Deliverable

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D5.4 – Pilot evaluation report

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C	Confidential, only for members of the consortium and the Commission Services	

Abstract:

This document presents and analyses the results of pilot 1 actions in the ImAc project. It considers both pilot actions with professional users, who have assessed the tools, and with end users, who have assessed the interface and the subtitling presentation modes.

REVISION HISTORY

Revision	Date	Author	Organisation	Description
0.1	24-09-2018	Anna Matamala	UAB	ToC
0.2	06-11-2018	Anna Matamala	UAB	First draft published for partners' comments
0.3.	16-11-2018	Anna Matamala	UAB	Version with partners' comments incorporated, sent to review
0.4	20-11-2018	Anna Matamala	UAB	Final version, after review

EXECUTIVE SUMMARY

This document describes the results of pilot actions, differentiating between the actions in which the tools have been tested with professionals and the actions in which the presentation modes and the interface have been tested with end users. For all pilot actions, five central elements are presented: measures, participants, materials, experimental protocol, and results. A final discussion is included on the main results, which can have an impact on user requirements and technical development in WP2, WP3 and WP4.

Pilot actions have been developed following D5.1. Pilot operation plan and D5.2 Pilot evaluation methodology, under T5.1. Execution and evaluation plan. The evaluation results are related to the actions developed as part of the German Pilot (T5.3.) and the Spanish Pilot (T5.4.) on content generated under Content Production (T5.2.).

Although both the German and the Spanish Pilots focus on subtitling, results from audio description are also included in relation to the audio description web editor, as they were developed in parallel to the subtitling web editor tests.

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LIST OF ACRONYMS

Acronym	Description
ACM	Accessibility Content Manager
AD	Audio description
AVT	Audiovisual Translation
CCMA	Corporació Catalana de Mitjans Audiovisuals
cps	Characters per second
D	Deliverable
HMD	Head-mounted display
ImAc	Immersive Accessibility
IPQ	Igroup Presence Questionnaire
M	Month
MA	Master of Arts
PhD	Doctor in Philosophy
RBB	Rundfunk Berlin-Brandenburg
SL	Sign Language
SUB	Subtitling
SUS	System Usability Scale
T	Task
UAB	Universitat Autònoma de Barcelona
US	United States
VR	Virtual Reality
wpm	Words per minute
WP	Work Package
P1-P31 AD	Participants in audio description web editor test (UAB)
US1-US3 AD	Participants in audio description web editor test – US round (UAB)
RBB1-RBB12	Participants in subtitling presentation modes test (RBB)
wps	Words per second

1. INTRODUCTION

This introduction describes the purpose of this deliverable, its scope, status and relationship with other ImAc activities.

1.1. Purpose of this document

This document presents the evaluation of the pilot actions developed under WP5. Pilot actions are understood as any tests in which ImAc services and products are demonstrated and feedback from users is gathered.

ImAc is a user-centric project (D2.1) in which input from users (D2.2.) is gathered in different iterations and forms. Under WP5, demonstration pilots take place. The results of such pilots have an impact on user requirements, which have an impact on T2.2. and T2.3., and also on the development of the immersive platform under WP4 and on the development of Accessibility Service Tools in WP3, as shown on Figure 1.

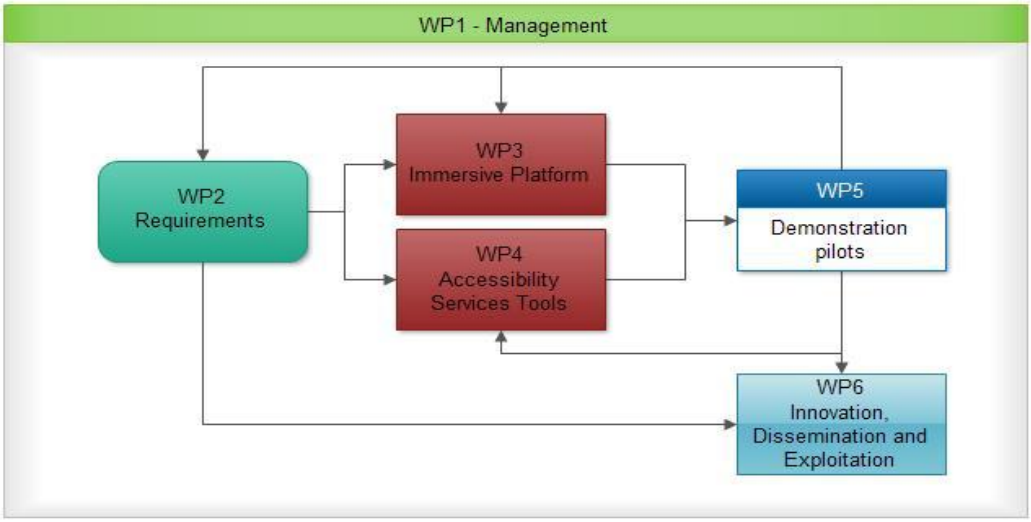


Figure 1: Diagram of relation between work packages, and its cycles (iterations).

1.2. Scope of this document

This document summarizes the development and results of pilot actions under WP5 with two different profiles: on the one hand, professional users creating content with the tools and, on the other hand, end users consuming accessible content on the ImAc player interface.

Section 2 presents an overview of the pilot actions (which follows D5.1 Pilot operation plan- first phase) and the methodology used, which follows D5.2 (Pilot evaluation methodology and plan).

Section 3 presents the results of the evaluation performed by professional users on the tools, namely the audio description web editor (UAB pilot action), the subtitling web editor (UAB pilot action) and the Accessibility Content Manager (ACM) tool (CCMA/RBB pilot action).

Section 4 presents the results of testing different subtitling presentation modes in two pilot actions: RBB pilot action (German Pilot), and CCMA pilot action (Spanish Pilot).

Section 5 presents the results of testing the interface in two pilot actions: RBB pilot action (German Pilot), and CCMA pilot action (Spanish Pilot).

For each pilot action, five central elements are presented: measures, participants, materials, experimental protocol, and results. In Section 6, final conclusions are included together with a discussion on the main results, which can have an impact on user requirements and technical development in WP2, WP3 and WP4.

1.3. Status of this document

This is the first version of D5.4, delivered in Month 14 (November 2018). A second iteration, and final version, is planned for Month 30 (March 2020).

The first version of the document presents results linked to the first phase of the German Pilot (T5.3.), the Spanish Pilot (T5.4.) and also documents tests with the audio description web editing tool. Results of cross-national pilot actions and second phase aftions for the German and Spanish pilots will be documented in the final version.

1.4. Relation with other ImAc activities

D5.4 presents the results of the pilot actions carried out according to the plan developed in D5.1 and the methodology designed in D5.4, using content created under D5.3. This document reports on the evaluation performed under T5.6. Evaluation. More specifically, on the results of the first phase of T5.3 and T5.4, and also provides data on the audio description web editor, which is a service analysed in T5.5. All WP5 tasks and deliverables are tightly linked and were designed based on WP2 input. The results of the evaluation feed on T2.2 User requirements, which have also an impact on WP3 and WP4. Similarly, results are disseminated under WP6. Figure 2 provides an overview of the relationship between the different tasks and deliverables.

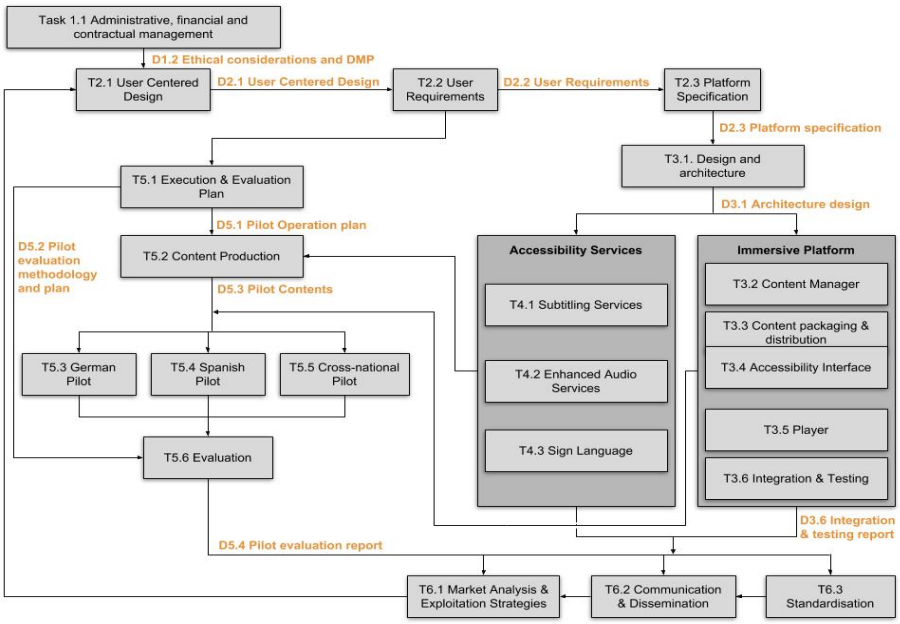


Figure 2: Diagram of tasks and its outcomes (deliverables). In this case, there are also 2 iterations.

2. PILOT OVERVIEW: PILOT ACTIONS AND METHODOLOGY

The pilot actions that have taken place in the first phase have its origin in WP2. In WP2, multiple possibilities or requirements by users were suggested through focus groups and interviews (D2.2). Users were classified in two main groups: on the one hand, home users, i.e. the end users who will be consuming the services; on the other hand, professional users, i.e. the users who will be creating the services.

Home users put forward needs and requirements in relation to the services, focusing mainly on two broad categories identified during the analysis: presentation modes and player interface (personalization and interaction). Professional users also contributed to the previous requirements but focused mainly on the features the access services editing tools should have. Figure 3 summarizes the relationship between WP2 and WP5.

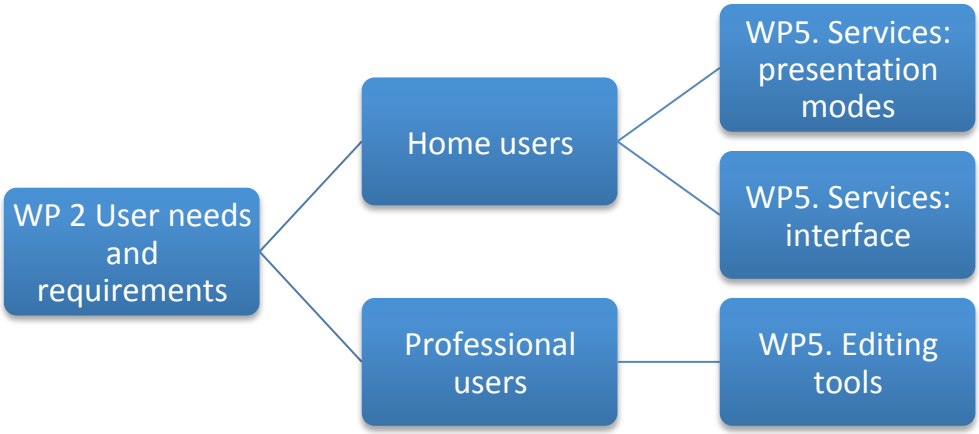


Figure 3: WP2-WP5 relationship.

Based on WP2 user input, criteria for the implementation of user suggestions and criteria for user testing were defined in D5.2. They could be summarized as follows:

- Requirements from users referring to the editing tools should be implemented, if technically feasible, and should be tested.
- Requirements from users referring to the services, both concerning the interface and the presentation modes, should be implemented if technically and methodologically feasible. When more than one implementation options are suggested by users, two feasible options may be tested.
- Requirements already tested in previous projects should not be tested.

In pilot phase 1 the actions described in Table 1 were planned.

What is tested?	With whom?	Pilot action responsible	When?
Tools: subtitling web editor	Professional users	UAB	July 2018
Tools: audio description web editor	Professional users	UAB	September-October 2018
Tools: Accessibility Content Manager	Professional users	RBB CCMA	July 2018
Service: subtitling presentation modes	Home users	RBB CCMA	September-October 2018
Service: subtitling- interface	Home users	RBB CCMA	September-October 2018

Table 1: Summary of pilot actions.

Regarding the subtitling services, it was decided to focus on the following items (Figure 4):

- For the user interface: traditional menu in a Head-Mounted Display and traditional menu on a tablet.
- For the presentation modes: arrow versus radar as a guiding mechanism to speaker (Figure 5).

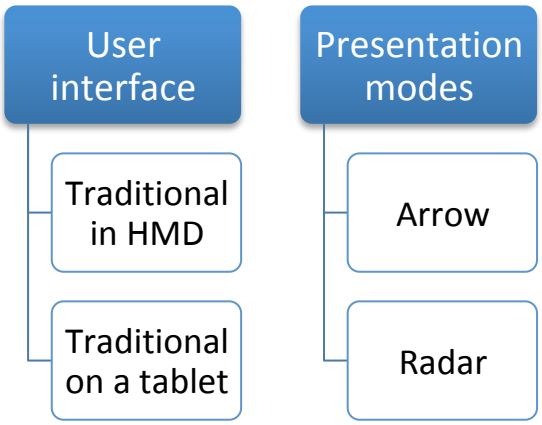


Figure 4: Subtitling: testing conditions.

The selection of these items was based on previous WP2 input and on the need to develop a methodologically feasible test. Adding more variables would have jeopardized the methodological soundness of the pilot actions.

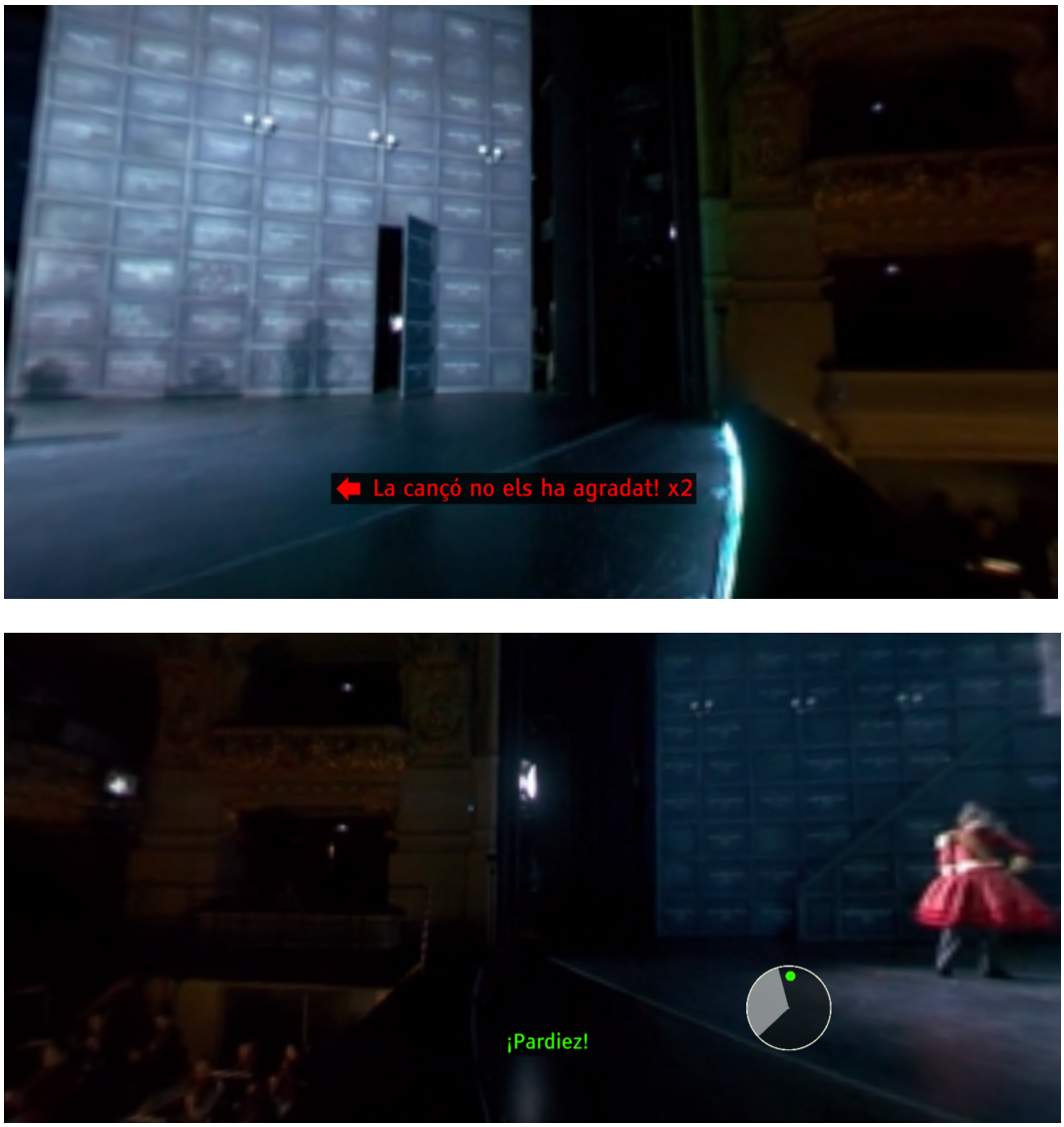


Figure 5: Presentation modes: arrow and radar.

Three key concepts framed the methodological design, as shown on Figure 6.

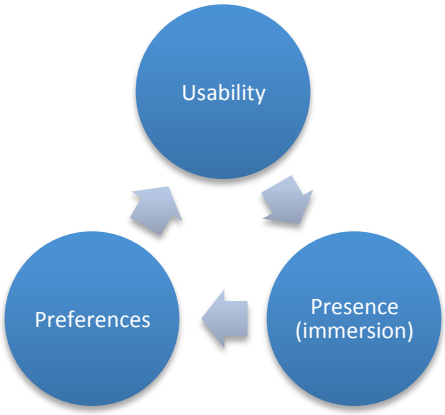


Figure 6: Key methodological concepts.

- **Usability** is understood as the ability of the user to use a thing or carry out a task successfully.
- **Presence**, sometimes also referred to as immersion, refers to the sense of "being there" [1].
- **Preferences** and opinions include general feedback gathered from users.

Depending on the type of tests, one or more of the previous measures were chosen. For each of these measures, a specific methodological tool was also selected, as shown on Figure 7 [2] [3]. The reasons for selecting these questionnaires is thoroughly explained in D5.2.

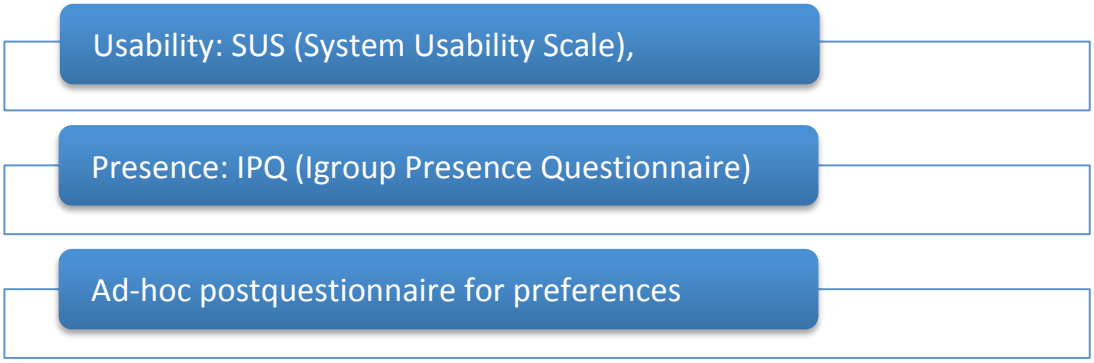


Figure 7: Methodological tools.

SUS [4] includes 10 items, is easy to administer and provides reliable results with small sample sizes. It can be accessed here: https://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html. SUS is available in English and also has a validated version in German (https://experience.sap.com/skillup/system-usability-scale-jetzt-auch-auf-deutsch/). The Catalan version used in ImAc was translated by CCMA and reviewed by UAB.

IPQ [5] combines previous questionnaires and it was the first presence questionnaire to specifically differentiate between spatial presence, involvement, and experienced realism. In this questionnaire, spatial presence refers to the sense of being there in the virtual environment. Involvement refers to the attention to the real and the virtual environment, and experienced realism refers to the reality judgment of the virtual environment. The questionnaire has been validated in different virtual environments, including HMD in a laboratory. It can be accessed here: www.igroup.org/pq/ipq/download.php. IPQ is available in English and German, as well as Dutch and French. The Catalan version was translated by CCMA and reviewed by UAB.

Regarding the post-questionnaire, it was created ad hoc for each pilot action, aiming to gather additional user input, especially concerning preferences but also opening the questions to more general feedback.

The methodological procedure followed in all tests shared some features, as shown on Figure 8:

1. The first step in any test was to welcome participants, inform about the project and carry out ethical protocols as approved by UAB's ethical committee. In this regard, all participants gave their informed consent to take part in the action and they were informed their data would be kept confidential.
2. The second step was to gather information from the users through a questionnaire. To this end, three versions of demographic questionnaires were developed:
    a. Demographic questionnaire for professional users: subtitler editors and audio describers.
    b. Shorter demographic questionnaire for ACM users.
    c. Demographic questionnaire for home users.

    When necessary for a pilot action, the demographic questionnaire was moved later in the process.
3. The third step was to perform one or multiple tasks, followed by the corresponding questionnaires. This central step obviously changed in each pilot action, and will be thoroughly explained in the sections below.
4. The final step in all pilot actions was to thank the participants and offer them the possibility to get more information about the project.

Figure 8 summarizes the key steps in all pilot actions.

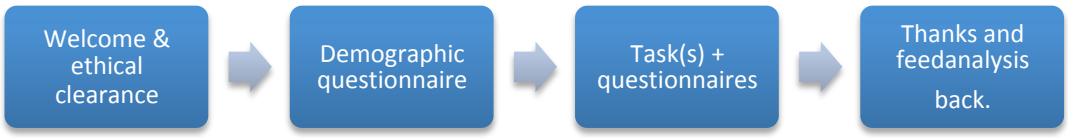


Figure 8: Shared protocol for all pilot actions.

3. TESTING THE TOOLS

Three tools were tested: the Accessibility Content Manager (section 3.1), the subtitling web editor (section 3.2.), and the audio description web editor (section 3.3.). Procedures and results are discussed in this chapter.

For each pilot action, a general description of the pilot action is given, followed by information on measures, participants, materials, experimental protocol, and results.

- The general description reports on the tool used, the general category of users, the partner responsible for the tests, the dates, and format of the pilot action.
- "Measures" are based on the framework described before (see Figures 6 and 7). If an ad-hoc preference questionnaire is used, it is reproduced in this section.
- "Participants" provide a thorough description of the participant profile, summarizing the data obtained through the demographic questionnaires.
- "Materials" describe the different content and questionnaires used for the tests. It must be stressed out that testing with 360º content is challenging, due to the fact that it is an emergent technology and contents are not widely available. More information on the content developed as part of ImAc is available in D5.3 Pilot Content.
- "Experimental protocol" specifies how the general framework in Figure 8 was implemented in each pilot action.
- "Results" provide an evaluation of the pilot action, with its main outcomes. More specific details, with a thorough reproduction of all replies, are included in the full reports in the annexes.

3.1. Accessibility Content Manager: CCMA/RBB pilot action

The main features of the accessibility content manager pilot action are summarized next:

- **ACM tested:** https://imac.gpac-licensing.com/acm/
- **Users:** professional users.
- **Partner responsible for tests:** CCMA, RBB. Analysis of results performed by UAB.
- **Dates**: July 2018.
- **Format**: face-to-face**.**

The full version of methodology for the Accessibility Content Manager pilot action is included in Annex 1.

The full report with all the results is included in Annex 3.

The reports in the annex keep the original formatting. What follows is a summary of the main elements, reproducing when appropriate excerpts of the full reports.

3.1.1. Measures

The Accessibility Content Manager pilot action measured usability and preferences (see Figure 5). It was decided that immersion was not a relevant measure for this test.

For usability, SUS was used (see Annex 1).

For preferences, a specific questionnaire with the following questions was developed:

- What did you like most about the accessibility content manager?
- What did you like less about the accessibility content manager?
- What do you think could be improved, and how?
- What missing functionalities did you find?
- Was it intuitive? If not, please write why.
- Other comments: (open field)

3.1.2. Participants

Seven participants took part in the test. There were 2 females (28.5%) and 5 males (71.5%). Three participants were recruited at RBB and 4 participants were recruited at CCMA. Ages ranged 31-60, mean age being 40.5. The participants had technological expertise and experience in the field of access services, varying from 3 to 28 years. Their current jobs were defined by themselves in the following terms: 'Project engineer', 'Innovation', 'Engineer', 'TV station', 'Broadcast manager', 'research manager', 'accessibility manager'. Participants declared using different content management software in their daily work (Confluence, Wordpress, Adobe AEM, WP, WPMS, Fingertext and others).

3.1.3. Materials

Participants were given access to the accessibility content manager online, which contained a clip from the CCMA humour programme *Polònia* and a subtitle file. See D5.3. Pilot Contents for further details on the ImAc contents.

Participants were also given a document with instructions and a user guide on how to use the editor. The user guide for the accessibility content manager is available in Annex 2.

Three online questionnaires were prepared for this test: demographic, SUS and preference.

3.1.4. Experimental protocol

The experimental protocol followed the framework summarised in Figure 8. It was specifically implemented in this pilot action as follows:

- Participants are welcomed and ImAc project and the specific test is presented (face-to-face)
- Ethical clearance: participants sign informed consent forms (paper copies).
- Participants are given instructions on how to access and use the accessibility content manager by the facilitator, who also provides a quick user's guide.
- The tasks to be performed are indicated, as follows:
    - Create a new asset.
    - Upload a video.
    - Create a subtitling task.
    - Duplicate an asset.
    - Create a subtitling task in more than one language.
    - Assign the subtitling task to a user.
    - Upload an existing subtitle file to the asset.

    - Delete an asset.
    - Recover an asset from the bin.
- Participants fill in a demographic questionnaire (online form).
- Participants fill in SUS questionnaire (online form).
- Participants fill in preference questionnaire (online form).
- Participants are thanked (face-to-face).

3.1.5. Results

Results are reported for the two measures selected for this pilot action: usability and preferences. Regarding **usability**, the SUS results are shown on Figure 9. The average score is 54.6 (below average, as the average is 68). The letter grade is D, and the obtained score corresponds to the percentile rank: 17-19%. The red line indicates where the accessibility content manager is in the moment the test was performed.

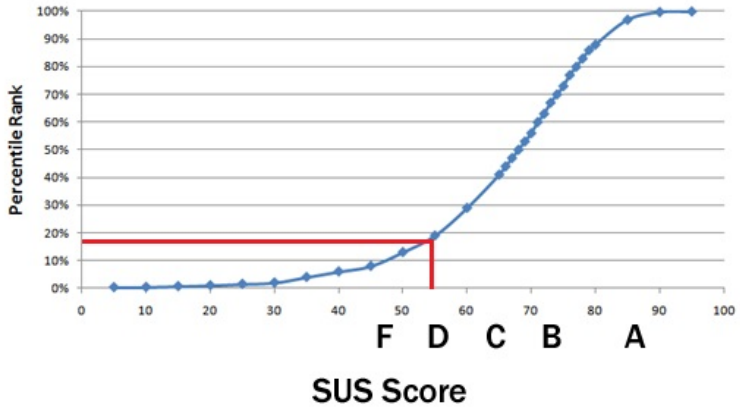


Figure 9: SUS score for Accessibility Content Manager pilot action.

Concerning **preferences**, participants positively assessed the look (icons, arrangement, style, not too much unnecessary text, responsiveness) and the possibility to manage all videos from one screen in the Accessibility Content Manager.

The aspects that were assessed less positively were: virtual folder structure (paths for assets), the functionality of adding videos, user interface interaction, bugs in certain icons, video treatment (which was deemed too slow), managing actions with mouse, and other inconsistencies and functionalities that need to be completed.

Among the items participants liked less there were some inconsistencies and some aspects to be improved such as: subtitling handling, as it is not clear how many subtitles are pre-defined in the asset; video upload: two progress bars show the same state and multiple upload of videos in assets; tooltips, which would benefit from a cleaner integration; assets webpage, which allows for different presentations (as box or as lines) but only returns to the “box” presentation after each action; html screen refresh code,

and visibility of the icons (which could be increased) and use of colours (which could be improved to distinguish different matters).

When asked about missing functionalities, two participants replied that there were none and one considered that it was still a "very first version" (P6). The other four participants provided some suggestions, such as: edit the subtitles in a WYSIWYG editor, provide an indicator for open tasks, give the possibility to add more than one subtitler at the same time for a subtitling job, set thumbnail for the video, and improve the seek video timeline. Most participants deemed the Accessibility Content Manager intuitive (71.43%). Those who replied negatively to the previous question, explained it in the following terms: "too many options to do the same work", "could be improved".

In the open comments field, three participants provided general comments indicating that the software is still under development and has to be improved, but one felt confident that "the usability could be fine once these improvements are resolved" (P4). Specific additional suggestions were made, namely: there were issues showing the password when clicking on the eye icon during login; the upload time of the video was not considered right; the icon for assigning the subtitlers was not clear or in the wrong position; the download icon while uploading a file was considered confusing, and some additional comments related to features such as preview or "Programme ID" were also made.

3.2. Subtitling web editor: UAB pilot action

The main features of the subtitling web editor pilot action are summarized next:

- **Subtitling editor tested:** http://imac.gpac-licensing.com/editor/
- **Version tested:** 23.
- **Users:** professional users.
- **Partner responsible for tests:** UAB.
- **Dates**: from 17/07/2018 to 31/07/2018 (one testing round).
- **Format**: online**.**

The full methodology for the subtitling editor pilot action is included in Annex 4.

The full report with all the results for the subtitling editor pilot action is included in Annex 6.

The reports in the annex keep the original formatting. What follows is a summary of the main elements, reproducing when appropriate excerpts of the full reports in the annex.

3.2.1. Measures

The subtitling web editor report focused on two measures: usability and preferences (see Figure 6).

For usability, SUS was used (see Annex 3).

For preferences, a specific questionnaire with the following questions was developed:

- What did you like most about the subtitle editor?
- What did you like less about the subtitle editor?
- What do you think could be improved, and how?
- Did you miss any functionality? If yes, can you tell us which?
- Do you find the feature for setting the angle for the subtitle easy to use? Explain why.

- Were the preview modes useful for you? Explain why.
- Do you think it will take you longer to subtitles videos in 360º? Why?
- Do you think 360º videos will impact your work as a subtitler?
- Other comments:

3.2.2. Participants

Twenty-seven participants took part in the test (20 females=74%, and 7 males=26%), ages ranging 24-48. Their main languages are Catalan, Spanish, Croatian, English, Basque, Polish and Romanian, and they usually subtitle in these languages. Their jobs are mainly AVT translators, subtitlers for different kind of products, university lecturers and researchers. Only one participant (3.7%) has subtitled a 360º video before. They presented a varying experience in the field of subtitling (varying from 1 month to 20 years). 16 participants (59.3%) have produced more than 300 hours of subtitled content, 3 (11.1%) between 151 and 300 hours, 4 (14.8%) between 51 and 150 hours, and 4 (14.8%) less than 50 hours. Participants declare using different subtitling software (FAB, WinCAPS, Aegisub, VisualSubSync, Subtitle Workshop, EZTitles, Swift, Subtitle Edit, TED, Amara, YouTube, Spot, VICOM, Jayex, proprietary software from clients, among others).

Most participants (26= 96.3%) have university studies: some participants have a degree or MA degree on translation and interpreting studies (or languages degrees), some of them specializing in Audiovisual Translation and some of them have PhD studies. Only 1 participant reports further education training. 24 participants (88.9%) have received specialized training on subtitling in MAs, specialized courses or training.

When asked about which devices they used on a daily basis, all participants agreed on using mobile phones; 23 participants (85.2%) use laptops; 21 (77.7%) use TV, 17 (62.9%) use PCs, and 9 (33.3%) use tablets. When asked about how often they watch virtual reality content, none of the participants have watched virtual reality content on a tablet, 23 participants (85.2%) have never watched virtual reality content in a smartphone plugged to HMD or in HMD; some (14, 5.8%) occasionally watch virtual reality content in a smartphone, 12 (44.4%) on a PC, 4 (44.4%) on a smartphone plugged to HMD and 3 (11.1%) in HMD; 1 participant (3.7%) watches virtual reality content on a PC at least once a month, and 1 participant (3.7%) in an HMD; finally, 1 participant (3.7%) watches VR content in smartphone at least once a week.

When asked to explain why they have never used virtual reality content such as 360º videos or only occasionally, 3 participants (11.1%) replied that they are not interested, 4 participants (14.8%) replied that it is not accessible, 16 participants (59.3%) replied that they have not had the chance to use it, and others (18.5%) gave other reasons such as: expensive price, difficulties to use the technology or lack of appealing contents.

When asked to state their level of agreement with the statement “I am interested in virtual reality content (such as 360º videos)”, 3 participants (11.1%) replied that they strongly agree, 13 (48.2%) replied that they agree, 7 (25.9%) that they neither agree nor disagree and 4 (14.8%) disagree.

Finally, when asked if they own any device to access virtual reality content, 15 participants (55.6%) replied that they don’t, 5 reply 18.5%) that they don’t know or prefer not to reply and 7 (25.9%) replied that they do, and later specified the following devices: BOBVR Z4, HTC Vive, PC, laptop, smartphone and PlayStation VR.

3.2.3. Materials

Participants were given access to the subtitling web editor, which contained one clip to be audio described. The clip chosen was a 1'11'' excerpt from the 04'46'' video "Life on Mars: At Home in The Habitat". This video is part of The New York Times series "The Daily 360". The full video is available here: https://www.nytimes.com/video/science/100000005108770/life-on-mars-at-home-in-the-habitat.html. The aim was to develop a test which would last less than 30 minutes, so that a short clip was prioritized.

Participants were also given a document with instructions and a user guide on how to use the editor. The user guide is available in Annex 5.

Three online questionnaires were prepared for this test: demographic, SUS, and preference.

3.2.4. Experimental protocol

The experimental protocol followed the framework established for all pilot actions (see Figure 8). It was first tested and then implemented as follows:

- Participants are welcomed and ImAc project and test is presented (by email).
- Ethical clearance: participants sign informed consent forms (online form).
- Participants fill in a demographic questionnaire (online form).
- Participants are given instructions on how to access and use the subtitling web editor (instructions online).
- Participants are instructed about the tasks to be performed, which are the following:
    - Open the video that has been assigned to the user.
    - Subtitle the video excerpt into their native language:
        - Add subtitles with the correct timecodes.
        - Assign different colors to different characters in the video.
        - Set angle for each subtitles.
        - Set a second region for the subtitles and apply it to one subtitle.
        - Change the alignment to the left for one subtitle.
        - Insert a subtitle between two existing subtitles.
        - Delete two subtitles.
        - Look for a subtitle by content.
    - Preview the video with forced mode.
    - Save the subtitles and go back to the main window.
    - Open the video again.
    - Preview the video with free mode.
    - Save the subtitles and go back to the main video.

- Participants fill in SUS questionnaire (online form).
- Participants fill in preference questionnaire (online form).
- Participants are thanked (face-to-face).

3.2.5. Results

Results were obtained for usability and preferences. Regarding **usability**, the SUS average score is 59.5 (below average, 68 or more is considered above average). Figure 10 provides a graphical representation and the red line specifies where the ImAc subtitle editor is when tested. The letter grade is D+, and the score corresponds to the percentile rank: 29-30%.

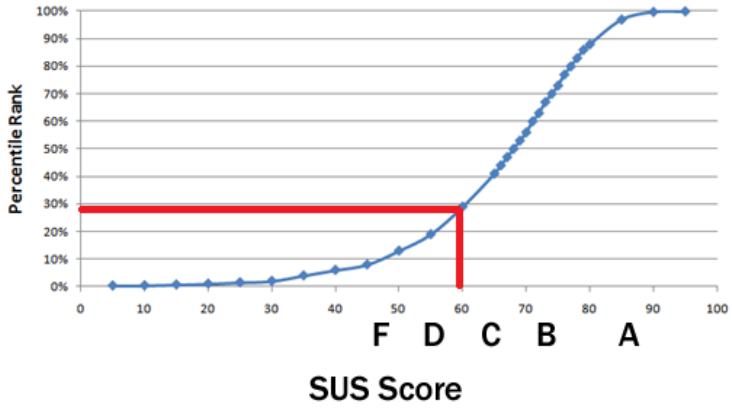


Figure 10: SUS score for subtitling web editor.

As far as **preferences** are concerned, the replies for this questionnaire were very different and specific among participants, so it is recommended to carefully look at them one by one on Annex 6, because all ideas can be interesting to implement in a new version. However, for the sake of clarity, the most relevant ideas are summarized next.

What participants liked most was that the tool was cloud based/online, it seemed to be easy and intuitive for most of them. They also highlighted as preferred elements the “set the angle” option, the interface, the reading speed thermometer, and the fast-editing options.

What participants liked least was the configuration for the default shortcuts: although participants were aware that shortcuts are customisable, they considered them uncomfortable and requested a more comfortable default setting. They did not like the buttons “fast backward” and “step backward” since they did not work properly. A functional frame by frame button to navigate the video is needed. Some users did not like the speed thermometer. They thought that it is important to get the characters per line limit and also that the thermometer should work with the parameter of cps rather than (or apart from) wps. Participants did not like they had to change modes in order to edit the subtitles, they would rather prefer to have the editing and preview modes integrated. Some users reported that the video went black several times and that they needed to load the video again to fix this issue. Some participants did not like not having enough freedom to break subtitle lines as you want to. Also, they reported that going to the next subtitle should be an automatic action.

When asked about what could be improved, most participants referred to the shortcuts, as explained above. Also, some would like to listen to the audio when moving frames forwards or backwards. As explained before, subtitlers would like to be able to preview the video in the edit mode or edit the video in the preview mode, either way, but both functionalities should be integrated to facilitate spotting.

Some participants discussed the possibility of improving the arrow in the preview/edit mode, as they considered it should be more visible. Also, some users complained about the fact that the auto-save option was deactivated each time they pressed F5 to load the video or went back to the main menu. They considered the software should remember this setting. Also, participants complained that subtitles in the subtitle list are not shown with the actual segmentation. They would like to have the subtitles in the subtitle list properly segmented. Some participants replied that the pop-up information from the control buttons covered the time codes and that was distracting. Some users suggested including general actions (and it corresponding shortcuts) such as undo, copy, paste, cut, etc.

When asked about any missing functionalities, most participants requested to have a sound wave to improve accuracy when spotting. Also, a participant requested an automatic separation by 3-4 frames between subtitles. Some participants asked about the possibility to include a spellchecker or quality assessment functionalities. Also, some participants think that segmentation needs to be customisable and more flexible (not automatically done by the editor based on the thermometer parameters).

Regarding the "set the angle" option, most users thought it was easy to use (also sometimes did not work properly), and some users find it difficult. Some participants highlighted that the arrow could be improved and be more visible. Some participants also raised their concerns regarding the level of precision and accuracy of this functionality. A participant suggested that it would be good to have an option to apply the same angle to consecutive subtitles. Also, some participants wonder what to do when the speaker is off-screen. An angle option for off-screen voices needs to be implemented. Finally, a participant suggested that s/he would prefer to move in 5-10º increments rather than in just 1º. The arrow was found a bit confusing around the 180 (135-225) and the 360 º (315-45).

As far as the preview modes are concerned, as explained before, participants thought these modes are useful, but they would like to be able to edit subtitles in the preview mode or be able to preview subtitles in the edit mode. These functions should be integrated for an optimal spotting process.

When participants were asked about the impact of subtitling 360º videos on the job of a subtitler, different opinions were presented. Some were not sure about it, others thought subtitling will take longer since they have to set the angle for the subtitle, and others thought that it should not take longer or have any impact if you have the right tools and software to edit. In general, subtitlers are a bit worried about the time-consuming tasks that this type of subtitling can bring. Also, some of them thought that subtitling is not the right way to localize 360º videos, although they probably were thinking about interlingual subtitling. Subtitling for the deaf and hard of hearing will always be necessary to access audiovisual content.

Finally, in the section "Other comments" an important issue was raised by one participant, who spotted that certain shortcuts correspond to characters in other alphabets (for instance, the Polish letter ą).

3.3. Audio description web editor: UAB pilot action

This section reports on measures, participant profile, materials, experimental protocol of the audio description web editor pilot action, and discusses its results.

- **AD Editor tested:** https://imac.gpac-licensing.com/editor/videos.php
- **Version tested:** 26.
- **Users:** professional users.
- **Partner responsible for tests:** UAB.
- **Dates**: from 22/09/2018 to 14/10/2018.

- **Testing rounds:** two rounds of testing were performed, the first one between 24.09-12.10.2018, aiming at different countries, and the second one between 3.10-19.10, aiming at US respondents thanks to a cooperation with US company RYOT. RYOT, part of the Oath brand, is a global creative studio specializing in immersive content with presence in 14 countries across five continents. Taking into account the number of completed tests in the second set, results of both rounds are presented together, using the code US for the second set.
- **Format**: online**.**

The full methodology for the AD web editor pilot action is included in Annex 7.

The full report with all the results for the AD web editor pilot action is included in Annex 9. The reports in the annex keep the original formatting. What follows is a summary of the main elements, reproducing when appropriate excerpts of the full reports in the annex.

3.3.1. Measures

The audio description web editor report focused on two measures: usability and preferences (see Figure 6).

For usability, SUS was used (see Annex 1).

For preferences, a specific questionnaire with the following questions was developed:

- What did you like most about the AD editor?
- What did you like less about the AD editor?
- What do you think could be improved, and how?
- Did you miss any functionality? If yes, can you tell us which?
- Do you find the feature for setting the angle for the AD easy to use? Explain why.
- Were the preview modes useful for you? Explain why.
- Do you think it will take you longer to audio describe videos in 360º? Why?
- Do you think 360º videos will impact your work as an audio describer?
- Other comments:

3.3.2. Participants

In the first round, 31 participants initially took part in the test and responded to the pre-questionnaire with demographic information. 21 out of 31 completed the whole test, which means that 10 participants dropped the test. The reasons expressed were technological (9.67%), personal (9.67%) and unknown (12.9%). The profile of the 21 participants who completed the test is described next. In the US round, 3 participants completed the test. This makes a total of 24 completed tests for this tool.

There were 15 females (62.5%) and 8 males (33.3%), and one user preferred not to reply to this question (4.17%), with ages ranging 25-64. Their main languages are Catalan, Spanish, Bosnian, English, Dutch, Polish, German and Swedish, and they usually audio describe in the same languages plus Croatian. Their jobs are mainly AVT translators, freelance audio describers, PhD researchers, academic lecturers, media accessibility/audio description supervisors, and project managers. Only four participants (16.67%) have audio described a 360º video before. They present a varying experience in the field of AD (from less than

1 year to around 30 years). 9 participants (37.5%) have produced more than 300 hours of AD content, 4 (16.67%) have produced between 151 and 300 hours, 4 participants (16.67%) have produced between 51 and 150 hours and 7 participants (29.17%) have produced less than 50 hours. Participants declare using different AD and subtitling software as well as video players for producing AD (Fingertext, Aegisub, FAB, Best player, Subtitle Workshop, Audition, WinCaps, Annotation Edit, ProTools, Earcatch, Google docs, F4, Swift ADePT, Starfish, Pro Tools, 3Play Media, CADET, QuickTime), but some of them use word processing tools for writing the script.

