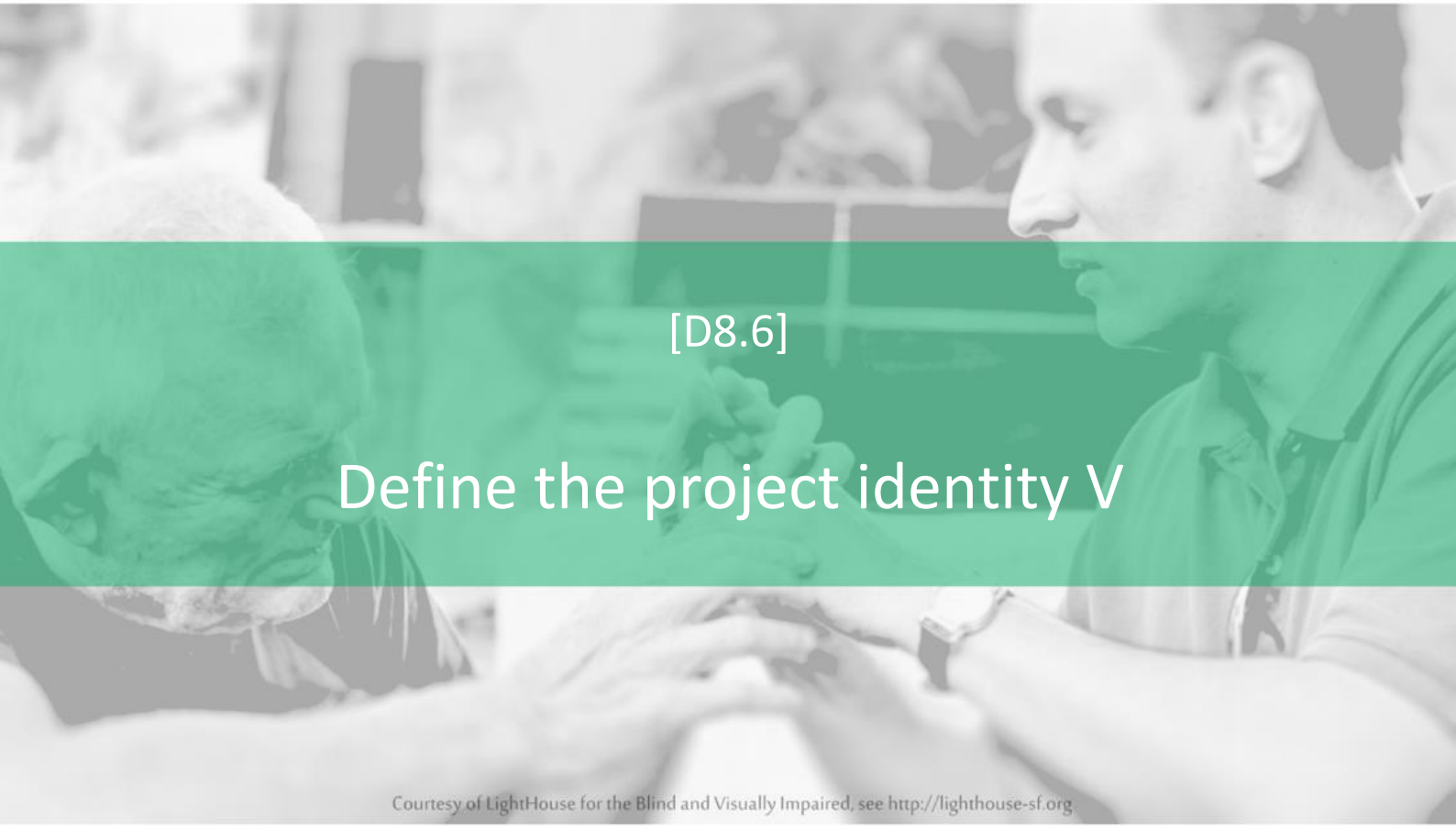
SUITCEYES

1 Jan 2018 - 31 Dec 2020

Smart, User-friendly, Interactive, Tactual, Cognition-Enhancer, that Yields Extended Sensosphere
Appropriating sensor technologies, machine learning, gamification and smart haptic interfaces



[D8.6]

Define the project identity V

Courtesy of LightHouse for the Blind and Visually Impaired, see http://lighthouse-sf.org

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 780814.

Dissemination level		
PU	PUBLIC, fully open, e.g. web	X
CO	CONFIDENTIAL, restricted under conditions set out in Model Grant Agreement	
CI	CLASSIFIED, information as referred to in Commission Decision 2001/844/EC.	

Deliverable Type		
R	Document, report (excluding the periodic and final reports)	
DEM	Demonstrator, pilot, prototype, plan designs	
DEC	Websites, patents filing, press & media actions, videos, etc.	X
OTHER	Software, technical diagram, etc.	

Deliverable Details	
Deliverable number	D8.6
Part of WP	8
Lead organisation	LDQR
Lead member	Mauricio Fuentes

Revision History			
V#	**Date**	**Description / Reason of change**	**Author / Org.**
v0.1	2019-03-04	Structure proposal	Mauricio Fuentes/LDQR
v0.2	2019-03-23	First draft for internal review	Mauricio Fuentes/LDQR
v0.3	2019-03-25	Second draft addressing review comments submitted to HB	Mauricio Fuentes/LDQR
v0.4	2019-03-27	Final draft after PC's comments	Mauricio Fuentes/LDQR
v1.0	2019-03-29	Final draft submitted to the EU	Thomas Bebis/HB

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HB	Review	Thomas Bebis

Glossary	
Abbr./ Acronym	**Meaning**
SUITCEYES	Smart, User-friendly, Interactive, Tactual, Cognition-Enhancer, that Yields Extended Sensosphere Appropriating sensor technologies, machine learning, gamification and smart haptic interfaces
LDQR	Les Doigts Qui Rêvent
HARPO	Harpo Sp. z o. o.
HB	Högskolan i Borås / University of Borås
HSO	Hochschule Offenburg / Offenburg University of Applied Sciences
HIPI	Haptic Intelligent Personal Interface
Dx.y	Deliverable number y from work package x
GA	Grant Agreement
GDPR	General Data Protection Regulation

Table of contents

1. Executive Summary

The set of deliverables titled *Define the project identity (I to VI),* report on dissemination activities and updates of the visual identity package, which contains different materials destined to create projects awareness and dissemination of the project's results.

