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D3.5.6 6TH SIX-MONTHLY REPORT ON EXPERIMENT PROGRESS AND ON REVIEWS

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1 Executive summary

The aim of the document is to present the collection of information about the progress of the selected Experiments from Call2 during the 6th six-monthly report. For further information on the experiments and their aims please refer to the Description of Work.





































The progress will be displayed through one table. The table consists of the following information for each experiment that summarizes the progress: technological KPIs (tKPIs); impact KPIs (iKPIs); milestones; deliverables and dissemination. The status of each section is represented by a traffic light having the colour of:

- **Green:** The progress is in line with the expectations;
- **Yellow:** The progress has some delays, and/ or the quality of the work is slightly below the expectations;
- **Red:** The progress is significantly delayed, and/or the quality of the work is below the expectations.
- **Blue:** The progress cannot be evaluated at this point, either because it is not applicable or not due yet.

For yellow and red traffic lights, justifications will be provided.

The report is based on the detailed traffic light report which can be found in the summary table provided in sec.2. Each KPI was evaluated by the following averaging system: In the considered categories, 1 point was given for every red light, 2 points for every yellow light and for every green light 3 points. Blue was not taken in consideration unless it wasn't possible to evaluate all the detailed KPIs of one section. For each KPI the points had been summed up and divided by the number of the detailed KPIs within its section, which leads to the averaging colour assigned in the table in sec.2. The threshold from red to yellow was set at 1,5 points, from yellow to green at 2,5 points.

2 Traffic-light overview

	Technical KPIs	Impact KPIs	Milestones	Deliverables	Dissemination
AAWSBE1					
CATCH					
CoCoMaps					
DUALARM WORKER					
FASTKIT					
FlexSight					
GRAPE					
HOMEREHAB					
HyQ-REAL					
INJEROBOTS					
KERAAL					
MAX-ES					
RadioRoSo					
SAFERUN					
SAGA					
WIRES					

3 Status report

AAWSBE1

Summary: Major delays continued in the second moderation period and suggestions made by the moderator were not completely adopted. In particular the exploitation documentation is still poorly written and does not provide a clear or reasonable exploitation plan. Experimenters prefer to upload and use videos on the AAWSBE1 system rather than produce written documentation. It is still difficult to understand the TRL reached by the system.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS:

- **Technical KPIs:** Old tKPIs are still pending, due in the previous periods; poorly written or insufficiently detailed to assess the work. (yellow)
- **Impact KPIs:** No realistic business plan or business model has been provided so far, nor a tentative exploitation plan. (red)
- **Deliverables:** Most of the deliverables has been provided with significant delays and were poorly written as periodically reported. (yellow)
- **Dissemination:** Although there was improvement in some of the dissemination processes (Attendance in fairs) most of the milestones in this KPI haven't been reached or are insufficiently documented. (yellow)

CATCH

Summary: The moderators have detected important delays 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 behaviour of the platform with surface irregularities and the correct detection of the fruit position). These questions came up in previous periods; however, until now no answers were provided by the Experimenters. Although interesting experimental content of the implemented platform was presented within the monitoring periodic reports #7 and #8 as well as some dissemination activities (Agritechnica Fair 2017, and a second CATCH Workshop), the experiment suffers from significant delays.

The Moderator has sent reiterated e-mails with a request of information regarding the delays, but no answer was given until now.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS:

- **Technical KPIs:** Delays in achieving the KPIs, in addition KPIs are insufficiently substantiated. (red)
- **Impact KPIs:** Delays in providing the KPIs, in addition there are not important evidences in CATCH Portal that corroborate impact KPIs. (red)
- **Milestones:** Important delays (of some months) in providing the deliverables are detected. (yellow)
- **Deliverables:** As commented before, important delays (of some months) in providing the deliverables are detected, and some deliverables are not uploaded on the CATCH Portal yet on April 10th, 2018, whereas the CATCH Experiment finished on February 28th, 2018. (yellow)
- **Dissemination:** Only two activities are reported in the periodic reports (Agritechnica Fair 2017, and a second CATCH Workshop presented in periodic report #8), but there are no evidences of any attendances at the planned or scheduled conferences (Automatica 2018, Grüne Woche 2018, and/or IROS 2018). (yellow)

CoCoMaps

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 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 diverges from the original objectives. According to the Experimenters the delays are caused by the postponed initial payment, which had a catastrophic impact on the original schedule (necessity to find a new employee, unavailability of the robot originally selected for the project, etc.). Another reason was that the team had to use different robots than initially planned, which also resulted in having different sensors to choose from. 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 a dialogue-based system. The experiments applied for a 4 months extension of the project. The request was rejected, due to the fact that the observed state of the development did not guarantee a positive outcome, even with the extension granted. The rejection of the request was confirmed by the reviewers of the ECHORD++ project during the last Review Meeting. The final review of the project is scheduled for the 3. May 2018.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Technical KPIs:** The reported state of all technical KPIs isn't sufficient', which caused a big divergence between the current state and the initial proposal. (red)
- **Impact KPIs:** Frameworks aren't available for download. (red)
- **Milestones:** As none of milestones has been achieved so far there is no reporting or data to add. (yellow)
- **Deliverables:** A number of deliverables had to be reworked due to lack of data and insufficient quality of the overall report. (yellow)
- **Dissemination:** They attended to Hannover Messer but presented a demonstrator of underwhelming quality. (red)