Most participants (21= 87.5%) have studies at university level, often specializing in translation or languages, but also with other specialisations in journalism or audiovisual communication. Most participants have received specific training on AD: in workshops, through company or association training, with specific courses on AD, modules in university courses, MA studies, seminars and conferences.

Participants use many devices on a daily basis (95.83% (23) mobile phone, 58.33% (14) PC, 87.5% (21) laptop, 62.5% (15) TV, 33.33% (8) tablet, 4.17% (1) other, but only one 4.17(%) reports using an HMD.

When asked about how often they watch virtual reality content, 21 (87.5%) have never watched virtual reality content in a smartphone plugged to an HMD; 2 (8.33%) occasionally watch virtual reality content in a smartphone plugged to HMD, and 1 (4.17%) watches virtual reality content in such a way at least once a month. 21 (87.5%) participants have never watched virtual reality content in HMD, 3 (12.5%) use HMD occasionally and 1 (4.17%) uses HMD at least once a week. 11 participants consume VR content in smartphone occasionally (11= 45.83%) or at least once a month (1= 4.17%). 7 (29.17%) use occasionally tablets to consume VR content and, regarding PC, 13 (54.17%) use this device occasionally and 1 (4.17%) at least once a month to access such content.

When asked to explain why they have never (or only occasionally) used virtual reality content such as 360º videos, 6 participants (25%) reply that they are not interested, 3 reply (12.5%) that they are not accessible, 12 (50%) reply that they have not had the change to use it, and 3 (12.5%) chose the option "other reasons". One of them explained in an additional comment that s/he doesn't normally access these contents because s/he thought they were just a few, but reports being surprised when accessing the project.

When asked to state their level of agreement with the statement "I am interested in virtual reality content (such as 360º videos)", 4 participants (16.67%) strongly agree, 8 (33.33%) agree, 9 (37.5%) neither agree nor disagree, 1 (4.17%) disagrees and 2 (8.33%) strongly disagree. Finally, when asked if they own any device to access virtual reality content, 11 (45.83%) replied that they don't, 5 replied (20.83%) that they don't know or prefer not to reply, and 8 (33.33%) replied that they do (including smartphone, Google cardboard, Laptop, Tablet, Virtual reality glasses and virtual reality headset, PC, Oculus Go, VR SHINECON Virtual Reality Glasses and TV).

3.3.3. Materials

Participants were given access to the web editor, which contained one clip to be audio described. The clip chosen was an excerpt of "Pearl", by 360 Google Spotlight Stories. The full clip can be watched here: https://www.youtube.com/watch?v=WqCH4DNQBUA

To select the clip, two main features were considered: the length was adequate for the test, and it included actions in different angles, posing a challenge to the audio describer.

Participants were also given a document with instructions and a user guide on how to use the editor. The user guide is available in Annex 8.

Three online questionnaires were prepared for this test: demographic, SUS and preference.

3.3.4. Experimental protocol

The experimental protocol followed the general framework established for all pilot actions and described in Figure 8. It was first tested and then implemented as follows:

- Participants are welcomed and ImAc project and test is presented (by email).
- Ethical clearance: participants sign informed consent forms (online form).
- Participants fill in a demographic questionnaire (online form).
- Participants are given instructions on how to access and use the web editor (instructions online).
- Participants are instructed about the tasks to be performed. They are requested to record the ADs. The tasks are the following:
    - Open the video that has been assigned to the user.
    - Audio describe video excerpt in native language, namely:
        - Add AD instances with the correct timecodes.
        - Set the angle for each AD instance.
        - Record the AD segments produced.
        - Insert one AD segment between two existing ones.
        - Delete two AD segments.
    - Preview the video with “forced preview” mode.
    - Preview the video with “free preview” mode.
    - Save the AD and go back to the main window.
- Participants fill in SUS questionnaire (online form).
- Participants fill in preference questionnaire (online form).
- Participants are thanked.

3.3.5. Results

Results are presented for the two measures under analysis: usability and preferences.

Regarding **usability**, the SUS average score is **55.9** (below average, 68 or more is considered above average). The letter grade is D, and the obtained score corresponds to the percentile rank: 19% (see Figure 11).

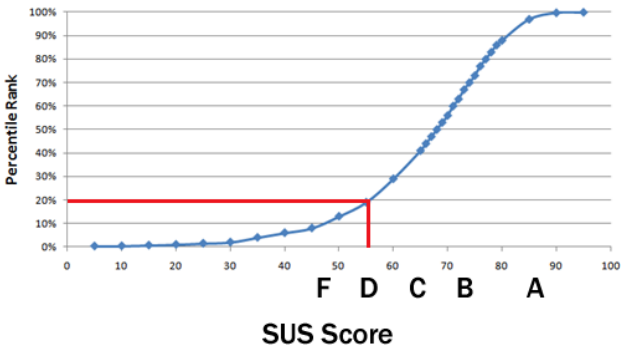


Figure 11: SUS score for web AD editor.

Regarding **preferences**, the whole list of replies is included in the full report in Annex 2, but results are summarized next. Annex 2 also includes an additional report one respondent provided after the usability test.

Participants appreciated the most that the whole process of producing AD, including recording, takes place in a single piece of software. Many comments referred to interface, which was described by participants as “very clear”, “simple”, “easy to use” and “easy to understand”. One of the comments (P9 AD) pointed to the fact that all the most important functions are displayed on one page, which facilitates the production of AD: “It is quite easy, it has shortcuts and everything is visible and easily accessible on one page (segments, controls)”. It was also appreciated that the software is available online. Also setting of the angle was assessed positively (US7 AD, US1 AD)

Many of the responses in the second question asking participants about the elements they liked the least, pointed to the problems in the recording and preview modules: they were not working properly, as described later in this summary. Also, some participants reported that the video froze.

Regarding shortcuts, the replies suggest that most participants would prefer a different, more intuitive configuration, or they would like to customise the shortcuts themselves. Regarding the recording, one response suggested that a line which would change its colour would be helpful to know when to start recording. One comment also suggested that it would be helpful to preview the produced AD in HMD.

When asked about what could be improved, many of the replies pointed to the shortcuts, recording controls and preview. One response suggested that better playback features would be needed, without the need to scroll back to change time codes (P16 AD). Some participants also reported that some buttons were frozen or they would be replying with delay. Additionally, some of the responses suggested that better video quality to see all the details would be needed.

Regarding missing functionalities, the responses suggested that the following features could be implemented: a waveform to indicate when a character starts or finishes speaking, jumping back to 5-10 frames at a time, synchrony between AD segments and video (if you click on segment, then de video also jumps to this timecode), an option to export the script to a text file for a professional recording, being able to join or separate descriptions, and at the same time add or subtract timecodes. US5 AD suggested also that more options for the fading of program audio could be added.

Regarding the "set the angle" option, most participants (75%) found it easy to use. However, one participant reported that the screen on her or his laptop would regularly turn black after trying to set the angle: the sound would remain, but the image disappeared. One response (P21 AD) suggests that this participant would prefer to set the angle only for very important situations, and not for all AD segments: "Yes, just 1 key command. But I would like to have more freedom. The tutorial tells me we need an angle for each segment. I would like to have an angle only for very important situations."

As far as the preview modes are concerned, some of the participants did not encounter any problems while using them (e.g. P2 Pilot AD: "Yes, one allows you to move, the other one makes you see your fixed angles"), but for 50% participants one or both preview modes were not working properly (e.g. P16 AD: "I think they are useful, but my video screen went black when trying them") or they could not see the difference between free and forced mode (e.g. P9 AD: "No. I could not hear myself and I did not see any difference between them"). Two participants (P33 AD and P13 AD) reported that not all of the recorded segments played in the preview mode.

When asked about whether it takes longer to audio describe videos in 360º, most of participants (79.2%) replied positively, as there are more visual details to describe, 360º content require more thorough content selection and the angles need to be set for every AD segment.

Regarding the impact of audio describing 360º videos on their AD practice, participants presented varying opinions. 58.3% of the participants consider, however, that it will impact on their work in the years. Participants who replied positively to this question mentioned the following reasons: (1) the application for this medium is vast, (2) it is a whole new approach for the production of AD.

Finally, in the section "Other comments", additional comments were made regarding the shortcuts, which in opinion of the participants should be customizable, as it would be easier to manage faster the AD 360º editor. Also, some participants reported some technological issues: problems with the recording (P2 AD) and problems playing the video (P38 AD): "stepping back and forwards in the video didn't work so well". One participant (US7 AD) added a comment about the edit mode: "I sometimes forgot to put it back in Edit mode in order to make changes. If you could make the change between modes more distinctive somehow that would be helpful." Another participant (US1 AD) commented on the review: "I would like to understand better how to output and review completed work."

4. TESTING THE INTERFACE

A pilot action at RBB and a pilot action at CCMA were used to test the player interface and the subtitling presentation modes (see Figure 5). It was decided to test both elements in the same pilot action, because the same users were targeted. However, for the sake of clarity, results are presented separately: Chapter 4 reports on the results of the tests on the user interface, both at RBB (German Pilot) and CCMA (Spanish Pilot). Chapter 5 reports on the tests on the presentation modes, again at RBB (German Pilot) and CCMA (Spanish Pilot).

The interface testing focused on the traditional menu in two devices: tablet and head-mounted display. Results are presented differentiating between the RBB and the CCMA pilot action with the following structure:

- General description of the pilot action: users, version, partner responsible, dates and format.
- Measures used, based on framework presented in Figures 7 and 8. If an ad-hoc preference questionnaire is used, it is reproduced in this section.
- Participants' description, summarizing the data obtained through the demographic questionnaires. Given that we are within the realm of media accessibility, it was decided to take a wider approach to testing and use different user profiles who claim using subtitles.
- Materials, presenting the different materials and content used for the tests.
- The experimental protocol, which follows the general framework in Figure 8.
- Results, with a discussion of the main results of the pilot action. More specific details, with a thorough reproduction of all replies, is included in the full reports included as annexes.

The full methodology for the subtitling pilot action, both for RBB and CCMA and both for interface and presentation modes, is included in Annex 10.

The full report with all the results for the subtitling pilot action for CCMA is included in Annex 11 and the full report for RBB is included in Annex 12. This full report includes data both for subtitling presentation modes and interface, which are here presented separately for easier understanding.

The reports in the annex keep the original formatting. What follows is a summary of the main elements, reproducing, when appropriate, excerpts of the full reports in the annex.

4.1. Subtitling: interface interaction (RBB pilot action)

The main features of the subtitling pilot action are summarized next:

- **Users:** home users.
- **Version** available on 19/09/2018.
- **Partner responsible for tests:** RBB.
- **Dates**: 27-28/09/2018, 15-19/10/2018.
- **Format**: face-to-face**.**

4.1.1. Measures

The user interface test focused on two measures: usability and preferences.

For usability, SUS was used. Some usability questions were also included in the preference questionnaire, after discussion among partners. The questions were the following:

- Did you use the setting "Indicator"? Yes/No
- What was the function of "Indicator"?
- Did you use the setting "Area"? Yes/No
- What was the function of "Area"?
- Which other subtitle personalisation options did you use?
- What did you like most about the ImAc Player?
- What did you like less about the ImAc Player?
- What do you think could be improved, and how?
- Did you miss any options? If yes, can you tell us which?
- Other comments:

4.1.2. Participants

12 users took part in the tests: 7 female (58.3%) and 5 male (41.7%) users, aged between 36 and 63. 5 users (41.7%) indicate German as their mother tongue, 5 (41.7%) indicate German Sign Language, 1 user indicate both German and German Sign Language (8.3%) and 2 (16.7%) indicate Serbian. Most of the users have at least secondary education studies or higher. 7 participants (58.3%) define themselves as deaf, 4 (33.3%) as hearing impaired, and one user reports having a cochlear implant. For almost all users, the impairment began at birth or below the age of 4, while for 2 users (16.7%) the impairment started between 41 and 60 years.

The technical device used most often on a daily basis is smartphones (11 users= 91.7%), followed by TV and laptop (both 9 users=75%), while tablet and PC are used less often (both 6 users= 50%). HMDs are not used by any of the participants. Almost all users (83.3%) have never watched virtual reality content before: only two report watching it occasionally (1 user) or daily (1 user) on a smartphone, one reports using it occasionally on a smartphone plugged to a HMD or in a HMD. The main reasons for not using virtual reality content are that they were not interested (33.3%) or have not had the chance to (58.3%). When directly asked if they are interested in virtual reality content, most of the testers reply positively (58.3%) while some are not sure (5=41.7%). The majority of the users (66.7%) do not own a device to access VR content, or do not know or do not want to reply (25%).

In terms of content preferences, the majority of the testers like news, fiction and documentaries, while some also like sports, talk shows and cartoons. Almost all of them use subtitles for all types of content. The smaller group of testers that do not always use subtitles explain that they only use subtitles for certain types of content or that they sometimes understand well enough without subtitles. There was an even distribution between 0 and more than 4 hours among the participants in terms of how many hours a day they consume subtitled content, and the majority of the testers use subtitles because it is their only way of accessing the dialogues.

4.1.3. Materials

For the user interface test, the traditional menu of the player was ready and content was uploaded. The content was a musical concert, *Desconcert 1*, in Catalan, with all modes and services tested (in this case subtitles) implemented in German.

Two devices were tested: HMD and tablet.

Three types of questionnaires were ready: the demographic questionnaire, the SUS questionnaire and the preference questionnaire, all in German versions.

4.1.4. Experimental protocol

The experimental protocol followed the general framework established for all pilot actions and described in Figure 8. It was first tested in a pilot test, improved, and then implemented as follows:

- Participants are welcomed and ImAc project and test is presented (face-to-face).
- Ethical clearance: participants sign informed consent forms (paper copies).
- Participants fill in a demographic questionnaire (online).
- Pilot action part 1: User interface test.
    - The facilitator explains how the ImAc player/menu works.
    - Users are requested to perform two tasks. Order of the tasks is randomized across participants.
        - Task HMD. Instructions given on paper:
            - After some seconds, pause the video.
            - Please play the video again.
            - Please change the volume.
            - Please open the menu and activate subtitles in your language.
            - Please randomly personalize subtitles, using all available options.
        - Task Tablet. Instructions given on paper:
            - After some seconds, pause the video.
            - Please play the video again.
            - Please change the volume.
            - Please open the menu and activate subtitles in your language.
            - Please randomly personalize subtitles, using all available options.
- After each task, SUS questionnaire is administered.
- After both tasks, preference questionnaire is administered.
- Pilot action part 2: presentation modes (see sub-section 5.1.4 for details).
- Participants are thanked.

4.1.5. Results

Concerning SUS, results for the tablet and HMD are presented in Figure 12 and Figure 13.

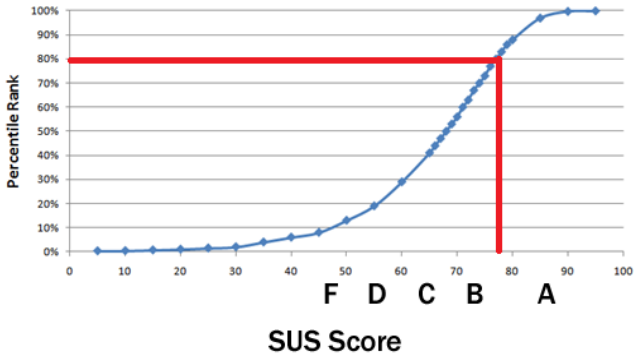


Figure 12: SUS score for HMD (RBB action).

The SUS average score for the HMD is 77.3 (above average, 68 or more is considered above average). The letter grade is B+, and our score corresponds to the percentile rank: 80%.

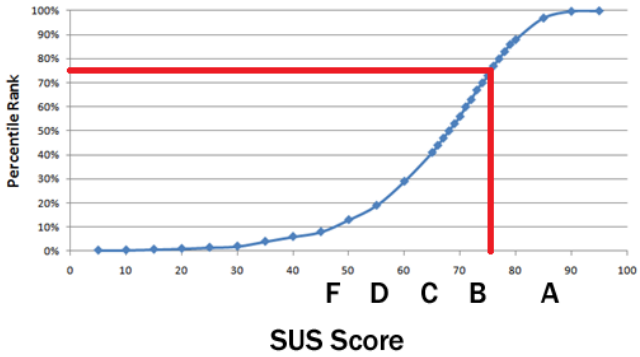


Figure 13: SUS score for tablet (RBB action).

The SUS average score for the tablet is 75.4 (above average, 68 or more is considered above average). The letter grade is B, and our score corresponds to the percentile rank: 74%.

Almost all testers completed the tasks of the user interface test without problems. However, 8 users (66.67%) had great difficulties in finding the on/off button for the subtitles and needed help with this task. It thus seems to be necessary to change the position of the on/off button in the accessibility interface.

Regarding the settings “indicator” and “area”, 10 participants (83.3%) used the first one and 11 (91.66%) used the second one as well. None of these terms were clear for the users, but at least the indicator was understood by most of them after trying. The area setting was not understood by any user because most of them only recognized the change in font size. We therefore conclude that the wording for these functions should be revised and we doubt the benefit of the area function.

Concerning positive feedback, what the testers like most about the player was the amount of personalisation settings and the clear design of the menu.

Concerning negative feedback, two users (16.6%) did not like the subtitles following their head movements (especially when tilting the head but also when turning the head) and two users (16.6%) found in difficult to find the menu in the HMD after opening it. Furthermore, it bothered many users that they did not find the on/off button and that the menu was very small on the tablet, which made it very difficult to select the options. Instead of adding a zooming function (as suggested by one user), we conclude that it might be necessary to show the enhanced accessibility interface in tablets by default.

Some improvements were suggested by participants**:** one user suggested that the subtitling submenu could be closed by clicking somewhere outside the menu in the HMD, which is already the case in the tablet mode. Another user asked for a better (or adjustable) contrast in the menu (not white/grey).

When asked about missing functionalities, two users would like to be able to customise the subtitle colour (e.g. for visual impairments regarding certain colours). Two users wanted to display subtitles and signer at the same time. One user had the idea to drag/drop the radar to a different position if it obscured an important area of the video. One user asked for a better "translation" of sound and music, e.g. with vibrations or visualizations such as spectra.

Beyond questionnaires, user observation by the facilitators allowed to identify some further interesting issues worth considering. For instance, usage of the HMD was uncomfortable for users wearing glasses, cochlear implants or hearing aids. The users wearing the last two devices asked explicitly whether it was possible to stream the audio directly to their device. The consequence was that the users either tried to use the headphones and their hearing aids together or just took off the hearing aids. The same applied for the glasses. Additionally, some users mentioned that the HMD was too heavy, and it was not comfortable to wear it for longer periods of time. The low video quality in comparison to standard resolution of TV content together with the weight and fit of the device were other reasons why users seemed not willing to wear an HMD on a regular basis.

Although users had not used 360º content in an HMD before the test, they were mainly amazed by the experience. They mentioned that they would like to see documentaries or concerts. Facilitators could see that users were partially part of the story and reacted with body movement if something came nearer. In conversation with *I, Philip,* a tester shook his head for no.

Facilitators also observed that it was easy for them to learn the usage of the controller to select an option in the menu and the large number of personalisation options was positively evaluated. The specific options like indicator and area for the usage in an HMD were not clear immediately. The testers got an idea about the functionalities once they tried them. We assume that this is part of a learning procedure and we should maybe revise the current wording. The main problem for all users was to locate the on/off button and to find the menu once it was opened as it was not in all cases in the field of view or the contrast was not high enough.

The usage on the tablet was mainly difficult because the size of the menu was too small, and we propose to use the enhanced accessibility menu for tablets and smartphones to avoid this problem. Please find all details below.

4.2. Subtitling: interface interaction (CCMA pilot action)

The main features of the subtitling pilot action at CCMA are summarized next:

- **Users:** home users.

- **Version** available on 19/09/2018.
- **Partner responsible for tests:** CCMA.
- **Dates**: 1/10/2018, 16-19/10/2018.
- **Format**: face-to-face**.**

4.2.1. Measures

The same measures were used for both RBB and CCMA user interface test, namely usability and preferences. Usability was measured by means of SUS, translated into Catalan by CCMA and validated by UAB. Some usability questions were also included in the preference questionnaire. The questions were presented in 4.1.1 and are reproduced again next for easier access:

- Did you use the setting "Indicator"? Yes/No
- What was the function of "Indicator"?
- Did you use the setting "Area"? Yes/No
- What was the function of "Area"?
- Which other subtitle personalisation options did you use?
- What did you like most about the ImAc Player?
- What did you like less about the ImAc Player?
- What do you think could be improved, and how?
- Did you miss any options? If yes, can you tell us which?
- Other comments:

4.2.2. Participants

13 participant took part in the test (7 male= 53.8% and 6 female= 46.2%) users, age ranging between 19 and 66. 6 users (46.2%) indicated Catalan as their main language, 3 indicated Spanish (23%), 3 indicated Catalan Sign Language (23%) and 1 indicated both Catalan and Catalan Sign Language (7.7%). Most of the users had at least secondary education studies, 46.13% with university degrees. 8 testers (61.5%) defined themselves as deaf and 5 as hearing impaired (38.5%). For the majority of users (69%), the impairment began at birth or below the age of 4, while for only 1 user the impairment started over 60 years.

The technical device used most often on a daily basis by participants was a smartphone (100%), followed by TV (12= 92%) and laptop (10=83.3%), while tablet had less use (6=46.15%) and PC was the less used device (5 users=38.5%). HMD was used by only one user, while another user indicated the use of a Sennheiser magnetic induction loop & a video game console. Nine of the users (69.23%) had never watched virtual reality content before, mostly because they were not interested or had not had the chance to. When directly asked if they were interested in virtual reality content, all testers replied positively. The majority of the users (8=61.5%) did not own a device to access virtual reality content, while 4 users (30.76%) owned some kind of device (cardboard, HMD, tablet, smartphone, Oculus Rift or PlayStation game console).

In terms of content preferences, the majority of the testers liked news, fiction, talk-shows and documentaries, while some also liked sports, and cartoons. Almost all of them used subtitles for all types of content. There was an even distribution between 0 and more than 4 hours among the testers in terms of how many hours a day they consume subtitled content and the majority of the testers use subtitling because it is their only way of accessing the dialogues. Those who do not activate it report that the

interface is not accessible or that they do not want subtitling in all content (for instance, sports), only in certain types.

Three types of questionnaires were ready: the demographic questionnaire, the SUS questionnaire and the preference questionnaire, all translated into Catalan.

4.2.3. Materials

The same materials described in 4.1.3 were used: the traditional menu of the player, translated into Catalan, was ready and the musical concert *Desconcert 1* uploaded, with all modes and subtitling presentation modes available in Catalan.

Two devices were available for the test: HMD and tablet.

Three types of questionnaires were ready: the demographic questionnaire, the SUS questionnaire and the preference questionnaire.

4.2.4. Experimental protocol

The same experimental protocol as for RBB tests was followed. It is described in section 4.1.4, but reproduced here again for easier access:

- Participants are welcomed and ImAc project and test is presented (face-to-face).
- Ethical clearance: participants sign informed consent forms (paper copies).
- Participants fill in a demographic questionnaire (online).
- Pilot action part 1: User interface test.
    - The facilitator explains how the ImAc player/menu works.
    - Users are requested to perform two tasks. Order of the tasks is randomized across participants.
        - Task HMD. Instructions given on paper:
            - After some seconds, pause the video.
            - Please play the video again.
            - Please change the volume.
            - Please open the menu and activate subtitles in your language.
            - Please randomly personalise subtitles, using all available options.
        - Task Tablet. Instructions given on paper:
            - After some seconds, pause the video.
            - Please play the video again.
            - Please change the volume.
            - Please open the menu and activate subtitles in your language.
            - Please randomly personalise subtitles, using all available options.
- After each task, SUS questionnaire is administered.
- After both tasks, preference questionnaire is administered.
- Pilot action part 2: presentation modes (see sub-section 5.1.4 for details).
- Participants are thanked.

4.2.5. Results

SUS scores were obtained for the traditional menu in the player interface, both when an HMD and a tablet were used. When using an HMD (Figure 14), the average score is 68.8 (above average, 68 or more is considered above average). The letter grade is C and the score corresponds to the percentile rank: 46-50%.

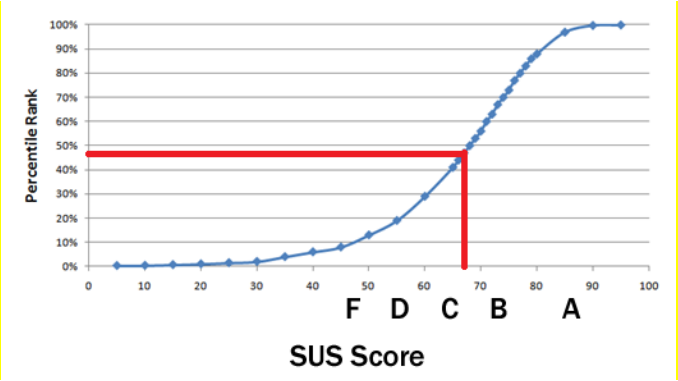


Figure 14: SUS score for HMD (CCMA action).

When using a tablet (Figure 15), the average score is 82.9 (above average, 68 or more is considered above average). The letter grade is A and the score corresponds to the percentile rank: 90-95%.

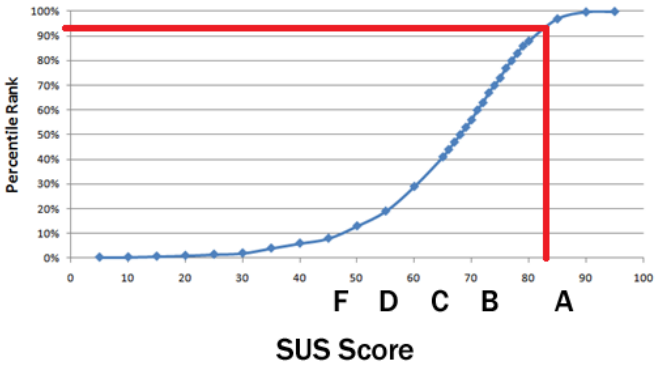


Figure 15: SUS score for tablet (CCMA action).

The user interface is well-received by all of users, because it offers the possibility to access to Immersive 360º videos adding the accessibility services adapted to this new environment.

Regarding the settings “indicator”, 100% of the users reported using it and was well understood by most users. Regarding the setting “area”, 75% of the users reported using it but understanding its real function proved challenging.

Participants also reported using most functions, such as change language, size, position on screen, indicators or background.

Concerning positive feedback, they highlighted the extensive personalisation, and they also referred to the indicator, the font selection, the simplicity of the options. They also stressed some aspects more related to the actual experience, such as the immersion and the possibility to access 360º images.

Concerning negative feedback, most users expressed their disagreement with the solution developed with the yellow pointer that is used to access the interface menus when using the HMD device. The main reason is the difficulty that it represents using it because it disappears constantly, which leads to the absolute disorientation of the user.

When asked for improvements, one of the users even made a graphical proposal (Figure 16) on how to implement the solution, recommending that the pointer is always active at a comfortable distance from the menu. Some users recommended that the pointer could be always active while the menu is ON and disappear when the menu is OFF.

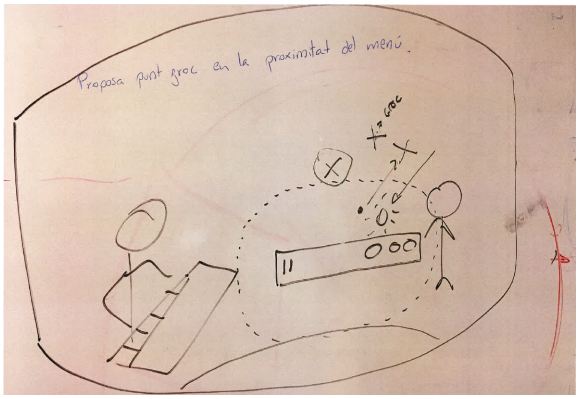


Figure 16: Suggestion by CCMA user.

Some users had difficulty finding the switch to activate / deactivate the subtitles, although they had previously been explained in detail how the interface works. Some users disagreed with the different colour of the arrow and recommended to use the same colour as the subtitle. In general terms, users were happy with the results and would like to repeat in new tests.

5. TESTING THE SUBTITLING PRESENTATION MODES

As indicated before, the interface was tested both at RBB and CCMA in the same pilot action in which presentation modes were tested. The presentation modes tested were: arrow versus radar (Figure 6).

Results are presented next, differentiating between the RBB and the CCMA pilot action, and following the same approach as in the previous chapters.

The full methodology for the subtitling pilot action, both for RBB and CCMA and both for interface and presentation modes, is included in Annex 10. The full report with all the results for the subtitling editor pilot action for CCMA is included in Annex 11 and the full report for RBB is included in Annex 12. Please notice that it includes data both for subtitling presentation modes and interface, which are here presented separately for easier understanding.

The reports in the annex keep the original formatting. What follows is a summary of the main elements.

5.1. Subtitling presentation modes: RBB pilot action

The main features of the subtitling pilot action are summarized next:

- **Users:** home users.
- **Version** available on 19/09/2018.
- **Partner responsible for tests:** RBB.
- **Dates**: 27-28/09/2018, 15-19/10/2018.
- **Format**: face-to-face**.**

5.1.1. Measures

The subtitling presentation mode test focused on two measures: presence and preferences. Presence was prioritized as the aim was to elicit if any of the two presentations modes guaranteed a higher immersion, which is one of the goals a 360º video aims to achieve.

For presence, IPQ was used (see Annex 10).

For preferences, a specific questionnaire with the following questions was developed:

- When directions need to be indicated, what system do you prefer? Arrow/Radar.
- Please explain why you prefer the above-indicated option.
- Please explain why you did not choose the other option in question 1.
- What do you think could be improved, and how?
- Would you implement another system to guide you to the user?
- How easy was to identify who was speaking on the clip with the arrow system? (1-5 Likert scale, 1= very difficult, 5= very easy) [6]
- How easy was to identify who was speaking on the clip with the radar system? (1-5 Likert scale, 1= very difficult, 5= very easy)
- Do you think you will be able to enjoy 360º videos with this type of subtitles? Explain your answer.

5.1.2. Participants

12 users, the same as in the user interface action, started the test. See section 4.1.2 for a thorough description of the users. However, data from all users could not be gathered for all questionnaires.

Regarding the presence IPQ questionnaire, data from only 10 participants were gathered because there were technical problems with the data from one user (RBB10) and another user felt uncomfortable and did not watch the videos on the HMD (RBB11). Concerning the preference questionnaire, data from participant RBB10 was also lost due to technical problems and data from participant RBB11 is based on the videos watched in the usability test. Although s/he did not undergo the same experimental conditions, data are included as they are mainly report on preferences and future suggestions.

5.1.3. Materials

For the presentation mode test, the short film *I Philip*, cut in two excerpts, was used. The plot of the short film is as follows: 23 years after Philip K. Dick's death, in 2005, David Hanson, a young engineer in robotics, revealed his first android with human form, "Phil". *I Philip* immerses the audience in the memories of what could be the last love affair of the writer. It may well be, though, that these memories are the fruit of the imagination of an android which has learned, little by little, how to become a human.

This sci-fi drama whose original language is English was subtitled into German, and two versions were created: German subtitles with arrow, and German subtitles with radar. Therefore, the stimuli for the tests were:

I Philip, part 1, subtitled in German, with arrow = Clip A1-GER.

I Philip, part 1, subtitled in German, with radar= Clip A2-GER.

I Philip, part 2, subtitled in German, with arrow= Clip B1-GER.

I Philip, part 2, subtitled in German, with radar= Clip B2-GER.

The test was performed on a HMD and the clips were available on the ImAc player.

Demographic questionnaire, IPQ questionnaire and preference questionnaire in German were also prepared in online forms.

5.1.4. Experimental protocol

The experimental protocol followed the general framework established for all pilot actions and described in Figure 8. It was first tested in a pilot test, improved, and then implemented as follows:

- Participants are welcomed and ImAc project and test is presented (face-to-face).
- Ethical clearance: participants sign informed consent forms (paper copies).
- Participants fill in a demographic questionnaire (online).
- Pilot action part 1: user interface. See 4.1.4 for details.
- Pilot action part 2: presentation modes. Participants are requested to watch two clips, one in which the arrow is implemented and one in which the radar is implemented. Order of presentation of arrow/radar is randomized across participants, but the clip always follows a chronological order because otherwise the action could not be understood.
    - Participants watch clip 1.

    - Participants watch clip 2.
- After watching each clip, participants are administered the IPQ questionnaire.
- After watching both clips, participants are administered a preference questionnaire.
- Participants are thanked.

5.1.5. Results

Results are presented for the presence questionnaire and for the preference open questions posed at the end. Regarding presence, it was measured through the IPQ questionnaire, which provides results concerning spatial presence, involvement and experienced realism. Spatial presence refers to the sense of being physically present in the virtual environment. Involvement measures the attention devoted to the virtual environment. Experience realism measures the subjective experience of realism in the virtual environment. The IPQ questionnaire features a 1 to 7 scale. Table 2 presents median values for the comparison of arrow versus radar per each scale.

Presentation mode	Spatial presence	Involvement	Experienced realism
Arrow	4.70	3.37	3.62
Radar	5.30	2.62	3.87

Table 2: Comparison of arrow versus radar (RBB).

Statistical analysis shows the following results:

- A Wilcoxon Signed-Ranks test [7] indicated that the ranks of Arrow and Radar for Spatial Presence scale are not statistically different (Z=21, p=.858)
- A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Involvement scale are not statistically different (Z =3.5, p=.276)
- A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Experienced Realism scale are not statistically different (Z =12.5, p =.799)

The p value shows the significance level of the test. It should be smaller than 0.05 for the differences to reach significance. Z is the statistics used in the Related-Samples Wilcoxon Signed-Ranks Test. This test assessed whether the distribution of two paired variables in two related samples is the same.

No significant difference in terms of presence between the arrow and the radar were found.

Concerning preferences, the majority of the users (8=72.73%) preferred the arrow because it was immediately clear and easy to understand. Those few users who preferred the radar (3=27.27%) liked it because it gave them a good overview and found it especially suitable for many speakers at the same time.

The majority of the testers did not like the radar because it was not intuitive and it was visually disturbing. Those who did not like the arrow argued that it was not precise enough when more than two speakers were present.

Regarding suggested improvements, two users (18.18%) asked for a better way to understand that an off-voice is speaking. A few testers found it difficult to follow fast conversations and suggested that either

the arrow is displayed before a person starts speaking or that the field of view can be enlarged in order to have a better overview. One user (9.9%) asked for a drag/drop function for the radar to move it away in case it obscures the video. One user had the idea to also display the depth of speakers in the radar (at least relative to each other).

There were two ideas for other guiding mechanisms: indicating the speaker position via audio (3D audio) and showing an arrow above the speakers (similar to football analysis videos). The rest of the participants (8= 72.73%) did not have any suggestions, in one case because s/he found the arrow ideal and in another case because this environment was considered very new.

When asked on a 5-point Likert scale (1= very difficult, 5= very easy) how easy it was to identify the speaker with the arrow or the radar system, results are the following: the arrow is considered easier than the radar. 6 participants (54.4%) select 4 or 5 for the arrow, whilst for the radar only 4 (36.37%) select these values.

Regarding enjoyment, most users (7= 63.63%) thought they could enjoy 360° videos with subtitles but not too often and depending on the content. A few users found the HMD uncomfortable or not technically satisfying.

5.2. Subtitling presentation modes: CCMA pilot action

The main features of the subtitling pilot action at CCMA are summarized next:

- **Users:** home users.
- **Version** available on 19/09/2018.
- **Partner responsible for tests:** CCMA.
- **Dates**: 1/10/2018, 16-19/10/2018.
- **Format**: face-to-face**.**

5.2.1. Measures

The subtitling presentation mode test focused on two measures: presence and preferences, the same already explained under 5.1.1. For presence, IPQ was used (see Annex 10), in its translated version into Catalan. For preferences, the same questionnaire as for RBB was used, translated into Catalan. It is reproduced in its English version again for easier access:

- When directions need to be indicated, what system do you prefer? Arrow/Radar.
- Please explain why you prefer the above-indicated option.
- Please explain why you did not choose the other option in question 1.
- What do you think could be improved, and how?
- Would you implement another system to guide you to the user?
- How easy was to identify who was speaking on the clip with the arrow system? (1-5 Likert scale, 1= very difficult, 5= very easy)
- How easy was to identify who was speaking on the clip with the radar system? (1-5 Likert scale, 1= very difficult, 5= very easy)
- Do you think you will be able to enjoy 360º videos with this type of subtitles? Explain your answer.

5.2.2. Participants

13 users, the same participants as for the user interface test, took part in this test. See section 4.2.2. for further details on the characteristics of the participants.

5.2.3. Materials

Since the pilot actions at RBB and CCMA followed the same methodological approach, the same film was used, in this case the short science fiction film *I Philip*, cut in two excerpts. For the Catalan pilot, the English short film was subtitled into Catalan, and two versions were created: Catalan subtitles with arrow, and Catalan subtitles with radar. Therefore, the stimuli for the tests were:

I Philip, part 1, subtitled in Catalan, with arrow = Clip A1-CA.

I Philip, part 1, subtitled in Catalan, with radar= Clip A2- CA.

I Philip, part 2, subtitled in Catalan, with arrow= Clip B1- CA.

I Philip, part 2, subtitled in Catalan, with radar= Clip B2- CA.

The test was performed on a HMD and the clips were available on the ImAc player.

Demographic questionnaire, IPQ questionnaire and preference questionnaire in Catalan were also prepared in online forms.

5.2.4. Experimental protocol

The experimental protocol is exactly the same as for the German pilot, and is explained in 5.1.4. It is reproduced next for easier access:

- Participants are welcomed and ImAc project and test is presented (face-to-face).
- Ethical clearance: participants sign informed consent forms (paper copies).
- Participants fill in a demographic questionnaire (online).
- Pilot action part 1: user interface. See 4.1.4 for details.
- Pilot action part 2: presentation modes. Participants are requested to watch two clips, one in which the arrow is implemented and one in which the radar is implemented. Order of presentation of arrow/radar is randomized across participants, but the clip always follows a chronological order because otherwise the action could not be understood.
    - Participants watch clip 1.
    - Participants watch clip 2.
- After watching each clip, participants are administered the IPQ questionnaire.
- After watching both clips, participants are asked a preference and general feedback questionnaire.
- Participants are thanked.

5.3. Results

Results are presented for the presence questionnaire and for the preference open questions posed at the end.

Table 3 presents median values for the comparison of arrow versus radar per each scale through the IPQ questionnaire, which measures spatial presence, involvement and experienced realism.

Presentation mode	Spatial presence	Involvement	Experienced realism
Arrow	5.60	4.00	3.50
Radar	5.80	4.75	3.50

Table 3: Comparison of arrow versus radar (CCMA).

Statistical analysis shows the following results:

- A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Spatial Presence scale are not statistically different (Z=36.5, p=.094)
- A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Involvement scale are not statistically different (Z=22, p=.952)
- A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Experienced Realism scale are not statistically different (Z=28.5, p=.918)

Therefore, no significant differences in terms of presence between the arrow and the radar were found.

Concerning preferences, most users (9=69.23%) preferred the arrow indicator, as it is simple and easy to understand. However, some users (4=30.76%) showed more interest in the radar, as this allows them to have much more accurate information about the position of the speakers.

Users felt that the radar was too big and interfered when trying to enjoy the video, but they agreed it is quite interesting to use this indicator, and some improvements in the design would definitely help. Some users proposed improvements which were contrasted with the interviewers through the help of hand-painted graphs on a blackboard.

When asked on a 5-point Likert scale (1= very difficult, 5= very easy) how easy it was to identify the speaker with the arrow or the radar system, results are the following: the arrow is considered easier than the radar. 9 participants (69.23%) select 4 or 5 for the arrow, whilst for the radar 7 (53.84%) select these values.

When asked if they would implement another system to guide them to the speaker, most participants did not make any suggestions as they were happy with either the arrow or the radar.

All in all, all users were really interested in ImAc subtitles implementation for immersive 360º contents, they felt very satisfied with the first results and expressed a great desire to collaborate in the future developments through the contribution of ideas.

6. CONCLUSIONS

The purpose of ImAc pilots (German pilot and Spanish pilot) is to introduce to a panel of users the tools and services developed for creating and consuming 360º contents and to gather qualitative measurements and feedback about their experience.

Pilot actions developed in the first phase have allowed to test three tools (Accessibility Content Manager, subtitling web editor, audio description web editor) and the subtitling service in terms of user interface interaction and presentation modes (arrow versus radar).

More than 80 users took part in the pilot actions (Table 4):

Pilot actions	**User profile**	**Number of users**
ACM	Professionals	7
Subtitling web editor	Professionals	27
Audio description web editor	Professionals	24
Subtitling pilot action in Germany, both for user interface and presentation modes	Home users	12
Subtitling pilot action in Spain, both for user interface and presentation modes	Home users	13

Table 4: Users involved in pilot actions 1 – first phase.

Regarding the tools, SUS scores are generally below average (68 or more is considered above average) and on the D range for the three tools (Figure 17). This is justified by the fact that the tools are under development and feedback has been sought from users at an early stage. Users have often mentioned the fact that tools seem at an early stage but have lot of potential. The invaluable input provided by means of the post-questionnaires will allow improving them in new versions.

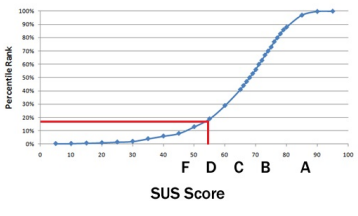
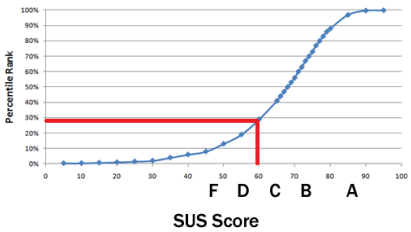
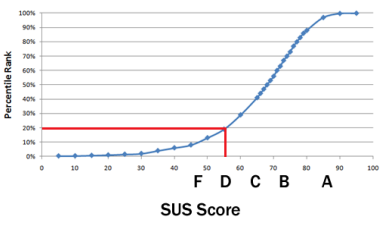
ACM: 54.6	Subtitling editor: 59.5	AD editor: 55.9
		

Figure 17: SUS scores: ACM, subtitling editor and AD editor.

Regarding the user interface, SUS scores differ for HMD and tablet, especially at CCMA. Figure 18 summarizes the results.