After a short introductory section, this report presents recent dissemination material concerning new publicity material and newsletter, which aim to further extend our project identity to our different target audiences. Considering the needs and preferences of some of our audiences, these materials were checked for accessibility and usability: providing sufficient contrast, using symbols and pictures to improve the comprehension of contents, and adjusting the texts for non-technical people and those with possible cognitive problems. Lastly, the updated version of the *Visual Identity Package* is shared.

This deliverable is closely related to prior deliverable *Define the project identity* versions (D8.2 - D8.5) and the *Detailed dissemination plan* (D8.9), where dissemination methods were discussed according to the specific target audiences. This deliverable also addresses the project reviewers' recommendations related to developing targeted messages and materials to each stakeholder accordingly to their characteristics and needs in terms of communication.

2. Introduction

Aiming to keep the project's templates and publicity materials updated, in the Grant Agreement (GA) a series of deliverables titled *Define the project identity (I to VI)* is to be presented every 6 months. In previous versions of this deliverable *(Define the project identity I – IV),* different aspects of the project identity were presented: the project logo (visual and tactile version), document templates, catch phrases, publicity materials, Braille versions of project documents, guidelines concerning the use of the project's visual identity and the accessibility features for dissemination of project information.

This deliverable, D8.6 *Define the project identity V*, aims to report on new publicity materials (a leaflet available in different formats and a poster) which disseminate project progress and results adapted to two different target audiences:

- Potential users of our Haptic Intelligent Personal Interface (HIPI), and
- The academic and industry audiences.

This deliverable also reports on other dissemination efforts such as the latest newsletter and an update on the visual identity package available to all project partners.

3. New publicity materials

3.1 Target audiences of these materials

Following the project reviewer's mid-project recommendations and having built at this stage of the project a community of different stakeholders, we have prepared new publicity materials centred on the needs of our audiences to communicate project progress. As introduced here, we recently centred our efforts in reaching potential HIPI users, and the academic community and industry sector.

In the context of the project's user-centred approach, different user-involvement activities have been developed with persons with deafblindness and leading institutions in the field. These include the people with deafblindness interviewed at the beginning of the project (81 interviews in 5 countries); the members of our Project Advisory Board which groups people with deafblindness and experts from different European institutions (complete list available at: https://suitceyes.eu/partners/project-boards/#PAB); and other potential users and organisations (European and national) that we have encountered throughout our dissemination activities. For example, our affiliated organisations (https://suitceyes.eu/affiliated-organizations/) and about 50 organisations reported in our stakeholders characterisation tool, from which half correspond to our interest-group audience, as reported in D8.12 Dissemination activities report II. As this deliverable is presented at the beginning of the last year of the project, it was important for us to communicate to these potential users, our latest achievements and the direction of the project.

Reaching the end of the project, we also consider vital to share with the scientific and industry community our results and progress. SUITCEYES is an important multidisciplinary effort that covers social studies approach to disability, psychophysics studies and the integration of various technologies, resulting in scientific contributions in different fields through open access publications (list of project publications: https://suitceyes.eu/publications/). As specific results are already reported in current and undergoing publications, the new publicity material here aims to contribute to the crucial collaboration strategies that are being established to enhance project sustainability and further development of results in the long run[1]. Therefore, for this new generation of publicity material, our aim was to reach the diverse academic and industry community related to the project, presenting a general overview of the project, and also, specific results from the different activities we conduct. This allows specific stakeholders to understand the scope of the project and at the same time identify specific areas of interest within our project structure.

In the next section, we present new publicity materials and the conception process based on the targeted audiences' needs. The objective was to create tailored promotional material considering each stakeholder's characteristics (needs, preferred communication methods, etc.).

[1] The project is working on this at different levels: enabling an open platform to share and further develop the technologies we are integrating, and at the same time evaluating the possibilities of making of the project a business case for commercialising and distributing related products (this will be further discussed in D8.16 Final exploitation plan and report on IPR issues).

3.2 Leaflet for potential users

As described earlier, our potential HIPI users are people with deafblindness but also the people around them with which they communicate and share different activities that require social interaction (learning, working, assistance, leisure, etc). This includes family members, interpreters and professionals involved in their care, education and professional activities. This is clearly a diverse audience with different preferred communication methods and even more challenging, with different levels of autonomy to access the contents of a publicity material; meaning those who will have direct access to the contents by a defined method, and those who will depend on others to transmit the contents of the material. This diversity was well apprised during the extensive interview process at the initial stage of the project.

The format "leaflet" was considered as we had a good experience with the first leaflet created for project awareness during the initial phase of the project. The format A4 (29.7 by 21 cm) folded in half, is easy-to-replicate (in house printing) and easy-to-carry item that can reach an important number of people. It also worked well in its paper version in meetings and venues, as well as in its digital version (accessible through screen reader software). For this second generation of publicity materials, additional considerations were taken into account to assure broader accessibility and better respond to specific audience's needs, as explained in this section.

In Table 1, some of the audience characteristics and preferred methods are listed to illustrate the diversity of this target audience.

