Deliverable D1.2.8

Eighth six-monthly QM Report

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Date	Name	Changes/Comments
27.09.2017	Marie-Luise Neitz	Strategic KPIs
04.10.2017	Sebastian Weisenburger	Dissemination KPIs
06.10.2017	Yannick Morel	RIFs and experiment overview
24.01.2018	Marie-Luise Neitz	Update to include latest update on experiment extensions for the review meeting

1 ECHORD++ Report on Performance Indicators (KPIs)

While the umbrella document of the QM deliverable (D1.2.3._a) outlines the methodology used to track / assess the performance of the different instruments of ECHORD++, this second part of the deliverable reports on the results of this assessment and will be updated every six months.

1.1 Strategic Performance Indicators

The Strategic Performance Indicators have to reflect those aspects which are important to make E++ a success. The target values are based on the lessons learned from ECHORD and are geared to the expectations of the different target groups. Important to note: These indicators were fixed from the perspective of the users – irrespective of the fact if the members of the core consortium are able to influence them to full extent. Only if the cooperation of all stakeholders works – core consortium, external users and European Commission – the target values can be met.

Indicator	Assessment	Instrument	**Target value**	**De-facto M43 – M48**	
Time-to-grant	The time span between call deadlines and the accepted Grant Agreement	Call II experiments	9 months	Not relevant in this reporting period, as last relevant amendment was for Call II experiments (last reporting period)	
Payment discipline	Time span between the submission of a Periodic Report and actual payments	Cost Claim II: Core, Experiments, public bodies (PDTI)	6 months	Submission of the Periodic Report: 27.01.2017 (for review – off-line) Submission via the NEF system: 29.06.2017 Acceptance of Cost Claim by EC: 13.12.2017 Payments done beginning of 2018	
Planning security	Amendments: time span between Amendment session opened in the NEF and signed Amendment	No Amendment done during the period	6 months between opening of the Amendment Session and signed Amendment request	Amendment VI (PDTI Phase III): not relevant as the NEF System has not been opened, yet.	
No of SMEs involved	Number of Small and Medium Sized companies involved in the project for all instruments	No Call and no Amendment during the period	Experiments & PDTI: 25% of the applicants; RIF targets as outlined in the RIF handbook	Call II experiments: already reported in last QM report – not reelvant	

No of newcomers without any former participation in EU-funded projects	Number of newcomers involved in the project for all instruments plus dissemination activities!	No Call and no Amendment during the period	Experiments & PDTI: 25% of the applicants; RIF targets as outlined in the RIF handbook	Call I and Call II expeirments have already been reported on in the previous periods. No additional data available or expected anmore.	
Strengthening the collaboration between industry and academia	Projects in which industrial partners and academic partners work together (during the runtime of E++ and afterwards)	Experiments, RIFs, PDTI: Willingness to participate with new partners in future academia-in-dustry projects	Experiments: 90% of the mixed consortia	Data on Call II experiments already reported – not relevant anymore	
			PDTI: 90% of the mixed consortia	Not relevant yet: Will be evaluated first time after Phase II of PDTI ended.	
Networking: Motivate new contacts which offer the potential for future collaboration in research projects or business leads	Number of new contacts gained by working on one of the instruments of ECHORD++.	Experiments PDTI RIFs	Experiments: 75% of the experimenting partners gained at least one new contact.	Not relevant: Call I experiments already included last QM report. Call II experiments to be evaluated after they finalize.	
			PDTI: 75% of the PDTI partners gained at least one new contact	Not relevant yet. Will be evaluated first time after Phase II of PDTI ends.	
Contribution to advancing the state-of-the art (technological progress)	The technological / scientific targets are outlined in the proposals	Experiments Call I (PDTI is not relevant yet as Phase I had not	Experiments: 80 % of all experiments selected for funding meet the	Out of 16 experiments with technical KPIs during the period, 4 met their objectives (40%)	

		been reviewed, yet)	technological targets outlined in their KPI documents.		
Impact achieved by the individual technological instruments of E++	The impact targets are outlined in the KPI documents (experiments, PDTI); impact for RIF takes time to materialize, outcome will be qualified at a later stage., and in RIFs proposals).	Experiments PDTI RIFs	**Experiments:** 80 % of all experiments selected for funding achieve the impact outlined in their KPI documents	2 out of 9 experiments with impact KPIs during the period met their targets (22%)	
Performant, strong proposals received: - **For the experiments** - **For PDTI** **For the RIFs**	The potential scientific / technological success of E++ heavily depends on the quality of the proposals submitted. They form the pool from which the independent experts can select.	No calls for experiments or PDTI were reviewed during the period.	Experiments 80% of the KPIs target values achieved. .	n.a. Call I experiments were reported on in QM report 6, Call II experiments will end in QM report 9	

1.2 Experiments

The assessment of KPIs against target values for E++ expeirments is done in the bi-monthly monitoring session supported by the monitoring platform of ECHORD++. The relvant KPIs are reported on in each QM report (taking account of the KPIs of those experiments which have been active in the individual periods. In the seventh QM report of E++ (M40-M45 of the project's runtime) the following experiments have been active (all experiments have joined the project after the second Call for experiments, no Call I experiments have been active anymore during the QM reporting period):

Experiment	Runtime in months	Expected end
AAWSBE1	18 months	February 2018
CATCH	18 months	February 2018
CoCoMAPS	18 months	February 2018 (4 months extension requested, but request turned down)
DUALARMWORKER	18 months	November 2017
FASTKIT	18 months	February 2018
FLEXSIGHT	18 / 22 months	February 2018 (4 months extension requested and being discussed – dissemination)
GRAPE	18 months	February 2018
HyQ-REAL	22 months	June 2018 (4 months extension granted)
HOMEREHAB	21 months	February 2018 (3 months extension granted)
INJEROBOT	18 months	November 2017
KERAAL	22 months	June 2018 (4 monhts extension granted)
MAX ES	22 months	June 2018 (4 monhts extension granted)
RADIOROSO	18 months	February 2018
SAFERUN	18 months	November 2017
SAGA	18 months	March 2018 (4 months extension granted)
WIRES	18 months	March 2018 (4 months extension granted)

Note: Call II experiments opted for two different starting dates. E++ offered to them the option to start either in June 2016 or in September 2016. This step was taken to mitigate the impact of the delayed signature of the 4th Amendment caused by the unplanned Amendment III to amend the PDTI process.

The below tables provide a meta-level overview of the KPIs (technical, impact and dissemination). Detailed information on the performance of each experiment and an in-depth analysis of them is provided in WP3 deliverable D355. This approach thus provides performance assessment on two level of granularity to feed various information needs (executive summary and detailed analysis). An overview of each individual KPIs on a bi-monthly basis is also provided (see attached to the deliverable). Please note that there is a time difference between the deliverables in WP3 with traffic light overviews and the QM reports. Therefore there might be slight devitation, but they can also be considered as confirming trends.

Monitoring of the experiments of Call II has been strict to motivate them to a better performance and higher focus on the targets. This results in a fairly high number of red or yellow traffic lights, even though the only experiment which really raises concerns is CoCoMAPS.

Already during the kick-off meeting for Call II experiments in Palma de Mallorca, the objectives of CoCoMaps were rated as extremely ambitious for the runtime of the project. The monitoring team has followed this experiment very closedly. As a result, the requested extension of the experiment's runtime was turned down.

Assessment	**AAWSBE1**	**CATCH**	**CoCoMAPS**	**DUALARM-WORKER**
Tech. KPIs				
Imp. KPIs		n.a.		

Deliverables				
Milestones				
Dissemination		n.a.		

Assessment	**FASTKIT**	**FlexSight**	**Grape**	**HyQ-REAL**
Tech. KPIs				
Imp. KPIs			n.a.	n.a.
Deliverables				
Milestones				
Dissemination				

Assessment	**Homerehab**	**Injerobot**	**Keraal**	**MAX ES**
Tech. KPIs				
Imp. KPIs	n.a.			n.a.
Deliverables				
Milestones				
Dissemination				

Assessment	**Radioroso**	**SAFERUN**	**SAGA**	**WIRES**
Tech. KPIs				
Imp. KPIs				n.a.
Deliverables				
Milestones				
Dissemination				

1.3 RIFs

The below table provides an overview of the consolidated performance of the three RIFs against targets for six months (M46-M51). Given targets refer to annual performance (12 months). The first six months from Dec. 2016 – May 2017 indicate the following trends:

Indicator	**Explanation**	**Way of Assessment**	**Target value (to be multiplied by 3 = 3 years of operation)**	**Progress (Dec. 2016-May 17)**
Businesses engaged • **SMEs** • **Non-SMEs** • **Individuals**	Total no. of organizations within the RIF network, including businesses, sole traders, non-profit organizations, HEIs and business start-ups.	Proposal and engagement statistics generated by E++ website & PM tools provided by BRL	**Annual** targets are (*total – SME*): BRL (150 - 90) CEA (100 - 60) SSSA (100 - 60)	BRL (**609** -385) CEA (**328** -159) SSSA (**259** -153)

Businesses assisted (>12hrs) • **SMEs** • **Non-SMEs**	Consultancy support, information, advice and guidance to individual businesses. The assistance can be face-to-face, via phone, web-based, dialogue at conferences, seminars, walkings, workshops or through networks.	Internal statistics generated by PM tools provided by BRL& sign-off by organization required.	**Annual** targets are (*total – SME*): BRL (60 - 36) CEA (40 - 24) SSSA (40 - 24)	BRL (**225**-151) CEA (**51**-19) SSSA (**67**-36)
New businesses/Pre-start-up assistance	New business: The creation of new businesses including start-ups of all sizes, sole traders, partnerships and not for profit organizations. Pre-start Assistance: Inquiries from individuals on how to acquire the technical & entrepreneurial skills to set-up a new business venture.	Internal statistics generated by PM tools provided by BRL& sign-off by organization and/or individuals required.	**Annual** targets are: BRL (4) CEA (2) SSSA (2)	BRL (**44**) CEA (**2**) SSSA (**0**)
Jobs safeguarded	The number of jobs declared “at risk” by a business prior to enrolling onto the RIF programme and receiving business support, and still active twelve months from start of the engagement. “At risk” – a permanent, paid, full-time equivalent (FTE) job which is forecast to be lost within one year.	Internal statistics based on statements of users - entered into and generated by PM tools provided by BRL - This is not a hard KPI, but still useful as an indicator for long-term impact of RIFs.	**Annual** targets are: BRL (6) CEA (3) SSSA (3)	BRL (**6**) CEA (n/a) SSSA (n/a)
Jobs created	A new paid, full-time equivalent (FTE) job. Temporary employment is captured if it has a life expectancy of at least 8 weeks (or Pro Rata equivalent). The post is	Evidence & sing-off by organization and/or individual required. Generated by questionnaire at the end of	**Annual** targets are: BRL (9) CEA (6) SSSA (6)	BRL (**40**+) CEA (n/a) SSSA (n/a)

	when an individual starts a new role.	the RIF stay and after-wards.		
Number of patents & other IPR products and / or processes launched.	As a result of direct assistance provided through engagement with a RIF.	Evidence of IPR device required. This information is gathered via a survey at the end of the engagement as well as long-Term (see "Impact on Innnovation")	**Annual** targets are: BRL (2) CEA (1) SSSA (1)	BRL (**n/a**) CEA (n/a) SSSA (n/a)
Number of new or improved products and/or processes launched	The launch of a new or improved product / service as a direct result of assistance provided through engagement with a RIF.	Evidence of new or improved products required and sign-off by organization and / or individual required. This information is gathered via a survey at the end of the engagement as well as long-Term (see "Impact on Innnovation")	**Annual** targets are: BRL (10) CEA (8) SSSA (8)	BRL (**25**) CEA (n/a) SSSA (n/a)

1.4 PDTI

With this QM period the official monitoring started. The below table provides an overview of the four competing teams (2 Urban Robotics and two for Healthcare Robotics).