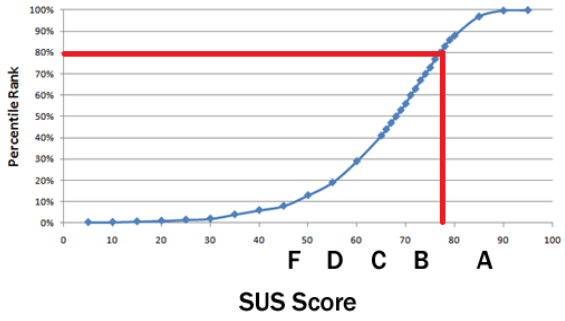
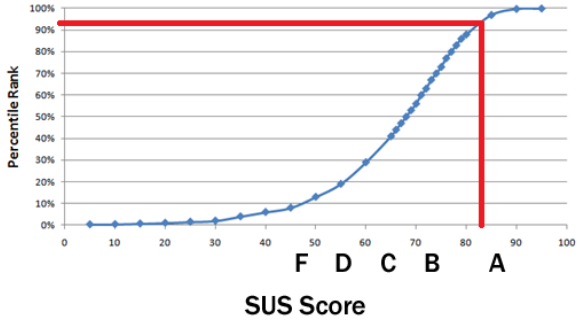
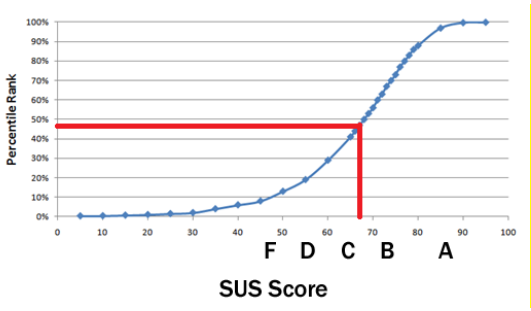
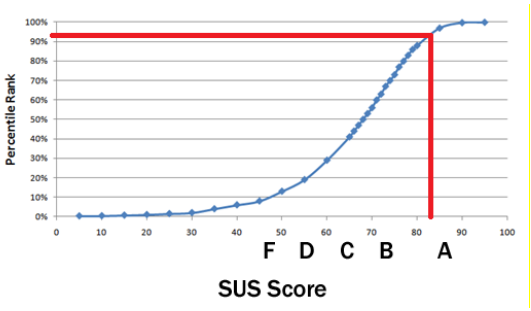
<table>
<tr><td>RBB- HMD: 77.3</td><td>CCMA-HMD: 68.8</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>RBB-Tablet: 75.4</td><td>CCMA-Tablet: 82.9</td></tr>
<tr><td> 
</td><td> 
</td></tr>
</table>

Figure 18: SUS scores: traditional menu.

Users seem to prefer the traditional menu on a tablet rather than on a HMD, and suggest through the post-questionnaire some improvements, mainly related to the wording of certain features (for instance, “area”), the activation and deactivation of subtitles on the menu and the use of the yellow pointer. Overall, users are attracted by the technology and show interest, providing valuable feedback that can help improve ImAc tools.

Regarding the presentation modes, users prefer the arrow rather than the radar (Table 5).

Presentation mode	**RBB**	**CCMA**
Arrow	72.73%	69.23%
Easiness of the arrow	54.4%	69.23%

Table 5: Preferences of users.

72.73% of users at the RBB pilot action select the arrow when directly asked and 54.4% give a 4 or 5 value on a 5-point Likert scale to the arrow when asked about how easy it was to find the speaker through this mechanism. At the CCMA pilot the percentages are 69.23% of participants showing a preference for the system and the same percentage selecting high values in relation to the easiness of this guiding mechanism.

Concerning presence, median values were obtained from the IPQ tests and a non-parametric test was prioritized due to the reduced sample size. Results at RBB and CCMA show that differences in terms of presence for both guiding mechanisms (arrow, radar) are not statistically significant. A further test (Independent Samples Mann-Whitney U Test [8]) was performed to compare RBB and CCMA results per scale and symbol, with the results indicated next:

- The distribution of arrow for spatial presence is the same across categories (Mann–Whitney U =73.00; p = .648).
- The distribution of arrow for involvement is different across categories (German: 3.7; Catalan: 4). (Mann–Whitney U =102.00; p = .021).
- The distribution of arrow for experienced realism is the same across categories (Mann–Whitney U =61.00; p= .832).
- The distribution of radar for spatial presence is the same across categories (Mann–Whitney U =83.50; p= .257).
- The distribution of radar for involvement is different across categories (German: 2.62; Catalan: 4.75). (Mann–Whitney U =110.00; p = .004)
- The distribution of radar for experienced realism is the same across categories (Mann-Whitney U =60.50; p = .784).

These results show that there are statistically significant differences in the involvement of users in Germany and in Barcelona: users in Barcelona are more involved in the 360º content. However, the differences are not related to the guiding mechanisms used. One could wonder whether they may be related to cultural differences or maybe to the users' interest: in this regard, when asked about their interest about virtual reality content such as 360º videos previous to the test, 58.3% of the German users seemed interested while the percentage rose to 100% in the Catalan users.

Apart from objective indicators, participants also provided valuable feedback and recommendations in the post-questionnaire.

To sum it up, most users have responded actively to all pilot actions developed in the ImAc project, suggesting improvements that have been translated into requirements and have been transferred into the tools and services development.

7. REFERENCES

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ANNEX 1. ACCESSIBILITY CONTENT MANAGER METHODOLOGY

1. What to test?
   - ACM: http://imac.gpac-licensing.com/acm/

2. Methodology: overview
   - **Research tools**: questionnaire.
   - **Measures:** usability and preferences.
   - **Participants:** 3-4 professional content managers and related professionals.
   - **Materials:** web editor, 360º video (*Polònia*) and subtitle file.
   - **Experimental protocol:** users will be asked to perform certain tasks and then report on the usability and preferences through an online questionnaire.
   - **Reporting:** results will be included in a report created by UAB. This will be done exporting data from the Google Form, so partners do not need to create a specific reporting document.
   - **Please make sure you test the experimental protocol below before the actual pilot action and that you have all materials and ethical forms ready.**

3. Methodology: experimental protocol

   - **Welcome and ethical clearance:** users are welcome and sign information sheets and consent forms. They are available under WP1/Project Management/0Deliverables/D1.2. Ethical Considerations/Ethical forms: information and consent forms. Please remember to sign them and provide original copies to UAB.
   - **Short presentation by facilitator:** the facilitator gives a short presentation on the main features of the ACM, and provides participants a quick user's guide. The guide is available here: https://drive.google.com/open?id=1OGkDhg74zcanWDi-yWAKK7cHMnB-vF7y
   - **Tasks**. Participants are asked to perform a series of tasks individually on a computer where the materials are available. Please make sure that the video file name and the subtitle file name is different for every user if they are interacting with the ACM at the same time.

     Suggested names for CCMA: Polonia_CCMA_P1, Polonia_CCMA_P2, etc. (where P is participant)

     Suggested names for RBB: Polonia_RBB_P1, Polonia_RBB_P2, etc (where P is participant)

     Please provide the following written instructions to participants.

     Thanks for agreeing to take part in this test. We kindly ask you to please perform the following tasks using the video and subtitle file provided. When you finish, you will be asked to reply to a questionnaire.

     1. Create a new asset.
     2. Upload a video.
     3. Create a subtitling task.
     4. View report.
     5. Duplicate an asset.

6. Create a subtitling task in more than one language.
7. Assign the subtitling task to a user.
8. Upload an existing subtitle file to the asset.
9. Delete an asset.
10. Recover an asset from the Bin.

Once you finish, please reply to questionnaire available on this link:
https://goo.gl/forms/5tQ9uEShqVMC3IzB2

4. Questionnaire

It will be provided to the participants using an online form, but is included below for reference. https://goo.gl/forms/5tQ9uEShqVMC3IzB2

1. Sex: female/male/other/I prefer not to reply
2. Age: (open numeric field)
3. Please describe your current job: (open field)
4. For how long have you been working in the field of access services? (open field)
5. What content management software do you normally use? (open field)
6. After performing the previous tasks, please score the accessibility content manager.

	Strongly disagree				Strongly agree
1. I think that I would like to use this system frequently	1	2	3	4	5
2. I found the system unnecessarily complex	1	2	3	4	5
3. I thought the system was easy to use	1	2	3	4	5
4. I think that I would need the support of a technical person to be able to use this system	1	2	3	4	5
5. I found the various functions in this system were well integrated	1	2	3	4	5
6. I thought there was too much inconsistency in this system	1	2	3	4	5
7. I would imagine that most people would learn to use this system very quickly	1	2	3	4	5
8. I found the system very cumbersome to use	1	2	3	4	5
9. I felt very confident using the system	1	2	3	4	5
10. I needed to learn a lot of things before I could get going with this system	1	2	3	4	5

7. Now please reply to the following questions in your own words.

- What did you like most about the accessibility content manager?
- What did you like less about the accessibility content manager?
- What do you think could be improved, and how?
- What missing functionalities did you find?
- Was it intuitive? Yes / No. If not, why?
- Other comments.

ANNEX 2. USER GUIDE: ACCESSIBILITY CONTENT MANAGER

ImAc editor - Content Manager - Quick User Guide

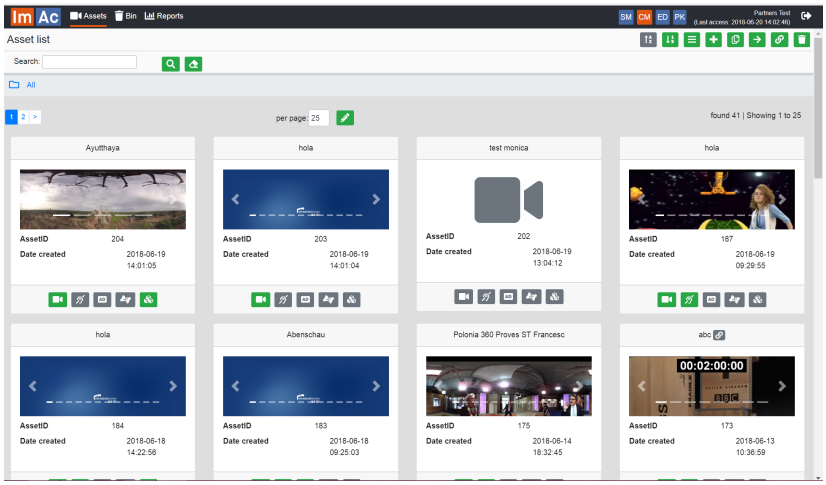
Definition

This content manager has been developed with the aim of managing the implementation of access services: subtitles (SUB), sign language (SL) and audio description (AD) in audiovisual content in 360 degrees. You can upload content, assign different tasks to different access services creators in different languages, and so on. In order to access it, you need to go to: http://imac.gpac-licensing.com/acm/.

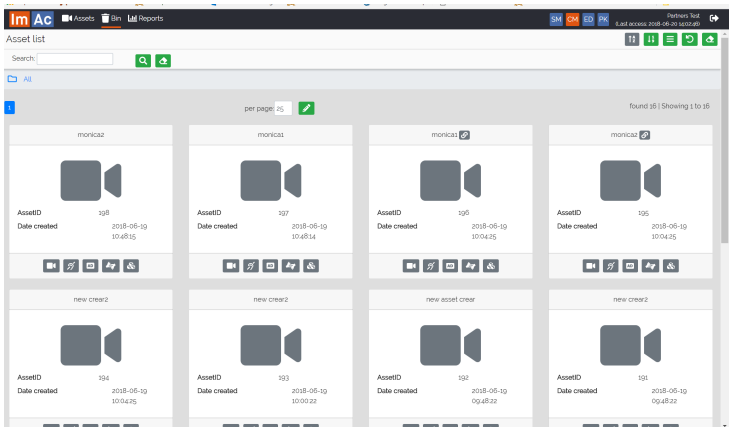
You have three **different sections** in the Content Manager 

.

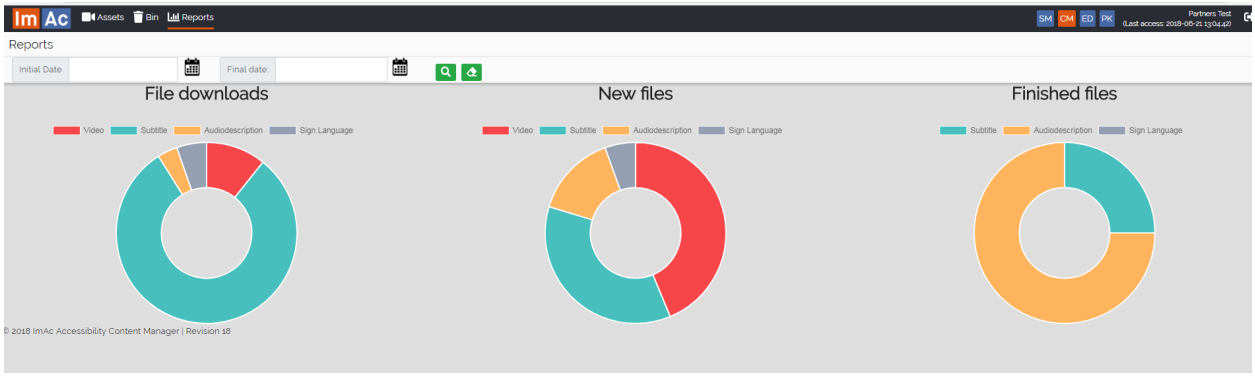
1) Assets: the working assets are located in this section of the Content Manager. **This section will be explained in more detail in this document.



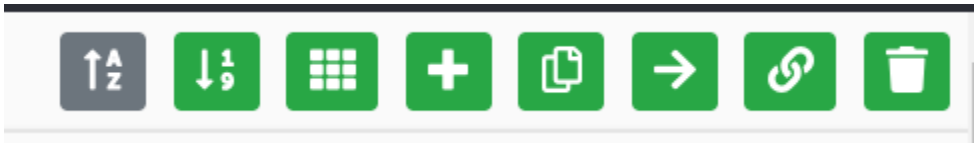
2) Bin: the deleted assets are located in this section. You can restore  or delete  assets, selecting the file and clicking on the right icons.



3) Reports: statistics about the percentage of videos with SUB, AD, SL, with the possibility to be filtered by date.



In the **Assets section, there are several options:



We will explain it following the icons order from left to right.

1)  We can sort items alphabetically or numerically.

2)  We can change the view from list to thumbnails or vice versa. With the list view, we can also sort items by AssetID, Title, Date created, Last modified, Created by, Updated by, and by which services are available for that content.

3)  We can add new assets. To do so, we click on the icon, name the new asset and select the video to be uploaded (drag & drop option available).

4)  We can copy existing assets.

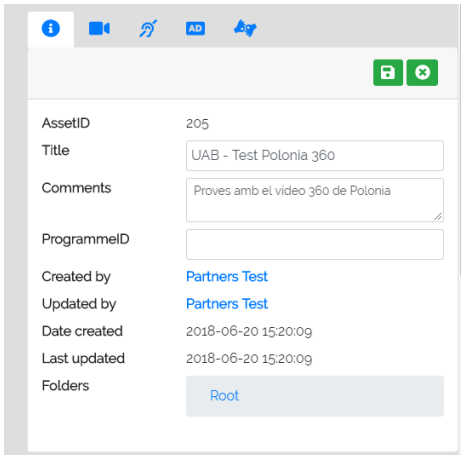
5) We can move assets (from one folder to another).

6) We can link assets.

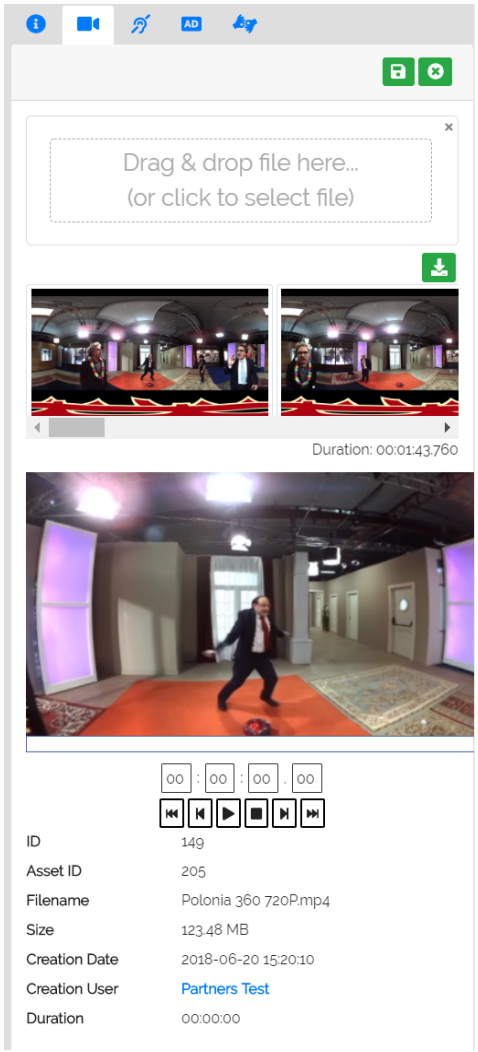
7) We can send assets to Bin.

In order to edit an asset, we just need to click on it, and the Edit menu will appear on the right side of the app. In the Edit options of the assets, we can do several things:

1. Modify/update the general information of the asset:



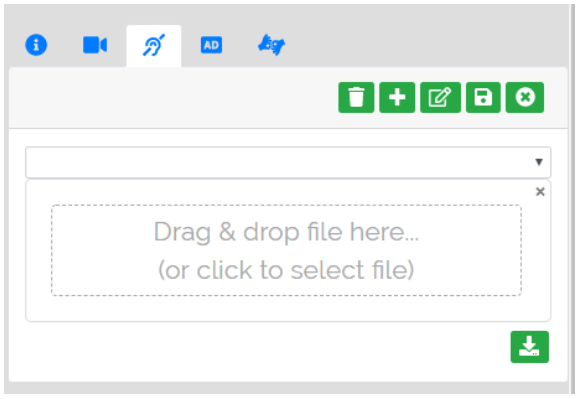
2. Previsualise the video, upload it again or download it.



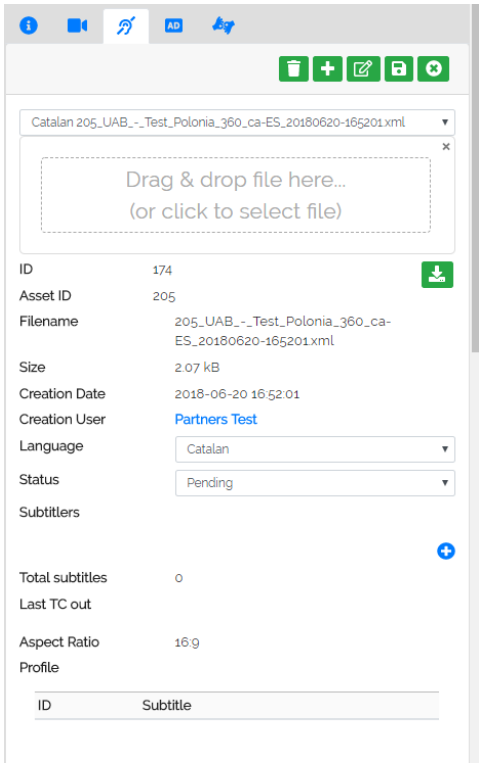
3. Subtitles:

You can:

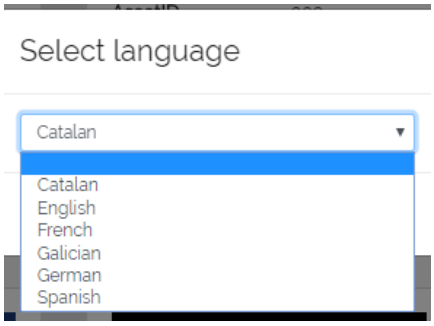
1) Upload a subtitles file with drag & drop option.

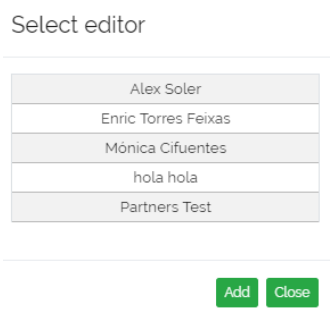


2) Delete existing files.
3) Create new instances of subtitles.



a) You can select the language and select the editor.

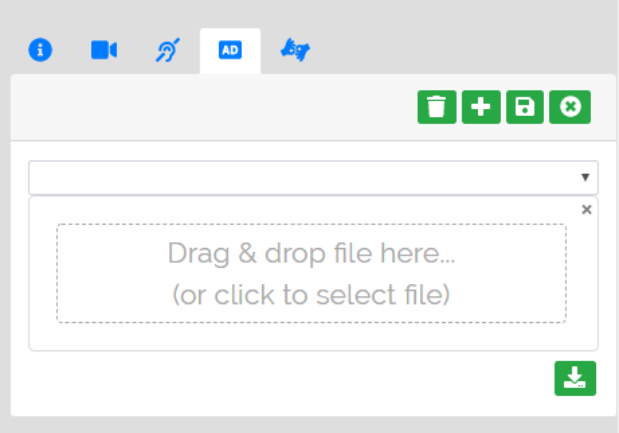




b) Go to edit the subtitles.

c) Download the subtitles file.
d) Save changes and close.

4. AD and SL have the same options: Upload an AD/SL file with drag & drop option, delete existing files, create new instances of AD/SL (you can select the language) and select the editor, go to edit subtitle, save changes and close. However, these options are not available yet. They will be activated in the near future.



ANNEX 3. ACCESSIBILITY CONTENT MANAGER REPORT

1. General information

- **ACM tested:** http://imac.gpac-licensing.com/acm/
- **Partner responsible for tests:** UAB.
- **Date of test**: July 2018
- **Research tool:** online questionnaire (Google forms)
- **Link to online form:** https://goo.gl/forms/5tQ9uEShqVMC3IzB2
- **Measures:** usability and preferences
- **Participants:** 7
- **Methodology of the test:** https://drive.google.com/open?id=1dhC-_KCi1_NnU3HdNZrnM4GjKwD5JU8s
- **User guide:** https://drive.google.com/open?id=1OGkDhg74zcanWDi-yWAKK7cHMnB-vF7y

2. Demographic profile of participants

In the first part of the online questionnaire, participants were asked to answer to six demographic questions. Link to responses:

https://drive.google.com/open?id=0BxHNRvh9EAESRGt2VVFBU1NqbGJaTWdoeXVZU25QbERrWmRR

- Demographics for users:
    1. **Please select where you are performing this test:** (3) 'RBB', (4) 'CCMA'
    2. **Sex:** (2) 'Female', (5) 'Male'
    3. **Age:** '43', '31', '46', '60', '55', '50', '59'
    4. **Please, describe your current job:** (2) 'Project engineer', 'Innovation', 'Engineer', 'TV station', 'Broadcast manager', 'research manager', 'accessibility manager'.
    5. **For how long have you been working in the field of access services?** '9', '5', '3', '15', '10', '28', '5'
    6. **What content management software do you normally use, if any?** 'None', 'Confluence (as Wiki), Wordpress (CMS for websites)', 'Adobe AEM, WP, VPMS…', 'Anglatecnic Fingertext', 'Our own' (reply provided by CCMA participant), 'Anglatecnic', 'Eventually content management software user, but with high acknowledge about content management'.

Summary: Seven participants took part in the test (2 females and 5 males), with ages ranging 31-60. The participants had technological expertise and experience in the field of access services (varying from 3 years to 28 years). However, as only a reduced number of participants took part in this test, its results cannot be extrapolated to a wider population. Participants declared using different content management software in their daily work (Confluence, Wordpress, Adobe AEM, WP, WPMS, Fingertext and others).

3. System Usability Scale (SUS) results

3.1. Scores (question by question)

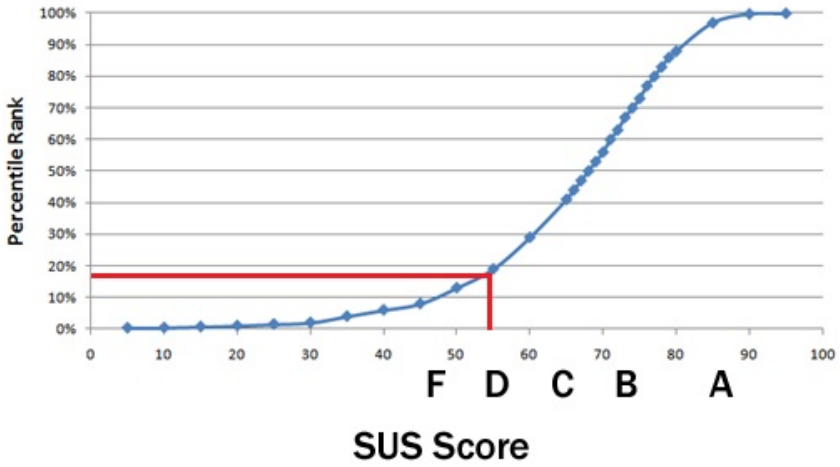
1 – strongly disagree / 5 – strongly agree

SUS statements	1	2	3	4	5
1. I think that I would like to use this system frequently	0 (0%)	3 (42,9%)	2 (28,6%)	2 (28,6%)	0 (0%)
2. I found the system unnecessarily complex	0 (0%)	3 (42,9%)	3 (42,9%)	1 (14,3%)	0 (0%)
3. I thought the system was easy to use	1 (14,3%)	2 (28,6%)	2 (28,6%)	2 (28,6%)	0 (0%)
4. I think that I would need the support of a technical person to be able to use this system	2 (28,6%)	3 (42,9%)	1 (14,3%)	1 (14,3%)	0 (0%)
5. I found the various functions in this system were well integrated	0 (0%)	2 (28,6%)	0 (0%)	5 (71,4%)	0 (0%)
6. I thought there was too much inconsistency in this system	0 (0%)	1 (14,3%)	3 (42,9%)	2 (28,6%)	1 (14,3%)
7. I would imagine that most people would learn to use this system very quickly	0 (0%)	2 (28,6%)	2 (28,6%)	2 (28,6%)	1 (14,3%)
8. I found the system very cumbersome to use	1 (14,3%)	2 (28,6%)	2 (28,6%)	2 (28,6%)	0 (0%)
9. I felt very confident using the system	1 (14,3%)	1 (14,3%)	4 (57,1%)	1 (14,3%)	0 (0%)
10. I needed to learn a lot of things before I could get going with this system	2 (28,6%)	3 (42,9%)	1 (14,3%)	1 (14,3%)	0 (0%)

3.2. Summary

The SUS average score is **54.6** (below average, as the average is 68). This score is not a percentile ranking.

The graph below shows how the SUS scores associate with the percentile ranks and letter grades[1]. The red line specifies where the ACM is at this moment.



The letter grade is D, and the obtained score corresponds to the percentile rank: 17-19%[2].

The excel spreadsheet with scores calculations can be consulted here:

https://docs.google.com/spreadsheets/d/1nUT8o9-Vxq5vT8zATgvnp-WdWOVIFuH8w1KFClJZPiA/edit?usp=sharing

4. Results from open preference questions

4.1. Results (question by question)

1. **What did you like most about the accessibility content manager?**
   P1: Clear arrangement.
   P2: Clear icons, not too much unnecessary text.
   P3: Clean style.
   P4: The look of the WEB GUI.
   P5: Quick responsive.
   P6: The look and the possibility to manage all videos from one screen.
   P7: Looks visually nice and intended to be intuitive.

[1] Sauro, J. 2011. Measuring usability with the System Usability Scale (SUS). Retrieved from http://www.measuringu.com/sus.php

[2] Sauro, J. & Lewis, J. R. 2016. *Quantifying the user experience: Practical statistics for user research*. Amsterdam: Morgan Kaufmann, p. 203-204.

2. **What did you like less about the accessibility content manager?**

P1: The virtual folder structure/paths for assets.

P2: Could look more modern, I was able to add videos to assets, that already got a video inside.

P3: UI Interaction.

P4: Still too many bugs. Icons don't always reflect the State in an easy way (for example green icons to edit accessibility content when accessibility content has not still been created). Uploaded subtitle files did not allow editing from the subtitle editor.

P5: Video treatment… too slow or not enough refresh.

P6: Most of action are manage with mouse, it's not clear to use.

P7: Still to be completed some functionalities and inconsistences.

3. **What do you think could be improved, and how?**

P1: The subtitle handling. It is not instantly clear what and how many subtitles are pre-defined in the asset.

P2: Video upload: 2 progress bars that show the same state, multiple upload of videos in assets.

P3: Tooltips, cleaner integration.

P4: I still see too many bugs, as for example the upload of subtitles did not work for twice, but it did work after refreshing the webpage. The ASSETS webpage allows two different presentations (as box or as lines), but after every action the presentation returns to "box" look, so it does not allow to personalize the ASSETS presentation.

P5: Html screen refresh code.

P6: Some icons must be more visible, more colours to distinguish different matters.

P7: Some inconsistences.

4. **What missing functionalities did you find?**

P1: None.

P2: Edit the subtitles in a WYSIWYG editor; set thumbnail for the video (lot of black screens in the beginning, not easy to filter the right asset), An indicator for open tasks, like indicators on iOS for mails etc.

P3: No.

P4: I missed the possibility to add more than one subtitler at the same time for a subtitling job. When multiple subtitles assets are active, it's not easy to discern which subtitle is chosen to be edited.

P5: Seek video timeline doesn't work properly.

P6: Still very first version.

P7: As the software is in development I found too many functionalities that must be improved.

5. **Was it intuitive?**

P1: Yes.

P2: Yes.

P3: No.

P4: Yes.

P5: No.

P6: Yes.

P7: Yes.

6. If you answered 'no' in the previous question, please write why:

P5: Too many options to do same work.
P7: Yes but could be improved.

Other comments:

P2: Login: You cannot click on the eye icon to show your password; upload time of the video is not right, add icon for assign the subtitlers is not clear / wrong position).
P3: 1 & 2. Video Upload --- There is already an download icon while uploading the file, which is a bit disconcerning. What does ProgrammeID mean, is it mandatory?
Detailed Preview – what is the idea behind. Within the preview popup there are 3 "?" or "!"?
P4: I still see too many details to be improved, so the usability could be fine once these improvements are resolved, but not before.
P5: A lot of improvements needed.
P7: The software is still under development and have to be improved.

4.2. Summary

Participants positively assessed the look (icons, arrangement, style, not too much unnecessary text, responsiveness) and the possibility to manage all videos from one screen in the Accessibility Content Manager.

The virtual folder structure, adding videos, paths for assets, UI interaction, icons (which should be more accurate), video treatment (which was deemed too slow), managing actions with mouse and other inconsistencies and some functionalities that need to be completed were assessed less positively in the open questions.

Among the things that could be improved, participants enumerated integration, the assets webpage, html screen refresh code, the subtitle handling, some icons that must be more visible, video upload, tooltips, more colours to distinguish different matters and other inconsistencies.

When asked about the missing functionalities, participants provided the following responses: edit the subtitles in a WYSIWYG editor, an indicator for open tasks, the possibility to add more than one subtitler, set thumbnail for the video, seek video timeline. Most of the participants deemed the Accessibility Content Manager intuitive (71,43%).

Participants who provided the answer 'no' in the question about the intuitiveness of the Accessibility Content Manager provided the following responses when asked about why they consider the system unintuitive: 'too many options to do the same work', 'yes but could be improved'.

Among other comments, assigning subtitlers, video upload, preview, uploading time of the video, difficulties with login appeared. All in all, participants consider that, as the Accessibility Content Manager is under development, further improvements are needed.

ANNEX 4. SUBTITLING WEB EDITOR METHODOLOGY

1. What to test?
   - Subtitle Editor: http://imac.gpac-licensing.com/editor/videos.php
   - Access: each participant will have their exclusive user and password.

2. When?

   From 17th July to 31st July.

3. Methodology: overview
   - **Research tools**: online questionnaires (Google Forms).
   - **Measures:** usability and preferences.
   - **Participants:** 30 professional subtitlers from different countries.
     - **Recruitment criterion**: professional subtitlers who professionally subtitle audiovisual content.
   - **Language of the test:** English.
   - **Materials:** subtitle editor and 360º video (*Life On Mars: At Home In The Habitat | The Daily 360 | The New York Times*).
   - **Experimental protocol:** users will be asked to perform certain tasks and then report on the usability and preferences through an online questionnaire.
   - **Reporting:** results will be included in a report created by UAB. This will be done exporting data from the Google Form.
   - **Please make sure you test the experimental protocol below before the actual pilot action and that you have all materials and ethical forms ready.**

4. Methodology: experimental protocol

   - **Online test:** the users will access this test online, via email plus Google Forms, and there will be no supervision or facilitators involved. The test will include different steps (some info will be in the email, and some other in the Google Forms, see the table below):

Section	Description	Where?
Section 1	Welcome and presentation of the ImAc project and the test.	E-mail
Section 2	Ethical clearance: information sheet and consent form to be approved by the participant.	Google Form: https://docs.google.com/forms/d/e/1FAIpQLSfNnUf6nezRDjJ-m4v___rnhb-3K0B5v4qpLd0fgo_xCjbk2A/viewform?c=0&w=1&usp=mail_form_link

Section 3	Demographic questionnaire.	Google Form: https://docs.google.com/forms/d/e/1FAIpQLSeOX3vbXmQgApjROu4zw7RK5lYeZNrASMFheRZrAngsTjNc6A/viewform?c=0&w=1
Section 4	The following items with be introduced: - Quick User Guide - The participants will be asked to read the Quick User Guide before performing the requested tasks. - Login information to access the subtitle editor. - Tasks to be performed.	E-mail (link to PDF): - Quick User Guide: https://drive.google.com/open?id=1y2d6khGiJ0RkoK6FNRH7SoD61EvL2A3r - Instructions sheet: https://drive.google.com/open?id=1noc9D0FNx705sVcShhN71Agfu_u-1D6S
Section 5	SUS questionnaire & Preference questionnaire.	Google Form: https://docs.google.com/forms/d/e/1FAIpQLSciWulXXCKnP8TuZD7NmdufvPsbql692nqPOZTfFGdZaThQbg/viewform?c=0&w=1
Section 6	Thank participants and follow up.	Section included in the Google Form from Section 5.

- **Materials**. The video to be used will be Life On Mars: At Home In The Habitat | The Daily 360 | The New York Times (https://www.youtube.com/watch?v=zqK_tm9lBHs). The duration of the video is 00:04:46. The video will be in low resolution to avoid overloading the server and make the subtitling task smoother.
- **Recruitment & User Code Assignment**.

  We will recruit participants via contacts, by email/social networks, etc. The test has been designed in English so that professionals from different countries can participate. Once we have a list of participants, we will contact them by email to provide instructions and access to the online form and web editor.

  We will create 30 different users (P01-P30) with the role of subtitler and each user will be assigned a video (same video for all users). The login information will be provided by email to the users. Then, they will access the ImAc subtitle editor and they will only have access to one video in the Editor module.

  This user name will be the user code that they will need to enter in the different questionnaires when requested.
- **Contact**:

To conduct the test, professional subtitlers (who have previously agreed on participating) will be contacted by email:

Subject: Test for ImAc subtitle editor - Instructions

Dear participant,

First of all, many thanks for participating in our study.

The **aim** of the test is to gather feedback from professional users like you regarding the ImAc web subtitle editor for 360º content that we have developed. This feedback will enormously help us to improve the tool and make it better for professional subtitlers to use it in the future.

This test is built in relation to ImAc (Immersive Accessibility) project. The goal of ImAc project is to explore how accessibility services (such as subtitles, audio description, or sign language) can be integrated with immersive media. http://www.imac-project.eu/

This test will approximately take **30 minutes**.

YOUR USER CODE IS: PXX.

These are the steps that you need to follow **in this order**:

1) Give your consent to participate in this test by filling this form and clicking on YES.
https://docs.google.com/forms/d/e/1FAIpQLSfNnUf6nezRDjJ-m4v___rnhb-3K0B5v4qpLd0fgo_xCjbk2A/viewform?c=0&w=1&usp=mail_form_link

2) Provide some information about yourself, by replying to the following questionnaire:
https://docs.google.com/forms/d/e/1FAIpQLSeOX3vbXmQgApjROu4zw7RK5lYeZNrASMFheRZrAngsTjNc6A/viewform?c=0&w=1

3) Perform a few tasks with the subtitle editor.

1. Please first read the Quick User Guide to get familiar with the tool:
   https://drive.google.com/open?id=1y2d6khGiJ0RkoK6FNRH7SoD61EvL2A3r
2. Now read the instructions and proceed with the test:
   https://drive.google.com/open?id=1noc9D0FNx705sVcShhN71Agfu_u-1D6S
   This is your login information:
   - User: / Password:

4) Tell us about your experience with the editor by replying to the following questionnaire:
https://docs.google.com/forms/d/e/1FAIpQLSciWulXXCKnP8TuZD7NmdufvPsbql692nqPOZTfFGdZaThQbg/viewform?c=0&w=1

5) Let us know by email that you have finished the test so that we can confirm that your data has been correctly registered.

The test will be open from today until the 31st of July. You can proceed with the test any time during this time frame but you should do it **in just one session**.

If you have any question or technical issue, please feel free to contact me any time.

Please, confirm that you have received this email and that you understand the instructions.

Thank you again for your collaboration!

All the best,

- **Tasks**. Participants are asked to perform a series of tasks individually on their own computers. The material will be available in the subtitle editor. They will need to access the subtitle editor and perform the tasks in the video that has been assigned to them.

  The duration of the video is 00:04:46, but the professionals will be requested to subtitle from 00:00:00 to 00:01:11.

  The instructions will be provided in a PDF document available here: https://drive.google.com/open?id=1noc9D0FNx705sVcShhN71Agfu_u-1D6S

5. Questionnaires

Questionnaires will be provided to the participants using online forms, but is included below for reference.

Demographic questionnaire addressed to professional users

1. **Sex**
   a) Female
   b) Male
   c) Other
   d) I prefer not to reply
2. **Age**:
3. **Main language**:
4. **Please, describe your current job**
5. **Have you ever subtitled a 360º video?** Yes / No
6. **For how long have you been working in the field of subtitling?**
7. **How many hours of subtitling have you produced in your professional life**?
   a) Less than 50 hours

   b) 51-150 hours

   c) 151-300 hours

   d) More than 300 hours

8. **In what language or languages do you normally subtitle?**
9. **What software do you normally use?**
10. **Please indicate your level of studies.**

a) Primary education
b) Secondary education
c) Further education. Please specify _____
d) University. Please specify _____

11. **If you replied "Further education" or "University" in the previous question, please specify.**

12. **If you have received specific training on subtitling, please indicate it here.**

13. What devices do you use on a daily basis? Multiple replies are possible.

a) TV
b) PC
c) Laptop
d) Mobile phone
e) Tablet
f) HMD
g) Other:_____

14. How often do you watch virtual reality content (for instance, 360º videos)?

	Never	Occasionally	At least once a month	At least once a week	Every day
In smartphone					
On a tablet					
On a PC					
In smartphone plugged to HMD					
In HMD					

15. If you have never used virtual reality content such as 360º videos or only occasionally, please indicate why. Multiple answers are possible.

a) Because I am not interested.
b) Because it is not accessible.
c) Because I have not had the chance to use it.
d) Other reasons. Please explain: _____

16. Please state your level of agreement with the following statement: "I am interested in virtual reality content (such as 360º videos)."

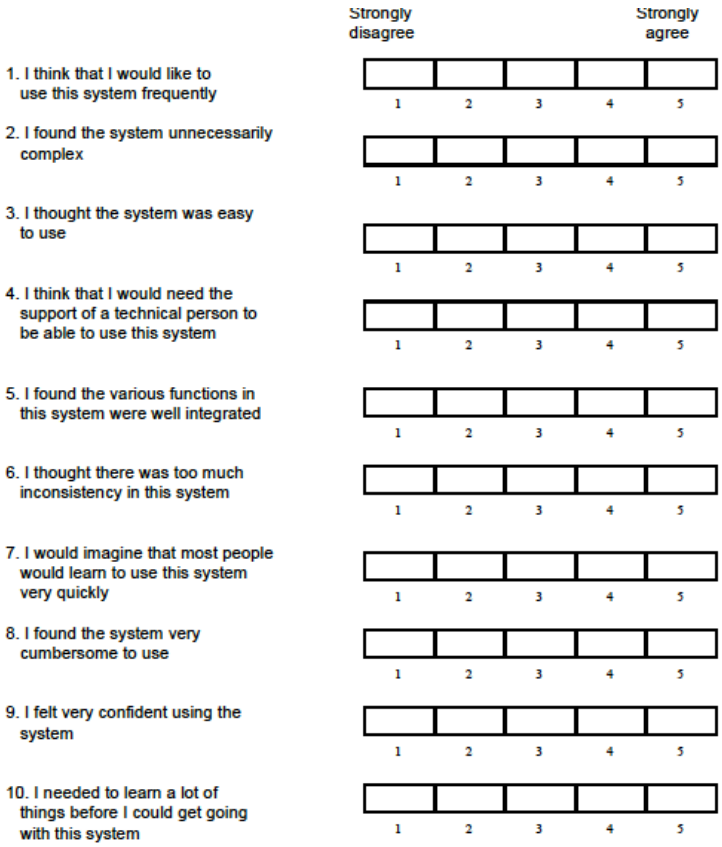
a) I strongly agree
b) I agree
c) Neither agree nor disagree
d) Disagree
e) Strongly disagree

17. Do you own any device to access virtual reality content?

a) Yes (If yes, which one? _____)
b) No
c) I don't know or I don't want to reply

18. If you replied "yes" to the previous question, please specify which device(s).

SUS



PREFERENCES

Now please reply to the following questions in your own words.

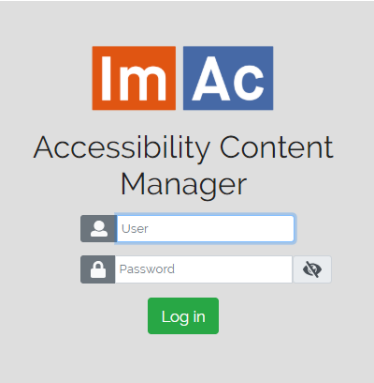
11. What did you like most about the subtitle editor?
12. What did you like less about the subtitle editor?
13. What do you think could be improved, and how?
14. Did you miss any functionality? If yes, can you tell us which?
15. Do you find the feature for setting the angle for the subtitle easy to use? Explain why.
16. Were the preview modes useful for you? Explain why.
17. Do you think it will take you longer to subtitle videos in 360º? Why?
18. Do you think 360º videos will impact your work as a subtitler?
19. Other comments:

ANNEX 5. USER GUIDE: SUBTITLING WEB EDITOR

1. What is it?

This web subtitle editor has been developed with the aim of producing accessibility services, specifically subtitles and subtitles for the deaf and hard-of-hearing, in audiovisual contents in 360 degrees. 360 degree videos are recorded with special cameras that reproduce highly realistic images as if you were inside a sphere. So when you are subtitling, you will be in the centre of that sphere and you will be able to move around to subtitle your contents.