Table 1. Potential users: characteristics of this target audience.

User's characteristics	Type of users	Preferred communication methods to access information
Person with deafblindness, with severe audition and sight loss	Potential HIPI users	- Braille - Through interpreters
Person with deafblindness, with severe audition loss and partial sight	Potential HIPI users	- Screen or large-print text with high contrast
Person with deafblindness, with severe sight loss and partial hearing	Potential HIPI users	- Braille - Screen text accessible to screen reader technology
Hearing and sighted person, expert in deafblindness and assistive technologies	Assistance to potential HIPI users, such as professionals, interpreters, caregivers…	- Screen or printed materials
Hearing and sighted person, non-expert in deafblindness or assistive technologies	Assistance to potential HIPI users, such as family helpers, loved ones…	- Screen or printed materials - Easy to understand language

Considering the characteristics of this target audience and the project's interest in reaching them, content focused around presenting in simple or "non-technical" language the main features of the HIPI. It was our aim also to emphasis on how the potential users will benefit from the HIPI and express the actual stage of the project progress and future directions.

Attending to the project reviewers' suggestions, an alternative, simplified language version of the contents was prepared, responding to the need of some users with comprehension difficulties (a condition that is sometimes experienced by people with deafblindness) or also for family helpers with absolutely no technical background. Having the contents ready, different "leaflet formats" were

created to communicate these contents accordingly to the different needs within this audience. The idea was to communicate the same contents through different methods to reach the whole, or at least the greatest part of this specific audience. In Table 2, these formats are presented with their characteristics and the user's needs they respond to.

Table 2. Leaflet formats and the audience's needs they respond to.

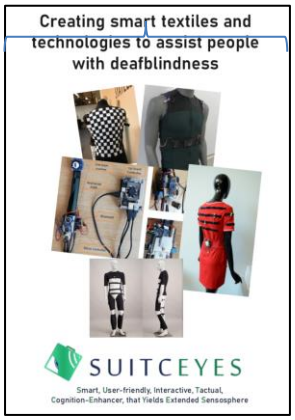
Leaflet format	Characteristics and users' needs being addressed
Paper version	Non-technical language, high-contrast graphics and text
Screen version	Non-technical language, high-contrast graphics and text, contents accessible with screen readers (including alternative texts for images and visual contents)
Paper easy-to-read version (simplified text)	Same as paper version, but with adapted language (simplified) for people with absolutely no technical background and/or comprehension difficulties
Screen easy-to-read version (simplified text)	Same as screen version, but with adapted language (simplified) for people with absolutely no technical background and/or comprehension difficulties
Plain large-print text	Non-technical language, large size text without graphics
Braille version[2]	Non-technical language, Braille (UEB – Grade 1)

Early versions of the leaflet in its different formats were tested by our colleagues at HARPO, providing important feedback on the contrast of colours, text readability and accessibility features. The graphic design of the leaflet (paper and screen versions) was kept simple to privilege low vision readability. Other elements were used such as numbering text boxes to easily follow the contents and icons to orientate the reader about the topic developed in text. Figure 1 shows the layout of the leaflet (paper version). The other leaflet formats mentioned in Table 2 are available in the annex of this document.

[2] This format is ready to be distributes on demand.

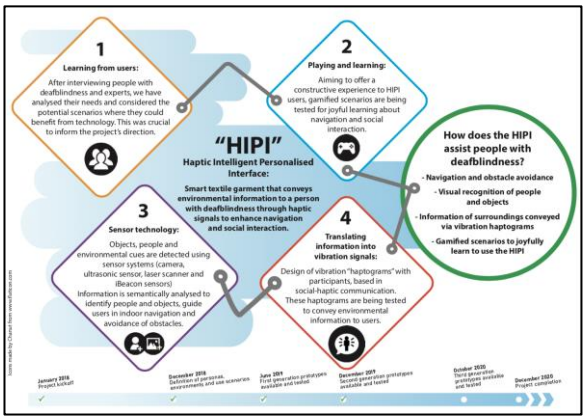
14.8 cm

Front page:



21 cm

Inner pages:



Back page:

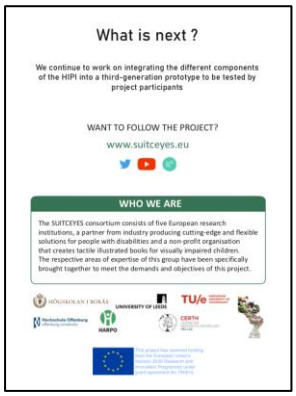


Figure 1. The layout of the leaflet addressed to potential HIPI users.

3.3 Poster for academic and industry audiences

Revising the project publications and documents, it is clear that SUITCEYES concerns a wide spectrum of academic and industry fields, such as disability social studies, psychophysics, computer science and assistive technologies. Each stakeholder has a different expertise and vocabulary. It was of our interest to reach this audience by summarising project results in a common language and to comment on the different activities to provide an overview of the project. This, with the aim to communicate the large scope of SUITCEYES to the target audience, and also to point the areas within the project's structure

that can be further developed beyond the project's end. The different sections of the poster were thought through to have a content that allows understanding and communication throughout different members of this audience, for example featuring a terminology section.

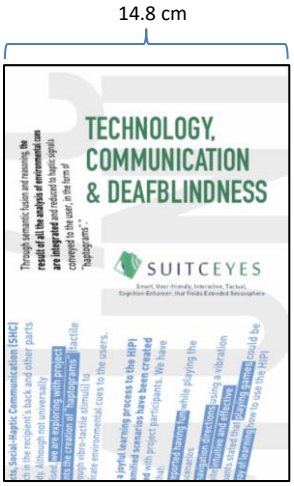
Concerning the format of the material, we proposed a novel approach by combining the advantages of the classic poster and leaflet formats. Posters are meant to be a graphic communication method that catches the audience's attention to have a closer look into the information. On the other hand, leaflets provide more in-depth information with more text following a structured order. While posters are difficult to replicate in office conditions (printing in large formats) and are displayed briefly in academic or industrial venues, leaflets are an easy-to-carry element that can be carried by the public for later consulting and sharing.

