



NEWSLETTER

VR for Rehabilitation



WELCOME TO OUR QUARTERLY NEWSLETTER

PRIME-VR2 at VRDays Europe

The 'VR Interactive Technologies for Rehabilitation event' for consortium members and stakeholders is planned to take place in Amsterdam Wed, 4 Nov 2020, 09:00 – Fri, 6 Nov 2020, 17:00 CET. The Consortium has decided to take the opportunity to join an important conference and exhibition, VRDays Europe, which is organized timely and in the same place. The PRIME-VR2 consortium is holding discussions with VR Days organisers how best to participate in the event due to the situation created by COVID-19.

VR Days is a 3-day conference and exhibition on Virtual, Augmented and Mixed Reality content, creativity and innovation. Expect a compelling range of keynotes, expert sessions, workshops and seminars with 140+ expert speakers from the worlds of health, tech, business and the arts. In previous years speakers included CEO of High Fidelity Philip Rosedale, Albert 'Skip' Rizzo, of USC, Miriam Reiner from the Israeli Institute of Technology Technion, The Guardian's Francesca Panneta, Samantha Gorman from TenderClaws and many many more.

pg.2

Design Workshop

Read about our initial concept review session

pg.3

Games environment

Read about an historical snapshot and the future of VR games in rehabilitation.

pg.4

Commercialization Workshop

Learn about the importance of commercialising results of EY research projects.

pg.5-7

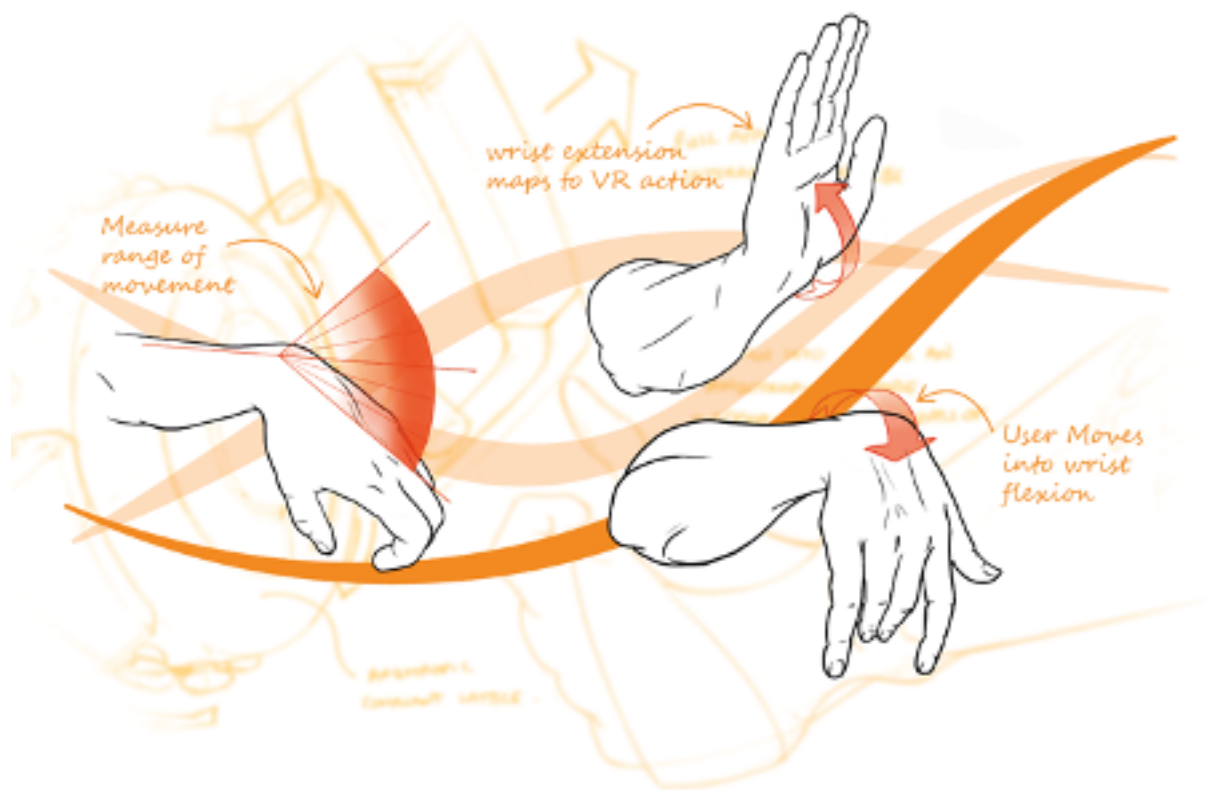
Spotlight on partners

Meet 3 academic partners of the PRIME-VR2 team: University of Strathclyde, Malta and Oulu.

