

**Acronym:** ExerG

**Project title: ExerG:** An innovative digital solution to individually improve physical and cognitive functions using an exergame (video game-based) training in an ecologically valid and safe setting for the geriatric population

**Call:** AAL Call 2020 (aal-2020-7-48-CP)

**Start date:** 01 May 2021

**Duration:** 30 months

## D1.6 Interim Management Report

Nature<sup>1</sup>: R

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Partners involved (coordinator in bold): **Sphery**, RHF, ZHdK, VAScAge, RZM, HCIGG

Author(s): Alexandra Schättin & Yanick Riederer (Sphery)

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<sup>1</sup> L = Legal agreement, O = Other, P = Plan, PR = Prototype, R = Report, U = User scenario

<sup>2</sup> PU = Public, PP = Restricted to other programme participants (including the Commission Services), RE = Restricted to a group specified by the consortium (including the Commission Services), CO = Confidential, only for members of the consortium (including the Commission Services)

## Partner list

Nr.	Partner name	Short name	Org. type	Country
1	Sphery AG	Sphery	SME	Switzerland
2	Reha Rheinfelden	RHF	End-user	Switzerland
3	Zurich University of the Arts	ZHdK	University	Switzerland
4	HCI Games Group, University of Waterloo	HCIGG	University	Canada
5	VASCage GmbH	VASCage	Research	Austria
6	Reha Zentrum Münster	RZM	End-user	Austria

## Document history

Rev.	Date	Partner	Description	Name
1	01.06.22	Sphery	Created the document	Alexandra Schättin
2	13.06.22	Sphery	Writing chapter 1, 2, 3	Alexandra Schättin
3	15.06.22	Sphery	Writing chapter 3	Alexandra Schättin
4	20.06.22	Sphery	Writing chapter 4	Alexandra Schättin
5	07.07.22	Sphery	Review	Yanick Riederer

6	13.07.22	<b>Approved by Sphery</b>		
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# 1. Introduction

This document is a delivery of work package 1 (project and quality management) including the tasks 1.1, 1.2 and 1.3. The lead partner of this work package and these tasks is Sphery AG (Sphery). This document is an interim management report of the ExerGetic project based on the deliverable D1.2 (Project management). Since D1.2 was a description about the planned steps, D1.6 includes a shortened version of D1.2 combined with updated information and actual data/numbers (if available).

## 1.1. The partnership

ExerGetic is funded under the AAL Call for proposals in 2020, aiming to develop an innovative digital solution that individually improves physical and cognitive functions using an exergame (video game-based) training in an ecologically valid and safe setting for the geriatric population. The ExerGetic consortium consists of 6 partners:

**Table 1 - Exergetic project partner list**

Nr.	Partner name	Short name	Org. type	Country
1	Sphery AG	Sphery	SME	Switzerland
2	Reha Rheinfelden	RHF	End-user	Switzerland
3	Zurich University of the Arts	ZHdK	University	Switzerland
4	HCI Games Group, University of Waterloo	HCIGG	University	Canada
5	VASCage GmbH	VASCage	Research	Austria
6	Reha Zentrum Münster	RZM	End-user	Austria

