering humans in cooperative heavy parts installation industrial applications • **Amedeo Cesta** (ISTC-CNR): A new framework for human-aware planning: integration of robot motion planning, task planning and scheduling • **Stefano Michieletto** (University of Padova): People tracking in Industrial Environments **Interaction Technologies** • **Nils Andersson** (EON Reality Inc.): Using holographic and Augmented Reality techniques for Human/Computer collaboration –LIVE DEMO • **Dr. George Michalos** (LMS, University of Patras): ROBO-PARTNER hybrid assembly cell – novel communication & interaction mechanisms - LIVE DEMO • **Dr. Fei Chen** (IIT): Human and Robot Tele-operated Collaboration in Industrial Assembly and Maintenance Scenario • **Arne Rönnau** (FZI): CAD-2-Path: EuRoC - Intuitive Programming of Surface Trajectories for Complex Objects • **Urko Esnaola** (TECNALIA): Program Less, Setup Fast, Be Safe
Workshop website link	http://www.project-leanautomation.eu/index.php?id=96&tx_ttnews%5Btt_news%5D=112&cHash=5aa62c6dc7d5ea4d63000ec042d04d19
Further information	Participants are asked to review the information and literature provided at http://www.project-leanautomation.eu/index.php?id=96&tx_ttnews%5Btt_news%5D=112&cHash=5aa62c6dc7d5ea4d63000ec042d04d19

PROGRAMME - 23 March 2017

Session title	Space - iBOSS Workshop part 2: Space Robotics and Spacecraft design, production and operation
Room	Harris 2 - EICC Level 1
Hours	10.45 - 12.15
Organiser(s)	• **Joerg Kreisel**, JKIC, Germany • **Juergen Rossmann** (MMI), Germany
Motivation and objectives	Space robotics and modular, reconfigurable satellite design now embrace key concepts of terrestrial robotics and Industry 4.0. This workshop aims at identifying synergetic effects in the joint development and at targeting applications which are beneficial for both, the space and the terrestrial sector. The workshop consists two parts and will give SMEs and research institutions the possibility to contribute - and to benefit from - new ideas related to the iBOSS concept (Intelligent Building Blocks for On-Orbit Satellite Servicing and Assembly). This modular approach to future satellite design - imagine a kind of Lego® in Space - emphasizes the developoment of building blocks (COTS, etc.) which synergetically combine terrestrial and space robotics know how. Last but not least, the developed modular und reconfigurable design approach provides new chances for robotic experts and manufacturers who have not yet looked into space applications: The entry threshold is being significantly lowered - and terrestrial spin-offs are inherent.
Agenda of the workshop	• 1 - Introduction and Workshop Outline by the Moderator (10 mins) • 2 - iBOSS and related production technology (15 mins) • 3 - Robotic components in iBOSS (15 mins) • 4 - Virtual Testbed iBOSS: Demonstration of Innovative Spacecraft Design (25 mins) • 6 - Use of COTS for iBOSS (10 min) • 5 - Technology Transfer Potential Mapping (10 mins) • 6 - Summary of Key Messages and Workshop Roundup (5 mins)
Relation to a Topic Group	Standardization, Space Robotics, Logistics and Transport, Entrepreneurship, Construction Robots, Software Engineering Systems integration Systems Engineering
Workshop website link	www.iboss-satellites.com AND www.youtube.com/watch?v=uvEoC0ifz7Y
Further information	Familiarize with the iBOSS concept (i.e. weblinks, public domain, etc.) and brainstorm potential Earth-to-Space technology transfer possibilities as well as the use of COTS or new iBLOCKS

PROGRAMME - 23 March 2017

Session title	Innovation - IPR and patents training (I and II)
Room	Ochil 1 - EICC Level 1
Hours	10.45 - 12.15 (I); 14.00 - 15.30 (II)
Organiser(s)	• **Dimitrios Chrysostomou**, Aalborg University, Denmark • **Paolo Barattini**, Sharika.eu, Italy • **Chris Holder**, Bristows LLP, UK • **Anna Chatzimichali**, Withers & Rogers LLP, UK • **Gurvinder Singh Virk**, InnoTec UK
Motivation and objectives	The main scope is to provide training in IPR and patents with regards to the specificities of robotics and related software. This kind of issues are mostly unknown to researchers, scientists, startups, spinoffs, SMES. These issues shall be considered since the beginning of any development for relevant choices of design, licenses, foss etc that later on will surface as conflictual or detrimental for exploitation.
Agenda of the workshop	**Dimitrios Chrysostomou**, Aalborg University, Denmark Presentation: Introduction to the topics and scope of the workshop **Paolo Barattini**. Kontor 46, Italy. Presentation: Project, reserach, SME, also plan and tools for the workshop **Chris Holder**, Lawyer, partner for Bristows LLP, UK, law and robotics expert. Presentation: software, copyright patents **Matthew Howell**, Patent Attorney, Partner for Withers and Rogers LLP. UK Expert in electronics, telecommunications, computing and software. Presentation: Two legal cases. • 10:45 - 10:55 - initial level assessment questionnaire • 10:55 - 11:10 - mind map free association warm up • 11:10 - 11:40 - presentations • 11:40 - 12:15 - practical exercises on use cases • 12:15 - 14:00 - lunch break • 14:00 - 14:30 - practical exercises on use cases • 14:30 - 15:00 - rendition session groups presenting results and rationale • 15:00 - 15:25 - discussion • 15:25 - 15:30 - questionnaire to assess if the training was successful
Relation to a Topic Group	TG Standardisation
Workshop website link	https://clawar.org/?event=workshop-erf17
Further information	Participants should bring their laptop/tablet with them so they can participate actively on the practical sessions.

PROGRAMME - 23 March 2017

Session title	Social - The contemporary Societal Applications of Social Robots and the Barriers to the Market
Room	Ochil 2+3 - EICC Level 1
Hours	10.45 - 12.15
Organiser(s)	• **Amit Kumar Pandey**, SoftBank Robotics, Paris, France • **Franziska Kirstein**, Blue Ocean Robotics, Denmark
Motivation and objectives	Social robots are getting more available to the public. Such robots have enormous potential to play essential roles in our everyday life, such as in scenarios like companionship, child-care, educational, special educational, edutainment, healthcare, and co-worker. However, there are still various constraints that end-users, robot providers and other involved stakeholders face, which prevent social robots from entering the market with full potential. There is a great need to create common ground and shared understanding about social robots, its potentials & applications, and the barriers. This workshop aims to serve as a unique platform to bring different stakeholders together and exchange thoughts and brainstorm to: • Identify Societal Applications of Robots for Innovation potentials. • Share feedback from End User and Public after some early deployment of such robots. • Identify current Technological, R&D and other barriers to Market for mass adaptation of such robots. • Listen to Policy Makers/EC about their expectation and future directions. • Get Input from Audience through Groups Brainstorming, Panel Discussion. • Provide Feedback to euRobotics and European Commission on these aspects and how to address those barriers to ensure leading role of Europe in this field. • Open up new social robotic business potentials through establishing a shared ground among stakeholders.
Agenda of the workshop	**Industry: Innovation Services and Barriers (15min)** 1. Amit Kumar Pandey, SoftBank Robotics - "Social Robots becoming commonplace, some use cases and barriers" 2. Claus Risager, Blue Ocean Robotics - "Experiences and challenges of selling, introducing, evaluating and securing social robots in public institutions" **Academics: R&D on barriers identification (15min)** 3. Satomi Sugiyama, Franklin University - "Social Consumer Robot in Japanese everyday life: An exploration of the public perception" 4. Friederike Eyssel, Bielefeld University - "on Users' perception of social robots in academics setting" **End User: The real needs (15min)** 5. Alberto Sanna, Ospedale San Raffaele - "Service robotics potentials and needs in socio-technological ecosystems" **Policy Makers: The Expectations (15min)** 6. Anne Bajart, Head of Sector, European Commission, Robotics and AI - "Robotics in Europe: development and impact" **Audience: Prioritization and the Next? (30min)** - 3 Group and Panel Discussions
Relation to a Topic Group	TSocially Intelligent Robots and Societal Applications (SIRo-SA)
Workshop website link	https://socialroboerf17.sciencesconf.org
Further information	In parallel group discussion sessions, participants should provide input on prioritizing the societal applications of robots, to be used in workshop report and euRobotics Multi Annual Roadmap (MAR).

PROGRAMME - 23 March 2017

Session title	AICoR - AI & Robotics: Delivering platforms and integration tools
Room	SPARC (Pentland) - EICC Level 3
Hours	14.00 - 15.30
Organiser(s)	• **Markus Vincze**, TU Vienna, Austria • **Tamin Asfour**, KIT, Germany • **David Bisset**, iTechnic, UK • **Cécile Huet**, European Commission, Belgium
Motivation and objectives	Robotics is growing together (again) with recent developments in fields such as AI, IoT, & Big Data. A catalyst in creating future impact could please the role of tools and platforms to integrate these initiatives. The goal is to exploit results across domains, foster the take-up of methods in either field of technology, and speed up the process of creating new innovations. Eg. recent advances indicate that the shift from knowledge to shared knowledge provides the tipping point in achieving impact in robotics from AI and cognition. The intention of this session is to identify who are the integrators of AI, robotics, and related fields; to create ideas on how to facilitate links between research, integrators & the take-up of results and developments; how can we identify existing solutions in different areas and make them available for everybody; & how to create links to other existing tools & domains such as in IoT or Big Data or other related initiatives. 2. question that needs to be answered for the robotics community is how to develop prototypes, real-life demonstrators, & pilot robotic systems & how to exploit them to demonstrate the capabilities of smart robots and potential use. The workshop exploits the experience of this year's workshop http://h2t-projects.webarchiv.kit.edu/ERF2016/ at ERF 2016.
Agenda of the workshop	14:00 - 14:10 - Goals of the workshop, procedure with brain walk and discussion 14:10 - 14:30 - Teaser presentations • **Mirko Bordignon** (Fraunhofer IPA (D) / ROS-Industrial Europe) • **Michael Suppa** (Roboception) • **Michael Beetz** (U Bremen, D) 14:30 - 14:50 - Brain Walk 14:50 - 15:20 - Discussion 15:20 - 15:30 - Summary of discussion
Workshop website link	workshops.acin.tuwien.ac.at/erf2017_AItools
Further information	The Webpage will list relevant background documents i.e. white papers, position statements of invited speakers, other willing to contribute early. Link will be sent out when inviting for the workshop.

PROGRAMME - 23 March 2017

Session title	Awards - Entrepreneurship Workshop : Final Pitch
Room	KUKA (Fintry) - EICC Level 3
Hours	14.00 - 15.30
Organiser(s)	• **Geoff Pegman**, R U Robots, UK • **Renaud Champion**, PRIMNEXT, France • **Jon Agirre Ibarbia**, Tecnalia, Basque Country
Motivation and objectives	The Entrepreneurship workshop provides the ability for small innovative companies to pitch their ideas for the next big thing in robotics to a panel of technology investment experts. As well as the chance to win a cash prize, entrants stand the chance to gain valuable skills in how to pitch an investment idea together with the potential to gain interest in their company from the investment community. The workshop will take place over three sessions. The first is a "speed dating" session at which all the entrants are invited to individually pitch their ideas to the panel of investment judges. This session will result in five entrepreneurs going forward to the next session. The second session is a coaching session in which the selected entrants are given coaching by experienced financiers and entrepreneurs in how to most effectively pitch their ideas to potential finance providers. In the final session, final pitch, each potential entrepreneur will make a public presentation of their idea in front of a panel of private finance providers. The panel will then consider the presentations and declare a winner of the ERF Entrepreneurship award. Sponsorship: This event is sponsored by the European Commission DG CONNECT through the RockEU2 CA project, TECNALIA Research & Innovation and euRobotics aisbl
Agenda of the workshop	The workshop will take place over three sessions : on Wednesday 22nd March, the first speed dating session will be between 14:00 and 18:00; on the Thursday 23rd, the second session for coaching of the 5 selected finalist will be between 8:30 and 10:15 and the third judging session - Final Pitch - will be between 16:15 and 17:45. The first two sessions will be closed sessions for the entrants only, while the last session will be open to all members of the ERF
Workshop website link	https://www.eu-robotics.net/robotics_forum/newsroom/press/call-for-the-entrepreneurship-workshop-2017.html?changelang=3

PROGRAMME - 23 March 2017

Session title	Agri-Food - Agri-food robotics: state of the art and future challenges
Room	SCHUNK (Sidlaw) - EICC Level 3
Hours	14.00 - 15.30
Organiser(s)	• **Gert Kootstra**, Wageningen University and Research, The Netherlands • **Gesa Reiss**, York, North Yorkshire & East Riding Enterprise Partnership, UK
Motivation and objectives	The agri-food industry faces difficult challenges. The world population is ever increasing, expecting to reach 9-10 billion people by 2050. This a higher demand for food, feed, fuel and fibres. Already now, there is a global growing scarcity of water, fossil fuel, and fertilizers. Moreover, the impact of the industry on the environment is enormous in terms of greenhouse gasses, waste, chemicals and diseases. To deal with these challenges, there is a need for new technologies, to produce more with less. Increasing the level of automation in the industry – agri-food robotics – is one of the solutions. In pre-harvest, precision agriculture can help to reduce the amount of fertilizer and pesticides, potentially even to zero with robotic mechanical weeding and crop maintenance. Sensor systems can give accurate and localized information about the crop that can optimize farm management. Harvesting can be optimized using robotic systems. And in post-harvest, the quality of food can be accurately determined and food can be sorted and packed using robots. In this workshop, we want to introduce applications in agri-food to the broad robotic field. We will discuss the technological challenges, show current solutions and discuss future directions. Apart from raising awareness, we want to connect researchers and stakeholders and discuss future solutions and collaborations.
Agenda of the workshop	• 14:00-14:10 - **Gert Kootstra** (Wageningen University and Research) – Introduction to Agri-Food Robotics • 14:10-14:20 - **John Gray** (University of Manchester) - Robotics in Food – PicknPack Project • 14:20-14:30 - **Simon Pearson** (Lincoln Institute of Agri-Food Technology, University of Lincoln) – Robotics in food processing (tbc) • 14:30-14:40 - **Richard Green** (National Centre for Precision Farming, Harper Adams University) - Agri-Food and Horticultural Robotic and Data Analytic Developments • 14:40-14:50 - **Thilo Steckel** (Claas) – (tbc) • 14:50-15:00 - **Gesa Reiss** (York, North Yorkshire & East Riding Enterprise Partnership) – Economic development aspects • 15:00-15:30 - Discussion on future challenges (panel and audience)
Relation to a Topic Group	Agricultural robotics
Workshop website link	https://agrifoodroboticsworkshop.com/
Further information	We encourage the audience to prepare issue to bring in at the panel discussion on future directions