In order to access it, you need to go to: http://imac.gpac-licensing.com/editor/videos.php and enter the login information that has been provided to you.



2. Requirements

It is recommended to use the web editor with Windows for now. The shortcuts are designed for Windows and are not customisable at this moment (although they will be in the near future). Therefore, if you use MAC, some of the shortcuts won't be available. However, you can always use the buttons, although the experience won't be the best. Sorry for the inconveniences at the moment.

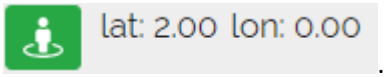
You need a stable internet connection.

The web editor must be accessed with:

- Google Chrome (recommended)
- Firefox

3. What is new in this editor?

Most of the options available in this web editor will be familiar to you, since they are very similar to those in other commercial subtitle editors that you may use.

However, there is a brand new option that has been designed due to the nature of 360º content. This options is called “Set current angle” and you will find it under this icon: 

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Set Angle - What is this?

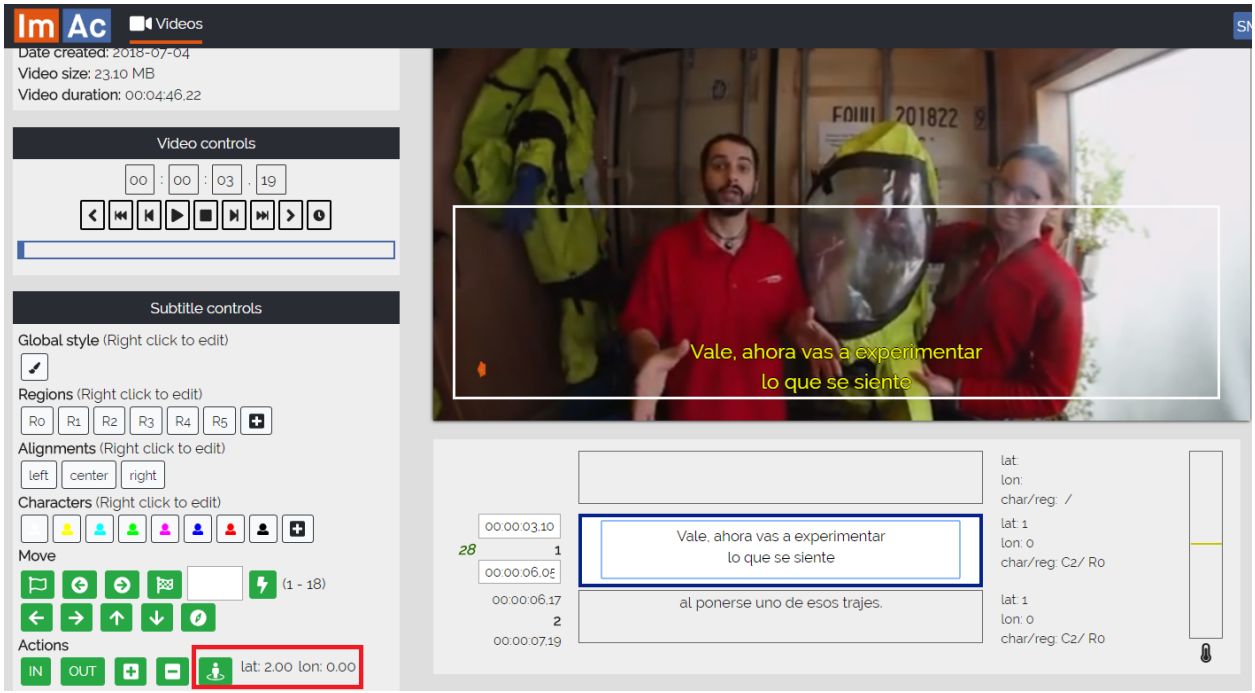
This option is new compared to tradition subtitle editors for 2D plain content.

4. How does it work?

Since we are subtitling a spherical video, the speakers are not always positioned in a static field of view, because they can move in the 360º space. So when we are subtitling, sometimes the speakers will be in our field of view, but if all of a sudden they move, we need to stop the video and move around to look for the speaker in his or her new position. In order to tell the subtitling system where the speaker is, we need to look for the speaker in the video moving around with the mouse or the arrows (you can find the option under these icons: 

)

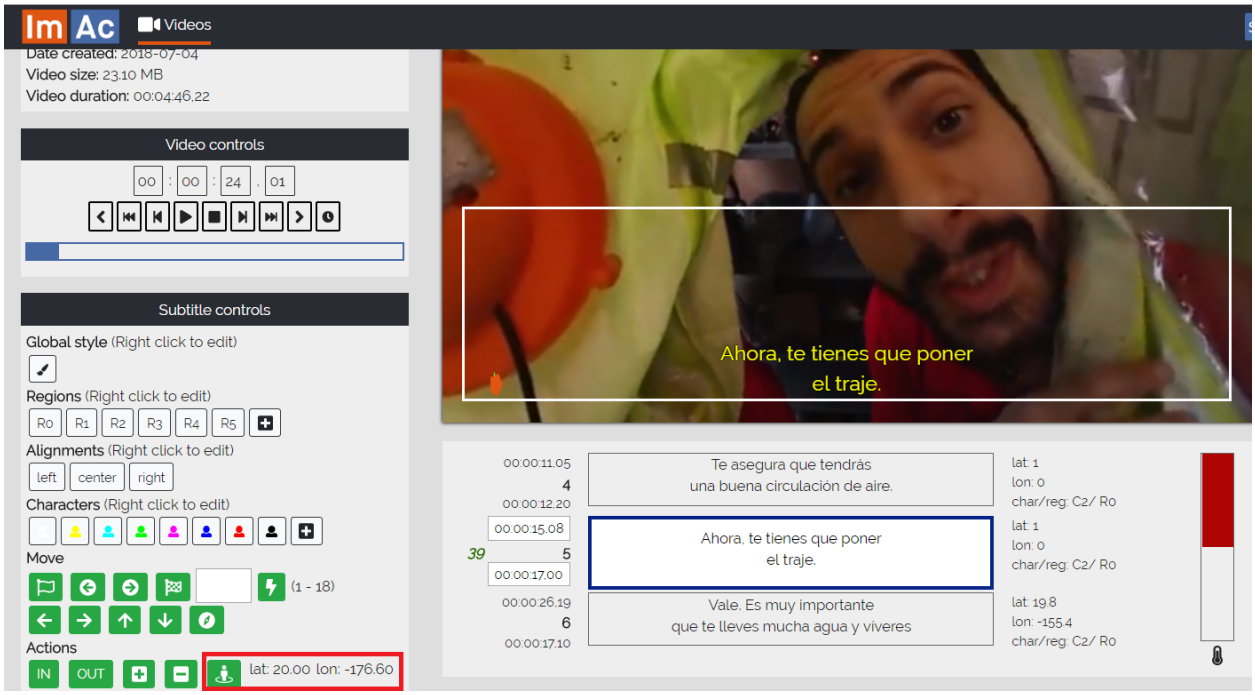
and press the button “Set current angle” so that the subtitle stays “tied” to that part of the 360º image. When you press the button, you can see that the info about lat and lon is updated:



5. Why do we need to do that?

Imagine that a viewer is watching the 360º content at home. OK, the viewer is navigating through the video, BUT she gets lost and misses the speaker. Maybe this viewer is deaf, so she lacks the auditory input. The solution will be that an arrow will appear close to the subtitle to indicate where the speaker is. If we, as subtitlers, do not provide this information (or metadata) when generating the subtitles, then it would be impossible for the system to provide this information to the audience when they are playing the video at home. So this is why this “Set current angle” option is important.

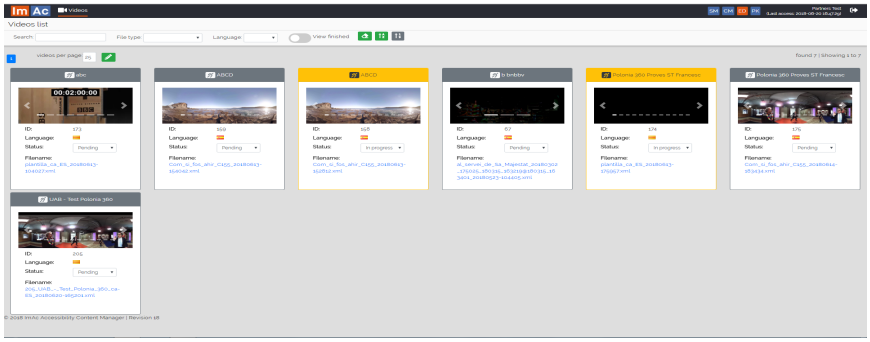
Therefore, we need to set the angle for all subtitles so that they are tied to their corresponding speakers in the video. So for example, if in the video that we are subtitling for the test, the guy disappears from our field of view, we need to look for him and “set current angle” in the new position in the video:



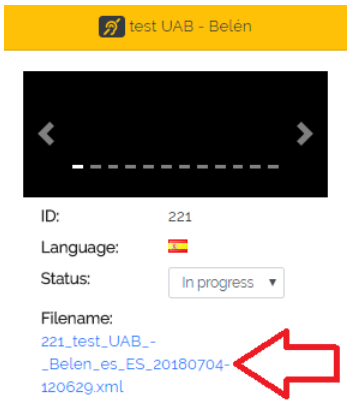
Once the angle is set, if we move around again in the video, there is an arrow that indicates where we have sent the angle so that we don't get lost.

6. How to start?

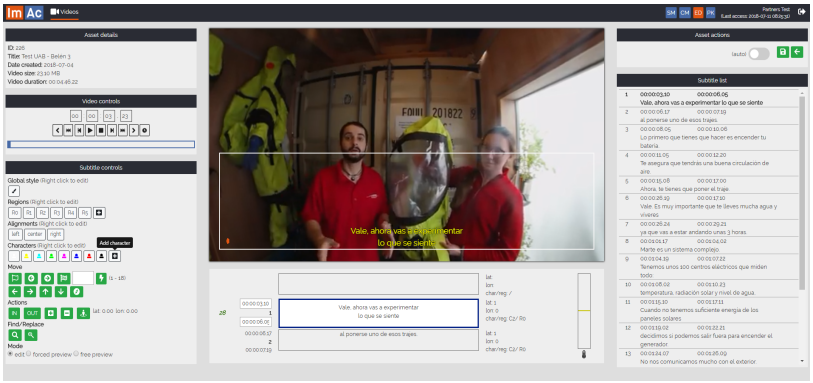
First thing you see when you access the web editor is the available assets that have been assigned to your account. You can visualise all assets available for you in the main window:



In order to edit a file, you have to click on the filename and the editor opens:



This is how the ImAc Subtitle Editor looks like:



7. What will I find in the different sections?

Now the different sections and options will be explained in detail.

Asset details

Here you will find general information about the file you are working on.

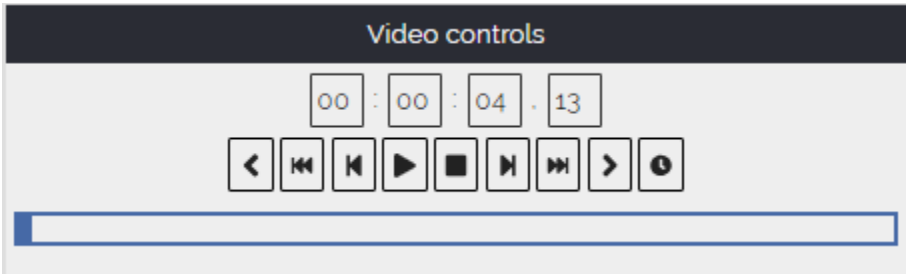
In this window, you will also get some pop-up messages warning you about potential errors or information that may be relevant.

These are the default parameters[3] for the warnings:

- Too short pause between subtitles: 5 frames
- Too short duration under: 5 frames
- Maxim number of characters per subtitle: 75
- Maxim number of lines per subtitle: 2

Video controls

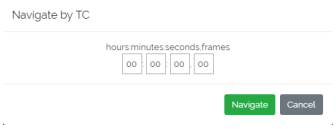
[3] The parameters will be customizable in a future version of the web editor.



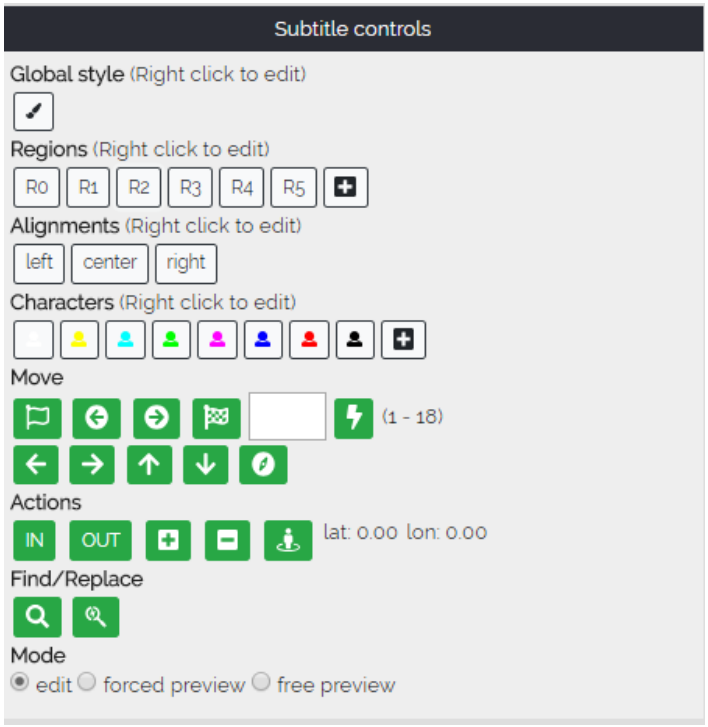
The options and the corresponding shortcuts[4] are:

Option	**Description**	**Shortcut**
Play/pause	This button plays and pauses the video.	Alt+F2
Stop video	This button stops the video (going to the beginning).	Alt+F3
Frame backward	This button makes the video go backwards frame by frame.	Alt+left
Frame forward	This button makes the video go forward frame by frame.	Alt+right
Slow forward/backward	These buttons make the video go forward/backwards with a slow speed.	Alt+F6/F7
Fast forward/backward	These buttons make the video go forward/backwards with a fast speed.	Alt+F5/F8
Navigate by TC	With this button, you can go to a specific time in the video that you can indicate manually.	Ctrl+Alt+T

[4] Shortcuts will be customizable in a future version of the web editor.

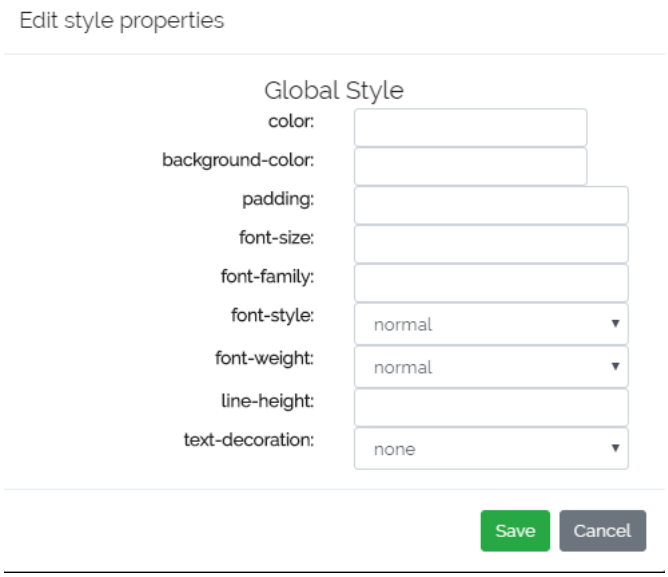
Subtitle controls



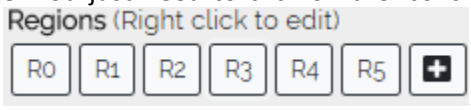
You can access different options here:

Global style

If you right click on the brush icon and click on Edit, you get this menu, in case you want to personalise subtitles appearance (for advanced users):



Regions

This option allows you to set different regions for the subtitles (for example, up, down, left, right, etc.). Six regions have been already defined and you can also customise your own regions. The regions are highlighted with a white rectangle. You just need to click on the icons when you are in the subtitle in order to set the different regions: 

.

Region 0 (default):

Region 1:

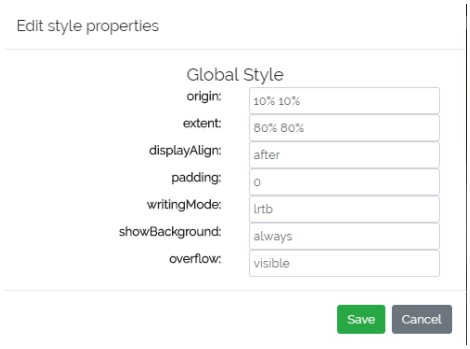
Region 2:

Region 3:

Region 4:

Region 5:

If you want to customise a region, you have to click on the + icon, then a new region will appear and if you right-click on the new region and click on Edit, you can customise the region by filling in the requested information (for advanced users):

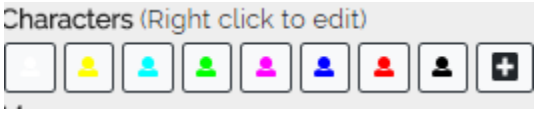


Alignments

You can select the alignment of the text of the subtitle (left, centred, right). By default is centred.

Characters

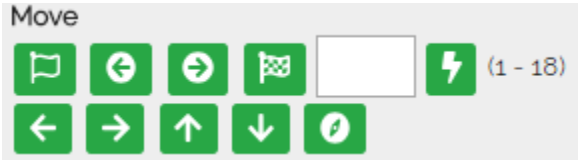
You can assign different colours for different characters for each subtitle.



You can add new colours in case it is needed with the + icon.

Move

Here you can find different options to move around the video and subtitles.



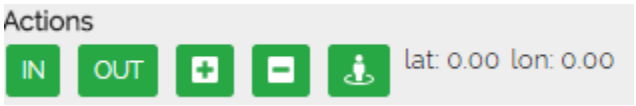
The options and corresponding shortcuts[5] are:

Option	Description	Shortcut
First subtitle	This button takes you to the first subtitle.	No shortcut available
Next subtitle	This button takes you to the next subtitle in relation to your current position.	Page down
Previous subtitle	This button takes you to the previous subtitle in relation to your current position.	Page up
Last subtitle	This button takes you to the last subtitle.	No shortcut available
Jump to a specific subtitle	With this option, you can jump to any subtitle you want. You just need to enter the number of the subtitle and click on this icon.	No shortcut available

[5] Shortcuts will be customizable in a future version of the web editor.

Move left in the video	With this button you move to the left in the spherical video.	Ctrl+Alt+left
Move right in the video	With this button you move to the right in the spherical video.	Ctrl+Alt+right
Move up in the video	With this button you move up in the spherical video.	Ctrl+Alt+up
Move down in the video	With this button you move down in the spherical video.	Ctrl+Alt+down
Navigate by Angle	With this button you can directly go to a specific angle of the video, instead of moving through the video manually with the previous options (left, right, up, down).	Ctrl+Alt+A

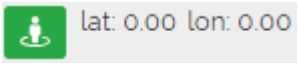
Actions



The options and corresponding shortcuts[6] are:

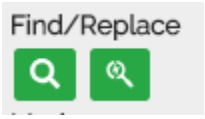
Option	**Description**	**Shortcut**
Set TC IN IN	This button sets up the timecode IN for the subtitle.	Shift+Page up
Set TC OUT OUT	This button sets up the timecode OUT for the subtitle.	Shift+Page down

[6] Shortcuts will be customizable in a future version of the web editor.

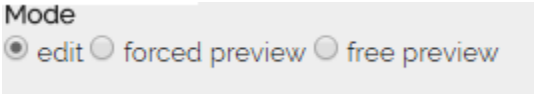
Set Angle 	This button sets the angle for the subtitle.	Ctrl+A
Insert subtitle 	This button inserts a new subtitle.	Ctrl+Insert
Remove subtitle 	This button deletes the current subtitle.	Ctrl+Supr

Find/Replace

You can use find and replace options to modify/review subtitles.



Mode



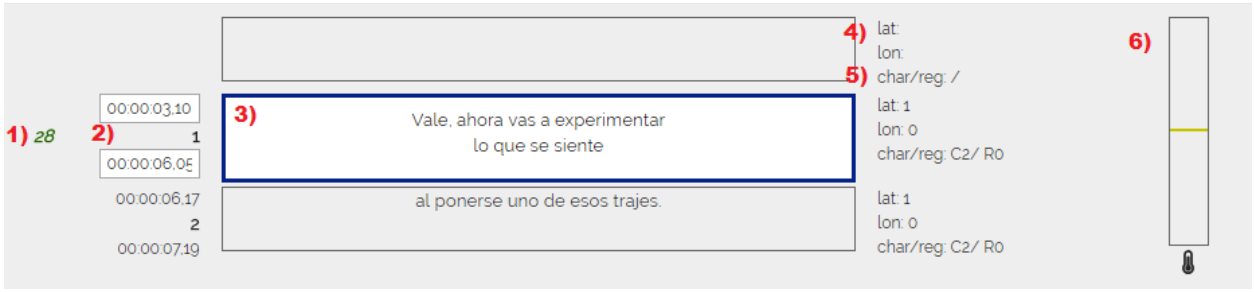
- Edit: in this mode, you can edit the subtitles.
- Forced preview: in this mode, you can preview the subtitles once you are done. With this mode, you don't need to navigate through the video to find the speakers, but the system directly forces you to see where the speaker is.
- Free preview: in this mode, you can preview the subtitles once you are done. With this mode, you are free to navigate in the video.

Video preview

Here is where we can see the video while subtitling. You can navigate in the 360º content.

Editor

Here is where you will produce your subtitles.



This section includes the following information from left to write:

1) Number of characters left: this value here indicates how many characters you have left for this subtitle (max. number of characters as it is set now: 75).
2) Timecodes & No. of the subtitle: here you can see the timecode IN and OUT for the subtitle, as well as the reference number of the subtitle.
3) Text: here is where you can write our subtitle.
4) Lat/Lon information: this provides you with information about the angle.
5) Char/reg information: this provide you with information about the character and the region used for the current subtitle.
6) Thermometer: the thermometer is a guide to avoid going over the permitted characters per minute. The current default parameters[7] are:

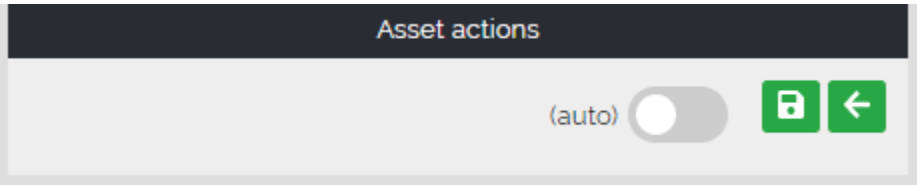
[7] These parameters will be customizable in a future version of the web editor.

- Reading speed: 120 words per minutes
- Characters per short word: 3
- Weighting for short word: 2

Assets actions

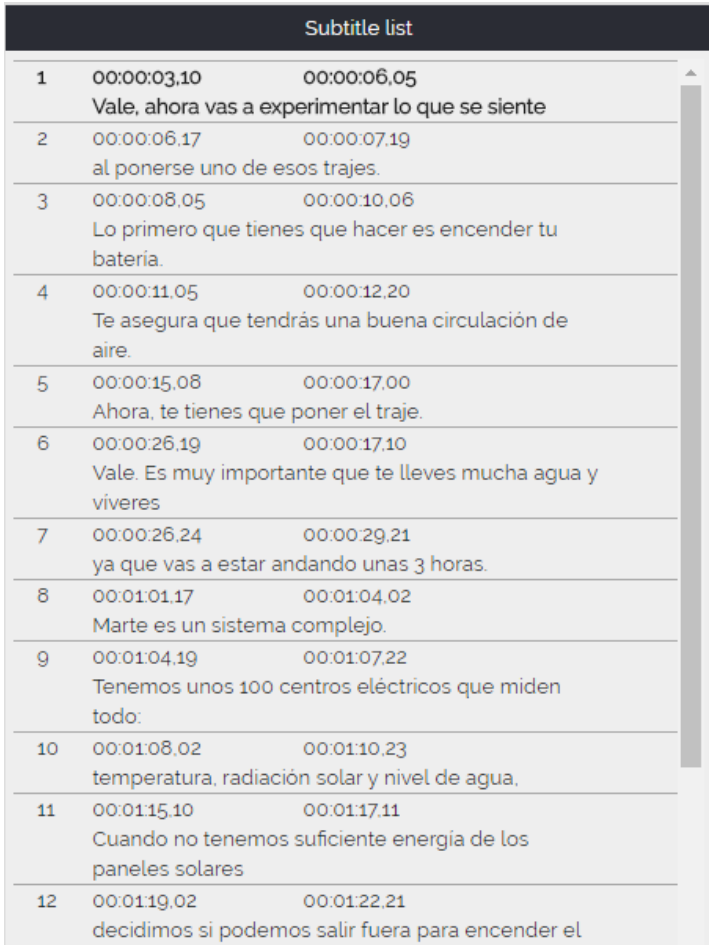
Here you can:

1) Activate/deactivate auto saving.
2) Save the current work.
3) Go back to the main menu.



Subtitle list

Here you find a list will all subtitles for the current video for your reference. If you click a subtitle, you directly go to that subtitle in the Editor.



Subtitle list

1	00:00:03,10	00:00:06,05
	Vale, ahora vas a experimentar lo que se siente	
2	00:00:06,17	00:00:07,19
	al ponerse uno de esos trajes.	
3	00:00:08,05	00:00:10,06
	Lo primero que tienes que hacer es encender tu batería.	
4	00:00:11,05	00:00:12,20
	Te asegura que tendrás una buena circulación de aire.	
5	00:00:15,08	00:00:17,00
	Ahora, te tienes que poner el traje.	
6	00:00:26,19	00:00:17,10
	Vale. Es muy importante que te lleves mucha agua y víveres	
7	00:00:26,24	00:00:29,21
	ya que vas a estar andando unas 3 horas.	
8	00:01:01,17	00:01:04,02
	Marte es un sistema complejo.	
9	00:01:04,19	00:01:07,22
	Tenemos unos 100 centros eléctricos que miden todo:	
10	00:01:08,02	00:01:10,23
	temperatura, radiación solar y nivel de agua,	
11	00:01:15,10	00:01:17,11
	Cuando no tenemos suficiente energía de los paneles solares	
12	00:01:19,02	00:01:22,21
	decidimos si podemos salir fuera para encender el	

ANNEX 6. SUBTITLING WEB EDITOR REPORT

1. General information

- **Subtitle Editor tested:** http://imac.gpac-licensing.com/editor/
- **Version tested:** 23
- **Partner responsible for tests:** UAB
- **Date**: from 17/07/2018 to 31/07/2018
- **Research tool**: online questionnaires (Google Form)
- **Link to online forms:**
    - Consent form: https://drive.google.com/open?id=1SjZc68N-A1Dxmv9QWq3KjyFRxQRfY5ZTrOVZElL6JbU
    - Demographic questionnaire: https://drive.google.com/open?id=1uqcgtoR1qOPGi3SEqV_ZPRDkff8fpRS1s7XnSWLQDYI
    - Post-questionnaire: https://drive.google.com/open?id=17-ez_gUlTZKRudEWvXdG3xpp55Oc1TdWbZsnWii0l7w
- **Measures:** usability and preferences
- **Participants:** 27 professional subtitlers
- **Methodology:** https://drive.google.com/open?id=17i0L7C7ch3s-P-DsrC7NWR2__tqzkx3lygHuD9tQ8uo
- **User guide**: https://drive.google.com/open?id=1y2d6khGiJ0RkoK6FNRH7SoD61EvL2A3r

2. Demographic profile of participants

In the demographic questionnaire, participants were asked to give 18 responses.

Link to responses: https://drive.google.com/open?id=122RQqskAabNoekO54dzuPrE6n1syc49j

1. **Sex**: a) Female (20=74%); b) Male (7=26%); c) Other (0=0%); d) I prefer not to reply (0=0%).
2. **Age**: 24 (1=3.7%); 25 (1=3.7%); 26 (1=3.7%); 28 (1=3.7%); 29 (3=11.1%); 30 (2=7.4%); 31 (1=3.7%); 32 (1=3.7%); 35 (1=3.7%); 36 (4=14.9%); 38 (1=3.7%); 41 (2=7.4%); 42 (3=11.1%); 43 (2=7.4%); 44 (1=3.7%); 45 (1=3.7%); 48 (1=3.7%).
3. **Main language**: Catalan (1=3.7%); Catalan, Spanish (1=3.7%); Croatian (1=3.7%); English (3=11.1%); Spanish (16=59.3%); Spanish, Basque (1=3.7%); Spanish, Catalan (1=3.7%); Polish (2=7.4%); Romanian (1=3.7%).
4. **Please, describe your current job:** Associate lecturer and freelance translator / proofreader (1=3.7%); Associate Professor in Translation Studies in the University of Leeds Centre for Translation Studies (1=3.7%); Audiovisual translator (4=14.8%); Audiovisual Translator, Subtitler, Audio describer (1=3.7%); Freelance subtitler (1=3.7%); Freelance Subtitler (Translator and QCer) (1=3.7%); Freelance translator / assistant professor at university / bookseller (1=3.7%); Freelance translator and subtitler (mainly videogame-related) (1=3.7%); I am a ESO English teacher, also do some translations from time to time (1=3.7%); I'm a freelancer EN>ES translator. I work mostly in videogame localization and audiovisual translation (especially for TV shows and movies for streaming services). (1=3.7%); Lecturer (1=3.7%); Lecturer and subtitler (1=3.7%); PhD research student, freelance subtitler (1=3.7%); PhD Researcher in Media Accessibility (1=3.7%); Researcher (2=7.4%); Spanish lector and audiovisual translator (1=3.7%); Subtitling Project Coordinator (1=3.7%); Supertitles and subtitles for opera (1=3.7%); Translator (5=18.6%).

5. **Have you ever subtitled a 360º video?** Yes (1=3.7%); No (26=96.3%).
6. **For how long have you been working in the field of subtitling?** 1 month (1=3.7%); 1 year (2=7.4%); 2 years (2=7.4%); 3-4 years (3=11.1%); 4 years (1=3.7%); 5 years (3=11.1%); 6 years (1=3.7%); 7 years (1=3.7%); 8 years (2=7.4%); 9 years (1=3.7%); 10 years (3=11.1%); 13 years (1=3.7%); 15 years (2=7.4%); 17 years (1=3.7%); 18 years (1=3.7%); 20 years (2=7.4%).
7. **How many hours of subtitling have you produced in your professional life**? a) Less than 50 hours (4=14.8%); b) 51-150 hours (4=14.8%); c) 151-300 hours (3=11.1%); d) More than 300 hours (16=59.3%).
8. **In what language or languages do you normally subtitle?** Catalan and Spanish (4=14.8%); Croatian and English (1=3.7%); English and Spanish (4=14.8%); English (2=7.4%); English, Polish (1=3.7%); French & Spanish very occasionally. Mostly English. (1=3.7%); From English or German into Spanish (1=3.7%); Polish (1=3.7%); Romanian (1=3.7%); Spanish (9=33.4%); Spanish and Italian (1=3.7%); Spanish, Basque, English (1=3.7%).
9. **What software do you normally use?** Acme Digital (FAB/WinCAPS-like proprietary software) (1=3.7%); Aegisub (1=3.7%); Aegisub, Subtitle and VisualSubSync (1=3.7%); Aegisub, Subtitle Workshop. I also produced subtitles for theatre productions using Microsoft Power Point. (1=3.7%); EZTitles (3=11.2%); EZTitles, Swift and Aegisub (1=3.7%); Fab Subtitler (1=3.7%); FAB Subtitler, but recently I have mostly used a web-based tool provided by my client. (1=3.7%); FAb, Subtitle Edit (1=3.7%); FabSub, Aegisub (1=3.7%); I don't usually localize subtitles, I use templates. (1=3.7%); in-house software (1=3.7%); Internal software of the companies or Eztitles (1=3.7%); Online platforms: TED, Amara, YouTube (1=3.7%); Proprietary cloud software (Sfera, Originator...) (1=3.7%); Provided by the client (1=3.7%); Quantum WinCAPs, in house software for live subtitles (1=3.7%); Software from the agencies I work for, not commercial (1=3.7%); Spot, FAB and Subtitle Workshop (1=3.7%); Subtitle Edit, Subtitle Workshop, Aegisub (1=3.7%); Subtitle Workshop (1=3.7%); Subtitle Workshop, Annotation Edit and client-specific software (1=3.7%); Swift Create (1=3.7%); VICOM (1=3.7%); Wincaps, Swift, Jayex (1=3.7%).
10. **Please indicate your level of studies.** a) Primary education (0=0%); b) Secondary education (0=0%); c) Further education (1=3.7%); d) University (26=96.3%).
11. **If you replied "Further education" or "University" in the previous question, please specify.** A degree in Translation and Interpreting and a master's degree in Audiovisual Translation (1=3.7%); Bachelor's Degree in Translation and Interpreting - Universitat Jaume I (1=3.7%); Currently registered in a PhD in Translation Studies. Have MAs in Linguistics and in Audiovisual Translation (1=3.7%); Degree in Translation, Master in TAV (1=3.7%); Degree on Translation and Interpreting (2=7.4%); English Literature and Linguistics; Translation and Technologies postgraduate (1=3.7%); English studies (2=7.4%); Spanish Philology (not finished). Others. (1=3.7%); I have a BA in English Studies, an MA in Audiovisual Translation and an MA in New Technologies Applied to Translation (1=3.7%); Licenciatura and Master en Traducción e Interpretación (1=3.7%); Licenciatura en Traducción e Interpretación. (1=3.7%); MA in Audiovisual Translation and Localization (1=3.7%); Máster en TAV (UAB) and Doctorat en Traducció i Estudis Interculturals (UAB) (1=3.7%); Master in audiovisual translation (1=3.7%); Master's degree (2=7.4%); Master's Degree in Audiovisual and Videogames Translation (1=3.7%); MSc in Scientific, Technical and Medical Translation with Translation Technology (1=3.7%); PhD (1=3.7%); PhD in Computer-Assisted Language Learning, MA in Translation Studies, BA in English and French (1=3.7%); PhD in Philology, University of Vienna (1=3.7%); PhD in Translation and Language Sciences (UPF) (1=3.7%); Translation and interpreting (1=3.7%); UGR/Universidad de Valencia (degree), ISTRAD (MA) (1=3.7%); Universitat Autonoma de Barcelona (PhD in Media Accessibility) (1=3.7%).

12. **If you have received specific training on subtitling, please indicate it here.** No training (3=11.1%); 3D subtitling (1=3.7%); A few undergraduate subjects, an intensive course at CenTraS, ATRAE's online courses on SDH… (1=3.7%); Audiovisual translating course in "Calamo y Cran" (1=3.7%); "Dubbing and Subtitling Courses (90 hours) + AVT Course (60 hours) (1=3.7%)"; During the degree and master we had different subjects to learn subtitling (1=3.7%); During the MA in AVT and in-house training (1=3.7%); I have received specific training on subtitling in UOC postgraduate in Translation and Technologies (1=3.7%); I learned from experience (1=3.7%); Informal training - learnt from shadowing a professional (1=3.7%); MA in Audiovisual Translation (5=18.6%); Máster en TAV + 3 years in house in a subtitling company (1=3.7%); Posgrado en Traducción Audiovisual (UAB), specific training in two subtitling companies where I worked for 6 months and almost 10 years. (1=3.7%); post degree (1=3.7%); Yes. Subtitling and audiodescription. (1=3.7%); Subtitling courses (1=3.7%); Subtitling module in MA in Audiovisual Translation and Localization (1=3.7%); Various courses with university colleagues who run subtitling departments (participation was just for fun). (1=3.7%); Yes (1=3.7%); Yes, a course (6 ECTS). (1=3.7%); Yes, during M.A. Studies and Postgraduate Studies (1=3.7%).
13. **What devices do you use on a daily basis? Multiple replies are possible.** a) TV (21=77.7%); b) PC (17=62.9%); c) Laptop (23=85.2%); d) Mobile phone (27=100%); e) Tablet (9=33.3%); f) HMD (0=0%); g) Other (0=0%).
14. **How often do you watch virtual reality content (for instance, 360º videos)?**

	Never	Occasionally	At least once a month	At least once a week	Every day
In smartphone	(12=44.4%)	(14=51.8%)		(1=3.8%)	
On a tablet	(27=100%)				
On a PC	(14=51.8%)	(12=44.4%)	(1=3.8%)		
In smartphone plugged to HMD	(23=85.2%)	(4=14.8%)			
In HMD	(23=85.2%)	(3=11.1%)	(1=3.7%)		

15. **If you have never used virtual reality content such as 360º videos or only occasionally, please indicate why. Multiple answers are possible.** a) Because I am not interested. (3=11.1%); b) Because it is not accessible. (4=14.8%); c) Because I have not had the chance to use it. (16=59.3%); d) Other reasons. (5=18.5%) Please explain:

    Because some virtual reality devices, like HMD, are expensive and because virtual reality content uses to use a lot of data. (1=3.7%)

    Given the kind of 360 videos I have come across so far, the real world is much more interesting to me. (1=3.7%)

    I used it (1=3.7%)

    I watch occasionally because I'm still learning to use my virtual reality device (1=3.7%)

I don't actively seek this kind of content and I have only found it "accidentally" online in the form of virtual tours of museums, buildings and such. (1=3.7%)

16. **Please state your level of agreement with the following statement: "I am interested in virtual reality content (such as 360º videos)."** a) I strongly agree (3=11.1%); b) I agree (13=48.2%); c) Neither agree nor disagree (7=25.9%); d) Disagree (4=14.8%); e) Strongly disagree (0=0%).
17. **Do you own any device to access virtual reality content?** a) Yes (If yes, which one? _____) (7=25.9%); b) No (15=55.6%); c) I don't know or I don't want to reply (5=18.5%).
18. **If you replied "yes" to the previous question, please specify which device(s).** BOBOVR Z4 (1); HTC Vive (1); If 360º videos are virtual reality content, I have accessed to those through PC, laptop and smartphone (1); PlayStation VR (1); Smartphone (2); Smartphone, Pc (1).

Summary: Twenty-seven participants took part in the test (20 females and 7 males), with ages ranging 24-48. Their main languages are Catalan, Spanish, Croatian, English, Basque, Polish and Romanian. Their jobs are mainly AVT translators, subtitlers for different kind of products, university lecturers and researchers. Only one participant has subtitled a 360º video before. They presented a varying experience in the field of subtitling (varying from 1 month to 20 years). 16 participants have produced more than 300 hours of subtitled content, 3 participants have produced between 151 and 300 hours of subtitled content, 4 participants have produced between 51 and 150 hours and 4 participants have produced less than 50 hours. Participants usually subtitle in Catalan, Spanish, Croatian, English, Polish, French, Romanian, Italian or Basque. Participants declared using different subtitling software (FAB, WinCAPS, Aegisub, VisualSubSync, Subtitle Workshop, EZTitles, Swift, Subtitle Edit, TED, Amara, YouTube, Spot, VICOM, Jayex, proprietary software from clients, among others). 26 participants have studies of university level and 1 participant has further education. Some participants have a degree or master's degree on translation and interpreting studies (or languages degrees), some of them specializing in Audiovisual Translation and some of them have PhD studies. 24 participants have received specialized training on subtitling in MAs, specialized courses or training.

When asked about which devices they used on a daily basis, all participants agreed on using mobile phones; 23 participants use laptops; 21 participants use TVs, 17 participants use PCs; and 9 of them use tablets. When asked about how often they watch virtual reality content, none of the participants have watched VR content on a tablet, 23 participants have never watched VR content in a smartphone plugged to HMD or in HMD; some (14) occasionally watch VR content in a smartphone, 12 participants on a PC, 4 in a smartphone plugged to HMD and 3 in HMD; 1 participant watches VR content on a PC at least once a month, and 1 participant in an HMD; finally, 1 participant watches VR content in smartphone at least once a week. When asked to explain why they have never used virtual reality content such as 360º videos or only occasionally, 3 participants replied that they are not interested, 4 participants replied that it is not accessible, 16 participants replied that they have not had the change to use it, and others gave other reasons regarding the expensive price, difficulties to use the technology or the lack of appealing contents. When asked to state their level of agreement with the statement "I am interested in virtual reality content (such as 360º videos)", 3 participants replied that they strongly agree, 13 replied that they agree, 7 that they neither agree nor disagree and 4 of them disagree. Finally, when asked if they own any device to access virtual reality content, 15 participants replied that they don't, 5 replied that they don't know or prefer not to reply and 7 replied that they do (including BOBVR Z4, HTC Vive, PC, laptop, smartphone and PlayStation VR).

5. System Usability Scale (SUS) results

3.1. Scores (question by question)

1 – strongly disagree

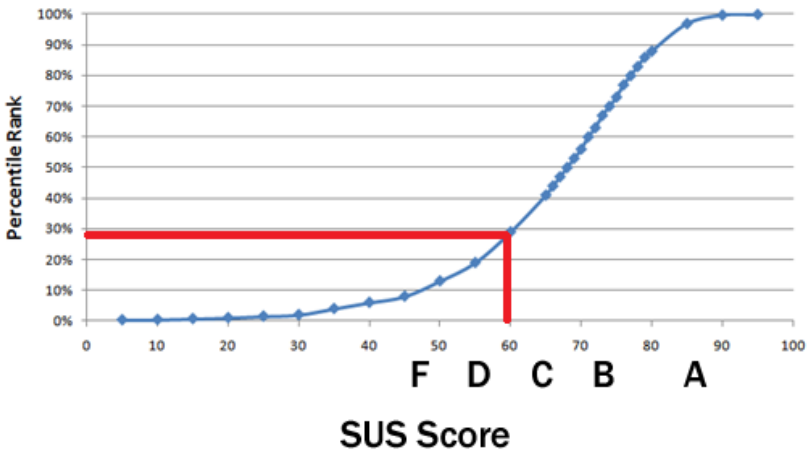
5 – strongly agree

SUS statements	1	2	3	4	5
1. I think that I would like to use this system frequently	3 (11.1%)	4 (14.8%)	11 (40.8%)	8 (29.6%)	1 (3.7%)
2. I found the system unnecessarily complex	5 (18.5%)	10 (37.1%)	7 (25.9%)	4 (14.8%)	1 (3.7%)
3. I thought the system was easy to use	1 (3.7%)	6 (22.2%)	4 (14.8%)	14 (51.9%)	2 (7.4%)
4. I think that I would need the support of a technical person to be able to use this system	8 (29.6%)	12 (44.5%)	5 (18.5%)	0 (0%)	2 (7.4%)
5. I found the various functions in this system were well integrated	0 (0%)	6 (22.2%)	9 (33.3%)	10 (37.1%)	2 (7.4%)
6. I thought there was too much inconsistency in this system	4 (14.8%)	10 (37.1%)	11 (40.7%)	2 (7.4%)	0 (0%)
7. I would imagine that most people would learn to use this system very quickly	2 (7.4%)	2 (7.4%)	7 (30%)	8 (29.6%)	8 (29.6%)
8. I found the system very cumbersome to use	2 (7.4%)	5 (18.5%)	8 (29.6%)	10 (37.1%)	2 (7.4%)
9. I felt very confident using the system	0 (0%)	8 (29.6%)	8 (29.6%)	11 (40.8%)	0 (0%)
10. I needed to learn a lot of things before I could get going with this system	9 (33.3%)	3 (11.1%)	10 (37.1%)	4 (14.8%)	1 (3.7%)

3.2. Summary

The SUS average score is **59.5** (below average, 68 or more is considered above average).

