eu Robotics Forum 2015

11-13 March 2015
Vienna

Robotics in Arts and Culture

Organised by

eu Robotics AISBL

Supporting partners

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FACHHOCHSCHULE TECHNIKUM WIEN

Welcome

Dear Robotics Community,

A warm welcome to the European Robotics Forum 2015 from beautiful Vienna. I am very pleased to see that the spread of robotics into many applications is reflected by the broad range of developers and users of robotics technology attending this time. This success is closely linked to the continuing growth of our membership – we are already more than 210 member organisations, as opposed to 160 a year ago! This shows that the community feels well represented by the association and that we are on track with our activities. 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.

2014 was the first year where the process of roadmapping – deriving from Topic Groups in the form of Recommendations to the European Commission – could evolve completely. We are happy to see that our members identified great potential for themselves by contributing their own expertise to this process and networking with other members. European robotics is currently mobilising many other sectors of industry, such as agriculture, gas and oil, and mining.

Building on the enormous acceptance of this process, SPARC, our partnership with the European Commission, will directly benefit Europe's economy and society. The relationship between robotics and the effects on jobs, the labour market and education, has become one of the three strategic initiatives of euRobotics AISBL in 2014. The interest in this topic intersects various DGs of the European Commission, with the resultant being that robotics is recognized as an important technology to stimulate growth. With the guests in the Opening Ceremony of this year's ERF, euRobotics wants to show that the benefits of robotics on our European economy and society can flourish when we manage to create a European "Highway Code" for robotics in all relevant areas.

I am looking forward to very informative days here in Vienna, full of discussions and networking opportunities, across the whole range of what robotics has to offer today and in the future. I would like to thank our members for turning this forum into a vivid exchange of ideas by organising more than 30 workshops. Special thanks go to the local organisational team around Markus Vincze, my colleagues from the Board of Directors and euRobotics' secretariat for the hard work that went into putting together this event.

Yours sincerely,

Bernd Liepert
President euRobotics AISBL

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Forum Information

Where and when?

The European Robotics Forum takes place in Vienna, Austria from

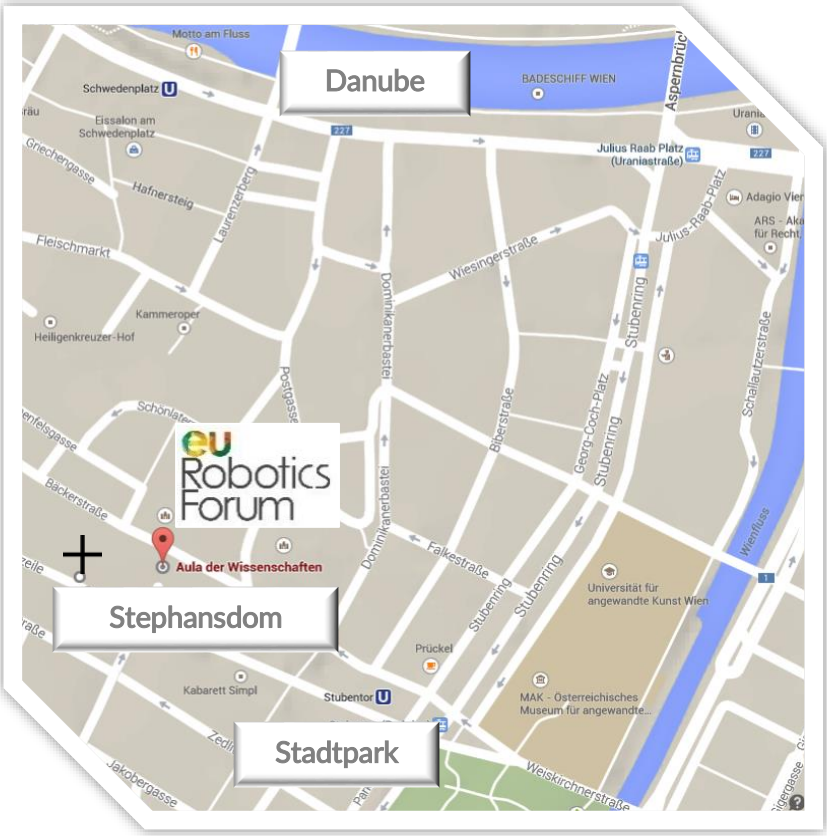
Wednesday, March 11, 2015 – Friday, March 13, 2015

At Aula der Wissenschaften, Wollzeile 27a, 1010 Vienna / Austria

Opening Hours

Days	Welcome Area	ERF
Wednesday, 11 March	8:00am to 7:00pm	8:30am to 6:15pm
Thursday, 12 March	8:00am to 7:00pm	8:30am to 5:45pm
Friday, 13 March	8:00am to 7:00pm	8:30am to 5:45pm

How to get there



From Vienna International Airport:

City Airport Train: 16 minutes *or* S-Bahn Regional Train: 26 minutes *to*
Landstrasse/Wien Mitte metro stop
10 min on foot to venue
Taxi: 20-30 minutes

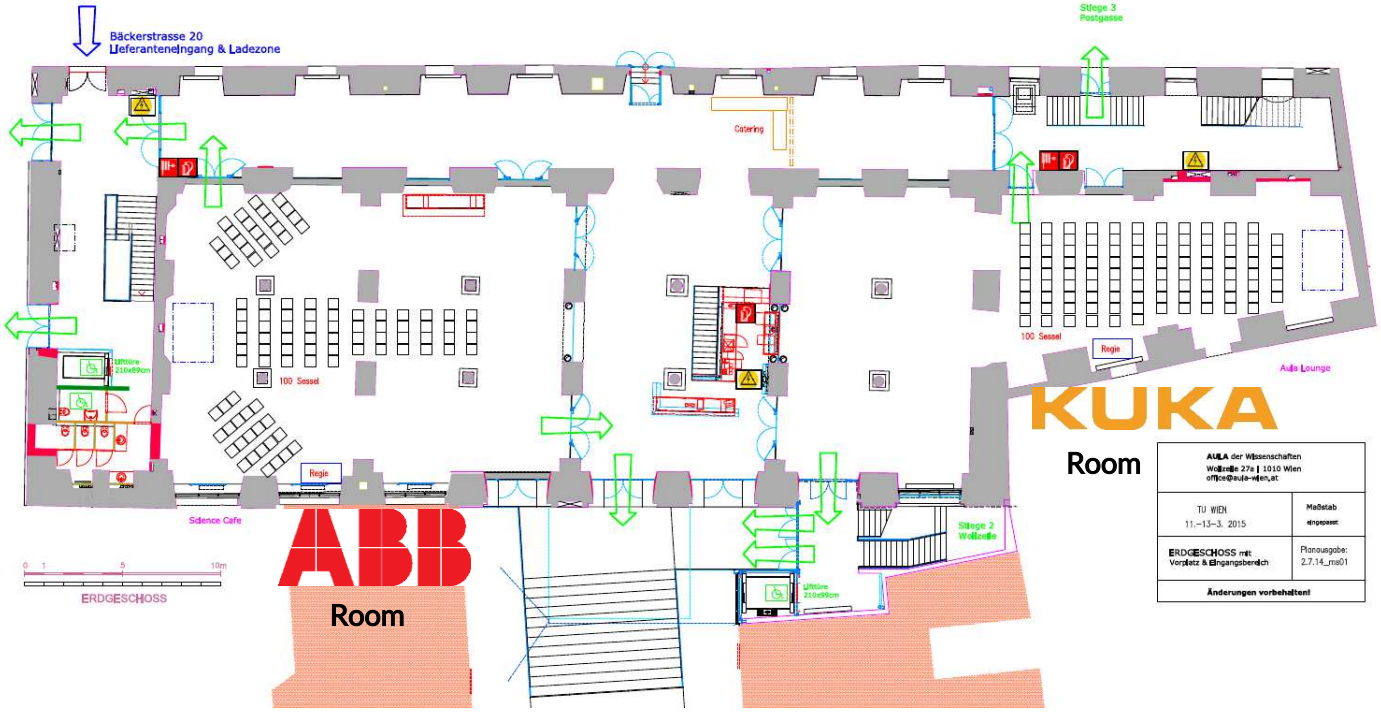
From train stations:

From Main Train Station (Hauptbahnhof)
Metro - U1 direction Leopoldau, stop Stephansplatz (5 min)

From Westbahnof
Subway - U3 direction Simmering, stop Stubentor (10 min)

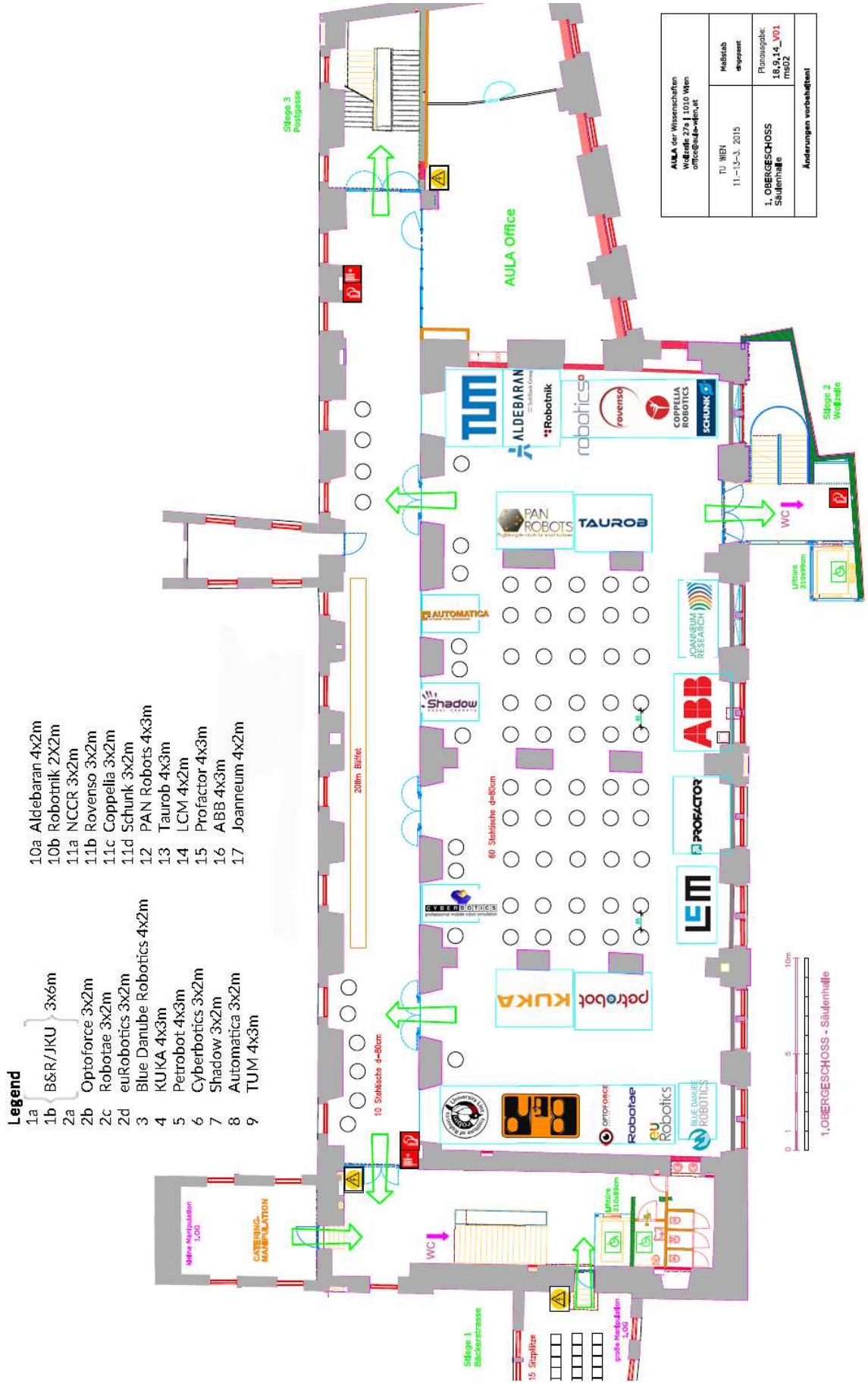
Floor Plan

Ground floor



Second floor

First floor – Exhibition area



Evening events - Social Programme

Networking reception

Wednesday, 11 March 2015 – 7.00 p.m.
Venue: Palais Pallavicini
Address: 1010 Wien, Josefsplatz 5
Website: www.palais-pallavicini.at
Price: included in all tickets
Public transport: attendees take care of their own transport
How to get there: 1.1 km from Aula of Science, by foot
How much time? 13-minute journey

Banquet

Thursday, 12 March 2015 – 7.00 p.m.
Venue: Heurigen "Schreiberhaus"
Address: Rathstrasse 54, 1190 Vienna, 07:00 pm
Website: www.dasschreiberhaus.at
Price: included in the registration fee for: 3 Days free members registration, 3 Days members registration, Day ticket – 12 March
Public transport: attendees take care of their own transport
How to get there: Take subway U6 or U4 and get off at Spittelau. At Spittelau take the bus 35A direction Salmannsdorf and get off at Neustift am Walde
How much time? 45-minute journey

Laboratory visits

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY TOMORROW TODAY

1. Quantum Cryptography with Entangled Photons

AIT Austrian Institute of Technology
Date: Tue, 10.3.2015, 16:15-18:00
Location: Donau-City-Strasse 1, A-1220 Vienna
Description:
One of the future applications for quantum cryptography is to secure sensor networks in critical infrastructures. Not only the communication link to the sensor over an optical fibers could be encrypted, but also the highest level of authentication is achievable to prevent fake control signals in order to avoid attacks. The state-of-the art to generate entangled photons used for optical quantum setups (ready to be visited in the lab) and

the prospective developments will be given.

2. RoboLab@FHTW

FH Technikum Wien
Date: Tue, 10.3.2015, 16:15-18:00
Location: University of Applied Sciences Technikum Wien, Höchstädtplatz 6, A-1200 Vienna
Description:
The robotics laboratory at UAS Technikum Wien is a large teaching and R&D lab in Vienna. It consists of state of the art equipment of well-known robotics OEM (e.g., ABB, EPSON, KUKA, PANASONIC, WITTMANN) as well as prototype installations of current topics (e.g., robot welding, digital factory). Additionally, several service robots are also part of these installations. Participants of the visit will get the unique opportunity to discuss the installations with students, researchers, and academic staff.