PROGRAMME - 23 March 2017

Session title	Industrial - 4th Workshop on Hybrid Production Systems (II)
Room	Harris 1 - EICC Level 1
Hours	14.00 - 15.30
Organiser(s)	• **Sotiris Makris**, LMS - University of Patras, Greece • **George Michalos**, LMS - University of Patras, Greece • **Iñaki Maurtua**, IK4-TEKNIKER, Spain • **Ramez Awad**, Fraunhofer IPA, Germany
Motivation and objectives	This workshop is dedicated to presenting the latest technologies, research results facilitating Human Robot Collaboration (HRC) in an industrial setting, e.g. Applications of augmented reality and wearables, Safety, Interaction, Planning, Simulation, Tele-Operation, etc. In the first quarter of the workshop early results from ongoing research projects are introduced. Early results are characterized as being developed within the first year of the project and as having been validated as a simple proof of concept in the lab (TRL3). The purpose is to give the researcher/inventor feedback w.r.t. to her/his results, e.g. potential enablers, multiplicators, restrictions, etc. The second and third quarter of the workshop are dedicated respectively to elaborating developed technologies (TRL 5/6) for intuitive and safe human robot interaction, with a short interlope of actual industrial applications of HRC in between. The purpose is to inform the community of emerging technologies that may soon be available on the market. Finally, the last quarter will be spent on discussing a joint technology report about the technologies to be submitted to the EC, as part of the joint dissemination effort of the Factories-of-the-Future Cluster on Human-Robot-Collaboration.
Agenda of the workshop	Applications • **Edwin Lotter** (LP Montage Technik GmbH): Robot-assisted Riveting • **Uwe Müller** (InSystems Automation GmbH): Mobile Symbiotic Robot Soldering Unit for human interaction Safety • **Ramez Awad** (Fraunhofer IPA): Design Conceptualization Tool • **Prof. Gordon** Cheng (Technical University of Munich): The artificial skin in Factory-in-a-day • **Dr. Carlos Hernandez Corbato** (TU Delft): Robot software in human-robot collaboration • **Nicola Pedrocchi** (ITIA-CNR): Modular composition of HRC applications using industrial standards • **Christian Vogel** (Fraunhofer IFF): Safe Human-Robot Cooperation with High-Payload Robots in Industrial Applications - SAPARO
Workshop website link	http://www.project-leanautomation.eu/index.php?id=96&tx_ttnews%5Btt_news%5D=112&cHash=5aa62c6dc7d5ea4d63000ec042d04d19
Further information	Participants are asked to review the information and literature provided at http://www.project-leanautomation.eu/index.php?id=96&tx_ttnews%5Btt_news%5D=112&cHash=5aa62c6dc7d5ea4d63000ec042d04d19

PROGRAMME - 23 March 2017

Session title	Space - H2020 SRC Space Robotics Technologies Future Roadmap
Room	Harris 2 - EICC Level 1
Hours	14.00 - 15.30
Organiser(s)	• **Daniel Noelke**, German Aerospace Center DLR, Germany • **Daniel Jones**, UK Space Agency, UK
Motivation and objectives	This session follows 'Space Invaders! PART 1'. The first session focused upon the status quo of the relationship between the space robotics sector and terrestrial sectors. This second session will focus on the imminent opportunities for collaboration and technology development within the framework of the Space Robotics SRC. We will deliver an interactive session that will outline the topics for the next funding Call, and facilitate a discussion about how each of these topics could be leveraged by / for terrestrial applications, and where terrestrial companies could bring expertise to the space robotics SRC. This session will create the conditions whereby different people with similar interests can talk to one another and discover new opportunities to collaborate, with specific direction towards the space robotics SRC. This session will begin with a short presentation showing the next steps for the SRC Roadmap. We will then present the 6 topics for the next call, one by one. Each topic will show the following: • An Operational Grant Factsheet (about the topic, the need, the rationale, the technology) • A flash poll on how useful this would be for terrestrial use Discussion on specific applications or crossover points
Agenda of the workshop	• G. Visentin, ESA: Introduction to the session • J. Rodriguez, CDTI: Next steps in the Roadmap • D. Noelke, DLR: OG7 factsheet • D. Noelke, DLR: Flash poll on OG7 • D. Noelke, DLR: OG7 Discussion • D. Noelke, DLR: OG8 factsheet • D. Noelke, DLR: Flash poll on OG8 • D. Noelke, DLR: OG8 Discussion • D. Noelke, DLR: OG9 factsheet • D. Noelke, DLR: Flash poll on OG9 • D. Noelke, DLR: OG9 Discussion • D. Noelke, DLR: OG10 factsheet • M. Delpech, S. Moreno, CNES: Flash poll on OG10 • M. Delpech, S. Moreno, CNES: OG10 Discussion • M. Delpech, S. Moreno, CNES: OG11 factsheet • M. Delpech, S. Moreno, CNES: Flash poll on OG11 • M. Delpech, S. Moreno, CNES: OG11 Discussion • M. Delpech, S. Moreno, CNES: OG12 factsheet • M. Delpech, S. Moreno, CNES: Flash poll on OG12 • M. Delpech, S. Moreno, CNES: OG12 Discussion • G. Visentin, ESA:Flash poll: did you change your mind? • G. Visentin, ESA: Summary
Workshop website link	www.h2020-peraspera.eu
Further information	• Attendees will be asked to participate in flash polls (instant polls via web browser) • Attendees at this workshop will need a smartphone (with QR Reader app) to participate fully

PROGRAMME - 23 March 2017

Session title	Health - Healthcare Topic Group cluster activities
Room	Ochil 2+3 - EICC Level 1
Hours	14.00 - 15.30
Organiser(s)	• **Christophe Leroux**, CEA, France • **Thierry Keller**, Tecnalia, Spain • **Patrick Courtney**, UK
Motivation and objectives	Healthcare is one of the major priorities in Europe. ICT and robotics are enablers to address socioeconomic challenges such as the ageing of the population, increase of Healthcare cost, prevention of disease and care at home. The TG is highly involved in the elaboration of the MAR of SPARC PPP as well as in the lighthouse project of SPARC. The workshop will present the actions undertaken this year and the perspectives for the next years. A structured debate will be organized about the next challenges for robotics in Healthcare. The objective will be to identify target scenarios and technological priorities representative of an ambition for robotics research in Healthcare for 2030 and the next 10 years after the h2020. The topics covered will include laboratory and assistive, rehabilitation , and operating room robotic. This workshop ambitions to involve the widest possible community of people interested in Healthcare from end users to industries and researchers.
Agenda of the workshop	**14h00 – 14h10** - Objectives of the workshop, actions of the TG in 2016, the Lighthouse project Christophe Leroux **14h10 – 15h10** • Future visions of Healthcare from Italy, Germany, Spain, UK and France (Alberto Sanna, Hassene Lareche, ...) • Esther alliance convergence with SPARC (Patrick Boisseau) **15h10 - 15h30** - Roundtable identification of priorities related to robotics. Action plan (all)
Relation to a Topic Group	Healthcare
Further information	People are asked to share their experience, propose their view and make suggestions about the challenges in the next 10 years in Healthcare

PROGRAMME - 23 March 2017

Session title	Industrial - Collaborative robots in Europe: overcoming current barriers for use in manufacturing
Room	SPARC (Pentland) - EICC Level 3
Hours	16.15 - 17.45
Organiser(s)	• **Shirley Elprama**, imec-SMIT-Vrije Universiteit Brussel, Belgium • **prof. dr. An Jacobs**, imec-SMIT-Vrije Universiteit Brussel, Belgium • **Thomas Vanderauwermeulen**, imec-SMIT-Vrije Universiteit Brussel, Belgium
Motivation and objectives	Due to technical advances, robot manufacturers are bringing collaborative robots to the market. These uncaged cobots are being advertised as cheap(er), easier to program and more flexible compared to the traditional industrial robots. However, in reality there are barriers for adoption, including limited knowledge about collaborative robots and their integration in the production line, unclear safety regulations, financial burdens and limited payload. In this session, we aim to bring together people from industry and academia to discuss current experiences with collaborative robots and identify what could help to overcome the existing barriers. A preliminary list of barriers in manufacturing will be discussed and extended both from an industrial and academic perspective, subsequently in small groups we will cocreate potential conceptual solutions for some of these barriers to enable a more widespread use of cobots in manufacturing across Europe. The goal of this interactive and participatory workshop is to discuss the following questions: • What are the barriers towards actual implementation of collaborative robots in a production line? • What actions are needed to overcome these barriers?
Agenda of the workshop	• 00:00 - 00:05 - General introduction by the organisers • 00:05 - 00:20 - Testimonials related to adoption of collaborative robots • 00:20 - 00:30 - Brainwriting to identify barriers towards adoption of collaborative robots. • 00:30 - 00:40 - First round: problem definition • 00:40 - 00:50 - Second round: creating solution(s) • 00:50 - 01:00 - Third round: optimizing solution(s) • 01:00 - 01:30 - Discuss outcomes including closing remarks

PROGRAMME - 23 March 2017

Session title	ELS - Overview and discussion of the study "European Civil Law Rules in Robotics"
Room	KUKA (Fintry) - EICC Level 3
Hours	16.15 - 17.45
Organiser(s)	• **Dr. Karin RÖHRICHT** and **Dipl.-Ing. Martin HÄGELE**, Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany
Motivation and objectives	Recently, within the European parliament ELS topics on Robotics were intensively discussed and further activities will take place with respect to the "Study for the JURI Committee: European Civil Law Rules in Robotics". These activities might have a remarkable influence on robotics research and industry. That is why we find it important that euRobotics will comment on the study to make clear which position the European Robotics community has on that. Therefore, we will ask for feedback from the community before the ERF takes place. At the ERF, the first part of the session will be used for providing a summary and necessary information to better understand the document. We plan to enrich the session with some details provided from the commission so that the processes within the EU institutions as well as the impact of European laws for member countries become clearer. Eu-nited will also present its position towards the study. The second part of the session is reserved for the presentation of already received feedback via mail as well as to directly discuss input from the session participants. We will document all and use it to prepare a statement from euRobotics.
Agenda of the workshop	• 4.15-4.30 pm - Presentation of the EU study "European Civil Law Rules in Robotics" (**Dr. Karin Röhricht**) • 4.30-4.45 pm - Presentation of the internal process within the EU, impact of parliamentary decisions (member of EU, tbd.) • 4.45-5.00 pm - Presentation of eu-nited position (**Dr. Susanne Bieller**, eu-nited) • 5.00-5.15 pm - Presentation of already received feedback from the community (**Dr. Karin Röhricht**) • 5.15-5.45 pm - Open discussion with participants (moderated and documented by **Dr. Karin Röhricht**)
Relation to a Topic Group	ELS
Further information	Every input with respect to the study is welcome.

PROGRAMME - 23 March 2017

Session title	Perception - Perception Challenges in Times of Deep Learning and Cognition
Room	SCHUNK (Sidlaw) - EICC Level 3
Hours	16.15 - 17.45
Organiser(s)	• **Dr. Michael Suppa**, Roboception GmbH, Germany • **Prof. Darius Burschka**, Technical University of Munich, Germany • **Prof. Achim J. Lilienthal**, University of Orebro, Sweden • **Prof. Michael Beetz**, University of Bremen, Germany
Motivation and objectives	Perception is the key technology allowing automatic adaptation of the system operation to the environment and robust operation of systems under presence of model or hardware errors. Fully or partially autonomous systems rely on perception results obtained from measurements of the world to understand their surroundings. The current breakthroughs in deep learning shift perception research toward indexing and labeling tasks, essential for referring to prior knowledge, neglecting other core aspects of robust measurements such as error estimates, confidence values, and parameter variation in increasingly complex environments. Nowadays, main focus of perception research shifts towards deep learning as the universal tool with emphasis on indexing to previous knowledge instead of measurements. However, deep learning techniques require a large amount of training data, which are in many cases not available. Furthermore, the mode of operation and limitations of a deep learning approach can be hard to understand. This has great impact on safety, robustness, reliability and dependability of robotic systems especially in real-life scenarios. This workshop will elaborate the role of model-based perception techniques w.r.t to the applicability and limitations of deep learning techniques in research and industry and will show future innovation directions in the field.
Agenda of the workshop	16:15 - 16:25 - Introduction by the moderators/definition of key questions 16:25 - 17:25 - Presentations • **Prof. Darius Burschka**, Technical University of Munich, “Challenges in Perception for Learning, Cognition and Control Approaches” • **Prof. Achim Lilienthal**, University of Örebro.” Challenges for perception due to small amounts of training data” • **Prof. Michael Beetz**, University of Bremen, “Perception for manipulation in real environments” • **Prof. Markus Vinzce**,” Challenges of modelling full 3D objects for pose recovery”, Technical University of Vienna • **Dr. Michael Suppa**, Roboception GmbH, “Perception made easy in industrial applications” • **Dr. Guglielmo Gemignani**, Magazino GmbH, “Learning and Model-based Approaches in Logistics” 17:25 - 17:35 - Discussion of the key questions with all speakers and the audience and their implication on the roadmapping process 17:35 - 17:45 - Conclusion for roadmapping and take home messages
Workshop website link	http://roboception.com/en/innovation-en/erf2017/
Further information	Participants should familiarize themselves with the MAR. The key questions and relevant EC projects/publications will be published on the workshop website ahead of time in order to enable preparation.