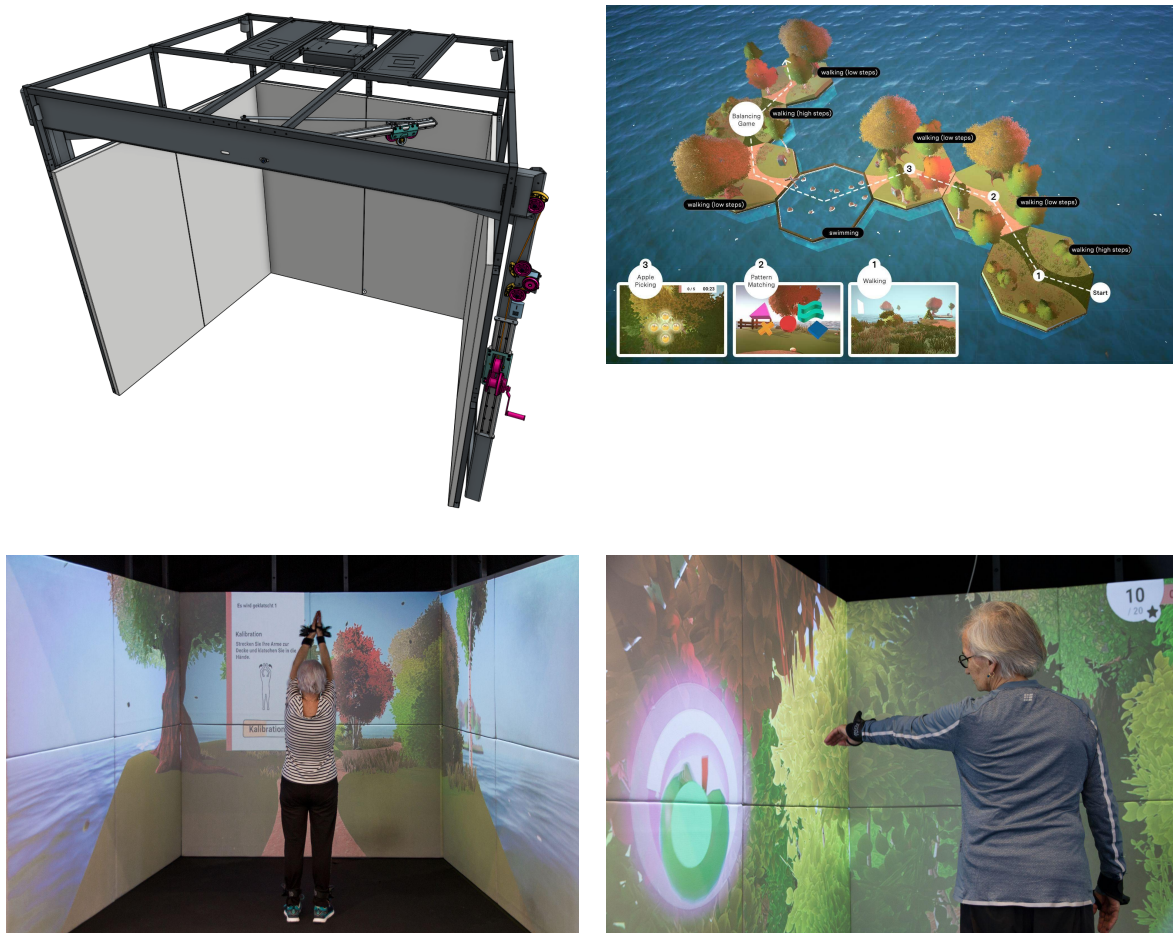
## 1.2. Project goals

The main goal of the ExerGetic project is to develop a user-centred exergame (video game-based) training to individually train physical and cognitive functions in the geriatric population. The project orients on this four unique selling propositions:

- **Personalised (end-user-centred) requirements**
- **Safe training setting**
- **Ecologically valid and meaningful training setting**
- **Cloud solution**

In summary, ExerGetic has three operational objectives: (1) Integrate an innovative digital solution allowing individually adaptable physical and cognitive exercises that have an impact on end users' quality of life, (2) Develop a solution that meets the needs of our target group by integrating them into the project process, (3) Shape the solution to become part of an interesting business case for distribution in European countries.

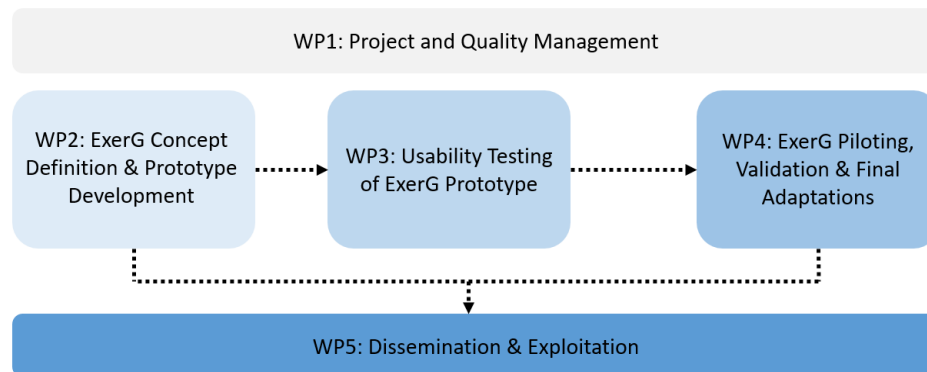
At this time, a first soft- and hardware prototype was developed in an interdisciplinary and user-centred design process (Figure 1). The prototype is now tested in a usability testing procedure.