3. Robotic Woodcraft

University for Applied Arts
Date: Tue, 10.3.2015, 16:15-18:00
Location: Oskar-Kokoschka-Platz 2, A-1010 Vienna
Description:
The research project "Robotic Woodcraft" is funded through the FWF's PEEK program for arts-based research, which enabled the acquisition of a heavy-payload KUKA KR120R2500 robotic arm at the University for Applied Arts Vienna. A transdisciplinary team of architects with a significant background in robotics, master carpenters with decades of experience with wood, mathematicians with elaborate knowledge of geometry, and practising designers now explores new approaches to apply the robots' inherent multifunctionality in an arts-based context, especially in relation to wood.

Similar to the multifunctional robots, wood is an especially diverse material that can perform a wide range of tasks and is available in various forms and sizes, from glue-laminated timber to wood polymers. We therefore consider industrial robots ideal machines for interacting with wood, as they are not limited to subtractive fabrication, but can bend, weave, glue, spray, etc.
We invite you to visit the new robot-lab at the University for Applied Arts, realized in cooperation with the Association for Robots in Architecture!

www.roboticwoodcraft.com

Awards

euRobotics Technology Transfer Award 2015

The aim of the "2015 euRobotics Technology Transfer Award" (now in its twelfth 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. Please download the detailed information about this award.

The presentations for the 2015 euRobotics Technology Transfer Award will take place at the 2015 European Robotics Forum in Vienna in a dedicated session on 11 March (16:15-18:15). Based on both the written application, and the presentation, the jury will determine the winners and the awards will be handed out on 13th March.

2015 Georges Giralt Ph.D. Award

The aim of the "Georges Giralt Ph.D. Award" is to showcase PhD theses defended in 2014 European universities from all areas of robotics. Outstanding theses with strong theoretical contributions, a focus on professional applications or technology transfer, with a high degree of multi-disciplinarity, or showing how robotics technologies can be 'exported' to new domains, are eligible for the prize.

The presentations for the 2015 Georges Giralt Ph.D. Award will take place at the 2015 European Robotics Forum in Vienna in a dedicated session on 11 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 out on 13th March.

Entrepreneur Award 2015

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 19).

The presentations for the Entrepreneur Award 2015 will take place at the 2015 European Robotics Forum in Vienna in a dedicated session on 12 March (14:00-15:30). Based on both the written application and the presentation, the jury will determine the winners and will receive their awards on 13th March.

Programme

Day 1 - Workshop descriptions

11 March, 08:30 – 10:00	
Session Title:	*"European Robotics projects… beyond the Robotics Unit"*
Organiser(s):	Anne Bajart – European Commission – Anne.Bajart@ec.europa.eu Olivier Da Costa – European Commission - Olivier.DA-COSTA@ec.europa.eu Cécile Huet – European Commission – Cecile.Huet@ec.europa.eu
Content:	The objective is to gather EU projects on robotics belonging to other parts of the FP7 or H2020 programmes such as SME programme, ECSEL, RTD, FET, Marie Curie, … This will be a unique opportunity to bring additional stakeholders, with different profiles and learn from their experience in using other types of funding schemes or being part of other priorities of the EU programme. Each type of project presented will highlight the main features of its funding scheme, give as example a brief description of the project and point to the next funding opportunities. The presentations will be followed by a discussion about the experience of the projects representatives, mechanisms to share information and build synergies among the various projects and types of activities. The potential contribution to and synergies with SPARC and the topic groups will also be addressed.
Agenda of the workshop:	Introduction (10') Robotics in ICT23-ICT24, but not only! Overview of other EU funded activities subCULTron - FET PROACT (10') - Thomas Schmickl, Karl-Franzens-University Graz, AT RoboSoft - FET OPEN (10') - Cecilia Laschi, Scuola Superiore Sant'Anna, Pisa, IT ROBOCADEMY - Marie Curie Initial Training Network (10') European Academy for Marine and Underwater Robotics - Dr. Thomas Vögele, DFKI Robotics Innovation Center Bremen, DE Robotic insulated - SME - ODI Project (10') - Mathew Holloway, Q-Bot Limited, UK JTI ECSEL - EPoSS & Robotics (10'): funding opportunities, possible collaborations - Gereon Meyer, VDI/VDE Innovation + Technik GmbH, DE Service Robotics for the Elderly (5') - Jan Komarek, European Commission GrowMeUp (5') - Jorge Dias - University of Coimbra, PT Discussion on lessons learned, exchange of information and possible collaborations (20')
Speaker(s):	Organizers, representatives of projects and funding programmes, SPARC representative
Workshop website link:	https://ec.europa.eu/digital-agenda/news-redirect/20625

11 March, 08:30 – 10:00	
Session Title:	Robotics for Logistics and Transport
Organiser(s):	Jesús Alfonso de la Riva, Aragon Institute of Technology (ITAINNOVA) , Spain, jalfonso@itainnova.es Achim J. Lilienthal, Örebro University, Sweden, achim.j.lilienthal@gmail.com
Content:	This workshop will bring together researchers from academia and industry, in order to discuss the major challenges and opportunities for Robotics in Logistics and Freight Transport and provide a common forum for exchange of ideas and expertise in both theoretical and practical aspects. It will consist on a series of contributions and round table.
Agenda of the workshop:	08:30 – 08:40 Introduction by the moderators and overview of the domain 08:40 – 09:45 Contributions from industry and academia • Semantic perception for safe long-term operation of robots for intralogistics applications • Seamless Robot Localization and Navigation in Indoors-Outoors for Logistics in Warehouses • E-commerce fast growth: the inevitable challenge for robotic automation in logistics • Flexible Logistics using the Modular CoWorker Framework on Small Mobile Robot Platforms • Futuristic technologies for logistic environments • FURBOT for urban freight delivery 09:45 – 10 :00 Round table discussion, wrap up and conclusions
Speaker(s):	Prof. Achim J. Lilienthal (Örebro University) Sweden Pablo Urcola (University of Zaragoza) Spain Prof. Wolfgang Echelmeyer (Reutlingen Research Institute) Germany Lars Dalgaard (Danish Technological Institute) Denmark Christopher Kirsch (IML Fraunhofer) Germany Matteo Zoppi (University of Genova) Italy
Workshop website link:	http://web.itainnova.es/eurobotics/erf-2015-workshop-robotics-for-logistics-and-transport/

11 March, 14:00 – 15:30

Session Title:	Hybrid Production Systems
Organiser(s):	Ramez Awad, Fraunhofer IPA, Germany, ramez.awad@ipa.fraunmhofer.de Sotiris Makris, LMS - University of Patras, Greece, makris@lms.mech.upatras.gr Martijn Wisse, TU Delft, The Netherlands, M.Wisse@tudelft.nl
Content:	This workshop presents a continuation of the "Hybrid production Systems" workshop that took place at the ERF 2014 and where research projects with the focus on Human-Robot-Collaboration were given the opportunity to present their objectives, approaches and use cases. In this year's workshop, three newly started projects - which will join the workshop in the future - will be introduced, namely *SYMBIO-TIC*, *FourByThree* and *Symplexity*. First results from ongoing projects (*FiaD*, *LIAA*, *ROBO-PARTNER* and *InSa*) will be presented. The presentations will facilitate the continuation of the dialogue between the projects, as well as between the projects and the community about the methodologies, technologies and platforms used and the results developed. The subsequent discussion shall explore possible synergy effects between the projects and other on-going research, technology developments and standardization efforts. Ultimately, the workshop's goal is to initiate activities with regard to developing a reference architecture for a hybrid production system.
Agenda:	14:00-14:10: Introduction 14:10-15:00: Project Presentations 15:00-15:25: Discussion of reference architecture and agreement on next steps 15:25-15:30: Conclusion
Speaker(s):	Dr. Emmanuel Dean, TU München, Germany Dr. George Michalos, LMS - University of Patras, Greece Dr. Stefan Zander, FZI, Germany Ramez Awad, Fraunhofer IPA, Germany
Further information:	LIAA: http://www.project-leanautomation.eu FiaD: http://www.factory-in-a-day.eu ROBO-PARTNER: http://www.robo-partner.eu ReApp: http://www.reapp-projekt.de
Workshop website link:	http://www.project-leanautomation.eu/index.php?id=erf2015_hybridproductionsystems

11 March, 16:15 – 18:15	
Session Title:	Robotics and Regulation: Beyond the RoboLaw project
Organiser(s):	Pericle SALVINI, BioRobotics Institute, Scuola Superiore Sant'Anna, Italy Erica PALMERINI, DIRPOLIS Institute, Scuola Superiore Sant'Anna, Italy Andrea BERTOLINI, DIRPOLIS Institute, Scuola Superiore Sant'Anna, Italy
Content:	The workshop intends to address the ethical, legal and societal issues related to the regulation of robotics technologies. The workshop is divided into two main sessions. The first session consists of invited talks by renowned experts in the fields of robotics, law, ethics, and technology assessment. The second session will be open to the interaction with the audience. Drawing on some of the main outcomes of the RoboLaw project, some of the topics that will be discussed in the open session are: robotics as a special case of regulation; the role of ethics in technology regulation, enhancement, and liability.
Agenda of the workshop:	*Session 1. Invited talks (16.15-17.45)* 16.15-16.25 Opening remarks – E. PALMERINI 16.25-16.45 'Decision making and moral rules in robots and their relevance for regulation' – M. DECKER 16.45-17.05 'Robotics in a legal perspective: the RoboLaw approach' – E. PALMERINI 17.05-17.25 'Making Robotic Autonomy through Science, Ethics and Law?' – N. VAN DIJK 17.25-17.45 'Managing risk in technological innovation: liability rules, insurance, standardization' – A. BERTOLINI *Session 2. Open session (17.45-18.15)* Moderators: E. PALMERINI and P. DARIO 17.45-18.15 Q&A from audience
Speaker(s):	Michael DECKER, Institute for Technology Assessment and Systems Analysis, Karlsruhe Institute of Technology, Germany. Erica PALMERINI, DIRPOLIS Institute, Scuola Superiore Sant'Anna, Italy Andrea BERTOLINI, DIRPOLIS Institute, Scuola Superiore Sant'Anna, Italy Niels VAN DIJK, Interdisciplinary Research Group for Law, Science, Technology & Society, Law Department, Vrije Universiteit Brussel, Belgium Paolo DARIO, BioRobotics Institute, Scuola Superiore Sant'Anna, Italy
Workshop website link:	http://regulatingrobotics-erf2015.robolaw.eu/

11 March, 08:00 – 10:00	
Session Title:	AERIAL MANIPULATION
Organiser(s):	Gianluca Antonelli, University of Cassino, Italy, antonelli@unicas.it Vincenzo Lippiello, University of Naples, Italy, lippiello@unina.it George Nikolakopoulos, Luleå University of Technology, Sweden, george.nikolakopoulos@ltu.se
Content:	In the recent years the research community is devoting a growing interest towards the field of aerial robotics. Main applications are inspections, monitoring, sampling or survey of areas or buildings. Recently, interaction with the environment also has been the object of attention for inspection and construction. A number of international and European projects have been dedicated and are trying to endow Unmanned Aerial Vehicles with the capacity to perform complex tasks among which also floating manipulation tasks by the use of robotic arms. The possibility to reach inaccessible or dangerous sites of UAVs in conjunction with the dexterity of articulated robotic arms for the execution of complex manipulation tasks represents nowadays the new frontier of service robotics. However, several problems remain opened and require further scientific and technological effort to allow the penetration of these solutions in a real industrial context. This workshop aims at presenting the current state of the art in the field of aerial manipulation, the industrial needs, the outstanding problems, and the future scenarios of this technology. To the purpose, the coordinators of 3 relevant European projects and one representative of the industry has been invited and already accepted to give a talk and participate to the discussion.
Agenda:	8.00 - Introduction. 8.05 - Aerial robots with general manipulation capabilities, A. Ollero. 8.25 - AEROWORKS: Collaborative Aerial Robotic Workers, G. Nikolakopoulos and K. Alexis. 8.45 - RobustControl of an Aerial Manipulator Interacting with the Environment, L. Marconi. 9.05 - Aerial robotic manipulation for inspection and maintenance – the industrial relevance, E. Zwicker. 9.25 - Round Table Discussion. 9.50 - Conclusions for the Roadmapping Process under Horizon 2020. 10.00 - End of the workshop
Speaker(s):	Anibal Ollero, University of Seville & Center for Advanced Aerospace Technologies, Spain Kostas Alexis, ETH Zurich, Swiss Lorenzo Marconi, Univerity of Bologna, Italy Ekkehard Zwicker, Alstom Inspection Robotics, Switzerland
Workshop website link:	http://arcas-project.eu/sites/default/files/erf15_website/erf15.html

11 March, 14:00 – 15:30	
Session Title:	4th Workshop on Robot Competitions, Challenges and Benchmarking: European Initiatives
Organiser(s):	Pedro U. Lima, Instituto Superior Técnico, Universidade de Lisboa, Portugal E-mail: pal@isr.tecnico.ulisboa.pt Prof Bruno Siciliano, Dipartimento di Ingegneria Elettrica e Tecnologie dell'Informazione, Universita' di Napoli Federico II, Italy E-mail: bruno.siciliano@unina.it Prof Alan Winfield, Bristol Robotics Lab, UWE Bristol, United Kingdom E-mail: Alan.Winfield@uwe.ac.uk
Content:	Robot competitions, including the EU FP7 funded projects RoCKin and euRathlon, and robotics challenges such as EuRoC, are becoming widely accepted as a complementary approach to advance robotics R&D. Competitions stimulate innovation in a compelling way by providing researchers and developers with realistic mock up scenarios to test and compare their robots. At the same time benchmarking is recognised as a major challenge in robotics, and several efforts have attempted to define and publish benchmarks. This workshop is the fourth of a series on Robot Competitions, and it will report on the outputs of the corresponding competition events held so far within the frame of these projects. Participants will be invited to participate in the panel discussion on robot competitions.
Agenda:	14:00 - Introduction by the organizers 14:05 - RoCKIn - Pedro U. Lima 14:15 - EuRoC - Bruno Siciliano 14:25 - EuRathlon - Alan Winfield 14:35 - Panel discussion on robot competitions - Rachid Alami, Anne Bajart, Wolfram Burgard, Daniele Nardi, Yvan Petillot 15:30 – Closing remarks (organizers)
Speaker(s):	• Rachid Alami. LAAS/CNRS, Toulouse, France • Anne Bajart, DG CONNECT, Robotics, European Commission, Luxemburg • Wolfram Burgard, Autonomous Intelligent Systems, U. Freiburg, Germany • Pedro U. Lima, Institute for Systems and Robotics, IST, U. Lisboa, Portugal • Daniele Nardi, University of Rome “La Sapienza”, Italy • Yvan Petillot, Heriot-Watt University, United Kingdom • Bruno Siciliano, Università degli Studi di Napoli, Federico II, Italy • Alan Winfield, Bristol Robotics Lab, U. West England, Bristol, United Kingdom
Workshop website link:	https://sites.google.com/site/erf2015robocompworkshop

