D4.2.2

Experiment Progress Report Including Intermediate Results

2012-12-14

Elena Garrido (ATOS), David Salama (ATOS), Diego Esteban (ATOS), Josep Escoda (CAR)

This deliverable is an intermediate progress report for EXPERIMEDIA’s driving experiment targeting technologies for high quality content production for remote sports analysis and training at live events, and executed by the Centre of high performance of Catalanian (CAR). Starting from the more abstract scenario description provided in the earlier D2.2.2, exploiting the architectural blueprint described in the D2.2.3, taking into consideration the methodological guidelines described in D2.2.1 as well as the ethical oversight principles described in D5.1.1, and of course based on the preliminary work described in D4.2.1, the document provides an overview of the work that has been done to this day, the data gathered, the conclusions drawn and the plans for the future of the experiment.
<table>
<thead>
<tr>
<th><strong>Project acronym</strong></th>
<th>EXPERIMEDIA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full title</strong></td>
<td>Experiments in live social and networked media experiences</td>
</tr>
<tr>
<td><strong>Grant agreement number</strong></td>
<td>287966</td>
</tr>
<tr>
<td><strong>Funding scheme</strong></td>
<td>Large-scale Integrating Project (IP)</td>
</tr>
<tr>
<td><strong>Work programme topic</strong></td>
<td>Objective ICT-2011.1.6 Future Internet Research and Experimentation (FIRE)</td>
</tr>
<tr>
<td><strong>Project start date</strong></td>
<td>2011-10-01</td>
</tr>
<tr>
<td><strong>Project duration</strong></td>
<td>36 months</td>
</tr>
<tr>
<td><strong>Activity 4</strong></td>
<td>Experimentation</td>
</tr>
<tr>
<td><strong>Workpackage 4.2</strong></td>
<td>EX2: content production and delivery for high quality and 3D Internet-based remote sports analysis</td>
</tr>
<tr>
<td><strong>Deliverable lead organisation</strong></td>
<td>ATOS</td>
</tr>
<tr>
<td><strong>Authors</strong></td>
<td>Elena Garrido (ATOS), David Salama (ATOS), Diego Esteban (ATOS), Josep Escoda (CAR)</td>
</tr>
<tr>
<td><strong>Reviewers</strong></td>
<td>Wolfgang Halb (JRS), Stephen C. Phillips (ITInnov)</td>
</tr>
<tr>
<td><strong>Version</strong></td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Final</td>
</tr>
<tr>
<td><strong>Dissemination level</strong></td>
<td>PU: Public</td>
</tr>
<tr>
<td><strong>Due date</strong></td>
<td>PM14 (2012-11-30)</td>
</tr>
<tr>
<td><strong>Delivery date</strong></td>
<td>2012-12-14</td>
</tr>
</tbody>
</table>
# Table of Contents

1. Executive summary ........................................................................................................ 4
2. Introduction .................................................................................................................... 5
3. Background...................................................................................................................... 6
   3.1. Goals and success evaluation criteria .................................................................. 6
   3.2. Constraints .............................................................................................................. 7
4. Experimental facility architecture .................................................................................. 9
   4.1. Definitions .............................................................................................................. 11
   4.2. Common services .................................................................................................. 11
       4.2.1. Overall services for training modules ......................................................... 11
       4.2.2. User services for training modules ............................................................. 12
       4.2.3. Usage services .............................................................................................. 12
       4.2.4. Training management and control ............................................................... 13
       4.2.5. Media services for training modules ............................................................. 13
       4.2.6. Annotation services training modules ......................................................... 14
   4.3. Sport specific modules ......................................................................................... 14
       4.3.1. Synchronized swimming module ............................................................... 14
5. Experiment execution ..................................................................................................... 17
   5.1. Before the beginning of the experiment ............................................................... 17
       5.1.1. Deploy the facility ......................................................................................... 17
       5.1.2. Familiarize ourselves .................................................................................... 20
       5.1.3. Inform staff and schedule accordingly ......................................................... 20
       5.1.4. Prepare the informed consent forms ............................................................. 20
       5.1.5. Prepare the questionnaire ............................................................................ 20
   5.2. Experiment procedure ............................................................................................ 22
       5.2.1. Preparatory phase .......................................................................................... 22
       5.2.2. Execution phase ............................................................................................ 22
       5.2.3. Data acquisition phase .................................................................................. 23
6. Data analysis .................................................................................................................. 26
7. Current status and future plans .................................................................................... 28
   7.1. Experimental facility ............................................................................................. 28
   7.2. Experimental methodology ................................................................................... 28
8. Ethics, privacy, PIA ....................................................................................................... 29
8.1. Minimum ethical principles ................................................................. 29
  8.1.1. Doing good ................................................................................ 29
  8.1.2. Doing no harm .......................................................................... 29
  8.1.3. Risk management ..................................................................... 29
  8.1.4. Consent .................................................................................... 30
  8.1.5. Confidentiality .......................................................................... 32
  8.1.6. Data protection .......................................................................... 32

8.2. Ethical oversight principles ............................................................... 32
  8.2.1. Informed consent ...................................................................... 32
  8.2.2. Deception ................................................................................ 32
  8.2.3. Data collection .......................................................................... 32
  8.2.4. Withdrawal from the investigation ............................................ 32
  8.2.5. Observational research .............................................................. 32
  8.2.6. Data protection regulation ......................................................... 33
  8.2.7. Consortium partner responsibility ............................................. 33

8.3. PIA .................................................................................................. 33

9. Risks .................................................................................................. 34

10. Conclusion ........................................................................................ 35
1. Executive summary

This document presents the progress report of CAR EXPERIMEDIA experiment. This experiment will focus on high quality content productions for remote sports analysis and training at live events.