**Figure 1** Prototype of the hardware (top left) and software/video game (top right, bottom left and right) that is used for the usability studies. The hardware extension includes a harness system allowing a secure training environment for the older adults. The video game is based on an octagon system where different activities (e.g. walking) are lined up one after the other to train important physical and cognitive functions.

## 2. Project management structure

The project is organised as shown in figure 2. For proper management and advice, the project includes a steering committee, advisory boards and work package (task) leaders (detailed in section 2.1).



**Figure 2 ExerGetic project structure.**

### 2.1 Staff involved

Members of the consortium play specific roles to assist project activities and project management. There are partners who assume specific roles and, within these, a specific person may be assigned the leadership in that role. Changes of the constellation within the committees are marked.

- Project Coordinator (Sphery) – Project Manager: Alexandra Schättin & Yanick Riederer
- Dissemination and exploitation Coordinator (Sphery) – Dissemination Manager: Alexandra Schättin & Yanick Riederer
- Steering Committee: Chaired by the Project Manager and consisting of one representative per partner.
- Ethics Committee – Helps to ensure the project's full adherence to ethical values.
- End-users advisory board – Advocates for users' points of view and interests.
- Scientific advisory board – Provides feedback and recommendations regarding scientific aspects during the conduct of the studies

#### 2.1.2. Steering Committee

- Chaired by Sphery – Alexandra Schättin & Yanick Riederer
- ZHdK – Anna Martin-Niedecken & Sonja Boeckler
- RHF – Corina Schuster-Amft & Frank Behrendt
- VASCage – ~~Tina Henneken~~ Marcia Happig
- RZM – Barbara Seebacher
- HCIGG – Lennart Nacke & ~~Katja Rogers~~

## 2.1.2. Ethical Committee

- Sphery – Alexandra Schättin & Yanick Riederer
- ZHdK – Anna Martin-Niedecken & Sonja Boeckler
- RHF – Corina Schuster-Amft & Frank Behrendt
- VASCage – ~~Tina Henneken~~ Marcia Happig
- RZM – Barbara Seebacher
- HCIGG – Lennart Nacke & ~~Katja Rogers~~

## 2.1.1. End-users advisory board

- RHF – Corina Schuster-Amft & Frank Behrendt
- VASCage – ~~Tina Henneken~~ Marcia Happig
- RZM – Barbara Seebacher
- HCIGG – Lennart Nacke & ~~Katja Rogers~~

## 2.1.1. Scientific advisory board

- RHF – Corina Schuster-Amft & Frank Behrendt
- VASCage – ~~Tina Henneken~~ Marcia Happig
- RZM – Barbara Seebacher
- HCIGG – Lennart Nacke & ~~Katja Rogers~~
- ZHdK – Anna Martin-Niedecken & Sonja Boeckler

## 2.1.3. Work Package leaders

- WP1: Project and quality management – Alexandra Schättin & Yanick Riederer (Sphery)
- WP2: ExerG concept definition and prototype development – Anna Martin-Niedecken & Sonja Boeckler (ZHdK)
- WP3: Usability Testing of the ExerG Prototype – ~~Tina Henneken~~ Marcia Happig (VASCage)
- WP4: ExerG Piloting and Validation – Corina Schuster-Amft & Frank Behrendt (RHF)
- WP5: Dissemination and Exploitation – Alexandra Schättin & Yanick Riederer (Sphery)



## 2.2. Project conflict resolution

Project conflicts shall be resolved at the lowest operational level possible in order to facilitate timely solutions. The consortium was able to solve the few conflicts that have arisen so far in the project (Table 1).