Criterion	Healthcare		Urban Robotics	
	Assesstronic	CLARK	SIAR	ARSI
Technical maturity of the prototype with regard to challenge objectives				

Fitness of approach to end-user needs				
Implementation of team coordination				
Capacity of consortia's engagement with monitoring team, end-users, external reviewers etc.				

1.5. Outreach and dissemination

Indicator	Assessment	Target values		
Online-communication	Visitors website	1000 per month		From 1st Nov 2014 (start of tracking) – 30th September 2017: on average 1354 visitors per month
	YouTube channel	Average of more than 500 views per video		23 videos, 527 views on average (30th Sept 2017)
	LinkedIn Group	More than 250 members		369 members (30th Sept 2017)
Media coverage	References in trade press	50 per year		106 trade press
	References in consumer press	10 per year		143 consumer press (both total until 30th September 2017)
Event audience	Estimated number of people from target audience reached at the various events	1000 per year		1.000
Direct contacts	Direct contacts in contact database	More than 4.000 active contacts at the end of E++		4,331 contacts in total (30th Sept 2017)
		More than 70 % new contacts		62 % new contacts

		(without login from old ECHORD)		
Scientific publications	Number of scientific publications	At least one per experiment	🟡	17 scientific publications in Call II experiments, but provided by only 8 experiments up to now.
Customer satisfaction	Specific questions on communication/dissemination in customer satisfaction surveys	Rating of at least good to excellent	**Based on Input from Call 2 experiments**	
	Overall content of E++ monitoring platform	🟢	2,2 (good)	
	Overall usability of the E++ monitoring platform	🟡	2,6 (good – average)	
	Questions answered within two business days	🟢	1,9 (good)	
	Did the E++ team give competent answers to your questions?	🟢	1,7 (good – excellent)	
	Was the E++ team capable of solving your problems?	🟢	1,7 (good – excellent)	
	How would you rate the communication of the ECHORD ++ management team regarding the administrative and financial process?	🟢	2,2 (good)	
	Was the session on public relations at the kick-off helpful for your PR efforts	🟢	2 (good)	
	Were the public relations references and the PR handbook helpful for your public relations efforts?	🟢	2,2 (good)	

	Does the ECHORD++ web-site echord.eu addresses the Experiment Partners' needs?		2,1 (good)
	How would you rate the ECHORD++ YouTube Channel?		1,9 (good)
	How would you rate the ECHORD++ Twitter profile		1,9 (good)

2 Risk Contingency Plan

We can classify the risks for E++ into three categories: (i) risks arising from the internal organization, (ii) risks related to the acceptance of and interest in the different instruments, and (iii) risks during the execution phase of the instruments. The following table lists the risks associated with the implementation of E++.

Risk (DOW)	Potential Impact	Corrective Action	Comments on current state
Type (i) Unclear work / task responsibilities	Impact high, Risk low Specific tasks and – in case of core tasks – the whole project may be delayed	The DOW of E++ shows clear responsibilities of Work Packages and tasks. Different escalation levels for different delays. Retain payments to beneficiaries, payments are linked to timely Delivery. Regular meetings (Video, Skype, phone and in person) to discuss the workflow openly.	___
Type (ii) E++'s visibility too low, profile unclear	Impact High, Risk low ECHORD has achieved very high visibility and credibility with clearly defined goals and means. In ECHORD, the inter-	A clear communication plan including presentations at broad-spectrum and specific events will likely resolve this problem – just as we did very successfully within ECHORD. Outreach to new potential robotics community members will be achieved by (i) a strong focus on dissemination events of various	---

	action with the classical community and other projects was very strong. However, the new instruments, RIFs and PCP activities could cause a risk.	types, by (ii) bringing experiments into the "real world" by on-site testing the demonstrators in the RIFs, by (iii) directly contacting new user groups, and by (iv) creating sustainable structures with the PCP activities.	
Type (ii) Lack of acceptance by stakeholders	Impact High, Risk low The classical experiments as in ECHORD are widely accepted, but the new instruments RIF and PCP rely on involvement of all stakeholders, especially robot users and customers.	Special information events and targeted campaigns at the beginning of the project and involvement of the industry in all phases, especially in case of the PCP activities, will minimize this risk. In addition, as a result of the structured dialogue, not only can the content of all activities be adapted, but their administration aspects as well	----
Type (ii) Lack of acceptance of the new instruments RIF and PCP	Impact Low, Risk medium Being pilots for new R&D instruments, there is a certain risk that they will not be accepted as anticipated	The interaction with all possible stakeholder groups in instrument- specific ways will lead to a good a priori estimation of the needs and acceptance criteria. This systematic approach will minimize the risk. An adjustment of the concepts in the structured dialogue will also be possible. Finally, it is always possible to adjust the budget so that resources can be shifted into the experiments and their number can be increased if needed.	----
Type (iii) Beneficiary bankruptcy	Impact Medium, Risk Low Potential risk of a failure of a specific experiment	Rapid alert system due to additional reporting duties for beneficiaries with weak financial validation. Replace beneficiary Financial risk is safeguarded by guarantee fund	ROBOSOFT – the coordinator of the ARNICA consortium in PDTI Phase I healthcare – had to declare bankruptcy. Mitigation measure were not necessary because ARNICA failed after Phase I (despite the redress filed).
Type (iii) Delayed	Impact High, Risk Medium-High No sound planning	Realistic timetable with enough time between the Calls to realize the Amendments Timetable	Apart from 2 experiments (CoCoMaps and

start of experiments and other instruments	of resources and timeline possible for beneficiaries Experiments cannot deliver the intended results on time Project duration likely to be extended (cost-neutral) Bad image of the project and demotivation of SMEs to participate in future EU-funded projects	which avoids conflict between Cost Claims and Amendments Communication of this timetable to the beneficiaries. Beneficiaries that do not meet start deadlines will be postponed to the next batch or replaced Beneficiaries with complete documentation can start their experiments without prior signature of Amendment.	Flexsight) all experiments are in a fairly good shape towards targets. Yellow traffic lights illustrate smaller delays, but will not prevent the success of the experiments. Delays (see above table) are balanced by cost-neutral extensions which are granted based on an official request and performance. b
Additional risks identified since DOW was written		Corrective Action	
Cooperation between core beneficiaries does not work well (lessons learned ECHORD)	*Impact: High, Risk: Medium*	Preventive measures taken: Regular specific group updates (every two weeks) for PCP, RIFs, Experiments and ExC Committee. Appointment of a facilitator to tackle issues which require in-depth communication between different instruments OR different beneficiaries involved in one instrument to achieve consensus with the best results.	The responsibilities within WP4 (RIFs) and the roles (coordination, contributors to reports and RIF owners) had to be clarified in skype calls (who is driving, who is contributing).
Problems with recruitment of evaluators	*Impact: High, Risk: High*	Intensive contact making with stakeholder groups not originally involved with the project (also by activating clusters and associations)	----
Experiment reviews do not provide sufficient input to make an informed funding decision.	*Impact: High, Risk: Medium / Low*	Calibration of the proposal evaluations during the panel meeting	---

Evaluators give high scores to proposals which do not provide a clear trackable target.	*Impact: High, Risk: High*	Analysis of the weaknesses of the proposals selected for funding and addressing these issues during the negotiations.	---
Tracking of take-up of results of all instruments reported by the partners / users	*Impact: High (for follow-up projects or second rounds); Risk: Medium*	Automated alarm system with deadlines for long-term tracking; implementation of the instruments for tracking (for instance questionnaires).	---

Summary

AAWSBE1

Moderator: Manuele Bonaccorsi

tKPIs	#1 Identification of batteries	#2 Identification of battery-containing objects	#3 Regain item location	#4 Adaptable pick list	#5 Picking and placing of requested items	#6 Segmentation of visible database items
						
	#7 Classification of database items found	#8 Rejection of non-database items	#9 Picking of waste items	#10 Prototype realization of automated sorter	#11 Output bin purity	
						

iKPIs	#1 Business case end user	#2 Business case Technology provider	#3 Use case redesign/ flow	#4 Increased performance in waste sorting
				
	#5 Interviews with stakeholders	#6 Users acceptance	#7 Quotes asked	
				

Mile-stones	#1 First images delivered to Refind from the final sensor suite	#2 Identification system working	#3 Picking works on the specified items	#4 Whole system integrated and working at DTI
				

Delivera-bles	#SB Story Board	#D1.1 Final form of perception hardware and algorithms	#D1.2 20 Common items identifiable in real time	#D2.1 Dynamically prioritised pick list	#D1.3 Report on the perception system and its evaluation
					
	#D2.2 Report on picking	#D3.1 Physical demonstrator	#MMR Multi-Media Report	#RIF Report on end-user evaluation	

	random, moving, waste items				
					

Dissemi-nation	#1 Exhibition-DIRA roadshow/robotbrag	#2 Exhibition, speech-Salzburg IERC	#3 Exhibition- Madrid expo	#4 Exhibition-New Orleans ISRI	#5 Exhibition-Herning HI messe
					
	#6 Exhibition-Automatica 2018	#7 Newsletter 1	#8 Press release 1	#9 Newsletter 2	#10 National TV - One of the TV channels
					
	#11 In house exhibition demos	#12 Newsletter 3	#13 Press release 2	#14 Final system video	#15 networking with associations
					

Impact KPIs

#2 Business case Technology provider – due on date 01.07.2017 (yellow) The KPI is set as "Business Plan", but no document is still avalable on 17/07/2017. The previous KPI named "Business case" is still poorly written, and no upgrade of the document was provided as suggested.
No document was uploaded on date 17/07/2017.

Technical KPIs

#3 Regain item location – due on date 01.06.2017 (yellow)
The KPI verification mean is "Compare system displacement to human inspection". No document has been provided so far on date 18/07/2017.
On date 09/10/2017 no information has been provided yet.

#2 Identification of battery-containing objects – due on date 01.06.2017 (yellow)
ROC chart has not been provided so far (date 14/07/2017). KPI seems to have more than one month of delay. Nevertheless, in the D1.1 document resubmitted (re-uploaded) on date 02/03/2017, experimenters states that AAWBE1 was able to identify and locate on the conveyor belt, cellphones and the small battery. The performance of the system is not very clear on the document, but probably, AASWBE1 can identify or locate a cellphones or a small battery, the 60-70% of times it is processed on the conveyor belt. Please, provide more details on the system performance.

#1 Identification of batteries – due on date 01.06.2017 ROC Charts Not ok (yellow)

ROC chart has not been provided so far (date 14/07/2017). KPI seems to have more than one month of delay.

Milestones
#2 "Identification system working" - due on date 01.06.2017 (green)
On date 14/07/2017 no document has been uploaded yet, or any contribution introduced by the experimenters.
I think that the milestone 2 was already reached on date 13/12/2016 where experimenters sent a video by e-mail showing the AASWBE1 prototype identifying objects on a conveyor belt.
#3 "Picking works on the specified items" - due on date 01.07.2017 (yellow)
On date 18/07/2017 no video link has been uploaded yet, or any contribution introduced by the experimenters.
On date 09/10/2017 no video link has been uploaded yet, or any contribution introduced by the experimenters.

Deliverables
 # D2.1. Dynamically prioritised picking list– due on date 01.06.2017 (yellow)
On date 14/07/2017 morning the document is still missing. Please, upload some document, picture, video o comment. It would improve the quality of the evaluation process.
On date 17/07/2017 evening, so with one month and an half after the deadline, the experimenters uploaded a very few detailed powerpoint document of two slides. The document details seems insufficient to understand the project progress on the dynamic prioritization of the picking list.
D1.3 Report on the perception system and its evaluation – due on date 01.07.2017 (yellow)
On date 18/07/2017 morning the document is still missing.
On date 09/10/2017 morning the document is still missing.