The solution to benefit from the advantages of both the poster and leaflet formats was to design an A3 format poster (29.7 by 42 cm) printed in both sides and folded in four to facilitate its distribution (folded size is 14.8 by 21 cm, as showed in Figure 2).

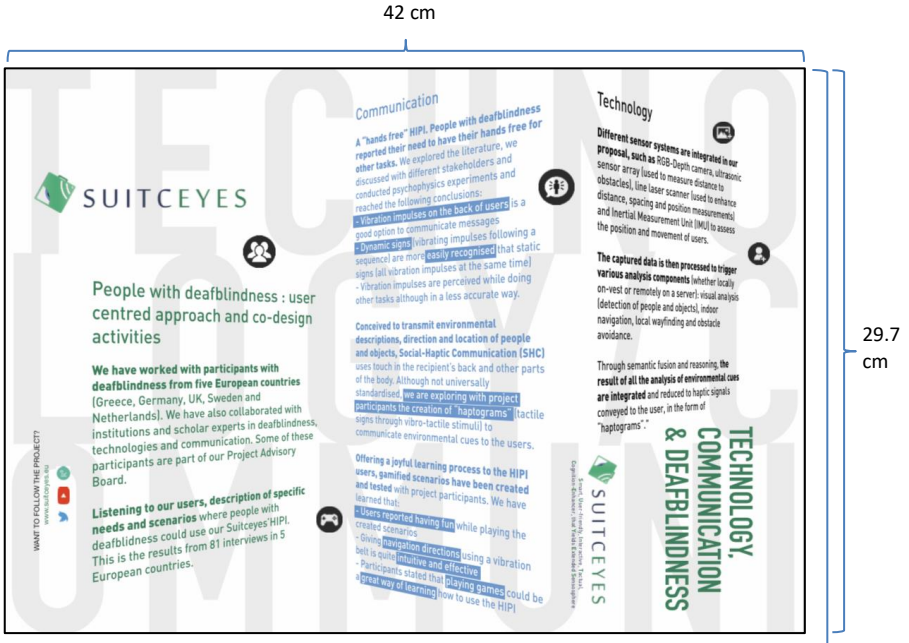
In order to maintain the easy-to-carry advantage of the leaflet format, the audience receives a portable material that resembles a classic leaflet (14.8 by 21 cm), featuring the project's logo and the title "Deafblindness, communication and technology" (Figure 2). Then, when the person unfolds the material, it will find information in both sides of the A3 format paper (29.7 by 42 cm).

In one side (side A in Figure 2), emphasis in project's achievements is made by focussing on three essential elements of our project (accordantly with the materials title): people with deafblindness, communication and technology. Under these three elements, the approach and results of the project are presented with an appealing graphic design. On the other side of the poster (side B in Figure 2), general information about the project is displayed in different sections such as: Our challenge; Objective; Terminology; Modular architecture; Impact; References, and; What is next? This material can be displayed as a classic poster by fixing in a wall two copies of the material (one sowing side A, and a second one below, sowing the side B), the first highlighting project achievements (more graphic contents), and the other displaying general project information, resulting together in an A2 (42 x 59.4 cm) poster (Figure 2).

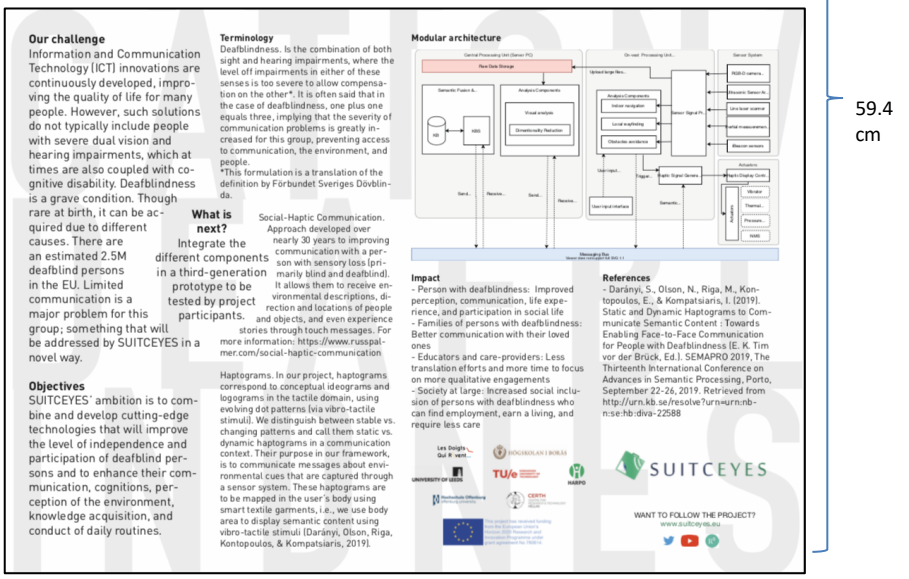
Front page:
A3 poster folded in four.



Side A:
A3 poster front side.



Side B:
A3 poster back side.



When sides A and B are placed together, they form an A2 (42 by 59.4 cm) poster that can be displayed on a board.

Figure 2. The layout of the poster addressed to academic and industry audiences.