**Table 1. List of occurred conflicts and risks.**

Risk/Conflict	Content	Status
Categorisation of the usability study by the responsible ethic committee	Study description and content was chosen avoiding the categorisation of a medical device allowing us to go forward with the usability study	Solved

## 3. Project monitoring

### 3.1 Project meetings

In order to secure a proper coordination among partners and timely delivery of results, the following project meetings shall take place in the course of the project:

#### **Consortium meetings:**

- Period: May '21 - December '21: The meeting was performed every second week on Wednesday from 4-5pm summing up to 15 meetings. These regular meetings allowed the consortium to get familiarised with each other and the process.
- Period: January '22 - July '22: The consortium decided to do the meeting once a month and to do written updates in-between summing up to 6 meetings and 6 written updates for this period.

#### **Bilateral meetings:**

- Several bilateral meetings were performed within the period of May '21 and July '22 allowing to coordinate the different tasks of each WP.

#### **Steering Committee meetings:**

- Two steering committee meetings were performed for the period May '21 to October '21 and November '21 to April '22.
- The Project Coordinator presented and provided a report on the project performance.
- Each WP leader prepared a presentation and provided a report on the work package status and progress.
- Each partner presented their dissemination activities.

## 3.2 Project performance monitoring

For each Steering Committee meeting, the Project Coordinator provided the key performance indicators (Table 2)

**Table 2. Key Performance Indicators.**

Period	Partner involved	Delivery of deliverables and reports	Quality of reports delivered	Milestones achievement	Use of the resources	Effective risk management
May '21 - Oct '21	84,6% (11 out of 13 meetings, reasons: vacation and conference)	85,7% (6 out of 7, reason: needed more time to set the consortium agreement, 1 month delay)	No report for this period	11,11% (1 out of 9 milestones)	No deviations	-
Nov '21 - Apr '22	100% (8 out of 8 meetings)	83,3% (5 out of 6, reason: delay due to longer ethic committee processing time, 3.5 months delay)	100% passed quality check, no resubmission	33,33% (3 out of 9 milestones)	No deviations	2 risks  Categorisation of the usability study (solved → see table 1)  Longer processing time of the pilot trial study (early start of preparing the application documents)

## 3.3 Risk management

The role of risk management activities in the project is to identify risks timely, assess their consequences (occurrence, impact on cost, results, time, most affected WPs and partners, among others), and develop suitable responses based on corrective courses of action or contingency plans. Risk tracking is thus made through the different meetings in order to minimise their impact to the widest extent possible. The status of each risk is described in table 3.

**Table 3. Project risk assessment**

Description	Impact	Prob.	Remedial actions	Status in the project (✓ = positive status, no risk so far)
<b>End-user risks</b>				
<b>Primary end-users</b>				
Psychological risks	Comparison with other older people may cause a deficit awareness (e. g., regarding the	Low	Focus groups will take part in an open and inviting setting. Use of open questions where primary end-users will be directly	✓

	cognitive status, motor function status, communication problems, technological knowledge and experience)		addressed and encouraged to participate in discussions. Use of an interview guide approved by ethics committees and primary end-users (test interviews, also approved by ethics committees)	
Technology-related psychological risks (WP 2-4)	Older people may have a lack of technological knowledge and understanding, potentially leading to feelings of inadequacy, fear and rejection of the ExerG.	Low	Mock-up illustrations, videos, photographs, verbal and written descriptions and explanations and guidance by a therapist will be used to foster end-users' technological understanding related to the ExerG.	✓
Physical risks	Fear of falling, fall risk, mental or physical fatigue	Low	Harness system will be used to reduce fear of falling and prevent participants from falling. An experienced therapist will be present at all times to enhance participants' self-efficacy regarding falling and for additional safeguarding. Training with a gradual increase in difficulty will be used. Periods of rest will be allowed whenever necessary.	✓
<b>Secondary end-users</b>				
Psychological risk	Therapists' different levels of work experience Mental distress regarding one's inability to safe-guard patients in the ExerG prototype	Low	Structured training plans, mock-up illustrations, videos, photographs, verbal and written descriptions and explanations and training sessions for the therapist team will be used to provide a similar level of understanding for all therapists and thus reduce psychological risks.	✓
Technology-related psychological risks	Therapists may have a lack of technological knowledge and understanding, potentially leading to feelings of inadequacy and rejection of the ExerG.	Low	Mock-up illustrations, videos, photographs, verbal and written descriptions and explanations and training sessions for the therapist team will be used to foster end-users' technological understanding related to the ExerG.	✓