PROGRAMME - 23 March 2017

Session title	Health - The past, present and future of European service robotics for eldercare and assisted living
Room	Harris 1 - EICC Level 1
Hours	16.15 - 17.45
Organiser(s)	• **Dimitrios Tzovaras**, Information Technologies Institute, Centre for Research and Technology Hellas (CERTH/ITI), Greece • **Rich Walker**, Shadow Robot Company, UK • **Dimitrios Giakoumis**, Information Technologies Institute, Centre for Research and Technology Hellas (CERTH/ITI), Greece
Motivation and objectives	The global population is ageing. Despite the great advances in life-expectancy, more life years are not necessarily translated into more healthy life years. Frailty and cognitive impairments still continue to put significant risks on older populations. While ageing in place is considered the key towards prolonged active and healthy ageing, this is a challenge often difficult to meet, given that it necessitates supervision and assistance provision from formal or informal human caregivers at home, often on a constant basis. Domestic service robots could help alleviate this, relieving some of the caregiving burden. A large number of European research projects are intensively working since the last decade towards the development of domestic service robots to support older adults and disabled persons in need. This workshop aims to summarize key achievements of past and present EU research projects in service robotics for assisted living, discuss on applications of such robotic systems, as well as on key challenges involved when service robots are to be applied in the real home environments. On this basis, the brainstorming session will aim to provide insights on key current advances and future trends. The workshop is organized by the EU-funded (Horizon 2020) project RAMCIP, bringing together further present (RADIO, i-Support, Enrichme) and past (HOBBIT) EU-funded research projects.
Agenda of the workshop	• 16:15 – 16:18 - Introduction by the moderator - workshop scope and participants summary (**Dr. Dimitrios Tzovaras**) • 16:18 – 16:26 - The FP7 HOBBIT project; key advances, applications and challenges (**Prof. Markus Vincze**) • 16:26 – 16:33 - The H2020 RAMCIP project; developing a service robot for MCI patients at home (**Dr. Dimitrios Giakoumis**) • 16:33 – 16:40 - The H2020 RADIO project; coupling service robots with smarthome infrastructures (**Dr. Stasinos Konstantopoulos**) • 16:40 – 16:47 - The H2020 Enrichme project; a mobile robot for elderly with MCI (**Mr. Matteo Bonasso**) • 16:47 – 16:54 - The H2020 I-Support project; developing a domestic service robot for bathing tasks (**Dr. Cecilia Laschi**) • 16:54 – 17:02 - Insights on end user needs, expectations and acceptability issues for service robots (**Ms. Carla Abdelnour**) • 17:02 – 17:10 - Development of advanced service robot products to better suit practical needs (**Mr. Rich Walker**) • 17:10 – 17:40 - Discussion/brainstorming session • 17:40 – 17:45 - Workshop conclusions and closure
Workshop website link	http://ramcip-project.eu/ramcip/content/erf-2017
Further information	All participants are expected to contribute to the discussion session, help in identifying the key applications and challenges for future projects on service robots for eldercare and assisted living.

PROGRAMME - 23 March 2017

Session title	Space - H2020 SRC Space Robotics Technologies Preliminary Results and Impacts
Room	Harris 2 - EICC Level 1
Hours	16.15 - 17.45
Organiser(s)	• **Daniel Jones**, UK Space Agency, UK • **Daniel Noelke**, German Aerospace Center DLR, Germany
Motivation and objectives	The links between downstream space capabilities and terrestrial sectors are well established, but the terrestrial understanding of upstream technologies such as robotics is perhaps less well known. At ERF 2017, the Peraspera PSA team aims to articulate how space robotics technologies and projects can be leveraged by terrestrial and commercial business to create powerful economic impacts. We also aim to broaden the audience's understanding of how to work with the space robotics sector, and how current opportunities can be of mutual benefit. Finally, we want to promote the message that space robotics can be a diverse, open and commercially viable sector, and will aim to try and create new conversations between people with mutual interests who wouldn't ordinarily meet. This session will begin by presenting a short overview of the SRC and its focus on strategic space robotics. An interactive poll will gauge the understanding and prejudices of the audience with respect to the space robotics community / sector. The poll will focus on Then we will take a first look at the work of the Call 1 consortia, derived from the roadmap of the EC's Horizon 2020 Strategic Research Cluster "Space Robotics Technologies". Particular focus will be given to the two non-space actors who will talk about their experience of working with space actors, and the benefits they bring and receive.
Agenda of the workshop	• **D. Jones**, UKSA: Introduction by the moderator; • **G. Visentin**, ESA: Presentation of the SRC • **G. Visentin**, ESA: Flash Poll #1: About the audience • **A. Muhammad**, VTT: Overview of robotics at VTT • **J. Rossmann**, RWTH Aachen University: Successful transfer of robotic Know-How between Space and Terrestrial Applications • **D. Jones**, UKSA: Flash Poll #2: understanding terrestrial capability needs (technology pull)
Further information	• Attendees will be asked to participate in flash polls (instant polls via web browser) • Attendees at this workshop will need a smartphone (with QR Reader app) to participate fully

PROGRAMME - 23 March 2017

Session title	Mining - Robotics in mining - where we are and where we want to be
Room	Ochil 1 - EICC Level 1
Hours	16.15 - 17.45
Organiser(s)	• **Piotr Kasza**, AGH University of Science and Technology, Poland • **Krzysztof Walas**, Poznan University of Technology, Poland
Motivation and objectives	• Determine the specific characteristics and requirements of mining robotics by end user • Presentation of robotic (mechatronics, automation, informatics) technologies used in mining and heavy industry • Cross-sector networking
Agenda of the workshop	• 16:15 - 16:20 - Introduction by the moderatoes • 16:20 - 16:35 - "Driving license for autonomous heavy machines" - **Juha Röning**, University of Oulu • 16:35 - 16:50 - "Mobile robots for industrial hazardous areas - implementation, research projects, inventions" - **Maciej Cader**, Industrial Research Institute for Automation and Measurements • 16:50 - 17:05 - "Sandvik Automation for Mobile Work Machines in Underground Mining" - **Jarkko Ruokojärvi**, Sandvik • 17:05 - 17:20 - "Good habits in construction of underground data networks for the needs of automation and robotisation of mining processes" - **Karol Bartodziej**, Famur SA • 17:20 - 17:35 - "Mining-RoX: Robots for Virtualization of Underground Mines" - **Steve Grehl**, TU Bergakademie Freiberg • 17:35 - 17:45 - Discussion

Session title	System Engineering: Progress in Robot Modeling - Why Modeling is Crucial for Success
Room	Ochil 2+3 - EICC Level 1
Hours	16.15 - 17.45
Organiser(s)	• **Andreas Müller**
Motivation and objectives	Despite the recent progress in artificial intelligence and robot learning, modelling of robotic systems is still important in particular for novel and safety critical applications such as human robotic collaboration but also in view of the ecological impacts of industrial robot applications.
Agenda of the workshop	• **Arne Wahrburg**: You cannot measure everything – On the importance of models for estimation and prediction in robotics • **Justus Piater**: Progress in Robot Learning - Is Modeling Crucial for Success? • **Mathias Brandstötter**: Modeling the Workspace of General Serial Manipulators • **Martin Pfurner**: Kinematic Modeling of Robots Using Algebraic Tools • **Andreas Müller**: Model-Based Industrial Robotics: Motion Planning and Control
Relation to a Topic Group	• Industrial Robotics • Construction Robotics

PROGRAMME - 24 March 2017

Session title	AICoR - Combining IoT, robotics and AI: where is the added value, where are the challenges?
Room	SPARC (Pentland) - EICC Level 3
Hours	8.30 - 10.00
Organiser(s)	• **Mauro Dragone**, Heriot-Watt University, UK • **Alessandro Saffiotti**, Örebro University, Sweden • **Ovidiu Vermesan**, SINTEF ICT, Norway
Motivation and objectives	The IoT (Internet of Things) and Robotics communities have produced highly complementary approaches that have so far been driven by different objectives, one focused on enabling pervasive sensing and interoperability, the other on producing action and interaction. It is increasingly claimed that the integration of results from the two communities will bring a strong added value to both, and that AI and cognition are key enablers for this integration. Before we engage into a serious integration effort, we need to be more precise both about the added value and about the needed enablers. This session will discuss these questions. In order to do so, we will bring experts from the communities of AI, Robotics and of the IoT, as well as representatives from industry, finance, policy, research and end-users, in a highly interactive workshop. The outcome of this session will be the seeds for a roadmap for integrated IoT, Robotics and AI.
Agenda of the workshop	• 00:00 - 00:05 - Introduction • 00:05 - 00:10 - Statement from the commission • 00:10 - 00:30 - 1st round short statement presentations by selected participants - added value of robotics for IoT • 00:30 - 00:50 - 2st round short statement presentations by selected participants - added value of IoT for robotics • 00:50 - 01:20 - Round table brainstorming discussions • 01:20 - 01:30 - Concluding discussion and summing-up Speakers will include: • **Cécile Huet**, Deputy Head of the Unit Robotics & Artificial Intelligence • **Alessandro Saffiotti**, Örebro University • **Ovidiu Vermesan**, SINTEF ICT • **Pieter Simoens**, Ghent University - imec • **Amit Kumar Pandey**, SoftBank Robotics (formerly Aldebaran Robotics) • **Filippo Cavallo**, The BioRobotics Institute, Scuola Superiore Sant'Anna • **Christian Verbrugge**, Kuka • **Anastasia Garbi**, Eurodyn
Relation to a Topic Group	AiCOR
Workshop website link	http://iotrobotics.eps.hw.ac.uk/erf/

PROGRAMME - 24 March 2017

Session title	Social - Empathic Human-Robot Interaction: A Joint Industry-Academia Outlook for the Future
Room	KUKA (Fintry) - EICC Level 3
Hours	8.30 - 10.00
Organiser(s)	• **Kerstin Dautenhahn**, University of Hertfordshire, UK • **Teena Chakkalayil**, Fraunhofer Institute for Integrated Circuits IIS, Germany • **Ana Paiva**, Universidade de Lisboa, Portugal • **Katrin Lohan**, Heriot-Watt University, Scotland
Motivation and objectives	The motivation is to bring together experts from industry and academia to discuss achievements and highlight challenges involved in empathic human-robot interaction (HRI), jointly outline where we should be heading and how industry, academia and research institutions could collaborate to define and drive new research directions to address the challenges and key open issues. Empathy typically relates to people's ability to understand others' feelings and thoughts, and is a multi-faceted concept with cognitive and emotional dimensions. Empathy is becoming increasingly relevant in robotics and in particular the areas of social robotics and HRI where we aim at developing systems that are not only efficient at the execution of certain tasks, but are able to "understand" the person they are interacting with, and convey their ability to the person. This touches upon hard problems in robotics and computer science. The benefits of such intuitive communication could spread to robotics applications for small manufacturing. For example, Baxter (by Rethink robotics) exploits a screen with (non-functional) eyes, just to leverage on its partners intuitive understanding of gaze-based signals in order to facilitate the collaboration. Empathic communication and interaction may thus significantly enhance the effectiveness and acceptability of robots in industrial contexts.
Agenda of the workshop	• **Dr. Alessandra Sciutti**, Cognitive Robotics and Interaction Lab at the Robotics, Brain and Cognitive Sciences Department of IIT: "Actions as a mean of empathic communication • **Prof. Andrea Bonarini**, AI & Robotics Lab, Politecnico di Milano, Italy, "Achieving empathic relationships with low cost robots: a need to get market leading positions" • **Prof. Agnieszka Wykowska**, Social Cognition in Human-Robot Interaction unit, IIT, "Social attunement in social cognitive neuroscience and human-robot interaction" • **Prof. Paul Verschure**, Catalan Institute of Advanced Research and Universitat Pompeu Fabra, "Results on robot empathy obtained in different EU projects" • **Dr. Costanza Navarretta**, Department of Nordic Research, University of Copenhagen, Denmark, "Mirroring facial expressions and the emotions/ attitudes in the mirrored and mirroring expression" • **Prof. Dr. Erwin Prassler**, Vice President IEEE-RAS (Industrial Activities): "Robotics and Empathy: The Uncanny Valley / A Critique"
Workshop website link	http://homepages.herts.ac.uk/~comqkd/TG-ERF-WS-2017.html
Further information	Prepare to actively join discussion groups

PROGRAMME - 24 March 2017

Session title	Logistics - Robust and long term operation of robotics for Logistics
Room	SCHUNK (Sidlaw) - EICC Level 3
Hours	8.30 - 10.00
Organiser(s)	• **Jesús Alfonso de la Riva**, Instituto Tecnológico de Aragón, Spain • **Martin Magnusson**, Örebro University, Sweden • **Achim Lilienthal**, Örebro University, Sweden • **Sören Kerner**, IML Fraunhofer, Germany • **Libor Preucil**, Czech Technical University in Prague, Czech Republic • **Marc Hanheide**, University of Lincoln, United Kingdom
Motivation and objectives	This workshop is being organised by the euRobotics Topic Group for robots in logistics and transport in close collaboration with consortium members of projects STRANDS and Safelog. The main objective is to bring together researchers from academia and industry, in order to discuss the major challenges and opportunities for Robotics in Logistics and Transport The workshop consist in two sections; Flash presentations from selected speakers and a round table. During the round table, we will discuss about content of presentations and deployment of solutions outdoors or non structured environments. In order to interactively engage the audience and to allow them to contribute and share their view in a structured way, the workshop will use an online voting tool, that participants will be using on their mobile devices (phone, tablets, laptops) with a standard internet connection. Details can be found at https://github.com/marc-hanheide/QuickVote/wiki
Agenda of the workshop	**Introduction** **Invited contributions** • **Martin Magnusson / Achim Lilienthal**: (Univ. Örebro) "ILIAD Safe and Scalable Fleets for Intralogistics in Shared Spaces" • **Tim Ensor** (Tharsus) "Delivering promises – a tough job for robots in logistics?" • **Nick Hawes** (Univ. Birmingham) "Long-Term Autonomy for Logistics in Dynamic Environments" • **Martin Davies** (Guidance automation) "Robust robotics in human centric industrial environments with collaborative navigation" • **Miroslav Kulich** (Czech Tech. Univ. in Prague) "Planning for complex logistic systems" - feasibility of RT algorithms for large-sized and real-world problems" • **Philip Nicolai** (Swisslog) "Introducing collaborative robots to automate highly monotonous tasks in intralogistics" • **Jesus Gonzalez** (Eurecat) "LOGIMATIC: Port vehicle automation through tight integration of GNSS and on-board" • **Markus Böhning** (Sick) "Robust localisation of AGCs in dynamic logistics environments" **Round Table:** Robust and long term operation for logistics and transport
Relation to a Topic Group	This workshop is organized by "Logistics and Transport" topic group
Workshop website link	http://web.itainnova.es/eurobotics/erf2017_rob4log_workshop2
Further information	We will use an online voting tool, so bring your mobile device fully charge.