Dissemination milestones
#4 Exhibition- New Orleans ISRI – due on date 27.04.2017 (Yellow)
No information was provided about the milestone status up to date 14/07/2017. Is the milestone reached? Do You have any contribution, video, picture or paper to share with moderators?
#8 Press release 1 – due on date 30.06.2017 (Green)
Experimenters declare the milestone "in the making", and they was featured on newspapers on date 18/07/2017. Nevertheless, no more details are provided so far.

Synthetic Summary (first period)

Impact KPI: Business cases are very basic
tKPI: tKPI not provided (on date 14/07/2017)
Milestones:
Deliverables:
Dissemination:

Traffic light 4 period: (Green) Please, consider the opportunity to improve the business case quality and the D1.2 document to made it easier the follow-up of the project progress

Traffic light 5 period: (Yellow) Please, upload more documents, pictures, videos or comments to made it easier for moderators the follow up of the project progress. I would appreciate more detailed written deliverables or more links to videos, papers or technical reports on the official ECHORD++ portal

Traffic light 6 period: (Green) The project has no significant deadlines expected in this period. Please, consider the opportunity to write some report on the research activities and work in progress, to let moderators aware about your efforts.

Synthetic Summary (second period)
Major delays. The next traffic lights will be absolutely red, and an inspection to the experimenters site will be suggested to verify the compliance of the work program to the research and development actions performed

Impact KPI: Business cases must be improved
tKPI: tKPI It is impossible to verify the work progress from the technical point of view
Milestones: Video, pictures or other milestone must be uploaded on the Echord portal
Deliverables: Too much delays on deliverables and too few details explained
Dissemination: Links or other verifiable means should be provided on the Echord portal

Moderators: Herminio Martínez García and Raffaele Esposito

tKPIs	#1 Amount of crushed cucumbers (mobile platform + grippers)	#2 Amount of lost cucumbers when placing them on the back basket	#3 Vision based cucumber detection	#4 Operating speed	#5 Efficiency	#6 Damage to plants
						

iKPIs	#1 Reduction in harvest costs per hector	#2 Patent application	#3 Number of jobs created	#4 Number of spinoffs originating from the project	#5 Number of products originating from the project
					

Mile-stones	#1 Experimental plan	#2 Recognition-Localization	#3 Experiment Set-Up	#4 End of Experiment
				

Delivera-bles	#D1 Experiment Plan and Conception	#D2 Vision System	#SB Story Board	#D3 Robot and Control System
				
	#D4 Programming Environment	#MMR Multi-Media Report	#D5 Evaluation of novel hortibot technology	
				

Disseminination	#1 Website of experiment	#2 Press release-I	#3 Press release-II	#4 Multi media report	#5 Networking associations
					
	#6 Attendance to trade fairs	#7 Attendance to trade fairs	#8 Attendance to scientific	#9 Attendance to scientific conference	#10 Scientific publications

	(Automatica 2018)	(Grüne Woche 2018)	conference (IROS 2018)	(Internationale Tagung Landtechnik)	
					

General comments:
The experimenters must specify, in a more detailed way, the information, potential solutions and decisions, at least, on critical aspects of vision, arms coordination and gripping in a “real” conditions context.

Waiting for that relevant information, experimenters are encouraged to continue their work even some concerns were already expressed to the research team in previous periods. In fact, moderators would like to have the opportunity to attend to some of the tests and demonstrations they plan to develop in “real” conditions context.

Technical KPIs:
According to the description of work (DOW), tKPI number 3 (Vision-based cucumber detection-video) was scheduled for this period (by July 1st, 2017). The vision-based cucumber detection-video was delivered by a Dropbox link.

The display of the video on vision-based cucumber detection clarifies some Moderators' doubts about the detection procedure of fruits. For this reason, the flag is GREEN. However, this video was uploaded with 25 days of delay (July 26th, 2017).

Impact KPIs:
According to the DOW, any iKPI was not scheduled for period by October 2017.

Milestones:
Although in previous period, the achievement of Milestone #M1 "Experimental Plan" was related to #D1 and it was not approved (the flag was RED), the milestone #M1 “Experiment Plan” was achieved in this new period. However, Raffaele suggested CATCH Experimenters to edit a short comment on the Echord Portal to confirm if the milestone achievement is related to D1 (paragraph 4) or if some changes occurred. However no comments were added. So, the considered flag is only YELLOW.

Deliverables:
Deliverable #D2 (“Vision System”) was delivered on June 1st, 2017. The reading of the document, together with the display of the video on vision-based cucumber detection (Technical KPI Milestone number 3) clarifies some Moderators' doubts about the detection procedure of fruits, especially when the vision system is stationary.

However, there are some questions that should be clarified for a correct implementation of the platform concerning the behavior of the aforementioned vision system when it is implemented on the platform: What is the behavior of the vision system when the platform is moving on a surface with irregularities and the correct detection of the fruit position?

In the Moderators' opinion, having into account that this point is important for a correct detection of the fruit, it should be clarified in the document. Considering all this information, the flag is YELLOW.

Concerning #SB (“Story Board”), it is useful in order to clarify the evolution of the development of the project during these months in a graphical manner. For this reason, the flag is GREEN. The deadline for this document was Septemeber 1st, 2017 and it was uploaded on CATCH Portal on October 8th, 2017.

Regarding the Deliverable #D3 ("Robot and Control System"), its deadline was past September 1st, 2017. However in October 18th, 2017 this deliverable has not been uploaded to CATCH Portal. Thus, #D3 is still missing. Considering it, the flag is RED.

Dissemination: According to the DOW, any Dissemination Milestones was not scheduled in this period by October 2017.

Synthetic summary

The monitoring periodic report #3 was delivered to moderators on May 18th, 2017 (two months and a half late). In the moderators’ opinion about this 3° periodic report (Jan-Feb 2017), the paragraph 2 (T1) describes the same work done in D1 (Dec 2016). Furthermore the T1 had to end on Feb. 2017, but it continued until Apr. 2017, this decision was taken by CATCH experimenters. About the paragraph 5 (T4), the work done respect to the 2° periodic report is not clear. So, considering all that, the traffic light should be yellow.

Regarding monitoring periodic report #4, connecting this new contribution with the previous information provided by Experimenters, in general, in the moderators’ opinion, having into account the previous information and this new information that is submitted, the project seems to be running correctly during this fourth considered monitoring period report.

Regarding monitoring periodic report #5, connecting this new contribution with the previous information provided by Experimenters, in general, the project seems to have a correct evolution during this considered firth period. Raffaele suggested to highlight how CATCH Experimenters faced and overcame the critical issues such as vision, arms coordination and gripping. However, it is detected an important delay in the submission of the documentation. In addition, there are some questions that should be clarified for a correct implementation of the platform concerning the behavior of the aforementioned platform face with surface irregularities and the correct detection of the fruit position.

Raffaele sent an e-mail with a request of information regarding the delay but no answer was given.

Moderator: Adam Schmidt

tKPIs				
	#1 Ability of current state of the art running on one Qbo robot	#2 Ability of real-world robot-robot interaction using new collaborative CMA	#3 Ability of real-world multi-robot-human interaction using collaborative CMA and speech	#4 Success rate in inserting wiring terminals
				
	#5 Efficiency of collaborative detection of humans	#6 Efficiency of collaborative information extraction through dialogue	#7 Efficiency of collaborative task extraction through dialogue	
				

iKPIs				
	#1 Industrial collaborations	#2 Psyclone framework	#3 Academic collaborations	#4 Psyclone + project bundle, ready for commercially funded integration projects
				

Mile-stones				
	#1 Kick-off Meeting	#2 Support for Qbo platform	#3 Current state-of-the-art supported	#4 Demonstration 1
				
	#5 Collaborative Cognitive Map complete	#6 Demonstration 2	#7 Demonstration 3	#8 Project completed
				

Delivera-bles					
	#T1.D1 Specification of Experimental Platform	#T6.D1 Current state-of-the-art implementation	#T8.D1 Draft Collaborative Cognitive Map	#T9.D1 Demo 1: Collaborative Visual Detection	#T8.D2 Final Collaborative Cognitive Map
					
	#T10.D1	#T12.D1	#T13.D1	#T15.D1	

	Demo 2: Collaborative Visual Search [RIF visit 1]	Four-way Turn-Taking	Demo 3: Collaborative Information Extraction [RIF visit 2]	Demos, results and literature publicly available	
					

Dissemi-nation	#1 website of experiment	#2 press release - I	#3 press release - II	#4 Final demo	#5 Multi media report
					
	#6 Networking w customers (Marel)	#7 Networking w customers (Magic Leap)	#8 Networking w customers (Honda)	#9 Attendance to trade fairs (Consumer Technology Association / CES)	#10 Attendance to trade fairs (Hanover Messe 2017)
					
	#11 Attendance to trade fairs (Hanover Messe 2018)	#12 Attendance to scientific conferences (CES in the US booked and scheduled)	#13 Attendance to scientific conferences (Hanover Messe 2017)	#14 Attendance to scientific conferences (Hanover Messe 2018)	#15 Create posters/leaflets/roll-ups
					
	#16 Social media				
					

General Comments: The initial goal of the project was to develop a collaborative, cognitive architecture allowing robots to have meaningful conversations with humans, to extract task-relevant information from them and then to act depending on the results of the conversation. Several components ranging from the scene-understanding to human-tracking to voice recognition were to be developed, while the cognitive architecture and conversation module were to be developed by extending the pre-existing software.

The project is significantly affected by delays and divergence from the original objectives. The first is, according to the Experimenters, cause by postponed initial payment, which had catastrophic impact on the original schedule (necessity to find a new employee, unavailability of the robot originally selected for the project etc.). The second is caused by having to use different robots than the originally selected, which in turn resulted in different sensors available.

The experimenters applied for an extension of the project and a revision of the KPI document to cope with those hindrances. According to the proposal, the deadlines for all the deliverables and KPIs would be postponed by three months to compensate for the initial delay. The Experimenters would also like to switch the scope of the image processing tasks from navigation and object recognition to emotions recognition and human detection, which seem to be more relevant to the development of dialogue based system.
In the current state of the development it is unclear if the Experimenters will be able to delivered the solution presented in the proposal. A lot of the components is still under development; the scope of the demonstration has changed as well. An interim review of the experiment will be organized before making the decision on the potential extension of the project.

Technical KPIs: None of the technical KPIs due was achieved

Impact KPIs: The Psyclone framework is not available for download

Dissemination KPIs: No verifiable information on attendance to some conferences or networking with potential customers. Presentation at the Hannover Messe 2017 was way below the expected quality.

Milestones: none of the milestones due was achieved so far

Deliverables:

- T1D1 Specs are lacking – the document contains a list of modules, a couple of unreadable diagrams etc. Needs to be corrected (yellow),
- T6D1 describes the features of the current implementation of the Psyclone platform, it is hard to verify what has been actually implemented
- T8D1, T8D2, T9D1, T10D1 - overdue

Synthetic summary:
The initial goal of the project was to develop a collaborative, cognitive architecture allowing robots to have meaningful conversations with humans, to extract task-relevant information from them and then to act depending on the results of the conversation. Several components ranging from the scene-understanding to human-tracking to voice recognition were to be developed, while the cognitive architecture and conversation module were to be developed by extending the pre-existing software.
The project is significantly affected by delays and divergence from the original objectives. The first is, according to the Experimenters, cause by postponed initial payment, which had catastrophic impact on the original schedule (necessity to find a new employee, unavailability of the robot originally selected for the project etc.). The second is caused by having to use different robots than the originally selected, which in turn resulted in different sensors available.
The experimenters applied for an extension of the project and a revision of the KPI document to cope with those hindrances. According to the proposal, the deadlines for all the deliverables and KPIs would be postponed by three months to compensate for the initial delay. The Experimenters would also like to switch the scope of the image processing tasks from navigation and object recognition to emotions recognition and

human detection, which seem to be more relevant to the development of dialogue based system.
In the current state of the development it is unclear if the Experimenters will be able to delivered the solution presented in the proposal. A lot of the components is still under development; the scope of the demonstration has changed as well. An interim review of the experiment will be organized before making the decision on the potential extension of the project.

