



European Coordination Hub for Open Robotics Development Plus Plus



ECHORD++ Review Meeting Reporting Period 4; Work package 4

Luxembourg, February 21st 2018

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RUROBOTS
Cognitive Science at Work



Overview of Presentation

- **Summary of outcomes for this period**
- **Examples of inter RIF engagements**
- **Some key observations**
- **Challenges ahead**
- **RIF@Bristol**

Summary

In period four the followings summarise the key RIFs global achievements:

- **21 collaborations commenced**
- **376 RIF clients engaged with RIF offerings**
- **66% of all activity conducted with SME.**

Summary

Global RIF Group

RIF User Type: Breakdown by Activity (RUNNING TOTAL)

Unique clients: 1113

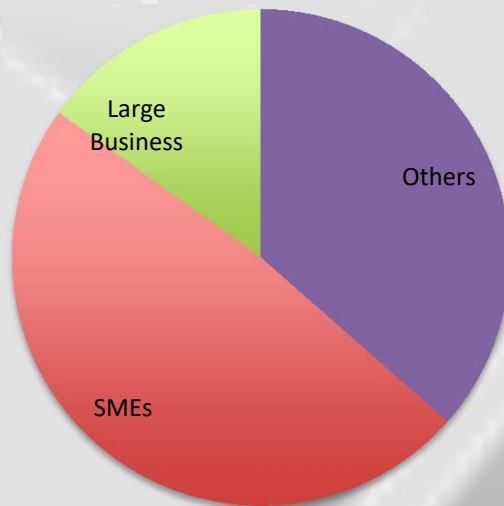
Digital Media	Twitter Followers	LinkedIn Contacts	Facebook Fans	YouTube Views	Email - Organisations	Email - Individuals	TOTAL
Connections	2029	0	0	7658	1957	4058	15702

Interactions	Researcher	Entrepreneur (Unregistered)	Start-Up	SME	Large Business	Public Body	Research Centre	HEI	Network	TOTAL	% of Interactions
InfoDays	47	0	0	33	1	3	0	9	0	93	7%
RIFLaunches	51	0	6	101	20	8	5	5	6	202	16%
External Events	0	0	10	217	43	12	23	13	73	391	32%
Collaborations	7	0	17	56	26	0	1	1	0	108	9%
Workshops	42	0	8	208	39	9	4	30	11	351	28%
Market Assessment	0	0	6	2	0	0	0	0	0	8	1%
Internships	33	-	-	-	-	-	-	-	-	33	3%
E++ Experimenters	0	0	0	5	2	0	3	0	0	10	1%
Pipeline	0	0	1	34	9	0	0	1	0	45	4%
	180	0	48	656	140	32	36	59	90	1241	

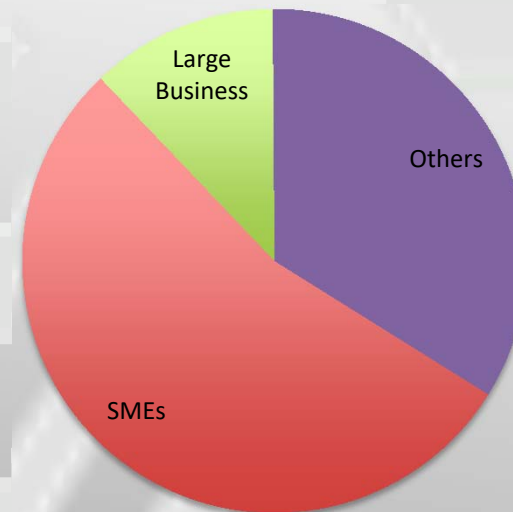
	Researcher	Entrepreneur (Unregistered)	Start-Up	SME	Large Business	Public Body	Research Centre	HEI	Network	TOTAL
Unique Clients	150	4	42	600	133	26	37	49	72	1113
% of Total Clients	13%	0%	4%	54%	12%	2%	3%	4%	6%	

Summary

**Global RIF Users Breakdown
(as of 30 Nov 2016)**



**Global RIF Users Breakdown
(as of 30 Nov 2017)**



Inter RIF Collaborations and exchanges

- RIF@Bristol and RIF@Peccioli have been engaged in joint work in assisted living with visits to and from both sites



Inter RIF Collaborations and exchanges

RIF@ Bristol and RIF@Saclay are working towards a project on polishing for a number of potential collaborators to be carried out at Bristol using a robot developed at Saclay.