pg.6

Contact details

ONLINE **CONCEPT** REVIEW SESSION



This month saw an initial concept review session taking place to bring together all the project partners and stakeholders to feedback on proposals for the VR controller hardware under development. This was a great chance to bring the full range of expertise of the consortium together in one forum with an extended and rich discussion of the opportunities and challenges we face in delivering the PRIME-VR2 hardware. Whilst the discussion was primarily focussed on the physical nature of the VR controller hardware, the meeting allowed for all stakeholders to consider the implications of these design concepts more broadly.

The wide ranging discussions covered the software design and data management platform, the development of interactions and their mapping between the digital and physical realms and above all how to maximise the therapeutic value that the users and collaborating clinicians will be able to realise through the VR-HABIT platform. This was an ideal forum to discuss the interplay between the digital and the physical, to what extent the PRIME-VR2 solution is embodied and tangible and how this gathers the right data for further analysis and visualisation in software.

Next steps agreed were moving to quick physical sketch models to evaluate the interaction styles discussed, both within the project team and with a small set of end users.

A HISTORICAL SNAPSHOT OF WAYS TO USE TECHNOLOGY FOR EXERCISES AND REHABILITATION

As digital games approach greater degrees of fidelity and complexity so does their potential to be used outside of pure entertainment. In little more than a decade we have seen digital games evolve with consumer devices such as the Nintendo Wii and the Microsoft Kinect. The trend brought forward by these living room consoles was that of utilizing motion sensing as an input to the game: interaction now required the use of the full body motion as opposed to button presses. The potential for rehabilitation using digital games was obvious and we have seen several successful projects using this technology.

With VR steadily gaining a foothold in the mainstream market, we are seeing the technology rapidly evolving and bringing new possibilities to digital games. We have seen several digital games such as Full Spectrum Warrior (PTSD) and Beat Saber (Tetraplegia) to name two, being used for therapy with varying degrees of success. The biggest advantage of VR over the last generation is arguably the immersion factor.



THE FUTURE OF VR GAMES IN REHABILITATION

So far, we have seen existing VR games adapting input to a standard off the shelf VR controllers, which may be inadequate for selective rehabilitation types as well as limiting the range of actions that can be performed inside the digital game. We believe that with this novel approach to a tailored controller design, PRIME-VR2 can enable the patients to interact with VR environments that simply was not possible before with conventional input devices.



The implication of finer and richer control over the environment means we now have the tools that can be used to explore deeper possibilities of how VR games can be played. In return, this not only drives the fun factor, which is essential in engaging the patient, but also in aiding physical rehabilitation of the patient. Furthermore, we can extend this beyond the VR space via the VRHAB-IT where we not only reward players in the game to keep them engaged playing but additionally, monitoring is being done across their movements, progress and other metrics which can be reviewed by a specialist remotely.

Patients strive to get back to lost abilities after a sports injury or a stroke. The three living labs provided us with invaluable feedback on the daily tasks patients struggle to achieve. The development team along with the researchers at PRIME-VR2 are working on innovative ways to build games and environments which enable the transfer of knowledge from a game in a virtual environment to the real world.

Commercialization Workshop



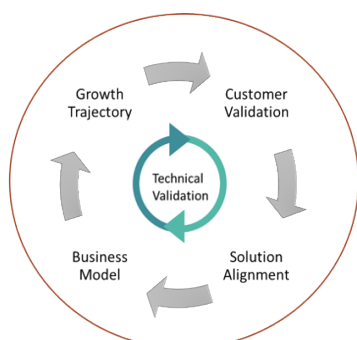
The importance of commercialising results of EU research projects

Horizon 2020 is the biggest ever EU Research and Innovation programme, with nearly €80 billion of funding available and is aimed at securing Europe's global competitiveness driving economic growth and creating jobs. H2020 aims to deliver scientific breakthroughs and innovation by taking great ideas from the lab to the market¹. Our goal in PRIME-VR2 is to create a body of work that provides a realistic roadmap for the commercialisation of outputs from the research project that are customer oriented, validated and supported by commercially motivated consortium partners.