11 March, 16:15 – 18:15	
Session Title:	On Robot's Social Intelligence and Natural Interaction Capabilities with End User Development (for Social Robots)

Organiser(s):

Session: Social Intelligence	*Session: Natural Interaction*	*Session: End User Development*
Amit Kumar PANDEY, Aldebaran Robotics, France akpandey@aldebaran.com *Rachid ALAMI*, LAAS-CNRS, France rachid.alami@laas.fr	*Agnieszka WYKOWSKA*, LMU/TUM Munich, Germany agnieszka.wykowska@tum.de *Anna ESPOSITO*, Second University of Naples, Italy anna.esposito@unina2.it	*Emilia I. BARAKOVA*, Eindhoven University of Technology, The Netherlands e.i.barakova@tue.nl *Bruce A. MACDONALD*, The University of Auckland, New Zealand b.macdonald@auckland.ac.nz *James P. DIPROSE*, The University of Auckland, New Zealand jdip004@aucklanduni.ac.nz

Content:	The workshop aims to provide a single and unique platform for discussion on three complementary but important pillars of development of socially acceptable robots: *Social Intelligence*, *Natural Interaction* and *End User* based development.
Agenda:	*Presentations* and Statements of Interest: • on Robot's Social Intelligence (30 min) • on Natural Interaction with Social Robots (30 min) • on End User development of Social Robots (30 min) *Panel Discussion*: Social Robotics, the current challenges and the needs (30 min)
Speaker(s):	*Michaela Pfadenhauer*, University of Vienna, Austria *Rachid Alami*, LAAS-CNRS, France *Lorenzo Natale*, Italian Institute of Technology, Italy *Amit Kumar Pandey*, Aldebaran Robotics, France *Agnieszka Wykowska*, LMU/TUM Munich, Germany *Anna Esposito*, Seconda Università di Napoli, Italy *Astrid Weiss*, TU Wien, Austria *Filippo Cavallo*, Scuola Superiore Sant'Anna, Italy *Alberto Sanfeliu Cortes*, Institut de Robòtica i Informàtica Industrial, Spain *Laurence Devillers*, University of Paris Sorbonne IV, France *Andrea Bonarini*, Politecnico di Milano, Italy *Milan Gnjatović*, Megatrend University and University of Novi Sad, Serbia *Emilia Barakova*, Eindhoven University of Technology, The Netherlands *Katsu Yamane*, Disney research, USA *James P. Diprose* and *Bruce A. MacDonald*, University of Auckland, New Zealand *J. Terken* and *T. Van den Gurp*, Eindhoven Univ. of Technology, The Netherlands
Website:	http://SocialRobotsERF.SciencesConf.org

11 March, 08:30 – 10:00	
Session Title:	Marine robotics
Organiser(s):	Massimo CACCIA, CNR-ISSIA, Italy. massimo.caccia 'at' ge.issia.cnr.it Ahmed CHEMORI, LIRMM, France. ahmed.chemori 'at' lirmm.fr Vincent CREUZE, GDR Robotics, LIRMM, France. vincent.creuze 'at' lirmm.fr Eleni PATOUNI, CMRE, Italy. Eleni.Patouni 'at' cmre.nato.int
Content:	This workshop is dedicated to marine robotics, focusing on communications, bio-inspired marine robotics, human-machine interaction, cooperation, control and innovative design. This workshop will be concluded by a round-table about the euRobotics *Marine Robotics Topic Group*.
Agenda:	Session 1: Technological & Scientific Challenges in Marine Robotics - Introduction by Eleni Patouni - Presentation by Joao Alves, "Underwater communications: technical challenges & tools for Marine Robotics" - Presentation by Maarja Kruusmaa, "Bio-inspired flow sensing for underwater robots" - Presentation by Nikola Mišković, "CADDY - Cognitive Autonomous Diving Buddy" Session 2: Case studies - Introduction by Ahmed Chemori - Presentation by Valerie Auffray, "Small and low-cost system for underwater inspections" - Presentation by Alfredo Martins, "Awareness at sea: From the surface to the deep ocean - the INESC TEC experience" - Presentation by David Lane, " Recent Developments in Persistent and Long Term Autonomy in Marine Robotics" Round table: Marine Robotics Topic Group, hosted by Massimo Caccia Prof Stathes Hadjiefthymiades will participate to the round table discussion.
Speaker(s):	Joao ALVES, Centre for Maritime Research and Experimentation (CMRE), Italy. Valerie AUFFRAY, Director of Tecnalia France, France. Maarja KRUUSMAA, Tallinn University of Technology, Estonia. David LANE, OSL, Heriot-Watt University, Edinburgh, United Kingdom. Alfredo MARTINS, INESC Porto, Portugal. Nikola MISKOVIC, LABUST, University of Zagreb, Croatia.
Workshop website link:	http://www2.lirmm.fr/~creuze/ERF2015/

11 March, 16:15 – 18:15	
Session Title:	Cognition in Robotics: pre-programmed vs. learning
Organiser(s):	Markus Vincze, Technische Universität Wien, Austria (vincze@acin.tuwien.ac.at) Alessandro Saffiotti, Örebrö University, Sweden (asaffio@aass.oru.se)
Content:	Discussing the potential of cognitive methodology, methods, and technologies to resolve problems in robotics. The discussion will involve selected recent or ongoing EU projects with a distinctive focus on applying AI and cognitive approaches to generate innovation (e.g., SMErobotics). Format: priming talks, mixed industry and research, on the demand in applications resp. newest exploitable results; followed by discussion on how to bring cognitive approaches onto the workshop level. The idea is to bring together industrial needs, present state of the art in cognitive technologies and discuss discrepancy and opportunities.
Agenda:	*9:00 Introduction by the moderators* *9:10 Flash presentations by selected industrial participants* *9:30 Flash presentations by selected academic participants* *10:00 Flash presentations by selected EU projects* *10:15 Open discussion speakers and audience* *10.45 Summary, measures to take to bring cognitive methods to application needs, how can euRobotics and the AICoR TG help*
Speaker(s):	• Lukas Silberbauer, taurob, Austria • Francesco Ferro, Pal Robotics, Spain • Ron Chrisley, University of Sussex, United Kingdom (Making cognitive systems more intelligible) • Florian Röhrbein, TU München, Germany (brain-inspired learning techniques • Andreas Bihlmaier, KIT, Germany (Pre-Programmed Control Strategies vs. Learning Spatial Know-How: The Case of an Automated Endoscopic Camera Guidance Robot) • Gerhard Kraetzschmar, Bonn-Rhine-Sieg University of Applied Sciences, Germany • Michael Beetz, Universität Bremen, Germany (open-EASE, the open web knowledge service for robots) • Jeremy Wyatt, University of Bermingham, United Kingdom (Learning robots for our world: uncertain, incomplete and unfamiliar) • Vincent Müller, Anatolia College, Oxford University, United Kingdom • Olivier da Costa, EU Commission, Luxembourg Alessandro: • Thilo Zimmermann, GPS
Workshop website link:	http://workshops.acin.tuwien.ac.at/erf2015/cognition.html

Entrepreneurial workshop

Who is participating in the entrepreneurial workshop?

The participants are expected to have already developed an idea for a product or service and done some background work in researching the marketplace in which it could be exploited. Entries are expected to be individuals but, exceptionally, could be small teams.
The coaches are respected members of the investment community and / or well established entrepreneurs.

When will it take place?

The workshop will take place over three sessions on Wednesday 11th March. The first speed dating session will be between 08:30 and 10:00, the second coaching session will be between 10:30 and 11:45/ 14:15 and 15:30 – all closed sessions. The third judging session will be between 16:15 and 18:15 – public session.

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.

A certificate and a cash gift will be awarded to the winning team during the Awards Ceremony, on Friday, 13 March. There will also be a press release prepared about the event, the winning team and their proposed product / service.

Organiser(s):

Jon Agirre Ibarbia, Tecnalia, jon.agirre@tecnalia.com
Renaud Champion, Robolution Capital, rc@robolutioncapital.com
Geoff Pegman, R U Robots, geoff.pegman@rurobots.co.uk

Sponsorship:

This event is sponsored by the European Commission DG CONNECT through the RockEU CA project, TECNALIA Research & Innovation, Robolution Capital and euRobotics aisbl.

Day 2 - Workshop descriptions

12 March, 8:30 – 10:00	
Session Title:	First H2020 Robotics projects and their contribution to the SRA, EuRoC, ECHORD++
Organiser(s):	H2020: Cécile HUET, European Commission, Luxembourg cecile.huet@ec.europa.eu Mariusz BALDYGA, European Commission, Luxembourg mariusz.baldyga@ec.europa.eu ECHORD++ : Reinhard LAFRENZ, Technische Universität München, Germany lafrenz@in.tum.de EuRoC: Ramez AWAD, Fraunhofer IPA, Germany ramez.awad@ipa.fraunhofer.de Jonathan VAN DER MEER, CREATE, Italy jonathan@slimict.com
Content:	This session will be the official presentation of all the new H2020 Robotics projects and to the European Robotics community. Each project will highlight its unique contribution to the field and its expected impact. In addition Echord++ and EuRoC will present their relevant activities and services they offer.
Agenda:	1) Introduction and portfolio overview 2) First H2020 Robotics Projects: Contribution to the SRA (Strategic Research Agenda for Robotics in Europe) and Expected Impact. "My project will make a change!" Pitch from each Project in 3 slides, 4 minutes i. Ambition: Step Change in robotics technology and ability? ii. How: what is our approach? iii. Impact on the Application Domain 3) "Echord++: How can you all benefit from it?" (5') 4) "EuRoC: Contribution to the SRA: current state of the technology and future requirements!" (5')
Speaker(s):	EC representative H2020 projects coordinators EuRoC / ECHORD++ representatives
Further information:	H2020 ICT-23: summaries of the first H2020 robotics projects: https://ec.europa.eu/digital-agenda/en/news/first-robotics-projects-h2020-starting EuRoC: http://www.euroc-project.eu/ ECHORD++: http://www.echord.eu/

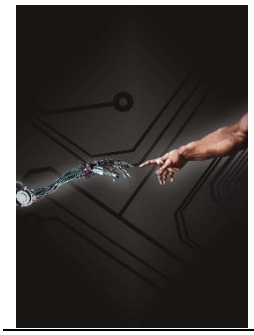
12 March, 10:45 – 12:15	
Session Title:	*"STEP CHANGE RESULTS FROM FP7 PROJECTS"* 
Organiser(s):	Cécile Huet , Bjoern Juretzki , Franco Mastroddi – European Commission
Content:	The objectives of the session are: 1) To demonstrate how the European Union investment through its programme contributes to the field of Robotics 2) To foster the exploitation 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). In addition, after the projects presentations, a panel of potential users of the technologies will present their perspectives about the impact on the projects in their application domains. For that purpose, each project was asked to nominate potential user(s) of their project results to accompany them at this session and take part in the "users panel".
Agenda:	Introduction (5') IntellAct (10') Norbert Krüger, The Maersk Mc-Kinney Moller Institute, DK User testimony: Claus Risager , Blue Ocean Robotics DK CYBERLEGs (10') Nicola Vitiello, The BioRobotics Institute, Scuola Superiore Sant'Anna, IT User testimonies: Dr. Freygarður Þorsteinsson, Ossur, IC and Dr. Manuel Palomino Garcia, Acciona, IT V-Charge (10') Roland Siegwart, ETH Zürich, CH User testimony: Volkswagen (speaker tbc) TAPAS (10') Rainer Bischoff, KUKA User testimony: Brian Fuglsang, Grundfos CoCoRo (10') Thomas Smickl, Karl-Franzens-University Graz User testimony: tbc CloPeMa (10') Sotiris Malassiotis, Informatics & Telematics Institute, Thermi-Thessaloniki User testimony: tbc Roundtable (20'): End-user perspective of the robotics projects, lessons learned and way forward
Speaker(s):	EC representatives, Projects representatives and Potential Users.
Workshop website link:	https://ec.europa.eu/digital-agenda/news-redirect/20626

12 March, 16 :15-17 :45	
Session Title:	EU Robotics Regions
Organisers:	*Paolo Dario*, Director, The BioRobotics Institute, Scuola Superiore Sant'Anna, Italy *Cécile Huet*, Deputy Head of Unit Robotics – A2, European Commission, Belgium *Uwe Haass*, Secretary-General euRobotics aisbl, Belgium *Laura Margheri*, The BioRobotics Institute, Scuola Superiore Sant'Anna, Italy
Content:	Robotics has a huge potential to contribute to economic growth and to solve major societal challenges, and it is in fact already a priority for many European Regions. In order to fully exploit this potential it becomes necessary to synchronize initiatives and programmes at Regional and European level. Therefore a series of actions aimed at the creation of the network of European Regions supporting robotics, smart specialization and infrastructures, has been started since October 2013 by the Tuscany Region, The European Commission, DG CONNECT, and the BioRobotics Institute in Brussels. This workshop at ERF2015 is part of this series and it represents an opportunity to meet together EC representatives, Regional and Member States policy makers, and roboticists, in order to enhance the collaboration between active centres, and to discuss needed instruments and infrastructures for further enhance smart specialisation on robotics.
Agenda:	- 16:15 – 16:25 EC presentation: H2020 / Research Infrastructure / Regional funding (Cecile Huet) - 16:25 – 16:45 Combined Research excellence hub with shared innovation facility (Paolo Dario/Chris Melhuish) - 16:45 – 16:55 Support EU-Robotics Map: a tool for the community to develop network of regions (Séverine Rengnet) - 16:55 – 17:05 Regional activities: the Slovak example (Ladislav Vargovcik) - 17:05 – 17:15 Express: A Coordination Actions for Smart Systems Integration (Gereon Meyer) - 17:15 – 17:25 Possible future shared facility - Technology push (Annibal Ollero) - 17:25 – 17:35 EuRobotics aisbl (Uwe Haass) - 17:35 – 17:45 Discussion and closing remarks (Paolo Dario, Chris Melhuish, Séverine Rengnet, Ladislav Vargovcik, Uwe Haass, Annibal Ollero, Alberto Sanfeliu, Gereon Meyer - Moderator: Cécile Huet)
Speaker(s):	Paolo Dario, Director, The BioRobotics Institute, Scuola Superiore Sant'Anna, Italy Cécile Huet, Deputy Head of Unit Robotics – A2, European Commission, Belgium Uwe Haass, Secretary-General euRobotics aisbl, Belgium Chris Melhuish, Bristol Robotics Laboratory, United Kingdom Alberto Sanfeliu, Universitat Politècnica de Catalunya, Spain Annibal Ollero, University of Seville, Spain Séverine Rengnet, madeeli, France Ladislav Vargovcik, ZTS VVU Kosice a.s., Slovakia Gereon Meyer, EXPRESS CA, Germany
Workshop website link:	http://sssa.bioroboticsinstitute.it/specials/workshopEuRobotics_vienna