DUALARMWORKER

Moderators: Annagiulia Morachioli and Ana Maria Puig Pey Claveria

tKPIs	#1 Time to plan a dual arm trajectory	#2 Trials to obtain a suitable solution	#3 Deviation with the respect to ideal trajectory	#4 Weight carrying capability
				

iKPIs	#1 Station Recurring Cost Reduction	#2 Number of Airbus operations as potential users of the dual-arm	#3 Open Source Software Modules release	#4 Automation in different industrial sectors	#5 Commercial exploitation of dual-arm planning libraries
					

Mile-stones	#1 Dual-arm closed kinematics chain planning algorithm selected	#2 First prototype implemented	#3 final prototype implemented
			

Delivera-bles	#D4.1 Story Board	#D1.1 Pilot case scenario definition	#D2.1 Intermediate report on dual arm motion planning algorithm	#D2.2 Library for dual arm closed kinematics chain motion planning	#D3.1 Prototype of the first demonstrator
					
	#D2.3 Library of dual arm constrained automatic programming	#D2.4 Library of dual arm online collision detection and avoidance	#D3.2 Prototype of the second demonstrator	#D4.2 Multi-media Report	
					

Dissemi-nation	#1 Website of experiment	#2 Press release I	#3 Press release II	#4 Multimedia report	#5 Networking with associations (AER-ATP)	#6 Networking with associations (GDR ROBOTIQUE CNRS)

						
	#7 Networking with associations (Hisparob)	#8 Attendance to trade fairs (INNOROBO)	#9 Attendance to scientific conferences (AIM 17)	#10 Social media		
						

General comment:
Even if there are some minor delays in providing information, the project is progressing well and as expected.

Deliverable D2.2 and D3.1 Intermediate report on dual arm motion planning algorithm submitted two months later (yellow)

Synthetic summary
Some delays were present and D2.2 and D3.1 were not developed in an optimal way but experimenters modified both quickly and provided the expected information.

In general, RRTConnect planner was used to develop the core of the motion planning. Test on Octomap done in order to assess the best method for fast change in the environment implemented. New grippers implemented too. Dual arm closed kinematics planner v1.2 tested both at Tecnalia and Airbus.
The Dual Arm Closed Kinematics Planner is combined with a Database that stores successfully calculated trajectories. With this strategy, experimenters are able to reuse trajectories instead of having to recalculate them every time.

Periodic assessment green: few questions on the new gripper but in general the progress is good.
Deliverable status: D2.2 and D3.1 were at first poor and I requested them to provide them in a more structured way and they quickly did so.
dKPI: a lot of work has been done to catch up properly on the dissemination KPIs and reports have been provided.

The experimenters always provide useful videos to assess their progresses.

FASTKIT

Moderator: Yannick Morel

tKPIs	#1 Robust and reliable navigation	#2 Robust and reliable perception	#3 Deployable and stable mechanical system	#4 Increase in speed of pick and place operation, workspace area and payload compared to competition
				

iKPIs	#1 Reduction in lead time of the operation compared to operation by competition	#2 Reduction in investment cost compared to competition	#3 Patent	#4 New product prototype	#5 Creation of Start up	#6 Potential users (PSA, Renault, BA systems)
						

Mile-stones	#1 AGV and tow able to reach each position	#2 CDPR with end effector able to pick up box	#3 CDPR integrated on mobile platform
			

Delivera-bles	#D3.1 Final and sub scenario design	#VD1 Simulation video of FASTKIT prototype performing scenario	#D1.1 Navigation Package (Software + Hardware)	#D2.1 Deployable CDPR prototype (Software + Hardware)	#VD2 Initial video of the robot in warehouse
					
	#MMR Multi-Media Report	#D3.2 Integrated prototype and final scenario implementation	#VD3 Final video of the robot in the warehouse	#VD4 One AGV autonomously pulling the other one to the destination	
					

Dissemi-nation	#1 Website of experiment	#2 Press releases-I	#3 Press releases-II	#4 Multi media report	#5 Networking w associations (IRT Jules Verne and CNRS)

					
	#6 Attendance to trade fairs (Innorobo 2017)	#7 Attendance to scientific conferences	#8 Organisation of events	#9 Create posters/leaflets/roll-ups	#10 Social media
					

Technical KPI #3: There is a deployable mechanical system, but the manipulator is suspended, not constrained (cables only connected to top part of gripper, not top and bottom). As a result, movements lead to some oscillations. This configuration is a first step, requiring less hardware, before moving on to the constrained configuration. It is functional at this point, but lacking. Change to a constrained configuration is expected by late October, with testing and tuning of constrained control of the gripper through November. **Yellow** for now, green when/if the constrained configuration is successfully implemented.

Impact KPIs #1-2: They substantiated achievement of these KPIs through a short analysis provided in writing to the moderator. This analysis is reasonable, but these KPIs remain orange for a number of reasons. In particular, the prototype's TRL remains fairly low (about 5 at this stage), and the analysis, in particular in terms of lead time, pertains to perspectives of operation at a higher TRL. In terms of cost, if the platform cost is lower than that of some existing logistics solutions, these solutions are difficult to compare due to different scope of operation and capacities. The cost of the platform remains high for what it offers (at over 200K€ now, ~90K€ in mass production). It's an **Yellow** on both counts.

Deliverable D3.1: Delivered late, could have used a little bit more detail, not dramatically bad but a little fuzzy. **Yellow**.

Dissemination #6: I know the IRT was at innorobo, I assume FASTKIT was represented, but I have not seen anything to substantiate. They probably were there, but pictures or it didn't happen. **Yellow**.

Dissemination #8-9: They refer to the website regarding some event they organised, I have seen nothing on there. I have not seen the posters/roll-ups anywhere either. I have asked for receipts, **Yellow** in the meantime.

General comments: The Experiment is progressing well, its strengths and weaknesses are transparent by now. They will develop a sound prototype, although of a TRL that is too low to consider getting out of the lab much (they may get to 6 but 7 is doubtful). The result will help demonstrate perspectives offered by the combination of mobile bases and cable robots, which is novel and provides clear benefits. However, this will not go "*Form lab to market*." The final result will not be a product, but several steps removed from a product. That is disappointing, but the work performed will benefit the team in several respects. The IRT is using the prototype (already, in its current unfinished state) to demonstrate the functionalities offered. A number of industrials have expressed very serious interest, including AIRBUS. A follow-up to FASTKIT to further develop the technology seems more than likely. The question to

be resolved is the manner in which they will do it, and they exploring different possible options. The CNRS partner (academia) wants to pursue additional research funding to both raise in TRL but also further investigate some of the research questions raised in FASTKIT's development. He is in the process of attempting to assemble a consortium to that end. In complement, the team is in advanced contact with AIRBUS for product development, on the basis of what was shown in FASTKIT. The company is ready to invest. However, AIRBUS wants the team's assistance to support them for an in-house development. Conversely, the team wants development to remain within the IRT structure, to retain IP rights, keep skills and knowledges at IRT, and be able to address different types of customers. Those perspectives are more than satisfactory for an ECHORD++ Experiment. FASTKIT is a **green**.

Synthetic summary: Technical progress has been good, but likely final prototype TRL is fairly modest (5 to 6). The system developed has and will help the team in securing follow-up funding, several industrials have expressed interest, one of them having signified their willingness to invest in the technology. Most functionalities have been integrated (locomotion, localisation, grasping), but a number of aspects remain to be implemented (constrained manipulator configuration instead of the current suspended) or improved (localisation, control of cable tension).

Moderators: Raffaele Limosani and Ana Maria Puig Pey Claveria

tKPIs	#1 Object recognition rate	#2 Localization accuracy	#3 Operation life of FSS	#4 Algorithm parallelization: computation time vs cycle time
				

iKPIs	#1 FSS product available	#2 FSS product cost compared to existing solutions	#3 FSS foreseen clients	#4 Interested stakeholders (system integrators or external brokerage provides)
				
	#5 News letter	#6 Website	#7 Leads	
				

Mile-stones	#1 Object recognition	#2 Object localization	#3 Final Prototype	#4 First system
				

Delivera-bles	#D1.1 Use-Case Analysis and Requirements Report	#D2.1 Object Recognition Report	#D3.1 FSS Final Prototype Report	#MMR1 Multi-Media Report on RIF Visit Outcome	#RIF RIF visit outcome Report and Prototype
					
	#D4.1 Final perception System Report	#D5.1 Final System Report and Demonstrator	#SB Story board	#MMR2 Final Multi-Media Report	
					

Dissemi-nation	#1 Website of experiment	#2 Press release 1	#3 Press release 2	#4 Press release 3	#5 Promotional multi media report
					
	#6 RIF Multi-Media Report	#7 Final Multi-Media Report	#8 Networking w associations-SIRI	#9 Attendance to trade fairs-MECSPE	#10 Attendance to trade fairs-Hannover Messe
					
	#11 Attendance to trade fairs - SPS parma, Italia	#12 Attendance to trade fairs-Automatica 2018	#13 Attendance to trade fairs-Vision	#14 Attendance to trade fairs-SPS Nuernberg	#15 Attendance to trade fairs- ITR open House
					
	#16 Attendance to scientific conferences - ICRA 2017 conference	#17 Attendance to scientific conferences-IROS 2017	#18 Attendance to scientific conferences-ICCV 2017	#19 organisation of events- Open-House in ITR facility	#20 Project presentation poster
					
	#21 Prototype presentation poster	#22 Product brochure	#23 social media Facebook & Twitter	#24 scientific papers	#25 other publications (e.g. newsletter, …)
					

General comment

Work carried out by experimenters is valuable but they do not provide the same value to documents on the portal. As sum up in the table, several documents are missing. Some of them (as the website) are missing only as information provided on the portal. From a technical point of view, some issues are occurring in the project, causing a deviation from DoW. As already marked, also for technical results some documents are missing (as Milestones) only due to an inaccurate use of the portal.

Experimenters should keep their activities closer to work planned and stated in the DoW and moreover should spend more effort on the presentation (i.e. information on the portal) of their work.

Dissemination milestones (red)

3) Press release 2 - 10.03.2017 not provided

16) Attendance to scientific conferences - 30.06.2017 not provided
17) Attendance to scientific conferences - 30.09.2017 not provided
23) Social media Facebook e Twitter - 10.01.2017 not provided

Technical KPI milestones (red)
1) Object recognition - 01.07.2017 not provided
2) Localization accuracy - 01.07.2017 not provided
3) Operation Life of FSS - 01.09.2017 not provided

Impact KPI milestones (red)
5) Newsletter - 01.07.2017 not provided
6) Website - 01.07.2017 not provided

Synthetic summary
From a technical point of view, some issues are occurring in the project, causing a deviation from DoW: managing deformable objects is not completely solved and onboard computation is delayed due to lack of support on chosen device.
However, interesting results obtainable at the end of the project are still clear and evident.