The graph below shows how the SUS scores associate with the percentile ranks and letter grades[8] and the red line specifies where the ImAc subtitle editor is at this moment.



The letter grade is D+, and our score corresponds to the percentile rank: 29-30%.

The excel spreadsheet with scores calculations can be consulted here: https://drive.google.com/open?id=1YKJeojpJHPrbLotYe7OS-rv0kxB4p_JD

6. Results from open preference questions

4.1. Results (question by question)

11. What did you like most about the subtitle editor?

P31: The fact that it is cloud-based.

P24: Once I had read the user manual, I found that most of the controls were very easy to get accustomed to.

[8] Sauro, J. (2011). Measuring usability with the System Usability Scale (SUS). Retrieved from http://www.measuringu.com/sus.php

P16: It's intuitive and easy to use.

P34: The reading speed thermometer, I think it's better than a set CPS limit.

P18: Font of the subtitles.

P20: La visión global del editor. (ENG: Global interface of the editor).

P33: The angle setting tool was very easy to use. I also thought changing speaker's colors was very easy.

P36: Is quite user-friendly and straightforward.

P22: Useful to be able to see 360 but think the setting of the angle is very subjective and a little unscientific/impressionistic in how it can be set.

P12: 3D subtitle positioning.

P5: Fast editing options.

P14: The new feature to set the angle.

P4: The fact that you can subtitle 360º videos, it's very clever. It asks before deleting a subtitle for good, which is nice. Setting up colors and changing the region is very easy.

P17: The possibility of setting current angle.

P8: Uso fácil e intuitivo. (ENG: It is easy to use and intuitive).

P7: It is very clearly designed and organized, the different sections well distributed on the screen, visually balanced and everything you need is at hand.

P23: Being an online system is appealing.

P32: The clear easy-to-use interface, and to be able to navigate the 360 video directly with the mouse.

P13: The interface is nice and clear.

P1: The angle and region features.

P37: La simplicidad y practicidad de la pantalla de edición. Me gusta también el indicador de legibilidad, el listado de subtítulos y, sobre todo, la opción de buscar y reemplazar. (ENG: The simplicity and practicality of the edition screen. I also like the thermometer, the subtitle list, and specially, the look and replace option).

P11: I love being able to move in 360 degrees. Once I got used to the keys for jumping to different subtitles and timecodes, they were fine. The frame keys are essential. The layout was fine. If a few of the features below could be tweaked, it would be quite smooth to work with.

P9: Ease to change color of speaker and region on the screen.

P40: Once you learn how to use it, is easy and even fun.

P6: The video editor and the preset regions.

P29: Easy to use.

P3: Its versatility for subtitle placement.

12. What did you like less about the subtitle editor?

P31: When you spot, the editor doesn't automatically bring up the next subtitle to be spotted.

P24: I found the timing of the subtitles in Edit mode to be very difficult to get right. Everything else felt very simple and intuitive but I consistently kept getting the timings wrong. When I played things back in either of the two preview modes, I had to keep on making changes to the timings.

Also, the Fast Backward and Step Backward functionality seemed not to work when I was subtitling my video. The other buttons did work, however.

P16: I'm not used to 360 so that confused me a bit.

P34: The time-code buttons and manual editing of time-codes are very time-consuming with this type of videos.

P18: I don't quite understand the usefulness of the regions. I didn't use it. Also, I don't understand the reading speed thermometer. There should be an indication how fast my subtitles are in wpm or cps. I don't trust the system doing the thinking for me.

P20: Demasiadas funciones. (ENG: Too many options).

P33: The navigation was very imprecise and not very user friendly. Some shortcuts weren't working for me, like playing the video back and forward (and I'm using Windows 7). Because of this, it was very difficult to set the timecodes correctly.

P36: The black box that appears when putting the cursor on top of one of the video controls is a bit annoying because it covers the time codes. It could go on the bottom part instead.

P22: It would take a lot longer to subtitle something for this type of video and the assumption that subtitles would be moving depending on the action can be disturbing for the audience.

P12: Lack of sound spectrum to identify shot changes.

P5: Some options were unavailable.

P14: That you must change between edit and view to see the subtitles while playing the video.

P4: I had many issues with the subtitle angles (I would set them up, but for some reason they wouldn't stay that way).

P17: Generally, it doesn't have many useful options other subtitling software have.

P8: Cuando insertas un subtítulo nuevo, te mueve el anterior y los tiempos de este. (ENG: When you enter a new subtitle, it takes you to the previous one and to its timecode).

P7: The shortcuts assigned by default. They're scattered all over the keyboard, which makes timing and playing quite inefficient and "jumpy". They should consist of simpler keystrokes and concentrate around the same area (using the numeric keypad + cursor and editing keys is the best option). I know they are customizable, but anyway, I think any program should provide by default a configuration that allows for optimal performance.

P23: The interface is cumbersome, and I personally think the basic premise is not very user-friendly: I think the subtitle should always be visible and follow the reader's eyes rather than it being placed fairly arbitrarily by the subtitler.

P32: Some technical issues that happened during the process: the video became a black screen several times (audio was still playing), the subtitle numbers in the "Subtitle list" did not match those of the editor.

P13: The video buttons did not work for me (moving backwards and forwards) and the shortcuts did not work, either. Also, when doing the spotting, I had to move from the editor to the subtitle list and this make my work really slow and not so precise as I'd like. It was also difficult to change time codes manually.

P1: The fact that it's quite difficult to have enough freedom to break subtitle lines as I want to. I noticed that especially when I applied the different regions: line breaks would automatically change, and I was not happy with the final layout.

Another factor that I think I didn't figure out quickly during the experiment is to be able to control the number of characters per line in a more precise way, especially when working with two lines.

P37: He tenido que estudiarme bien el manual y al principio me ha costado un poco pillarle el truco. Pero, supongo, que ha sido por motivos personales, ya que no estoy acostumbrada a utilizar este tipo de editores. En mi trabajo diario sincronizo en directo y no tengo que insertar parámetros de entrada y salida en el momento de la edición (y mucho menos de ángulo). (ENG: I had to study the user guide thoroughly and at the beginning it took me a while to get used to it and use it properly. But, I guess, that has been because of personal reasons, since I am not used to use this kind of editors. In my daily job I synchronize subtitles live and I don’t have to insert any timecode IN or OUT when I am editing (and much less set the angle).

P11: By editing naturally, I inserted subtitles before the instructions came. I know I ended up with one or two subtitles that were double numbered, and which therefore would not play. I couldn't find a solution to this issue, which was frustrating as I don't like sending in something (as a subtitler or for a test) that is not correct. I was aware that some of my subtitles were fast, but I needed a thermometer scale / wpm reading - can we ever get to full red bar? I was using a laptop and the function key commands didn't function - I would have preferred to be working on a computer with a separate mouse and keyboard. That would have made it easier for me. When I moved from frame to frame, I couldn't hear the sound

(i.e. p-p-p-a-a-r..). This is essential to me when I work, and it made my timecodes very slow and clunky to start with.

P9: You must push a button to go to the next subtitle, it's not automatic.

P40: The first time I changed from edit to preview, the video went black and it was impossible to fix, I had to go back to load it again.

P6: The absence of a waveform to spot and set subtitles quickly. The IN/OUT buttons are not that precise.

P29: Not enough functionalities to properly edit the subtitles.

P3: The fact that subtitles are locked in the editing mode, i.e. there is no correspondence with the video. This makes the spotting harder.

13. What do you think could be improved, and how?

P31: The above, plus some unusual shortcuts - the shortcuts for in and out times of subtitles doesn't make sense to me. You should be able to just hold space bar for as long as you want the subtitle to last.

P24: I think it would be very helpful to 1) have the current time in the video displayed much closer to the video itself (at the top or bottom of the video itself).

P16: Maybe make the shortcuts editable so that you can set your own.

P34: Time-coding features (see next answer). I also think that it would be better if subtitle boxes only appear at the IN time-code, and not earlier (that is, I think they should go with the video).

P18: There should be a default position for the speaker. The red icon with the arrow should be made more prominent and more visible as it seems to be an important part. Could you also explain what Lat and Lon mean exactly?

P20: Lo anterior y lo posterior expuesto. (ENG: Which has been explained above and below).

P33: TC setting should be more intuitive (I always prefer having a visual timecode where you can see when a speaker is talking), the navigation bar for the video was very slow as well.

P36: It would be very useful to be able to listen to the audio when moving the frames forward or backward. This way it would be possible to know when a word starts or finishes.

P22: Not sure if subtitles are the best way to localize such content. Voice over would be much more appropriate, in my view. For the burnt-in text, editing the video in its original environment with the translated text would be the most appropriate.

P12: More like Aegisub, less like Amara.

P5: Make sure all options are running.

P14: I think that when you are on Edit mode you should be able to click on play and see the subtitles changing with the video.

P4: It should be possible to see the subtitle flow within the Edit mode, so that we don't need to be switching to Preview to be able to see if we timed them correctly and then back to Edit if anything needs changing. I also think the arrow that tells the viewer that they need to look elsewhere is not sufficiently clear/visible.

P17: Adding many more functions.

P8: La forma de insertar los subtítulos y el cómo colocarlos en el ángulo que deseas, ya que uno de ellos se ha colocado bien pero el otro aunque he hecho lo mismo no me ha dejado. (ENG: The way in which you insert the subtitles and the angle that you want to, since I have set the angle for one subtitle properly, but I did the same for another one and I couldn’t).

P7: Some major issues with the video: when 3D-navigating while playing it, it went black and I had to reload it to continue with my work. The fast/slow rewind didn't work; this should be fixed. Also, every time you reload a video, the autosave option toggles off, which is minor but kind of annoying, when you already switched it on in the first place. Duration of each subtitle is a useful piece of information that is missing. Adding the numeric wpm/cps count to the thermometer would be helpful. The subtitle list would benefit of showing the actual text segmentation. Subtitles are inserted before the current subtitle, when the usual logic in other applications is doing it after (or, some have a specific "insert before or after" option).

P23: Apart from the basic premise mentioned above, here are some specific functionalities: Step backward and Fast backward didn't seem to work. The way subtitles were presented was counter-intuitive, with the first subtitle not necessarily being no 1 in the list (especially if subtitles were timed in and out later on, or if they were inserted afterwards). The buttons for Previous and Next subtitle are also rather confusing - Next is more like New subtitle. Insert subtitle inserts the subtitle before the current one rather than after it (this is again confusing) but for some reason it times it until the Out point of the previous subtitle... The segmentation in the R3 (or all smaller, for that matter) layout(s) is also strange - two lines easily become three without any obvious reason.

P32: I would add accurate reading speed values along with the thermometer.

P13: A sound wave would be very useful to the spotting. It's also good that you can have the spotting while you are editing and don't have to move to the subtitle list.

P1: The thermometer is useful, but I would like to have the option to have a more exact indicator.

Finally, I didn't quite get it how to personalize regions, although I know it's for advanced users.

The instructions are useful, but it's necessary to play around to get familiarize and understand how to apply everything.

I was using a Mac laptop and I think it would be useful to create all shortcuts for this system as well.

P37: Creo que si se estableciera el ángulo con el ratón, botón derecho y un clic sobre el vídeo facilitaría la edición. Por otro lado, aunque se puede cambiar el estilo global, ¿se podrían dar formato (por ejemplo, cursivas y negritas) para solo unas palabras de un subtítulo y no en su totalidad? ¿Podría, en un subtítulo de dos líneas, especificar colores diferentes para cada línea (por ejemplo, si intervinieran dos personajes a la vez)? (ENG: I think that if you could set the angle with the mouse, right-clicking on the video, that would make editing easier. Also, although you can change the global style, is it possible to format (for example, italics and bold) just some words in a subtitle and not the entire subtitle? Is it possible in a subtitle with two lines to specify different colors for each line (for example, if two characters intervene at the same time?).

P11: Really, see my answer to 12. The 'worst' feature (or where my skill was most lacking) was when my subtitles got hidden because I had two of the same number. To correct would have meant starting again and in the test situation, I chose not to. In a professional situation, this would be painful!

P9: The green buttons on the left, to move through the subtitles, should be down the editor, below the timeline codes and text.

P40: Some sort of automatic alignment would be great because there where fragments where the angle was just a little bit different and the "jumps" in the video in forced preview where uncomfortable to see instead of having a smooth transition. The popup info from the control buttons covered the time codes, it should appear somewhere else. A sound wave would be really useful to make the timecodes more accurate.

P6: Mentioned before.

P29: Segmentation in the Subtitle List (or it's ill-segmented on purpose?).

P3: - When you write over the character limit in a line, it breaks in two, but it does not react when you delete the extra characters. It stays split.

- The fast backward and step backward buttons did not work for me (Mac user).

- It would be nice to be able to add a subtitle by just clicking on the empty box below the subtitle being edited, and to choose whether you want to add it before or after.

- Is it possible to undo an action? It did not work for me.

- The segmentation in the subtitle list does not match the one in the actual subtitles.

- I would place the Save button further from the Exit button, just in case.

14. Did you miss any functionality? If yes, can you tell us which?

P24: No, I think all the key functionality I would require is available in the tool.

P16: Automatic separation by 3-4 frames between subtitles.

P34: Maybe having a sound wave would be a better way for introducing time-codes in a more accurate manner.

P18: Shot change detection, audio wave, keyboard shortcuts, spellcheck, automatic error detection.

P20: Sí. La definición del código de tiempos. El timing en la pantalla. (ENG: Yes. The time code definition. The timing on screen).

P33: The visual timecode.

P36: See question 13.

P22: The curvature of the original burnt-in text cannot be done, at least I didn't find a way, with the subtitle editor.

P12: *functionality / Sound spectrum.

P5: Wind back option was unabled.

P14: Yes, it would be nice to have a sound wave. It would be easier to set the timing codes and calculate the frames between subtitles.

Also, when you click the keyboard for undoing something it should also apply for the timing changes not only the textual changes.

It would be nice that you can change things on Preview mode if then they are not applicable. The option should be on grey, so you don't change it and then see it has not changed.

P4: It would be useful to be able to split a subtitle in two within the timing.

P17: Autocalulating time-out from the time-in of the following subtitle, you cannot see how many characters you have per line, reading speed is in words per seconds instead of cps, you have to move to another subtitle before you see if the color is green or red, you don't have a shortcut to jump backwards or forwards five seconds while you play de video, no sound while you go backwards or forwards frame by frame...

P7: Yes, several. Here's a summarized list, I'm providing further details by e-mail: subtitle block selection on the subtitle list; move words up and down between subtitle lines; customizable short video jump (forth and back); video jump to current subtitle TC IN, TC OUT and angle from the edit mode; characters-per-line counter; add and subtract frames to TC IN and TC OUT; set current in-cue modifying previous out-cue; split subtitles; merge subtitles.

Details by email (original in Spanish here: https://drive.google.com/open?id=1Wz_ojYcXVhXtRTDE9_964r6KpjI6n_kn):

ImAc Comments – P7

BUGS / IMPROVEMENTS

The functions Alt F5 and F6 do not work, while F7 and F8 work.

I would put the video and editing times of subtitles in the numeric keyboards. Now, hand movement is very scattered in the keyboard (keys to function play and cursor for timing; it's what we are going to do the most, and your hand has to be constantly jumping, not just your right hand, but also your left-hand needs to continuously go from Alt for the video to Shift for the timing: it is very uncomfortable).

Sometimes, the thermometer is not automatically updated when you change the times of the subtitle, you must go to the next subtitle and then go back to the previous one to check if the characters limitation is OK.

The subtitles in the subtitles list do not appear segmented, the sentences are complete, without reflecting the segmentation.

When you insert a subtitle between two existing subtitles, it inserts it before the selected subtitle, when the most usual logic in other software is that the software inserts the subtitle after.

Suddenly, after having edited several subtitles without changing the angle of the video, the screen went black when I tried to change it. It happened more times, it seems that it happens when you do it during the play mode. It does not get fixed when you press stop. You must load the app again in the browser (F5). When doing so, the auto-save option goes back to "deactivated".

The auto-save option is deactivated each time the video loads, both if you press F5 or if you go back to the main menu.

At the beginning, it is a bit difficult to understand how to define regions.

MISSING FUNCTIONALITIES

You cannot select several subtitles at the same time (it is useful to delete or apply styles)

Option to move up and down the words in the line.

Option to make the video jump to the TC IN, TC OUT or angle for a specific independent subtitle from the edit mode, with its corresponding shortcut.

A count for characters per line is missing. The information of total characters is not always relevant (maybe only in the case of subtitles of long duration, it serves to warn you that your text is too long, even if the speed is correct, and then you need to create a new subtitle). What really matters is how many characters I can put according to the duration of each subtitle (and that information is given by the thermometer), not according to a general maximum. At the beginning, the change of color of the thermometer is misleading, because it only indicates that you are getting closer to 0 from 75, but as subtitlers that does not matter to us, if in a subtitle of 1 second of duration, we will never go to 0 because it's been a while that the thermometer has turned into red. What really helps you is the count for the characters per line, to avoid going over that limitation, that right now you cannot know in this editor (the subtitle break is automatic, and that parameter is not customizable).

Adding and subtracting frames one by one from the time rectangle (not just inputting the number with the keyboard), and its corresponding shortcut.

Option to set TC IN and at the same time modify the TC OUT of the previous subtitle, so that you don't have to go back to the previous subtitle and manually modify the TC OUT.

There is a moment when the thermometer line disappears, and I understand is when you have reached the ideal specified speed; that can be misleading, maybe it should always be a fine line just in the middle, so that the user does not think that the thermometer is not working.

It would be great that the thermometer also showed the reading speed in numbers, not just changing the color, and that this information appeared in each subtitle, apart from the angle, the region and the character.

It would also be nice to have the duration of each subtitle apart from TC IN and OUT.

That the reading speed would be measured in cps instead of (or apart from) wps.

A customizable short jump to navigate the video is needed (especially since the functions of moving forward/backward do not work), it is cumbersome to go back and look for the moment in which characters start talking.

Option to segment subtitles. The best solution would be that it also did an automatic duration distribution according to the quantity of text inside each subtitle.

Option to merge subtitles.

OTHER

Typo in the transcription: it says electric centers, but the correct transcription is electric sensors.

P23: Splitting lines where I want them and the subtitles actually staying that way.

P32: Maybe some kind of feature that allows to quickly set up subtitle TCs.

P13: It was difficult for me to change time codes manually. It would be also good to have the typical shortcuts (like cut, or undo) included in the editor.

P1: It could be useful (but it's not vital either) to have a wave display/detector to do the spotting of subtitles.

P37: No, cuanto más simple, más fácil y rápido de utilizar. (ENG: No, the simpler the better and easier to use).

P11: Frame-by-frame sound.

P9: Sure, the one that you can see what you are doing when subtitling instead of going to forced or free preview.

P40: To be able to jump to previous/next subtitle when in preview mode.

P6: Mentioned before.

P29: Audio wave to see when the characters start/stop speaking (useful for inserting precise TC in/out); shortcuts for find and replace; shot/scene changes indicators.

P3: It would be very useful to be able to customize the speed limit of the reading thermometer. And perhaps also showing the reading speed at any given time.

15. Do you find the feature for setting the angle for the subtitle easy to use? Explain why.

P31: Yes, it is very easy, but I wouldn't use numbers such as R1 and R2, I would put a small screen that would immediately show you where the subtitle goes.

P24: Yes, it was relatively simple.

P16: It's easy to do, but it does confuse me a bit, as I don't know how to use it from a philosophical point of view XD

P34: Yes, I think it's pretty straightforward. It could be easier to have a button to copy & paste the same angle to other subs, though.

P18: I don't think it's very easy to use as the red icon is not exactly intuitive. Should I see no arrow, just the red shape? That's what I was aiming for. So, I think I would need some guidelines to know how to set subtitles in 360 videos, as I hadn't done it before.

P20: Sí, es otra función más. (ENG: Yes, it’s another function).

P33: Yes, it seems very easy because you just need to remember to center the camera on the speaker/text on screen whenever you add a subtitle.

P36: Yes. You just must move the cursor.

P22: Not very easy and doubt the level of precision needed can be achieved with this.

P12: Setting the angle is not complex; making the system remember this preference is slightly more cumbersome

P5: Not very easy.

P14: Yes, this is the easiest part to use because it is very graphic.

P4: Easy enough to set, but it doesn't seem to stay that way.

P17: Yes, it's quite straightforward.

P8: Sí y no, ya que es fácil de integrarlo pero no siempre funciona como quieres. (ENG: Yes and not, since it is easy to integrate it, but it does not always work as you want to).

P7: Yes, it is very straightforward and intuitive.

P23: It takes some getting used to, but it can be used in the end.

P32: Yes, I find it easy to use because first you move "inside" the video to see exactly where you want to place the subtitle. And then, just one click and you have the angle set.

P13: Not really. I've tried using it, but the results were quite weird. I'm not sure I've understood the concept, as when I did the preview, the original inserts also seemed to be moving, but anyway, I've tried to do my best.

P1: Yes, it is. Maybe it would be good to have an option to apply the same angle of consecutive subtitles.

P37: Ha sido moderadamente fácil. Ver respuesta a la pregunta 13. (ENG: It's been moderately easy. See response in question 13).

P11: Yes, it was very logical. However, while looking for the woman, I wasn't sure how far round I had moved, so a clearer dial may help. I ended up labelling her as offscreen. Again, working with a mouse and different keyboard might have helped here.

P9: No, it's on the left, I think should be easier nearer the temperature thermometer.

P40: It was really easy, you just need to locate the correct angle and press the button, although finding the correct angle with just the mouse was a little bit difficult sometimes. I must confess I didn't use the arrows.

P6: Yes. The regions and the possibility of setting also moving the video editors are useful. It is just a move and a click :)

P29: Fairly easy, quite straightforward with the arrow, gives an idea of how it works.

P3: Yes, but I find the buttons too time consuming. I would prefer to move in 5-10 º increments than in just 1º. The arrow is a bit confusing around the 180 (135-225) and the 360 º (315-45).

16. Were the preview modes useful for you? Explain why.

P31: Preview mode is always useful.

P24: Yes, they gave me the rapid ability to review my work and correct any errors or make desired changes.

P16: Yes. I liked that a lot. I think it is nice to be able to see the subtitles from different points of view.

P34: Both are useful. The forced one helped me see if the angle was correct and the free one is really useful to navigate the video in the same way as the final viewers.

P18: However, when I previewed my subs and changed to the edit mode to correct the angle, the video preview went black and I couldn't revise the angle, as all I could see was black screen. Free preview also

resulted in black screen. When I changed it to forced preview, I could see the screen again. In the end, I'm not sure if my angle is correctly set.

P20: Sí, pero tienes que familiarizarte con el editor al fin y al cabo. (Yes, but you must get use the editor at the end of the day).

P33: Forced view gave some stuttering issues, but free preview was fine.

P36: I think that the editing and preview modes could be integrated. This way it would be able to edit and preview the subtitled video without having to change the mode.

P22: OK.

P12: Watching 3D videos in 2D makes it harder to judge.

P5: Yes, they help to get a general idea of the subtitling work.

P14: Yes, but I think the edit mode and the preview mode should just be one.

P4: Yes, that way I could see whether the subtitles where correctly timed.

P17: Yes, especially the second one (forced), because you can edit while watching the subtitles

P8: Sí, sobre todo el que te pone justamente donde has puesto los subtítulos para comprobar que están ahí bien insertados. (ENG: Yes, especially the forced perspective to check if you have insert the subtitles correctly).

P7: Yes, preview is fundamental in subtitling and, in the case of 360º videos, the possibility of locking and unlocking angle is useful to check whether you did it right (locked) and to be able to freely preview the video (unlocked) as a normal viewer would do.

P23: Yes, though they were initially out of the page and so not obviously visible.

P32: They were useful as I wanted to know how the user experience would be, and also to check TCs, subtitle positions, etc.

P13: They were useful, but it's not useful to have to change to preview every time you are doing the spotting.

P1: Yes, but I didn't find out in the instructions that when using the forced mode, I can go to the image and the subtitle, and then edit it. It would be good to specify it. When I was in the edit mode, I found it hard to go to the timing of specific subtitles to edit them.

P37: Sí, porque en el modo forzado se puede verificar la exactitud del trabajo que estoy realizando y en el modo libre se puede comprobar la experiencia real que tendrá el usuario. (ENG: Yes, because in the forced perspective you can verify the accuracy of you the work you are doing and in the free mode you can check the real experience that the user will have).

P11: Yes - I needed them to check my timecodes as I was having difficulty with accurate cueing. Being able to override a timecode by typing it in would have been helpful, as would seeing changes in speed as you type/edit. I realized I had to key in the new in and out timecodes to apply them.

P9: It's useful but it would be more useful integrated in the tool.

P40: Yes, they were useful because I was able to fix or relocate subtitles really easy and to see the final output being able to make changes in edit mode.

P6: Yes, although I mainly use the editor and free view.

P29: yes, they are necessary! a subtitler needs to see how the subtitles are presented on the screen. although I am not sure if we need two types of "previews".

P3: I find the movement in the forced preview too abrupt.

17. Do you think it will take you longer to subtitle videos in 360º? Why?

P31: I am not sure.

P24: Yes, because there is the angle to take into account and also, perhaps, more considerations regarding the positioning of the subtitles.

P16: Not necessarily. Subtitling is subtitling. I would need to get used to 360º videos and understand what is expected from me, but technically is as easy as any other subtitles.

P34: Yes. You need more time to navigate the whole video and see if there's on screen text that needs subtitling, for instance.

P18: Yes - as you need to adjust the angle.

P20: Es otra función más a añadir. Debería ser algo automático. (ENG: It is another function to add. It should be something automatic).

P33: I will say that I am mostly used to working in videos where the timecodes are already set, so I only must worry about translation and little else. But I think this would take me more time than if I were using a regular subtitling software like FAB.

P36: Yes. Setting the angles will be also important here.

P22: Definitely.

P12: Definitely so. There is at least one extra parameter to input; therefore, subtitling would take longer, if only slightly per line.

P5: Yes, because it's something new.

P14: Yes, because you must set the angle.

P4: Yes, if only to find the source of the audio! Apart from that, it's probably not a lot more time-consuming if the angles can be set up correctly and independently for each subtitle.

P17: Yes, you must set the angle and move around to see if there are any inserts.

P8: Sí, por lo de la localización de los subtítulos, pero con esto más pulido disminuiría mucho el tiempo. (Yes, because of the localization of the subtitles, but once the software is polished that should decrease the time a lot).

P7: Yes, a bit longer because there's a new parameter to add (angle) for every subtitle, which implies an extra time for the 3D navigation, but luckily angle doesn't need to change for every subtitle. It will also depend on the editing style of each video, but yes, by definition, an extra action requires extra time, even if sometimes only an extra second or less.

P23: Yes, because of all the looking around for the person speaking, positioning subtitles, etc.

P32: Not that much, as long as we have access to editors like this one.

P13: Yes, it will, if you must take care of position of subtitles and angles.

P1: Maybe at the beginning if you are not familiarized with the system, but then I think it would not take too much extra time, it's just the fact of applying the angles. It would be good to offer more options for angle editing.

P37: Sí, porque hay que especificar más parámetros. (ENG: Yes, because you must specify more parameters).

P11: Yes, but not as long as it took me this time round. Once I was familiar with the software, I began to speed up. I think being able to drag the 360 degrees (which I couldn’t do on the laptop) would mean that there isn't a huge difference in time needed.

P9: I think it will take a little bit longer requiring setting the right angle, but not too much.

P40: Probably yes, because finding the right angle to make a smooth transition to the next one is more complex than I thought.

P6: Yes, although it may be just a matter of time of getting use to the app. Either way, looking for the people talking will always be more time-consuming.

P29: Yes, I think it will, mainly because you must set the angles for each subtitle, decide on the region, etc. My concern are shot/scene changes - how should we approach them in such videos? In the same way as in regular ones?

P3: Definitely. Because of the added factor.

18. Do you think 360º videos will impact your work as a subtitler?

P31: I am not sure it makes a big difference.

P24: Over time, yes. I believe we will all have to learn how to include the subtitling of 360-degree subtitles into our skillset. This will take time and effort if we want to remain up-to-date and marketable within our industry.

P16: I don't think so.

P34: In the future, maybe. If only agencies knew the work they entail... (one can dream).

P18: Difficult to say.

P20: Como digo, es otra función más a añadir. (ENG: As I said, it's another function to add).

P33: I don't think so.

P36: I guess so, but, probably, in the future.

P22: Not at the moment.

P12: Undoubtedly yes. I was already familiar with the NYT 3D project and started to wonder back in 2012 how 360º subtitle positioning should be normalized.

P5: Not sure.

P14: We will have to change a bit the procedure but with the right tools it shouldn't be hard.

P4: Yes, I have already been contacted about this kind of subtitle.

P17: Yes. I would demand that the scripts should also include inserts, so that you don't need to move around looking for them.

P8: Si ganan mucho terreno en el campo, sí. (ENG: If this content is mainstreamed, then yes).

P7: I think it will in a not-so-far future, yes.

P23: In the future, yes.

P32: I had never worked with them before, but I would like to in the future. So, I think it could be positive for my work as a subtitler.

P13: I don't think so.

P1: Yes.

P37: No creo que afecte a mi trabajo actual de forma inmediata. Pero, tal vez, sí lo haga cuando crezca la demanda y grabación de espectáculos en 360º para su retransmisión o venta. (ENG: I don't think it will impact my current work immediately. But, maybe, then the demand and creation of 360º content increases, yes).

P11: I would love to have this as regular functionality.

P9: I am not sure. I wouldn't mind if it were.

P40: It will depend on the market and the demands of the consumers.

P6: Yes, as it is helpful for many areas in audiovisual translation.

P29: Definitely. It will change the way we are working now - different requirements for subtitles, different time needed to perform the task. Besides not everybody will be able to work on such files (e.g. people with health problems mentioned in the consent form or people with old PCs/laptops etc.)

P3: Perhaps, but I really have no clue.

19. Other comments:

P24: Overall, the tool seemed simple to use once I had read the instruction manual and started to play around with it for about 30 minutes.

P34: I think you're doing a great job with this! :)

P18: It would be nice to have the sound on while moving forwards and backwards in the video frame by frame. Fast backward button does not work.

P20: Me ha resultado imposible set el timing. (ENG: It was impossible to set the timing).

P36: It would be interesting to experience this on a virtual reality device.

P22: As mentioned above, I do not believe subtitling is the optimum way of localisation such content. However, congratulations on your research and looking forward to receiving updates on your findings/publications. Thank you for the opportunity!

P14: Thank you for this opportunity. Although there are things to improve, I think the par of setting the angle is a very good idea in these videos.

P17: I spent around 1,5 hours doing the test (reading instructions, getting used to the software, translating) and I was told it would be done in 30 minutes. I think that should be improved in future tests you carry on.

P8: Muchas gracias por dejarme participar y mucho ánimo, ¡es una herramienta muy buena! (ENG: Thank you so much for letting me participate and keep up the good work, it is a very good tool!)

P7: Congratulations, this is an excellent tool and field of research. So even if, as mentioned above, there's room for improvement, it's already really good. Keep up the good work!

P23: It was an interesting exercise, which however actually lasted quite a bit longer than advertised - I have spent 89 minutes on it so far.

P13: I'm not quite happy with my spotting, but I didn't have quite time and I found the software not so easy to use.

P37: Gracias por darme la oportunidad de probar esta nueva herramienta. (ENG: Thank you for giving me the chance to try this new tool).

P11: Feel free to ask me to expand on anything if you need me to.

P9: It's a nice tool! I will change the organization of buttons. I like the interface.

P40: I think this is a great system to subtitle these videos and I hope it to be a success if the demand is enough.

P29: First of all, awesome work! Congratulations!

Some comments/ideas below :-)

Please check the shortcuts for Polish - when I wanted to insert a Polish letter ""ą"", I got a pop-up window informing me that it's a shortcut for something.

I guess this may also be an issue for other languages with non-standard letters.

Also, I had a problem with video buffering - but it may just be my computer (too old). So, the TCs in/out in my test are VERY approximate. I did the test anyway as I wanted to finish the task and check out all the functions.

When I was jumping to different subtitles, the program allowed me to jump just to the text. The video wasn't moving. I am not sure if that's because of my buffering problem or that's a general rule? In general, when jumping to different subtitles, the video should ""jump with me"" (so that when I edit the sub and I hit ""play"", I can see the change right away).

Quite a lot of colors available. Not too many? Viewers usually get lost with more than four.

More basic options for editing the subtitles would be useful like move sub left/right etc.

What about the spell check function? Will it be just the one available in the browser or you are planning something more?

Any quality check functions? Like a report when I am done? To see whether all my subtitles are correct, or some things should be improved (e.g. too many characters per line, wrong reading speed etc.).

4.2. Summary

The replies for this questionnaire were very different and specific among participants, so it is recommended to carefully look at them one by one, because all ideas can be interesting to implement in a new version. However, for the sake of clarity, we will try to summarize the most relevant ideas in this section.

What participants **like the most** was that the tool was cloud based/online, it seemed to be easy and intuitive for most of them, they also liked the "set the angle" option, and the interface.

What participants **like the less** was the configuration for the default shortcuts, they considered them uncomfortable, and need to be customized but also, they are requesting a more comfortable default setting. They did not like the buttons "Fast backward" and "Step backward" not to work properly. A functional frame by frame button to navigate the video is needed. Some users did not like the speed thermometer. They think that it is important to get the characters per line limit and also think that the thermometer should work with the parameter of cps rather than (or apart from) wps. Participants did not like that the fact that they had to change modes in order to edit the subtitles, they would rather prefer to have the editing and preview modes integrated. Some users reported that the video went black several times and that they needed to load the video again to fix this issue. Some participants did not like not having enough freedom to break subtitle lines as you want to. Also, they reported that going to the next subtitle should be an automatic action.

When asked about **what could be improved**, most participants referred to the shortcuts, as explained above. Also, some would like to listen to the audio when moving frames forwards or backwards. As explained before, subtitlers would like to be able to preview the video in the edit mode or edit the video in the preview mode, either way, but both functionalities should be integrated to facilitate spotting. Some participants discussed the possibility of improving the arrow in the preview/edit mode, it should be more visible. Also, some users complained about the fact that the auto-save option was deactivated each time they pressed F5 to load the video or went back to the main menu. The software should remember this setting. Also, participants complained about the fact that the subtitles in the subtitle list are not shown with the actual segmentation. They would like to have the subtitles in the subtitle list properly segmented. Some participants replied that the pop-up information from the control buttons covered the time codes and that was distracting. Some users suggested to include general actions (and it corresponding shortcuts) such as undo, copy, paste, cut, etc. If the undo option is not implemented, it should be.

When asked about any **missing functionalities**, most participants requested to have a sound wave to improve accuracy when spotting. Also, a participant requested an automatic separation by 3-4 frames between subtitles. Some participants asked about the possibility to include a spellchecker or QA functionalities. Also, some participants think that segmentation needs to be customizable and more flexible (not automatically done by the editor based on the thermometer parameters).

Regarding the **"set the angle" option**, most users thought it was easy to use (also sometimes did not work properly), and some users find it difficult. Some participants highlighted that the arrow could be improved and be more visible. Some participants also raised their concerns regarding the level of precision and accuracy of this functionality. A participant suggested that it would be good to have an option to apply the same angle to consecutive subtitles. Also, some participants wonder what to do when the speaker is offscreen. An angle option for off-screen voices needs to be implemented. Finally, a participant suggested that would prefer to move in 5-10 º increments rather than in just 1º. The arrow is a bit confusing around the 180 (135-225) and the 360 º (315-45).

As far as the **preview modes**, as explained before, participants think these modes are useful, but they would like to be able to edit subtitles in the preview mode or be able to preview subtitles in the edit mode. These functions should be integrated for an optimal spotting process.

When participants were asked about **the impact of subtitling 360º videos on the job of a subtitler**, different opinions were presented. Some are not sure about it, others think that subtitling will take

longer since they have to set the angle for the subtitle, and others think that it should not take longer or have any impact if you have the right tools and software for it. In general, subtitlers are a bit worried about the time-consuming tasks that this type of subtitling can bring. Also, some of them thought that subtitling is not the right way to localize 360 videos (but this is not relevant because subtitling for the deaf and hard of hearing will always be necessary to access audiovisual content).

Finally, in the section **“Other comments”** an important issue was raised by one participant: “Please check the shortcuts for Polish - when I wanted to insert a Polish letter ""ą"", I got a pop-up window informing me that it's a shortcut for something.

I guess this may also be an issue for other languages with non-standard letters.” We need to check that at least all European languages characters are accepted by the editor.

ANNEX 7. AUDIO DESCRIPTION WEB EDITOR METHODOLOGY

1. What to test?
   - Audio description Editor (dynamic AD): https://imac.gpac-licensing.com/editor/videos.php
   - Access: Each participant will have their own exclusive user and password.

2. When?

   From 24th September 2018 to 30th September 2018.

3. Methodology: overview
   - **Research tools**: online questionnaires (Google Forms).
   - **Measures:** usability and preferences.
   - **Participants:** 30 professional audio describers from different countries.
     - **Recruitment criterion**: audio describers who professionally audio describe audiovisual content.
   - **Language of the test:** English. The audio descriptions can be written in any language.
   - **Materials:** AD editor and 360º video ("360 Google Spotlight Stories: Pearl").
   - **Experimental protocol:** users will be asked to perform certain tasks and then report on the usability and preferences through an online questionnaire.
   - **Reporting:** results will be included in a report created by UAB. This will be done exporting data from the Google Form.
   - **The current methodology will be tested by UAB with three users.**

4. Methodology: experimental protocol
   - **Online test:** the users will access this test online, via email plus Google Forms, and there will be no supervision or facilitators involved. The test will include different steps (some info will be in the email, and some other in the Google Forms, see the table below):

Section	Description	Where?
Section 1	Welcome and presentation of the ImAc project and the test.	E-mail
Section 2	Ethical clearance: information sheet and consent form to be approved by the participant.	Google Form: https://goo.gl/forms/tKew4U7B1DrlCJAX2
Section 3	Demographic questionnaire.	Google Form:

		https://goo.gl/forms/BnmYgnF4GBbYnRNn2
Section 4	The following items will be introduced: - Quick User Guide - The participants will be asked to read the Quick User Guide before performing the requested tasks. - Login information to access the AD editor. - Tasks to be performed.	E-mail (link to PDF): - Quick User Guide: https://drive.google.com/open?id=19eEBJY7mOr9jKNzfCgToA8BLwM7wVsKE - Instructions sheet: https://drive.google.com/open?id=166o5sCm5DvfGF8YSGoEtJh7ae-TtrUFc
Section 5	SUS questionnaire & Preference questionnaire.	Google Form: https://goo.gl/forms/Iq3ZSltOYYcoA5o03
Section 6	Thank participants and follow up.	Section included in the Google Form from Section 5.

- **Materials**. The video to be used will be "360 Google Spotlight: Pearl" (https://www.youtube.com/watch?v=WqCH4DNQBUA). The duration of the video is 00:05:38. The video will be in low resolution (720s) to avoid overloading the server and make the audio describing task smoother.
- **Recruitment & User Code Assignment**.

  We will recruit participants via contacts, by email/social networks, etc. The test has been designed in English so that professionals from different countries can participate. Once we have a list of participants, we will contact them by email to provide instructions and access to the online form and web editor.

  We will create 30 different users (P01-P30) with the role of audio describer and each user will be assigned a video (same video for all users). The login information will be provided by email to the users. Then, they will access the ImAc AD editor and they will only have access to one video in the Editor module.

  This user name will be the user code that they will need to enter in the different questionnaires when requested.
- **Contact**:

  To conduct the test, professional audio describers (who have previously agreed on participating) will be contacted by email:

Subject: Test for ImAc AD editor - Instructions

Dear participant,

First of all, many thanks for participating in our study.

The **aim** of the test is to gather feedback from professional users like you regarding the ImAc web AD editor for 360º content that we have developed. This feedback will enormously help us to improve the tool and make it better for professional audio describers to use it in the future.

This test is built in relation to ImAc (Immersive Accessibility) project. The goal of ImAc project is to explore how accessibility services (such as subtitles, audio description, or sign language) can be integrated with immersive media. http://www.imac-project.eu/

This test will approximately take **45 minutes**.

YOUR USER CODE IS: PXX AD.

These are the steps that you need to follow **in this order**:

1) Give your consent to participate in this test by filling this form and clicking on YES.

https://goo.gl/forms/tKew4U7B1DrlCJAX2

2) Provide some information about yourself, by replying to the following questionnaire:

https://goo.gl/forms/BnmYgnF4GBbYnRNn2

3) Perform a few tasks with the AD editor.

1. Please first read the Quick User Guide to get familiar with the tool:

   https://drive.google.com/open?id=19eEBJY7mOr9jKNzfCgToA8BLwM7wVsKE

2. Now read the instructions and proceed with the test:
   https://drive.google.com/open?id=166o5sCm5DvfGF8YSGoEtJh7ae-TtrUFc

3. This is your login information:

   - User: PXX
   - Password:

4) Tell us about your experience with the editor by replying to the following questionnaire:

https://goo.gl/forms/Iq3ZSltOYYcoA5o03

5) Let us know by email that you have finished the test so that we can confirm that your data has been correctly registered.

The test will be open from today until the 30th of September. You can proceed with the test any time during this time frame but you should do it **in just one session**.

If you have any question or technical issue, please feel free to contact me any time.

Please, confirm that you have received this email and that you understand the instructions.

Thank you again for your collaboration!

All the best,

- **Tasks**. Participants are asked to perform a series of tasks individually on their own computers. The material will be available in the AD editor. They will need to access the AD editor and perform the tasks in the video that has been assigned to them.

  The duration of the video is 00:05:38, but the professionals will be requested to AD from 00:00:00 to 00:01:10.

  The instructions will be provided in a PDF document available here:

  https://drive.google.com/open?id=166o5sCm5DvfGF8YSGoEtJh7ae-TtrUFc

5. Questionnaires

Questionnaires will be provided to the participants using online forms, but is included below for reference.