12 March, 08:30 – 10:00	
Session Title:	Challenges in Perception based on Domain Requirements
Organiser(s):	Michael SUPPA, Institute of Robotics and Mechatronics, German Aerospace Center (DLR),Germany, michael.suppa@dlr.de Jesús Pablo GONZALEZ, Fundació Privada Ascamm, Spain, jgonzalez@ascamm.com Darius BURSCHKA, Technical University of Munich, Germany, burschka@cs.tum.edu
Content:	The current robot systems are mostly capable of sensory verification and update of static configurations of the environment. Domian-specific challenges arise from the transition of robotic systems into unstructured every-day life with direct interaction with people requires an anticipation of actions and autonomous generation of action models to ensure safety in the operation. Robots must be enabled to operate in real-life scenarios to bring value to society. This is achieved by increased awareness and autonomy and better system design for fully autonomous operation of mobile manipulation systems. Future robots will no longer be isolated systems operating in segregated environments, but they will share spaces with humans and other systems and robots. In order to achieve successful (reliable and efficient) operations in these situations, robots will have to provide excellent perception abilities in dynamic unstructured environments and scenarios. This workshop will allow industry and research community present and discuss about current technical challenges in the domains, analyze potential solutions and propose input to the technology roadmap.
Agenda of the workshop:	08:30 – 08:45 Introduction 08:45 – 09:00 Perception and Manipulation, Closing the Gap (Prof. Darius Burschka) 09:00 - 09:15 Perception Challenges in Automation/Industry 4.0/Mobile Robotics (tbc) 09:15 – 09:30 Perception Challenges in Service Robotics (Dejan Pangercic) 09:30 – 09:45 Perception Challenges in Healthcare (tbc) 09.45 – 10:00 Discussion an Conclusions for the Roadmapping Process under SPARC/Horizon 2020
Speaker(s):	Prof. Darius BURSCHKA, Technical University of Munich, Germany Dejan PANGERCIC, Robert Bosch GmbH, Germany

12 March, 10:45 – 12:15	
Session Title:	Digital Skills for attractive jobs in manufacturing and service automation
Organiser(s):	Martin HAEGELE, Fraunhofer Institute for Manufacturing Engineering and Automation, Stuttgart, Germany; Martin.Haegele@ipa.fraunhofer.de
Content:	New trends in robotics and automation will significantly shape future manufacturing and services: • We anticipate that rigid production lines will be increasingly replaced by agile production environments which will build on human-robot cooperation, effective use of autonomous guided vehicle for flexible logistics, lean equipment and advanced industrial IT for near optimum manufacturing for volatile markets. Furthermore advanced automation equipment is increasingly used in small to medium sized manufacturing. • Service robots will increasingly become part of professional services in areas as diverse as health care, logistics, and facility maintenance. At the same time the role of the worker or of the service provider will drastically change from physical labour to competence and skills. This opens up new opportunities and challenges: Attractive, well paid work places, interest in manufacturing and service jobs among the youth, and the perspective to keep workers longer in their professional live. However this will entail activities in educating and training workers at all age levels. This aspect of what digital skills will be required for future manufacturing and service jobs and how to educate and enable the work force at all age and qualification levels will be the topic of this session. The goal is to discuss the skills gap in the robotics context and identify relevant skills, in particular concerning the users of robots.
Agenda of the workshop:	• Introduction and motivation of the topic (Martin Haegele) • Digital Skills Strategy of the European Commission (Bjoern Juretzki) • Worker needs - opportunities and challenges (Martin Beckmann) • The Danish practice and experiences (Kurt Nielsen) • Case study: Human-Robot Collaboration in Wooden House Production (Ludovic Resch)
Speaker(s):	Juretzki, Bjoern, European Commission Beckmann, Martin, ver.di, Germany Nielsen, Kurt, DTI, Danemark Resch, Ludovic, MIVELAZ Techniques Bois SA, Switzerland (tbd)

12 March, 14h00– 15h30	
Session Title:	First H2020 projects, ECHORD++ and EuRoC "Impact beyond projects"
Organiser(s):	H2020: Cécile HUET, European Commission, Luxembourg cecile.huet@ec.europa.eu Mariusz BALDYGA, European Commission, Luxembourg mariusz.baldyga@ec.europa.eu ECHORD++ : Reinhard LAFRENZ, Technische Universität München, Germany lafrenz@in.tum.de EuRoC: Ramez AWAD, Fraunhofer IPA, Germany ramez.awad@ipa.fraunhofer.de Jonathan VAN DER MEER, CREATE, Italy jonathan@slimict.com
Content:	In this forum projects partners exchange best practices and ideas to cooperate in order to maximise the impact of the individual projects and the programme. The EC will present the requirements and expectations in terms of dissemination and impact and SPARC will also present the services and support the PPP offers. ECHORD++ and EuRoC will explain how the community can benefit from these projects and possibilities for collaboration.
Agenda of the workshop:	1) Being an EU-funding project: Dissemination, exploitation, impact? [EC] 2) SPARC & Projects: being a SPARC project & mutual benefits! [SPARC] 3) Clustering opportunities: Goals? Criteria? Practicalities? [ALL: discussion] 4) Join efforts to optimise Outreach and Impact [discussion] a. Create critical mass in: presence in major tradefairs, invite high level decision makers b. Joint efforts to increase visibility of the Robotics EC programme: dissemination activity and material, outreach to various audiences, disruptive ideas! 5) Echord++: Service offered, how to optimise collaboration with other projects 6) EuRoC: Contribution from current challenges and lessons learned, design of future challenges, how to optimise mutual benefits with other projects
Speaker(s):	EC, SPARC, H2020 projects participants, EuRoC / ECHORD++
Further information:	H2020 ICT-23: summaries of the first H2020 robotics projects: https://ec.europa.eu/digital-agenda/en/news/first-robotics-projects-h2020-starting EuRoC: http://www.euroc-project.eu/ ECHORD++: http://www.echord.eu/ SPARC: http://sparc-robotics.eu/
Workshop website link:	https://eeuropa.eu/digital-agenda/news-redirect/20620

12 March, 16:15 – 17:45	
Session Title:	Ethical problems of robotics – actual and perceived
Organiser(s):	Vincent C. Müller, Anatolia College/ACT, Greece vmueller@act.edu
Content: 	Robotics is moving out of the yellow cages and into mainstream industry and public perception, but robotics has an image problem: It is seen as threat to humans – to safety, to jobs, to a fair and just society. The workshop allows roboticists to better understand the perceived impact of robotics on society – and the importance of this perception for robotics funding and market uptake. The euRobotics topics group on "Ethical, legal and societal issues" supports this workshop.
Agenda of the workshop:	4 Short talks by Müller, Dewandre, Chatila and Winfield, followed by open discussion.
Speaker(s):	Vincent C. Müller - Anatolia College/ACT, Greece [www.sophia.de] "Introduction: Ethical problems in robotics - image problems or real problems?" Nicole Dewandre - Advisor for Societal Issues, DG CONNECT, Belgium [https://ec.europa.eu/digital-agenda/en/nicole-dewandre-biography] "Responsible Innovation in robotics" [TBC] Raja Chatila - Institut des Systèmes Intelligents et de Robotique (ISIR) Paris, France & CERNA-Allistene [http://www.isir.upmc.fr/?op=view_profil&lang=fr&id=229] "On the Ethics of Research in Robotics" Alan Winfield - UWE Bristol, UK [http://www.cems.uwe.ac.uk/~a-winfield/] "Ethics for autonomous robots"
Workshop website link:	http://www.pt-ai.org/ELS-ERF2015

12 March, 08:30 – 10:00	
Session Title:	Flexibility and dexterity in industrial robots: Demonstrators of new frontiers in industrial applications
Organiser(s):	Dr. Ferdinando CANNELLA, IIT, Italy ferdinando.cannella@iit.it Dr Sotiris MAKRIS, LMS – University of Patras, Greece, makris@lms.mech.upatras.gr Dr. Matteo ZOPPI, University of Genoa, Italy zoppi@dimec.unige.it
Content:	The increasing need for High Mix and Low Volume production pushes the industry to investigate new solutions for increasing flexibility. Radical changes can be achieved by introducing autonomous production/handling units which can change task (from joining to handling and vice versa) and position (around the shop floor), eventually cooperating among themselves, reacting quickly to stoppages and reducing losses as much as possible. Technologies in this direction involve: - Reconfigurable tools to enable autonomous and flexible assembly equipment to adapt production process to process/market variations, - Intelligent, Control & Monitoring systems enabling enhanced performance and high level re-configurability of production processes - Open integration & communication architectures to allow easier integration and networking of the control systems utilizing agent-based, web-services and ontology technologies. This workshop will focus on presenting the latest advances in these topics, ranging from flexible grippers, dexterous robots and intelligent decision making software, aiming at concluding to challenges for the future.
Agenda of the workshop:	08:30-08:35: Introduction 08:35-09:45: Project Presentations 09:45-10:00: Round Table Discussion on Industrial robots needs on Dexterity and flexibility
Speaker(s):	Dr. Ferdinando CANNELLA, IIT, Italy Dr. Sotiris MAKRIS, LMS-University of Patras, Greece, Prof. Rezia MOLFINO, UNIGE, Italy Mr. Aldo BOTTERO, COMAU, Italy Dr. Damien SALLE, TECNALIA, Spain Dr. Dragoljub SURDILOVIC, Fraunhofer IPK, Germany, Control Dr. Fei CHEN, IIT, Italy
Further information:	Link to relevant projects: • AUTORECON: http://www.autorecon.eu • X-act: http://www.xact-project.eu • Tomsy project: http://www.cas.kth.se/tomsy/ • SwarmItFIX: http://www.swarmltfix.eu
Workshop website link:	http://www.iit.it/it/aia-news.html

12 March, 10:45 – 12:15	
Session Title:	Cognitive Robotics in Future Manufacturing Scenarios
Organiser(s):	Dr. Andreas Pichler, PROFACTOR GmbH, Austria, andreas.pichler@profactor.at Gerald Fritz, MSc., PROFACTOR GmbH, Austria, gerald.fritz@profactor.at
Content:	The future manufacturing and assembly lines will be influenced by today's research topics in the domain of robotics and automation. Keywords like the robotic co-worker, human-in-the-loop models, human-friendly robotics, etc. are omnipresent. Thus, future robotic systems need to reach a level of cognition that will allow them to understand and effectively operate specifically in industrial environments. Those systems will interact with humans in close proximity, and adapt their actions to an ever growing range of situations. Realizing cognitive robotics and systems (CRS) will therefor require advances along multiple challenges, form sensing through learning to acting. We will bring together researchers from relevant disciplines to exchange ideas and results towards the goal of boosting cognitive robotics principles in the factory of the future.
Agenda of the workshop:	10:45-10:50 Introduction by the organizers 10:50-11:15 Keynote (title to be announced) 11:15-11:25 Discussion concerning the keynote 11:30-12:00 Poster Session of accepted papers 11:30-12:00 Open Fishbowl (Brainstorming) moderated 12:05-12:15 Wrap-Up and Closing by the organizers
Speaker(s):	Fredrik Heintz, Linköpings Universitet, President of the Swedish AI Society (SAIS) Sweden
Further information:	The topic of the open fishbowl discussion is "crazy ideas and visions for future manufacturing principles". Participants will be asked to prepare in advance up to two short statements concerning their individual ideas and visions about the topic apart from well-known roadmaps and strategic outlines.
Workshop website link:	http://www.profactor.at/events/erf-workshop-2015.html

12 March, 14:00 – 15:30	
Session Title:	Space Robotics
Organiser(s):	Daniel Nölke, German Aerospace Center (DLR), GERMANY daniel.noelke@dlr.de Bernd Sommer, German Aerospace Center (DLR), GERMANY bernd.sommer@dlr.de
Content:	This session will give an outlook on past, present and future missions, research and development efforts in the field of space robotics by members of the PERASPERA consortium. The consortium will present their roadmap which serves as an input to the EC's Horizon 2020 Strategic Research Cluster "Space Robotics Technologies". Within the presentations relevant topics according to spin-in/spin-off aspects will be addressed.
Agenda of the workshop:	1. „Space Robotic Missions" [15 min] 2. „Space Robotic Systems" [15 min] 3. „Space Robotic Technologies" [15 min] 4. „PERASPERA Roadmap and Spin-In/Spin-Off Potential" [15 min] 5. Discussion [30 min]
Speaker(s):	1. Bernd SOMMER, German Aerospace Center (DLR), Germany 2. Javier RODRIGUEZ GONZALEZ, Centre for the Development of Industrial Technology (CDTI), Spain 3. Michel DELPECH, National Centre for Space Studies (CNES), France 4. Gianfranco VISENTIN, European Space Agency (ESA), The Netherlands Daniel JONES, United Kingdom Space Agency (UKSA), United Kingdom
Further information:	http://www.congrexprojects.com/2015-events/15m12
Workshop website link:	PERASPERA website is under construction

12 March, 16:15-17:45	
Session Title:	Industrial Robotics - Needs and directions
Organiser(s):	José Saenz (Fraunhofer IFF); Jose.saenz@iff.fraunhofer.de Federico Vicentini (CNR-ITIA) federico.vicentini@itia.cnr.it Mark Lewandowski (Procter & Gamble) lewandowski.ml@pg.com
Content:	The objective of this workshop is to update the MAR in the field of Industrial Robots by bringing industry and academia together and discussing and prioritizing future challenges, as well as identifying current barriers to entry. In addition to the invited speakers, members of the audience are invited to submit 1 slide with their opinions regarding needs and directions for industrial robots and will be given 2 minutes for presenting their ideas during the final discussion.
Agenda of the workshop:	• 16:15-16:20 – Introduction, Overview goals of workshop – José Saenz • 16:20-16:35 – Trends in robot hardware design (new shapes and sizes, actuation technologies) and description of industrial pull behind these trends, linking industrial needs for future applications to new developments in robot hardware – Elisabeth Schärtl • 16:35-16:45 – Industry needs based on experience and risk assessments, SME experiences and perspectives – Mark Lewandowski, Geoff Kerr, Alain Morelli • 16:45-16:55 – Overview typical collaborative robot applications / potential, examples from risk assessments - Paulo Paolo Pusceddu • 16:55-17:10 – Status report on EN ISO 10218, ISO TS 15066 Standards, outlook on which standards need to be further refined for pHRI – Björn Matthias • 17:10-17:20 – Studies in human-robot collision, why are these taking place and what are implications for future research for force and power limiting – Roland Behrens • 17:20-17:30 – Industrial robot control system needs for speed and separation monitoring – Federico Vicentini 17:30-17:45 – Open floor discussion whereby audience can contribute with their long-, medium, and short term needs including 1 slide contributions with individual perspectives
Speaker(s):	José SAENZ, Fraunhofer IFF, Germany; Elisabeth Schärtl, KUKA, Germany, M. Lewandowski, Procter & Gamble, USA; Geoff Kerr, Procter & Gamble, USA; Alain Morelli, COESIA, Italy; Paulo Paolo Pusceddu, Coesia, Italy; Björn Matthias, ABB AG Forschungszentrum, Germany; Roland Behrens, Fraunhofer IFF, Germany; Federico Vicentini, CNR-ITIA, Italy
Workshop website link:	Link to Google Drive Page for Industrial Robots – Needs and Directions