This deliverable is public and it can be used by anyone interested in any experiment that takes place at CAR installations using EXPERIMEDIA.

The document is organised as follows:

- Section 1 is the introductory section and contains the basic information of this deliverable, as well as the private or public character of the document
- Section 2 provides a brief introduction to the document
- Section 3 shows the experiment's background indicating the goals and evaluation criteria, as well as the constraints identified to develop the experiment.
- Section 4 describes how the experimental facility architecture was implemented. It includes some important definitions, a description of the common services to be used and a description of the Sport specific modules.
- Section 5 focuses on the execution of the experiment. It covers all experiment stages: before the beginning of the experiment and during its execution.
- Section 6 presents methods and metrics used for the analysis of the data collected during the experiment.
- Section 7 shows the current status and future plans for the second stage of the experiment.
- Section 8 is related to ethics and privacy during the experiment. General ethics aspects were explained in D4.2.1; they have been now adapted to the experiment.
- Section 9 refers to the risks identified during the execution of the experiment.
- Section 10 shows the final conclusions.
2. Introduction

The focus of the CAR experiment is to implement a new procedure to improve the accuracy and execution of the performance of the Synchronized Swimming (synchro) Duo Team on a mandatory routine of the Olympic Games. This deliverable is an intermediate progress report for EXPERIMEDIA’s CAR experiment focusing on real-time, collaborative, remote coaching experience. The abstract scenario has been described in deliverable D4.2.1.

To fulfil this experiment first of all several bilateral meetings were held in CAR premises to:

- gather requirements from the synchronized swimming coaches and biomechanical staff
- see how the training of the athletes is done for a better understanding of how the experiment could be designed and implemented
- detect limitations that has to be considered in the experiment like two teams might be in the swimming pool but only one of them can be running the experiment due to the fact the swimming pool is sharing the cameras for both training teams.

Once we had the requirements, a new architecture is designed and new software has to be developed to achieve this goal. First of all, we identified that a huge effort will need to be made to deliver this system. We detected common parts that can be reused in other sport disciplines and in other synchro modalities like the teams. We decided that we should develop in such manner that the big effort could be reused for future experiments. We thought it would be interesting to split the architecture in two parts:

1) A general for all sport disciplines: we considered that general services should be created so they can be reused in other disciplines in future experiments
2) A specific part for synchronized swimming: we thought in creating user terminal application that can be used for synchronized swimming in general not just for the duo team.

In the CAR experiment we’re also aware of that we’re developing a system with non-technical persons that are making a high performance task. We have to be careful when interfering with them. The system should give added value to the current performed tasks but should not have a long learning curve that decreases their performance during several months.
3. **Background**

Objectives and background have been described in D4.2.1. Here we will summarize already described improvements detected in the synchronized swimming training process; briefly review some of the main elements, and add value to them with the learning experience during progress done in the last months.

3.1. **Goals and success evaluation criteria**

With the CAR Experiment from EXPERIMEDIA we identify different types of goals: for the coaches and staff, athletes, for CAR as institution and for EXPERIMEDIA.

The goals for the coaches and staff that are involved with the coaches would be to simplify their daily tasks. Currently they have to make a lot of tasks manually; cameras are held by assistants next to the swimming pool and are recording the routine. Immediately after a performance they review and comment it by just plugging a cable from the camera to a screen (see Figure 1). They have to rewind using the options of the camera and search the concrete moments they want to comment on.

![Figure 1: Review of the performance](image)

Other video cameras are transferred to a computer where the assistant takes screenshots of the video on every beat\(^1\) in the music. This is done to be able to get a picture of the exact position and posture of the athletes during the crucial moments. This concrete task is done by the assistant during lunch time or in the evening. It is a tedious and slow task that makes a person to be busy with something that could be automatized with the current existing technologies.

---

\(^1\) Beat: The biomechanical staff and coaches define which moments within the routine are crucial and are considered beats.
The goal for the CAR as institution is to demonstrate that the investment they’re doing in technology is being paid off. They’ve incurred a huge expense purchasing a high-quality recording system with GigE Video interface, in storage capability and in fast distribution equipment. Now they should be able to demonstrate the results are achieved by using all this technology.

A goal for EXPERIMEDIA would be evaluated through a couple of direct measures based on subjective and objective criteria.