Demographic questionnaire addressed to professional users

1. **Sex**
   a) Female
   b) Male
   c) Other
   d) I prefer not to reply
2. **Age**:
3. **Main language**:
4. **Please, describe your current job:**
5. **Have you ever audio described a 360º video?** Yes / No
6. **For how long have you been working in the field of audio description?**
7. **How many hours of audio description have you produced in your professional life?**

   a) Less than 50 hours

   b) 51-150 hours

   c) 151-300 hours

   d) More than 300 hours

8. **In what language or languages do you normally audio describe?**
9. **What software do you normally use?**
10. **Please indicate your level of studies.**

a) Primary education
b) Secondary education
c) Further education. Please specify _____
d) University. Please specify _____

11. **If you replied "Further education" or "University" in the previous question, please specify.**
12. **If you have received specific training on audio description, please indicate it here.**
13. **What devices do you use on a daily basis? Multiple replies are possible.**
    a) TV
    b) PC

c) Laptop
d) Mobile phone
e) Tablet
f) HMD
g) Other:_____

14. How often do you watch virtual reality content (for instance, 360º videos)?

	Never	Occasionally	At least once a month	At least once a week	Every day
In smartphone					
On a tablet					
On a PC					
In smartphone plugged to HMD					
In HMD					

15. If you have never used virtual reality content such as 360º videos or only occasionally, please indicate why. Multiple answers are possible.
a) Because I am not interested.
b) Because it is not accessible.
c) Because I have not had the chance to use it.
d) Other reasons. Please explain: _____

16. Please state your level of agreement with the following statement: "I am interested in virtual reality content (such as 360º videos)."
a) I strongly agree
b) I agree
c) Neither agree nor disagree
d) Disagree
e) Strongly disagree

17. Do you own any device to access virtual reality content?

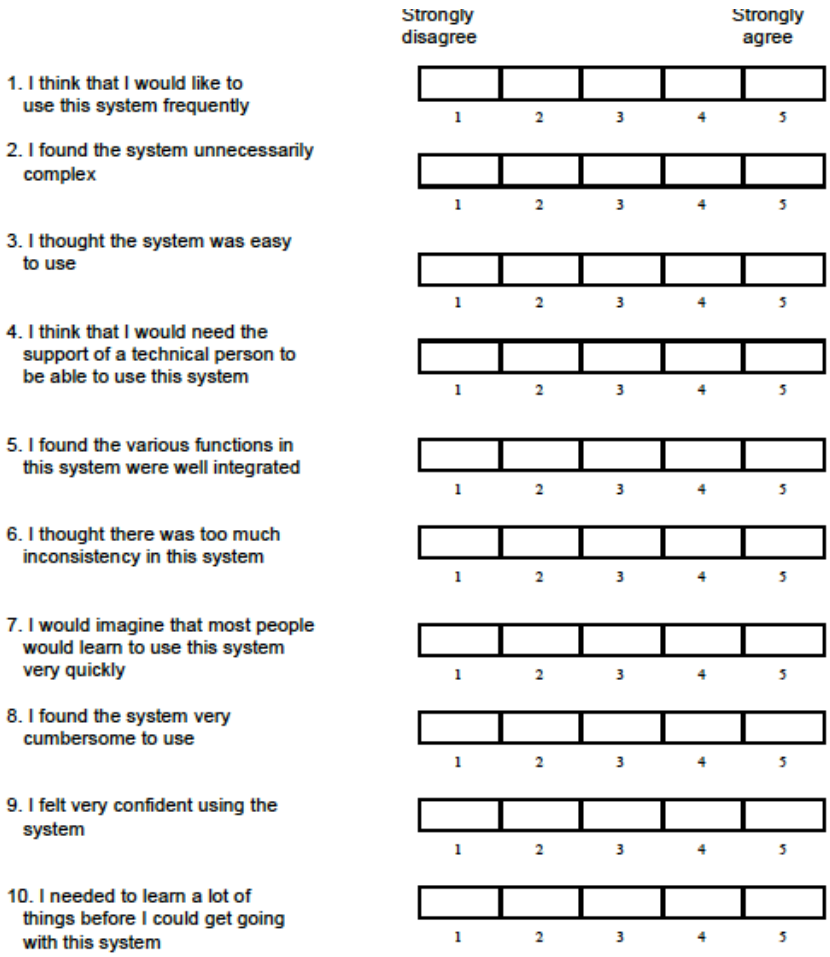
a) Yes (If yes, which one? _____)

b) No

c) I don't know or I don't want to reply

18. If you replied "yes" to the previous question, please specify which device(s).

SUS



PREFERENCES

Now please reply to the following questions in your own words.

- What did you like most about the AD editor?
- What did you like less about the AD editor?
- What do you think could be improved, and how?
- Did you miss any functionality? If yes, can you tell us which?
- Do you find the feature for setting the angle for the AD easy to use? Explain why.
- Were the preview modes useful for you? Explain why.
- Do you think it will take you longer to AD videos in 360º? Why?
- Do you think 360º videos will impact your work as an audio describer?
- Other comments:

ANNEX 8. USER GUIDE: AUDIO DESCRIPTION WEB EDITOR

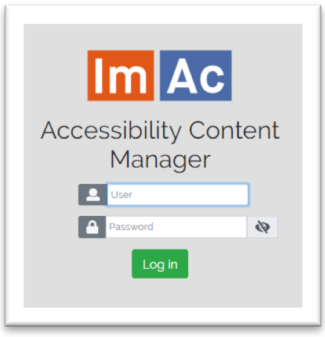
What is it?

This web AD editor has been developed with the aim of producing access services, specifically audio description (AD) and audio subtitles (AST), in audiovisual contents in 360 degrees. 360° videos are recorded with special cameras that reproduce highly realistic images, as if you were inside a sphere.

It means that when you are producing AD, you will be in the centre of that sphere and you will be able to move around to audio describe your contents.

With this web editor, you can manage the tasks that are assigned to you, add audio description instances, insert timecodes, set different angles for audio description instances, record audio descriptions, and more.

To access web AD editor, go to: https://imac.gpac-licensing.com/editor/videos.php and enter the login information that has been provided to you.

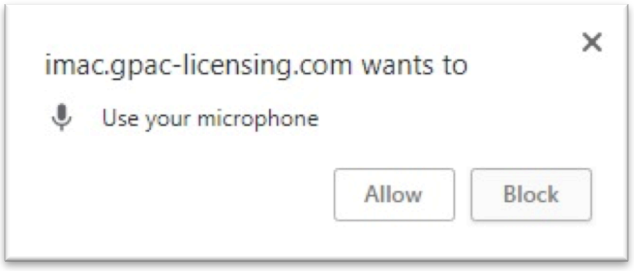


Requirements

You need a stable internet connection. The web editor must be accessed with:

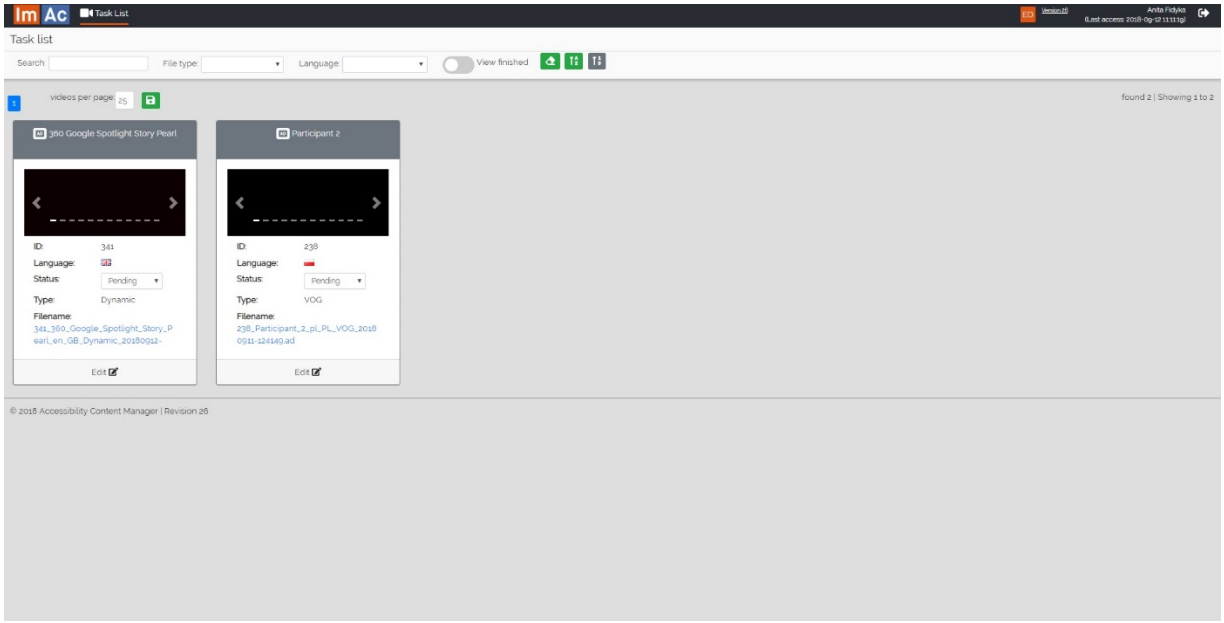
- Google Chrome
- Firefox

A pop-up message will ask you to allow the AD editor to use your microphone. Click allow: it will enable you to record the AD instances, and test the recording.

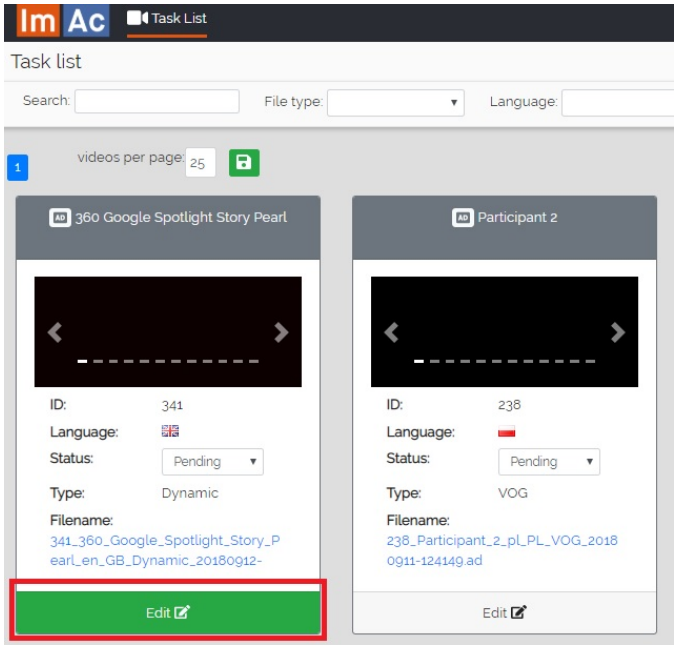


How to start?

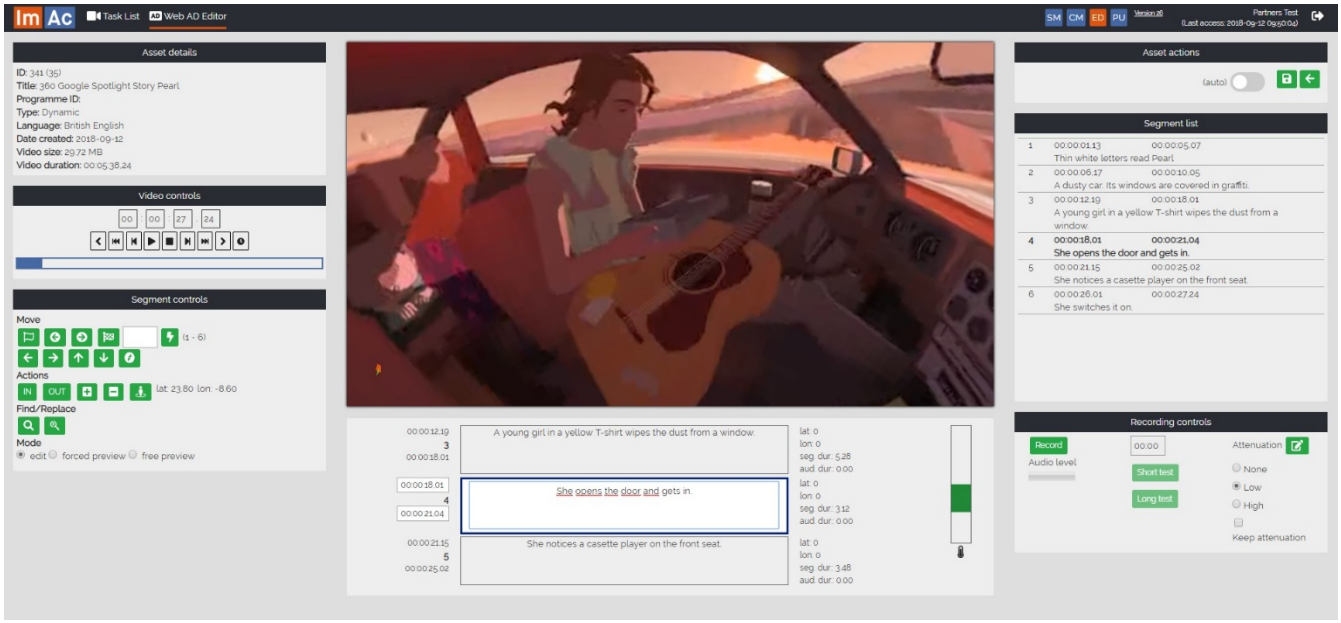
When you access the web AD editor, you will see assets that have been assigned to your account:



To edit the file, click **edit** and the editor will open automatically:



This is how the AD editor will look when you open it:



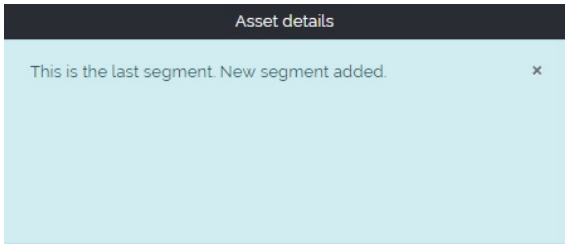
What will I find in the different sections?

Now, the different sections and options will be explained in detail.

Asset detail

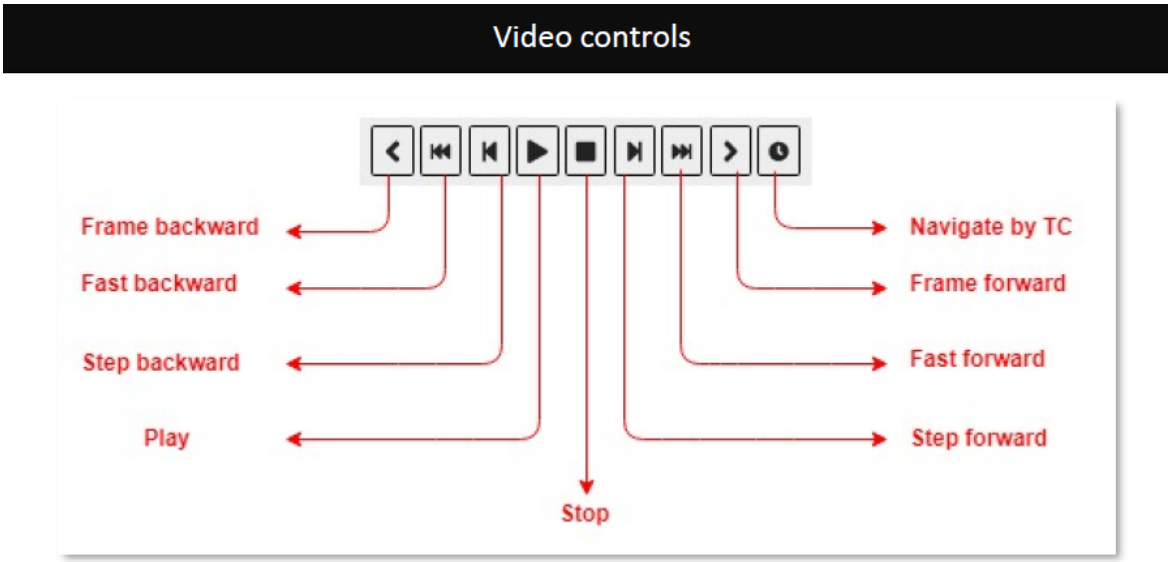
It shows the basic features of the file: name, size, language. Also, messages will appear here in case an error occurs.

A message can look like this:



Video controls

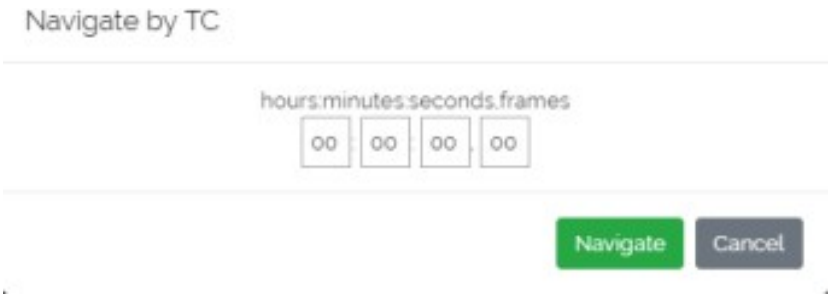
The description of video controls and corresponding shortcuts[9] is provided below:



Option	Description	Short cut
Play / pause	This button plays and pauses the video.	Alt + F2
Stop	This button stops the video (going to the beginning).	Alt + F3
Frame backward	This button makes the video go backwards frame by frame.	Alt + Left
Frame forward	This button makes the video go forward frame by frame.	Alt + Right
Slow forward / backward	These buttons make the video go forward/backwards with a slow speed.	Alt + F6 / F7
Fast forward/backward	These buttons make the video go forward / backwards with a fast speed.	Alt + F5 / F8
Navigate by TC	With this button, you can go to a specific time in the video that you can indicate manually.	Ctrl + Alt + T

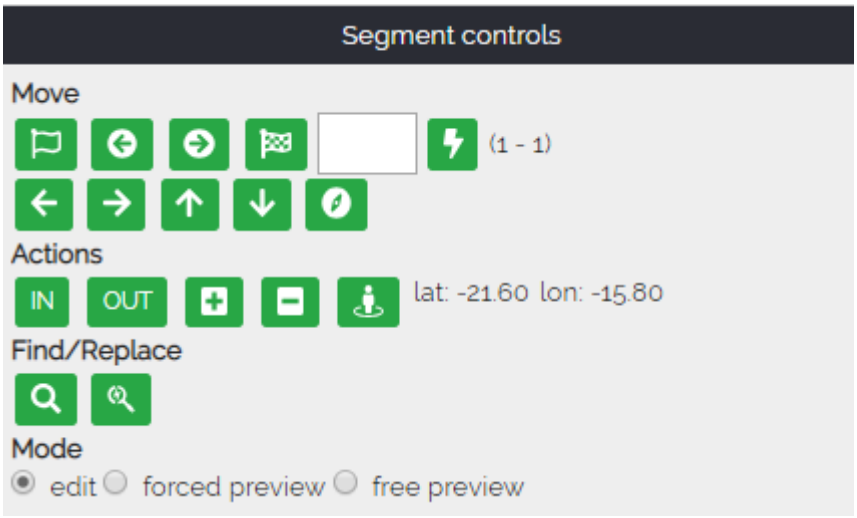
[9] Shortcuts will be customizable in a future version of the web AD editor.

When you choose “Navigate by TC”, you will see this:



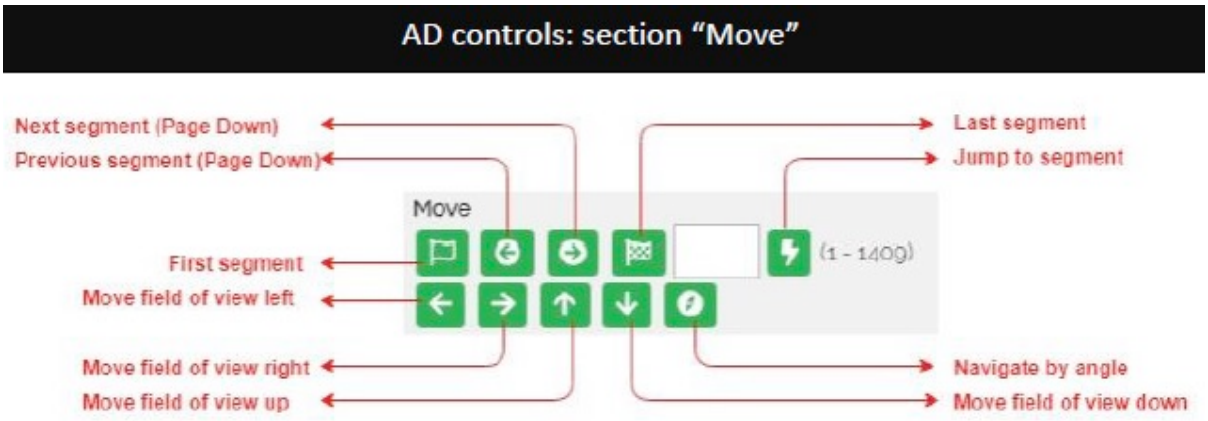
AD controls

You can access different options here:



The description of the respective controls is provided in the next sections of this guide.

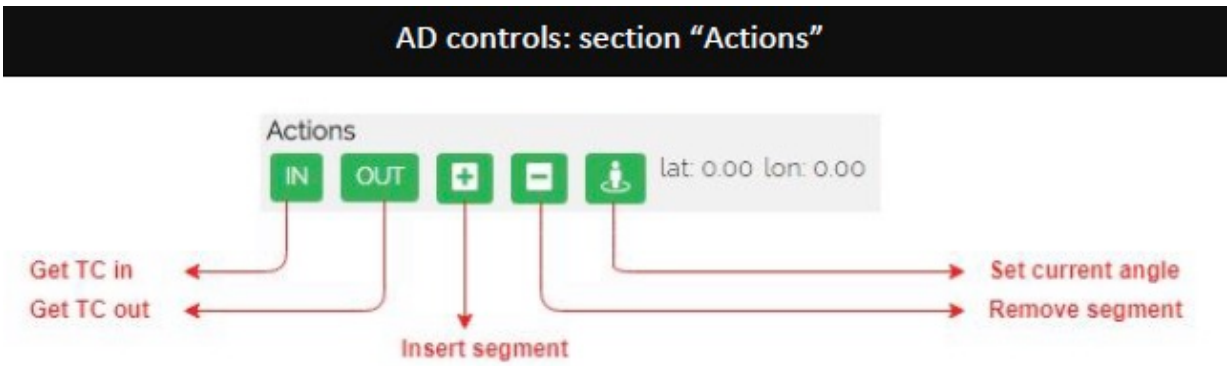
AD controls: section “Move”



Option	Description	Shortcut
First segment	This button takes you to the first AD segment.	

Previous segment	This button takes you to the previous AD segment in relation to your current position.	Page Down
Next segment	This button takes to the next AD segment in relation to your current position.	Page Up
Last segment	This button takes you to the last AD segment.	
Jump to segment	This button takes you to a specific AD segment.	
Move Field of View to the left	With this button, you move to the left in the spherical video.	Ctlr + Alt + Left
Move Field of View to the right	With this button, you move to the right in the spherical video.	Ctlr + Alt + Right
Move Field of View up	With this button, you move to the upper side in the spherical video.	Ctlr + Alt + Up
Move Field of View down	With this button, you move down in the spherical video.	Ctlr + Alt + Down
Navigate by angle	With this button, you can directly move the field of view to a specific angle of the video, instead of moving through the video manually with the previews options (left, right, up, down).	Ctlr + Alt + A

AD controls: section "Actions"



The options and corresponding shortcuts provided in the table below:

Option	Description	Shortcut
Get TC IN 	This button sets In Time Code for the AD segment.	**Shift + Page Up**
Get TC Out 	This button sets the Out Time Code for the AD segment.	**Shift + Page Down**
Insert segment 	This button inserts a new AD segment between existing ones.	**Ctrl + Insert**
Remove segment 	This button removes the selected AD segment.	**Ctlr + Delete**
Set current angle 	This button sets an angle for current AD segment. To learn about what "setting angle" means, see the explanation below.	**Ctlr + A**

Setting angle – What is it?

This option is new compared to traditional AD editors for 2D audiovisual content.

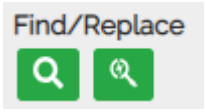
How does it work? Since we are are working in a spherical video, in order to tell the AD system where the important event or character that we want to audio describe is exactly, we need to direct the video at this event or character and press "Set angle".

Thanks to this, audio description stays "tied" to that part of the 360º sphere and the user can hear the AD from that direction.

Why do we do that? Imagine that a person with sight loss is watching the video with audio description. If we "tie" audio description to a special angle of the 360º sphere, this person will know where the sound comes from. This solution will guide him or her inside the sphere and prevent them from getting lost.

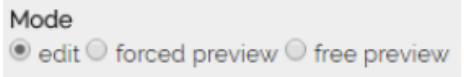
If we, as audio describers, do not provide this information when producing the script, the system will not provide this location information to final audience. This is why setting current angle, which is specified by latitude and longitude, has a great importance.

AD controls: section "Find/Replace"



These controls can help you find specific words and replace them if you need.

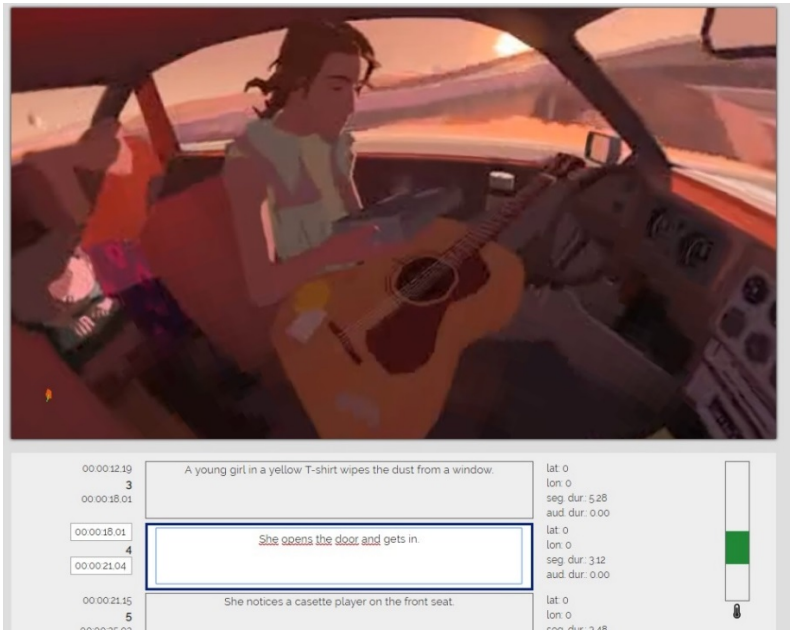
AD controls: section "Mode"



Option	Description
Edit	In this mode you will produce AD, moving freely through the AD segments.
Forced preview	With this verification mode, you don't need to navigate through the video to find the events and characters: the system will do this automatically, forcing you to see where they are.
Free preview	You can use this mode, just like the previous one, for verification. But with this mode, you are free to navigate the video.

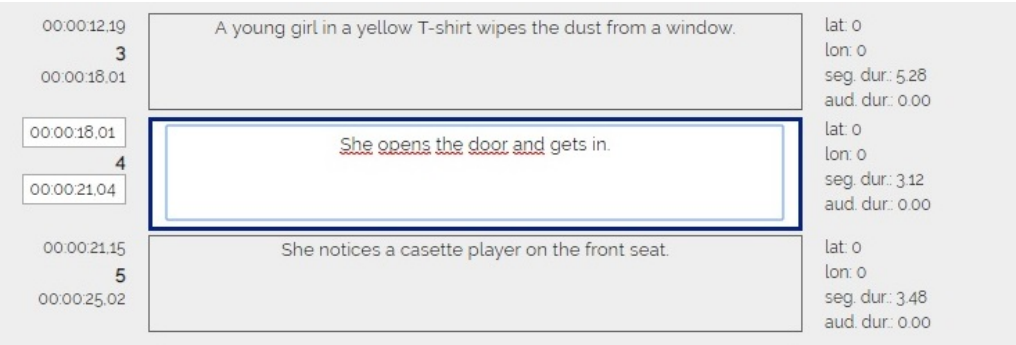
AD preview

In the central section, you can edit the AD script and preview the video with the audio description:

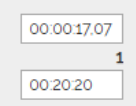


In the left bottom of the video, there is a small arrow which shows the current angle of the viewer.

Below, you can edit the script.



Left to the script, you will find TC IN and TC Out for the corresponding AD segment. The number of the segment is also displayed here.

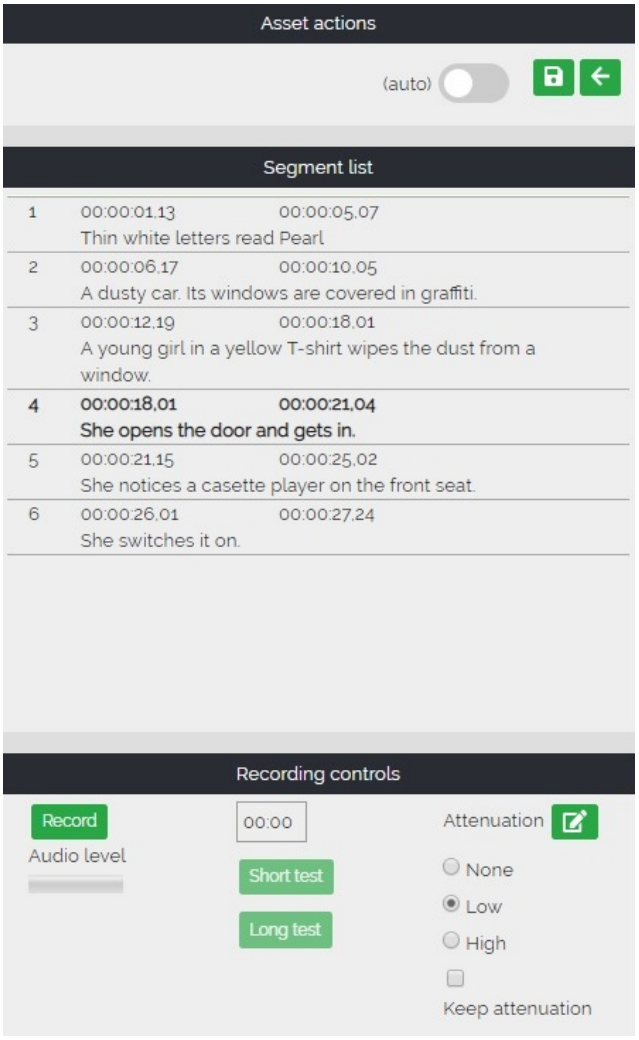


Right to the script editing area, the longitude and latitude of the current segment is shown. The duration of the corresponding audio is also displayed there.

At the very right, the reading speed display is shown. This indicator is a guide to avoid going over the permitted characters per minute.

Asset action, segment list and recording controls

There are 3 subsections on the right side of the editor: asset action, segment list and recording controls.



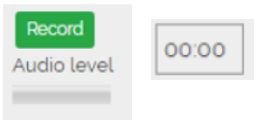
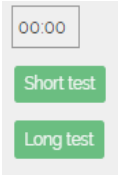
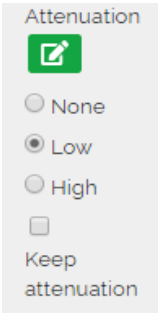
Asset action

Option	Description
(auto)	When the button "auto" is switched on, auto save is enabled. The AD editor will save the work periodically.
	Manually save audio files.
	Go back to the main page of the editing interface.

Segment list

It contains the AD script with time codes and a segment number. When AD for a given segment is recorded, the colour of this segment changes into green. When all segments are green, it means that all segments are recorded.

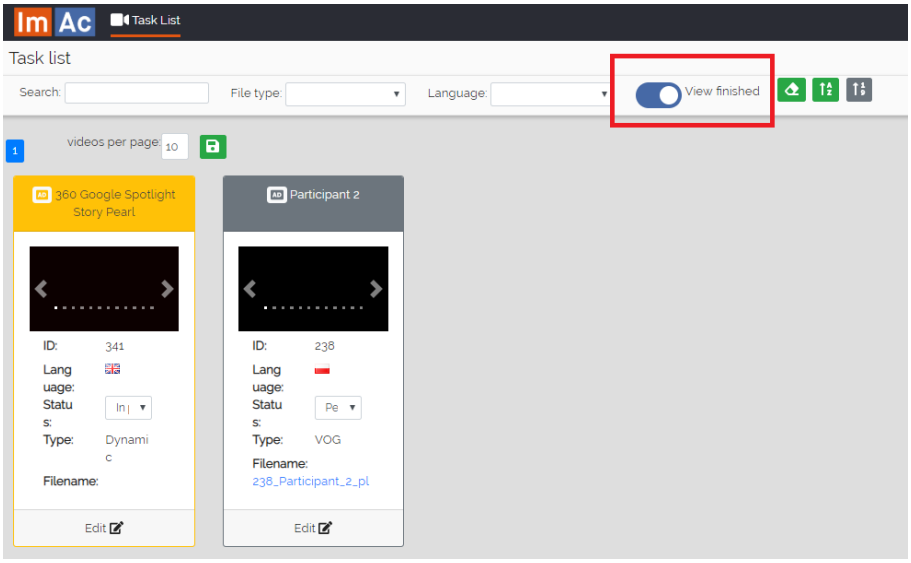
Recording controls

Option	Description
	You can record the audio for the corresponding AD segment by pressing the "record" button. A countdown during the recording is provided to show you how much time is left according to the time codes in segments. Below the "record" button, you can check the audio level of the recording.
	After AD is recorded, you can preview your recordings in 2 tests. Short test starts 2 seconds before the TC IN of the AD segment. Long test starts 5 seconds before the TC IN.
	You can choose fading, which refers to the gradual decrease of the volume of the main video while AD is playing. Fading can be: none, low or high. The "None" option will not reduce the volume of the video. If you choose "High", it will give you the most reduction of volume. If you check the checkbox "Keep fading", the fading will be kept between the TC OUT of the current segment until the TC IN of the next segment.

Save AD file

When you finish your tasks, save your AD by clicking at the save button  in the right menu and go back to the Editing interface by pressing  button.

Change the status of the video into **Finished.** To view the finished files, click **View finished.**



Possible scenario of producing AD

Let's imagine that you or other professional audio describer wants to produce AD in this editor.

What are the consecutive steps? The procedure is as below:

1. First step is to create the script that you will record, describing the different visual elements of the video.
2. You need to add AD instances in segments and set TC IN (Shift + Page Up) and TC Out (Shift + Page Down), while playing and pausing the video (Alt + F2) or moving the video frame by frame (Alt + left / right).
3. As you are working in 360°, we need an angle for each segment. You will need to search for the desired angle (Ctlr + Alt + Left / Right / Up / Down) or by moving the mouse over the video and set it (Ctlr + A).
4. Once you have a script, we need to record the first segment by clicking the "record" button. A countdown will appear, so you can prepare yourself for the recording. Once finished, you click "stop".
5. Then, you can check the recording by clicking on "Short test" or "Long test". If you need, you can repeat recording.
6. Finally, you can apply "fading" if the volume of the video is too high to hear AD.
7. Now, you can record the next segment by clicking "Page down".

It is recommended that, once recording is finished, an audio describer checks the work in "Forced preview" or "Free preview" to make sure that everything is fine. If needed, it's possible to add or remove some of the segment after finishing the work.

ANNEX 9. AUDIO DESCRIPTION WEB EDITOR REPORT

1. General information

- **AD Editor tested:** https://imac.gpac-licensing.com/editor/videos.php
- **Version tested:** 26.
- **Partner responsible for tests:** UAB.
- **Date**: from 22/09/2018 to 14/10/2018 .
- **Research tool**: online questionnaires (Google Form).
- **Link to online forms:**
    - Consent form: https://goo.gl/forms/tKew4U7B1DrlCJAX2
    - Demographic questionnaire: https://goo.gl/forms/BnmYgnF4GBbYnRNn2
    - Post-questionnaire: https://goo.gl/forms/Iq3ZSltOYYcoA5o03
- **Measures:** usability and preferences.
- **First and second set of testing:** Two sets of testing were performed, the first one between 24.09-12.10.2018, aiming at different countries, and the second one between 3.10-19.10, aiming at US respondents thanks to a cooperation with the US. Taking into account that the reduced number of participants (3) completed the test in the second set, the results of both sets will be presented together, using the code US for the second set. Demographic data related to the first set of testing is presented in section 2 and demographic data of the second can be found in section 3.
- **Participants:** 31 professional audio describers started the first set of testing, but only 21 finished it. 3 participants completed the second set of testing.
- **Methodology:** https://drive.google.com/file/d/1y8K-NsMrfMLnzMF-UbQCSb1nh7VcmHY0/view?usp=sharing
- **User guide**: https://drive.google.com/open?id=19eEBJY7mOr9jKNzfCgToA8BLwM7wVsKE
- **Instructions:** https://drive.google.com/file/d/166o5sCm5DvfGF8YSGoEtJh7ae-TtrUFc/view

2. Demographic profile of participants: first set of testing

Number of participants who finished the pre-questionnaire: 31.

Number of participants who finished the test: 21.

10 dropped the test, the reasons being technological for 3 participants (9.67%), personal for 3 (9.67%), and unknown for 4 (12.9%).

Link to responses: https://docs.google.com/spreadsheets/d/1dYIXyzMoehqkN6l_-aBVnBUuU8PE4Z3xOOC9oXLsYqg/edit?usp=sharing

Answers of the participants who finished the test in the first set are presented below:

- **Sex**: a) Female (14=66.67%); b) Male (6=28.6%); c) Other (0=0%); d) I prefer not to reply (1=4.8%).
- **Age**: 25 (1=4.8%); 26 (2=9,5%); 27 (2=9.5%); 30 (1=4.8%); 31 (2=9,5%); 33 (3=14.29%); 34 (1=4.8%); 35 (2=9,5%); 36 (1=4.8%); 41 (1=4.8%); 43 (1=4.8%); 47 (1=4.8%); 50 (1=4.8%); 60 (1=4.8%); 64 (1=4.8%).
- **Main language**: Spanish (6=%); Catalan & Spanish (2=9,5%); Bosnian (1=4.8%); English (3=14.29%); Polish (3=14.29%); Dutch (2=9,5%); Swedish (1=4.8%), Catalan (1=4.8%), German (2=9.5%).
- **Please, describe your current job:** PhD researcher (2=9,5%); Freelance translator and audio describer (1=4.8%); Audio Describer (1=4.8%), Actor, Filmmaker, Standardized

Patient trainer (1=4.8%); Audio visual translator, audio describer and subtitler (1=4.8%); Audio description researcher and practitioner (1=4.8%); Product manager (1=4.8%); Financial corporation (1=4.8%); academic tutor (1=4.8%); Assistant professor, freelance translator and bookseller in a bookshop (1=4.8%); Access Advisor (1=4.8%); Audio Describer/Visual interpreter An Organizer of AD in Sweden Syntolkning Nu (1=4.8%); Managing Director (1=4.8%); project manager with French language (1=4.8%); 1. President of the Association "Novis" which introduced practice of AD in cultural activities of Bosnia and Herzegovina in 2017 that did not exist before. Currently working on the projects that will secure AD as a continuous practice for one theatre house and one cinema in Sarajevo making them able to have their regular repertoar adapted for blind and visually impaired persons. 2. Manager of the Studio Chelia (sound post production studio) (1=4.8%); Translation Project Manager (1=4.8%); profesora y audiodescriptora (1=4.8%); freelance audiodescriber for film and TV (1=4.8%); Audiodescriber amd Language Teacher (1=4.8%); Audio describer (1=4.8%); freelancer audio describer and subtitler (1=4.8%).

- **Have you ever audio described a 360º video?** Yes (2=9.5%); No (19=90.5%).
- **For how long have you been working in the field of AD?** 3 years (1=4.8%); About 1 year (1=4.8%); 9 years (2=9,5%); less than a year (1=4.8%); Since 2012 (1=4.8%); 8 years (1=4.8%); 21 years (1=4.8%); 2 years (4=19%); 13 years (2=9,5%); 4 years (1=4.8%); around 30 years (1=4.8%); 11 years (1=4.8%); 1.5 year (1=4.8%); 6.5 years (1=4.8%); 12 years (1=4.8%); 5 years (1=4.8%).
- **How many hours of audio description have you produced in your professional life**? a) Less than 50 hours (6=28.6%); b) 51-150 hours (4=19%); c) 151-300 hours (4=19%); d) More than 300 hours (7=33.33%).
- **In what language or languages do you normally audio describe?** Catalan (1=4.8%); Spanish (5=4.8%); English (2=9.5%); Dutch (1=4.8%); English, Polish (Polish, English) (2=9.5%); Spanish and Catalan (Catalan or Spanish) (2=9.5%); Swedish (1=4.8%); Dutch, English (1=4.8%); Bosnian and Croatian (1=4.8%); Polish (2=9.5%); German (2=9.5%); Catalan, amb sometimes in English (1=4.8%).
- **What software do you normally use?** Word/Fingertext (1=4.8%); Aegisub (1=4.8%); paper script and pencil/eraser (1=4.8%); xxx (1=4.8%); FAB (1=4.8%); Subtitling software (1=4.8%); Free (1=4.8%); Microsoft Word (None. I produce a script in Word) (Microsoft Office, Best player) (word y reproductor de vídeo VLC u otros) (4=19%); Subtitle Workshop (I've never had to record my own ADs) (1=4.8%); none (2=9.5%); Audition for movies and Word for theatre (1=4.8%); WinCaps, Annotation Edit, ProTools, Earcatch (1=4.8%); Google docs (1=4.8%); f4 (1=4.8%); Fingertext (1=4.8%); - (1=4.8%); Swift ADePT (1=4.8%).
- **Please indicate your level of studies.** a) Primary education (0=0%); b) Secondary education (2=9.5%); c) Further education (1=4.8%); d) University (18=85.7%).
- **If you replied "Further education" or "University" in the previous question, please specify.** PhD (1=4.8%); Master's degree, almost a PhD (1=4.8%); Studies theatre performance in college (1=4.8%); master (1=4.8%); Comunicación Audiovisual (1=4.8%); PhD in Translation Studies (PhD in Translation) (2=9.5%); no (non) (2=9.5%); Linguistic and Russian Philology (1=4.8%); John Paul II Catholic University of Lublin, Poland (1=4.8%); UPF (Journalism), UAB (Translation) (1=4.8%); MA (Sound Design) (1=4.8%); Jagiellonian University (1=4.8%); Academy of Performing Arts Sarajevo (Dramaturgy department) (1=4.8%); MA in International Business Relations and Linguistics - translation and intercultural communication (1=4.8%); doctora en traducción e interpretación (1=4.8%); Sociology (MA), Comparative Literature (ongoing) (1=4.8%); Classical Philology (Greek amb Latin) (1=4.8%); Accessibilty at University of Hildesheim (1=4.8%); Bachelor of International Studies (Languages), MA (Translation and Interpreting Studies), Graduate Diploma (Publishing) (1=4.8%).