12 March, 08:30 – 10:00	
Session Title:	Research & Innovation Camps for Open Source Industrial Robot Software
Organiser(s):	Ulrich Reiser, Fraunhofer IPA, Stuttgart, Germany (ulrich.reiser@ipa.fraunhofer.de)
Content:	The Objective of the workshop is to specify together with both research community and industry the concrete contents for research & innovation camps organized in RockEU
Agenda of the workshop:	*08:30 – 08:35 Introduction by the moderators* *08:35 – 08:45 Presentations of structure and format of the research & innovation camps* *08:45– 09:00 Short Brainstorming Session to identify topics of interest* *09:00 – 09:45: Split-up in groups to detail identified topics for the research camps* *09:45 – 10:00 Presentation of groups and conclusions for the organization of the research camp*
Moderator(s):	Thilo Zimmermann, GPS GmbH, Stuttgart, Germany
Further information:	The results of the workshop will be used for the organization of the RockEU research & innovation camps
Workshop website link:	http://ric-eu.rosindustrial.org/erf2015-research-and-inovation-camps/

12 March, 10:45 – 12:15	
Session Title:	Hardware and software modularity and interoperability in service robotics: Towards standardisation
Organiser(s):	• Gurvinder Virk, University of Gävle, Sweden gurvinder.virk@hig.se • Paolo Barattini, Kontor 46 s.a.s., Italy paolo.barattini@sharika.eu • Maria Elena Giannaccini, Bristol Robotics Laboratory/University of Salford, United Kingdom maria.elena.giannaccini@brl.ac.uk • Nicole Mirnig, University of Salzburg, Austria, nicole.mirnig@sbg.ac.at • Lars Dalgaard, Danish Technological Institute, Denmark ldd@teknologisk.dk • Dimitris Chrysostomou Aalborg University, Denmark dimi@m-tech.aau.dk • Nicola Bellotto, University of Lincoln, United Kingdom, nbellotto@lincoln.ac.uk • Tamas Haidegger, Obuda University, Hungary haidegger@irob.uni-obuda.hu • Michael Hofbaur, Joanneum Research, Austria Michael.Hofbaur@joanneum.at
Content:	Modularity should not be a goal but be a means to achieve flexibility, adaptability, easy re-configurability and quick prototyping of bespoke robot systems. The workshop aims are: • To provide a state of the art on service robot modularity from research and standardisation viewpoints • To involve European researchers and companies in the ISO TC184/SC2/WG10 (Modularity for service robots) standardisation work and highlight the relevance of contributions from the European robotics community. • To create a medium for open discussion on robot modularity between the TG Standardisation, European research community, robotics companies and WG10. • To understand how industry benefited from modularity standards in non-robotic areas • To tackle "buy-in" resistance from EU companies to open robot modularity standards.
Agenda of the workshop:	10:45–11:50 Introduction by the moderators and short presentations by selected participants, followed by a questions and answers and discussion 11:50–12:15 Round Table Discussion and Conclusions for the Roadmapping Process under SPARC/Horizon 2020
Speaker(s):	1. Gurvinder Virk (Professor of Robotics, University of Gävle), Sweden 2. Paolo Barattini (Ridgeback sas), Italy 3. Lars Dalgaard (Head of Service Robotics at Danish Technological Institute), Denmark 4. Dimitris Chrysostomou (Robotics and Automation Group, Aalborg Univ.), Denmark 5. Christian Wögerer (Profactor GmbH), Austria 6. Johann Hegel (AUDI AG), Germany 7. Christian Lehmann, (Brandenburg University of Technology), Germany 8. Zhenzhou Shao, (Lecturer at Capital Normal University), China 9. Mariusz Baldyga (European Commission), Belgium 10. Tamas Haidegger (Professor at Obuda University), Hungary 11. Matteo Matteucci (Professor at Politecnico of Milano), Italy 12. Ulrich Reiser (Fraunhofer DE), Germany 13. Rich Walker (ShadowRobot), United Kingdom 14. Geoffrey Biggs (Intelligent Systems Research Institute), Japan 15. Reinhard Lafrenz (Institut für Informatik VITechnische Universität), Germany
Workshop website link:	http://misrs15.blog.aau.dk/

12 March, 14:00 – 15:30	
Session Title:	Functionality Driven Mechatronics Design: Do we answer the right questions?
Organiser(s):	Markus Grebenstein, DLR, Germany Giorgio Metta, IIT, Italy
Content:	Mechatronics hardware is a key challenge in robotics and maybe the oldest research topic in robotics. Hence, it is very likely that the underlying technology is quite mature on one hand, but on the other hand there is a significant danger that the questions mechatronics development answers are outdated and do not perfectly fit the needs of current robotics research. This workshop intends to identify where research is based on dogmas and assumptions and to derive what is needed for future "better robots".
Agenda of the workshop:	10 minutes introduction. 4-5 presentations of 10 minutes each, given by experts from industry and academia. 30 min moderated discussion to derive/approve key challenges in mechatronic developments.
Speaker(s):	TBC

12 March, 16:15 – 18:15	
Session Title:	Robotics in Education & Education of Robotics
Organiser(s):	Petra KOUDELKOVÁ DELIMOGES, Aldebaran, France pkoudelkova@aldebaran.com
Content:	The workshop aims to provide an overview and a discussion on the main challenges concerning two strategic axes defined for the topic group: Education of Robotics and Robotics for Education. The organization of the topic group as well as its action plan will be reviewed. All interested academics, industrials, public stakeholders, end users representatives, etc. are most welcome to join and enrich the workshop.
Agenda of the workshop:	Presentation of TG Education : its objectives and actions (10 min) Invited Talks (70 min): • Georges Giralt Award • Evaluating the impact of educational robotics to young people • Robotics opportunities to foster STEM education • An experiment in global teaching of embodied AI • Robotics competitions – a tool for higher level robotics and engineering education Discussion (10 min) TG Education Action plan & Next steps (30 min)
Speaker(s):	Martin KANDLHOFER, Technische Universität Graz, Austria Benedetto ALLOTTA, University of Florence, Italy Fabio BONSIGNORIO, The BioRobotics Institute, SSSA and Heron Robc Italy Benedetto Allotta, University of Florence, Italy Alfredo Martins, Instituto Superior de Engenharia do Porto, Portugal Petra KOUDELKOVÁ DELIMOGES, Aldebaran, France Gerhard K. KRAETZSCHMAR, Bonn-Rhein-Sieg University, Germany
Further information:	For any further information, please contact Petra KOUDELKOVÁ DELIMOGES, pkoudelkova@aldebaran.com

Day 3 - Workshop descriptions

13 March, 08:30 – 10:00	
Session Title:	Robots as Helpers and Companions for Assisted Living
Organiser(s):	Filippo Cavallo, Scuola Superiore Sant'Anna, ITALY, (f.cavallo@sssup.it) Paolo Dario, Scuola Superiore Sant'Anna, ITALY (paolo.dario@sssup.it) Sabine PAYR, Austrian Research Institute for Artificial Intelligence (OFAI), AUSTRIA (sabine.payr@ofai.at) Franz WERNER, Research group for assisted living technologies (raltec), AUSTRIA (f.werner@raltec.at)
Content:	Many types of robots will play a role in assisted living applications, facing issues related to prevention, support, compensation, and independent living. The core of providing assistive care is the development of sustainable systems, designed around the human being with advanced capabilities, such as dependability, safety, cognitive and interaction abilities. This could bring on a new ecosystem of sustainable consumer service-products, which however still lacks clear definitions and boundaries. The field also requires appropriate evaluation procedures and contents that additionally could be a prerequisite for the good functioning of the multiannual roadmapping process. In this context, the first session of this workshop presents an overview of AAL robotics, developed from actual user needs and application fields, and invites discussion on robot categories and potentials. The second session focuses on the presentation of the Companions Robot vision for assisted living applications and a possible evaluation model in the practical case of the Robot-Era Project.
Agenda of the workshop:	• 8:30 – 8:35 Introduction by the workshop organizers • 8:35 – 9:15 Session 1: - Overview of AAL Robotics: State-of-the-art, Categories, Potentials (Payr, Werner) - Structured brainstorming and discussion on session 1, using questionnaires, voting and ranking instruments • 9:15 – 10:00 Session 2: - Overview on Robot Companions for Assisted Living: concepts and vision (Prof. Paolo Dario) - A model for evaluating Robot Companions in active and healthy ageing (Dr. Filippo Cavallo) - Open Round Table Discussion
Speaker(s):	Sabine PAYR, Austrian Research Institute for Artificial Intelligence, AT Franz WERNER, Research group for assisted living technologies, AT Filippo Cavallo, Scuola Superiore Sant'Anna, IT Paolo Dario, Scuola Superiore Sant'Anna, IT
Further information:	For session 1, participants are encouraged to download the handout available (as of March 2.) from the workshop website.
Workshop website link:	www.potenziaal.at

March 13, 10:45 – 12:15	
Session Title:	Replicable robotics research and benchmarking
Organiser(s):	Fabio BONSIGNORIO, The BioRobotics Institute, SSSA and Heron Robots, Italy (fabio.bonsignorio@sssup.it, fabio.bonsignorio@heronrobots.com); Jan VENEMAN, Tecnalia, Spain (jan.veneman@tecnalia.com)
Content:	The workshop will present and discuss methodologies for experimental replication and benchmarking and will discuss current projects and infrastructures (such as Echord++ RIFs) aimed at their deployment in the market. As an example of benchmarking technical challenges, there will be an introduction by specialists active in the working group "Benchmarking of Bipedal Locomotion" set up by European research projects on Humanoids and Exoskeletons.
Agenda of the workshop:	10:45–10:55 How to assess robotics research and products? The case of Robot Companions for Assisted Living – Fabio Bonsignorio10:55 – 11:05 An early model of robotics infrastructure: the ECHORD++ Research and Innovation Facility (RIF) – Filippo Cavallo 11:05–11:15 Technical Issues in Benchmarking: The example of benchmarking of bipedal locomotion in robotics by selected presenters 11:15-11:40 Open Round Table Discussion about introduced benchmarking approach with selected invited participants and the audience 11:40-12:05 Open Round Table Discussion "Towards a research and innovation infrastructure for robotics" (moderated by Paolo Dario): 12:05–12:15 Conclusions by the organizers for the Roadmapping Process under SPARC/Horizon 2020
Speakers/Round Table participants:	Paolo DARIO, coordinator of the Topic Group on Robot Companions for Assisted Living, The BioRobotics Institute, Scuola Superiore Sant'Anna, Italy; Fabio BONSIGNORIO, coordinator of the Topic Group on Benchmarking and Competitions, The BioRobotics Institute, Scuola Superiore Sant'Anna, Italy and Heron Robots, Italy; Alois KNOLL, coordinator of the EU project ECHORD++, TUM, Germany; Chris MELHUISH, partner in the EU project ECHORD++ and responsible of the Bristol RIF, Bristol Robotics Laboratory, UK; Comau representative, Italy; ECHORD ++ RIF experiment representative; Cécile HUET, Deputy Head of Unit Robotics – A2, European Commission; Gurvinder VIRK, coordinator of the Topic Group on Standardization, Sweden; Diego TORRICELLI, H2R FP7 project, coordinator bipedal benchmarking working group, CSIC, Spain; Katja MOMBAUR, Koroibot FP7 project Coordinator, University of Heidelberg Germany; Nikos TSARAGAKIS, Walkman FP7 project coordinator,, IIT, Italy; Jose Luis PONS, Biomot FP7 project coordinator, CSIC, Spain; Anne BAJART, EC, Robotics Research Programme Officer; Jan VENEMAN, Balance FP7 project coordinator, expert in ISO and IEC on medical and personal care robots, Tecnalia, Spain
Further information:	Join the "list on benchmarking bipedal locomotion". https://listas.csic.es/wws/info/benchmarking_list
Workshop website link:	http://www.heronrobots.com/EuronGEMSig/gem-sig-events/rrr-and-benchmarking-erf-2015 (available one week before the ERF at the latest)

13 March, 14:00 – 15:30	
Session Title:	Topic Group Healthcare in robotics
Organiser(s):	C Leroux, CEA (christophe.leroux@cea.fr) P Fiorini, U. Verona (paolo.fiorini@univr.it) T Keller, Tecnalia, (thierry.keller@tecnalia.com) B Graf, FhG IPA (Birgit.Graf@ipa.fraunhofer.de)
Content:	Workshop organized by the Healthcare TG. Information to the community of the work done and next steps Organisation of the work. Discussion about the MAR. The workshop will consist in presenting the global organization and objectives of the TG, its involvement in the Sparc PPP. Co leaders will present the activities in assistive, rehabilitation and surgical robotics. Next effort will be discussed as well as effectiveness of the TG. A brainstorming about the organization and challenges for the domain, will be organized
Agenda of the workshop:	14:00 - 14:10 presentation of the TG, definition of terms 14:10 - 14:20 activities in assistive robotics 14:20 - 14:30 activities in rehabilitation robotics 14:30 - 14:40 activities in surgical robotics 14:40 - 14:50 Point of view of the EC 14:50 - 15:00 Open questions next activities, challenges 15:00 – 15:30 questions: effectiveness of the TG, next steps and next actions planned
Speaker(s):	- Christophe Leroux (CEA LIST) - Paolo Fiorini (University of Verona), - Birgit Graf (FhG IPA) - Thierry Keller (Tecnalia) - EC representative - End user representative - Industry representative

13 March, 16:15 – 17:45	
Session Title:	Civil Robotics Networking Workshop
Organiser(s):	Francesco FEDI,Selex ES (Finmeccanica), ITALY fedi@ssi.it
Content:	The workshop will discuss the key topics of relevant euRobotics documents such as MAR, and related Priorities to foster a debate about the networking opportunities with those Topic Groups (TGs) whose goals may impact the outcomes of R&I in Civil Robotics Domain, such as: • Domain Topic Groups with similar priorities • Technological Topic Groups addressing key technologies for Civil Robotics Domain • Platform Topic Groups
Agenda of the workshop:	

Speaker	Title	Time
FF	The Civil Robotics Topic Group	16:15
FF	Civil Robotics Multi Annual Roadmap	16:30
FNM	Finmeccanica Experience & Needs in Civil Robotics	16:50
PMT	Indra Experience & Needs in Civil Robotics	17:10
FF	Discussion on Civil Robotics TG Networking with other TGs	17:30

Speaker(s):	FF: Francesco FEDI, Selex ES (Finmeccanica), Italy (Speech 1, 2,5) FNM: Finmeccanica Speaker, Finmeccanica, Italy (Speech 3) PMT: Pablo MIANGOLLARA TEJEDA, Indra, Spain (Speech 4)
Further information:	The workshop will include a brief discussion to highlight Civil Robotics networking opportunities with other euRobotics TGs.