PROGRAMME - 24 March 2017

Session title	Standardisation - Standards and Standardisation for Robots
Room	Harris 1 - EICC Level 1
Hours	8.30 - 10.00
Organiser(s)	• **Theo Jacobs**, Fraunhofer IPA, Germany
Motivation and objectives	Safety standards reduce the legal risks for manufacturers and enable the development of new, innovative robotic products. Additional standards, e.g. for performance measurement and interoperability foster a sustainable market growth. Despite the great importance of standards and standardisation the awareness of standards and the willingness to participate in standardisation is rather low in the European robotics community. This workshop, organized by the Topic Group Standardisation and the H2020 coordination action RockEU 2 has the intention to raise the awareness of standards and show up ways to contribute to standardisation on a national and international level. In an open discussion, issues that hinder an active participation are identified and the need for new standards in additional domains is discussed.
Agenda of the workshop	• 8:30 – 8:55 - **Theo Jacobs**: Overview of standardisation projects in ISO TC 299 and other regulation • 8:55 – 9:20 - **Paolo Barattini**: The Topic Group Standardisation and its current and future work • 9:20 – 9:55 - Open discussion • 9:55 – 10:00 - Wrap up
Further information	Participants are encouraged to think in advance how standards are currently used in their company or research facility and which issues they experience with standardisation in their daily life.

PROGRAMME - 24 March 2017

Session title	Competitions - European robotics competitions and challenges: status quo and lessons learned (I and II)
Room	Harris 2 - EICC Level 1
Hours	8.30 - 10.00 (I); 10.45 - 12.15 (II)
Organiser(s)	• **Agostino De Santis**, Consorzio CREATE, Italy • **Pedro U. Lima**, Instituto Superior Técnico - Universidade de Lisboa, Portugal • **Matteo Matteucci**, Politecnico di Milano, Italy • **Alan Winfield**, University of the West England, United Kingdom
Motivation and objectives	The H2020 Coordination and Support Action RockEU2, based on the legacy of RoCKIn, euRathlon and EuRoC, includes among its objectives the identification of directions to drive robotics competitions and challenges in EU, with particular attention to the European Robotics League (ERL), and the preparation of related specifications and roadmaps. A preliminary set of recommendations has been recently proposed. The aim of this workshop will be to analyse the competitions currently running within the ERL together with the EuRoC challenges, and discuss their outcomes based on both the experiences of successful teams and the draft recommendations (which will be sent to speakers before the event). With respect to previous workshops, a significant space is reserved to teams active in current competitions and challenges, and a panel discussion is scheduled, involving relevant stakeholders for robotics in EU, in order to analyse whether suggested recommendations and best practises are in place and to provide additional hints for the expected roadmaps. In particular, the key topics of sustainability and benchmarking in competitions will be discussed.
Agenda of the workshop	• 8:30 - **Agostino De Santis** - Introduction to the RockEU2 recommendations on Competitions in EU • 8:40 - **Pedro U. Lima** - Status of the European Robotic League (ERL) and main results • 8:50 - **Jon Martin** - Team's experience in ERL - Industrial Robots • 9:00 - **Raphael Memmesheimer** - Team's experience in ERL - Service Robots • 9:10 - **Daniel Serrano** - Team's experience in ERL - Emergency Robots • 9:20 - **Bruno Siciliano** - Status of EuRoC and main results • 9:30 - **Stefania Pellegrinelli** - Team's experience in EuRoC Challenge 1 - Reconfigurable Interactive Manufacturing Cell • 9:40 - **Loreto Susperregi** - Team's experience in EuRoC Challenge 2 - Shop Floor Logistics and Manipulation • 9:50 - **Vlad Usenko** - Team's experience in EuRoC Challenge 3 - Plant Servicing and Inspection • 10:45 - Panel discussion - Chairpersons: **Gerhard Kraetzschmar**, **Matteo Matteucci** Participants: • **Anne Bajart, Rainer Bischoff, Fabio Bonsignorio, Sabine Hauert, Daniele Nardi, Fiorella Operto, Marta Palau Franco**
Workshop website link	https://sites.google.com/site/erf2017robocompworkshop/

PROGRAMME - 24 March 2017

Session title	Health - Robotic surgery in the European researchers community
Room	Ochil 1 - EICC Level 1
Hours	8.30 - 10.00
Organiser(s)	• **Marta Capiluppi**, University of Verona, Italy • **Elena De Momi**, Politecnico di Milano, Italy • **Riccardo Muradore**, University of Verona, Italy
Motivation and objectives	As showed during the Eurosurge project (http://www.eurosurge.eu), there is a great number of research centres/universities dealing with autonomous and semi-autonomous surgical interventions around Europe. Eurosurge project launched the idea of creating a network for sharing development of common tools related to surgical robotics: now there exist platforms and share repositories to effectively sharing research outcomes in order to speed up European research in the field. In this context, the objectives of this workshop are: 1) to present ongoing research activities in the field of robotic autonomous and semi-autonomous precision interventions, currently addressed by recently funded EU projects on surgical robotics themes 2) to pave the way to a new generation of young researchers in this field 3) to point out the challenges to be addressed on the near future from both the medical and the engineering point of view 4) to create a network of young researchers to exploit next European funding opportunities in this field (e.g. Marie Curie actions and COST actions). This last point also takes advantage of current European actions to connect researchers in the field of robotic surgery, such as the DVRK European community, which is currently taking common initiatives for sharing results on the application to the da Vinci robot.
Agenda of the workshop	• Workshop introduction (5 mins) • Poster teasers (25 mins) - EndoVESPA: a computer-assisted robotic platform for magnetically-driven painless colonoscopy (**Gastone Ciuti, Paolo Dario**) - EDEN2020: Diffusion Measurement and Modelling (**Zhengchu Tan**) - EDEN2020: Surgical Planning & Intraoperative Navigation (**Marlene Pinzi**) - MURAB: Combining MRI and Ultrasound for robotic assisted biopsy in breast cancer and muscle diseases – Design robot end effector (**Johannes Lachner**) - MURAB: Combining MRI and Ultrasound for robotic assisted biopsy in breast cancer and muscle diseases – Image registration for optimal needle insertion (**Johannes Lachner**) - SMARTsurg: SMart weArable Robotic Teleoperated surgery (**Antonia Tzemanaki**) - EurEyeCase: Robot-assisted vitreo-retinal surgery via sensor-integrated instruments (**Gianni Borghesan**) • Poster presentation (30 mins) • Round table and interactive discussion (30 mins)
Relation to a Topic Group	Healthcare
Workshop website link	http://nearlab.polimi.it/news/european-robotics-forum-2017/
Further information	Visit the website for updated information to interactively participate to the roundtable at the end of the workshop

PROGRAMME - 24 March 2017

Session title	AICoR - AI for Long-Term Autonomy in Robot Applications
Room	SPARC (Pentland) - EICC Level 3
Hours	10.45 - 12.15
Organiser(s)	• **Nick Hawes**, University of Birmingham, UK • **Alessandro Saffiotti**, Örebro University, Sweden
Motivation and objectives	As robots and autonomous systems (RAS) are increasingly embedded into application environments for long periods they will encounter natural shifts in their tasks and execution environment away from the conditions they were initially developed for. Examples of such phenomena include changes in layout or population density in an environment for a mobile robot, changes in product branding or shape in picking tasks, and changes in the idioms used by interlocutors in interaction. The ability of systems to autonomously adapt to, and learn from, such long-term variations will be important to the effectiveness of future deployed RAS systems, avoiding the need for regular software updates and recalibration. In this session we will identify the opportunities in current and future RAS applications for AI techniques (e.g. learning, planning) to support long-term autonomy in the face of the kinds of variations identified above, and the challenges in applying existing AI techniques to them.
Agenda of the workshop	The workshop will feature challenge statements on the use of AI for long-term autonomy in industrial applications, plus discussion on these challenges, featuring the following: • **Mathias Bürger**, Corporate Research, Bosch • **Martin Davies**, Software & Algorithms Engineer, Guidance Automation • **Mary Ellen Foster**, MuMMER project, University of Glasgow • **Guglielmo Gemignani**, Robot Software Engineer, Magazino • **Michael Gienger**, Honda Research Institute Europe • **Raphael Grech**, Technical Specialist, Manufacturing Technology Centre • **Nick Hawes**, STRANDS Project, University of Birmingham • **David Lane**, Heriot-Watt & SeeByte Ltd • **Alex Phillips**, Head of Marine Autonomous Systems Development, National Oceanography Centre • **Christian Reuther**, Senior Software Architect, MetraLabs
Further information	Participants should consider how AI can enable long-term autonomy in their application cases, and what the barriers to its use are.

PROGRAMME - 24 March 2017

Session title	Health - Ethical, Legal, and Social Aspects of Healthcare Robotics (part 1)
Room	KUKA (Fintry) - EICC Level 3
Hours	10.45 - 12.15
Organiser(s)	• **Sanja Dogramadzi**, Bristol Robotics Laboratory, UK • **Giancarlo Ferrigno**, Politecnico di Milano, Italy • **Nicola Vitiello**, Scuola Superiore Sant'Anna, Italy • **Nunzio Alberto Borghese**, Università degli Studi di Milano, Italy • **Antonia Tzemanaki**, Bristol Robotics Laboratory, UK • **Eduard Fosch Villaronga**, University of Twente, Netherlands • **Aurelia Tamò**, University of Zurich, Switzerland • **Christoph Lutz**, BI Norwegian Business School, Norway
Motivation and objectives	Healthcare is the second major expenditure of the Member States, accounting for up to 11% of GDP and 15% of general government expenditure. This is expected to further increase due to the increase of the elderly population and the simultaneous lack of healthcare experts and carers. Estimated costs of such an increasing population indicate an enormous economic burden caused by falls in old age, while the total estimated worldwide costs of dementia were US$ 604 billion in 2010, one third of which belonged to Western Europe. Thus, dementia is already imposing huge economic burdens, both through direct (medical and social care) and hidden costs (unpaid care-giving by families and friends). Furthermore, in the period between 2016-2020, the global rehabilitation robots market is expected to grow steadily at a compound annual growth rate of 25%.At the same time, minimally invasive surgery (MIS) has changed the landscape of peri-operative surgical care over the last decades, while robot-assisted surgical systems have been increasingly used in MIS procedures over the past ten years. While the case of their use is complex, it is strongly expected that there will be an increasing number of different procedures carried out using telerobotic technology in the coming decade. The global MIS market, which was valued at US$25.03 billion in 2012, will reach a worth of US$50.60 billion by 2019.
Agenda of the workshop	This session brings together three health robotics projects covering rehabilitation, surgery and assisted living. All consider users (professionals and beneficiaries) in the loop, thus raising regulatory issues and Ethical, Legal and Social Aspects (ELSA) related to the level of autonomy and perception of the system's service. • Overview: Maria Chiara Carrozza • KS-ELSA: Andrea Bertolini • KS-Robotics Industry: Joel Van Den Bosch • KS-Non-robotics industry: Freygarður Þorsteinsson • KS-Human-robot interaction: Vicky Charisi • 3 topics: Alberto Borghese, Nicola Vitiello, Sanja Dogramadzi • RTD topic 1-moderators: Alberto Borghese, Jonathan Gomez-Raja • RTR 1: Eduard Fosch Villaronga • Lunch break • KS-End-user: Ottavio De Cobelli • RTD topic 2-moderator: Nicola Vitiello, Giancarlo Ferrigno • RTR 2: Aurelia Tamò • RTD topic 3-moderators: Sanja Dogramadzi, Emmanuel Papacostas • RTR 3: Sanja Dogramadzi • Final debriefing: Maria Chiara Carrozza • KS: keynote speaker, RTD: round table discussion, RTR: round table results
Workshop website link	http://www.brl.ac.uk/research/researchthemes/medicalrobotics/erf2017workshop.aspx
Further information	Participants are encouraged to send a one-page abstract related to ELS challenges of robotics in: Rehabilitation; Surgery; Homecare. Participants can attend without contributing with an abstract.