GRAPE

Moderators: Antoni Grau and Stefano Betti

tKPIs	#1 Capability to cover large area autonomously after addition of electronics and the arm	#2 Vinestock structure identification	#3 3D map of the vineyard	#4 Autonomous navigation in a vineyard	#5 Robust dispenser deployment	#6 Multi-dispenser storage system for easy pick-up by a robot
						

iKPIs	#1 Industry interest in GRAPE	#2 Patentability study for potential patent application	#3 Number of jobs created	#4 Extended usage of the platform	#5 Cross-crop usage (quick reconfiguration)	#6 Open publication of data	#7 Scientific dissemination
							

Mile-stones	#1 Agreement on scenario definition and requirements' specification	#2 Robot navigates in a vineyard and performs a monitoring task	#3 Robot performs a dispenser deployment task	#4 Farmer can satisfactorily use the robotic platform
				

Delivera-bles	#D1.1 Scenarios and requirement specifications	#D2.1 Vineyard navigation (methods and algorithms)	#D2.2 Vineyard navigation (results)	#D3.1 Vineyard monitoring technique	#D4.1 Pheromone dispenser manipulation techniques
					
	#SB Story Board	#D5.1 Vineyard robotic platform HMI	#MMR Multi-Media Report	#RIF Report on RIF visit outcome and demo results	#D1.2 Exploitation plan and commercial agreements
					

Dissemi - nation	#1 Website of experiment	#2 Press release- I	#3 Press release- II	#4 Multi media report	#5 Networking w associations (>50 individual stakeholders contacted)
					
	#6 Attendance to trade fairs (>=5 trade fairs (including ERF))	#7 Attendance to scientific conferences	#8 Create posters/leaflets/r oll-ups	#9 Social media	
					

Deliverables
#D2.2 Vineyard navigation
Delay: 6 days (GREEN).

#D3.1 Vineyard monitoring technique
Delay: 6 days (GREEN).

Milestones
#2 Robot navigates in a vineyard and performs a monitoring task
Delay: 6 days (GREEN).

#3 Robot performs a dispenser deployment task
Not yet loaded (19/10/2017) -> Expected date 1/9/2017 (YELLOW)

tKPIs
#1 Capability to cover large area autonomously after addition of electronics and the arm
Delay: 2 months. The experimenters waited the results of the integration week to upload the material (YELLOW). -

#2 Patentability study for potential patent application
Delay: 2 months. The experimenters waited the results of the integration week to upload the material (YELLOW).

#3 3D map of the vineyard
Delay: 2 months. The experimenters waited the results of the integration week to upload the material (YELLOW).

#4 Autonomous navigation in a vineyard
Not yet uploaded (19/10/2017) -> Expected date 1/9/2017 (YELLOW)

#5 Robust dispenser deployment
Not yet uploaded (19/10/2017) -> Expected date 1/9/2017 (YELLOW)

#6 Multi-dispenser storage system for easy pick-up by a robot
Not yet uploaded (19/10/2017) -> Expected date 1/9/2017 (YELLOW)

Synthetic summary
About the Period Reports the experimenters obtained two green lights.
Period 5 comment - Good improvements in the project.
Period 6 comment - In the experiment website, there is no mention to EU funding; both EU and ECHORD++ logos must appear. The rest looks good.

Moderator: Adam Schmidt

tKPIs	#1 Protocol for safety of users	#2 Protocol for the storage of patients' data	#3 Simulation video of rehabilitation therapy robot	#4 Learning based intention and physiological state monitoring system	#5 Video Demo of control software with or without human	#6 Tele Rehabilitation interface
						

iKPIs	#1 High performance	#2 Reliability	#3 Commercialisation of standalone system	#4 Certification
				

Mile-stones	#1 First Results of Robot Design Specifications and Patient Bio-Signal Monitoring System	#2 Development of Robotic System	#3 Development of Monitoring System	#4 Validation of the Completed System
				

Delivera-bles	#SB Story Board	#D2 State of the Art in Robot Requirements and Features for in Home Use	#D7 Protocol for safety of users	#D3 Report about New Robot Design and Patient Bio-Signals Online and Offline Analysis	#D4 Report about the Development of a Tele-Rehabilitation Robotic System
					
	#MMR Multi-Media Report	#RIF Report on RIF visit outcome	#D5 Final Demonstration	#D6 Publications in International Journal and Conferences	#FR Final Report to Echord++ team
					

Dissemi-nation	#1 website of experiment	#2 Press release-I	#3 Press release-II	#4 Multi media report	#5 Networking associations (euRobotics)

					
	#6 Attendance to trade fairs- (AUTOMATICA 2018)	#7 Attendance to trade fairs (REHACARE 2016)	#8 Attendance to scientific conferences (BIOROB 2018)	#9 Attendance to scientific conferences (ICORR 2017 / REHAB WEEK 2017)	#10 Organisation of events (IWART)
					
	#11 Create posters,leaflets, roll-ups	#12 Social media (Twitter account)	#13 Publications in scientific magazines (Advances in Mechanical Engineering)	#14 Publications in scientific magazines (Computer Methods and Programs in Biomedicine)	#15 Other (Internal Company Newsletter)
					

Milestones 2 & 3: due, but not verifiable yet
Technical KPIs:
4 not documented properly but reported,
6 partially finished, but delayed
Dissemination: 2,7,11,15 not verifiable

General comments:
The goal of the project is to develop an affordable and mobile system for rehabilitation of upper limbs. In the last period the Experimenters have finalized development of the prototype system which will be used in the validation trials in the hospital. The robotic system offers all the expected functionalities: movement in 6 degrees of movement, force support, gravity compensation etc. The device allows the user to control 3D games in order to motivate him/her to properly execute the exercises.

The project was also supposed to develop a system for monitoring the physiological and emotional state of the patient and modify the training program accordingly. This part has been developed, but is a bit simplistic compared to the original proposal. In fact, only the pulse and the galvanic skin response are considered and a system based on the fuzzy-neural architecture is used to estimate the patient's state.

Additionally, a subsystem for estimation of the patient's joints poses has been proposed. The system uses 2 IMU units and can be periodically used to assess the progress of the rehabilitation program.

Finally, a tele-rehabilitation platform for remote access to patients' data and rehabilitation progress was to be developed. This part of the project is not completed yet and will be further developed, as only the basic information is available so far.

The experimenters are going to start test trials in a local hospital in the second half of November. The process was delayed due to the formal issues related to acquiring the

ethics board committee approval. Moreover, the device will be compared with a commercially available product made available by one of the local institutions.

To sum up, the experimenters managed to catch up with most of the delays and technical issues reported earlier. The prototype with slightly limited functionalities is available and the test trials will start soon. A slight extension of the project may be necessary to properly analyse the acquired data though.

Synthetic summary

The goal of the project is to develop an affordable and mobile system for rehabilitation of upper limbs. In the last period the Experimenters have finalized development of the prototype system which will be used in the validation trials in the hospital. The robotic system offers all the expected functionalities: movement in 6 degrees of movement, force support, gravity compensation etc. The device allows the user to control 3D games in order to motivate him/her to properly execute the exercises. A patient's state monitoring system was also developed, though it is a bit simplistic with respect to the initial claims. The tele-rehabilitation platform offering remote access to patient's rehabilitation progress and state data needs some final polishing as well. The experimenters are going to start testing trials in a local hospital in the second half of November.

Overall, the project is going well and most of the deficiencies reported earlier were resolved. There is a slight delay caused by necessity to get ethics approval, so an extension of the project may be needed.

Moderators: Yannick Morel and Laura Fiorini

tKPIs	#1 Characterization of Integrated Servo Actuator (ISA) on bench test	#2 Increased robot energy efficiency due to the integrated Servo actuators	#3 Overall weight reduction due to ISA (including less cooling, smaller pump thanks to higher efficiency)	#4 Increase in operating range (hours of operation) due to the hybrid power supply	#5 Active temperature management	#6 Leg-internal hydraulic routing	#7 PSU design
							

iKPIs	#1 Patent application	#2 Number of jobs created	#3 Number of spinoffs originating from the project	#4 Number of products originating from the project	#5 Number of companies that are starting to work with Moog to adapt ISA technology for their own products	#6 TRL increase of ISA
						

Mile-stones	#1 Concept figures of new engine powered hydraulic system	#2 Self-righting in simulation	#3 Bench test report covering operation, performance and efficiency of hyd. system	#4 Robot power-autonomy ruggedization and self-righting of robot	#5 Joystick-Controlled robot with 25kg payload moving in operational environment
					

Delivera-bles	#D1.1 Different views of CAD model of updated HyQ2Max robot with overview of plan of ruggedization	#D2.1 Different views of CAD model of the new engine-powered hydraulic system mounted inside the robot torso model.	#D3.1 Simulation video showing self-righting from different starting postures	#D2.0 Requirements of the gasoline power supply in context of the project.	#D1.2 Water and dust proofing of robot limbs
					
	#D2.2 Combustion engine-powered	#D3.2 Joystick based control of the robot with the	#D1.3 List of improvements gain in ISA. A	#D2.3 Combustion engine-powered hydraulic system prototype	#D1.4 Ruggedized and power-autonomous

	hydraulic system bench test report, efficiency analysis	new ISA. Robot speed and direction can be adjusted by the joystick.	complete list of what has been improved: weight, design, energy efficiency, strength, force etc	finished and delivered to IIT	robot demonstration during RIF Pisa visit
					
	#SB Story Board	#D4.1 Exploitation plan with market analysis	#RIF Report on RIF visit outcome	#D3.3 Final demonstration of power-autonomous robot with joystick control showing self-righting and 25kg load carrying	#MMR Multi-Media Report
					

Dissemi-nation					
	#1 Website of experiment	#2 Press release-I	#3 Press release- II	#4 Multi media report	#5 Networking w associations (Italian Civil Protection)
					
	#6 Networking w associations (Corpo Nazionale dei Vigili del Fuoco)	#7 Networking w associations (the Nuclear Institute)	#8 Attendance to trade fairs (Innorobo and Hannover Messe)	#9 Attendance to scientific conferences(ICRA 2017)	#10 Attendance to scientific conferences (IROS 2017)
					
	#11 Create posters/leaflets/roll-ups	#12 Social Media-Twitter	#13 Scientific papers (IEEE IROS or ICRA conference)		
					

Technical KPI #7: The analysis supporting design of the PSU is not as strong as it should be. They did some work, based on to numerical models (one simulating rigid body dynamics, the other the hydraulics). They used this models to evaluate the hydraulic power needs of the system, and the electric power needs upstream of that. It is not great, in particular because they cannot split things in a satisfactory way (it's an overall, system-wide feedback loop). Their results are thus not rigorous. And the overall analysis is too fuzzy and not clear enough. But they did some work, and that's

help them dimension their PSU. It's not great (or even good), but it's 'OK', in that it shouldn't lead to major system failures. Not good, but passable. Orange.

Deliverable D2.0: It is the document supporting the PSU design analysis discussed above. Orange too.

Deliverable D3.2: They have the remote control function working properly, but on a previous version of the quadruped. The functionality is there, but it will need to be integrated on the newer version of the robot. Orange.

Dissemination #2: They want to postpone this press release to a later time, at which the new robot is integrated and functional, which makes sense. The item is late though, so, orange.

Dissemination #10: They were at IROS, but I have not seen anything to really substantiate it. I'm waiting to see their paper being sent over to the ECHORD++ dissemination people, orange for now, will turn to green once it's verified.

General comments: HyQ-REAL is doing well but they won't have time to finish everything by the end of the Experiment. They underestimated the time it takes to secure a number of the robot's building blocks, including the MOOG-produced, high-tech, impressively designed and manufactured ISAs, which are only now making their way to IIT. They have a lot of work ahead of them for integration and testing. The leading man has experience doing that, I trust his judgement and respect his expertise on the topic. They will need more time however, which I brought up in the most recent monitoring call. They've now formally asked for a 4 month extension, which in quality of Technical Moderator I fully support. I had given them a hard time on PSU design, they did not fully deliver on that, but I've lost interest and it's not the major issue right now. They're better off focusing on the integration work ahead and leaving PSU design as it is. I'll keep a close look on integration and testing progress, but with the added time they should be comfortable. In addition, they have also secured national funding for a major follow-up project to their work in HyQ-REAL (not official, confidential information).