Potential Polishing Application:
Injection moulding tools
Front panel of stoves
Car body panels
Marine propellers
Detail parts from aerospace



Continued awareness generation of the RIF Instrument

- All RIFs are scheduled to be present at Automatica 2018 in Munich, June 2018
- RIF@ Bristol will present at sessions in ERF-2018 in Finland, March 2018 and Automatica 2018
- A Pakistan government representative has made enquires about the concept of RIFs with potential for seeking help in the future.

Continued awareness generation of the RIF Instrument

- RIF@Saclay are developing a common format Booklet for all RIFs to adopt, detailing the collaboration particulars to be available both on line and in print.

Some Lessons Learnt

Levels of engagements and collaborations, show that the RIFs are effective vehicles in meeting the original goals of the E++ project in extending robotics and automation awareness across various application areas and businesses.

**The potential for a zero risk
collaboration is proving very
attractive to all concerns from micros
to major organisations.**

The key offering of a nominal six weeks free engagement, the security of any IP developed during this stage and access to the latest equipment and trained personnel are effective in attracting clients.

The value of RIF collaborations in enabling the technology champions in securing board approval for future projects in larger organisations is highly prized, examples include JLR and RTZ .

There is a need for providing assistance not only in technology but also in such activities as finance, marketing, Intellectual Property and Human Resources amongst other helps.

Addressing societal issues should not be divorced from the aims of ever expanding application of robotics and automation.

Some decision makers see robotics as a means of reducing headcount and others see it as a much more complex capability.

Branding strategy for the RIFs

- The RIFs are coming into their own
- RIFs have developed a reputation and presence
- So far RIFs have engaged with over a 1000 unique clients
- The current debate is whether the brand will be relevant post funded period

RIF@Bristol

Examples of engagements in Bristol

New engagements in the current period

Trading companies

- Removing of Dock weed from grazing field
- Handling of empty honey jars for packaging
- Development of an active chair for the disable
- Laser processing of cables
- Application of Machine Learning in construction

Start Ups

- Miniature manipulator arm for satellites
- Harvesting of Malaysian Oil Palm Fruit Bunch
- Handling of culture samples for detection of pathogens
- Robotic picking of strawberries

Additions to the pipeline in the current period

Trading companies

- Automated Lettuce picking
- Polishing of car body paint work
- Additive Layer Manufacturing

Active collaborations in the current period

Trading companies

- Development of a stabilised mobile platform for field applications
- Polishing of injection moulding tools

In Addition integration of a prosthetic hand with the YUMI robot for Automatica 2018

Completed collaborations for the current period

Trading companies

- Magazine Palletising, SME- Czech Republic
- Assistance for wearing compression socks, SME-UK

Start Ups

- Stroke patient recovery device- UK
- Manipulation of chemical test tubes and beakers- UK
- Robotic manufacture of false hair pieces-UK
- Sensor start up -Denmark

RIF@Bristol Road to sustainability

- **Training with industrial focus**
- **Funded research**
- **Technical assistance**
- **Dissemination and residency**
- **Dialogue with Blue Ocean Robotics have started with the aims of exploring potential ways forward.**

Recent submissions – Award not granted

- **RE-IN4SME**-In collaboration with CEA and others-
I4MS – H2020
- **PAVO**- Jaguar Land Rover and others - APC8- Innovate UK
- **UK Assistive Technologies Elevator Programme in Robotics and Artificial Intelligence**-with UCL and Loughborough universities —HEFCE
- Note: considerable person days of effort have been spent on the above efforts

Recent submissions-Awaiting Results

- **Agri-Tech DIH**-H2020
- **Additive Layer Manufacturing**- Innovate UK
- **BRL Technology Solutions**-European Regional Development Fund

Recent submissions-Awarded

- **TERRINet-H2020**

RIF@Bristol Road to sustainability

Some initiatives to facilitate sustainability:

- As part of Bristol Robotics Laboratory Technology Solution a cost centre has been created with a budget code. This provides RIF@Bristol with a clear route to charging for its services in future
- A number of externally funded small projects have been delivered via the above vehicle
- A number of paid training workshops for a large organisation are being prepared for delivery in the next few weeks.

