TACTILITY

Tactile feedback enriched interaction through virtual reality and beyond

WP8 – Dissemination, exploitation & communication

D8.6 Reports on stakeholder workshops and demonstrator presentations 3

REVISION HISTORY

Modification Description	Author	Date
Document template creation and initial content	E. Hernández (TEC)	03/06/2022
Addition of information regarding the workshop	A. Garzo (TEC)	13/06/2022
Final review	T. Keller (TEC)	21/06/2022

ACRONYMS

IMM: IMMERSION
MR: Mixed Reality
TEC: FUNDACION TECNALIA RESEARCH & INNOVATION
TECSR: TECNALIA SERBIA DOO BEOGRAD
VR: Virtual Reality
XR: Extended Reality

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EXECUTIVE SUMMARY

Background	Aim
During 2022 the work on the TACTILITY system has been progressing with new hardware components and new software implementations. This has allowed improving constantly the TACTILITY demonstrators with the goal to show and demonstrate system's capabilities to stakeholders and the VR community.	This document describes the event held during the last months to demonstrate TACTILITY system and obtain feedback from stakeholders.

Approach
A specific workshop with the stakeholders' board members has been organized to get their feedback about the system development and the workshop has been extended to external stakeholders to learn and test the TACTILITY system.

Findings and results
The TACTILITY system has been shown to stakeholders, in general with positive feedback and raising interest on the system. The feedback from the members of the stakeholders' board has been focused in opening the system to the community and rely on the brain's capability to interpret perceptions which are not fully realistic.

Impact	Planned dissemination and/or exploitation
This event organized by the consortium helped the dissemination and demonstration activities to be done in WP8.	Dissemination level of this deliverable 8.6 is public.

1   INTRODUCTION

In February 2021 a webinar was organized where the members of TACTILITY stakeholders' board were invited. Because of the restrictions caused by the COVID19 pandemic, this event was completely remote and even if the presentations done showed well the work done in the project. None of the attendees could had the chance to test the capabilities of the TACTILITY technology to better understand potential applications. Despite that limitation, some interesting topics arose during the discussion that were useful for the development of the system.

This activity has been continued during 2022, specifically organizing a presential event with the members of the stakeholder's advisory board.

2   WORKSHOP WITH STAKEHOLDERS

As mentioned before, as a continuation of the activity with stakeholders, in May 2022 a specific presential workshop with the members of the stakeholders' board has been organized in San Sebastian (Spain) at TECNALIA's facilities. The main goal of the workshop was to get useful insights of the experts giving them this time to possibility to test different demonstrators of the system. While this event was organized, it was also proposed to have a second day to open the workshop to other external stakeholders that could know about TACTILITY and test the demonstrators. And additionally, in order to be able to bring more audience to the event, it was decided to organize the workshop along with other two projects were TECNALIA is taking part (DIH-Hero, grant No. 825003 and REHYB, grant No. 871767).

Finally, the 17th of May was organized an open event with sessions in parallel focused on virtual reality and health care robotics. The agenda (see below) included several talks about the TACTILITY technology and also presentations from stakeholders with their current developments where they were asked to talk about potential future applications of TACTILITY technology. On the afternoon some discussion panels were held, and the demonstrations of the system happened. The private workshop with the experts took place on the next day, 18th of May, that was taken the opportunity to have a plenary consortium meeting.

The different demonstrators of the TACTILITY system shown in this event were related to the three main use cases of the project (automotive, health and teleoperation) with an additional demonstrator related to a set of different kind of effects included in a VR scene. More information of these demonstrators will be provided in deliverable D7.3 "Prototype description and test results report for Gamma demonstrators".