4. Newsletter

The second version of the project newsletter was issued in December 2019, covering the project's achievements from the second half of 2018 to the end of 2019. Although activities and achievements are usually reported by work packages, the newsletter was structured in different thematic titles to make it easy to find specific information and better inform our readers. The sections are as follows: Introduction; Meetings, work and information; Consortium meetings; Prototypes; Demonstrations; Gamification; Dissemination, and; Future events (Figure 3).

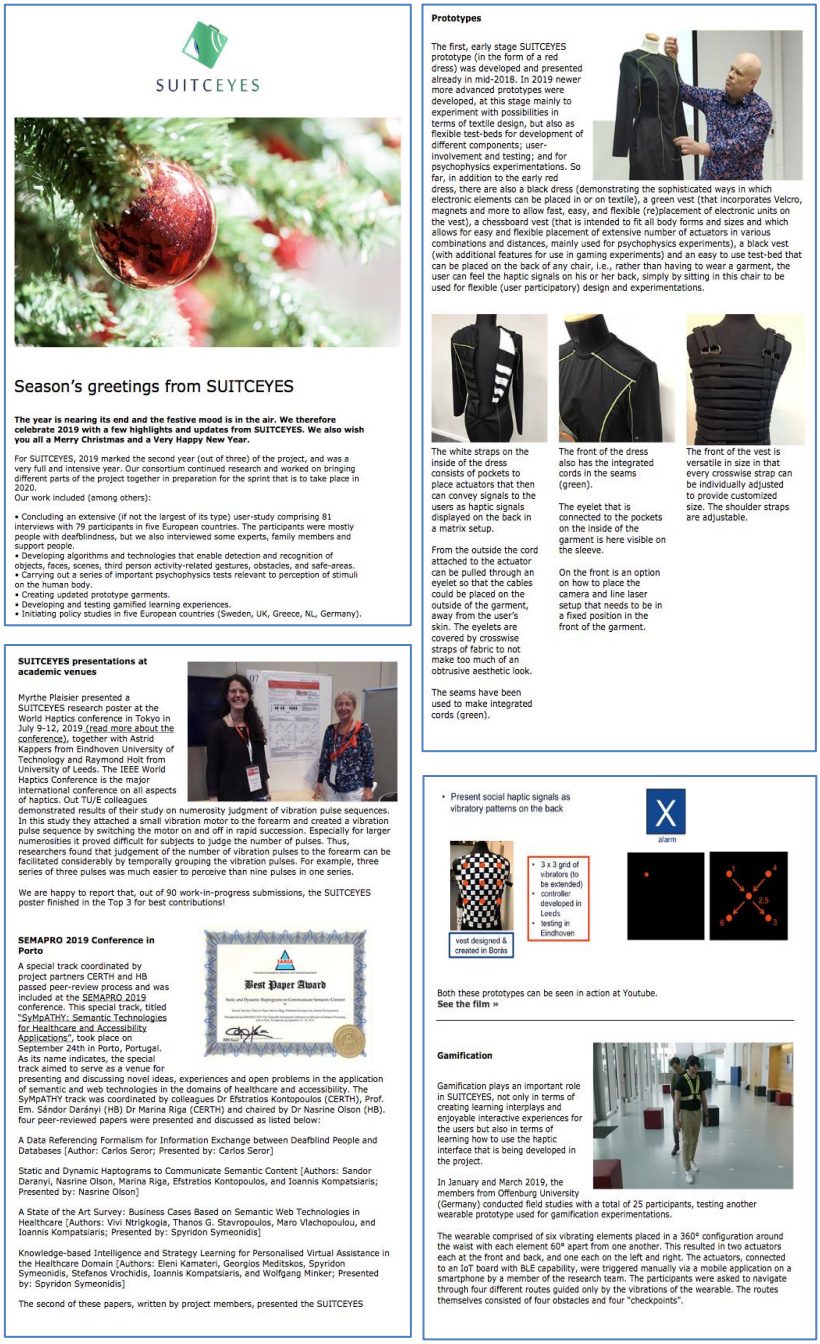


Figure 3. Pictures of the newsletter disseminated through the project's website.

In the introduction section, the contents of the newsletter are presented, highlighting the latest activities of the project. The Meetings, work and information section features general information of the latest SUITCEYES symposium at Borås. The three consortium meetings held in 2019 are reported in the third section of the newsletter, exhibiting pictures of these events. The Prototypes section presents details and pictures of the latest work in this area. In a fifth section, two videos and our demonstration session with Project Advisory Board members are informed, including the links to the project's YouTube channel, where the videos are displayed. The Gamification section features the results from user studies concerning gamified scenarios for the navigation features of the HIPI. These studies were conducted in Offenburg University (Germany). In the final sections of the newsletter, the list of dissemination activities, results from the project's participation in venues (such as awards), and the project's future events, are accessible.

This dissemination method contributes to project awareness and it was conceived in a press-type language, as it was designed to keep the project stakeholders informed about SUITCEYES latest achievements. This material also concerns the general public that follows the project and visitors of our website (project's main dissemination method).

The newsletter is available on the project website (https://suitceyes.eu/newsletter/) and was sent via email to subscribers according to General Data Protection Regulation (GDPR).

5. Visual Identity Package Update

The following Table reports on the updates on the visual identity package. For this version the main update concerns the new publicity materials in different formats (paper, screen and Braille) and new project consent forms. The elements are ordered by the date of update (latest first). This visual identity package is available to all project partners to support their different dissemination activities.

Table 1. Visual identity package and updates (ordered by the date of update).