PROGRAMME - 24 March 2017

Session title	Innovation - Development & Learning from Technology Transfer Initiatives Towards Digital Innovation Hubs
Room	SCHUNK (Sidlaw) - EICC Level 3
Hours	10.45 - 12.15
Organiser(s)	• **Jeremy Hadall**, Manufacturing Technology Centre, United Kingdom
Motivation and objectives	Whilst the EU, national and regional areas have set up technology transfer networks and projects, there has to date been little attempt at sharing best practice across projects clusters and networks. The aim of this session is to present some of the projects and techniques used across Europe in an effort to share best practice. Further, the session will aim to develop an understanding of best practice, techniques, methodologies and pitfalls to avoid by asking participants to share their experiences so that a comprehensive guide can be created.
Agenda of the workshop	• Introduction to the session • Introduction to Digital Innovation Hubs • Technology Transfer Approach in ECHORD++ (TBC) • Technology Transfer Approach in ROBOTT-NET • Technology Transfer Approach in HORSE (TBC) • Technology Transfer in the Odense Robotics cluster • Brainstorming Session Introduction • Brainstorming (five minutes per base) • Feedback from bases & Closing Remarks
Workshop website link	www.robott-net.eu
Further information	Participants will be asked to contribute their experiences and ideas for building stronger clusters and technology transfer hubs in the future both for regional, national and international benefit.

PROGRAMME - 24 March 2017

Session title	Miniaturised - Towards a European open platform on miniaturised robotics (I and II)
Room	Harris 1 - EICC Level 1
Hours	10.45 - 12.15 (I); 14.00 - 15.30 (II)
Organiser(s)	• **Nicolas Andreff**, Institut FEMTO-SR, France • **Albert Sill**, OFFIS, Germany
Motivation and objectives	This workshop will be dedicated to build a European open platform on miniaturised robotics, providing access to high-level technologies, software and methods for both industry (especially SMEs) and academia. "platform" may as well be understood as a definition of a set of interfaces, both for hardware and software, in order to be able to combine all the different hardware components (actuators, sensors), and software tools (for sensor data processing, control, and automation) that are developed by academia and offered by SMEs on the market. The platform will be multi-centric with specialisation on each member's expertise. Members of the platform can be companies or research laboratories.
Agenda of the workshop	Presentations of available facilities and needs in Europe: • **Albert Sill**, OFFIS, Oldenburg, Germany • **Quan Zhou**, Aalto University, Espoo, Finland • **Arianna Menciassi**, Biorobotics Institute, Pisa, Italy • **Michaël Gauthier**, FEMTO-ST Institute, Besançon, France • **Samuel Charreyron**, ETHZ, Zürich, Switzerland • **Pasi Kallio**, TUT, Tempere, Finland • **Metin Sitti**, Max Planck Institute, München, Germany • **Florent Cosandier**, CSEM, Neuchatel, Switzerland • **David Hériban**, Percipio Robotics, Besançon, France • **Sinan Haliyo**, ISIR, Paris, France • **Yassine Haddab**, LIRMM, Montpellier, France
Relation to a Topic Group	Miniaturised Robotics
Workshop website link	http://projects.femto-st.fr/miniaturised-robotics/news/erf-2017-workshop-miniaturised-robotics
Further information	Participants will be asked to express their needs and expectations; to describe their fields of expertise; and to provide a view of their plans to contribute to the platform.

PROGRAMME - 24 March 2017

Session title	Maintenance & Inspection - Aerial Robotics Inspection: from prototypes to industrial applications
Room	Ochil 2+3 - EICC Level 1
Hours	10.45 - 12.15
Organiser(s)	• **Anibal Ollero**, University of Seville, Coordinator of the euRobotics Topic Group on Aerial Robotics, Spain • **Ekkehard Zwicker**, GE Inspection Robotics, Coordinator of the euRobotics Topic Group on Inspection and Maintenance, Switzerland • **Philippe Chrobocinski**, Airbus DS, France • **George Nikolakopoulos**, Lulea University of Technology, Sweden • **Matteo Fumagalli**, Aalborg University, Denmark
Motivation and objectives	The Workshop is motivated by the continuous growing of Aerial Robotics and its applications to inspection, as well as the success of the ERF 2016 Workshop on Aerial Robotics for Inspection and Maintenance. This workshop will focus on the Technology Readiness Level (TRL) increase analysing the state of Aerial Robotics for Inspection and the current existing prototypes and practical applications. Already existing applications will be presented. Moreover, the main gaps and barriers for new industrial applications will be examined. Particularly, technology requirements, costs and regulatory barriers will be analysed. The workshop will start with short presentations (5-7 minutes) on technology and applications. Then, a "world cafe" with 3 tables focusing on process industry applications, energy generation and transportation, and infrastructure inspection will be held. In these tables the requirements, existing systems and gaps will be discussed. Finally, the summary of the discussions will be presented to the full audience.
Agenda of the workshop	• **10:45 – 10:50 - Welcome** • **10:50 – 11:35 - General presentations** **- H2020 Projects:** • AEROARMS aerial manipulation, **A. Ollero** (Univ. Seville, Spain) • AEROWORKS collaborative workers, **G. Nikolakopoulos** (Lulea Univ. Tech, Sweden) • AEROBI bridge inspection, **P. Chrobocinski** (AIRBUS, France) **- Technology presentations:** • Perception, **A. Sanfeliu** (Univ.P Catalonia, Spain), • 3d printing and repair, **L. Margheri** (Imperial College., UK) • Sewer Inspection, **D. Serrano** (EURECAT, Spain) • SHERPA aerial robots, **L. Marconi** (Univ. Bolonia, Italy) • Parallel aerial robots, **A. Chriette** (LS2N Nantes, France) • **11:35 – 12:05 - World Cafe brainstorming in 3 round tables** - Applications to process industries, moderated by **E. Zwicker** (GE Inspection Robotics) - Infrastructure inspection, moderated by **P. Panetsos** (Egnatia Odos AE) - Energy Generation and Transportation applications, moderated by **M. Fumagalli** (Aalborg Univ.) • **12.05 – 12:15 - Outcome by each table moderator**
Relation to a Topic Group	"Aerial Robotics" and "Inspection and Maintenance" Topic Groups
Workshop website link	https://aeroarms-project.eu/aerial-robotics-inspection-from-prototypes-to-industrial-applications/
Further information	Participants should prepare inputs related to technologies, particular applications and existing barriers (technology gaps and regulations) to the three round tables dealing with applications.

PROGRAMME - 24 March 2017

Session title	AICoR - Case studies and future needs of long term navigation and reasoning
Room	SPARC (Pentland) - EICC Level 3
Hours	14.00 - 15.30
Organiser(s)	• **Markus Vincze**, TU Vienna, Austria • **Christian Reuther**, Metralabs, Germany • **Nick Hawes**, School of Computer Science University of Birmingham, UK • **Matai Capatu**, Academy of Aging Sciences, Austria
Motivation and objectives	Robots are expected to operate for longer and longer durations without human interference. The session sets out to confront recent research results, needs established by applications that have driven the research, and the needs of related industrial areas. Confirmed speaker will cover a wide range of fields such as logistics, field robotic, care institutions, security and surveillance, transport, and manufacturing industries. The industrialists will discuss with researchers the results from recent developments in extracting spatio-temporal structure from sensor data gathered during months of autonomous operation. The extracted structure includes reoccurring 3D shapes, objects, people, and models of activity and these structures are used on control models to yield adaptive behaviour in highly demanding, real world security and care scenarios. The goal of the discussion is two-fold: (1) make industrial practitioners aware of the scientific advance and (2) discuss further needs to push methods towards an uptake in actual robotic use cases.
Agenda of the workshop	• 14:00 - 14:05 - Introduction by the organisers • 14:05 - 14:30 - Industrial needs • 14:30 - 14:55 - Scientific results, summary • 14:55 - 15:20 - Discussion moderated by organisers • 15:20 - 15:30 - Summary of discussion
Workshop website link	workshops.acin.tuwien.ac.at/erf2017_casestudies
Further information	The Session Webpage will list relevant background documents such as publications of results or experiences from companies published and the material will be sent out when inviting for the workshop.

PROGRAMME - 24 March 2017

Session title	Health - Multidisciplinarity in Robotic Exoskeleton Technology
Room	KUKA (Fintry) - EICC Level 3
Hours	14.00 - 15.30
Organiser(s)	• **George Nikolakopoulos**, Luleå University of Technology, Sweden • **Matteo Fumagalli**, Aalborg University, Denmank • **Ulrik Röijezon**, Luleå University of Technology, Sweden
Motivation and objectives	The motivation behind the proposed special session is the growing need for developing practical and multi-dimensional robotic exoskeletons for supporting the human body and enhancing its motion capabilities. Such a vision requires the scientific conjunction of multiple disciplines, while the formulation of such multidisciplinary groups can ultimately guide technological novelty to new horizons and impact society in radical ways. The main objective of this special session will be to bring together the leading research and industrial community in a) Biomechanics, b) Control Engineering, c) Machine Learning, d) Neurorehabilitation, e) Safety/Physio-Ergonomy, for discussing the recent developments, trends, challenges and concepts on assistive exoskeleton technology. Via the brainstorming of new ways of interconnecting different scientific and technological backgrounds for the conceptualization of multi-purpose exoskeletal appliances, the final outcome of this workshop will be the roadmap for future actions and collaborations in robotic exoskeleton technology.
Agenda of the workshop	• 00:00 - 00:05 - Introduction by the moderators • 00:05 - 00:20 - Short statement presentations by selected participants • 00:20 - 01:10 - Round-table brainstorming discussions • 01:10 - 01:25 - Presentation of the outcome by the moderators • 01:25 - 01:30 - Concluding discussion on planned follow-up This workshop will give more emphasis on an interactive networking via round-table discussions and brainstorming, rather than following a classic presentation-based schedule. Only short statements are going to be provided at the beginning of the Agenda, but the names of those presenters are yet to be decided.
Workshop website link	http://www.ltu.se/research/subjects/control/Nyheter-Aktuellt/European-Robotics-Forum-1.162170?l=en
Further information	Email to geonik@ltu.se with subject: "ERF 2017 Workshop - Participation Statement" addressing : 1) Area of expertise 2) Vision in exoskeleton-related technology 3) Challenges 4) Proposed solution

PROGRAMME - 24 March 2017

Session title	Competitions - Now coming: Research Reproducibility in Robotics
Room	SCHUNK (Sidlaw) - EICC Level 3
Hours	14.00 - 15.30
Organiser(s)	• **Fabio Bonsignorio**, The Biorobotics Institute, Sant'Anna, Pisa and Heron Robots, Italy
Motivation and objectives	Significant progress has been made in the replicability of results in robotics research and their objective evaluation and comparison in recent years. A RAM special issue composed of replicable experiments and guest edited by some of the proposers has been published at the end of 2015, and the 2015 IEEE Summer School dedicated to same topics has been held. Research Reproducibility is now an IEEE priority and within IEEE Robotics is leading thanks to the early activities started in 2008 by the Euron GEM and Benchmarking SIG. This workshop aims to share the recent developments and to discuss how to cope with the still open issues. How should these issues be reflected into the Work Programme 18-20 of H2020 and BEYOND?
Agenda of the workshop	We will trigger the discussion on the organization of the euRobotics TG on Benchmarking and Competitions that will continue on line and in other occasions. __This won't be a mini conference__ We aim to a real discussion with just a few (short) prescheduled talks from some of the best speakers of previous editions, but hopefully some more 'improvised' provocative ones. Please be (inter- and pro-) active and voice your opinion. The list of speakers will be published on the workshop website a couple of weeks in advance following the preparatory web forum and discussion.
Relation to a Topic Group	TG Benchmarking and Competitions
Workshop website link	www.reproducibleroboticsresearch.org/ERF2017
Further information	Participants will be involved in a (online and by other media) discussion before the workshop. The best ideas will be included in the plenary discussion during the ws and afterwards.

PROGRAMME - 24 March 2017

Session title	Systems Engineering - Agile for Robotics
Room	Harris 2 - EICC Level 1
Hours	14.00 - 15.30
Organiser(s)	• **Damien Sallé**, Tecnalia, Spain
Motivation and objectives	This workshop objective is to share positive experience in the application of Lean and Agile techniques to Robotics. Lean and Agile techniques have been widely used in production and in Software product development. However, Robotics offers a very complex challenge since it embeds both hardware and software. Another important aspect that is of interest to the European robotics community is: how to manage multiple concurrent projects with an agile team when robotics requires multiple expertize onboard and that R&D research is funded in Europe through projects... How can Projects and Product developments could be made compatible. This is the first known initiative to discuss specifically Agile for Robotics, focusing on the specificities of Robotics technology and development practices. The 3 main topics to be discussed will be: • Agile for hardware development in the context of Robotics? • How to design an Agile team for a Robotics development when robotics requires various experts to work together...? • How to work on multiple concurrent projects such as H2020 and industrial projects, plus an internal product development?
Agenda of the workshop	The workshop will start with a 30 minutes slot of presentations to introduce the 3 topics. Then one group for each topic will be formed to share real experiences, benefits and limitations. Visual brainstorming techniques will be used. A final session will then be set to summarize the results of the groups and try to draw conclusions and initial best-practices. • 5' - **Damien Sallé** - Tecnalia - Introduction to the workshop • 10'- **Guy Caverot** - BA Systeme - Introduction to topic: Agile for hardware development in the context of Robotics • 10' - **Anders Billeso Beck** - DTI - Introduction to topic: How to design an Agile team for a Robotics development when robotics requires various experts to work together...? • 10' - **Ugo Cupcic** - Shadow Robot - Introduction to topic: How to work on multiple concurrent projects such as H2020 and industrial projects, plus an internal product development? • 30' - Group work moderated by the speaker of the each of the 3 topics • 25' – Synthesis and conclusion
Workshop website link	http://www.tecnalia.com/en/robotics/projects/agile4robotics/agile4robotics.htm
Further information	This workshop is not a "listen to presentation" session. The participants will be asked to share their experience. They should come with a printed 2 pages A4 illustrating the solution they implemented

PROGRAMME - 24 March 2017

Session title	ELS - Ethical, Legal, and Social Aspects of Healthcare Robotics (part 2)
Room	Ochil 2+3 - EICC Level 1
Hours	14.00 - 15.30
Organiser(s)	• **Eduard Fosch Villaronga**
Motivation and objectives	Social robots are increasingly utilized in therapy and education. The therapeutic robot seal Paro, for example, helps elderly patients by soothing their moods and giving them emotional support. While it has shown positive effects on patient wellbeing, Paro as well as other social robots in therapy and education raise a range of ELS concerns.
Agenda of the workshop	• Workshop Introduction (5 minutes) – **Maria Chiara Carrozza** • Keynote Speaker 1 (ELSA) (10 minutes) – **Andrea Bertolini** • Keynote Speaker 2 (Robotics Industry) (10 minutes) – **Joel Van Den Bosch** • Keynote Speaker 3 (Non-robotics industry) (10 minutes) – **Freygarður Þorsteinsson** • Keynote Speaker 4 (Researcher in human-robot interaction) (10 minutes) – **Vicky Charisi** • Three topics introduction (10 mins) – **Alberto Borghese, Nicola Vitiello, Sanja Dogramadzi** • Round table discussion topic 1 (20 minutes) – moderators: **Alberto Borghese, Jonathan Gomez-Raja** • Round table presentations 1 (10 minutes) – **Eduard Fosch Villaronga** • Lunch break • Keynote Speaker 5 (End users) – **Ottavio De Cobelli** • Round table discussion topic 2 – moderator: **Nicola Vitiello, Giancarlo Ferrigno** • Round table presentations 2 – **Aurelia Tamò** • Round table discussion topic 3 – moderators: **Sanja Dogramadzi, Emmanuel** Papacostas Round table presentations 3 (10 minutes) – **Sanja Dogramadzi** • Wrap up and final debriefing – **Maria Chiara Carrozza**
Workshop website link	https://legalaspectsofsocialrobots.wordpress.com/erf-2017/
Further information	Participants shall read a booklet that contains relevant background information for the workshop (available in the website).