13 March, 08:30 – 10:00	
Session Title:	Networking and Communication for Robots
Organiser(s):	Libor PŘEUČIL, Czech Technical University in Prague, Czech Republic (preucil@labe.felk.cvut.cz) Johan PHILIPS, University of Leuven, Belgium (johan.philips@kuleuven.be) Miroslav KULICH, Czech Technical University in Prague, Czech Republic (kulich@labe.felk.cvut.cz)
Content:	The overall objective of the workshop is to: 1. Map the latest achievements in hardware/software/protocols for Networked Robots 2. Bring the robotic and communication communities together, dealing with various aspects of Networked Robots 3. Foster a discussion about approaches and paradigms of networked robots 4. Define streams of further research leading to high-quality scientific results and practical applications
Agenda of the workshop:	The workshop will consist of a series of targeted presentations of approximately 10 minutes on different aspects of problems and technologies. As always active participation during the discussion sessions as well as constructive criticism during the presentations is requested.
Speaker(s):	Antonio FRANCHI, Centre National de la Recherche Scientifique, France Hartmut SURMANN, Fraunhofer Institute for Intelligent Analysis and Information Systems, Germany Miroslav KULICH, Czech Technical University in Prague, Czech Republic Christian Schlegel, Hochschule Ulm, Germany Bart Scheers, Royal Military Academy, Belgium Johan Philips, KU Leuven, Belgium
Workshop website link:	http://imr.felk.cvut.cz/Events/ERF2015-NetworkedRobots

13 March, 10:45 – 12:15	
Session Title:	Model-Driven Engineering for Improved Software Modularity in Robotics and Automation
Organiser(s):	Ulrike THOMAS, German Aerospace Center (DLR), Germany, ulrike.thomas@dlr.de Klas NILSSON, Lund University, Sweden, klas.nilsson@cs.lth.se Bernhard RUMPE, RWTH Aachen University, Germany, rumpe@se-rwth.de Andreas WORTMANN, RWTH Aachen University, Germany, wortmann@se-rwth.de
Content:	The scope of this workshop includes, but is not limited to: • Integration of knowledge engineering with architecture and deployment modeling • Composition of modules and components with the help of knowledge engineering • Modeling languages for knowledge engineering • Toolchains for the knowledge-aware modeling of robotics applications • Applications of knowledge engineering to models at run-time and self-* properties • Knowledge-Driven model transformation between languages and frameworks
Agenda of the workshop:	The workshop will be held Friday, March, 13th, 10:45 to 12: 5.10:45 - 10:50 Opening & Introduction 6.10:50 - 11:05 Keynote speeches 7.11:20 - 12:00 Authors' Presentations 8.12:00 - 12:15 Discussion and Closing
Speaker(s):	Keynote speaker 1: Michael BEETZ, Bremen University, Germany, Keynote speaker 2: Christian BERGER, Chalmers University Gothenburg, Schweden
Workshop website link:	http://se-rwth.de/mdke15

13 March, 14:00 – 15:30	
Session Title:	Towards New Robotics Software Markets for SMEs
Organiser(s):	Reinhard LAFRENZ, Technische Universität München (TUM), Germany Christian SCHLEGEL, Hochschule Ulm (HSU), Germany Geoff PEGMAN, R. U. Robots Ltd., United Kingdom lafrenz@in.tum.de, schlegel@hs-ulm.de, geoff.pegman@rurobots.co.uk
Content:	SMEs play a major role in a robotics business ecosystem and they need in particular access to a robotics software market. From mainly a SMEs perspective, we want to identify gaps, carve out needs and opportunities and align these in a prioritized roadmap towards a software market.
Agenda of the workshop:	• 14:00 – 14:10 Short round of introduction of the participants • 14:10 – 14:25 Presentation by TG "Software Engineering, System Integration, Systems Engineering": The Vision of a Robotics Software Business Ecosystem • 14:25 – 14:40 Presentation by TG "Entrepreneurship": "Software Markets from the Perspective of a SME" • 14:40 – 14:55 Short Invited Talk Gurvinder Virk: "Standardization" • 14:55 – 15:25 Structured / Moderated Dialogue, e.g. "world café method" to identify concrete steps towards a SW market • 15:25 – 15:30 Wrap-Up
Speaker(s):	Gurvinder VIRK, "Standardization", CLAWAR Association Active involvement of WS participants via "world café method" to explicate concrete needs and steps towards a software market
Further information:	Joint workshop of two topic groups, TG "Software Engineering, System Integration, System Engineering" and TG "Entrepreneurship"
Workshop website link:	http://www6.in.tum.de/Main/TG-Software-Systems-Engineering

13 March, 16:15 – 17:45	
Session Title:	ROS Community Workshop
Organiser(s):	Rich WALKER, Shadow Robot Company, United Kingdom rw@shadowrobot.com
Content:	Most of the European robotics research is building on ROS – we should come together to understand how ROS will develop, how we are using it, what the particular needs of European research and industry are, and how we can work together better in the future.
Agenda of the workshop:	0-5: Introduction and Goals (Rich Walker) 5-10: Current ROS Roadmap (Ugo Cupcic, Shadow) 10-15: ROS-Industrial (Ulrich Reiser, Fraunhofer IPA) 15-20: ROS-Control (PAL Technologies) 20-45: 5-10 2-3 minute “my issue with ROS/my new feature” talks 45-80: Plenary discussion/brainstorm (Moderators) 80-90: Selection of key issues (Moderators) 90-100: Identify Next steps (Moderators)
Speaker(s):	Rich WALKER, Shadow Robot Company, United Kingdom. Ulrich REISER, Fraunhofer IPA, Germany Ugo CUPCIC, Shadow Robot Company, France ??, Pal Techonlogies, Spain Plus lightning talks
Workshop website link:	http://www.shadowrobot.com/ros-community-workshop-at-erf-2015/

13 March, 08:30 – 10:00	
Session Title:	Mobile manipulation in manufacturing
Organiser(s):	Volker Kruger, Aalborg University, Denmark, vok@m-tech.aau.dk Germano Veiga, INESC-TEC, Portugal, germano.veiga@inescporto.pt Antón Garcia-Diaz, AIMEN, Spain, anton.garcia@aimen.es José Saenz, Fraunhofer IFF, Germany, Jose.saenz@iff.fraunhofer.de Uwe Zimmermann, KUKA Labs, Germany, Uwe.zimmermann@kuka.com
Content:	The manufacturing sector is nowadays the largest robot user. It has in-depth knowledge of the advantages and limitations of the traditional robotics systems, and therefore offers application scenarios par excellence to the mobile manipulators research community. The objective of this workshop is to open a discussion forum that allows experts and potential end-users in mobile manipulation to cross share recent developments, challenges and future research trends with the potential end-users of this technology.

Agenda of the workshop:	• 08:30-08:35 Introduction by the moderators
	• 08:35-08:55 Part handling in manufacturing automation. STAMINA project – Volker Kruger and Germano Veiga
	• 08:55-09:15 Cooperative outfitting inside ship blocks. CARLoS project – Antón Garcia, Germano Veiga, Volker Kruger, Rafael Lopez
	• 09:15-09:35 Mobile manipulators for aerospace production. VALERI project – José Saenz, Uwe Zimmermann.
	• 09:35-10:00 Open discussion on industrial applications of cooperative manipulation:
	  ○ Challenges and benchmarks
	  ○ Technology needs for SPARC roadmapping

Speaker(s):	Volker Kruger, Aalborg University, Denmark, vok@m-tech.aau.dk Germano Veiga, INESC-TEC, Portugal, germano.veiga@inescporto.pt Antón Garcia-Diaz, AIMEN, Spain, anton.garcia@aimen.es Rafael López, Robotnik, Spain, rlopez@robotnik.es José Saenz, Fraunhofer IFF, Germany, Jose.saenz@iff.fraunhofer.de Uwe Zimmermann, KUKA Roboter, Germany, Uwe.zimmermann@kuka.com
Further information:	We will have industrial and RTD partners involved in mobile manipulators projects in manufacturing application scenarios such as logistics for the automotive industry (STAMINA), large scale manufacturing operations for shipyards (CARLoS), and assembly in aerospace manufacturing (VALERI). Topics of interest include: • Challenges on mobile manipulators for industrial applications, • Localization and Navigation, • Arm navigation and path planning, • Human robot interaction and cooperation, • Safety for collaborative robotics • Manipulation and Object recognition and localization.
Workshop website link:	http://homes.m-tech.aau.dk/vok/ERF2015/ERF2015/ERF2015.html

13 March, 10:45 – 12:15	
Session Title:	Robots in the Laboratory – for science, healthcare and beyond
Organiser(s):	Dr Patrick COURTNEY, United Kingdom pikcourtney@yahoo.co.uk Dr Francesco BECCHI, Telerobot labs, Italy
Content:	Laboratory Robotics makes an Important contributor to healthcare, science and the economy (key goals for H2020) and is a European strength but is often overlooked. It also provides an interesting example of a viable robotics business ecosystem. The increasing importance, scale and complexity of modern biology, the increasing diversity of fragile and demanding samples from cells to animals, all create new demands in robotic sensing and manipulation. The "robot scientist" concept also requires advances in interaction and intelligence. This workshop aims to build bridges between the sector and the Robotics programme by exploring future needs and developing synergies with other Topic Groups ELRIG (The European Laboratory Robotics interest group with 7000 members) is supporting a white paper identifying current success and future needs across the supply chain, and how these could be addressed by research in H2020.
Agenda of the workshop:	10:45 introduction ELRIG (European Laboratory Robotics Interest Group) 10:50 White paper on Laboratory Robotics in Europe : Status & prospects 11:10 Keynote : Automating Chemistry and Biology using Robot Scientists 11:40 A user perspective from the pharmaceutical industry 12:00 discussion : synergy with other Topic groups (Panel)
Speaker(s):	Prof Ross KING, Manchester University, United Kingdom Julie HUXLEY-JONES, GlaxoSmithKline, United Kingdom Oliver PETER, SILA consortium, Switzerland Francesco BECCHI, General manager Telerobot labs, Italy Patrick COURTNEY, Sartorius/TAP biosystems, Germany Thomas EDMONDS, Servier Laboratories/ELRIG, France
Workshop website link:	http://elrig.org/call-white-paper-european-robotics-research/

13 March, 14:00 – 15:30	
Session Title:	Tactile Sensing – Down to Earth Lessons Learned From Research to industry
Organiser(s):	Michael Strohmayr, DLR , Germany; michael.strohmayr@dlr.de Philipp Mittendorfer, ICS, TU Munich, Germany; philipp.mittendorfer@tum.de
Content:	Despite the long research history towards tactile sensing hardware, even today, there are only very few successful implementations in real world industrial application. One of the reasons is the prevailing focus of researchers on the transduction properties of the sensing hardware and the neglect of requirements from the industrial application. The goal of this workshop is to initiate a process to derive guidelines that help researchers to take into account the requirements and constraints of industrial applications of tactile sensing hardware.
Agenda of the workshop:	The workshop will consist of two parts: In the first part of the workshop speakers are invited to present lessons learned on the way towards industrial application of tactile sensor systems in short (3min, 3slides) teaser presentations. Following, an open round table discussion is planned
Speaker(s):	Rich Walker, www.shadowrobot.com, United Kingdom Karsten Weiss, Weiss Robotics, Germany József Veres, OptoForce Ltd., Hungary Giorgio Cannata, DIBRIS – Universita' di Genova, Italy Markus Fritzsche, Fraunhofer IFF, Germany Maurizio Valle, University of Genova, Italy Giorgio Metta , IIT, Italy …
Further information:	Following the workshop, is planned to initiate a continuous exchange of experiences between researchers and application specialists from industry. Regular meetings of the tactile sensing community, e.g. at topic group meetings are planned to align research efforts with the needs of industrial application
Workshop website link:	http://web.ics.ei.tum.de/~philipp/euroboticsws/index.html

13 March, 16h15 – 17h45	
Session Title:	Robotic Agenda for the Inspection & Maintenance in the Energy Sector
Organiser(s):	Tjibbe BOUMA, Quasset, Netherlands (bouma@quasset.com) Ekkehard ZWICKER, ALSTOM Inspection Robotics, Switzerland (zwicker@iinspection-robotics.com) Sieger TERPSTRA, SHELL, Netherlands (sieger.terpstra@shell.com) Hakon FERKINGSTAD, GASSCO, Norway (hhf@gassco.no) Mauricio CALVA, CHEVRON, UK (mcalva@chevron.com)
Content:	Oil&Gas and Power Generation Asset Owners have defined an agenda for the robotic inspection & maintenance from end user perspective. Further they have started to organize themselves to implement robotic technology. The objective is present and to discuss this robotic agenda with the euRobotic community and to define research & development needs.
Agenda of the workshop:	Introduction by the moderators Presentation of the robotic road-map How industry of the energy sector has organized them self to implement robotic technology Round Table Discussion / Brainstorming Summary, Conclusion
Speaker(s):	Tjibbe BOUMA, Quasset, Netherlands (bouma@quasset.com) Ekkehard ZWICKER, ALSTOM Inspection Robotics, Switzerland (zwicker@iinspection-robotics.com)