Element	Description	Format	Date of last update (DD/MM/YY)
Poster A3 (front and back print) for academic and industry audiences	Full colour, digital and ready-to-print poster in A3 format (29.7 x 42.0 cm). To be printed on both sides and forded in four for distribution.	.pdf	23/03/2020
Leaflet for potential users	Full colour, digital and ready-to-print leaflet in A4 format (21.0 x 29.7 cm). Accessible format tested for screen-reader software.	.pdf	23/03/2020
Leaflet for potential users: easy-to-read version	Full colour, digital and ready-to-print leaflet in A4 format (21.0 x 29.7 cm). Accessible format tested for screen-reader software. Simplified texts (easy-to-read version).	.pdf	23/03/2020
Leaflet for potential user: plain text version	Digital and ready-to-print contents in A4 format (21.0 x 29.7 cm). No graphic contents, large text and accessible format tested for screen-reader software.	.docx .pdf	23/03/2020
Leaflet for potential user: Braille version	Braille version (UEB – Grade 1) in A4 format (21.0 x 29.7 cm). No graphic contents.	.pdf	23/03/2020
First prototype demonstration video	Video (2 minutes and 49 seconds long), featuring the first prototype demonstration during project's symposium at Borås (August 20-23, 2019).	.mp4	15/09/2019
Tactile poster	One full colour printed poster (60 x 80 cm), including a large size tactile image of the project's logo.	Paper	22/08/2019
Postcard with tactile logo	50 full colour printed postcards (17 x 17 cm), including a tactile image of the project's logo.	Paper	22/08/2019
Bookmark with Braille title	Full colour bookmark (9 x 15 cm) with project information and featuring the projects name in Braille.	Paper	22/08/2019
Leaflet (German version)	Full colour, digital and ready-to-print leaflet in A4 format (21.0 x 29.7 cm). Language: German. Accessible format tested for screen-reader software.	.pdf	20/06/2019
Flyer	Full colour, digital and ready-to-print flyer in A5 format (21.0 x 14.9 cm). Accessible format tested for screen-reader software.	.pdf	15/02/2019
Leaflet	Full colour, digital and ready-to-print leaflet in A4 format (21.0 x 29.7 cm). Accessible format tested for screen-reader software.	.pdf	15/02/2019
Poster A1	Full colour, digital and ready-to-print poster in A1 format (59.4 x 89.1 cm). Accessible format tested for screen-reader software.	.pdf	15/02/2019

Poster A3	Full colour, digital and ready-to-print poster in A3 format (29.7 x 42.0 cm). Accessible format tested for screen-reader software.	.pdf	15/02/2019
User manual of visual identity	Deliverable D8.3 *Project identity II* which includes the user's manual and other recommendations.	.pdf	29/09/2018
Deliverable template	Full colour template including front page, title styles and typography.	.docx	21/09/2018
Presentation template	Full colour template including title slide, contents slide, final slide, title styles and typography.	.pptx	06/08/2018
Letter sheet template	Full colour template including headed page, title styles and typography.	.docx	02/08/2018
Logo (Standing format)	Full colour logo in standing format.	.png .pdf	01/2018
Logo (Horizontal format)	Full colour logo in horizontal format.	.png .pdf	01/2018

6. Conclusions

The SUITCEYES project has continued to create different project awareness materials that acknowledge the diversity of communication methods and needs of the deafblind community, and other specific audiences such as the academic and industry community.

Scientific results, available through publications, are being shared with different audiences encouraging new discussions with different stakeholders and foreseeing future project directions. Nevertheless, new generation of publicity materials were needed to reach two targeted audiences with tailored formats and messages. We aimed to explain the HIPI to potential users and to inform them on how they will benefit from the project's results. Concerning the academic community and industry, the aim was to present the multidisciplinary scope of the project, comment on specific results in a common language, and invite to further collaborations in different aspects of the project.

More general information on the project activities and achievements is available to the general public through our newsletter, which is available on our project website.

The project identity evolves as the project progresses and it is in constant adaptation to the needs of our audiences. In the next version of this deliverable (D8.7), we will continue to report on this evolution.

7. Annex

1. Leaflet for potential users

2. Leaflet for potential users: easy-to-read version

3. Leaflet for potential users: plain text version

4. Poster (A3 format) for academic and industry audiences

What is next ?

We continue to work on integrating the different components of the HIPI into a third-generation prototype to be tested by project participants

WANT TO FOLLOW THE PROJECT?

www.suitceyes.eu

WHO WE ARE

The SUITCEYES consortium consists of five European research institutions, a partner from industry producing cutting-edge and flexible solutions for people with disabilities and a non-profit organisation that creates tactile illustrated books for visually impaired children.The respective areas of expertise of this group have been specifically brought together to meet the demands and objectives of this project.

HÖGSKOLAN I BORÅS

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HARPO

CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 780814.

Creating smart textiles and technologies to assist people with deafblindness

SUITCEYES

Smart, User-friendly, Interactive, Tactual, Cognition-Enhancer, that Yields Extended Sensosphere

"HIPI"

Haptic Intelligent Personalised Interface:

Smart textile garment that conveys environmental information to a person with deafblindness through haptic signals to enhance navigation and social interaction.

1

Learning from users:

After interviewing people with deafblindness and experts, we have analysed their needs and considered the potential scenarios where they could benefit from technology. This was crucial to inform the project's direction.

2

Playing and learning:

Aiming to offer a constructive experience to HIPI users, gamified scenarios are being tested for joyful learning about navigation and social interaction.

3

Sensor technology:

Objects, people and environmental cues are detected using sensor systems (camera, ultrasonic sensor, laser scanner and iBeacon sensors). Information is semantically analysed to identify people and objects, guide users in indoor navigation and avoidance of obstacles.

4

Translating information into vibration signals:

Design of vibration "haptograms" with participants, based in social-haptic communication. These haptograms are being tested to convey environmental information to users.

How does the HIPI assist people with deafblindness?