Synthetic summary: They are late on integration, due in part to delays in obtaining some of the components, in particular the MOOG ISA, which is a complicated piece of hardware with a sophisticated conception process (3D printed metal). Most components are on the way, and they are beginning the main integration task. They asked for an extension to have the time to finish integration and testing comfortably, the Technical Moderator is in favor of this request. They have secured funding for a follow-up.

INJEROBOT

Moderators: Antoni Grau and Alessandra Moschetti

tKPIs	#1 Grip operation Accuracy	#2 Correct cut	#3 Success of clipping operation and correct graft	#4 Robot arm speed	#5 Time/cycle
					
	#6 Correct positioning of grafted plants in output tray	#7 Quality control calibration	#8 Number of grafted plants/ hour	#9 Survival rate of grafted plants	#10 Stakeholders involvement
					

iKPIs	#1 System ability for grafting horticultural species	#2 Economic viability of solution	#3 Reduction of labour Cost of grafted plant	#4 Number of implementations
				

Mile-stones	#1 Starting solution	#2 All needed components acquired	#3 Prototype components developed	#4 Total integration completed	#5 System test done
		 *			

Delivera-bles	#D1 Report on the state of the art	#D2 Report on requirements and specification of the prototype components	#D3 Report of conceptual design of the system	#D4 Report on metrics defined	#D5 Plans and photos of the gripper developed	#D6 Plans and photos of the auxiliary devices (cutting, clipping and others)
						
	#D7 Software package for ROS-Ind	#D8 Tested solution in TEC facilities	#D9 Report on RIF@Bristol visit outcome	#D10 Results on growing chamber	#D11 Final report	
						

Dissemi - nation	#1 Website of experiment	#2 Press release-I	#3 Press releases-II	#4 Press releases-III	#5 Multi media report
					
	#6 Networking associations(COEXPHAL)	#7 Networking associations (Federación de agricultores Viveristas de)	#8 Networking associations (ASEHOR)	#9 Networking associations(SOCIEDAD ESPAÑOLA DE AGROINGENIERIA)	#10 Attendance to trade fairs (AUTOMATICA 2018)
					
	#11 Attendance to trade fairs (Infoagro Exhibition)	#12 Attendance to scientific conferences (IROS 2018)	#13 Attendance to scientific conferences (ROSCON 2018)	#14 Other publications (e.g. newsletter, …)	
					

Technical KPI:

- **#4:** The yellow light is linked to the delay in reaching the tKPI, since it was due on 01/08/17 and it was set as ok by the experimenters on 18/10/2017. However the experimenters kept on updating the portal with the status of the tKPI each month.
- **#5:** The yellow light is linked to the delay in reaching the tKPI, since it was due on 01/08/17 and it was set as ok by the experimenters on 18/10/2017. However the experimenters kept on updating the portal with the status of the tKPI each month.
- **#6:** The yellow light is linked to the delay in reaching the tKPI, since it was due on 01/08/17 and it was set as ok by the experimenters on 18/10/2017. However the experimenters kept on updating the portal with the status of the tKPI each month.
- **#7:** The yellow light is linked to the delay in reaching the tKPI, since it was due on 01/07/17 and it was set as ok by the experimenters on 18/10/2017. However the experimenters kept on updating the portal with the status of the tKPI each month.
- **#8:** The yellow light is linked to the delay in reaching the tKPI, since it was due on 01/08/2017. This tKPI has not been reached yet, however the experimenters have updated its status on the portal and supposed to reach it at the end of October.

Impact KPI #1: "System ability for grafting horticultural species": this iKPI is set as yellow since it has been reached only in part, even if it was due on 01/07/2017. The experimenters updated the portal communicating that the system is able to perform

the grafting on one specie, but on the other one it has not reached the minimum requirement. They are working on it.

Milestone #2 "All needed components acquired": The milestone was set as ok on 05/07/2017. It was set as green since the Experiments said that the milestones was badly placed in the original DoW, since they are still designing the final gripper and auxiliary devices (according to the Gantt chart the design phase will end in June 2017).

Dissemination:

- **#3:** The yellow light is linked to the delay in uploading material about this dissemination milestone, since it was due on 30/06/17, but the experimenters justified the delay. As a matter of fact, it has not been reached yet, but the experimenters said that they would like to make the press release linked to a workshop, to give visibility to a demo workshop with seedbed companies and farmers to show experiment results, but they are having some delays in this workshop.
- **#5:**Even if this dissemination milestone was due at the beginning of November, the experimenters have already added a link on the portal.

Syntethic summary

Injerobot is progressing well. There have been some delays in reaching technical and impact KPI, but the experimenters always justified the delays. The experimenters are almost always on time with the upload of the required documents and are responsive to the requests made by the moderators. They have been to the Bristol RIF to test their system and reported the visit in Deliverble 9. On the other side, the website is extremely poor, and we have recommended to improve it, with more information and easy to browse to get organized information (such as publication, events, research, visit to RIF, partners....).

Keraal

Moderator: Abdul Butt

tKPIs	#1 Number of exercises in rehabilitation identified as coachable by the robot for low back pain.	#2 Exercises implemented by the robot for demonstration	#3 Detection rate of wrong exercise or movements	#4 Percentage of patients needing the exercises coached by the robot
				

iKPIs	#1 Number of jobs created	#2 Potential profit per sale	#3 Time saved from doctors	#4 Interest from therapists
				
	#5 Better healthcare for patients	#6 Sales of Poppy	#7 Application to other fields	
				

Milestones	#1 "Kick--off" meeting	#2 Choice of a scenario	#3 Delivery of a anthropomorphic robot	#4 Intelligent tutoring algorithm	#5 Functional robot coach
					

Delivera-bles	#D1.1 Website	#D2.1 Report on the Specifications of Exercises, Robot Platform and the Human-Robot Interaction	#D1.2 Ethics committee approval	#D3.1 Anthropomorphic Robot Platform Adapted to Rehabilitation	#D4.1 Demonstrator of the HRI	#D5.1 Demonstrator of the ITS
						
	#D6.1 Demonstrator of a Functional Robot Coach	#D7.1 Evaluation Report	#D8.1 Business Model Report	#FR Final Report	#SB Story Board	#MMR Multi-Media Report
						

Dissemi-nation	#1 Website of experiment	#2 Press releases-I	#3 Press releases-II	#4 Press releases-III	#5 Press releases-IV
					
	#6 Press releases-V	#7 Press releases-VI	#8 Multi media report	#9 Networking w associations - Ordre des kinés	#10 Networking w associations- 3th european symposium "Silver économie & Habitat"
					
	#11 Networking w associations- Pole Images & Réseaux- Technoférence	#12 Attendance to trade fairs - INNOROBO	#13 Attendance to trade fairs- Medica 2018	#14 Attendance to scientific conferences- ACCAS 2016	#15 Attendance to scientific conferences- CogRob2016 at IEEE IROS 2016
					
	#16 Attendance to scientific conferences- ISPRM 2018	#17 Create posters/leaflets/roll-ups - for Innorobo	#18 Create posters/leaflets/roll-ups - for Medica	#19 Publications in scientific magazines- IEEE	#20 Newsletter- blog from IMT
					

Deliverables
D 1.2 Received ethical approval for clinical trials but no document provided yet
D 5.1 Delivered with self assessment which is green. Demonstration of intelligent tutoring system D 6.1 was due 1/9/2017 not delivered yet.

Milestones
Milestone No 5 about the functional robot coach was not yet delivered, which was due on 01.09.2917. There is no self assessment by experimenters.

Technical KPI
Technical KPIs No 4 “Percentage of patients needing the exercises coached by the robot” is 80% reported, there is needed to improve the overall accuracy which is in progress.
At the same time in technical KPI No 3 “Detection rate of wrong exercise or movements” 83.00% accuracy is reported with video proof, which is also needed to improve and in progress.

Impact KPI

Impact KPI no 4 about the interest of therapists Questionnaire to therapists was not delivered yet which was due on 1.9.2017.

Dissemination Milestones

Dissemination 9 about Networking association was not delivered yet which was due 1.10.2017. similarly, in Dissemination 2 about Press releases-I not delivered yet which was also due on 1.10.2017.

General Comments

D5.1, derived with technical details but D6.1 is not delivered yet and there is no justification provided about the delay. D.1.2 Experimenters claimed they got ethical approval without documentary proof. Similarly, Milestone No 5 about the functional robot coach was not delivered yet, which was due on 01.09.2917. Technical KPIs no4 reported that Percentage of patients needing the exercises coached by the robot is 80% but this percentage needs to improve, at the same time in technical KPI 3 “Detection rate of wrong exercise or movements” reported 83.00% that need to improve

Impact KPI no 4 (about the interest of therapists Questionnaire to therapists) was not delivered yet which was due on 1.9.2017. Dissemination no9 about Networking association was not delivered yet which was due 1.10.2017. Similarly in Dissemination no2 about Press releases-I is not delivered yet which was also due on 1.10.2017.

In general project is on track but the progress is slow.

Synthetic summary

The overall project is on track. Pproblem in deliverables and Dissemination milestones observed. I push experimenters to provide more technical details. The experimenters not responded yet to provide relevant information. Progress is on track according to self-assessment by Experimenters. I am in contact with them, overall, they are doing well.

Moderators: Adam Schmidt and Ana Maria Puig Pey Claveria

tKPIs	#1 Position accuracy while docking	#2 Indoor accuracy	#3 Outdoor accuracy
			

iKPIs	#1 Costs reduction	#2 Increase in productivity	#3 Further interests
			

Mile-stones	#1 Preliminary design review	#2 Pre-Integration Review	#3 Pre-trail review	#4 Post-campaign review
				

Delivera-bles	#2 (RIF) Report on RIF replaced by RTA prototype presentation report	#3 (D1.1) Use Cases	#1 (SB) Story Board	#4 (D2.1) System Specification	# 5 (D3.1) Navigation Module
					
	# 6 (D3.2) Test report for Navigation Module	# 7 (D4.1) Safety Module	# 8 (D4.2) Test report for safety module	# 9 (D6.1) Docking and Handling module	# 10 (D6.2) Test report for Docking and Handling module
					
	# 11 (D7.1) MAX Robot with all modules	# 12 (D7.2) Test report for integrated system	# 13 (D5.1) Test report for Numerical Safety validation	# 14 (D8.1) Final test campaign report	# 15 (D8.2) Dissemination plan
					
	# 16(MMR) Multi-Media Report				
					

Dissemi-nation	#1 Website of experiment	#2 Press releases- I	#3 Press releases- II	#4 Multi media report	#5 Networking w associations- I	#6 Networking w associations- II	#7 Networking w associations- III
							
	#8 Attendance to trade fairs- Automatica	#9 Attendance to scientific conferences - AUTONOMOUS SYSTEM WORLD CONFERENCE	#10 organisation of events - Journées de l'industrie at Dunkirk	#11 social media- Youtube			
							

Milestone #1: Title is misleading, milestone not about design but about use case and evaluation scenario definition. A short document was produced. It is woefully shallow and insufficient. They were told to provide additional details in the last monitoring call. Red, shifting to green if they fix it.

Milestone #2: The pre-integration review, as several other things, is delayed because of the change in the robot used (described below). Orange for now, until extension granted.

Deliverable SB: Not a storyboard, not that important though. Orange.

Deliverable D1.1 use cases: See comments about milestone #1, use case description is no good, needs a lot more detail. Red. They've been told to fix it, however still not fixed.

Deliverable D2.1 specs: Still does not contain a true functional analysis, the second document just gives rough details on the requirements for the navigation component. Still needs to be fixed.