RIF@Bristol Road to sustainability

Discussions with System Integrators:

Tharsus-collaborated on JLR Application also potential for AI collaboration

Granta Automation-discussions about end of arm tooling

Reeco – Discussion about general robotic applications

Loop Technology-Introduced a NatWest contact to this company

Examples research projects conducted in RIF

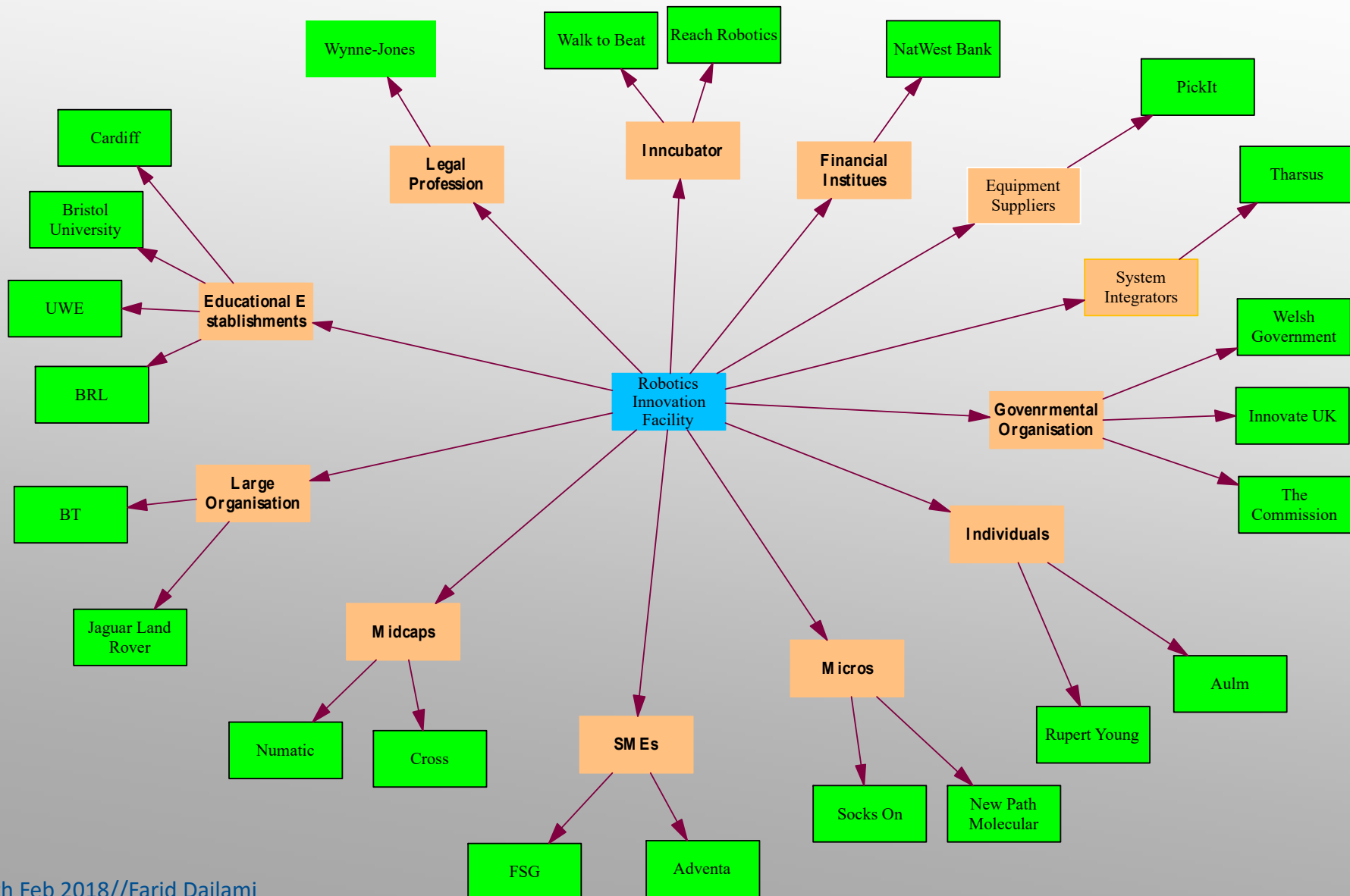
- **PhD Remote presence- in collaboration with Norwegian Robotics Company**-Funded by The Norwegian Government
- **PhD Polishing**-Funded privately
- **PhD Automated Assembly**-Funded privately
- **MSc Additive Layer Manufacturing**- Funded by an ALM Company