13 March, 08:30 – 10:00	
Session Title:	New applications and opportunities in telerobotics
Organiser(s):	Manuel FERRE, Center for Automation and Robotics UPM-CSIC Name, Spain (m.ferre@upm.es) Jordi ARTIGAS, DLR - Robotics and Mechatronics Center, Germany. (jordi.artigas@dlr.de)
Content:	Main goal of this workshop is put together companies and researchers to discuss new applications and opportunities for the use of robots remotely controlled by human. Traditional applications are related to aerospace, nuclear and underwater robots. Telesurgery has been developed most recently and is a good example that demonstrate how robot and human can successfully collaborate, performing complex tasks. Applications related to remote handling, telemaintenance, inspection, etc, are a good example of new opportunities for increasing the use of telerobotics
Agenda of the workshop:	- 08:30 – 08:45: Introduction by the organizers - 08:45 – 9:45: Presentations by invited speakers most of them from companies - 9:45 – 10:00: Round table discussion and conclusions for future road maps.
Speaker(s):	Mario di Castro, European Organization for Nuclear Research (CERN), Switzerland. David Hamilton, International Thermonuclear Experimental Reactor (ITER), France. Rich Walker, Shadow Robot, UK. Jeremi Gancet, Space Applications Services, Belgium. Stephen Sanders, Oxford Technologies Ltd., UK. Thomas Voëgele, Deutsches Forschungszentrum Kuenstliche Intelligenz (DFKI), Ge.
Further information:	More speakers are pending of confirmation. All updates will be available at the workshop website link.
Workshop website link:	http://www.dlr.de/rmc/rm/en/staff/jordi.artigas/telerob-erf2015

13 March, 10:45 – 12:15 (start and end hours, numbers from 08:00 to 18:15)	
Session Title:	Market place for Open Innovation between European SMEs
Organiser(s):	Erwin Prassler, Locomotec GmbH, Germany, prassler@locomotec.com Nikola Petrović, Morena inženjering, Serbia, nikola@morenaict.com Herman Bruyninckx, KU Leuven, Belgium, herman.bruyninckx@mech.kuleuven.be
Content:	The workshop will be the kick-off event for a open innovation initiative amongst European SME. The objective is to make matches between current demands and supplies.
Agenda of the workshop:	Erwin PRASSLER: Open innovation amongst European Robotics SMEs Nikola PETROVIC: How to find the right niche for your robots Ioannis MARKOPOULOS: Ioannis MARKOPOULOS: A serial entreupreneurs list of lessons learned while developing an innovative robotics product Mathew HOLLOWAY: Insulation of buildings using robotics Donato MELITA: Precision positioning and control for robotic applications Fabio P. BONSIGNORIO: Disrupting robotics manipulation and beyond Viktoria FONTANEL: 100% driverless & electric transport solutions
Speaker(s):	Erwin PRASSLER, Locomotec GmbH, Germany Nikola PETROVIC, Morena Inzenjering, Serbia Ioannis MARKOPOULOS, ZeroOne Ltd, Greece Mathew HOLLOWAY, Q-Bot Limited, United Kingdom Donato MELITA, Etnamatica, Italy Fabio P. BONSIGNORIO, Heron Robots s.r.l., Italy Viktoria FONTANEL, Navya Technologies, France

13 March, 14:00 – 15:30	
Session Title:	Operator Assisted Mobile Robots for Inspection of Harsh Environments
Organiser(s):	Lukas SILBERBAUER, Austria, Lukas.silberbauer@taurob.com
Content:	In the next few years, the deployment of civil robots will extend to increasingly extreme environments in domains including remote inspection and search and rescue. The effective application of these robots demands for new methods in supervised autonomy and perception. In the course of this workshop, speakers will present such methods and highlight new approaches. Extensive discussions will be moderated to collect domain specific requirements and predictions about future developments. These will be summarized and communicated to relevant topic groups (potentially including Aerial Robots, Autonomous Navigation, Civil Robots, Field/Service Robots in Unstructured Environments, Maintenance and Inspection, Perception, and Telerobotics and Teleoperation).
Agenda of the workshop:	See http://aass.oru.se/Research/mro/orihe.html
Speaker(s):	See also http://aass.oru.se/Research/mro/orihe.html
Workshop website link:	http://aass.oru.se/Research/mro/orihe.html

13 March, 15:30 – 17:00	
Session Title:	Support for Startups
Organiser(s):	Geoff Pegman, R U Robots Limited, United Kingdom of Great Britain, geoff.pegman@rurobots.co.uk Renaud Champion, Robolution Capital, France, rc@robolutioncapital.com Michael Strohmayer, DLR, Germany, michael.Strohmayr@dlr.de
Content:	The theme of the workshop is to examine the types of support that are available in different parts of Europe to robotics startup companies and to try and identify some best practice themes, to inform discussions with National and regional governments. A secondary objective, is to discuss the most effective way in which the robotics community can present the opportunities and needs of startups in the sector to the venture capital community, particularly at events in which many private sector representatives are expected to be present, such as Digital -Life-Design (DLD). The format of the workshop will be three to four invited talks highlighting the most relevant activities in highlighted regions and countries followed by a round table debate focusing on the identification of best practice and next steps.
Agenda of the workshop:	15:30 - 15:35 Introduction: Renaud Champion 15:35 - 15:55 Bristol & the South-west region of UK: Carol Jarvis 15:55 - 16:15 Tuscany region of Italy: Paulo Dario, TBC 16:15 - 16:35 Lessons learnt & funding opportunities in Germany: Michael Strohmayer 16:35 - 17:00 Round Table: Chair Michael Strohmayer Participants: Carol Jarvis Paulo Dario Cecile Huet
Speaker(s):	Renaud Champion, Robolution Capital, France, rc@robolutioncapital.com Carol Jarvis, University of West of England, United Kingdom, carol4.Jarvis@uwe.ac.uk Paolo Dario, SSSA, Pisa, Italy, paolo.dario@sssup.it Michael Strohmayer, DLR, Germany, michael.Strohmayr@dlr.de

Exhibition descriptions

ABB AG - Booth 16	
Description of the exhibition:	ABB robot IRB 1200 with IRC5 compact controller 2nd generation, ABB ACS 355 drive & motor to run the conveyor, conveyor with sensors for parts positioning, encoder and encoder interface, high resolution camera, Schunk EGP 40 electrical gripper. The ABB demo cell shows an integrated vision application combined with ABB's conveyor tracking technology. The robot grips the vision-detected part, put it on the conveyor,
Website:	www.abb.at/robotics

Aldebaran - Booth 10a	
Description of the exhibition:	Have you ever heard of Aldebaran? Aldebaran is one of the brightest stars in the night-time sky and it is also the name of our company. Since 2005, we have been driving technology into a new world by designing humanoid robots and have become the worldwide leader in humanoid robotics. They've already had an impact in education, assistance, reception, entertainment and also autism therapy. More than 6000 Nao, its small humanoid robots has been sold all over the world. Nao is a perfect platform for research and education. It comes with a full development environment based on a graphical interface (Choregraphe) and a powerful framework NaoqiOS. During the ERF Exhibition, Aldebaran will present Nao but also Romeo, a tall humanoid robot, that has been developed for research purposes. The Romeo presented in Vienna is the property of the Technical University of Vienna. https://www.youtube.com/watch?v=pYpCyehoQCw
Website:	www.aldebaran.com

AUTOMATICA
OPTIMIZE YOUR PRODUCTION

AUTOMATICA 2016, June 21 to 24, 2016 - Booth 8	
Short description of the exhibit:	Manufacture higher-quality products faster and more affordably: AUTOMATICA is the leading platform for optimizing your production. AUTOMATICA is... • The leading platform for automation and production-process innovations • The world's largest range of robotics, assembly lines and machine-vision systems • The place where companies from all branches of industry find pioneering solutions that allow them to manufacture higher-quality products more efficiently • A mandatory event for decision-makers and production managers in all branches of the manufacturing industry • The place to gather information about the latest developments, find solutions to the latest challenges, make contacts and invest effectively in future technologies processes
Website:	www.automatica-munich.com

Bernecker & Rainer Industrie Elektronik GmbH / Johannes Kepler Universität Linz, Institute of Robotics - Booth 1a + 1b + 2a	
Short description of the exhibit:	Bernecker & Rainer and the Institute of Robotics jointly perform innovative research on advanced robot control. Lightweight robots are deemed as an answer to increasing demands to improve energy efficiency and thus reduce operational cost. However, the advantages of such robots are accompanied with considerable challenges due to their inherent compliance. This calls for model-based control schemes eliminating elastic vibrations so to admit performing complex trajectories. At the European Robotics Forum booth, two showcases are presented: Feedback control for vibration damping, and time-optimal motion control. The first shows the importance of the employing advanced model-based control, and the latter documents that precise time-optimal control of lightweight robots is actually feasible. The energy consumption of the lightweight robot is directly compared with that of a standard robot.
Website	www.br-automation.com/ www.robotik.jku.at

Blue Danube Robotics - Booth 3	
Short description of the exhibit:	Blue Danube Robotics is showcasing its AirSkin tactile sensors. AirSkins are lightweight, foam-based tactile sensors, which measure air pressure variations inside its airtight skin. AirSkins are a very flexible, easy-to-install and low-cost solution to cover complex and large areas of robots. AirSkin Safety, a soft, tactile safety cover for industrial robots is presented on ABB IRB20. An application of AirSkin Safety as emergency stop for AGV's is also shown. AirSkin Sense, the tactile solution for service robots is presented on a mobile platform as full body sensor.
Website:	www.bluedanuberobotics.com

Coppelia Robotics GmbH - Booth 11c	
Short description of the exhibit:	Coppelia Robotics is a small Swiss SME active in the field of robotics simulation. It provides services in the field of robotics software, and also develops a robot simulation platform "V-REP", which is a commercial product since March 2010. The platform allows the realistic simulation of any type or number of robots in various environment settings. Coppelia Robotics will exhibit the V-REP robot simulator, an open-source and free software for educational entities (e.g. students, schools and universities). V-REP has thousands of users worldwide with application areas ranging from the packaging, space exploration, research and development, defense, transport, automotive or robotics industries. The robot simulator V-REP, with integrated development environment, is based on a distributed control architecture: each object/model can be individually controlled via an embedded script, a plugin, a ROS node, a remote API client, or a custom solution. This makes V-REP very versatile and ideal for multi-robot applications. Controllers can be written in C/C++, Python, Java, Lua, Matlab, Octave or Urbi. It also features 3 physics engines, an IK/FK solver, proximity sensors, vision sensors, collision detection, minimum distance calculation, etc.
Website link:	www.coppeliarobotics.com

Cyberbotics Ltd. - Booth 6	
Short description of the exhibit:	Since 1998, Cyberbotics is the leading company in robot simulation with the Webots reference software used by over 1000 universities and research centers worldwide. Cyberbotics also develops custom simulation tools like the Aldebaran NAO simulation, robot simulations for the nuclear security and participated in several European research projects. The exhibition booth will demonstrate the capabilities of the Webots simulation software. Webots developers and managers will be able to answer the questions of the visitors.
Website:	www.cyberbotics.com

euRobotics - Booth 2d	
Short description of the exhibit:	euRobotics AISBL is a non-for-profit association based in Brussels. It was founded in September 2012, to provide the European Robotics Community with a legal entity to engage in a public/private contract with the European Commission. euRobotics aims at: • Strengthening Europe's competitiveness and ensuring industrial leadership of manufacturers, providers and end users of robotics technology-based systems and services • The widest and best uptake of robotics technologies and services for professional and private use to the benefit of Europe's economy and society • The excellence of the science base of European robotics SPARC 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 the European economy and the society at large. SPARC is the largest civilian-funded robotics innovation programme in the world, with €700M in funding from the European Commission for 2014 – 2020, which is tripled by European industry to yield a total investment of €2,800M.
Website:	www.eu-robotics.net; www.sparc-robotics.net

JOANNEUM RESEARCH Forschungsgesellschaft mbH - Booth 17

Short description of the exhibit:	With the use of methods from the field of Industrial Internet (Industry 4.0) JOANNEUM RESEARCH provides an essential prerequisite for the increasing flexibility in production and the associated need to shift from the classical automation towards robotics. "Intelligent Sensor technology" is based on imaging, acoustic, radar and wearable sensors and data glasses. Only the sum of these data and their intelligent evaluation provide a bi-directional real-time feedback system in human-robot interaction (collaboration human-robot and robot-environment). This technology is already used in the European Mars rover “ExoMars 2019”. The prediction of human activities and knowledge of spatial planning task the robot can optimize tasks and identify and even prevent potential risk situations at an early stage. For mobile robotics both opto-chemical sensors for the detection of gases as well as an organically-based panoramic heat radiation camera for the surroundings detection in the infrared spectral range are developed. Especially in the field of collaborative robotics the detection of humans approaching the robots arms or other parts is essential for a safe cooperation. This sensing should happen before a collision of the robot and the human, ideally as early as possible, to let the robot adequately react, e.g. stopping the motion of an arm or the like. JOANNEUM RESEARCH develops an innovative organic based proximity sensor system for the use in robotics which will be capable of being placed also on curved surfaces to sense the approximation of a human when it comes close to some ten centimeters to the respective part of the robot.
Website:	www.joanneum.at

KUKA AG - Booth 4

Short description of the exhibit:	Agilus Schulungszelle - For the engineers and skilled specialists of tomorrow, in-depth knowledge of robotics and automation is essential. With the KUKA Agilus training cell you get exciting insights into the fascinating world of KUKA. It is the ideal addition to theoretical tuition and allows practical robotics training, identical to real applications, in accordance with globally recognized industry standards. youBot - Watch the youBot in action. Its open-source software enables youBot users to develop their own algorithms. Furthermore, a series of additional interfaces allows users to equip the mobile robot with sensors such as laser scanners and cameras. The youBot thus provides researchers and students with an optimal platform to test their ideas and refine them. FlexFellow - KUKA flexFellow allows completely new flexibility for planning systems as well as fluid variation in terms of the degree of automation. A flexible robot unit of this nature offers many advantages – such as the reduction or elimination of complex, externally mounted sensor equipment due to the use of the LBR iiwa’s force and torque sensors. The real highlight, however, is a mobile robotic system with the capability of human-robot collaboration.
Website:	www.kuka.com