A questionnaire will be provided to identify the level of satisfaction after the training session to each of the participants: athletes, coaches, staff and scientific support personnel. This questionnaire will include information about the quality experience of the audio management process with music and the rhythm parameters plus the video management tools provided in the experiment.

Additional information will be required regarding their feeling with the whole process and their perception of the learning process as also their interaction with their coaches and staff.

This evaluation will cover not only the experience inside the training process at the pool site but also the process out of the pool reviewing and discussing contents of the practice done.

### 3.2. Constraints

With the bilateral meetings with CAR we’ve detected some constraints to develop and test the experiment.

As commented in the introduction, in the CAR experiment we’re aware developing a system for athletes that are making are high performance task. One of the most repeated sentences by CAR is that we have to be aware that we should not interfere with the synchronized swimming team and we should not disturb them while they’re training.

Some of the tasks will be done remotely by the Atos technicians. We should run our systems in the CAR premises accordingly to the training schedule. The experiment cannot play music in the swimming pool while the team is training; therefore we’ve requested the standard synchro daily schedule to know the hours where the swimming pool is available. This schedule depicted in Table 1:

<table>
<thead>
<tr>
<th>Hours</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:30</td>
<td>Wake up</td>
</tr>
<tr>
<td>08:00 – 10:30</td>
<td>Study</td>
</tr>
<tr>
<td>10:30 – 14:00</td>
<td>Training</td>
</tr>
<tr>
<td>14:00 – 15:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>15:00 – 15:30</td>
<td>Follow up scientific support</td>
</tr>
</tbody>
</table>
This schedule has to be matched with the ones of Atos’ technicians.

This daily schedule might change when the date of a competition gets closer. CAR should inform Atos from a schedule change.

Another constraint is that some of the tests have to be done *in-situ*. The audio sound system (see Figure 2) is installed in CAR facility. It is not possible to reproduce the installation in Atos to make test locally.

<table>
<thead>
<tr>
<th>Hours</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:30 – 20:00</td>
<td>Training</td>
</tr>
<tr>
<td>20:00 – 21:00</td>
<td>Dinner</td>
</tr>
<tr>
<td>21:00 – 00:00</td>
<td>Study, Free time and homework</td>
</tr>
</tbody>
</table>

Figure 2: Audio sound system installed in a rack
4. Experimental facility architecture

As commented in the previous sections we will create a new system to improve the performance of athletes and to help coaches and assistants to do their tasks. The way athletes are training is changing with the new technologies existing in the market and nowadays it is impossible to think about an Olympic winning team that is not using technology in their training process. In CAR facility they are provided of necessary equipment required for the experiment: cameras, virtual machines, communication networks, and storage will be supported by CAR. Streaming and servers will be provided by ATOS. Within this project we want to exploit all these technology in the experiment and provide of a practical tool for coaches and all staff involved in the training of the athletes.

As it has been commented in the introduction, we thought it would be interesting to split the architecture in two parts:

1) A general for all sport disciplines: we considered that general services should be created so they can be reused in other disciplines in future experiments
2) A specific part for synchronized swimming: each sport has different requirements, vocabulary and needs.

The system has to be dynamically configurable; CAR is a living institution that changes through the time: athletes, coaches and staff come and go. The system has to be dynamic for:

- New people might be added to use the system. Each user will have at least a role assigned within the system
- New sport: In case that CAR decides to train a new sport, the system has to be adaptable and be able to add it
- New equipment: the system should be able to accept new interfaces.

The following figure depicts the modules from the CAR system:
The system will have a set of common services for the training modules. These common services can be divided into the following sub modules:

1) Overall services for training modules: We’re going to develop a system for synchronized swimming but we would like to leave the system open for future sport disciplines. This module aims to manage the disciplines and their associated hardware.

2) User services for training modules: It will contain information like all the people involved in the training process: coach’s names, athlete names, doctors, etc. It will do the validation of a user during the access to the system.

3) Usage services: statistical information will be recorded about the usage that is being done about the system. This information can be useful for CAR to see how the system is used and to show to the different sport federations the tasks they’re doing in CAR. These services will be integrated with the ECC module.

4) Training management and control: this module will give all the services like search, remove or publish to internet a training session. A lot of training processes have some functionality in common like the training starts or ends, process that must be executed once the training is finished; all this will be managed and controlled by this module.

5) Media services for training modules: this element will provide the required audiovisual services like streaming to internet, streaming to a local player, remote control over a stream, storage of a video (temporary or not). Transcoding services will be provided by this module if it required by the experiment.

6) Annotation services training modules: it will provide definition and search of annotations.
An important issue to keep in mind is that all sport modules must be able to run in parallel. A synchronized swimming session and trampoline jumping can occur at the same time.

Each sport will be implemented in a different module. Each sport uses their own terms, have different requirement, the training session is performed in a different way. For all these reasons we consider that the most feasible way to implement it is having a different module for each sport. It should only have interfaces with the common services. The sports should not have any connection between them. In EXPERIMEDIA we will concentrate our efforts in synchronized swimming, but CAR facility might want to have other disciplines in the future. CAR should be able to add or remove disciplines from the system if they need.