Further developments at RIF@Bristol

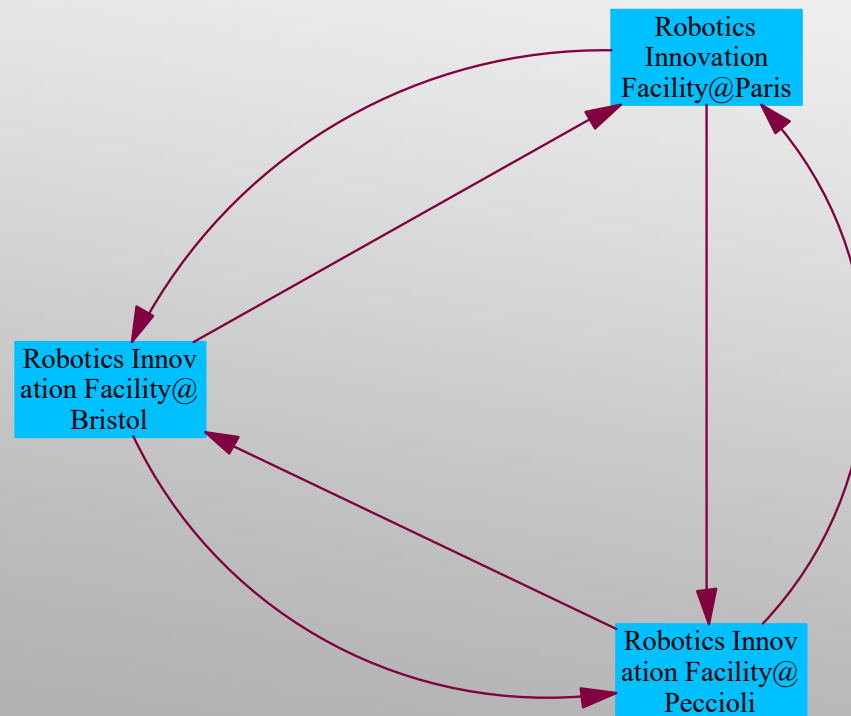
- RIF@Bristol Registered as a DIH
- Developing a strong relationship with NatWest Bank, collaborating on a robot application assessment tool



RIF@Bristol Ecosystem Snapshot



Network of RIFs



Awareness Generation at RIF@BRL

- Peccioli and Bristol have continued with their Social Media presence on Twitter; and to date have 466 & 2193 followers respectively
- RIF@Bristol's collaboration with NatWest Bank has continued over the past year. A total 37 of the bank's client companies have engaged with RIF@Bristol during 6 events.

A number of VIPs have visited BRL and RIF@Bristol, invariably accompanied by news and broadcast media. Example of visitors include:

- Prince Andrew, Duke of York
- Ambassador of the United States of America to the United Kingdom
- Dr Liam Fox, President of the Board of Trade

Awareness Generation at RIF@BRL



Awareness Generation at RIF@BRL



RIF SWOT Analysis

Strengths

- Reputation and brand
- Neutrality and impartiality
- Access to different equipment
- Competitive operating costs
- Providing access to the latest technologies & expertise

Weaknesses

- Limited availability of resources
- Slow delivery of solutions
- Lack of clarity of RIF Value Proposition wrt to integrators
- Lack of visibility

Opportunities

- Provide low/zero risk engagement for applicants
- Collaborate at high risk early TRLs
- Offer broad scope of capabilities and training

Threats

- Will be replicated by others
- Unable to manage expectations
- Unable to secure sustainable income
- Perceived Competition with System Integrators

Co-ordination Issues and opportunities

Challenges (of relevance to DIHs?)

- Time to build relationships and a collaborative ethos
- Lack of time for regular dialogue
- Cultural and linguistic differences
- Lack of human resources
- Different work practices and legal frame works
- Geographical distance between RIFs
- Failure of communication systems

Successes

- Creation of handbook-elements already used for other projects
- Collaboration and development of working relationships
- Creation of a network
- Continually improving understanding and working relationship
- Collaboration in other projects

Co-ordination Issues and opportunities

Opportunities

Potential for deeper collaboration between CEA and BRL

Polishing Project

Continuation of collaboration between SSSA and BRL

Assisted Living

Opportunities for joint application for funding

Current examples:

TERRINet

Future examples:

Digital Innovation Hubs

Thank you!

The ECHORD Plus Plus Consortium acknowledges support by the European Commission under FP7 contract 601116.