Deliverables D3.1, D3.2, D4.1, D4.2, D6.1, D6.2: Delayed because of the change in the project scope and timeline described below. Orange for now, will switch to blue once the extension is accepted or green once uploaded.

tKPI #1 #2 #3: Also delayed because of the platform change. However, according to the monitoring call, the work seems to be progressing there.

dKPIs: some either not traceable (press release) not available (website) or overdue (II networking with associations)

General comments:

After pressuring them to provide us with some actual technical details we got a bit more information on the navigation, docking and safety systems. There are some issues with the verification of the navigation component that they proposed, but we are working together on solving them.
The experimenters unilaterally decided to change the robot used in the experiment from a laboratory prototype to a larger, serially-produced variant, which will be available later this year. Although this change may have a positive impact on the project by bringing the final solution closer to marker and delivering results better fitting the needs of the end user it has also introduced significant delays in the project. Therefore, the deliverables, technical KPIs and milestones related to the experimental verification of the solution are delayed. The Experimenters have applied for a 6 months' extension of the project to cope with the delays and present the final results within the timeframe of the project.
Despite the lack of formal reporting, initial results related to the navigation and docking components have been presented and seem to be promising in terms of achieved accuracy. The safety module for the developed AGV has also been designed. The protocol for measuring the mapping and positioning accuracy is being developed right now.
The relatively low scores of the project are caused by the delays related to changing the robot used and some issues with reporting. However, the project is generally going well and will probably finish successfully.

Synthetic summary

The goal of the project is to develop a navigation, docking and safety system for autonomous guided vehicles working in an aluminum smelter. Due to the high requirements on the precision of docking, difficult environmental conditions and necessity to work both in- and out-door most of the solutions need to be tailor-made for the application at hand.
The project is generally going well. The experimenters unilaterally decided to change the robot used in the experiment from a laboratory prototype to a larger, serially-produced variant, which will be available later this year. Although this change may have a positive impact on the project by bringing the final solution closer to marker and delivering results better fitting the needs of the end user it has also introduced significant delays in the project. Therefore, the deliverables, technical KPIs and milestones related to the experimental verification of the solution are delayed. The Experimenters have applied for a 6 months' extension of the project to cope with the delays and present the final results within the timeframe of the project.
Despite the lack of formal reporting, initial results related to the navigation and docking components have been presented and seem to be promising in terms of achieved accuracy. The safety module for the developed AGV has also been designed. The protocol for measuring the mapping and positioning accuracy is being developed right now.
The relatively low scores of the project are caused by the delays related to changing the robot used and some issues with reporting. However, the project will probably finish successfully.

Moderators: Yannick Morel, Antoni Grau and Clementina Cruceli

tKPIs	#1 Average single item sorting time (grasping, classification, separation from heap, measurement)	#2 Sorting error for compressible/rigid items.	#3 Percentage of wrongly detection of item radioactivity level.
			

iKPIs	#1 Production of a new radioactivity-proof gripper (possible product)	#2 Reduction of cost of sorting procedure	#3 Improved health, safety and quality of work of personnel	#4 Attract interest of possible stakeholders in RadioRoSo technology	#5 Commercial viability of RadioRoSo results
					

Mile-stones	#1 Demonstration of Scenario A with CloPeMa gripper	#2 Demonstration of Scenario A with RadioRoSo gripper	#3 Demonstration of the full-scale scenario B
			

Delivera-bles	#SB Story Board	#D1.1 Detailed Experiment Specification and Evaluation Methodology	#D2.1 Gripper detailed design and interface specifications	#D5.1 Phase 1 experiment report	#D5.2 Phase 2 experiment report	#MMR Experiment Multimedia Report	#D5.3 Experiment final report
							

Dissemi-Nation	#1 Website of experiment	#2 Press release-I	#3 Press release-II	#4 Multi media report	#5 Networking w associations
					
	#6 Attendance to trade fairs (Innorobo 2017)	#7 Attendance to trade fairs (Automatica 2018)	#8 Attendance to scientific conferences	#9 Organisation of events	#10 Organisation of events
					

tKPI #2: Experimenters only detect and localize a specific type of items: Springs. They could make the case that they are sorting these springs from the surrounding rubble. However, the spirit of the work proposed clearly involved the classification of different types of objects, which they are not doing at this point. Instead, they detect, localize and grasp/manipulate springs, and perform a generic object grasping procedures for the remaining rubble. It does not address this KPI, **red**.

tKPI #3: The Experimenters have performed some very limited work on detection of radioactive sources. They have laid out the groundwork to possibly pursue localization of radioactive sources. They have some measures of radioactivity levels, but they are not trying to precisely estimate this level. There are addressing something that is vaguely related to the KPI, but not clearly and decisively tackling the issue. They are also investing minimal effort. In addition, it is unclear, from the language, whether this is experimental or simulated. It is implied that it is experimental, but left vague. This is a dark **orange**.

iKPI #1: They have a gripper, that looks very much like the previous gripper (CloPeMa), it was supposed to have tactile sensor but that aspect is not clearly integrated, and it is unclear the manner in which it is supposed to be radiation-resistant. That is not good enough. **Red**.

iKPI #2: They have not produced the required analysis. **Red**.

iKPI #3: This is an **orange** that maybe should be a red. Their work is so far from practical relevance, they have no hope of substantiating this impact.

Milestones #1 & #2: They have a setup running, but there are a number of caveats. First off, they built upon their work in a previous project (CloPeMa), and efforts invested here appear minimal. Then, scope of what is shown is very limited compared to what was in the proposal. Finally, some videos would allow to get a better idea of what they are doing. **Orange**.

Deliverables: The storyboard is OK, all other deliverables are **orange**. D1.1 defines a use-case that severely limits the scope of the work done. Experimenters argue that this is to best address the problem that is of interest to the end-user. There is some merit to this argument, but it is clearly disingenuous. They are using this as an excuse to under-deliver. There is nothing stopping them from addressing the original Experiment scope, within which they would be able to easily fit this use-case. As a result, experimental reports show limited scope. This point was brought up to Experimenters before the summer, and 5 key areas in which they were lacking were identified (with respect to work reported in D5.1). In the second experiment report (D5.2), they addressed some of these 5 areas, but typically in a partial, limited manner, and in a way that makes it difficult to assess reality of the work done. Specifically, there are a few items which they affirm in the report that they addressed (experimentally), but there are no elements to support this assertion (no picture, video, figure, anything). For instance: Grasping of “previously unseen objects.”

Dissemination items #2 & #3: No press releases. **Red**.

Dissemination items #5, #9, #10: No evidence of completion. **Red**.
Dissemination item #8: They claim attendance to innorobo, unsubstantiated, but we will verify through dissemination people, the Experimenters have no reason to lie about it. **Orange** till verified.

General comments: The outlook is mixed. In the spring of 2017, it became clear that the Experimenters were using the defined use-case as an excuse to limit scope of the work performed. They were called out on it by the Technical Moderators, and a number of key areas that were lacking pointed out to them. They vowed to bring back the scope of the work performed more in line with what it was in the proposal. Results of this, looking at progress up to late October 2017, are mixed. Recent developments are presented in D5.2. By far and large, they seem to remain focused on the use-case defined by the industrial partner. Additional aspects have been included, but not in a very convincing manner. Significant areas of investigations remain absent, in particular dual-arm manipulation, classification of different objects based on vision, tactile feedback to support the grasping function, and adaptation of the hardware to operation in a radioactive environment. In addition, some aspects included are treated in a shallow, superficial manner (e.g. radioactive source localisation). For other parts of the work, it is unclear what the specific nature of the efforts expanded precisely was. In particular, they claim results on grasping of objects of unknown geometry (rubble). Those results are provided without anything substantiating the reality of the work done; no video, no picture, not much of a discussion. The general outlook is not particularly positive. The suspicion here is that 1) They largely rely on previous work, from CloPeMa, 2) They are not willing to put in significant efforts, and 3) They intended to use the limited use-case as an excuse to under-deliver. The following actions are suggested, a) In the upcoming monitoring call, asking explanations regarding the missing aspects (dual arm manipulation, classification of different objects, tactical feedback, compliance with constraints linked to radioactivity), b) Asking clarifications on the work performed, and substantiation of this work (remote demonstration of the setup through video, or offline videos, for different tasks treated), c) clarification on the scope of the work on radioactive source detection (which is very limited as of now), d) clarification on what is completely new and what directly comes from CloPeMa, e) perspectives after the project (implicit message being that the prototype developed is of very low TRL and appears to have very little direct industrial relevance, in its current state, in no small part due to a lack of consideration for constraints stemming from radioactive environments). In light of how severely they appear to be underperforming, we will remind them, if useful, that final costs are reimbursed based on perceived efforts expanded. Finally, Technical moderators should right now start actively estimating number of MMs expanded by the partners, in anticipation of this process.

Synthetic summary: The Experimenters are under-delivering, relying on previous work in another project. After the Moderating Team pointed out the problem, they said they were intent on correcting course. Judging from material delivered, that has been only very partially the case. A few, low-effort, additional aspects have been included, but the overall package still falls short of the target. Final TRL is expected to be very low, and industrial accordingly weak. A firm tone is probably necessary to try to get as much as possible from them. In addition, we should start to carefully assess efforts expanded, to have concrete elements supporting the diagnostic of under-delivery.

Moderators: Yannick Morel and Ana Maria Puig Pey Claveria

tKPIs	#1 Handling of different weights and different types of weights (E80 plant)	#2 Test experiment No. 1 executed in a Matlab Environment	#3 Test experiment no. 2 executed in a Matlab Environment	#4 Test experiment no. 3 executed in a Matlab Environment	#5 Test experiment no. 4 executed in a Matlab Environment	#6 Test experiment No.5 executed in a Matlab Environment
						
	#7 Test experiment No. 1 executed in the E80 plant with the prototype vehicle	#8 Test experiment No. 2 executed in the E80 plant with the prototype vehicle	#9 Test experiment No. 3 executed in the E80 plant with the prototype vehicle	#10 Test experiment No. 4 executed in the E80 plant with the prototype vehicle	#11 Test experiment No.5 executed in the PG plant with the prototype vehicle	#12 Extensive tests considering real operation conditions (PG plant)
						

iKPIs	#1 Number of jobs created	#2 Provision of a novel velocity controller which adapts its speed based on the curvature and on the safety areas, instead of using constant velocity	#3 Number of PhD Positions	#4 Increase in TRLs (3 to 4)	#5 Increase in TRLs (4 to 5)	#6 Increase in TRLs (5 to 6)
						

Mile-stones	#1 Project specifications	#2 The safe and optimal velocity planner is tested in a Matlab environment	#3 The safe and optimal velocity planner is ported in C and tested in the E80 environment	#4 The hardware of the experimental AGVs is ready	#5 The safe and optimal velocity planner is adapted to the planning scheme used in the E80 plants
					
	#6 Integration and debugging phase in the E80 demo plant	#7 Integration and debugging phase in the PG plant	#8 The PG plant is ready for the extensive test phase	#9 The overall system is extensively tested in the PG plant	
					

Delivera-bles	#SR Specification Report	#D4.1 Technical Report on the Matlab implementation of the planner and corresponding comparison tests	#D2.1 Technical report	#D2.2 Prototype LGVs ready at E80 and PG	#D4.2 Technical Report on the C implementation of the planner
					
	#D3.1 Multi-M11edia Report showing the first movements of the E80 prototype vehicle	#D4.3 Technical Report concerning the implementation of the planner on the E80 vehicle and corresponding comparison tests	#D3.2 Multi-Media Report showing the first tests in the E80 plant	#D4.4 Technical Report concerning the implementation of the planner on the PG vehicle and first extensive tests on the E80 vehicle	#D3.3 Multi-Media Report showing the first tests in the PG plant
					
	#D4.5 Technical Report concerning the first tests on the PG vehicle	#D3.4 Multi-Media Report some comparison tests in the PG plant	#D3.5 Technical Report concerning a set of variable load tests executed with the E80 prototype	#D4.6 Technical Report concerning a complete set of comparison tests executed on the PG vehicle	#D5.1 Experiment demonstrator ready at PG
					
	#SB Story Board	#MMR Multi-Media Report	#RIF Report on end-user tests outcomes		
					

Dissemi-nation	#1 Website of experiment	#2 Press releases -I	#3 Press release-II	#4 Press release-III	#5 Multi media report
					
	#6 Multi media report	#7 Multi media report	#8 Multi media report	#9 Networking associations (ANIPLA)	#10 Attendance to trade fairs (sps ipc drives)

					
	#11 Attendance to trade fairs (Automatica)	#12 Attendance to trade fairs (Tissue World)	#13 Attendance to trade fairs (Interpack)	#14 Attendance to trade fairs (Drinktec)	#15 Attendance to trade fairs (MIAC)
					
	#16 Attendance to scientific conferences (IROS 2017)	#17 Attendance to scientific conferences (ICRA 2018)	#18 Create posters/leaflets/roll-ups	#19 Social Media (Facebook)	#20 Scientific publications
					

Milestone #1 and Deliverable #SR: The Experimenters have not technically provided specifications. Instead, they have evaluated the level of performance of the current planning solution in both the E80 test environment and the PG plant. That level of performance will serve as a comparison to assess merit of the proposed approach. It's OK and useful overall, but not actual specifications (**orange**).