4.1. Definitions

Here we add some definitions to avoid confusion.

Sport or discipline: here we use the terms with the same manner. Synchronized swimming, swimming, water polo we consider then different sports even if they’re managed by the same International Sport Federation.

Training session: the minimal expression of the performance from the sport. In trampoline for example it would be just one jump. In synchronized swimming it would we the execution of the routine or just one figure.

Modality: a lot of sport can be performed in different ways, for example in swimming we have freestyle, breaststroke, backstroke and butterfly. Each of them would be a different modality. In case of synchronized swimming we have solos, duets, trios, combos, or teams.

Training pattern: depending of the sport a template can be associated to a training session before it starts. For example, in synchronized swimming they use music while they perform the routine. This music will be most of the time the same for all training session. The coaches are also interested to have the music annotated and use this information while they review the training session. All this information as what we consider the training pattern (music file and annotations).

Annotation: information that is associated to the music from synchronized swimming. This annotation will have a start time and a length (time that is valid that annotation).

4.2. Common services

4.2.1. Overall services for training modules

This module will allow adding, updating and removing disciplines from the system. Currently, we’re concentrating our effort in synchronized swimming, but, as it has previously been commented, we would like to leave it open for future disciplines.
CAR might change their equipment, or some interfaces might be implemented for existing equipment like the SCADA\textsuperscript{2}.

SIEMENS SCADA software has been implemented recently and runs the Desigo Insight version 3. Siemens Desigo Insight runs OPC\textsuperscript{3} standards to communicate with other applications as it will be required for providing environmental data as ambience temperature and humidity and water temperature.

Integration with SCADA is under study. This is not a vital process for the experiment, so, in case of this integration was excessively complex, a manual process will be implemented.

4.2.2. User services for training modules

It will contain information like all the people involved in the training process: coach’s names, athlete names, doctors, etc. This module must get as much information as possible from the existing CAR systems. For this experiment application we will need to have the information of the role of the people and the sport they’re associated.

A coach and an athlete will have a sport associated to them; they will also train for one sport like synchronized swimming. They don’t need access to data from any other sport. When they start the application they should see directly the screens from their sport.

Medicine, biomechanical they are no associated to just one sport. They work with different disciplines. They should have access to all the disciplines they have associated and when they look for information they should be able to search in all they’re associated.

For the system, we will need to know if a person is a coach, an athlete a biomechanical staff. Only coaches should be allowed to add or remove people from the training session, this should not be done by any athlete for example. Coaches are able to start a training session; it should not be done by other staff.

Super-user and administrator will be assigned to the system. The super-user will be able to perform tasks like assigning disk space for each sport.

4.2.3. Usage services

The system should be able to record the statistical data about how it is used. Once the system is running it can be interesting to see if there is an evolution from the coach and if they use the system remotely, at what time they connect, from which kind of devices they like to connect.

The output from this module can be used by CAR to identify the needs they have; they can see how the evolution of the usage of the system changes when they get closer to the sport event: World Cup, Olympic Games, National cup, etc.

\textsuperscript{2} SCADA: Acronym of Supervisory Control and Data Acquisition. This software allows computer to manage and supervise processes in a remote way.

\textsuperscript{3} OPC: OLE (Object Linking and Embedding) for Process Control. Standards specification that specifies how to control and supervise industrial processes.
4.2.4. Training management and control

This module will give the services like search, remove or publish to internet a training session. The training sessions in different disciplines have a lot of similarities: there is a start time, and end time, coaches and athletes involved, it is for a specific sport and modality, the athlete is using some special equipment (horse in equestrian, different skis in ski jumping).

The training sessions have a lot of similarities during their execution, something triggers their start, something triggers their end, some action can be performed once the session has ended, etc.

Other services that will be provided by this module are to limit the amount of training sessions recorded in different ways:

- The coach should be able to remove immediately some training sessions he is not interested in
- The system should remove automatically training sessions after two weeks if it has not been marked by the coach as not removable.
- The system can inform that the recording of training sessions is blocked: the system can inform to the coach that he has reached the amount of space available, he might let him record that day even if he passes the space available to not interfere with the training that day but block him the recording of the session for the next day. The system should be also inform the coach if he can reach his limit that day taking into account the statistics from previous training days.

This module will control the acquisition and synchronization between cameras feeds, audio and metadata, including matching exact frames from different cameras with the help of the AV services.

4.2.4.1. Sharing

Two ways of sharing will be contemplated in EXPERIMEDIA CAR experiment

- Online: This system will allow to share ‘on the fly’ data. While the training session is taking place live or when the coaches are reviewing a training session, they can put their marks to share their knowledge and to make a collaborative work.
- Offline: A coach can decide to share a training session with other staff or with an athlete. The staff might not be available at that moment. He will be able to see what has been shared with him/her when he/she enters the application.

4.2.5. Media services for training modules

With the EXPERIMEDIA we want to promote the usage of cameras and other sensors for the training sessions.