Social Programme

Evening Events

The ERF2017 social events (Welcome Reception and Banquet Dinner) take place at the National Museum of Scotland, housed in a magnificent Victorian building. Founded in 1780, in 2016 the Museum celebrated 150 years, since the building first opened to the public. Join us for the social programme, and follow the story of Scotland from prehistory to the present day in Scottish galleries and meet the Scots whose ideas, innovations and leadership took them across the world in Discoveries gallery.

NATIONAL MUSEUM OF SCOTLAND
Chambers Street, Edinburgh, EH1 1JF, Tel: 0300 123 6789

22nd March (19.30-23.30)
Welcome Reception

National Museum of Scotland - Scottish History and Archaeology galleries & Explore gallery (Level 1)

The Scottish galleries guide you from the Palaeolithic era to the present day, from the earliest cultures to space age science, prehistory to pop culture. The Explore gallery brings science to life with hands-on games and interactive exhibits. Don't miss Dolly the sheep: she's a science superstar and one of the Museum's most iconic objects.


Explore Credits euRobotics


Scottish gallery Credits Replica of the tomb of Mary, Queen of Scots. The original is in Westminster Abbey


Explore Credits Aeroplanes in the In Flight display. Pilcher's Hawk can be seen at the top

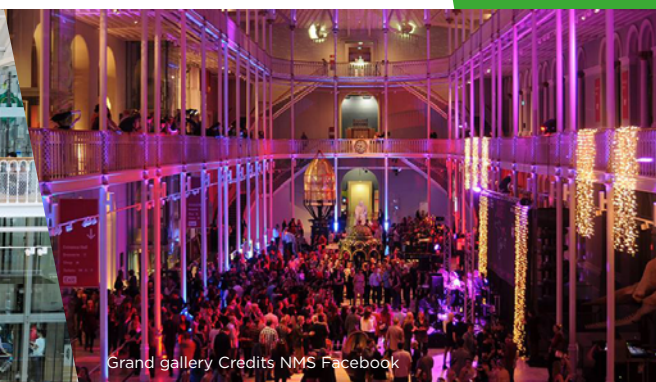
23rd March (19.00-23.00)
Banquet Dinner and euRobotics Awards Ceremony

National Museum of Scotland - Grand Gallery

Rising up through the four storeys, the Window on the World is the largest single museum installation in the UK. The display celebrates the variety and scope of the Museum, showcasing a spectacular array of over 800 objects drawn from a wide range of cultures and disciplines, from tiny glass sculptures to a girder from the original Tay Bridge, whale bone scrimshaw to Art Nouveau design.


National Museums of Scotland


Grand gallery Credits The Window on the World NMS


Grand gallery Credits NMS Facebook

Social Programme

What to do in Edinburgh

Buy your discounted Edinburgh Bus Tour ticket in advance to receive a discount.

EDINBURGH CASTLE
www.edinburghcastle.gov.uk

Edinburgh Castle was recently voted top UK Heritage Attraction in the British Travel Awards and is Scotland's number one paid-for tourist attraction. This most famous of Scottish castles has a complex building history. The oldest part, St Margaret's Chapel, dates from the 12th century; the Great Hall was erected by James IV around 1510; the Half Moon Battery by the Regent Morton in the late 16th century; and the Scottish National War Memorial after the First World War. The castle houses the Honours (Crown Jewels) of Scotland, the Stone of Destiny, the famous 15th century gun Mons Meg, the One O' Clock Gun and the National War Museum of Scotland.

THE PALACE OF HOLYROODHOUSE

The Palace of Holyroodhouse is Her Majesty The Queen's official residence in Scotland. Visitors can explore 14 magnificent historic and State Apartments, the romantic ruins of the 12th-century Holyrood Abbey and remarkable royal gardens.

THE ROYAL MILE AND GRASSMARKET

The Royal Mile connects Edinburgh Castle with the Palace of Holyroodhouse. A walk down this world-famous street will take you past traditional Edinburgh tenement buildings and cobbled closes. Attractions include The Real Mary King's Close, St Giles' Cathedral and the modern Scottish Parliament building. The Grassmarket was once the location of a medieval market place and the site of public executions. Today this area is popular with tourists and locals alike who come here to enjoy great views of the Castle, medieval architecture, and a variety of friendly pubs and eclectic shops.

NATIONAL GALLERIES SCOTLAND
www.nationalgalleries.org

Edinburgh boasts three art galleries; the Scottish National Gallery, the Scottish National Gallery of Modern Art and the Scottish National Portrait Gallery. Visitors to the galleries can view one of the best collections of fine art in the world, modern and contemporary art and portraits of well-known Scottish characters both past and present.


Marketing Edinburgh


Royal Collection Trust / © Her Majesty Queen Elizabeth II 2016


www.visitscotland.com

Eoin Carey © National Galleries of Scotland

Social Programme

PRINCESS STREET GARDENS

Princes Street Gardens lies at centre of Edinburgh's World Heritage Site, within New Town and Old Town Outstanding Conservation Areas. It is listed in the Inventory of Gardens and Designed Landscape in Scotland and has geological and botanical scientific interest. The Gardens are set in the valley between the old and new towns with Edinburgh Castle on its rock towering above the western end. The park has been awarded a Green Flag since 2011 and its central location make it a popular choice with residents and visitors. The world renowned Floral clock was first planted in 1903 and each year the planting scheme commemorates a special anniversary. The planting schemes are designed by the Technical team in the Parks and Greenspace Service. The colourful displays take 30,000 plants, and a variety of flower and foliage plants are used in the designs. All are of a dwarf nature, suitable for carpet bedding, including annuals such as Lobelia, Pyrethrum and Golden Moss and succulents such as Echeveria and Sedum.

ROYAL BOTANIC GARDEN

Just one mile from city centre, the Royal Botanic Garden Edinburgh offers visitors peace and tranquillity amongst 72 acres of stunning scenery. The Royal Botanic Garden Edinburgh is one of the finest botanic gardens in the world. A pleasure for all the family, the Garden offers fantastic views of the capital's skyline, featuring Edinburgh Castle, and is located just a mile from the city centre. Visitors can discover its fascinating history, which dates back 300 years, learn about its plantings and walk around 70 acres of beautiful landscape. The Glasshouse visit is a particular highlight, starting at the Victorian Temperate Palm House dating back to 1858 and one of the tallest traditional palm houses ever built. The Garden's 10 magnificent Glasshouses each has a different climatic zone, from steamy tropics to arid desert, and are home to 3,000 exotic plants from around the world including a 200-year-old palm tree. Visitors can enjoy the serenity of the Chinese Hillside, explore the world-famous Rock Garden or stroll amongst the awe-inspiring Giant Redwood trees in the Woodland Garden. Plus, there are fine artworks to view in the Garden's contemporary art gallery Inverleith House. Open all year, the Garden hosts a popular programme of events, exhibitions and guided tours. The Garden's restaurants include the award-winning Gateway Restaurant and the Terrace Cafe which serves a delicious selection of high quality hot and cold foods for all tastes. Snacks are also available at the East Gate Lodge.

Marketing Edinburgh

Royal Botanic Garden Edinburgh

Social Programme

EDINBURGH ZOO

The Scottish National Zoological Park, is an 82-acre (33 ha) non-profit zoological park in Edinburgh, the capital of Scotland. The land lies on the south facing slopes of Corstorphine Hill, from which it provides extensive views of the city. Built in 1913, and owned by the Royal Zoological Society of Scotland, it receives over 600,000 visitors a year, which makes it Scotland's second most popular paid-for tourist attraction, after Edinburgh Castle. As well as catering to tourists and locals, the zoo is involved in many scientific pursuits, such as captive breeding of endangered animals, researching into animal behaviour, and active participation in various conservation programs around the world.Edinburgh Zoo was the first zoo in the world to house and to breed penguins. It is also the only zoo in Britain to house koalas and giant pandas. The zoo is a member of the British and Irish Association of Zoos and Aquariums (BIAZA), the European Association of Zoos and Aquaria (EAZA), the World Association of Zoos and Aquariums (WAZA), and the Association of Scottish Visitor Attractions. It has also been granted four stars by the Scottish Tourism Board. The zoo gardens boast one of the most diverse tree collections in the Lothians.

PRINCES STREET

One of the major thoroughfares in central Edinburgh, Scotland, and its main shopping street. It is the southernmost street of Edinburgh's New Town, stretching around 1 mile (1.6 km) from Lothian Road in the west to Leith Street in the east. The street is mostly closed to private cars, with public transport given priority. The street has virtually no buildings on the south side, allowing panoramic views of the Old Town, Edinburgh Castle, and the valley between.

SCOTLAND

Scotland is a land of dramatic coastlines, sandy beaches, wild mountain landscapes and stunning lochs. Why not schedule in some extra time to explore its landscape, history, culture, and food and drink.

http://www.conventionscotland.com/choose-scotland/Staying-Longer-in-Scotland
https://www.youtube.com/watch?v=otEcULXOpGc

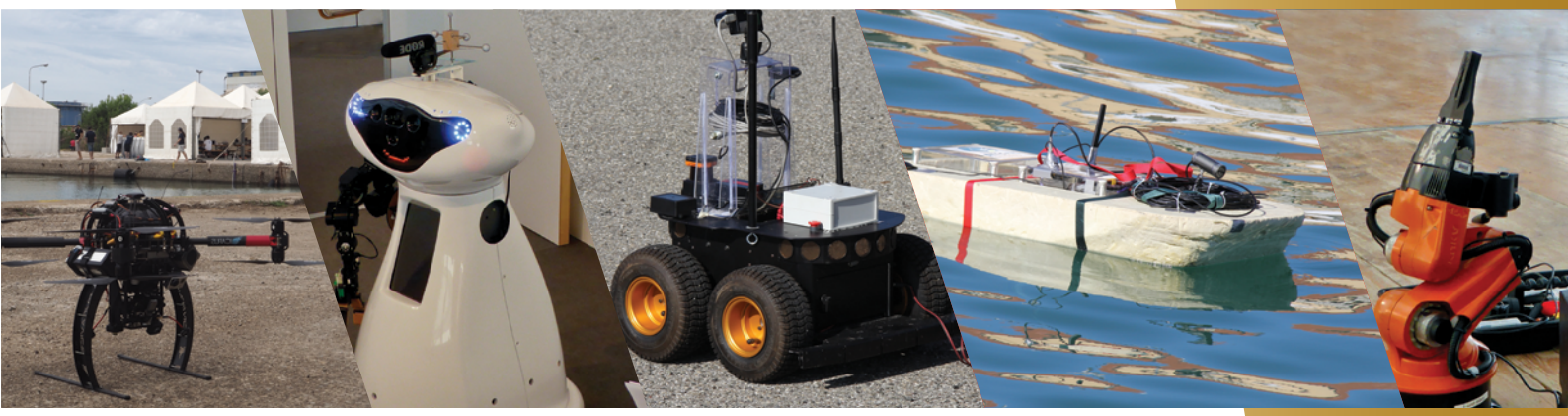
RZSS Edinburgh Zoo


©Ian Murphy

Awards

EUROPEAN ROBOTICS LEAGUE

Brought to you by SPARC www.robotics-league.eu



EUROPEAN ROBOTICS LEAGUE AWARDS 2017

The European Robotics League is a novel pan-European robotics competition launched under the umbrella of SPARC- the Partnership for Robotics in Europe. International teams compete against each other in three vibrant fields of robotics: industrial, service and emergency robotics. Competitors engage in local and major tournaments distributed across Europe and organised by a coalition of Europe's most prestigious robotics institutes. Teams have to compete in at least two tournaments per year, and the scores accumulated by each team are then used to rank them.