¹ What is H2020 <https://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020>

Delivering a product that will meet patients' needs

To ensure that PRIME-VR2 develops products which have the greatest potential for commercial success, we are engaging with our project partners to find out more about their specific patient needs. The commercialisation leader, Inlecom, is working with St James Hospital (Malta), the Nicomed Rehabilitation Center (Cyprus) and the Evelina Children's Healthcare center, in Guy's and St Thomas hospital partnered with the Global Disability Innovation Hub (UK) to ensure that we understand the complex and varying needs of patient rehabilitation and develop a product that will have a big impact on the delivery of rehabilitation services in Europe.



The lean start-up methodology

PRIME-VR2 will be adopting a lean start up methodology to drive the commercialisation strategy and provide answers to questions such as

- "What problem is commercially most important to solve?";
- "Who will be the early adopters of a PRIME-VR2 product?";
- "What is the best win/win approach to delivering a solution?";
- "What will future commercial "reality" look like?";

Working with the PRIME-VR2 partners, Inlecom will run a number of workshops to answer these questions and start to focus on what a commercially successful PRIME-VR2 product could look like! Our first commercialization workshop was held on the 29th April 2020.

The PRIME-VR2 commercialization strategy

As we build the PRIME-VR2 commercialisation strategy, the project partners will be working through four key phases on the roadmap to delivering a commercialisation and business plan for the PRIME-VR2 products.

Until September 2020, PRIME-VR2 will be working on the first phase of the strategy which is Customer Validation, where the project will refine customers wants and needs with a series of use-case and business validation focused workshops.

Commercialisation Methodology





MEET THE TEAM: UNIVERSITY OF STRATHCLYDE

The University of Strathclyde is located in Glasgow, Scotland. Founded in 1796 as the Andersonian Institute, it received its royal charter in 1964 as the first technological university in the United Kingdom. It was recently named UK University of the Year in the Times Higher Education Awards for the 2nd time.

The participating centres at the University of Strathclyde are the Department of Design, Manufacture and Engineering Management (DMEM) and the Advanced Forming Research Centre (AFRC). DMEM is one of the UK's leading centres for Industrial Engineering and home to over 150 academic, teaching, research, knowledge exchange and technical staff.

The Advanced Forming Research Centre (AFRC) is a collaborative venture between the University of Strathclyde, Scottish Enterprise, the UK Government and leading multinational engineering firms. The £80 million facility has a world-leading reputation for forming and forging research. The centre uses its production scale facilities to take new R&D up the TRL scale and accelerate its industrial exploitation.

The PRIME-VR2 team at Strathclyde is led by Andrew Wodehouse (Senior Lecturer), and includes Lewis Urquhart (Research Assistant), Kareema Hilton (Manufacturing Engineer), Stephen Fitzpatrick (Machining and AM Team Lead) and Danny McMahon (Manufacturing Team Lead). Andrew's recent research has been concerned with optimising technology for users through the adoption of a human-centred approach. Two recent examples illustrate this approach and have informed Strathclyde's contribution to PRIME-VR2. Firstly, a range of trumpet bells, developed in conjunction with the AFRC, using advanced forming methods that allow new geometries bespoke for the user. And secondly a collaborative project with L1D (another PRIME-VR2 partner) that resulted in a VR design review environment with enhanced usability.



Andrew Wodehouse

Dr. Andrew Wodehouse is a Senior Lecturer in the Department of Design, Manufacturing and Engineering Management at the University of Strathclyde.



Lewis Urquhart

Lewis Urquhart is a Research Assistant in the Department of Design, Manufacturing and Engineering Management at the University of Strathclyde.



Kareema Hilton

Kareema Hilton is a Manufacturing Engineer in the Machining and Additive Manufacturing Team at the Advanced Forming Research Centre (AFRC) at the University of Strathclyde.



MEET THE TEAM: UNIVERSITY OF MALTA

University of Malta (UM) is the sole public and highest teaching institution in Malta. The UM has a 400-year history and consists of 14 Faculties 12 Centres and 3 Schools, that perform research in various fields. UM has been successfully participating and coordinating national and EU research-based projects. In the last years, the Department of Industrial and Manufacturing Engineering within the Faculty of Engineering, has developed therapeutic and safety-related solutions to improve both children and adult's lives. Examples include, Olly Speaks, a speech and language therapeutic device for preschoolers, and Ride&Safe, a novel VR-based simulator for designing customised and safer motorcycles based on bikers' characteristics.

UM's role in PRIME-VR2 concerns mainly the assembly and testing of the controllers, while also supporting other partners with dissemination and coordination activities. Based on the international regulatory and safety standards, UM will define the controller specifications and apply the DfMA methodology for the assembly plan. UM will also define a testing plan and build testing jigs by which the VR device's performance will be evaluated.