This module will provide services for multi quality and multi device input and output.

- Input; two different sources will be contemplated:
The system should be able to receive the stream from different cameras in GigaE. This module will transcode the content to have something ‘standard’ for CAR EXPERIMEDIA system. Something that can be streamed internally within CAR or externally over internet. The streams to be delivered

- Coaches or biomechanical will be able to upload their own recorded video files. This video files can be from official competitions or trainings. It has to be decided which video formats will be accepted by the system.

Output; different output will be contemplated:

- Stream: coaches and other stuff will connect from different type of devices with different bandwidth. This module will be in charge of delivering the stream.

Annotation is associated to the audio visual content. Some services will be provided by this module to tag the content and help the synchronization between annotation and the audiovisual (AV) content.

Audio content will be also prepared by this module to be used during the training session. The synchronized swimming team uses music for their training session; this must be uploaded and converted to something playable by the CAR infrastructure.

4.2.6. Annotation services training modules

Annotations will be associated everywhere. A training session will have its annotation. During the training session, automatically data might be associated. Annotation that will be generated only when the coaches working a collaborative way.

This module will provide tools to annotate in a standard way and tools to search within the annotations database.

4.3. Sport specific modules

Each sport has its own terminology and its way of working, therefore, each sport should have its own module implemented, where the user interfaces are implemented. For each sport, the review of a training session is done in a different manner.

4.3.1. Synchronized swimming module

4.3.1.1. Actions prior to training

The coaches will be the only ones able to create training patterns, start and stop the training session and ‘folders’ to classify this information. The following image depicts the concept:
Each time a training session is recorded it will be left in the same ‘folder’ as the pattern. Each time they specify a pattern they will need to specify:

- **Pattern name**: they have to select a pattern name, so the coaches are able to identify it
- **Coaches**: that will be involved in the training
- **Athletes**: that will be involved
- **Music**: to be used for the training, the coach will be able to upload a file
- **Annotation of music**: for synchronized swimming, a training session will be the training of a specific figure in the swimming pool or the training of the whole choreography. Different type of annotation can be added to the music: beat, figure…

### 4.3.1.2. **Record a training session**

When a coach executes a training session she has to select a training pattern. Before recording, the coach will be able to modify the ‘default’ athletes that where introduced in the pattern. The coaches will be able to remove one in case that one is injured or add comments to any of the athletes. He will be also able to mute the music and just have some sound depending on the beat metadata.

The coach will be able to select the portion of music to be reproduced for that session.

The coach will have a button to start the session. The EXPERIMEDIA experiment for CAR will do the following actions:

- Record some values like humidity and temperature of the swimming-pool
- Start the recording of cameras
- Record a tag as annotation when the coach presses a mouse button or a touch-screen device.
- Start playing the music.

The recording of training session will finish when the selected part of the music finishes or when the coach decides to end it.
4.3.1.3. **Post training session**

Once the training session has been recorded, the coach can forward or rewind to any position of the music using the timeline or selecting one of the music annotation predefined in the pattern or recorded during the session. The feeds from the different cameras will be shown. They will be able to mark an annotation that will be highlighted for all the connected users.

By default, a training session will be kept in the system during two weeks. The coach will be able select if he wants to keep the session longer than that. He will be able to remove the training session immediately.

The coach will be able to share in the information in the post training. Both ways of sharing described in Section 4.2.4.1 (Sharing) will be accepted by the synchronized swimming sport.

4.3.1.4. **Non-training actions**

The coach or staff should be able to upload video files in two different ways:

1) Associated to a training session: in such a case the coach or biomechanical staff will synchronize the video with and existing pattern.

2) Not associated to a training session (videos from competitions): in such a case, it will be shown in the folders structure. Staff should be able to annotate this uploaded.

Any person should be able to perform a search within the annotations. The list of training sessions that have that annotation will be shown. If the returned list has at least 2 items, the user should be able to compare both items.
5. **Experiment execution**

In this section we present the actions taken and procedures followed in order to conduct the experiment.

5.1. **Before the beginning of the experiment**

5.1.1. **Deploy the facility**

The new facility at CAR has been prepared to be ready for the EXPERIMEDIA Experiments with the WiFi infrastructure. In order to make it accessible to all users a new access procedure has been placed at the facility for the public access.

![Figure 5: Wifi Infrastructure](image)

Figure 5: Wifi Infrastructure
The audio infrastructure has been also placed in order to use the networked audio system from all the points at each of the sporting halls of the building.
Analogue audio can be entered in place through the RCA Stereo connectors and managed by the BIAMP RED1 devices locally. Also audio is available from the network through the same device.

Figure 7: Audio remote management and connection point
Due to a couple of constraints, mentioned in previous reports, delay on constructor building finalization, the Olympic Games London 2012 and the change of the coaching team of Synchronized Swimming Team for the next Olympic period, most of the planned milestones of the experiment, cannot be accomplished before the end of the year.