<b>Tertiary end-users</b>				
Technology-related psychological risks	Therapists may have a lack of technological knowledge and understanding, potentially leading to feelings of inadequacy and rejection of the ExerG.	Very low	Mock-up illustrations, videos, photographs, verbal and written descriptions and explanations will be used to foster end-users' technological understanding related to the ExerG.	✓
Terminology-related psychological risks	Use of medical, technological or scientific terminology may cause feelings of uncertainty and rejection of the ExerG.	Low	Use of an appropriate language depending on the end-user interviewed may reduce this sort of risk.	✓
<b>Technological risks</b>				
Implementation of solution functionalities	Problems in implementing the solution in the different locations	Low	Usability testing will be performed in WP 3. Related parameters as functionalities, configurations, service availability etc. will be taken into account.	✓
Study location characteristics	Technological problems due to inadequate study locations	Medium	Partners will check their study facilities to counteract the occurrence of any possible problems. This process will happen in WP 1 & 2, so that the facilities are ready for the upcoming studies.	✓
User expectations	The system does not fulfil end-user expectations and needs	Low	Involving end-users from the very beginning of the project will be key to get important feedback about expectations and needs. End-user feedback will be covered and implemented by WP 2,3 & 4.	✓
<b>Study risks</b>				
Environmental settings	Environmental needs may change from study to study	Medium	Partners will check the environmental needs of their study location as characteristics, materials and equipment in the WP 3 & 4.	✓
Results evaluation	Assessments to measure user satisfaction & study outcomes are not suitable	Low	This situation will be avoided by using suitable existing models and research for evaluation of user satisfaction and defining study outcomes.	✓

Management risks				
Project management	Discrepancies between original project plan and reality	Low	Project coordinator will check the project state via periodical internal meetings, progress reports, and internal communication. If needed, corrective measures will be applied to assure the success and timely delivery of the work according to the WPs.	Due to corona restrictions and a longer processing time for ethics issues (due to clarification of medical device categorisation), the start of the focus groups or usability study was postponed, respectively. However, the impact was minimal as the time schedule can nevertheless be adhered to.
Project consortium	Discrepancies between partners or about the assigned work	Low	Work assignments will be decided in internal meetings. If any discrepancy between two or more partners exists, these will be discussed in internal meetings, and the final decision belongs to the project coordinator.	✓
Partners withdraw	Withdrawal of one or more partners	Low	Partner will be replaced by one with similar skills or the role is taken over by another partner.	✓
COVID	Adjustments of the project due to COVID	Medium	The project partners are aware of the current situation and will make any necessary adjustments to carry out the project successfully. The advantage of this project will be that the ExerG will allow safe training (e.g. sterile cleaning, spatially separated if needed etc.).	Due to corona restrictions the start of the focus groups was postponed in Canada. However, the impact was minimal as the time schedule can nevertheless be adhered to.
Standardisation risks				
Adoption difficulties and incompatibility issues	Integration of/Interpenetration of new standards or techniques may be difficult	Low	Partners will inform the project consortium by considering relevant forums and standardisation bodies.	✓
Cost risks				
Costs for real users deployments	The cost of solution deployment can reveal itself to be too high for the market users	Medium	Consortium will try to solve this by providing different solutions at different costs (which may include different versions). Rent and economic capabilities amongst different users can be an important point. Analysing the socio-economic scenarios will provide a clear answer.	on going