The top-ranked teams to be awarded prizes during the European Robotics Forum 2017 Banquet Dinner at the National Museum of Scotland, on 23 March, fall under the following categories:

European Robotics League - Service Robots

- Best-in-Class Task Benchmark 1 "Getting to Know My Home"
- Best-in-Class Task Benchmark 4: "Visit My Home"
- Best-in-Class Task Benchmark 5: "General Purpose Service Robot (GPSR)"
- Best-in-Class Functionality Benchmark 1: "Object Perception"
- Best-in-Class Functionality Benchmark 3: "Speech Recognition" (TBD)

European Robotics League - Industrial Robots

- Best-in-Class Task Benchmark 3: "Fill a Box with Parts for Manual Assembly"
- Best-in-Class Functionality Benchmark 4: "Navigation Functionality"

Awards

TECHTRANSFER AWARD

TECHNOLOGY TRANSFER AWARD 2017

The aim of the "2017 euRobotics Technology Transfer Award" (now in its fourteenth year) is to showcase the impact of robotics research and to raise the profile of technology transfer between science and industry. Outstanding innovations in robot technology and automation that result from cooperative efforts between research and industry are eligible for the prize. The presentations for the 2017 euRobotics Technology Transfer Award will take place at the European Robotics Forum 2017 in Edinburgh in a dedicated session on 23 March (10:45-12:15). Based on both the written application and the presentation, the jury will determine the winners and the awards will be handed on 23 March during the Banquet Dinner at the National Museum of Scotland.

ENTREPRENEURSHIP AWARD

ENTREPRENEURSHIP AWARD 2017

The Entrepreneurship workshop provides the ability for small innovative companies to pitch their ideas for the next big thing in robotics to a panel of technology investment experts. As well as the chance to win a cash prize, entrants stand the chance to gain valuable skills in how to pitch an investment idea together with the potential to gain interest in their company from the investment community (see more on page 47). The presentations for the Entrepreneurship Award 2017 will take place at the European Robotics Forum 2017 in Edinburgh, in a dedicated session on 23 March (14:00 - 15:30). Based on both the written application and the presentation, the jury will determine the winners and the awards will be handed on 23 March during the Banquet Dinner at the National Museum of Scotland.

PhD AWARD

Brought to you by
euRobotics aisbl

EUROBOTICS GEORGES GIRALT PHD AWARD

euRobotics yearly gives the Georges Giralt PhD Award at the European Robotics Forum (ERF) to recognise great work of Ph.D. students in our community. Unfortunately and due to series of serious unexpected circumstances, we are extremely sorry to announce that we are unable to deliver the award this year. Regrettably, we will need to postpone the selection and announcement of a winner for this prestigious prize to ERF 2018, where we plan to host two final selection rounds, one for 2017 and one for 2018. This will not extend the deadline for submitting theses to this year's PhD Award. Submission procedures for the PhD award 2018 will be announced in due time.

SPONSORS & EXHIBITORS

PLATINUM SPONSOR

KUKA AG

Description of the exhibit or company/ organisation	KUKA is a global automation corporation with sales of around 3 billion euro and around 13,200 employees. As leading global supplier of intelligent automation solutions KUKA offers its customers in the automotive, electronics, consumer goods, metalworking, logistics/e-commerce, healthcare and service robotics industries everything they need from a single source: from components and cells to fully automated systems. The KUKA Group is headquartered in Augsburg. **A charming demonstration of human-robot collaboration** KUKA's exhibit at this year's European Robotics Forum (ERF) features a charming application demonstrating human-robot collaboration (HRC) and object-oriented programming of the robot in a Bavarian service application: pouring in wheat beer in a traditional wheat beer glass. The robotic colleague you see at the exhibition already assisted the service team behind the bar at Hannover Messe and Automatica by helping them to serve beer. Side by side with its human colleagues, the robot takes care of all the necessary actions itself: it fetches a full bottle of beer, opens it, picks up a glass and rinses it before pouring the wheat beer in perfect fashion. The mechanical colleague also looks after the washing up. **Sensitivity opens up the ultimate form of cooperation** How does that work? The lightweight robot LBR iiwa has joint torque sensors in all seven axes. They enable it to recognize whether the bottle is full or empty by its weight, to grasp the glass without breaking it and to open the bottle by applying just the right amount of force. And of course the lightweight robot does not pose a hazard when collaborating with humans. In other words: an ordinary colleague who naturally also meets the hygiene requirements and does not dip the bottle into the beer when pouring it. Well, then: Cheers!
Website link	www.kuka.com

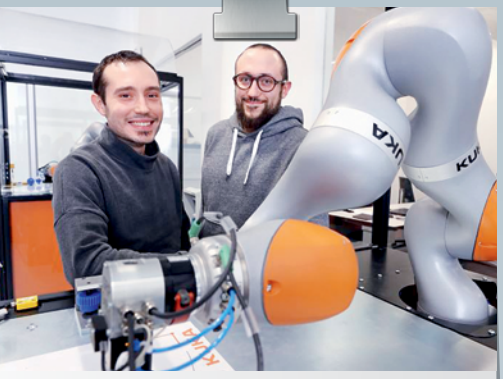
GOLD SPONSOR

SCHUNK

Description of the exhibit or company/ organisation	**SVH 5-Finger Hand from SCHUNK is the World's first HRC Gripper which received the German Social Accident Insurance (DGUV) Certificate** SCHUNK the competence leader for gripping systems and clamping technology has taken a decisive step on the way to save human/robot collaboration: As the world's first robot gripper for collaborative operation, it is certified and approved by the German Social Accident Insurance (DGUV). Control takes place via a RS-485 interface. The SCHUNK SVH can be connected with industry-standard industrial and lightweight construction robots via defined mechanical interfaces. For use in mobile applications power supply is designed for 24 V DC batteries. Last year, the innovative family-owned company showed impressively by means of different HRC grippers, how humans and robots will work hand in hand in future. It is the aim that the SCHUNK Co-act grippers will enable a complex interplay of different sensors and safety mechanisms. This includes force-measuring jaws and visual monitoring, but also covers made of tactile and capacitive sensors or a current-based force control. Comparable to humans, who usually combine several senses for evaluating a situation, the SCHUNK Co-act grippers will bundle information from several sensor sources in future and therefore a most accurate and realistic picture of the reality will be derived.
Website link	www.schunk.com

KUKA

_creating a new robotic world



Human-robot collaboration solution for the assembly of heavy parts in the aerospace industry

Istituto Di Tecnologie Industriali E Automazione
Italy

Collaboratively carrying and positioning objects with stationary and flying robots

LAAS-CNRS in Toulouse (a lab of the French National Center for Scientific Research), with members from the University of Siena, Seoul National University and CNRS at the research center IRISA in Rennes
International research team

Advanced robotic finishing of various work pieces in small batch sizes

Center for Advanced Manufacturing, University of Southern California
United States of America

Airbag system for safe human-robot collaboration

German Aerospace Center DLR
Germany

Human-robot collaboration for moving and positioning heavy parts in the automotive industry

École polytechnique fédérale de Lausanne
Switzerland

Say Hello _to the robotic evangelists

Innovation Award 2017: the finalists have been selected. Research teams from around the globe were asked to submit their concepts on the topic of "Advanced Mechatronics" for the KUKA Innovation Award. Five teams made it to the finals and will be presenting their projects live at HANNOVER MESSE 2017. The award includes a 20,000 Euro prize.

Witness the finals live at the KUKA booth.
HANNOVER MESSE from 24–28 April 2017, Hall 17/G03.

KUKA Innovation Award 2017

innovationaward.kuka.com

Superior Clamping and Gripping

SCHUNK®

The NEW HRC Gripper from SCHUNK

Interacting intelligently and safely with humans.
SCHUNK offers HRC-capable gripping technology with force limitation and collision protection under the new brand name Co-act (collaborative actuator).

Please contact us about your individual requirements.
You can reach the **SCHUNK Co-act Team** as follows:
Phone: +49-7133-103-3444
E-mail: co-act-team@de.schunk.com

Our brand ambassador and „godfather" of the gripper's name:
„With the collaboration between humans and robots, SCHUNK has the technology firmly in its grasp. I am proud to have the SCHUNK HRC Co-act gripper JL1 bear my initials."

schunk.com/co-act

Jens Lehmann, German goalkeeper legend, SCHUNK brand ambassador since 2012 for safe, precise gripping and holdling
schunk.com/Lehmann

SPONSORS & EXHIBITORS

SILVER SPONSOR

EPSRC UK-RAS Network

Description of the exhibit or company/ organisation	The EPSRC UK Robotics and Autonomous Systems Network (UK-RAS Network) was established in March 2015 with the mission to provide academic leadership in Robotics and Autonomous Systems (RAS), expand collaboration with industry and integrate and coordinate activities at eight Engineering and Physical Sciences Research Council (EPSRC) funded RAS capital facilities, four Centres for Doctoral Training (CDTs) and partner universities across the UK. The Network is expanding to include broader stakeholders including key national laboratories in the UK and leading international collaborators in both academia and industry. It has already received strong support by major industrial partners, the Science Museum and the UK's major professional engineering bodies including Royal Academy of Engineering, IET, RACE and IMechE. The Network organises a wide range of activities including network and strategic roadmap events such as the UK Robotics Week, symposia and focused workshops, public engagement and exhibitions. It also has extensive online engagement activities using social media, web and user forums. The Network aims to strengthen the relationship with industry by supporting interdisciplinary mobility and industrial secondment, developing proof-of-concept (PoC) projects and running design challenges. There is also a strong emphasis on government policy and high-level engagement with international stakeholders.
Website link	www.ukras.org

SILVER SPONSOR

Tharsus Group

Description of the exhibit or company/ organisation	Robotics is complex, we make it simple. We are Tharsus, the UK's leading designers and manufacturers of autonomous system robotics. We guide FTSE 250/500 companies and technology start-ups through the uncharted landscapes of the robotics world to imagine, define and produce robotic solutions that deliver commercial impact. We do this in a way that reduces the commercial risk attached to 'first of kind' product development. On a project-by-project basis, we essentially become our client's outsourced product development and manufacturing teams. With pre-built manufacturing facilities and all the development tools to handle the volume manufacture of any robotic service product, we know what it takes to deliver new; new technology, new engineering pathways and better ways of production and operation.
Website link	www.tharsus.co.uk

SPONSORS & EXHIBITORS

BRONZE SPONSOR

Adele
FEELING ROBOTS

Adele Robots

Description of the exhibit or company/ organisation	Adele Robots was created in 2010 with the aim to make life easier for people. That eagerness and dream make all our energies were focused on finding out the formula to integrate robots into society, making them part of our lives.
Website link	https://www.adelerobots.com/en/

BRONZE SPONSOR

Association for Robots in Architecture

Association for Robots in Architecture

Description of the exhibit or company/ organisation	The international Association for Robots in Architecture is originally a spin off association of Vienna University of Technology. Its goal is to make industrial robots accessible for the creative industry, artists, designers and architects, by sharing ideas, research results and technological developments. Founded in December 2010 by Sigrid Brell-Cokcan and Johannes Braumann, Robots in Achitecture is an open platform for everybody interested in the creative use of and innovative fabrication with industrial robots. Robots in Architecture is engaged in applied research, soft- and hardware development, "robot pedagogics" – and in the question: how soon will robots revolutionize architecture? We pursue the association's goal by offering workshops and holding lectures at international conferences, schools, and universities, and by maintaining the Robots in Architecture homepage www.robotsinarchitecture.org, which serves as a hub for all things robotic in architecture, art, and design. In 2011, Robots in Architecture presented KUKA|prc, a plugin for Grasshopper that for the first time enables robot control from within architectural software. It is continuously updated with new features and freely available for Robots in Architecture members.
Website link	http://www.robotsinarchitecture.org

BRONZE SPONSOR

CLEARPATH ROBOTICS™

Clearpath Robotics

Description of the exhibit or company/ organisation	Clearpath Robotics is a global leader in unmanned vehicle robotics for research and development, and provides hardware, software and services to enable self-driving vehicle development, deployment, and operation. Clearpath works with over 500 of the world's most innovative brands in over 40 countries, serving markets that span industrial materials handling, mining, military, agriculture, aerospace, and academia. Clearpath is an award-winning company with recent awards, including Robotics Business Review Top 50 Company, Edison Award for Innovation, Business Insider Top 40 under 40, and Canada's Top 100 Employers. Visit Clearpath Robotics at www.clearpathrobotics.com.
Website link	www.clearpathrobotics.com

SPONSORS & EXHIBITORS

BRONZE SPONSOR

High Value Manufacturing Catapult

Description of the exhibit or company/ organisation	Showcase of the High Value Manufacturing Catapult's advanced manufacturing robotics capability.
Website link	https://hvm.catapult.org.uk/

BRONZE SPONSOR

Honda Research Institute Europe

Description of the exhibit or company/ organisation	At HRI our products are ideas - ideas that lead to innovations. In 2003, when the Honda Research Institutes were founded in Japan, in the United States and in Europe, research into computational intelligence, optimization and robotics was our central focus. More than a decade later artificial intelligence is seen as the next big tech thing. We couldn't agree more. Intelligent systems will shape our future in many ways, ranging from autonomous and accident-free driving to personal robots and from smart design and manufacturing to the efficient use of resources. We envision intelligent systems to work among us, for us and with us. This is why we call it Cooperative Intelligence. The ideas and concepts our researchers introduce on the next pages are the basis for achieving cooperative intelligence. Innovation most frequently occurs at the intersection of traditional disciplines where true synergy can be harvested and where we start to think out of the box. Our partners in Honda and in universities in Europe and beyond help us to maintain a broad perspective and to keep on challenging ourselves. At HRI-EU we work together with Universities in Europe and beyond. We call it our HRI European Graduate Network. It is a vibrant, personal community of current and former PhD and Master students, who have spent time at HRI-EU. It is also the home of all graduate students who are supported by the Honda Research Institute Europe. It also includes associates who pursue a PhD degree together with their work at our institute. The EGN shall foster the spirit of togetherness among "our" students, strengthen our advisory role and create a network that lasts beyond their time at our institute.
Website link	http://www.honda-ri.de