5.1.2. Familiarize ourselves

Familiarization process has been produced several times with meetings with the scientific Staff appointed for each sport. Also coaches have been reported regarding the future experiment.

Due to the mentioned constraints, this has not happened yet as much as we would like at this moment in time.

Process will continue going on in order to achieve a bigger knowledge of the experiments to be performed and the whole EXPERIMEDIA project

5.1.3. Inform staff and schedule accordingly

Due to the change of the team coach all agendas has been rescheduled accordingly after the new appointments at the Spanish Federation. The appointment was suddenly announced at the end of October, so the new team, which one of the members is coming from the US, will require an adaptation time. We expect availability from them by the beginning of December.

Figure 8: Meetings taken place with the coaching team

5.1.4. Prepare the informed consent forms

Consent forms are a common practice at the centre due to the scientific activity of our organization in order to protect our top athletes from this kind of practice.

Consent forms have been adapted to EXPERIMEDIA specifications. It is attached to the Ethics chapter of this report.

5.1.5. Prepare the questionnaire

Questionnaires will be prepared to collect some subjective information, to be added to the direct measures of QoS and other data parameters collected directly from the servers providing the services for the experiments.
**Questionnaire of quality experience. Synchronized Swimming Experiment.**

I, .......................................................... with ID ..............................................

As (tick the correct option from 1 to 5: Worst to Best).

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>How was your global experience with the new multimedia learning process?</td>
<td>1</td>
</tr>
<tr>
<td>How was your access to the video contents?</td>
<td>1</td>
</tr>
<tr>
<td>How was your access to the audio contents?</td>
<td>1</td>
</tr>
<tr>
<td>How was your experience with the interaction with your coach or athletes?</td>
<td>1</td>
</tr>
<tr>
<td>How was your learning experience with the new networked video process?</td>
<td>1</td>
</tr>
<tr>
<td>Would you recommend this new methodology for the future of your training process?</td>
<td>1</td>
</tr>
</tbody>
</table>

---

Figure 9: Quality check list questionnaire for coaches, athletes and staff
5.2. **Experiment procedure**

5.2.1. **Preparatory phase**

Software developed for the experiment have to be prepared in advance accordingly to the participants who has to sign consent forms specifically prepared for the EXPERIMEDIA experiment. This phase will include all administration and configuration tasks related to the experiment preparation.

![Figure 10: Captures of the software developed for the experiment](#)

5.2.2. **Execution phase**

The software deployed for the experiment will be used accordingly following the complete logic process. This phase will be followed by coaches, staff and athletes accordingly to their profile.
5.2.3. Data acquisition phase

During the experiment itself a couple of annotations take place related to the routines, either linked to the music and movement performance itself.

Data of QoS will be acquired through networked services and local questionnaires after the experiment.

Additional environmental data will be collected either manually from the displays or networked from the Siemens SCADA Desigo Insight Building management software.
Figure 13: SCADA Desigo Insight Building management Software

Figure 14: SCADA Desigo User's guide
Coach – live – env. conditions

Figure 15: Captures of the software developed for the experiment
6. **Data analysis**

Data Analysis will include different measurements obtained during the experiment and will approach evidences of progress on the use of the new technology as the personal impressions from the participants regarding the different stages covered on the experiment.

After every session of the experiment, the actors of the experiment, (trainers and athletes) will vote with a note, from 1 (not useful) to 5 (very useful), indicating if the session has been productive or not. For this purpose two proposals are being studied.

- Classical rating system; this implies the use of a classical rating system in which the actors should mark from one to five of the stars that appears.
- Babylon; It could be possible to use the Babylon system developed in Activity 2 to record the votes of the trainers and athletes involved in the experiment.

These votes will be integrated with the ECC module; and these votes will be also mixed with the AVCC module metrics.

These metrics are divided in three types:

- **AVCC Server:** In this type, the following parameters will be measured:
  - Client Count
  - I/O Bytes Total
  - I/O Bytes Rate
  - Publisher Count
  - Stream Count
  - Connection Count per Stream Type
  - I/O Bytes Total per Stream Type
  - I/O Bytes Rate per Stream Type
  - I/O Bytes Total per Stream
  - I/O Bytes Rate per Stream

- **Playback Client:** In this type, the following parameters will be measured:
  - Audio, Video and Data Bitrate ([audio, video, data], Audio, Video and Data Buffer Length (bytes and seconds)
  - A/V Data Input Bitrate
  - Playback Rate
  - Dropped Frames
  - Network capacity
  - AVCC Server RTT (SRTT)
  - Last Metadata Received

- **Publish Client:** In this type, the following parameters will be measured:
  - FPS (from camera)
- Publish/Playing time
- A/V Activity Level (0-100)
- Video Resolution
- Key Frame Interval
7. **Current status and future plans**

7.1. **Experimental facility**
Due to the delays mentioned before we are on the preparation phase of infrastructure and working in parallel to launch the experiment as soon as software and cameras are in place to start.

7.2. **Experimental methodology**
A first approach to the data analysis will provide guidelines for the methodology to be established after this experience.