DUALARMWORKER

Summary: Some deliverables have been delayed and were not developed in an optimal way, but experimenters modified both quickly and provided the expected information. In general, the RRTConnect planner was used to develop the core of the motion planning. They successfully completed a test on Octomap in order to assess the best method for a fast-changing environment. New grippers are implemented too. The Dual Arm Closed Kinematics Planner v1.2 has been tested both at Tecnalia and Airbus and is equipped with a Database that successfully stores calculated trajectories. With this strategy, experimenters are able to reuse trajectories instead of having to recalculate them every time.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Deliverables:** Delays in providing D2.2 and D3.2. (yellow)

FASTKIT

Summary: FASTKIT is an ambitious Experiment with interesting results. The volume of work that was demonstrated and the quality of efforts expanded were noted and positively commented on by the external evaluator. Considering the ambition of the work (large technical scope), the end of the TRL is exceeding the

expectations. A small number of specific aspects were slightly underperforming (localization for example), but overall, they received a very positive review.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Technical KPIs:** There is not a lot to substantiate the achievements of the KPIs. Although some results have been positive, the overall outcome does not necessarily represent a major breakthrough with respect to the state of the art. (yellow)
- **Deliverables:** Some of the deliverables are lacking qualitative information and are somewhat simplistic. (yellow)

FlexSight

Summary: From a technical point of view, some issues occurred during the project, causing a deviation from the Description of Work. The experimenters requested an extension, which was granted. Interesting results at the end of the project are still obtainable, clear and evident. The work carried out by the experimenters is valuable and interesting but delayed to technical issues and the granted extension.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Impact KPIs:** The Majority of iKPIs have not been provided until now. (red)
- **Milestones:** Due to the granted extension the last milestones have not been achieved yet. (yellow)
- **Deliverables:** Several deliverables are unsatisfactory or haven't been uploaded. (yellow)
- **Dissemination:** Specific data on certain dissemination projects is non-existent or haven't been uploaded. (yellow)

GRAPE

Summary: The obtained period reports are six green lights and three red light. Reports of period 8 and period 9 are missing. The team presented the project in collaboration with a local wine producer, which is not part of the project, but which resulted in an end-user interest in the results and application of the project. The description of the developments, implementation and results achieved by the scientific and technical partners was disconnected in some parts. The evolution of the project was not clear, and many questions were needed in order to obtain a clear idea of the evolution and application of the project. The industrial partner of the project seems truly interested in the industrial development of a robotic vineyard Pheromone dispenser and the conception and the description of the business plan seems to be realistic. The onsite demonstration was large, complete and exhaustive, showing the operation of all the solutions implemented in the vineyard robot. All doubts and questions presented were answered with reasonable argumentations. In general, the onsite demonstration was satisfactory but there were some problems with the implementation time that made the demonstration fail several times.

Some issues that were detected during the demonstrations left the reviewers in doubt about the feasibility of the experiment. The major issues detected during the demonstrations were that the planned strategy to store the pheromone dispensers in the mobile robot is apparently not designed or optimized for a repetitive, unsupervised and massive industrial operation; and the inexistence of an estimation of some technical KPIs for the robotic application, such as the rate of production. As a final summary of the on-site visit, the scientific and technical evolution of the project seem to be adequate and reasonable, the demonstration was not as convincing as needed, the experimenters need to address some problems that arose during the demonstration (vibrations, cable limitation in arm rotation, loss of localization, bad HMI). The technical leadership of the project has neglected the writing of the promised and then required documentation of the project, at that moment there are still four documents that need to be uploaded in the ECHORD++ portal.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Technical KPIs:** There is a significant delay with all tKPIs. (yellow)
- **Impact KPIs:** None of the iKPIs are uploaded yet. (red)
- **Milestones:** Major delay, especially with milestone 3. (yellow)
- **Deliverables:** Deliverables were uploaded with a slight delay, the material was assessed as satisfactory. In the last month of the project, the requested deliverables were not uploaded. (yellow)
- **Dissemination:** Not uploaded or unsatisfactory. (red)

HOMEREHAB

Summary: In the last period the Experimenters have finalized the 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 project delivered the results foreseen in the proposal and successfully underwent tests in a local hospital. The consortium managed to find investors willing to support the product further.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Deliverables:** Although we see very good results with this experiment, some of the deliverables have not been satisfactory. The final evaluations are still pending. (yellow)

HyQ-REAL

Summary: HyQ-REAL has been extended, now finishing at the end of June 2018. The Design phase is well over. The current work is on finishing integration (work in progress), testing in the lab, subsystems (well underway) and overall system (starting), before testing in the field (around May for a final demo in June for the review). The progress is slow but steady. The impact of the work done in the Experiment in MOOG is starting to materialize (patents, positions created in relation to the new technology developed, ISA product, etc.).