Philip Farrugia

Prof Ing. Philip Farrugia is Associate Professor at the Department of Industrial and Manufacturing Engineering of the UOM.



Pierre Vella

Dr Ing. Pierre Vella is a Senior Lecturer within the Faculty of Engineering and Heads the Department of Industrial and Manufacturing Engineering of the UOM.



Glenn Cassar

Dr Ing. Glenn Cassar is a Senior Lecturer within the Faculty of Engineering and Heads the Department of Metallurgy and Materials Engineering.



Maria Victoria Gauci

Dr Maria Victoria Gauci is a Lecturer within the Faculty of Social Wellbeing at the Department of Disability Studies.



Emanuel Balzan

Ing. Emanuel Balzan is Researcher Support Officer at the Department of Industrial and Manufacturing Engineering.



Edward Abela

Mr Edward Abela is Researcher Support Officer at the Department of Industrial and Manufacturing Engineering.



MEET THE TEAM: UNIVERSITY OF OULU

The University of Oulu in Finland, with approximately 16,000 students and 3,000 employees, is an international, multidisciplinary research university, with a rich pool of creative and intellectual talent. The strengths of the University include multidisciplinary research interests, modern research and study environments, and broad international cooperation. Center for Ubiquitous Computing (UBICOMP, <http://ubicomp oulu.fi>) in the Faculty of Information Technology and Electrical Engineering (ITEE) is the largest cluster of HCI and ubicomp researchers in Finland and one of the largest in Europe. UBICOMP conducts multidisciplinary research on next generation interactive systems and its results are regularly published in leading journals and conferences in the field. Design Research (DR) and Perception Engineering (PE) groups of UBICOMP are contributing to PRIME-VR2 project. DR group explores the foundations of human ideation and creative performance using techniques and technology, as well as human technology-mediated interaction with the artifacts and environment. Ultimate research goal is to empower different human abilities through advanced technological and techno-social paradigms. The DR group employs methods from the fields of design science, digital fabrication, design thinking, digital prototyping, design computing and cognition, knowledge science, applied computing, embedded systems, NLP and others. PE research focuses on fundamental issues in virtual reality and robotics. We consider virtual reality broadly as a category that leverages the latest technologies and products in virtual reality (VR), augmented reality (AR), mixed reality (MR), and telepresence. We consider core robotics problems such as sensing, sensor fusion, planning, learning, and control.



Georgi V. Georgiev

Dr. Georgiev is an Associate Professor leading the Design Research group at the Center for Ubiquitous Computing (UBICOMP), University of Oulu, Finland.



Steven M. LaValle

Steven M. LaValle is Professor of Computer Science and Engineering, in Particular Robotics and Virtual Reality, at the University of Oulu, Finland.



Vijayakumar Nanjappan

Vijayakumar Nanjappan is a postdoctoral researcher at the Center of Ubiquitous Computing of the University of Oulu.



Yazan Barhoush

Yazan Barhoush is currently employed as a doctoral student in the Center for Ubiquitous Computing at the Faculty of Information Technology and Electrical Engineering at the University of Oulu.

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PRIME-VR2

Personalised recovery
through a multi-user
environment
VR for Rehabilitation

NEXT ISSUE: SEPTEMBER '20

In our next issue we will talk about how we have carried on working and researching through the COVID-19 pandemic. We will introduce 3 members of the consortium from our Living Labs who are working with research participants with a range of conditions. We will give you an update on our plans for our Amsterdam workshop in November.

NEXT EVENTS

PRIME-VR2 has continued to work through the COVID-19 pandemic, adapting our methods to online communications, working with our research participants and partners across Europe. Our project will be reviewed by the European Commission in mid-June, where we will present our accomplishments to our project officer from the Horizon 2020 programme.

November '20: The PRIME-VR2 team will be meeting again in the beginning of November where we will be organising an event in Amsterdam, focusing on Virtual Reality for Rehabilitation. This event, which will take place between the 4th and 6th of November, is composed of a number of workshops and whether you are new to Virtual Reality or already familiar to the technologies, these workshops will get the participants motivated to live and experience the latest innovations in field of VR for Health/Rehabilitation. The event will be taking place during the popular annual event VRDays. Make sure to check our website, prime-vr2.eu, where more information will be available soon. We hope to see you there!

CHECK THE WEBSITE REGULARLY FOR MORE NEWS, DOWNLOADABLE CONTENT AND INFORMATION!

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PRIME-VR2 is on the [Virtual Reality Helix](#)



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