A great number of new technology tools will be implemented for the first time ever on this high performance learning process, so it will require certain time for adaptation.

The beginning of the 4 year Olympic period is the best time to start this kind of experiences having a long term goal to achieve all the new knowledge required.
8. Ethics, privacy, PIA

EXPERIMEDIA will conduct research with human participants and is, in particular, interested in human behaviour and experience with Future Internet technologies to understand how to provide meaningful collective experiences to individuals and society. Given that participants in social and networked media research should have confidence in the experimenters, good research will only be possible if there is mutual respect and confidence between experimenters and participants. As some areas of human experience and behaviour may be beyond the reach of experiments, observation or other form of investigation and may raise ethical considerations, EXPERIMEDIA will provide an ethics management process that incorporates ethical and data protection review of experiments.

Appropriate management of ethical issues will be guaranteed by the project management through a mixture of measures to ensure the right technical, physical and administrative environment. The project identified an ethical issues coordinator, as well as a data protection coordinator, which will be incorporated within the overall project management structure. Additionally, an Ethics Advisory Board (EAB) and Data Protection Board (DPB) have been created. The EAB will advise the EXPERIMEDIA consortium on ethical, privacy and data protection issues. The DPB is responsible for ensuring that EXPERIMEDIA is compliant with data protection requirements and that the technical partners develop a system that considers privacy.

8.1. Minimum ethical principles

8.1.1. Doing good
The Experimedia experiment will provide an added value for the training process of top athletes. An improvement of performance is expected due to the use of new technologies that will do good for them and good for the sport. The access of new ways of information added to the training process will provide new opportunities to explore and go deeper in the learning process.

8.1.2. Doing no harm
No harm will be added to the normal procedure of training sessions due to the experiments.

8.1.3. Risk management
In order manage appropriately the risks involved in this project the following have been identified and addressed, regarding the people involved, the infrastructure, the equipment, and the experiment itself.

Due to the environment of the experiment which happens in a formal organization with 25 years of experience on preparing high performance athletes, we will address the ones that are relevant for the EXPERIMEDIA project itself and the specific differences that could impact on the final results of the unique experiment.
That includes the adaptation to new synchronized swimming team that has changed after the Olympic Games in London and will require a bigger adaptation to the standard behaviour of the centre and all their services, plus the ones who impact on the performance of the team.

As is the integration of the training process due to the incorporation of new technology that never before has been applied in that sport.

On that sense the new building which experienced big delays for the impact of the crisis in the construction sector in our country have also to be addressed.

And finally the technology itself that will be deployed in the new infrastructure, and how this implementation process will be managed accordingly to the requirements of the project and their experiments.

8.1.4. Consent
As the training season is part of the normal behaviour developed on everyday basis at the centre and the experiment is part of this process, athletes are aware of it as a standard procedure at the centre.

Consent form has been adapted for specific requirements for the EXPERIMEDIA project, which are far reduced that the ordinary routines addressed on a daily basis at the Centre.
Consent form for testing and procedures of use of personal data.

I, ……………………………………………………………………………..with ID ……………………………

As (tick the correct option):

☐ Myself
☐ Tutor responsible for minors

Give my consent for testing and procedures at the High Performance Sports Center (CAR) that are necessary for the monitoring and control of my health or physical fitness, during my whole relationship with the CAR.

**Tests and procedures for the performance training routines**

- Assessment for the adaptation effort.
- Nutritional Studies.
- Anthropometric assessment.
- Biomechanical studies.
- Psychological Monitoring.
- Advice on planning training.
- Fitness assessments.

Give my consent to the data obtained from the results of these tests and procedures to be managed at the CAR database and can be communicated to my coach, my family, to the Sport Governing Bodies, and staff when necessary for the proper control of my preparation and performance.

**Tests and procedures health care routines**

- Doctor consultancy.
- Health assessment.
- Blood tests and urine.
- Vaccinations.
- Administration of medication.
- Ultrasound.
- X-rays.
- Psychological Monitoring.
- TAC.
- Magnetic resonance imaging MRI.
- Holter.
- Broncoreactivity assessment
- Intradermal tests.
- Strenght assessment.
- Physiotherapy treatments.

Give my consent to the process data obtained from the results of these tests or routine procedures are introduced in the CAR database and can be communicated to my coach, my family and the Chief Medical Federation, where necessary control and monitoring my health or likely to affect my athletic performance.

I understand that this consent does apply in that case for the EXPERIMEDIA, EU research project.

I also understand that I can change anytime this consent proceeding to modify, revoke or deny. For this, it needs to notify in writing the CAR.

Sant Cugat del Vallès, ……… of …………………………………….. of 20 ……..

Signature or of the Tutor (minors).

The CAR database of Catalonia is registered with the Data Protection Agency (DPA). The information you provide will be used for the CAR and procedures are available to exercise the right to access, modify and / or cancellation in the High Performance Sports Center, located at Avenida Alcalde Barnils, 3-5, Sant Cugat del Vallès, 08174, by sending a signed written request to that effect, including your phone number, address, name and surname. (Law 15/1999 of 13 December on the Protection of Personal Data)

Figure 16: Consent form
8.1.5. **Confidentiality**
During the experiment only the required data is gathered, this data will only be made available to the individuals that are needed to process that data and no part of this data will be disclosed to any third parties.