- **If you have received specific training on audio description, please indicate it here.** Workshop (1=4.8%); No (1=4.8%); I trained under my AD manager in Australia at The SubStation company (1=4.8%); course on AD (1=4.8%); FPO Audiodescripción para cine y televisión (1=4.8%); Module in audiovisuel translation, including AD (1=4.8%); Yes (3=14.3%); Master in Audiovisual Translation and other courses in the UK, Germany... (1=4.8%); Just attended some seminars (1=4.8%); I have educate over 250 persons in Sweden and soon some more i Finland (1=4.8%); training during conferences (1=4.8%); university course (2 years) (1=4.8%); Training organized by Association "Zamisli" (Zagreb, Croatia) (1=4.8%); University course, extracurricular activities with specialists) (1=4.8%); 3-days-beginners-workshop by people from BR (Bayrischer Rundfunk) (1=4.8%); I trained on AD with the feedback of users from TV3 programs, and with some instructions taken from foreign AD (1=4.8%); - (1=4.8%); I trained under my AD manager in Australia at The SubStation company (1=4.8%); Training from Deborah Lewis (Weekend) and apprenticeship then continuing professional development (1=4.8%).
- **What devices do you use on a daily basis? Multiple replies are possible.** a) TV (13=61.9%); b) PC (12=57.1%); c) Laptop (18=85.7%); d) Mobile phone (20=95.2%); e) Tablet (7=33.3%); f) HMD (1=4.8%); g) Other (1=4.8%).
- **How often do you watch virtual reality content (for instance, 360º videos)?**

	Never	**Occasionally**	**At least once a month**	**At least once a week**	**Every day**
In smartphone	(10=47.6%)	(10=47.6%)	(1=4.8%)		
On a tablet	(15=71.4%)	(6=28.6%)			
On a PC	(9=42.8%)	(11=52.4%)	(1=4.8%)		
In smartphone plugged to HMD	(18=85.7%)	(2=9.5%)	(1=4.8%)		
In HMD	(17=80,95%)	(3=14.3%)		(1=4.8%)	

- **If you have never used virtual reality content such as 360º videos or only occasionally, please indicate why. Multiple answers are possible.** a) Because I am not interested. (5=23,8%); b) Because it is not accessible. (3=14.3%); c) Because I have not had the chance to use it. (11=52.4%); d) Other reasons. (2=9.5%) Please explain:

  no suelo acceder a estos contenidos, creo que hay poco, aunque me ha sorprendido al entrar en este proyecto. (1=4.8%)

  No reply (1=4.8%)

- **Please state your level of agreement with the following statement: "I am interested in virtual reality content (such as 360º videos)."** a) I strongly agree (3=14.3%); b) I agree (8=38.1%); c) Neither agree nor disagree (7=33.33%); d) Disagree (1=4.8%); e) Strongly disagree (2=9.5%).

- **Do you own any device to access virtual reality content?** a) Yes (If yes, which one? _____) Yes (7=33.3%); b) No (10=47.6%); c) I don't know or I don't want to reply (4=19%).
- **If you replied "yes" to the previous question, please specify which device(s).** Smartphone (3); Google Cardboard (1); Virtual reality glasses and virtual reality headset (1); Laptop (2); PC (1); Oculus Go (1); VR SHINECON Virtual Reality Glasses (1); TV (1).

Summary

The profile of 21 participants who finished the test, and whose data are considered for the analysis, is as follows:

Twenty-one participants completed the test (14 females and 6 males; 1 - prefer not to reply), with ages ranging 25-64. Their main languages are Catalan, Spanish, Bosnian, English, Dutch, Polish, German and Swedish.

Their jobs are mainly AVT translators, freelance audio describers, PhD researchers, academic professors and project managers. Only two participants have audio described a 360º video before. They presented a varying experience in the field of AD (varying from less than 1 year to around 30 years). 7 participants have produced more than 300 hours of AD content, 4 participants have produced between 151 and 300 hours of AD content, 4 participants have produced between 51 and 150 hours and 6 participants have produced less than 50 hours. Participants usually audio describe in Catalan, Spanish, German, Bosnian and Croatian, English, Polish, Swedish and Dutch. Participants declared using different AD and ST and software as well as video players for producing AD (Fingertext, Aegisub, FAB, Best player, Subtitle Workshop, Audition, WinCaps, Annotation Edit, ProTools, Earcatch, Google docs, F4, Swift ADePT). Many participants used Microsoft Word for writing the script.

18 participants have studies of university level, 1 participant has further education and 2 participants had secondary education. Some participants have MA in translation and interpreting studies (or languages degrees), some of them specializing in Audiovisual Translation and some of them have PhD studies. Most of the participants have received specific training on AD: during workshops, in their companies, during courses on AD, modules in university courses on audiovisual translation, MA studies, seminars, training during conferences and trainings organized by associations.

When asked about which devices they use on a daily basis, almost all participants (20) agreed on using mobile phones; 20 participants use mobile phones; 18 participants use laptops; 13 participants use TVs, 12 participants use PCs; 7 of them use tablets; 1 of them uses HMD and one participant chose the option "other".

When asked about how often they watch virtual reality content, 18 have never watched VR content in a smartphone plugged to HMD; some (2) occasionally watch VR content in a smartphone plugged to HMD and one watches VR content in such a way at least once a month. 17 participants have never watched VR content in HMD, 3 use HMD occasionally and 1 participant uses HMD at least once a week. 11 participants consume VR content in smartphone occasionally (10) or at least once a month (1). 6 participants use occasionally tablets to consume VR content and, regarding PC, 11 participants use this device occasionally and 1 participant at least once a month to access such content.

When asked to explain why they have never used virtual reality content such as 360º videos or only occasionally, 5 participants replied that they are not interested, 3 participants replied that

it is not accessible, 11 participants replied that they have not had the change to use it, and two participants chose the option “other reasons”. One of them provided an additional comment: “no suelo acceder a estos contenidos, creo que hay poco, aunque me ha sorprendido al entrar en este proyecto” (“I don’t normally access these contents, I think there are just a few, although I have been surprised when accessing the project”).

When asked to state their level of agreement with the statement “I am interested in virtual reality content (such as 360º videos)”, 3 participants replied that they strongly agree, 8 replied that they agree, 7 that they neither agree nor disagree, 1 of them disagree and 2 of them strongly disagree. Finally, when asked if they own any device to access virtual reality content, 10 participants replied that they don’t, 4 replied that they don’t know or prefer not to reply and 7 replied that they do (including smatphone, Google cardboard, Laptop, Tablet, Virtual reality glasses and virtual reality headset, PC, Oculus Go, VR SHINECON Virtual Reality Glasses and TV).

The profile of the 10 participants who did not finish the test is as follows:

9 females and 1 male did not complete the test, with ages ranging 32-74 (58, 35, 36, 64, 70, 52, 32, 40, 74, 70). Their main languages are Catalan, Polish, Spanish (2), English (5) and German. Their responses in relation to their jobs are the following: "Audio Describer" (3); "Academic teacher"; "Translator and high-school professor"; "Retired"; "AD Commentator", "Presenter, Press – Officer"; "Project Manager"; "Audio Describer/AD Consultant" and "Head of Production- Adelaide Fringe (production manager of a small team overseeing all Fringe managed events). Adelaide Fringe is the 2nd largest un-curated Fringe festival in the world. Fringe managed events are large-scale public engagement projects across the 5 weeks of the festival".

Only one participant of those who have not finished the test has audio described a 360º video before. They presented a varying experience in the field of AD, varying from 1 month 19 years (3 years (2), 4 years, 19 years, 18 years (2), 12 years (2), 1 month, 7 years). 5 participants have produced more than 300 hours of AD content, 2 participants have produced between 151 and 300 hours of AD content and 3 participants have produced less than 50 hours. They usually audio describe in Catalan, Spanish (1); Polish (1), English (5), Spanish (2) and German (1).

These 10 participants provided the following responses when asked about the software used for the production of AD: "Fingertext Audio Description Editor"; "I don't use software"; "None"; "None (live work in theatres) - have previously used Swift Adept"; "None"; "I do Live AD – Software "Artecast"; "Garage Band"; "Word Processing"; "Audacity for prerecorded information"; "Starfish". Of all them graduated from the University. These are the responses that they provided when asked to specify their education: "Filologia Catalana (UB)", "Màster en Traducció Audiovisual (UAB)"; "PhD"; "Traductora Técnico-Científico y Literaria en Inglés / Magíster en Literaturas Comparadas"; "BA Hons English and American Literature"; "BA Dip ED. MSSc"; "Arts"; "BA. Translation & Interpreting; Postgraduate Studies"; "Bachelor of Dramatic Art/ Production"; "University".

Most of these participants have received specific training on AD in MA studies or during trainings. These are the responses provided by them to this question: "Màster en Traducció Audiovisual (UAB)"; "No" (2); "Postítulo en Textos Audiovisuales y Accesibilidad"; "Yes"; "Have Open College Network Level 3 certificate"; "Yes", "Audiodescription for the means of media and communication"; "Yes"; "Yes in 2011 conducted in Adelaide by Willie Elliott (Audio description trainer from Grey Eye - at the time, for the UK) through Access 2 Arts in Adelaide. 5 day course; Training at National Theatre London and at Red Bee."

When asked about which devices they use on a daily basis, almost all participants who completed the pre-questionnaire (9) agreed on using laptops and mobile phones (9); 6 participants use tablets; 5 participants use TVs; and 1 participant uses PC.

When asked about how often they watch virtual reality content, 6 have never watched VR content in a smartphone and 4 occasionally watch VR content by means of this device. All of them have never watched VR content in HMD or on smartphone plugged to HMD, 1 participant uses occasionally tablet to consume VR content and 2 participants use PC occasionally to access such content.

When asked to explain why they have never used virtual reality content such as 360º videos or only occasionally, 6 participants out of 10 reported that they have never had chance to use it, 1 answered "I am not interested", 1 "Because it is not accessible" and 2 participants have not provided their reply to this question, without adding any additional comments.

When asked to state their level of agreement with the statement "I am interested in virtual reality content (such as 360º videos)", 4 participants replied that they agree, 2 that they strongly agree and 4 that they neither agree nor disagree.

Finally, when asked if they own any device to access virtual reality content, 7 participants replied that they don't, 3 replied that they do. When asked to specify which type of devise they have, they provided the following responses: "smartphone", "Tablet and PC", "Smart TV", "At a previous place of employment we used google cardboard (headset) and mobile phone".

Three out of these 10 participants did not complete the test because of technological reasons. For one participant (P28 AD), the visualisation of the videos was not possible. This participant could only hear the sound, but was not able to see any image in the video. This participant was using iMac. The second participant who did not complete the test (P19 AD), reported that his/her microphone did not work with the software and that the software kept freezing on his or her laptop. The third participant (P26 AD) specified that this technology was too difficult for him/her. His/her profile was an aged participant (70 years old), who worked for 18 years in the field of AD, but never watched virtual reality content on any device. The challenge of audio describing the 360º video could therefore result from unfamiliarity with this medium. Furthermore, when asked about the usage of software, this person responded "non", declaring not using any software while producing AD.

7. Demographic profile of the participants: second set of testing (US)

3 participants completed the test in the second set.
Link to responses:

https://docs.google.com/spreadsheets/d/1rLuSMYoT0zITJtZvMxMLTDr14ykN4nB_C3_eiL52qN4/edit?usp=sharing

Answers of the participants who finished the test in the second set are presented below:

1. **Sex**: a) Female (1=33.33%); b) Male (2=66.67%); c) Other (0=0%); d) I prefer not to reply (0=0%).
2. **Age**: 36 (1=33.33%); 47 (1=33.33%); 64 (1=33.33%).
3. **Main language**: English (3=100%).
4. **Please, describe your current job:** Description Supervisor at Captionmax (1=33.33%); Oversee media accessibility for major internet media and technology company. (1=33.33%); Audio Describer (1=33.33%).
5. **Have you ever audio described a 360º video?** Yes (2=66.67%); No (1=33.33%).
6. **For how long have you been working in the field of AD?** 6+ years (1=33.33%); 28 years (1=33.33%); 18 years (1=33.33%).

7. **How many hours of audio description have you produced in your professional life**? a) Less than 50 hours (1=33.33%); b) 51-150 hours (0=0%); c) 151-300 hours (0=0%); d) More than 300 hours (2=66.67%).
8. **In what language or languages do you normally audio describe?** English (3=100%).
9. **What software do you normally use?** Swift Adept, Starfish, Pro Tools (1=33.33%); CADET, QuickTime, 3Play Media (1=33.33%); company-developed description software (1=33.33%).
10. **Please indicate your level of studies.** a) Primary education (0=0%); b) Secondary education (0=0%); c) Further education (0=0%); d) University (3=100%).
11. **If you replied "Further education" or "University" in the previous question, please specify.** Master of Fine Arts in Creative Writing (1=33.33%); University of Southern California, BA, Broadcast Journalism (1=33.33%); BS in Biology; MS in Science Journalism (1=33.33%).
12. **If you have received specific training on audio description, please indicate it here.** Internal company training (1=33.33%); WGBH Descriptive Video Service (Yes, from WGBH Descriptive Video Service; Trained at WGBH Descriptive Video Service) (2=66.67%).
13. **What devices do you use on a daily basis? Multiple replies are possible.** a) TV (2=66.67%); b) PC (2=66.67%); c) Laptop (3=100%); d) Mobile phone (3=100%); e) Tablet (1=33.33%); f) HMD (0=0%); g) Other (0=0%).
14. **How often do you watch virtual reality content (for instance, 360º videos)?**

	Never	**Occasionally**	**At least once a month**	**At least once a week**	**Every day**
In smartphone	(2=66.67%)	(1=33.33%)			
On a tablet	(2=66.67%)	(1=33.33%)			
On a PC	(1=33.33%)	(2=66.67%)			
In smartphone plugged to HMD	(3=100%)				
In HMD	(3=100%)				

15. **If you have never used virtual reality content such as 360º videos or only occasionally, please indicate why. Multiple answers are possible.** a) Because I am not interested. (1=33.33%); b) Because it is not accessible. (0=0%); c) Because I have not had the chance to use it. (1=33.33%); No reply (1=33.33%).
16. **Please state your level of agreement with the following statement: "I am interested in virtual reality content (such as 360º videos)."** a) I strongly agree (1=%); b) I agree (0=0%); c) Neither agree nor disagree (2=66.67%); d) Disagree (0=0%); e) Strongly disagree (0=0%).
17. **Do you own any device to access virtual reality content?** a) Yes (If yes, which one? _____) Yes (1=33.33%); b) No (1=33.33%); c) I don't know or I don't want to reply (1=33.33%).

18. **If you replied "yes" to the previous question, please specify which device(s).** Google Cardboard + iPhone (1)

Summary:

The profile of 3 participants who finished the test, and whose data are considered for the analysis, is as follows:

Three participants completed the test (1 female and 2 males), with ages ranging 36-64. Their main languages are English. Their jobs are audio description supervisors or audio describers. All of the participants had studies of university level: MA in Creative Writing, BA in Broadcast Journalism and MS in Science Journalism.

When asked about which devices they use on a daily basis, all participants (3) agreed on using mobile phones and laptops; 2 participants use PCs and TV and 1 participant uses tablet.

When asked about how often they watch virtual reality content, all of the participants have never watched VR content in a smartphone plugged to HMD or in HMD. 1 participant consumes VR content in smartphone occasionally, 1 participant uses occasionally tablet to consume VR content and, regarding PC, 2 participants use this device occasionally.

When asked to explain why they have never used virtual reality content such as 360º videos or only occasionally, 1 participant replied that he/she is not interested, 1 participant replied that they have not had the change to use it, and another participant did not provide answer to this question.

When asked to state their level of agreement with the statement "I am interested in virtual reality content (such as 360º videos)", 2 participants replied that they neither agree or disagree and one participant replied that he/she strongly agrees.

Finally, when asked if they own any device to access virtual reality content, 1 participant replied that he/she don't, 1 participant replied that he/she don't know or prefer not to reply and 1 replied that they do (Google Cardboard + iPhone).

8. System Usability Scale (SUS) results from both sets of testing

Link to the results from the postquestionnaire from the first set: https://docs.google.com/spreadsheets/d/194h40UckOad1PE5HUtDvt3bwPVr61Veg49GOx5c3Sbs/edit?usp=sharing

Link to the results from the postquestionnaire from the second set:

https://docs.google.com/spreadsheets/d/1SgSpYj8LjAFEuw5w08pjFhlXGasE0LWCE4w8cf3hNSo/edit?usp=sharing

4.1. Scores (question by question)

1 – strongly disagree

5 – strongly agree

SUS statements	1	2	3	4	5
1. I think that I would like to use this system frequently	1 (4.17%)	6 (25%)	11 (45.83%)	4 (16.67%)	2 (8.33%)
2. I found the system unnecessarily complex	4 (16.67%)	7 (29.2%)	9 (37.5%)	4 (16.67%)	0 (0%)
3. I thought the system was easy to use	1 (4.17%)	4 (16.67%)	6 (25%)	11 (45.83%)	2 (8.33%)
4. I think that I would need the support of a technical person to be able to use this system	10 (41.67%)	5 (20.83%)	4 (16.67%)	3 (12.5%)	2 (8.33%)
5. I found the various functions in this system were well integrated	1 (4.17%)	7 (29.2%)	10 (41.67%)	2 (8.33%)	4 (16.67%)
6. I thought there was too much inconsistency in this system	2 (8.33%)	10 (41.67%)	9 (37.5%)	2 (8.33%)	1 (4.17%)
7. I would imagine that most people would learn to use this system very quickly	2 (8.33%)	4 (16.67%)	8 (33.33%)	8 (33.33%)	2 (8.33%)
8. I found the system very cumbersome to use	6 (25%)	4 (16.67%)	6 (25%)	5 (20.83%)	3 (12.5%)
9. I felt very confident using the system	5 (20.83%)	6 (16.67%)	5 (20.83%)	7 (29.2%)	1 (4.17%)
10. I needed to learn a lot of things before I could get going with this system	4 (16.67%)	10 (41.67%)	2 (8.33%)	4 (16.67%)	4 (16.67%)

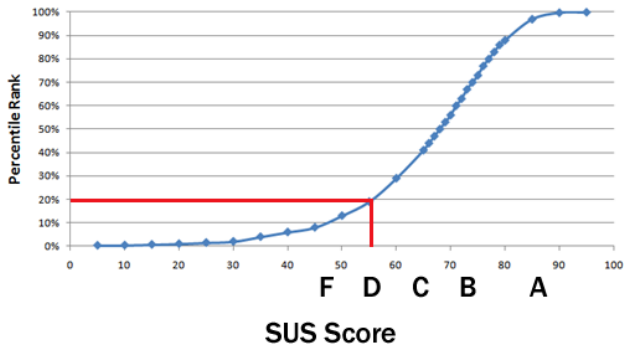
1. I think that I would like to use this system frequently: 1 (1), 2 (6), 3 (11), 4 (4), 5 (2)
2. I found the system unnecessarily complex: 1 (4), 2 (7), 3 (9), 4 (4), 5 (0)
3. I thought the system was easy to use: 1 (1), 2 (4), 3 (6), 4 (11), 5 (2)
4. I think that I would need the support of a technical person to be able to use this system: 1 (10), 2 (5), 3 (4), 4 (3), 5 (2)
5. I found the various functions in this system were well integrated:
   1 (1), 2 (7), 3 (10), 4 (2), 5 (4)
6. I thought there was too much inconsistency in this system: 1 (2), 2 (10), 3 (9), 4 (2), 5 (1)

7. I would imagine that most people would learn to use this system very quickly: 1 (2), 2 (4), 3 (8), 4 (8), 5 (2)
8. I found the system very cumbersome to use: 1 (6), 2 (4), 3 (6), 4 (5), 5 (3)
9. I felt very confident using the system: 1 (5), 2 (6), 3 (5), 4 (7), 5 (1)
10. I needed to learn a lot of things before I could get going with this system: 1 (4), 2 (10), 3 (2), 4 (4), 5 (4)

4.2. Summary (from two sets of testing)

The SUS average score is **55.9** (below average, 68 or more is considered above average).

The graph below shows how the SUS scores associate with the percentile ranks and letter grades[10] and the red line specifies where the ImAc AD editor is at this moment.



The letter grade is D, and the obtained score corresponds to the percentile rank: 19%[11].

The excel spreadsheet with scores calculations can be consulted here: https://docs.google.com/spreadsheets/d/1dxhaOUg92iH6NgTaBHyxIqAz__30A6ywv8LPQTpK52U/edit?usp=sharing

9. Results from open preference questions from two sets of testing

Results are presented question by question, and then followed by a summary of the replies. The following codes are used: PX Pilot AD (participants from the pilot who have been analysed as part of the first set of tests as the methodology did not change), PX AD (participants from the first set of tests) and USX (participants from the US test).

5.1. Results

- **What did you like most about the AD editor?**

P1 Pilot AD: Aesthetically it was sort of appealing.

[10] Sauro, J. 2011. Measuring usability with the System Usability Scale (SUS). Retrieved from http://www.measuringu.com/sus.php

[11] Sauro, J. & Lewis, J. R. 2016. *Quantifying the user experience: Practical statistics for user research*. Amsterdam: Morgan Kaufmann, p. 203-204.

P2 Pilot AD: Its simplicity.

P1 AD: You can perform the whole process of AD (also recording).

P2 AD: It is available online.

P5 AD: The possibility of seeing the whole sphere (the arrows allowing you to see everything).

P7 AD: To see almost everything in the same screen.

P9 AD: It is quite easy, it has shortcuts and everything is visible and easily accessible on one page (segments, controls).

P11 AD: Layout.

P13 AD: The vision in the monitor, because it's so clear to use. Yo [sic] can view the video at the same time that yo [sic] write amb [sic] record.

P14 AD: After the first couple of minutes it turned out to be quite intuitive. Still, sometimes I had to use the manual. I like the list of subtitles on the right and how easily you can go back to a segment.

P15 AD: No reply.

P16 AD: It's simple and intuitive.

P18 AD: To create AD segments and AD moves.

P21 AD: Simple and intuitive.

P23 AD: Script and audio integrated in one software.

P27 AD: It was very intuitive and I liked the multiple ways of navigating the visuals.

P31 AD: Mover la flecha para el ángulo (“Move the arrow to the angle”).

P33 AD: It's [sic] interface is very clear and easy to understand.

P36 AD: The clear layout and easy-to-understand functions. The recording function was very straightforward also.

P37 AD: To be able to set an angle; hwever [sic], I'm not sure that the sound than really came from the direction?

P38 AD: One interface for video and text.

US1 AD: Navigation of video and ability to tag locations.

US7 AD: The ease of setting the desired viewing angle for 360.

US5 AD: The user interface is straightforward and relatively easy to use. It's similar to other AD systems I'm familiar with.

- **What did you like less about the AD editor?**

P1 Pilot AD: The fact that, when you record, the video starts before you actually have to speak.

P2 Pilot AD: That there are a lot of buttons with arrows.

P1 AD: Difficulties lo learn the shortcuts (lack of usage, I guess). It wasn't clear that in order to listen to your recordings you need to be in preview mode. Also, apart from the mark fo [sic] reading speed, you don't know exactly your reading speed and that would bé [sic] very interesting to have in any AD editor. I couldn't see the video in free preview.

P2 AD: I had some problems using it.

P5 AD: I liked it in general.

P7 AD: Miss undo, Timeline in picture I use iMac so I need an other [sic] browser.

P9 AD: A Segment List is exactly the same as a central section - it should be limited to the real list of segments with TCs only. Also, I could not hear my recordings - probably I have problems with my microphone. But maybe this is why I do not see any difference between neither short and long test nor free and forced preview.

P11 AD: A lot of functions and buttons.

P13 AD: you don't know when to start recording. You'd need something like a colour line that changes colour when you have to start. It seems that it is not possible to put 2 or more segments at the same time, or sharing time, from different points of view. For me it was'n't [sic] easy to discover how to listen to all thew [sic] segments. May be you have to discover de points of view from those the audiodescriber do his descriptions, amb [sic] for me it is very difficult to find when you ar [sic] looking the video.

P14 AD: The recording part: I think the icons and settings are not so clear (I wasn't sure if the recording is saved or not).

P15 AD: No reply.

P16 AD: Video, audio and playback.

P18 AD: Shortcuts. They're not intuitive.

P21 AD: No direct HMD output for reference / check.

P23 AD: Sticky to use, has not flow.

P27 AD: Nothing about the recording worked for me- there was an obvious glitch, the frames started moving around. I could not hear playback and needed to go back and for both between frames and the preview and edit modes and still it didnt [sic] work. Also as I was trying to adjust the AD sections in terms of timing I found that part hard to control.

P31 AD: Los controles manuales de vídeo (“Manual video controls”).

P33 AD: The position of a countdown square. When looking at it to start the recording, its position (down to the right side of a page) makes it hard to have your eye on the text that you need to start reading.

P36 AD: I found the shortcuts very difficult to use because I am used to the shortcuts I currently use in Swift. I kept reaching for the number pad.

P37 AD: Not very intuitively; not very pictorial icons; few optins [sic] to navigate smoothly between the various parts of the Editor.

P38 AD: Navigation.

US1 AD: Inability to review completed work, with described locations appearing on a map.

US5 AD: Some of the video and recording controls did not work as desired. More on that below. Also, it wasn't clear whether there should be a minimum separation between descriptions.

US7 AD: Some of the buttons were too similar and too close together - easy to get mixed up.

- **What do you think could be improved, and how?**

P1 Pilot AD: The shortcuts are hard on the hands, not easy nor practical. Kind of painful, at least in my keyboard.

P2 Pilot AD: The going backwards and forwards along the video. I use Mac and maybe that is the problem with the video moving.

P1 AD: Adding the actual reading speed, not just the lights. Also being able to set up your own shortcuts (I read you're planning that, but even for the test... It's very difficult to get used to new shortcuts just for one test, so I eventually used the mouse and I guess the AD would have been better being able to use the shortcuts I'm used to).

P2 AD: Sometimes the buttons get frozen or they reply with delay.

P5 AD: Nothing to mention.

P7 AD: Move sound/text by mouse.

P9 AD: More room in the central section.

P11 AD: No reply.

P13 AD: May be it woult [sic] be better to have some fixed points of view from those you can do the descriptions. If not, I think it would be difficult for the user to find where are the hidden descriptions. For me i'ts [sic] difficult to understand that the descriptions are going with the movie, because some of them are going at the same time.

P14 AD: The quality of the video made it hard to recognize some details.

P15 AD: No reply.

P16 AD: Better playback features. Scrolling back to change timing does not work well.

P18 AD: Shortcuts/ How the AD recording controls works/ The arrow position. It's not very clear when the video has the 2D position, I mean, the standard position.

P21 AD: See 12.

P23 AD: The usability. Maybe been not a web editor.

P27 AD: Recording- have playback in the recording section for retakes creating AD segments, I'd like to see them on a visual timeline even if its vertical because I think mine overlapped as I was having a hard time changing the times. Playback- I wasn't able to get the playback to work. It started playing after I pressed stop or wouldn't play at all. It seems like it would be good if it didn't have glitches.

P31 AD: Me gustaría que los controles play, pause, avanzar retroceder tuvieran los mismos controles (o que se pudieran editar) que otros editores de vídeo, se me hace muy raro no poder darle a la barra espaciadora para parar o alt+flecha para avanzar y retroceder, eso me hacía perder tiempo y no poderme meter en el proyecto. Pondría asset details debajo y segment controls arriba, es decir, intercambiaría sus sitios.

("I would like if the controls 'play', 'pause', 'go forward and backward' would be the same (or could be edited) as in other video editors. I find it very strange not being able to click on spacebar to stop or alt + arrow to move forward and backward, that made me lose time and not being able to focus on the project.

I would put asset details below and segment controls up, that is, I would exchange their sites.")

P33 AD: Countdown square could be placed closer to the segment text.

P36 AD: The frame jumping I found difficult to use. It also wasn't clear if it was necessary to activate the shortcut key several times repeatedly or just once to activate a command.

P37 AD: Better icons; more ways to go through; more effective player; full [sic] screen; better video quality; free settable shortcuts!

P38 AD: Navigation and Interface could be easier to use (less buttons).

US1 AD: Playback of completed work seems difficult.

US5 AD: The "step backward" and "fast backward" functions did not play the video as they moved, making it difficult to tell how far back I was moving. And there was some delay on the playback of recordings -- they did not play at the in-time, but rather 1-3 seconds late, causing some of the more tightly timed ones not to play at all.

US7 AD: Make the view control arrows and segment up down buttons distinct (not both arrows) and separate them spacially.

- **Did you miss any functionality? If yes, can you tell us which?**

P1 Pilot AD: I find the bar with the cpm unnecessary and not very practical. Just a number turning red would suffice.

P2 Pilot AD: No reply.

P1 AD: Actual reading speed. Also, the sound quality of the recording seems improvable.

P2 AD: A waveform to indicate when a charater [sic] starts / finishes to speak and a timeline to show where exactly the video is.

P5 AD: No.

P7 AD: To use earphone during recording.

P9 AD: Yes. I could not find a button when I wanted to restart the video.

P11 AD: No reply.

P13 AD: The functions of go and stop by the keys didn't work; when you want to stop, you go to the start. And when you want to use the screen controls, the overwrite covers the time codes, and that makes the work hard.

P14 AD: No.

P15 AD: No reply.

P16 AD: Jumping back 5 tot 10 frames at a time. Synchrony between AD segments and video (if you click on segment, then de video also jumps to this timecode).

P18 AD: Maybe a key/button to go to a exactly [sic] TC. (I think I didn't find it).

P21 AD: An option to export the script to a text file for professional recording.

P23 AD: No.

P27 AD: A visual editor on a timeline for the AD sequences. I realize this is complex. One thing I am not clear on is if there can be simultaneous [sic] AD segments placed depending on where the user is facing.

P31 AD: Quizá una que se pudieran ver las líneas que equivalen al sonido, en los editores de vídeo tipo sony vegas viene y es muy útil para que la AD no interfiera con diálogos u otros sonidos de la película. Por ejemplo, cuando la chica coge la grabadora y suspira, me gustaría ver dóde exactament está ese suspiro para meter antes la AD.

("Perhaps one in which you could see the lines corresponding to sound, used in in such video editors as sony vegas. It shows and it is very useful to ensure that AD does not interfere with dialogues or other sounds in the film. For example, when the girl picks up the recorder and sighs, I would like to see exactly where that sigh is to write the AD before.")

P33 AD: No.

P36 AD: I missed being able to join or separate descriptions, and at the same time add or subtract timecodes.

P37 AD: No reply.

P38 AD: No.

US1 AD: How to play back recordings and get overview of complete work.

US5 AD: The keyboard shortcuts could be simpler, and the fading of program audio could be smoother, with more options for levels.

US7 AD: I'm used to using sound and dialogue cues rather than In times only. I find it helpful to see the dialogue cue that leads into a description.

- **Do you find the feature for setting the angle for the AD easy to use? Explain why.**

P1 Pilot AD: Yes, it's just a button.

P2 Pilot AD: Yes, I have done it with the pointer directly on the video.

P1 AD: It was easy, but in this case, most actions only occurred in one angle, so it was not of much use.

P2 AD: Yes, it is easy to sent the angle. However, most of the time I did not really change it. I did not think it was necessary. Maybe if I had seen a 360 film with the sound around I would understand it better. At this moment, however, I can imagine how the sound in such a film works and that it strongly affects the whole viewing experience. But I am not quite sure if AD should be made part of the film in the same way as the sound coming from the film. What comes to my mind is the analogy with subtitles - the viewer is aware they are not part of the film, but they are a necessary supplement. For the moment it is difficult for me to imagine.

P5 AD: I have not used it, the video used for the test did not require audio describing in 360.

P7 AD: Didn't get it to work.

P9 AD: Yes. I can just choose a preferred angle with my mouse and then set it with one click.

P11 AD: Yes, it was very easy to use.

P13 AD: Not so much, because there are many points of view, and there are only some of them with descriptions. And if you don't pass exactly over that described point you lose the information that is there.

P14 AD: Yes, it was quite intuitive.

P15 AD: No reply.

P16 AD: Yes, but on my laptop, the screen of the video regularly became completely back after trying to set the angle. The sound remained but the image disappeared.

P18 AD: It's a bit challenging. Tecnically [sic], I consider it easy to use, the problem is which angle is the most important to describe.

P21 AD: Yes, just 1 key command. But I would like to have more freedom. The tutorial tells me we need an angle for each segment. I would like to have an angle only for very important situations.

P23 AD: Yes, easy to use, but don't understand how will be the result for the final user.

P27 AD: After I figured it out, yes.

P31 AD: No tengo muy claro si lo he hecho bien ("I'm not sure if I did it right").

P33 AD: Yes.

P36 AD: I found the function easy but I wasn't sure if the idea was to have simultaneous descriptions for the same timecodes. If a non-sighted person could access each recording, surely several recordings could be attached to a single in/out timecoded description. This made the writing of AD complicated in my mind because I wasn't sure if I should do several descriptions or choose an angle and describe only that angle for the time.

P37 AD: Yes; I just used the mouse and clicke [sic] the button to set it.

P38 AD: No, I didn't understand it.

- **Were the preview modes useful for you? Explain why.**

P1 Pilot AD: Not really. They didn't start exactly on time, there was a delay.

P2 Pilot AD: Yes, one allows you to move, the other one makes you see your fixed angles.

P1 AD: I counldn't [sic] see the video in the free preview mode.

P2 AD: No reply.

P5 AD: Yes, because it avoids you omitting information.

P7 AD: I see a movie etc several time befor [sic] starting write my script.

P9 AD: No. I could not hear myself and I did not see any difference between them.

P11 AD: No, because it did not work properly.

P13 AD: Not at all. When I put the preview modes, I could listen to only few descriptions. It seems that you have to make the descriptions in temporary order, amb [sic] it would be more useful that the program had the fuction [sic] of ordering them. When I did the descriptions, I nedded [sic] to view the scene from different points of view, and it would be very difficult to do in strict temporary order. So, for me it would be very important that the program could do it for us.

P14 AD: Yes, I could check if everything is in time.

P15 AD: No reply.

P16 AD: I think they are useful, but my video screen went black when trying them.

P18 AD: No reply.

P21 AD: Yes, although the forced preview.

P23 AD: Yes, essential for can go on.

P27 AD: They didn't work- it did not preview for me.

P31 AD: No reply.

P33 AD: Preview modes were useful but confusing. I've recorded total of 8 segments and I've checked each of them after recording with short and long test and they worked. Afterwards, when I did forced and free preview, some of the segments were not played. I couldn't find the logic in "losing" some of the recorded segments, I was not sure at the end if some of the segments were not previewed because of the type of the preview or because I did something wrong during the recording process.

P36 AD: Because I tried to create simultaneous descriptions, the preview modes weren't terribly helpful as the recordings didn't play back. If you only need consecutive descriptions, the preview modes would be helpful.

P37 AD: The "feee" [sic] one didn't show the video, just blackscreen; the other was cool.

P38 AD: Yes to see the Timing of the takes.

US1 AD: No reply.

US5 AD: Yes, but even in the "free preview" mode, I was not able to change angle. When I tried, the video would go black, although it would continue playing.

US7 AD: I wasn't always able to hear my recordings play and the video had a delay that I think made the timing not quite correct. But mostly it was useful to see the final and make corrections.

- **Do you think it will take you longer to audio describe videos in 360º? Why?**

P1 Pilot AD: Yes, because you have to choose the right angle.

P2 Pilot AD: Yes, cause you take into consideration many other things that you won't think of in a regular content.

P1 AD: Yes. You need to check all the angles to see if something is happening there.

P2 AD: No.

P5 AD: Yes, because there will be more content to describe (not this case).

P7 AD: No It [sic] the same when we do live AD of theatre, musicals and Song Contest. I very interested in hove to use special goggles. This film I decided what to see. When a person use goggles how can we help them to explain what they are looking at.

P9 AD: Yes because there is far more to describe, to choose what to describe, how to set an angle... more choices.

P11 AD: Yes, a bit longer. You need to focus on more features and think carefully what you should describe.

P13 AD: Yes, because there is infinite points of view of every scene. That is why I propose to reduce the points of view from where to do the description.

P14 AD: Yes, because there are more details to describe.

P15 AD: No reply.

P16 AD: Yes. You need time to check the best angle to describe. It requires different information selection and wording.

P18 AD: Of course, because there're more visual information to describe, to analyze and to focus on more images.

P21 AD: Depends on the content.

P23 AD: Maybe, I'm not familiarized with this tech.

P27 AD: Well if we can have description in 360 or on various points in the same moment in time then yes naturally. 360 to me seems to be closer to theatre which I believe takes longer to get right than film because there is more to consider.

P31 AD: Supongo que sería acostumbrarse, pero sí, tardaría más porque adaptar el ángulo es una función más ("I guess it is a matter of getting used to it, but yes, it would take longer because adapting the angle is another function").

P33 AD: Yes. Because of all possible options for choosing the angle for AD.

P36 AD: I think it will take a lot longer as you need to consider all angles. Perhaps some kind of standard should be developed so AD'ers know when/where/what to describe.

P37 AD: The question seems rather self-explanatory ;) Because I have more to do.

P38 AD: yes, but only in the beginning. I think it needs time to learn the program and the characteristics of 360 videos.

US1 AD: Yes - infinite number of points to describe, decision-making as to what is relevant needs guidance.

US5 AD: Yes, because setting the angle is an extra step.

US7 AD: Yes, due to the need to check the angles.

- **Do you think 360º videos will impact your work as an audio describer?**

P1 Pilot AD: I usually translate live television, so I don't think so, but who knows.

P2 Pilot AD: No reply.

P1 AD: Yes, it's a whole new approach.

P2 AD: Not really.

P5 AD: For sure, more content will have to be audio described.

P7 AD: Well hard to say. I like the idea and need to see more of it.

P9 AD: I am only a beginner but I think yes.

P11 AD: Probably yes.

P13 AD: Maybe those kind of videos will open my mind to note different points of view in every scene of a film.

P14 AD: Yes.

P15 AD: No reply.

P16 AD: No.

P18 AD: Yes. In a positive way, because I'd be more efficient, and I'd be able to offer a new way to understand audiovisual products.

P21 AD: Yes.

P23 AD: No, I would adapt.

P27 AD: Completely, because the applications are so vast and as a filmmaker this work with AD excites me very much.

P31 AD: Mucho, es muy interesante ("A lot, it is very interesting").

P33 AD: Yes.

P36 AD: I am not so concerned about the virtual component as feeling comfortable with the software. That would take some getting used to. The 360-degree videos would change the way I work as an AD'er but as with everything, practice makes perfect.

P37 AD: Not in the next years.

P38 AD: Maybe in the next years.

US1 AD: Yes - so many more options and innovations!

US5 AD: Probably in the future. I've described a few short 360 projects within the past year, but it's not very widespread yet. And I also don't understand how the audio would play from different locations for the end user, unless they're in a theater or have a home theater system with multiple audio sources. But for web-based content, where one is most likely listening via headphones or computer speakers, 360 seems like a purely visual experience. I'm sure future development will eventually prove me wrong!

US7 AD: Yes, with more VR films released, it will become necessary to describe them and be faithful to 360's nuances.

- **Other comments**

P1 Pilot AD: I would strongly suggest that you don't choose the shortcuts yourself. Every audio describer knows whats [sic] best for their fingers, wrists and keyboards. Let them customize them.

P2 Pilot AD: No reply.

P1 AD: No reply.

P2 AD: I tried more than 5 times to record the AD. I hope it is recorded, but I could not play it, I did not hear anything. There was no way I could check it. I am sorry, I rather awful at technology and usually need someone to show me how to use it - a few times. But thank you for allowing me to have a try at IMAC.

P5 AD: The choice of the video might not be the best one to test this editor because the action is always happening in the same place.

P7 AD: Pearl was lovely to work with. The music was important to hear so it's a fight with AD, what to listen to. You can always contact me if you will hear more.
Thank you for your understanding that allowed me this extra time.
Hope you will ha a nice weekend.

P9 AD: This program is amazing, keep doing great work, I was happy to help :)

P11 AD, P13 AD, P14 AD, P15 AD: No reply.

P16 AD: Nice work.

P18 AD: To have shortcuts similar than other editors would be easier to manage faster the AD 360º editor.

P21 AD: Will there be a possibility to write adaptive AD as well? I think that will be very useful for 360º videos / games.

P23 AD: I only use to make scripts, we use professional voices, maybe for this I'm not familiarized with this part of the workflow.

P27 AD: I'd love to use it again without the glitches. Thanks for the opportunity to try this out.

P31 AD, P33 AD: No reply.

P36 AD: It certainly is an adjustment as an AD'er to think about 360-degree videos. It opens up a whole new way of thinking about video and accessibility. I wouldn't feel comfortable taking on a job like this without proper instructions from the client and/or relevant training.

P37 AD: Good work, has potential and is in a way fun; but for real working, it's rather too clumsy right now. But the reason may be that, for this short test, it wasn't useful for me to remember shortcuts, so I did it without; maybe with shortcuts it works better.

P38 AD: Stepping back and forwards in the video didn't work so well.

US1 AD: It's great to see this tool. I would like to understand better how to output and review completed work.

US5 AD: No reply.

US7 AD: I sometimes forgot to put it back in Edit mode in order to make changes. If you could make the change between modes more distinctive somehow that would be helpful. Time wise it took me at least twice as long as was recommended. Took me a while to get the feel for it.

5.2. Summary

It is recommended to carefully look at particular replies obtained from the participants, as each reply points to different aspects of the software. The summary in this section will provide the most relevant and most frequent comments.

Participants **appreciated the most** that the whole process of producing AD, including recording, takes place in a single piece of software. Many comments referred to interface, which was described by participants as "very clear", "simple", "easy to use" and "easy to understand". One of the comments (P9 AD) pointed to the fact that all the most important functions are displayed on one page, which facilitates the production of AD: "It is quite easy, it has shortcuts and everything is visible and easily accessible on one page (segments, controls)". It was also appreciated that the software is available online. Also setting of the angle was assessed positively (US7 AD, US1 AD)

Many of the responses in the second question, which asked participants about **the elements that they liked less**, pointed to the problems encountered in the recording and preview modules. For some participants the recording and preview modes were not working properly, as described later in this summary. Also, some participants reported that the video was freezing.

Regarding shortcuts, the replies suggest that most of the participants would prefer a different, more intuitive configuration, or they would like to customise the shortcuts themselves. Regarding the recording, one response suggested that a line which would change its colour would be helpful to know when to start recording. One comment also suggested that it would be helpful to preview the produced AD in HMD.

When asked about **what could be improved**, many of the replies pointed to the shortcuts, recording controls and preview. One response suggested that better playback features would be needed, without the need to scroll back to change time codes (P16 AD). Some participants also reported that some buttons were frozen or they would be replying with delay. Additionally, some of the responses suggest that better video quality to see all the details would be needed.

Regarding **missing functionalities,** the responses suggest that the following features could be implemented: a waveform to indicate when a character starts or finishes speaking, jumping back to 5-10 frames at a time, synchrony between AD segments and video (if you click on segment, then de video also jumps to this timecode), an option to export the script to a text file for a professional recording, being able to join or separate descriptions, and at the same time add or subtract timecodes. US5 AD suggested also that more options for the fading of program audio could be added.