INJEROBOTS

Summary: Despite the dedication and the work that has gone towards the project by all the partners, the outcome does not match the expected goal in the original proposal. Some crucial points are missing in the system that are indispensable to improve the final accuracy and the outcomes of the system. The project ended end of November 2017, after the on-site evaluation it was seen that some tKPI and iKPI were not reached.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Technical KPIs:** There have been significant delays with the reporting, most of the tKPIs are OK by now, whereas some haven't been reached at all. (yellow)
- **Impact KPIs:** Despite the huge delays, none of the iKPIs has been satisfactory. (red)
- **Milestones:** Major delays, but overall OK. (yellow)
- **Deliverables:** Even after the suggestion of the moderators to improve the quality of some of the documents by adding some information about the general results of the project and about some parts of the system, the experimenters did not properly implement these suggestions. (yellow)

KERAAL

Summary: The overall project seems not to be on track. Problems in deliverables and dissemination are observed since the beginning of this year. The moderator pushed the experimenters to provide more technical details. The experimenters did not yet provide the relevant information. According to a self-assessment by Experimenters, the progress is on track.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Technical KPIs:** Automatic detection of all re-educate exercises due on 1/6/2017 are not yet completed and not updated. (yellow)
- **Impact KPIs:** Interest from the therapist's questionnaire is not yet delivered. There is no justification provided by the experimenters. (red)
- **Deliverables:** There was no final report provided about the deliverables, also without any justification. (yellow)
- **Dissemination:** Milestones 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. D milestones 4, 16, 19 and 20 are not yet delivered there is no updated information regarding these deliverables on the portal. No justification provided. (yellow)

MAX-ES

Summary: 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 the market and delivering better results that are fitting the needs of the end user, it has also caused 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 requested extension was granted, and the project is following the updated schedule. Currently, the work focuses on the electric commissioning of the newly built prototype of the AGV. Full integration and field tests will follow.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Technical KPIs:** Delayed because of the platform change. According to the monitoring call, the work seems to be progressing. (yellow)
- **Milestones:** Milestones have been reached to a certain extend but the reporting has been shallow and insufficient. (yellow)
- **Deliverables:** Some delays occurred due to a change in planning. In addition, the lack of detail in the reporting is to be questioned. (yellow)
- **Dissemination:** Most of them aren't traceable, not available or significantly overdue. (yellow)

RadioRoSo

Summary: The Experimenters are under-delivering and relying on previous work from another project. After an intervention from the moderating team, there has been a mild course correction. Final results are not great,

including technological maturity, shown interest of the stakeholder and exploitation perspectives. On the whole, the volume of work appears to be commensurate with their budget, however that work was not of great quality and therefore the outcome questionable. The most useful outcome is the Gripper designed by the Genoa partner.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Technical KPIs:** Experimenters claim positive results, which cannot be confirmed or compared. (yellow)
- **Impact KPIs:** Some of the required analysis has not been produced. Overall, their work is far removed from practical use. (yellow)
- **Deliverables:** Although some of them have been satisfactory, the majority of Deliverables is substandard, as the reporting is limited. (yellow)
- **Milestones:** The scope of what is shown is limited compared to what was in the proposal. Live demonstrations at the review were not very convincing. (yellow)
- **Dissemination:** Multimedia and online presence is satisfactory, whereas interaction with the press or event attendance has not happened at all. (yellow)

SAFERUN

Summary: Although the final review still needs to happen, the Experiment runs really well. Exemplary in terms of scope and ambition for tech transfer, cascade funded, small-scale project. The technical scope was modest and focused on a specific item (velocity planner). This has allowed the partners to carry the technical development and actively integrate it into an existing product (LGVs operating at an E80's customer factory). Outcome in terms of process efficiency (improvement to the logistics tasks performed by the LGVs) has been measured in practice and compares favourably with previous analysis. Only caveat is to what extent the academic partners will be able to benefit from the results (locked into exclusive relationship with industrial partner).

SAGA

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 a B-plan, using lighter drones. The work is proceeding but with some delays. They were granted a four-month extension which allows them a comfortable completion of their work. There has been significant turnover with some of the involved partners as well as significant delays. But the Experiment is moving in the right direction, with a final review scheduled for early June.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Impact KPIs:** The system is far removed from practical relevance and is expected to be cost-intensive. (yellow)
- **Deliverables:** There have been ongoing issues with the drones and the overall concept, which caused a delay. (yellow)

WIRES

Summary: 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 on the training of the electronic components of

the 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. Overall it is a good project that can be expected to deliver meaningful results. The new gripper has not been prepared yet, and the experiments are performed using a sensorized version of two commercial grippers.

JUSTIFICATIONS FOR YELLOW OR RED LIGHTS

- **Technical KPIs:** The change in the schedule caused a delay, some data show insufficient or wrong results and need to be corrected. (yellow)
- **Dissemination:** Still waiting for response from the team as achievements are not verifiable for now. (yellow)