8.1.6. **Data protection**
Data protection procedure will follow standards defined by the Catalan Agency of data protection as is made with all other data managed at the centre until today. Following Spanish and Catalan regulations under the (Law 15/1999 of 13 December on the Protection of Personal Data)

8.2. **Ethical oversight principles**
D5.1.1 has also produced a more detailed set of ethical principles, more customized to the specifics of EXPERIMEDIA and the embedded experiments. These have also been considered and adopted in the design of the experiment, as seen in the following.

8.2.1. **Informed consent**
All participants are informed of the research objectives and all aspects of the research that might reasonably be expected to influence willingness to participate. We explain all other aspects of the research about which the participants may enquire. This is done in the preparatory phase of the experiment, before participants are asked to join the experiment, so their decision constitutes informed consent.

Based on the standard procedure of training sessions athletes assume the experiment as part their training and consent have been provided by writing form at the beginning of the season.

8.2.2. **Deception**
We will never intentionally deceive, mislead or withhold information from participants over the purpose and general nature of the investigation.

8.2.3. **Data collection**
Data collection will include recordings and some physiological data as is on a standard training process at CAR.

8.2.4. **Withdrawal from the investigation**
We will make it plain to participants that they have the right to withdraw from the research at any time.

8.2.5. **Observational research**
At the centre all services are provided to the teams with the purpose of continuous improvement of the procedures, in our case with the Synchronized Swimming experience there will be no differences.

So in order of warranty an appropriate follow up of this process development, our Sport Psychology staff follows a major part of all the training sessions in order to help coaches and
athletes to identify best practices and a better benefit for their personal development and learning experiences.

Observational research is an intrinsically part of the training process at CAR and will be benefit of it for the success of the project and all the experiments performed during the duration of the EXPERIMEDIA Project.

8.2.6. Data protection regulation
The CAR database of Catalonia is registered with the Data Protection Agency in Catalonia (DPA).

And follows Spanish and Catalan regulations under the (Law 15/1999 of 13 December on the Protection of Personal Data)

8.2.7. Consortium partner responsibility
All EXPERIMEDIA partners are invited to participate in the ethical review of our plans. As the experiment design progressed partners will be updated about our planning.

In the same way, EXPERIMEDIA partners are also invited to monitor the experiment either for the sake of acquiring a better of the operation of the technical components they have provided or simply for their information. Any concern that they may have at that time will be considered and treated accordingly

8.3. PIA
As was shown in D4.2.1, no further PIA is required. Nevertheless, written consent is acquired. Josep Escoda will act as the data controller for the experiment. Since no other personal data is recorded, the data controller’s duty is limited to keeping safe the forms of informed consent and deleting them at the end of the predefined period.
9. Risks

Risks have been approached as the difficulties identified to accomplish the goals within the project.

Hereby we will refer to a couple of them and which measures has taken accordingly.

<table>
<thead>
<tr>
<th>ID Description</th>
<th>Probability</th>
<th>Impact</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff Federation Changes</td>
<td>Low</td>
<td>High</td>
<td>Wait for new Federation appointments</td>
</tr>
<tr>
<td>Building construction delays</td>
<td>High</td>
<td>High</td>
<td>Persecuting engineering staff</td>
</tr>
<tr>
<td>Camera Suppliers delays</td>
<td>Low</td>
<td>High</td>
<td>Persecuting administrative procedures</td>
</tr>
</tbody>
</table>
10. Conclusion

This document presents the progress report of the CAR EXPERIMEDIA experiment. During this first stage of the preparation and execution of the experiments goals and evaluation criteria have been identified.

CAR infrastructure has been adapted by the creation of a new system to improve the performance of athletes and to help coaches and assistants to do their tasks to the experiment. Furthermore, several procedures and actions have been carried out in order to prepare CAR installations for the experiment.

A plan for analyse all data gathered during the experiments has been designed. This plan includes the measurements and metrics to be taken into account for evaluating the results of the experiment. This plan will also provide guidelines for the methodology to be established after this experience.

Due to the timing of our experiment additional work had to be carried out from our part in order to address issues not yet addressed by our technical partners. Meetings will follow to approach all kind of requirements from the facility managements to the technology integration and the new procedures to be implemented by the team at work.

Ethics and privacy have been considered, and constraints have been addressed due to the adaptation of the normal behaviour that the centre usually manages all this data under the strong regulations of personal data management in our country.

Risks will be monitored and handled throughout the design, implementation and execution of the experiment.

While this deliverable was being elaborated, CAR was in the preparation phase of infrastructure. The experiment will be launched as soon as software and cameras are in place to start. Now we are at the beginning of the 4 year Olympic period. It is important to remark that this is the best time to start with the experiments because we have a long term to achieve all the new knowledge required.