- **Navigation and obstacle avoidance**
- **Visual recognition of people and objects**
- **Information of surroundings conveyed via vibration haptograms**
- **Gamified scenarios to joyfully learn to use the HIPI**

January 2018
Project kickoff ✓

December 2018
Definition of personas, environments and use scenarios ✓

June 2019
First generation prototypes available and tested ✓

December 2019
Second generation prototypes available and tested ✓

October 2020
Third generation prototypes available and tested

December 2020
Project completion

What is next ?

Make a third version of the HIPI that can be tested by people with deafblindness and others

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HARPO

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This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 780814.

Combining garments and technology to assist people with deafblindness

SUITCEYES

Smart, User-friendly, Interactive, Tactual, Cognition-Enhancer, that Yields Extended Sensosphere

1

Talking and learning with people with deafblindness:

We talked to people with deafblindness about what they need and how technology could help. We also asked people who knew them well. Then we decided what we would do.

2

Playing and learning:

We are also developing games that can help people with deafblindness to learn how to use the HIPI for getting around and for communicating with other people.

The technology is called a "HIPI"

This is a Haptic Intelligent Personalised Interface:

We are making clothes that can tell people with deafblindness what is happening around them. It does this by making vibration patterns on the body.

3

Sensor technology:

The technology uses cameras and sensors that can identify which people and things are nearby. It can help people to move from one place to another and avoid things in the way.

4

Translating information into vibration signals:

People with deafblindness are helping us to create vibration patterns that we call "haptograms". These haptograms give information about the surroundings to users.

What does the HIPI assist people with deafblindness to do?

- **Move between places and avoid obstacles**
- **Identify people and objects**
- **Learn about the surroundings through vibration patterns (haptograms)**
- **Do game-type activities to learn how to use it**

January 2018 ✓
Project kickoff

December 2018 ✓
Find out what people with deafblindness need

June 2019 ✓
Develop first version of the HIPI

December 2019 ✓
Develop second version of the HIPI

October 2020
Develop third version of the HIPI

December 2020
Project completion

Date: 23 of March 2020

Creating smart textiles and technology to assist people with deafblindness.

In this document, the latest results of the SUITCEYES project are presented. This version includes the contents of the latest promotional material created.

The HIPI, is our Haptic Intelligent Personalised Interface. It is a smart textile garment that conveys environmental information to a person with deafblindness through haptic signals to enhance navigation and social interaction.

To further explain what the HIPI is, and what we have accomplished, we present four important aspects of the HIPI.

1. Talking and learning with our users:

After discussing with people with deafblindness from 5 European countries and experts, we have analysed their needs and considered the potential scenarios where they could benefit from technology. This was crucial to agree on the direction of our designs.

2. Playing and learning:

Thinking ahead, gamified scenarios for joyful learning about navigation and social interaction are being tested, aiming to offer a constructive experience to HIPI users.

3. Sensor technology:

Objects, people and environmental cues are detected using sensor system, such as camera, ultrasonic sensor, laser scanner and iBeacon sensors.

All of this information is analysed to identify people and objects, to guide users in indoor navigation and obstacle avoidance.

4. Translating information into vibration signals:

Design of vibration “haptograms” with participants, based on Social-Haptic Communication. This haptograms are being tested to convey environmental information to users.

Conclusion: How does the HIPI assist people with deafblindness?

- Navigation and obstacle avoidance.

- Visual recognition of people and objects.

- Information for navigation and visual recognition will be conveyed via vibration haptograms.

- The HIPI will feature gamified scenarios to joyfully learn to use the HIPI.

Project milestones:

- January 2018: Project kickoff.

- December 2018: Definition of personas, environments and use scenarios.

- June 2019: First generation prototypes available and tested.

- December 2019: Second generation prototypes available and tested.

- October 2020: Third generation prototypes available and tested.

- December 2020: Project completion.

What is next?

Integrate the different components into a third-generation prototype to be tested by project participants.

Project general information:

The SUITCEYES consortium consists of five European research institutions; a partner from industry producing cutting-edge and flexible solutions for people with disabilities; and a non-profit organisation that creates tactile illustrated books for visually impaired children. The respective areas of expertise of this group have been specifically brought together to meet the demands and objectives of this project.

- University of Borås, Sweden (project coordinator).
- Centre for Research & Technology Hellas, Greece.
- Offenburg University of Applied Sciences, Germany.
- University of Leeds, United Kingdom.
- Eindhoven University of Technology, Netherlands.
- Dreaming Fingers, France.
- Harpo Sp. z o.o., Poland.

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 780814.

SUITCEYES

People with deafblindness : user centred approach and co-design activities

We have worked with participants with deafblindness from five European countries (Greece, Germany, UK, Sweden and Netherlands). We have also collaborated with institutions and scholar experts in deafblindness, technologies and communication. Some of these participants are part of our Project Advisory Board.

Listening to our users, description of specific needs and scenarios where people with deafblindness could use our Suitceyes'HIPI. This is the results from 81 interviews in 5 European countries.

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Communication

A "hands free" HIPI. People with deafblindness reported their need to have their hands free for other tasks. We explored the literature, we discussed with different stakeholders and conducted psychophysics experiments and reached the following conclusions:
- Vibration impulses on the back of users is a good option to communicate messages
- Dynamic signs (vibrating impulses following a sequence) are more easily recognised that static signs (all vibration impulses at the same time)
- Vibration impulses are perceived while doing other tasks although in a less accurate way.

Conceived to transmit environmental descriptions, direction and location of people and objects, Social-Haptic Communication (SHC) uses touch in the recipient's back and other parts of the body. Although not universally standardised, we are exploring with project participants the creation of "haptograms" (tactile signs through vibro-tactile stimuli) to communicate environmental cues to the users.