Healthcare robotics sessions	Virtual reality sessions
08:45 Welcome and registration	
09:00 Introduction *Dr. Michael Obach (Tecnalia)*	**09:00 Introduction** *Dr. Thierry Keller (Tecnalia)*
09:15 The role of (interoperability) standards in innovation and overcoming barriers in robotics for SMEs and users - some examples from laboratory science and automation *Dr. Patrick Courtney (Advisory Board Member, SiLA Consortium)*	**09:15 Electrotactile stimulation: principle, advantages, elements** *Dr. Matija Strbac (Tecnalia Serbia)* **09:45 Tactile communication: perception and feedback coding** *Dr. Strahinja Dosen (Aalborg University)*
10:15 Bridging the gap between market and research using standards and benchmarking tools *Dr. Diego Torricelli (Bioengineering Group of CSIC)*	**10:15 Virtual reality** *Dr. Ferran Argelaguet (Inria)* **10:45 Teleoperation** *Dr. Maurizio Valle (Genova University)*
11:15 Coffee break	
11:45 Software Design for Spinal Robotic Assistant *Dr. Davide Scorza (Project Manager from Cybersurgery)*	**11:45** *Iñaki Aramburu (Oroi Tech, Co-CEO and Co-founder)*
12:05	**12:05** *Unai Extremo (VirtualWare Group, Founder and CEO)*
12:25 Basque DIH. Opportunities for SMEs. *Carmen Pastor (Coordinator of Health Node at BDIH)*	**12:25** *Paulo Sérgio Machado Veloso Gomes / António Manuel Sousa Correia (Instituto Politécnico do Porto)*
12:45 Lunch	
14:00 Discussion panel on standards and best practices *Moderated by Dr. Ainara Garzo (Tecnalia)*	**14:00 Discussion panel on virtual reality** *Moderated by Dr. Thierry Keller (Tecnalia)*
14:30 Conclusions *Moderated by Dr. Thierry Keller*	
14:45 Coffee break	
15:15 Networking / TACTILITY System demonstration / TECNALIA's laboratory visit and demonstrations	

Figure 1 – Agenda for the workshop with stakeholders

Figure 2 – Presentations of the TACTILITY technology (top) and demos of the automotive and health use cases (bottom right and left respectively)

A total of 45 people of 24 different institutions (industrial, clinical, universities…) were registered to the event. Most of them attended presentially, but there were people from 4 different countries that also attended remotely. All the presentations done during the event can be accessed offline through TECNALIA's YouTube channel or directly through the following links:

- Introduction, by Dr. Thierry Keller.
- Electrotactile stimulation: principle, advantages, elements, by Dr. Matija Strbac.
- Tactile communication: perception and feedback coding, by Dr. Strahinja Dosen.
- Virtual reality, by Dr. Ferran Argelaguet.
- Teleoperation, by Dr. Maurizio Valle.
- VirtualWare, by Unai Extremo (CEO).
- Virtual reality in elderly care therapies, by Jorge Maylin & Iñaki Arámburu (co-CEOs).
- Virtual Reality use in Mental Health, by Dr. Antonio Manuel Sousa Correia.
- Discussion panel on virtual reality, by Dr. Thierry Keller.
- Conclusions, by Dr. Thierry Keller.

The main conclusions to be mentioned after the talks and discussions of the first day, were:

- VR market in still mainly for professionals, so price is not necessarily an issue but added value needs to be clear. It might be worth working on the added value than thinking on a killer app.
- Usability is key, and on this sense times of calibration and donning/doffing have been identified as weaknesses.
- When coming into barriers, price was not considered as one whenever the added value is enough. The only barrier identified was that as for several other systems a learning curve will be necessary before squeezing the capabilities of the technology.

The experts from Oroi and Virtualware were able to test the TACTILITY demonstrators with detail and have more specific discussions about the system during the private meeting of the second day. The main two conclusions given by the experts during that session were:

- As it is being difficult to identify already a *killer app* for this technology, they proposed to make the technology openly accessible to the VR community and let the community find many new applications for the technology. Although not all the knowledge will be openly shared, this is very well aligned with the goals of the ORDMP, where the middleware/API to control the stimulator is intended to be openly shared.
- It is very well appreciated the efforts of the consortium in recreating with electrotactile stimulation a realistic perception of objects and textures, but experts also remind that VR relies many times on twisting user's perceptions, so it could be enough to provide different sensations that users learn to interpret as a given object, texture or indication.

3   CONCLUSIONS

A first event to show and let the members of the stakeholder's board test TACTILITY demonstrators was organized in May in San Sebastian. A previous open event was also organized the day before to disseminate and show to the community the same demonstrators. Even if the system's need to be more robust yet, very good feedback related to the technology was obtained during this event focusing mainly in two relevant aspects: making the technology open to the community and avoiding a too big effort in replicating exactly a sensation through electrotactile stimulation but letting the user learn new feedbacks for those sensations.