Quantification of investment costs for launch and solution maintenance	Price difference amongst countries due to different legislations and other factors	Low	The consortium comprises the required specialists to perform these tasks. Within the project, an intermediate and final business plan will be elaboration (WP5).	on going
<b>Market risks</b>				
Market key aspects evaluation	Lack of good positioning in the market	Low	Analyse all the relevant characteristics related to the potential market, and the position of the solution will be defined accordingly. Previsions on market size and other aspects like competitor studies will be performed. Target market and best marketing strategies will be defined. As a flexible solution, market potential seems to be good, so this risk will be minimised (WP5).	on going
Market key customers and their expectations	Wrong selection, insufficient number or low acceptance of end-users	Low	Users and technical partners will be chosen according to their position in the market. Different end-user profiles to which the solution could be interesting will be taken into account (WP2).	✓
Business model definition for each end-user typology	Identify only a small or limited group of suitable subjects to use the system	Low	Business cases will be elaborated together with the public as well as private organisations to ensure suitable cases for each one of them (WP5).	✓
Final business plan implementation including accounting and payment procedures	Different conjunctures among countries	Low	A business plan will be developed that considers all the received feedback from the validations assuring its suitability for each country, and this is why it will be prepared towards the end of the project (WP5).	on going
Financing requirements for solution launching	Wrong estimations	Low	Evolution of the whole project will give the consortium partners enough perspectives to foresee a proper deployment plan for the European market.	on going

### 3.4 Target group involvement

For the project to be successful and the ExerG solution to be accepted by the end-users, users' needs and requirements are taken into account from project onset and the project strives to achieve the latest recommendations on user involvement for designing, developing and testing the solution across several iterations. The project takes advantage of its special conditions, i.e., having three partners, in three different countries, who closely work with the end-users. This provides a unique opportunity to design and develop a solution that truly meets end-users' needs and expectations. The project parts are summarised in table 4 (definitely included and planned ahead for end-user involvement).

Target groups for this project are: (1) older adults (geriatric population defined by the presence of a geriatric-typical multi-morbidity and an older age - predominantly 65 years or older) as primary end-users, (2) health care services/institutions, e.g., rehabilitation centres, geriatric institutions/organisations, physiotherapists, and general practitioners, as secondary end-users and (3) health insurers or public sector service organisers as tertiary end-users.

**Table 4. Activities involving end-users.**

Project part	Switzerland	Austria	Canada	Total
<b>Focus groups</b> Collecting the requirements, need and opinions	10 primary 8 secondary 2 tertiary end-users	10 primary 8 secondary 2 tertiary end-users	10 primary 8 secondary 2 tertiary end-users	<b>30 primary</b> <b>24 secondary</b> <b>6 tertiary</b> <b>end-users</b>
	12 primary 8 secondary 4 tertiary	12 primary 10 secondary 5 tertiary	13 primary	<b>37 primary</b> <b>18 secondary</b> <b>9 tertiary</b> <b>end-users</b>
<b>Usability study</b> Assessing the usability of the first prototype	12 primary 15 secondary end-users	12 primary 15 secondary end-users	12 primary end-users	<b>36 primary</b> <b>30 secondary</b> <b>end-users</b>
<b>ongoing till summer 2022</b>	15 primary 12 secondary	5 primary 12 secondary	(not started yet)	<b>20 primary</b> <b>24 secondary</b> <b>end-users</b>
<b>Pilot randomised controlled trial</b> Assessing the feasibility, attractivity, and preliminary effectivity of the final prototype	12 primary end-users	12 primary end-users	-	<b>24 primary</b> <b>end-users</b>
<b>start in autumn 2022</b>				

## 4. Documentation

The documentation could be maintained during the period from May '21 to July '22 as described in D1.2. We don't expect to have any adaptations for the upcoming project period.

### 4.1. Periodic progress report

In table 5, the performed periodic reports (Steering committee meetings) are listed. All mandatory documents were prepared and presented by the responsible partners.

**Table 5. Overview periodic progress report.**

Nr.	Date	Period	WP report		Dissemination activities	
1	02.11.21	May'21-Oct'21	WP 1, 2, 5	✓	All partners	✓
2	04.05.22	Nov'21-Apr'22	WP 1, 2, 3, 5	✓	All partners	✓

### 4.2. National reports

National reports were individually done by each project partner for the project period. Information was provided if needed.

### 4.3 Annual central reports

In table 6, the submitted annual report is listed.

**Table 6. Overview annual central reports.**

Nr.	Date	Deliverables	Scientific/technical progress	Dissemination activities	Human resources
1	Feb '21	✓	✓	✓	✓

### 4.4. Mid-term review

The mid-term review will take place on 21.09.22 from 10am to 2pm in the rehabilitation clinic in Rheinfelden. Before the meeting, the partners will provide the required documents as described in D1.2 and as reported by AAL.