Offering a joyful learning process to the HIPI users, gamified scenarios have been created and tested with project participants. We have learned that:
- Users reported having fun while playing the created scenarios
- Giving navigation directions using a vibration belt is quite intuitive and effective
- Participants stated that playing games could be a great way of learning how to use the HIPI

Technology

Different sensor systems are integrated in our proposal, such as RGB-Depth camera, ultrasonic sensor array (used to measure distance to obstacles), line laser scanner (used to enhance distance, spacing and position measurements) and Inertial Measurement Unit (IMU) to assess the position and movement of users.

The captured data is then processed to trigger various analysis components (whether locally on-vest or remotely on a server): visual analysis (detection of people and objects), indoor navigation, local wayfinding and obstacle avoidance.

Through semantic fusion and reasoning, **the results of all the analyses of environmental cues are integrated** and reduced to haptic signals conveyed to the user, in the form of "haptograms".

DEAFBLINDNESS, COMMUNICATION & TECHNOLOGY

SUITCEYES
Smart, User-friendly, Interactive, Tactual, Cognition-Enhancer, that Yields Extended Sensosphere

Our challenge

Information and Communication Technology (ICT) innovations are continuously developed, improving the quality of life for many people. However, such solutions do not typically include people with severe dual vision and hearing impairments, which at times are also coupled with cognitive disability. Though rare at birth, deafblindness can be acquired due to different causes. Limited communication is a major problem for this group; something that will be addressed by SUITCEYES in a novel way.

Objectives

SUITCEYES' ambition is to combine and develop cutting-edge technologies that will improve the level of independence and participation of deafblind persons and to enhance their communication, cognitions, perception of the environment, knowledge acquisition, and conduct of daily routines.

Terminology

Deafblindness: Is the combination of both sight and hearing impairments, where the level off impairments in either of these senses is too severe to allow compensation on the other[1]. The severity of communication problems is greatly increased for this group, preventing access to communication, the environment, and people.

Social-Haptic Communication: Approach developed over nearly 30 years to improving communication with a person with sensory loss (primarily blind and deafblind). It allows them to receive environmental descriptions, direction and locations of people and objects[2].

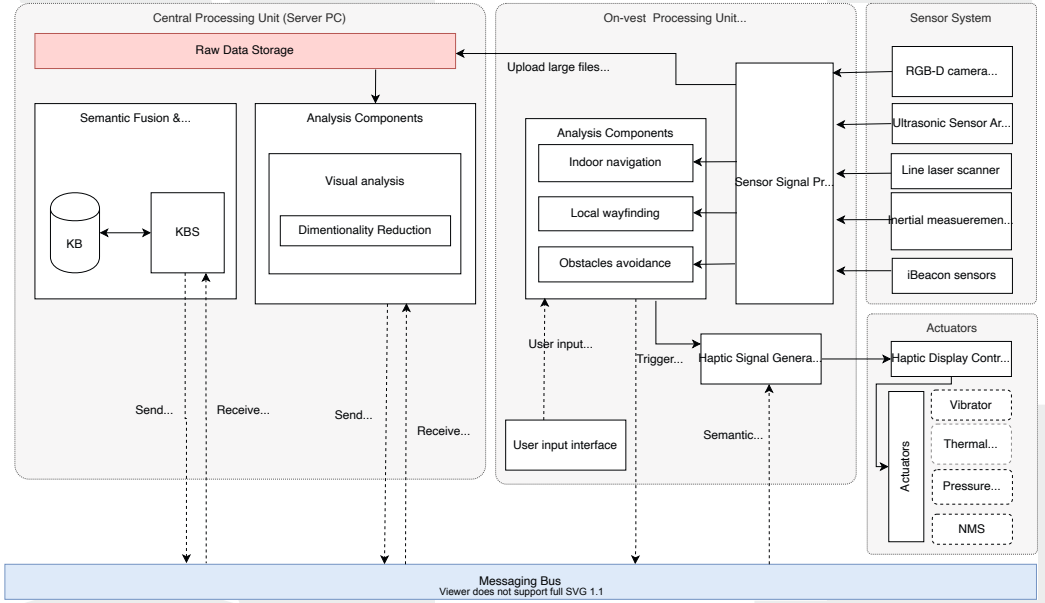
Haptograms: In our project, haptograms correspond to conceptual ideograms and logograms in the tactile domain, using evolving dot patterns (via vibro-tactile stimuli). We distinguish between stable vs. changing patterns and call them static vs. dynamic haptograms in a communication context. Their purpose in our framework, is to communicate messages about environmental cues that are captured through a sensor system. These haptograms are to be mapped in the user's body using smart textile garments, i.e., we use body area to display semantic content using vibro-tactile stimuli[3].

HIPI: By using a sensors system (face and object recognition, and other Internet of Things technologies), information about the surroundings is captured and communicated to the user via a haptic interface based on smart textiles. We call this interface the HIPI: Haptic Intelligent Personalised Interface.

What is next?

Integrate the different components in a third-generation prototype to be tested by project participants.

Modular architecture



Impact

- Person with deafblindness: Improved perception, communication, life experience, and participation in social life
- Families of persons with deafblindness: Better communication with their loved ones
- Educators and care-providers: Less translation efforts and more time to focus on more qualitative engagements
- Society at large: Increased social inclusion of persons with deafblindness who can find employment, earn a living, and require less care

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 780814.

References

1. This formulation is a translation of the definition by Förbundet Sveriges Dövblinda.

2. More information: https://www.russpalmer.com/social-haptic-communication.

3. Darányi, S., Olson, N., Riga, M., Kontopoulos, E., & Kompatsiaris, I. (2019). Static and Dynamic Haptograms to Communicate Semantic Content : Towards Enabling Face-to-Face Communication for People with Deafblindness. SEMAPRO 2019, The Thirteenth International Conference on Advances in Semantic Processing, Porto, September 22-26, 2019.

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