Dissemination: The Experimenters have been very active overall, and provided quite a bit of material attesting of their activity. A few spots should be clarified however, we are missing substantiating elements for items #12, 15, and 16. In addition, press release II (item #3) was actually an article in an industrial journal. It is a value, but it is not a press release. **Orange** for this four mentioned items.

General comments: SAFERUN is by now essentially done. Algorithms were developed early on in the Experiment, simulated, tested on the vehicle in the E80 testing environment (technology user, in the business of developing factories, looking to integrate the algorithm into their products), implemented and tested in the factory of one of E80's customers, PREGEL. In that sense, the software prototype has been tested in operational environment, likely achieving a TRL of 7 before the end of the Experiment. Right now, Experimenters are not actively doing anything. The path planner is integrated on a number of vehicles in the PREGEL factory, and they are simply collecting data, to support performance analysis. Performance is dependent on traffic flow, itself changing with factory operating load. They are looking to collect several months' worth of data to obtain a statistically representative result. The end user (E80) is happy with the results, therefore to that extent the Experiment is already a success. However, it remains unclear to what extent the academic partner will be able to benefit from this success. The relation with E80 is exclusive, meaning the academic partner is unable to exploit its software product with other possible interested customers. It would be interesting to try to quantify the benefit to the academic partner. In addition, quantifying improvements to E80's products (factories) is a difficult proposition, which can only be realistically pursued in simulation. Factory floor-plan is optimized to account for UGV's path planning. Changes to the path planner imply a different factory design, which is a process that takes several months.

There is not a single factory that would be a fair comparison case to evaluate improvement of proposed planner over existing ones.

Synthetic summary: Most of the technical work in the Experiment is finished, they have successfully integrated their software into the industrial partner's platform (E80) and successfully implemented and demonstrated in an end-user factory (PREGEL). All is left is data collection for post-processing. Impact of the Experiment is a bit of a question mark. The industrial partner E80 is getting a benefit from it, in the form of an improved product (although the improvement is hard to quantify). Specific impact for the end-user and academic partner are unclear.

Moderators: Alessandro Manzi and Yannick Morel

tKPIs	#1 On-board processing	#2 Usability of the system	#3 Performance in autonomous motion planning	#4 Performance in individual weed detection	#5 Ability of coordinated motion behaviour	#6 Field coverage ability	#7 Scalability	#8 Collective performance in weed detection
								

iKPIs	#1 Reduce weed control costs	#2 Definition of a business model	#3 Involvement of stakeholders	#4 Collaborations with end-users	#5 Portability to other crop/weed	#6 Fundraising
						

Mile-stones	#1 UAV prototype and low-level control	#2 UAV prototype with individual-level control	#3 UAV swarm with collective-level control	#4 Final demonstration
				

Delivera-bles	1 SB	2 D1 Methods and guidelines	3 D2 Hardware and control design	4 MMR1 UAV w/ motion planning	5 MMR2 Collision avoidance	6 MMR4 Interactive simulations
						
7 D3 Prototype	8 MMR3 Individual weed recognition	9 MMR5 overal multi-media report	10 RIF visit outcome	11 D4 Final demonstration	
						

Dissemi-nation	#1 Website of Experiment	#2 Press release-I	#3 Press release -II	#4 Multi-Media Report	#5 Networking associations (ZLTO)	#6 Networking associations (Confagricoltura)
						

	#7 Networking associations (IFOAM EU Group)	#8 Attendance to trade fairs (Maker fair)	#9 Attendance to trade fairs (TUS Expo)	#10 Attendance to trade fairs (Automatica 2018)	#11 Attendance to trade fairs (Agritechnica)	#12 Attendance to trade fairs (Precisiebeurs)
						
	#13 Attendance to trade fairs (Vision, Robotics & Mechatronics)	#14 Attendance to scientific conference s (ICRA or IROS 2018)	#15 Attendance to scientific conference s (DARS or ANTS 2018)	#16 Attendance to scientific conference s (EurAgEng)	#17 Organisation of events (IEEE TC AgRA Webinar)	#18 Organisation of events (Field Robot Event, Harper Adams University)
						
	#19 Create posters/leaflets/roll -ups	#20 Social media (Twitter account)	#21 Scientifc publications (Robotics)	#22 Scientific publications (Precision Farming)		
						

tKPIs #5 & 7: A lot of what the Experimenters are showing in terms of coordination and scalability is only substantiated by analysis and numerical simulation. Actually demonstrating coordination in practice, with a reasonable number of drones flying together (5+) would be appreciated. Similarly, scalability is inherent to the approach, but a better substantiation to that claim would be good. **Orange** for both.

Milestone #3: Difficulties with flight certification have forced the Experimenters to adjust plans, going towards a different type of drones. This has an impact on timeliness of milestones, and they are not able to demonstrate milestone #3 at this point in time. They are working towards it however. **Orange**.

Deliverables #4 & 5: Motion planning and collision avoidance are not demonstrated properly. For motion planning (#4), a video of an actual drone is provided, but there is no evidence of particular motion planning involved. For collision avoidance (#5), only simulation results are provided. Practical results are expected. **Orange** in both cases.

Deliverables #7 & 8: The aforementioned delays have pushed back delivery of these items. The final drones will be made available to implement coordination schemes in the coming month. Meanwhile, one such prototype has been used in Wageningen to collect a data set. This data set will support learning to achieve the result expected in #8. **Orange** for both of these, there are not there, but should get there eventually.

Dissemination: A number of items are not justified (#7, 13, 18), those are **red**, and event #17 is being postponed, so **orange** for now.

General comments: The Experimenters have hard early delays due to hardware development, in particular integration of sensors on-board turned problematic. Then,

after they resolved these issues, they failed to obtain the required flight certification. To circumvent this issue, they decided to fall back on a different type of drones, lighter (from 5 to 1.5Kg), which does not require certification. One such drone is integrated and being used in Wageningen to capture a data set to support vision. In parallel, work has been conducted, largely in simulation, on coordination aspects. Similarly, preliminary work was done on vision, but the real work in that respect will be performed once they have collected a sufficient data set for the application. The Experimenters have requested a four month extension, which the Moderators have approved. The added time should allow them to successfully complete the Experiment. The current plan is to finish data collection in the coming couple of weeks (by mid-November). Following that, the first batch of two functional drones will be delivered by Avular to CNR in December, to implement and test coordination of flight. Additional drones will come in early 18, followed by testing indoors, vision testing, and finally testing in the field.

Synthetic summary: the Experiment has suffered from a series of setbacks; first, integration of sensors presented problems (electronic interference), then, flight certification could not be obtained. The Experimenters moved on to the B-plan, using lighter drones. Work is proceeding but with some delays. They were granted a four-month extension to allow comfortable completion of their work. Currently, they are finishing the collection of a data set to train the computer vision component. Development of the prototype drone is essentially done. Coordination algorithms have been developed and tested in simulation. CNR will begin work on practical flight coordination on a pair of drone prototypes in December. There were significant delays, but the Experiment is moving in the right direction.

WIRES

Moderator: Adam Schmidt

tKPIs	#1 Time to complete single wiring	#2 Time to complete full task	#3 Gripper simulation	#4 Success rate in inserting wiring terminals	#5 Detection of wires
					
	#6 Time spent to execute the connection/Overall wiring time	#7 Manufacturing efficiency			
					

iKPIs	#1 Patent application	#2 Industrial collaborations	#3 Cross domain application	#4 Job creation
				

Mile-stones	#1 Task execution	#2 Sensory system validation	#3 End effector validation	#4 System integration	#5 Experimental evaluation results
					

Delive ra-bles	#D1 Application requirements report	#D2 Simulation environment	# RIF 1	#D3 Sensory system	#D4 End effector prototype
					
	#D5 Task planning and execution	#D6 Manipulation control	#D7 System integrati on	#RIF2	#SB Storyboard
					
	#MMR				

	Multimedia report				
					

Dissemi-nation	#1 Website of experiment	#2 Press release I	#3 Press release II	#4 Press release III	#5 Multimedia report
					
	#6 Networking associations (unindustria)	#7 Networking associations (capiel)	#8 Networking associations (anie)	#9 Attendance to tradefairs (Futuro remoto)	#10 Attendance to tradefairs (SPS IPC Drives Nuremberg)
					
	#11 Attendance to scientific conferences (ICRA)	#12 Attendance to scientific conferences (AIM)	#13 Attendance to scientific conferences (IROS)	#14 Create posters/leaflets	#15 Social Imedia (facebook)
					
	#16 Social media (youtube)	#17 Publication in scientific magazine (IEEE-TRO)	#18 Publication in scientific magazine (IEEE-TMECH)	#19 Publication in scientific magazine (Automatica)	#20 Publication in scientific magazine (Mechatronics)
					
	#21 Publication in scientific magazine (Sensors and actuators: A: physical)				
					

Technical KPIs: #1 and #4 delayed because of a change in schedule, #2 need correction – it just shows a simulation of the complete task,

Milestone #3 delayed due to the change in schedule

Deliverables:

RIF 1 – lack of support from the RIFs' side, the experimenters tried though

D4 – delayed

D12 – the paper won the best paper award

Dissemination:

#9 – not verifiable

#7 and #8 – waiting for a reply from the associations

#3 – not verifiable

General comments:

The goal of the project is to develop an automated system for wiring of switchgears. The work involves design of a new gripper with a tactile sensors and a vision system for precise localization of the components and wires.

So far the work has been progressing well, some additional tasks e.g. development of an external vision system for precise localization of the wire in the gripper has been performed. This system is used to augment the efficiency of the tactile system integrated with the gripper that was developed in the project. In order to successfully manipulate the wires during insertion in the sockets an extensive research on modelling the deformation of the wires has been performed.

The experimenters have also proposed a new method of generating semi-automatically data for deep-learning based training of electronic components recognition system.

There have been slight changes in the schedule of the project – in order to prepare two submissions to ICRA task 3 has been temporarily delayed while the effort focused on tasks 4 and 5. Overall it is a good project that can be expected to deliver meaningful results. Therefore, the new gripper has not been prepared yet, and the experiments are performed using sensorized version of two commercial grippers.

Synthetic summary

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