SPONSORS & EXHIBITORS

BRONZE SPONSOR

PAL Robotics

Description of the exhibit or company/ organisation	PAL Robotics is attending the European Robotics Forum and will be exhibiting two of its most advanced platforms, TIAGo and REEM-C. PAL Robotics is a worldwide leading company in biped humanoid robots based in Barcelona (Spain). The team is composed of about 35 people from different nationalities and fields that design, craft and customize humanoid and service robots. With over 13 years in the most challenging field in robotics, PAL Robotics has achieved partnerships all over the world. PAL Robotics supports open source initiatives and all of its robots are 100% ROS compatible. TIAGo is a service robot designed to work in indoor environments and to be a configurable and adaptive platform for research. It is a modular robot that can be customized to adapt to multiple research needs. TIAGo has the capability to carry up to 2 Kg. As it is modular, it's end-effector can be easily exchangeable even with another commercial grippers and also has the option to include a force torque sensor on the wrist. PAL Robotics also will attend with REEM-C. A self-contained biped of 1.65m and 80 Kg that can carry up to 10 Kg. REEM-C comes with modular hardware architecture and open-source software that make it easy to program and customize. It has the capabilities to perform a large set of movements such as climbing stairs, sitting down or picking up objects from the floor.REEM-C is one of the most advanced bipeds in the world that is currently available for top universities.
Website link	http://www.pal-robotics.com

BRONZE SPONSOR

SoftBank Robotics

Description of the exhibit or company/ organisation	SoftBank Robotics is driving technology forward by becoming a worldwide leader in robotics. SoftBank Robotics developed Pepper, Romeo and NAO. These humanoid robots, are used in more than 70 countries worldwide and offer innovative applications relevant for the fields of research, education, retail, healthcare, tourism, hospitality and entertainment. NAO was developed in 2006 and is SoftBank's first humanoid robot. NAO is an interactive companion robot. More than 10 000 NAO have been sold, especially for education and research purposes. A technological platform for personal assistance research, Romeo is a 140 cm tall humanoid robot designed to explore and further research into assisting elderly and people losing their autonomy, to provide physical as well as cognitive support. Pepper is the first humanoid robot capable of recognizing the principal human emotions and adapting his behavior to the mood of his interlocutor. In more than 140 SoftBank Mobile stores in Japan, Pepper helps to welcome, inform and amuse the customers. Pepper also recently became the first humanoid robot to be adopted in Japanese homes. Pepper is also the robot used in MuMMER collaborative project funded by the European Commission. Its aim is developing a humanoid robot capabilities to engage and interact autonomously and naturally in the dynamic environments of a public shopping mall, providing an engaging and entertaining experience to the general public. The robot will exhibit behavior that is socially appropriate, combining speech-based interaction with non-verbal communication and human-aware navigation. For such objective, Pepper is the perfect humanoid robotic platform.
Website link	www.ald.softbankrobotics.com

SPONSORS & EXHIBITORS

EXHIBITOR

BA Systèmes

Description of the exhibit	BA SYSTEMES is a key player in intralogistics solutions offering Automated Guided Vehicles (AGV) and their supervision software to industrials. As a pioneer in its field, BA SYSTÈMES is one of the leading French companies in research and innovation. The company implements the open innovation model since 2007 to spread innovation and maximizing its potential. The know-how in mechatronics and mobile robotics of the company added to the skills of its academic partners enable to answer new needs of end-users of all industries (manufacturing, construction, aeronautics, etc.). Thus, BA SYSTÈMES is involved in several collaborative projects of R&D and innovation such as the EU funded projects STAMINA and COROMA that aims at developing a mobile robotic system for the factory of the future. The company received the IERA award of the International Federation of Robotics and IEEE in 2014 for its robotics developments dedicated to the imagery in surgery rooms and entrepreneurship.
Website link	https://www.basystemes.com/en/

EXHIBITOR

Edinburgh Centre for Robotics

Description of the exhibit	The Edinburgh Centre for Robotics comprises the Centre for Doctoral Training in Robotics and Autonomous Systems and the Robotarium, a national UK facility for research into the interactions amongst robots, environments, people and autonomous systems. We will be showcasing the cutting edge research work being carried out in the Centre and some of the state of the art equipment from the Robotarium.
Website link	http://www.edinburgh-robotics.org/

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EXHIBITOR

European Robotics League (ERL)

Description of the exhibit	The European Robotics League is a novel pan-European robotics competition launched under the umbrella of SPARC - the Partnership for Robotics in Europe. International teams compete against each other in three vibrant fields of robotics: industrial, service and emergency robotics. Competitors engage in local and major tournaments distributed across Europe and organised by a coalition of Europe's most prestigious robotics institutes. This exhibit will be an opportunity for a direct contact with some of the organizers the three different competitions which compose the ERL: ERL Service Robots, ERL Industry Robots and ERL Emergency Robots. SPARC, the public-private partnership (PPP) between the European Commission and euRobotics, is a European initiative to maintain and extend Europe's leadership in civilian robotics. Its aim is to strategically position European robotics in the world thereby securing major benefits for European economy and the society at large. SPARC is the largest research and innovation programme in civilian robotics in the world, with 700 million euro in funding from the European Commission between 2014 to 2020, which is tripled by European industry, to yield a total investment of 2.1 billion euro. SPARC will stimulate an ever more vibrant and effective robotics community that collaborates in the successful development of technical transfer and commercial exploitation.
Website link	www.robotics-league.eu

EXHIBITOR

The Institution of Engineering and Technology

Description of the exhibit	• The IET is one of the world's largest engineering institutions with over 168,000 members in 150 countries. • We offer membership to individuals from a range of engineering disciplines, sectors and interests. • And as an interdisciplinary institution we reflect the increasingly diverse nature of engineering in the 21st century. • Our vision is working to engineer a better world and our mission is to inspire inform and influence. • 'Engineer a Better World' campaign aims to inspire more parents to encourage their children, especially girls, to become engineers. • Our research behind the campaign showed that fewer than half of parents of girls would encourage their children to consider a career in engineering, compared to two thirds of parents of boys. • By inspiring both todays and tomorrow's engineers and technologists to drive innovation, it will ultimately benefit society.
Website link	www.theiet.org

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EXHIBITOR — iniLabs GmbH

Description of the exhibit	iniLabs invents, produces and sells neuromorphic technologies for research. Our founders have invented some of the key foundations of the field, and we continue to lead the world in applications of neuromorphic engineering through our close collaboration with the Institute of Neuroinformatics at the University of Zurich and the ETH Zurich. iniLabs technologies are now in use at over 150 labs and companies around the world in industries including aerospace, automotive, consumer electronics, industrial vision and security.
Website link	https://inilabs.com/

EXHIBITOR — N8 Research Partnership

Description of the exhibit	The N8 RAS Community is a collaboration of leading researchers from the north of England, with research in enabling technologies applied to interdisciplinary fields: • Deployment of RAS in challenging real-world environments • Health, medical & assistive robots • Transport & unmanned vehicles • Flexible manufacturing • Resilient infrastructure With unparalleled breadth, excellence and critical mass, the N8 RAS community draws on expertise in: Durham University, Lancaster University, University of Leeds, University of Liverpool, University of Manchester, Newcastle University, University of Sheffield, University of York. The N8 are announcing a new Robotics Student Network, and are looking for industrial projects, seminar speakers and sponsors, as well as long-term partners. The N8 Robotics Student Network will provide opportunities to collaborate, network, and work on industrial and societal challenges, linking up with end-users & OEMs, holding events and assembling cross-disciplinary teams.
Website link	http://www.n8research.org.uk/

EXHIBITOR — NCCR Robotics

Description of the exhibit	The Swiss National Centre of Competence in Research Robotics (NCCR Robotics) brings together a selection of the top robotics laboratories in Switzerland to advance research, education and technology transfer of future intelligent robots with a focus on wearable robotics and mobile robotics for rescue and education.
Website link	http://www.nccr-robotics.ch

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EXHIBITOR — Robotnik Automation

Description of the exhibit	Since 2002, Robotnik Automation has been established as a european reference company in mobile service robotics. We will show at ERF2017 our new mobile platforms and mobile manipulators for R&D and also the final applications of them in different sectors: logistics, inspection&maintenance, defense or cleaning.
Website link	www.robotnik.eu

EXHIBITOR — Ross Robotics Limited

Description of the exhibit	Ross Robotics Ltd offers a flexible, robust and cost effective robotic delivery platform. Our fully modular platform allows our robots to be quickly re-configured to perform a wide variety of tasks. An expanding portfolio of sensors and tools can be deployed on our platform separately or simultaneously Our patented universal connector means robots can be easily re-configured and maintained by non-specialist personnel as damaged modules are simply replaced. Our design and development incorporates not only the latest technological advances in materials, software and electronics, but also draws inspiration from abilities and solutions seen in the natural world.
Website link	www.robosynthesis.com

EXHIBITOR — Rubedo Sistemos

Description of the exhibit	Rubedo Sistemos develops unmanned missioning and computer vision solutions for professional applications since 2009. The company provides hardware, software, and services to enable self-driving vehicle development, deployment, and fleet operation. Rubedo can convert customer selected vehicle platforms into robotic systems. Rubedo smart stereo camera sensor provides real-time passive optical depth sense and can extract natural objects of interest in real-time.
Website link	www.rubedos.com

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EXHIBITOR

Shadow Robot Company Ltd

Description of the exhibit	We are exhibiting two of our products at ERF17. The first is our transformative new Smart Grasping System; more than just an industrial gripper, the System has built-in intelligence which enables it to pick and place a variety of products, ensuring a truly efficient production line. The System integrates seamlessly into the Industry 4.0 agenda. Our SGS has a library of different grasps, meaning you can use one Hand to pick up many different types of object, which reduces the need for multiple machines in your factory. We will also be exhibiting our world-renowned Shadow Dexterous Hand (which is also currently on display in the Robots exhibition at the Science Museum, London). The Hand has 20 degrees of freedom, absolute position and force sensors, and ultra sensitive touch sensors on the fingertips, providing unique capabilities for problems that require the closest approximation of the human hand currently possible.
Website link	http://www.shadowrobot.com/

EXHIBITOR

SICSA Cyber Physical Systems

Description of the exhibit	The Scottish Informatics and Computer Science Alliance (SICSA) is a collaboration of Scottish Universities whose goal is to develop and extend Scotland's position as a world leader in Informatics and Computer Science research and education. The stand will present work on cyber physical systems from SICSA teams. Cyber-Physical Systems are mechanisms controlled or monitored by algorithms, representing the tight integration and interaction of multiple physical and software components, each operating on different spatial and temporal scales and exhibiting multiple behavioural modalities. Examples range from robots, avionic systems and medical devices to smart grids and automotive networks.
Website link	http://www.sicsa.ac.uk/research/cyber-physical-systems/

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EXHIBITOR — SMART-E Marie Curie ITN

SUSTAINABLE MANUFACTURING THROUGH ADVANCED ROBOTICS TRAINING IN EUROPE

Description of the exhibit	The SMART-E training network is preparing the next generation of leading Advanced Roboticists to ensure a Sustainable Manufacturing sector in Europe. We are training 13 Early Stage Researchers and 3 Experienced Researchers, developing a leading European doctoral training programme in advanced robotics technologies. SMART-E combines state-of-the-art techniques and utilizes novel technologies in new or lesser known areas involving a team of experts in embodied intelligence, soft robotics, compliant robotics, smart materials, safety and human-machine interaction and autonomous systems, dexterous end effectors and statistics. In the exhibition, the researchers will show their last achievements on: development of innovative solutions for industrial applications in advanced robotics and intelligent automation for sustainable manufacturing in dexterous, soft and compliant robotics in manufacturing; reconfigurable and logistics robotics; safety and human robot interaction and cooperation.
Website link	http://smart-e-mariecurie.eu/

EXHIBITOR — taurob GmbH

Description of the exhibit	As provider of teleoperation solutions for CBRN first responders, EOD teams, fire-fighters and search & rescue teams, taurob's solutions aid in gaining situational awareness in dangerous environments as well as accomplishing tasks such as riskless detection, sample-taking or manipulation of hazardous substances. taurob is also experienced in providing versatile, rugged, easy-to-use, easy-to-integrate robots for outdoor projects within the robotic research & education community at a low price. Ethernet interfaces allow for easy integration of almost any given sensors and processing units. The platform has excellent rough terrain capabilities. Its variable track geometry facilitates driving through vegetation as well as stair climbing (45°). The robots are ROS compatible and will usually be shipped with standardized aluminium-profiles in order to attach any kind of sensors. It is also equipped with at least 3 Ethernet-interfaces and can be easily customized for specific needs.
Website link	www.taurob.com

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EXHIBITOR

The STRANDS Project

Description of the exhibit	The EU STRANDS Project has spent the last four years researching the problem of long-term autonomy in mobile service robots. Our work has focussed on the application of AI and machine learning techniques to enable robust and intelligent behaviour in robots in everyday environments such as offices and care homes. In this exhibition we demonstrate an example STRANDS system that can patrol an environment whilst detecting and tracking passers by, and monitoring its environment for significant changes. You will also have the opportunity to meet members of the STRANDS team and discuss future application and exploitation opportunities.
Website link	http://strands-project.eu/

EXHIBITOR

UKAEA RACE

Description of the exhibit	Promoting ROBOTICS TEST AND EVALUATION CENTRE a government backed initiative . RACE TEST's portfolio of services for measurement standards provide solutions that ensure measurement traceability, enable quality assurance, and harmonise documentary standards and regulatory practices in robotics. The tools, information, and training provided by RACE TEST, and the contributions and results produced by its staff, are leading to advancements in research and technological innovation that will foster the drivers of the UK economy: invention, improvement, and commercialisation. The facility houses tests equipment for measuring how well robots perform under a variety of tasks taken from abstract real-world challenges. The application domains supported by this facility include search and rescue, bomb-disposal, emergency services, driverless cars UAVs and industries involved in challenging environments.
Website link	www.race.ukaea.uk/

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