LINZ CENTER OF MECHATRONICS GMBH

Linz Center of Mechatronics GmbH - Booth 14

Short description of the exhibit:	The Linz Center of Mechatronics GmbH (LCM) is a non-university research center for applied mechatronics research at the interface between scientific research and industry. Since its foundation in 2001, LCM is a reliable partner for its customers, the most diverse of companies, from SMEs to global players. Our international network of partners and customers enables access to latest know-how and findings. Furthermore, LCM is running an integrated research center, within the national framework of the COMET K2 scheme. Within this project LCM was able to establish a widespread international network of renowned scientific partners as well as numerous research projects with international companies. Beyond R&D activities, LCM's infrastructure enables the production of prototypes and small lot sizes. Due to an intelligent interconnection of Informatics, Mechanics and Electronics LCM is able to provide mechatronic standards for new products as well as for product and process enhancements.
Website:	www.lcm.at

robotics
Swiss National Centre of Competence in Research

NCCR Robotics - Booth 11a

Short description of the exhibit:	NCCR Robotics promotes three main strands of research: • Wearable robots: We work with neurologists and physicians to truly understand the human body and nervous system so that robots are attuned to the needs of the wearer. This includes enabling prosthetic limbs to process impulses from the brain and developing soft technologies to make wearable and rehabilitation robots more practical and natural. • Rescue robots: We develop new types of flying, walking, and swimming robots that are portable and safe for humans, and could be used disaster areas or in normal life for exploration and transportation. Our robots are unique because they have been engineered to perform multiple types of locomotion, such as walking and either flying, grasping, or swimming. Education: We are designing new foldable and reconfigurable robots fitted with sensors and actuators to provide a cheap and effective tool for teaching in schools and universities.
Website link:	www.nccr-robotics.ch

OptoForce - Booth 2b

Short description of the exhibit:	Multi-axis tactile and Force/Torque sensors, built on a novel, optical technology are the major product lines of OptoForce. Many of the leading robotic research institutes use OptoForce sensors as they are much more robust, lighter and affordable than competing products, while offering comparable or better accuracy. Inside the sensors, infrared light is used to detect the deformations of the optical grade silicone sensor structure.
Website:	www.OptoForce.com

PETROBOT - Booth 5

Short description of the exhibit:	The PETROBOT project aims to develop a series of robots which can be used by inspectors to conduct remote inspection of pressure vessels and storage tanks widely used in the oil, gas and petrochemical industry. The objective of the PETROBOT project is minimize the exposure of personnel to potentially hazardous conditions, reduce downtime and save resources by using robotic technology. PETROBOT mobilises the complete value chain, including robot and inspection technology providers, inspection service companies and end-users. The inspection robots are being tested in the installations of the end-user consortium members. Special project activities aim at preparing the future user community to maximize the uptake of the new technology. PETROBOT is supported by an EU grant from the FP7 Robotics program. The project was started on September 1st, 2013 and has a duration of three years. The ten-party project consortium comprises of the following participants: - Shell Global Solutions International B.V., Netherlands - GASSCO AS, Norway - Chevron North Sea Ltd., United Kingdom - Koninklijke VOPAK N.V., Netherlands - A.Hak Industrial Services B.V., Netherlands - Dekra Industrial AB – DEKRA, Sweden - Alstom Inspection Robotics (AIR), Switzerland - OC Robotics, United Kingdom - Innospection GmbH, Germany - Quasset B.V., Netherlands
Website link:	www.petrobotproject.eu

PROFACTOR GmbH - Booth 15

Short description of the exhibit:	XRob -- A Robotic Inspection Assistant The PROFACTOR Team will present a robotic inspection system demonstrating the use-case on verifying the correct interlock of a plug-and-socket connection. This is achieved using different technologies like 3D vision, path planning, intuitive human machine interaction developed by the PROFACTOR GmbH to provide an integrated system. The XRob solution has already been deployed for the BMW Group in their engine production facility at Steyr. The easy to use configuration and adaptation for new inspection positions and objectives is demonstrated as well as the direct collaboration with the robotic system. The XRob inspection system demonstrates the save interaction of a robotic system without security fence, due to the integrated and effective safeguards with respect to force cut-down as well as controlled TCP velocity mechanism.
Website link:	www.profactor.at

Robotae Ltd - Booth 2c

Organisation:

Short description of the exhibit:	Robotae Ltd is a technology consultancy specialising in the service robotics industry. We are based in Cambridge, UK, and work with clients worldwide. Our core technical competences lie in tight integration of hardware and software, real-time embedded software, microcontroller-based electronics design, mathematical algorithm development, precise and flexible motor control, low power design and machine learning. We offer a full range of services from requirements capture and concept generation through to transfer to manufacture. We have close ties with several local companies, allowing us to expand our capabilities and scale resources as needed.
Website link:	www.robotae.com

Robotnik

Robotnik - Booth 10b	
Short description of the exhibit:	We will show our mobile robot Summit XL, a medium-sized high mobility all terrain robot with extreme performance. It is ideal for research and as a test bed for application development both for indoor and outdoor applications.
Website link:	www.robotnik.eu

ROVENSO - Booth 11b	
Short description of the exhibit:	ROVENSO is a Swiss startup of EPFL (Ecole Polytechnique Fédérale de Lausanne). Our mission is to design, manufacture and market agile Remote Operated Vehicles that preserve human life from hazardous situations that can occur in nuclear decommissioning or emergency response operations. The innovations ROVENSO brings to the market solves two very costly bottlenecks in operations: First, current ROVs with heavy payloads are either limited in mobility or very slow. Second, there is a lack of Human-Machine Interfaces allowing to efficiently tele-operate fast ROVs in challenging terrains. The first bottleneck is solved by ROVéo. This four-wheeled rover is able to easily overcome unstructured obstacles as well as vertical steps of more than 150% of its ground clearance without any active control. In other words ROVéo does not need to actively change its shape to overcome obstacles. An innovative and Lightweight Immersive control Station (LISéo) solves the second bottleneck. It combines immersive vision with haptic interfaces to provide an ergonomic and very intuitive way of driving ROVs in rough terrain. We will demo at ERF2015 the teleoperation of a 1 ton version of ROVéo in a real-time physics engine with the last version of LISéo.
Website link:	www.rovenso.com

SCHUNK Mobile Greifsysteme GmbH - Booth 11d

Short description of the exhibit:	The SCHUNK LWA 4P lightweight arm with the world´s most compact performance, is equipped with three highly integrated Powerball modules, and offers 6 degrees of freedom. Integrated intelligence makes powerful, mobile handling possible as never before. On option, it can be operated with batteries, making it mainsindependent. Combined with the SCHUNK SVH 5-finger gripper hand, the LWA 4P opens up new dimensions in gripping and workpiece handling. Man-robot communication is done by gestures.
Website link:	www.schunk.com

Shadow Robot Company - Booth 7

Short description of the exhibit:	The Shadow Robot Company is a UK SME developing advanced robotics technologies and systems, including advanced manipulation technologies. The company was founded in 1997 by a group of independent robotics researchers and now includes 20 engineers working in a wide range of research and engineering capabilities across the entire range of robotics design and development. The Shadow team brings a variety of skills to bear ranging from deeply-embedded microcontroller systems through to design of advanced sensors and mechanical assemblies. Shadow develops advanced prototypes and does limited production of robotic systems at its London headquarters. Shadow has been developing and applying dextrous manipulation since 1998, and works with many of the lead innovators in sensing and control solutions. Shadow is an active participant in the robotics research community, with strong links in the UK and across Europe. In previous European projects Shadow has been responsible for developing routes to market for project research, and in creating new spinout products from the research work of the project. Shadow's team have long experience designing and developing new types of robotic hardware and systems, as well as significant expertise in the integration and systems engineering work required to support this process. In FP7 projects Shadow has led integration and trial support work, bringing a clear focus on robust usable platforms that efficiently and effectively support research work.
Website link:	www.shadowrobot.com

taurob GmbH - Booth 13

Short 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

Technische Universität München, EU-Project Factory-in-a-day - Booth 9

Short description of the exhibit:	We will demonstrate our robot TOM (Tactile Omni-directional Mobile Manipulator) equipped with the CellulARSkin sensors – an artificial robotic skin. The multi-modal skin sensors allow to perceive different modalities such as force, proximity, temperature and inertial effects. This easy-adaptable multi-modal skin can be used to increase the safety in human-robot close collaboration. Furthermore, we will demonstrate that by using the skin we can enhance the robot's behaviour, for example enabling compliance on non-compliant robots. A standard industrial robot arm (UR-5) and a highly adaptable robotic hand (Allegro Hand) are covered with the hexogonal-shaped skin sensors. We will show the enhanced functionalities of the robot in a pick'n place task using the CellulARskin sensors integrated with a high-level reasoning system. The chair for Cognitive Systems at Technische Universität München is also a partner in the EU-funded project Factory-in-a-day, coordinated by TU Delft. The aim of the project is to increase the use of robots in small and medium-size enterprises due to a reduction in set-up costs and a flexible robotic system that allows for quick changes. Automation of tasks will be carried out more flexible and in less time thus reducing the installation costs. The idea is to set-up any kind of work that is to be automated within a very short time frame, ideally within 24 hours. The robotic skin will be used as one feature on the Factory-in-a-day robot in order to make it more secure and flexible in typical industrial scenarios. The different modalities together with the RGB-LED embedded in each cell increase the intuitiveness of the robot programming since they can serve as a friendly user interface.
Website link:	www.ics.tum.de, www.factory-in-a-day.eu

University of Modena and Reggio Emilia: PAN-Robots project - Booth 12	
Short description of the exhibit:	University of Modena and Reggio Emilia is an Italian University organized on a ”site network” model embracing the cities of Modena and Reggio Emilia, in close cooperation with surrounding economical clusters (more than 300 companies, most of them in the area of Mechatronics, logistic and automotive in one of the richest economic area in Italy). UNIMORE participate to the project through the research group of Automation, Robotics and System Control Lab (ARSControl, www.arscontrol.unimore.it) of the Department of Sciences and Methods of Engineering, (DISMI). As we know, today, automation is only marginally applied to factory logistics. In fact, transportation of raw materials and final products from/to storage and shipment points usually requires manually operated forklifts. The use of robotic Automated Guided Vehicles (AGV) in factory logistics is not yet widespread in manufacturing plants. For this reason, factory logistics is not well integrated into the modern manufacturing processes so far. The use of forklifts results in low efficiency and high energy consumption. Furthermore, the operation of forklifts is not safe for workers. It is listed among the most frequent causes of severe accidents in factories. This is mainly due to the fact that forklift drivers are prone to errors and not always sufficiently trained. In addition to that, manufacturing environments are often rather cluttered with numerous blind spots. The PAN-Robots consortium stresses that the use of AGVs in factory operations will lead to: higher flexibility, cost efficient logistics, low energy consumption and enhanced work safety.
Website link:	www.pan-robots.eu

Media partner

Robohub (http://robohub.org) is a non-profit online communication platform that brings together experts in robotics research, start-ups, business, and education from across the globe. Our mission is to connect the robotics community to the rest of the world. Content-area specialists curate all incoming articles to make sure that reporting is truthful, fair and balanced, and in-house editors ensure that all content meets the highest editorial standards for language and clarity. Embedded comments, and an active presence on Google+, Facebook and Twitter further help to promote discussion and debate.

Organisers

euRobotics aisbl (Association Internationale Sans But Lucratif) is a Brussels based international non-profit association for all stakeholders in European robotics. euRobotics aims to promote excellence in robotics by providing many networking opportunities to its members from both industry and academia, to exchange knowledge within the robotics community and to shape the future of robotics in Europe through cooperation between both sides.

Automation and Control Institute, Vienna University of Technology
Automation and Control Institute (ACIN) employs 58 persons most of them researchers in Electrical and Mechanical Engineering, Mathematics, and Computer Science. ACIN conducts research in the areas of robotics, robot vision, and automation technology and control theory. ACIN has been member of EURON and euCognition, coordinated EU projects RobVision, ActIPret, robots@home, and presently HOBBIT and Squirrel. ACIN contributed to many EU projects including FlexPaint, FibreScope, MOVEMENT, XPERO, TACO, GRASP, and CogX. The main fields of expertise are real-time robot-vision, object detection and tracking, and solutions to make robots see in real-world applications.

FerRobotics Compliant Robot Technology GmbH
FrerRobotics was founded 2006 as a spin-off of the Johannes Kepler University Linz and has become the worldwide leader in sensitive robotics. FerRobotics develops and produces "sensitive" and physically compliant robots as well as robotic parts, like an innovative "active contact flange" and compliant gripping tools. This new physically compliant concept is based on a worldwide unique and revolutionary technology which has been invented and patented by FerRobotics.

incubed IT GmbH
incubed IT delivers innovative, fully integrated software solutions to operate autonomous, freely navigating, and co-operative mobile shuttles.

Joanneum Research Forschungsgesellschaft mbH
JOANNEUM RESEARCH Forschungsgesellschaft mbH develops solutions and technologies for businesses and industries across a wide range of sectors, and conducts top-level research at an international level. With a focus on applied research and technology development, the INNOVATION COMPANY plays a key role in the transfer of technology and know-how in Southeast Austria. With its newly established ROBOTICS Institute, JOANNEUM RESEARCH will address the current needs of the economy for applied research in technologies that interface between the digital and the real world. The Institute's main areas of expertise are human-robot collaboration and interactions that occur in innovative production processes, as well as robot safety.

Institute for Software Technology, Graz University of Technology
The Institute for Software Technology (IST) employs around 30 researchers and conducts basic and applied research in the areas software engineering, artificial intelligence and robotics. IST focuses on the application of methods from software engineering and artificial intelligence to robotics. The aim is to increase the robustness and dependability of robot systems by the application of model-based testing, model-based diagnosis and advanced planning and reasoning techniques. IST has been member of EURON and euCognition. IST coordinated several national funded research projects in robotics and artificial intelligence.

Profactor GmbH
PROFACTOR is an Austrian research company located in Steyr and focuses on developing new methods for integrated production technologies. The technological focus is on robotics and machine vision. About 80 scientists of various disciplines conduct research to improve the competitiveness of the production industry and to strengthen the Austrian and European industry. Profactor is conducting the whole range from basic research to applied research. By establishing strategic partnerships with industrial partners, Profactor focuses on closing the innovation gap between research results and market introduction. The main field related to robotics is the development of Adaptive Plug & Produce systems. Adaptive Plug & Produce systems are based on the cooperation between human and machine. Adaptive machines need to react to changes of the environment in a flexible way. In the frame of robot assistance, the bottom line is the safe, intuitive and synergetic interaction with the humans.

LCM Linz Center of Mechatronics GmbH
Since its founding in 2001, the Linz Center of Mechatronics GmbH (LCM/ACCM) has become established as a center of peak performance in mechatronics with high international recognition and reputation. LCM builds a bridge between scientific mechatronic research and its realization in products. Key competences of ACCM include: the fields of mechanics and model based control, computational and experimental process modeling and simulation, sensors and signals, information analysis and fault diagnostics, electrical drives and actuation systems, mechatronic design of machines and components, and hydraulic drives actuation systems.

FH Technikum Wien
UAS Technikum Wien offers both a bachelor and a master programme in Mechatronics/Robotics. Its robotic labs are well equipped with state of the art industrial and service robots from leading vendors like ABB, KUKA, or EPSON. UAS Technikum Wien conducts national R&D projects and contributes to international projects in the area of autonomous systems and service robotics.

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