Regarding the **"set the angle" option**, most participants (75%) found it easy to use. However, one participant reported that the screen on her or his laptop would regularly turn black after trying to set the angle: the sound would remain, but the image disappeared. One response (P21 AD) suggests that this participant would prefer to set the angle only for very important situations, and not for all AD segments: "Yes, just 1 key command. But I would like to have more freedom. The tutorial tells me we need an angle for each segment. I would like to have an angle only for very important situations."

As far as the **preview modes** are concerned, some of the participants did not encounter any problems while using them (e.g. P2 Pilot AD: “Yes, one allows you to move, the other one makes you see your fixed angles”), but for 50% participants one or both preview modes were not working properly (e.g. P16 AD: “I think they are useful, but my video screen went black when trying them”) or they could not see the difference between free and forced mode (e.g. P9 AD: “No. I could not hear myself and I did not see any difference between them”). Two participants (P33 AD and P13 AD) reported that not all of the recorded segments played in the preview mode.

When asked about whether it takes longer to audio describe videos in 360º, most of participants (79.2%) replied positively, as there are more visual details to describe, 360º content require more thorough content selection and the angles need to be set for every AD segment.

Regarding the impact of audio describing 360º videos on their AD practice, participants presented varying opinions. 58.3 % of the participants considers, however, that it will impact on their work in the years. Participants who replied positively to this question, mentioned the following reasons: (1) the application for this medium is vast, (2) it is a whole new approach for the production of AD.

Finally, in the section **“Other comments”**, additional comments were made regarding the shortcuts, which in opinion of the participants should be customizable, as it would be easier to manage faster the AD 360º editor. Also, some participants reported some technological issues: problems with the recording (P2 AD) and problems playing the video (P38 AD): “stepping back and forwards in the video didn't work so well”. One participant (US7 AD) added a comment about the Edit mode: “I sometimes forgot to put it back in Edit mode in order to make changes. If you could make the change between modes more distinctive somehow that would be helpful.” Another participant (US1 AD) commented on the review: “I would like to understand better how to output and review completed work.”

5.3. Additional report

Apart from completing the test, US1 AD provided the following report on the usability of the AD Editor:

“In general, I found the tool quite straight-forward and usable (and familiar, as I have used the similar CADET accessibility tool from WGBH NCAM).

Here are some suggested changes:

- Scrub bar: most video editing tools make use of a video scrub bar below the video controls and you have included one as well, but it is not very responsive or accurate, perhaps because the video is hosted externally. If the video was available locally, perhaps the scrub bar would work better.

- Time code look-up: When navigating by time code, it would be handy if the cursor would land directly in the seconds field, the most likely place one would begin to search

- It would also be helpful if I could type numbers right into the time code read-out in the left-hand video control area rather than having to click on the small clock to open the time code search function

- Moving between described segments: it would be nice if I could click in the segment window in the center of the screen to go directly to that time and place in the video, instead of having to use the "next segment" arrows.

- Reading speed thermometer - I don't quite understand how this is used

- Having to jump from the left-hand to the center to the right-hand columns is a bit tedious.

- Tool tips cover time code read-out: in the left-hand column, if I leave my cursor over one of the video controls, the opaque tool tip blocks the time code read-out - it would be nice if the tool tip would time out or be semi-transparent

- I tried recording a segment but don't know where that recording is - it didn't play out when I rewound and played back

- When I play back the video after entering some descriptions, it would be good if the segments I described stepped down in the center column and if the video would shift to the location of the thing I was describing, and playback the recorded description.

- Upon playback, could the point of view move to where something was described, using the longitude and latitude markers.

- Can the text be read back via synthesis or does my voice have to be recorded?

- The tool tip for the "first segment" reads "fist segment"

- The key combos are all Windows-centric and while the tool works on a Mac, it would be good to give instructions for the Mac keys to use (i.e., fn instead of alt)

- It would be nice to see an overview map of some sort that showed where in space and when in time descriptions have been added. Maybe a sort of exploded globe (Mercator map projection), perhaps toggling between a flattened sphere for showing location and a timeline showing timing.

- Is there a full-screen mode, to get a "big picture" of the completed wok [sic] to review?”

ANNEX 10. SUBTITLING PILOTS METHODOLOGY

1. What will be tested? (summary)

The purpose of the pilots (German pilot and Spanish pilot) is to introduce a panel of users of subtitling services to the developed solution for consuming fully accessible 360º contents and, at the same time, to gather qualitative measurements and feedback about the user experience when consuming those services in an immersive environment.

PART 1. USER INTERFACE.
Access to ImAc Player and access services for usability and user preferences on the version available on September 19th. The traditional menu will be tested for subtitles.

PART 2. PRESENTATION MODES.
Arrow vs radar for immersion, user preferences and usability.

2. When?
   - German Pilot: 15/10-19/10
   - Spanish Pilot: 01/10-19/10

3. Who?
   - German pilot: RBB
   - Spanish pilot: CCMA

4. Stimuli
   - Desconcert (CCMA) - Video 2 - Desconcert 1
     - Test: Part 1. User interface.
     - Description: musical concerts.
     - Genre: musical
     - Original language: Catalan
     - Duration: around 5/6 minutes (although, no need to watch it completely).
     - Link:
     - http://84.88.32.46/imacpilot1_part2/
     - All modes and services to be tested (subtitles) must be implemented.
   - I Philip (RBB)
     - Test: Part 2. Presentation modes.
     - Description: 23 years after Philip K. Dick's death, in 2005, David Hanson, a young engineer in robotics, revealed his first android with human form, "Phil". 'I Philip" immerses you in the memories of what could be the last love affair of the writer. But aren't these memories the fruit of the imagination of an android which learned, little by little, how to become a human?
     - Genre: Sci-Fi, drama
     - Original language: English
     - Duration: 12:26 (until the credits), to be split in two clips
     - Link: http://84.88.32.46/imacpilot1_part1/
     - Access services needed:
       - GER subtitles with arrow
       - GER subtitles with radar
       - CAT subtitles with arrow
       - CAT subtitles with radar

IDENTIFICATION CODES FOR THE STIMULI

- A1: I Philip part 1 - with arrow
- A2: I Philip part 1 - with radar
- B1: I Philip part 2 - with arrow
- B2: I Philip part 2 - with radar

5. Methodology: overview
   - **Aim:** gather data from users about 1) their experience with the ImAc Player and access services, replying to questions regarding usability and preferences; 2) their experience with different presentation modes, replying to questions regarding immersion, preferences and usability.
   - **Experimental protocol:** users will be asked to perform certain tasks while they watch different stimuli, and then report on the usability, preferences and immersion through digital questionnaires with closed and open questions.
   - **Research tools**: digital questionnaires (Google Forms). The questionnaires will be digital in order to facilitate data processing. The questionnaires will be translated into German/Catalan/any other needed language by each partner responsible for the pilot (CCMA and RBB). SUS and IPQ translations will be provided by UAB.
   - **Measures:** usability, preferences and presence (immersion).
   - **Participants:** we should aim at 30 participants with hearing loss. Minimum per partner: 15. Recruitment will be done via associations/organisation and/or at partners' discretion.
   - **Duration**: approx. 90 minutes.
   - **Language of the test:** German/Catalan (depending on the territory).
   - **Materials:** HMD, tablet, computer and clips.
   - **Facilitators**: two facilitators will be needed. One facilitator will be the leader (welcoming participants, explaining the project, explaining the test) and another facilitator will assist the sessions (by providing the digital questionnaires and helping filling them in, providing technical assistance with the different devices, etc.).
   - **Test accessibility:** adequate measures must be taken by tests organisers (CCMA, RBB) so that communication with persons with hearing loss is fluent.
   - **Reporting:** results will be included in a report created by each partner. This will be done exporting data from the Google Form. A template will be provided. All feedback must be translated into English by the partners responsible for the pilots (RBB and CCMA).
   - **Testing the methodology by RBB and CCMA:** please make sure you test the experimental protocol below before the actual pilot action. If the methodology needs to be improved based on this previous test, let UAB know. It is important that both RBB and CCMA use the same methodology.
   - Please make sure that you have all materials and ethical forms ready before the test.

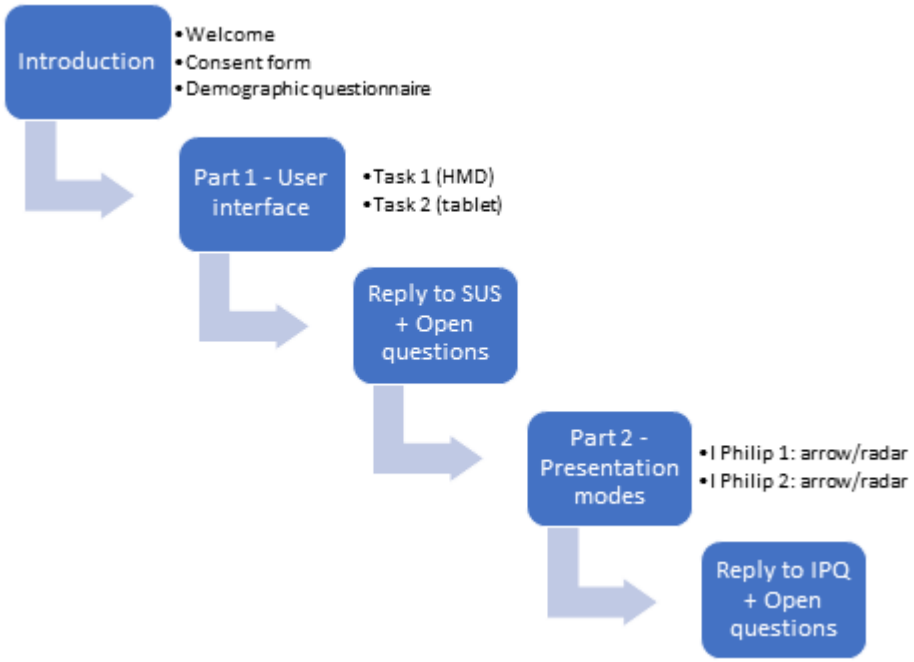
6. Methodology: experimental protocol

PLANNING

Introduction	15 min
Part 1 - User interface	25 min

Part 2 - Presentation modes	40 min
Farewell and thanks	5 min
Buffer time	5 min
Total	**90 min**

WORKFLOW



LATIN SQUARE FOR ALL PARTICIPANTS (if more than 15, repeat from the beginning).
Each participant will follow a different order to avoid the order of presentation affecting the results.

Participant	User interface	User interface	Presentation modes	Presentation modes
RBB1/CCMA1	Task 1 (HMD)	Task 2 (tablet)	A1	B2
RBB2/CCMA2	Task 2 (tablet)	Task 1 (HMD)	A2	B1
RBB3/CCMA3	Task 1 (HMD)	Task 2 (tablet)	A1	B2
RBB4/CCMA4	Task 2 (tablet)	Task 1 (HMD)	A2	B1
RBB5/CCMA5	Task 1 (HMD)	Task 2 (tablet)	A1	B2
RBB6/CCMA6	Task 2 (tablet)	Task 1 (HMD)	A2	B1

RBB7/CCMA7	Task 1 (HMD)	Task 2 (tablet)	A1	B2
RBB8/CCMA8	Task 2 (tablet)	Task 1 (HMD)	A2	B1
RBB9/CCMA9	Task 1 (HMD)	Task 2 (tablet)	A1	B2
RBB10/CCMA10	Task 2 (tablet)	Task 1 (HMD)	A2	B1
RBB11/CCMA11	Task 1 (HMD)	Task 2 (tablet)	A1	B2
RBB12/CCMA12	Task 2 (tablet)	Task 1 (HMD)	A2	B1
RBB13/CCMA13	Task 1 (HMD)	Task 2 (tablet)	A1	B2
RBB14/CCMA14	Task 2 (tablet)	Task 1 (HMD)	A2	B1
RBB15/CCMA15	Task 1 (HMD)	Task 2 (tablet)	A1	B2

INTRODUCTION (15 min)

Who?	What?	How long?
Lead facilitator	**Welcome** the participants, who will individually attend the test. Please assign a **participant code** when they arrive, so that they can enter that code in each online questionnaire. Codes should be as follows: - For RBB: RRB1, RBB2, RBB3, RBB4, etc. - For CCMA: CCMA1, CCMA2, CCMA3, CCMA4, etc.	1 min
Lead facilitator	**Explain** the **project** (if unknown to the participant), the **aim** of the test and the **procedure.**	5 min
Assistant facilitator	Provide the participant with the **consent form** for ethical clearance. You can find the last version here: https://drive.google.com/drive/folders/1X5Nj9KxkpFVwvEuKFk6XVgz0VFUSzUOS Provide signed original consent forms to UAB (next meeting or send by snail mail).	3 min
Assistant facilitator	Provide the participant with the digital **demographic questionnaire** to be filled in (access to a computer/laptop will be needed): ● ENG: https://goo.gl/forms/o2B4dLHhk2M3Bxrk1 ● GER: https://goo.gl/forms/E5el8lqtvt8qOtlg1 ● CAT: https://goo.gl/forms/KSfjmnPIGXJOW8j32	6 min

In the following sections, the different parts of the test will be explained, including tasks and measures.

PART 1. USER INTERFACE (25 min)

- **Measures**: usability and preferences
- **Participants**: minimum of 15 per partner
- **Materials**:
    - Devices: the test will be performed with an HMD and a tablet.
    - Player:
        - Link to the player: http://84.88.32.46/imacpilot1_part2/
        - Only traditional menu will be tested.
    - Clip: Desconcert with subtitles.
- **Room**: make sure the atmosphere is comfortable for the participants, with an adequate room arrangement.

Previous to task (5 min)
The lead facilitator will roughly explain to the users how the ImAc Player/Menu works (you have to look down to open the menu, you have to press that button from the controller to select the different options, you will find options to play/pause, volume control, accessibility services, etc.) and advise during the test if necessary.
IMPORTANT: Please randomise the order in which you perform TASK 1 and 2, to avoid a learning effect that could have a negative impact on the results. Please follow the Latin Square provided above.

TASK 1 - Test with HMD. Duration: 10 min.

Participants will receive the **instructions on paper** before starting the test and the lead facilitator will clarify any doubt before starting the test.

1) After some seconds, please pause the video.
2) Please, play the video again.
3) Please change the volume.
4) Please, open the menu and activate subtitles in your own language.
5) Please, randomly personalise subtitles, using all available options.

After TASK 1 is finished, participants will be asked by the assistant lead to fill in the following questionnaire (SUS):

- ENG: https://goo.gl/forms/6fRIEAZYMtmGJNpw1
- GER: https://goo.gl/forms/gohpTNToOIXpF99f1
- CAT: https://goo.gl/forms/IwMD97vzoCwvxdXg1

TASK 2 - Test with tablet. Duration: 10 min.
Participants will receive the **instructions on paper** before starting the test and the lead facilitator will clarify any doubt before starting the test.

1) After some seconds, please pause the video.
2) Please, play the video again.
3) Please, change the volume.
4) Please, open the menu and activate subtitles in your own language.
5) Please, randomly personalise subtitles, using all available options.

After TASK 2 is finished, participants will be asked by the assistant lead to fill in the following questionnaire (SUS):

- ENG: https://goo.gl/forms/pGWN0BWkQmj6G1sx1
- GER: https://goo.gl/forms/e38pxNnJal2tqGOD3
- CAT: https://goo.gl/forms/1CUUmNwUthIFaG522

After both tasks, participants will be asked to reply open questions about both systems.

- ENG: https://goo.gl/forms/pYpQWzh4mIPrmiyj1
- GER: https://goo.gl/forms/Tka8apnoJI9fRqoE2
- CAT: https://goo.gl/forms/L7BHkx51ZH6k4yuZ2

PART 2. PRESENTATION MODES (40 min)

- **Measures**: preferences, presence and usability
- **Participants**: minimum of 15 per partner
- **Materials**:
    - Device: the test will be performed with an HMD.
    - Player:
        - Link to the player: http://84.88.32.46/imacpilot1_part1/
    - Stimuli: Two comparable clips (A, B) with 2 conditions (1, 2) for each presentation mode tested, so that participants can watch both conditions in different but comparable clips to avoid a learning effect.
        - I Philip:
            - 2 comparable clips, 6-7 min each. Both parts contain different speakers in different positions to test the presentation mode (guiding to speaker).
- **Room**: make sure the atmosphere is comfortable for the participants, with an adequate room arrangement

Introduction (5 min)
The lead facilitator will explain the aim of this part: testing two different presentation modes to guide the user to the speaker. There will be two presentation modes: an arrow integrated in the subtitle that will indicate where to look for the speaker and radar which will always be present. After watching the clips, they will be asked to answer a set of questions.

The order of presentation of the stimuli will be balanced across participants. A latin square protocol in which the presentation mode is tested with two conditions (arrows versus radar).

Order of presentation (please repeat up to the number of agreed participants): Please follow the Latin Square provided above.

TASK 3. ARROW vs RADAR. Duration: 40 min.

1) The participants will be asked to watch the two randomised clips. Please follow the order specified in the Latin Square provided above.
2) The participant will have to watch 2 clips (A, B) with the randomised variables (1) arrow and 2) radar). After watching **each clip**, participants will have to reply to the IPQ (presence) questionnaire to gather feedback about immersion. Please don't share

technicalities with participants, only tell them they will be asked to reply some questions in the following forms:

a) Arrow - I Philip:
   i) ENG: https://goo.gl/forms/SZZvMDW4bqfrvhhT2
   ii) GER: https://goo.gl/forms/92v9knhVak84pirM2
   iii) CAT: https://goo.gl/forms/eAsV2viwGjg52Oa63
b) Radar - I Philip:
   i) ENG: https://goo.gl/forms/2RRqBiADarz8UZfo2
   ii) GER: https://goo.gl/forms/Jt0hRAxvWyWAgM0V2
   iii) CAT: https://goo.gl/forms/DcOXVOB0q3egAmfL2

IMPORTANT: Please make sure that you provide the correct IPQ questionnaire to participants depending on the order in which they are visualising the clips.

3) After watching **the two clips**, the participants will be asked to provide feedback about preferences and usability:
   - ENG: https://goo.gl/forms/aHmBrORo9Ew6Lr6T2
   - GER: https://goo.gl/forms/AgDIuDiaO0lja9yS2
   - CAT: https://goo.gl/forms/MQo142qG3zXwKAa23

FAREWELL AND THANKS to participants (1 min)

REPORTING (after the tests)
Upload your report one week after the tests under Google Drive under XXXXXXXXXXXX and let Pilar Orero/Anna Matamala know.
It must follow the template available in the same folder ("XXXXXXXXXX"): https://drive.google.com/open?id=1Jg4bFAzlguah3SsMEdFhJNc78j3KocAtlGbf3Ao-dKk

7. Questionnaires

Questionnaires will be provided to the participants using online forms, but is included below for reference.

Demographic questionnaire
Some questions about yourself
Please reply to these general questions about yourself.
Participant code:

1. Sex
   a) Female
   b) Male
   c) Other
   d) I prefer not to reply

2. Age:
3. Main language:
4. Please indicate your level of studies.
a) No studies
b) Primary education

c) Secondary education
d) Further education
e) University

5. I define myself as....

a) Deaf person
b) Hearing impaired person
c) Deaf-blind person
d) Other:_____.

6. Age in which your disability began:

a) From birth
b) 0-4
c) 5-12
d) 13-20
e) 21-40
f) 41-60
g) more than 60

7. What devices do you use on a daily basis? Multiple replies are possible.

a) TV
b) PC
c) Laptop
d) Mobile phone
e) Tablet
f) Head Mounted Display
g) Other:_____

8. How often do you watch virtual reality content (for instance, 360º videos)?

	Never	Occasionally	At least once a month	At least once a week	Every day
In smartphone					
On a tablet					
On a PC					
In smartphone plugged to HMD					
In HMD					

9. If you have never used virtual reality content such as 360º videos or only occasionally, please indicate why. Multiple answers are possible.

a) Because I am not interested.
b) Because it is not accessible.
c) Because I have not had the chance to use it.
d) Other:_____.

10. Please state your level of agreement with the following statement: "I am interested in virtual reality content (such as 360º videos)."

a) I strongly agree

b) I agree
c) Neither agree nor disagree
d) Disagree
e) Strongly disagree

11. Do you own any device to access virtual reality content?

a) Yes
b) No
c) I don't know or I don't want to reply

12. If you replied "yes" to the previous question, please specify which device(s).

13. Do you like watching the following types of content on television or online?

	I like it very much	I like it	Neither like it nor dislike it	I don't like it	I don't like it at all
News					
Fiction (series, films)					
Talk shows					
Documentaries					
Sports					
Cartoons					

14. When subtitling is available, do you activate it for the following type of content?

	Always	Sometimes	Rarely	Never
News				
Fiction (series, films)				
Talk shows				
Documentaries				
Sports				
Cartoons				

15. If it is available and you do not activate it, please select the reasons why

a) Because the interface is not accessible.
b) Because I don't want subtitling in all the content, only in certain types of content.

c) Other:_____.

16. How many hours a day do you watch subtitled content?

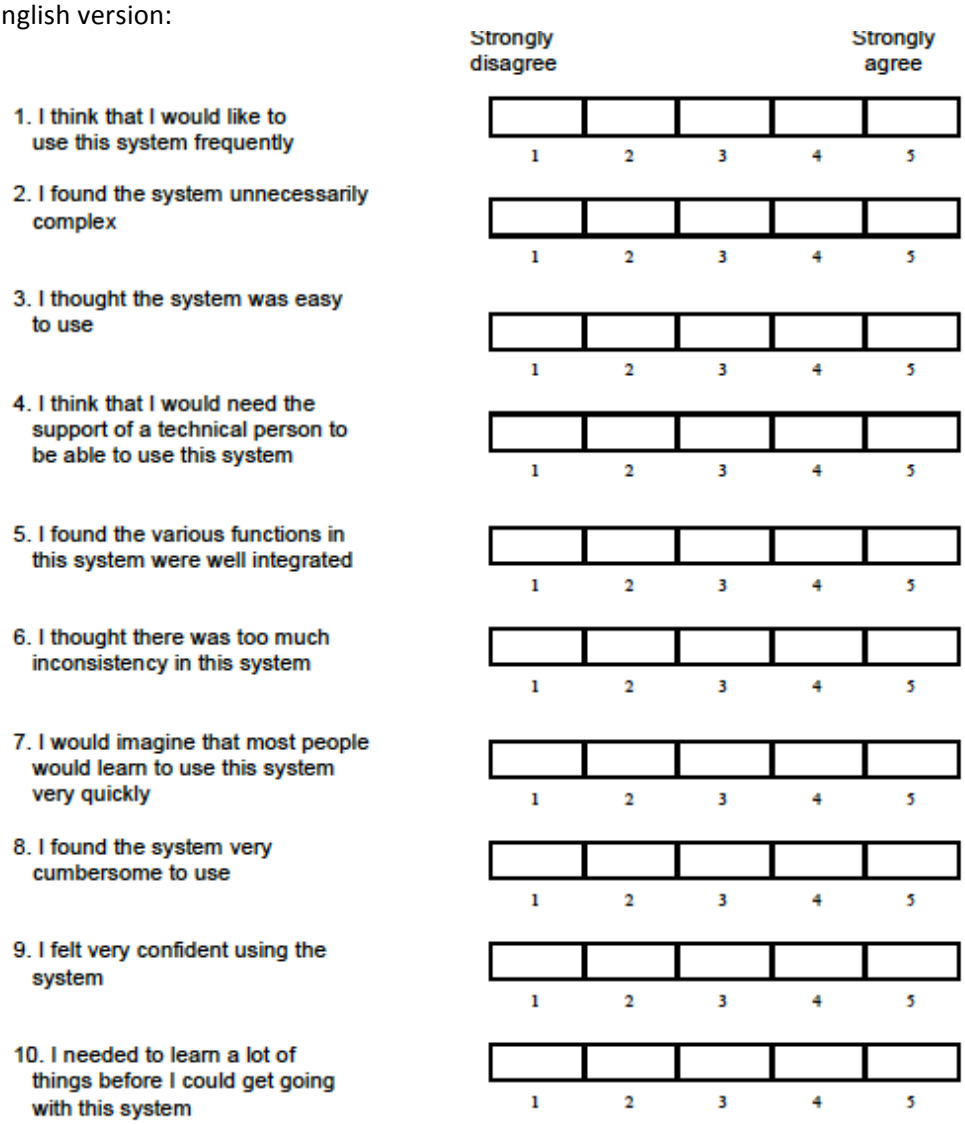
a) None
b) Less than 1 hour
c) 1-2 hours
d) 2-3 hours
e) 3-4 hours
f) 4 hours or more

17. What do you use subtitles for?

a) They help me understand
b) They are my only way to have access to the dialogue
c) I use them for language learning
d) Other: _____

SUS

English version:



German version: Fragebogen zur System-Gebrauchstauglichkeit

Stimme überhaupt nicht zu 1	2	3	4	Stimme voll zu 5

1. Ich denke, dass ich das System gerne häufig benutzen würde.
2. Ich fand das System unnötig komplex.
3. Ich fand das System einfach zu benutzen.
4. Ich glaube, ich würde die Hilfe einer technisch versierten Person benötigen, um das System benutzen zu können.
5. Ich fand, die verschiedenen Funktionen in diesem System waren gut integriert.
6. Ich denke, das System enthielt zu viele Inkonsistenzen.
7. Ich kann mir vorstellen, dass die meisten Menschen den Umgang mit diesem System sehr schnell lernen.
8. Ich fand das System sehr umständlich zu nutzen.
9. Ich fühlte mich bei der Benutzung des Systems sehr sicher.
10. Ich musste eine Menge lernen, bevor ich anfangen konnte das System zu verwenden.

Catalan version

1- Totalment en desacord 5- Totalment d'acord

1. Crec que utilitzaria aquest sistema amb freqüència.
2. Penso que el sistema és massa complex.
3. Crec que el sistema és fàcil d'utilitzar.
4. Crec que em caldria suport tècnic per a poder utilitzar aquest sistema.
5. Penso que les diferents funcions d'aquest sistema estan ben integrades.
6. Penso que el sistema presenta massa inconsistències.
7. Crec que la majoria de gent aprendria a utilitzar el sistema molt ràpidament.
8. Penso que el sistema és incòmode d'utilitzar.
9. M'he sentit molt segur utilitzant el sistema.
10. He hagut d'aprendre moltes coses abans de fer-lo anar.

<u>Open questions after SUS:</u>

More questions…

Please, reply the open questions with your own words. The aim of these questions is to gather feedback to improve the ImAc Player and the access to the accessibility services.

11. Did you use the setting "Indicator"? Yes/No
12. What was the function of "Indicator"?
13. Did you use the setting "Area"? Yes/No
14. What was the function of "Area"?
15. Which other subtitle personalisation options did you use?
16. What did you like most about the ImAc Player?
17. What did you like less about the ImAc Player?
18. What do you think could be improved, and how?
19. Did you miss any options? If yes, can you tell us which?
20. Other comments:

IPQ (Immersion)

Source: http://www.igroup.org/pq/ipq/download.php

English IPQ Items

Number	PQI/II Nr. (internal)	IPQ item name	shortcut	loading on ...	English question	English anchors	Copyright (item source)
1	s62	G1	sense of being there	PRES	In the computer generated world I had a sense of "being there"	not at all--very much	Slater & Usoh (1994)
2	s44	SP1	sense of VE behind	SP	Somehow I felt that the virtual world surrounded me.	fully disagree --fully agree	IPQ
3	s30	SP2	only pictures	SP	I felt like I was just perceiving pictures.	fully disagree --fully agree	IPQ
4	s28	SP3	not sense of being in v. space	SP	I did not feel present in the virtual space.	did not feel--felt present	???
5	s31	SP4	sense of acting in VE	SP	I had a sense of acting in the virtual space, rather than operating something from outside.	fully disagree --fully agree	IPQ

6	s33	SP5	sense of being present in VE	SP	I felt present in the virtual space.	fully disagree --fully agree	IPQ
7	s64	INV1	awarenes ss of real env.	INV	How aware were you of the real world surrounding while navigating in the virtual world? (i.e. sounds, room temperature, other people, etc.)?	extreme ly aware-moderat ely aware-not aware at all	Witmer & Singer (1994)
8	s37	INV2	not aware of real env.	INV	I was not aware of my real environment.	fully disagree --fully agree	IPQ
9	s40	INV3	no attentio n to real env.	INV	I still paid attention to the real environment.	fully disagree --fully agree	IPQ
10	s38	INV4	attentio n captivat ed by VE	INV	I was completely captivated by the virtual world.	fully disagree --fully agree	IPQ
11	s48	REAL1	VE real (real/no t real)	REAL	How real did the virtual world seem to you?	complet ely real--not real at all	Hendrix (1994)

12	s7	REAL2	experience similar to real env.	REAL	How much did your experience in the virtual environment seem consistent with your real world experience ?	not consistent-moderately consistent-very consistent	Witmer & Singer (1994)
13	s59	REAL3	VE real (imagined/real)	REAL	How real did the virtual world seem to you?	about as real as an imagined world--indistinguishable from the real world	Carlin, Hoffman, & Weghorst (1997)
14	s47	REAL4	VE wirklich	REAL	The virtual world seemed more realistic than the real world.	fully disagree--fully agree	IPQ

German IPQ Items

Number	IPQ item name	German question	German anchors
1	G1	In der computererzeugten Welt hatte ich den Eindruck, dort gewesen zu sein...	überhaupt nicht--sehr stark
2	SP1	Ich hatte das Gefühl, daß die virtuelle Umgebung hinter mir weitergeht.	trifft gar nicht zu- -trifft völlig zu

3	SP2	Ich hatte das Gefühl, nur Bilder zu sehen.	trifft gar nicht zu- -trifft völlig zu
4	SP3	Ich hatte nicht das Gefühl, in dem virtuellen Raum zu sein.	hatte nicht das Gefühl--hatte das Gefühl
5	SP4	Ich hatte das Gefühl, in dem virtuellen Raum zu handeln statt etwas von außen zu bedienen.	trifft gar nicht zu- -trifft völlig zu
6	SP5	Ich fühlte mich im virtuellen Raum anwesend.	trifft gar nicht zu- -trifft völlig zu
7	INV1	Wie bewußt war Ihnen die reale Welt, während Sie sich durch die virtuelle Welt bewegten (z.B. Geräusche, Raumtemperatur, andere Personen etc.)?	extrem bewußt-mittelmäßig bewußt-unbewußt
8	INV2	Meine reale Umgebung war mir nicht mehr bewußt.	trifft gar nicht zu- -trifft völlig zu
9	INV3	Ich achtete noch auf die reale Umgebung.	trifft gar nicht zu- -trifft völlig zu
10	INV4	Meine Aufmerksamkeit war von der virtuellen Welt völlig in Bann gezogen.	trifft gar nicht zu- -trifft völlig zu
11	REAL1	Wie real erschien Ihnen die virtuelle Umgebung?	vollkommen real-weder noch-gar nicht real
12	REAL2	Wie sehr glich Ihr Erleben der virtuellen Umgebung dem Erleben einer realen Umgebung?	überhaupt nicht-etwas-vollständig

13	REAL3	Wie real erschien Ihnen die virtuelle Welt?	wie eine vorgestellte Welt- -nicht zu unterscheiden von der realen Welt
14	REAL4	Die virtuelle Welt erschien mir wirklicher als die reale Welt.	trifft gar nicht zu- -trifft völlig zu

Catalan IPQ Items (provided by UAB)

Number	loading on ...	Catalan question	Catalan anchors
1	PRES	En el món generat per ordinador, he tingut la sensació de "trobar-m'hi a dins".	de cap manera--moltíssim
2	SP	He sentit que en certa manera el món virtual m'envoltava.	totalment en desacord--totalment d'acord
3	SP	He sentit com si només veiés fotografies	totalment en desacord--totalment d'acord
4	SP	No m'he sentit present en l'espai virtual.	no m'hi he sentit present--m'hi he sentit present
5	SP	He tingut la sensació d'estar dins l'espai virtual, en lloc de mirar-m'ho des de fora.	totalment en desacord--totalment d'acord
6	SP	M'he sentit present a l'espai virtual.	totalment en desacord--totalment d'acord

7	INV	Fins a quin punt eres conscient del món real que t'envoltava quan navegaves pel món virtual? (per exemple, sorolls, temperatura de la sala, altres persones, etc.)	molt conscient-moderadament conscient- gens conscient
8	INV	No era conscient de l'entorn real que m'envoltava.	totalment en desacord--totalment d'acord
9	INV	He continuat parant atenció al món real que m'envoltava.	totalment en desacord--totalment d'acord
10	INV	Estava totalment captivat pel món virtual.	totalment en desacord--totalment d'acord
11	REAL	Fins a quin punt t'ha semblat real, el món virtual?	totalment real--gens real
12	REAL	Fins a quin punt l'experiència en el món virtual t'ha semblat comparable a l'experiència en el món real?	gens - moderadament-molt
13	REAL	Fins a quin punt t'ha semblat real, el món virtual?	tan real com un món imaginat--impossible de distingir del món real
14	REAL	El món virtual m'ha semblat més realista que el món real.	totalment en desacord--totalment d'acord

PREFERENCES & USABILITY

IMAC-WP5-methodology-Form-PostQuestionnaire_Pilot_PresentationModes_Preferences_ENG

Please provide some feedback about your experience with the clips and the subtitles
Please reply to the questions with your own words.

1. When directions need to be indicated, what system do you prefer?
a) Arrows
b) Radar

2. Please, explain why you prefer the above indicated option.

3. Please explain why you did not choose the other option in question 1).

4. What do you think could be improved, and how?

5. Would you implement another system to guide you to the user?

6. How easy was it to identify who was speaking on the clip with the arrow system?
1- Very difficult
5- Very easy

7. How easy was it to identify who was speaking on the clip with the radar system?
1- Very difficult
5- Very easy

8. Do you think you will be able to enjoy 360º videos with these type of subtitles? Explain your answer.

ANNEX 11. CCMA SUBTITLING PILOT REPORT

1. General information

- Partner responsible: CCMA
- Place and date: 01.10.2018 / 17-19.10.2018
- Access service(s) discussed: *subtitling.*

2. Demographic questionnaire

- Number of end users: 13
- Demographics for users.

1.	Sex	7 male 6 female 0 other 0 prefer not to reply
2.	Age	19, 25, 27, 30, 31, 35, 44, 50 (x2), 55, 62, 63, 66
3.	Main language of the participants:	Spanish (3x), Catalan (x6), Catalan & Sign Language in Catalan (x1) Sign Language in Catalan (x3)
4.	Level of studies	0 no studies 2 primary education 3 secondary education 2 further education 6 university
5.	I define myself as a…"	8 deaf person 5 hearing impaired person 0 deaf-blind person
6.	Age in which your disability began	8 From birth 1 0-4 2 5-12 0 13-20 1 21-40 0 41-60 1 More than 60

7.	What technology do you use on a daily basis? You can select more than one.	12 TV 5 PC 10 Laptop 13 Mobile Phone 6 Tablet 1 Head Mounted Display (HMD) 1 other: Sennheiser magnetic induction loop, video game console

8. How often do you watch virtual reality content (for instance, 360º videos)?

	Never	Occasionally	At least once a month	At least once a week	Every day
In smartphone	2	11			
On a tablet	9	4			
On a PC	11	2			
In smartphone plugged to HMD	9	2	2		
In HMD	8	3	2		

9.	If you have never used virtual reality content such as 360º videos or only occasionally, please indicate why. Multiple answers are possible.	0 Because I am not interested 3 Because it is not accessible 6 Because I have not had the chance to use it 4 Other reasons: ● I've seen ● Yes, I've seen ● Yes, I've seen VR contents ● Because no...
10.	Please state your level of agreement with the following statement: "I am interested in virtual reality content (such as 360º videos)."	5 Strongly agree 8 Agree 0 Neither agree nor disagree 0 Disagree 0 Strongly disagree

11.	Do you own any device to access virtual reality content?	4 Yes 8 No 1 I don’t know or I don’t want to repl
12.	If you replied "yes" to the previous question, please specify which device(s).	1 HMD 1 PlaystationVR & Oculus Gear 1 Smartphone & Tablet 1 Cardboard

13. Do you like watching the following types of content on television or online?

	I like it very much	I like it	Neither like it nor dislike it	I don’t like it	I don’t like it at all
News	10	2	1		
Fiction (series, films)	8	4	1		
Talk shows	6	4	2	1	
Documentaries	6	5	2		
Sports	2	5	3	2	1
Cartoons	0	2	7	3	1

14. When subtitling is available, do you activate it for the following type of content?

	Always	Sometimes	Rarely	Never
News	10	1		2
Fiction (series, films)	11		2	
Talk shows	8	2	1	2
Documentaries	11		1	1
Sports	7	1	4	1
Cartoons	8	2	2	1

15.	If it is available and you do not activate it, please select the reasons why.	3 Because the interface is not accessible 2 Because I don't want subtitling in all the content, only in certain types of content 8 Other reasons: ● 4x I always activate ● 1x I always activate. If there are no subtitles, then I don't watch content ● 1x because in sports subtitle is over statistics and results, and hides important information ● 1x because interface not accessible or because I want subtitles for language learning ● 1x Because they don't subtitle Spanish film
16.	How many hours a day do you watch subtitled content?	1 None 1 Less than 1 hour 2 1-2 hours 5 2-3 hours 2 3-4 hours 2 4 hours or more
17.	What do you use subtitles for?	2 They help me understand 4 They are my only way to have access to the dialogue 1 I use them for language learning 6 Other: ● 3x For the first two reasons (help me understand & my only way to have access to the dialogue) ● 1x They help me to understand & Language Learning ● 1x They are my only way to have access to dialogue & Language Learning ● 1x They help me understand (but I prefer to use Sign Language to keep more attention to video)

Summary

7 male and 6 female users aged between 19 and 66 took part in the tests. 6 users indicated Catalan as mother tongue, 3 indicated Spanish, 3 indicated sign language in Catalan and 1 users indicated both Catalan & sign language also in Catalan. Most of the users had at least a secondary education or higher. 8 testers saw themselves as deaf, 5 as hearing impaired. For almost all users, the impairment began at birth or below the age of 4, while for only 1 user the impairment started over 60 years.

The technical device used most often on a daily basis was a smartphone (13 users), followed by TV (12 users) and laptop (10 users), while tablet had less use (6 users) and PC was the least often used (5 users). HMDs was used by only one user, while another user indicated the use of a Sennheiser magnetic induction loop & a video game console. Nine of the users had never watched VR content before, mostly because they were not interested or had not had the chance to. When directly asked if they were interested in VR content, all of the testers agreed. The majority of the users did not own a device to access VR content, while 4 users owned some kind of device (cardboard, HMD, tablet, smartphone, Oculus Gear or Playstation game console).

In terms of content preferences, the majority of the testers liked news, fiction, talk shows and documentaries, while some also liked sports, and cartoons. Almost all of them used subtitles for all types of content. There was an even distribution between 0 and more than 4 hours among the testes in terms of how many hours a day they consume subtitled content and the majority of the testers used ST because it is their only way of accessing the dialogues.

3. PART 1 - Task 1 & 2

a) SUS – HMD

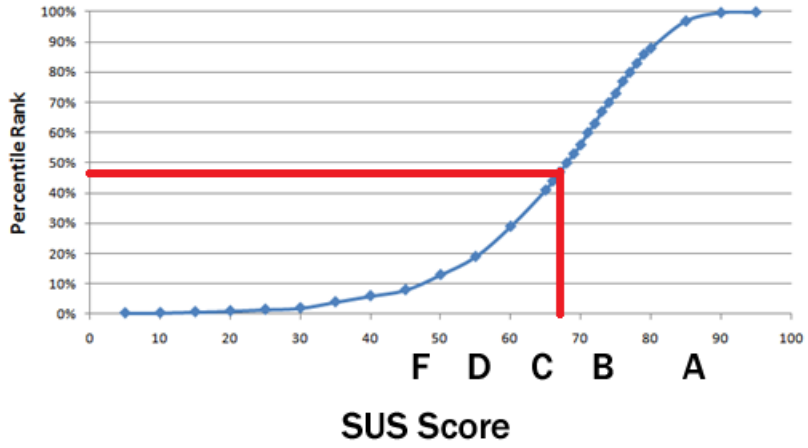
Please indicate the number of replies that you have received for each rating.

SUS statements	1	2	3	4	5
1. I think that I would like to use this system frequently		1	2	5	5
2. I found the system unnecessarily complex	3	6	3	1	
3. I thought the system was easy to use		4	1	4	4
4. I think that I would need the support of a technical person to be able to use this system	5	3	3	1	1
5. I found the various functions in this system were well integrated		3	1	5	4
6. I thought there was too much inconsistency in this system	3	2	7	1	
7. I would imagine that most		3	3	5	2

people would learn to use this system very quickly					
8. I found the system very cumbersome to use	3	5	2	3	
9. I felt very confident using the system		1	2	5	5
10. I needed to learn a lot of things before I could get going with this system	6	2	2	2	1

The SUS average score is **68.8** (**above average**, 68 or more is considered above average).

The graph below shows how the SUS scores associate with the percentile ranks and letter grades[12] and the red line specifies where the ImAc Player - HMD is at this moment.



The letter grade is C and our score corresponds to the percentile rank: 46-50%.

The excel spreadsheet with scores calculations can be consulted here: https://drive.google.com/open?id=1isDeXqeD1qFXte8I1qG2AaRCSDuvE7-8

b) SUS – Tablet

Please indicate the number of replies that you have received for each rating.

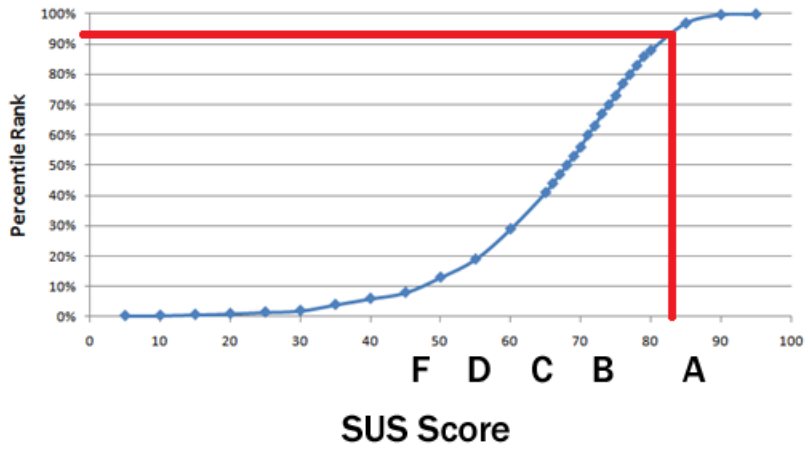
SUS statements	1	2	3	4	5
1. I think that I would like to use this system frequently	1	1	3	3	5
2. I found the system unnecessarily complex	8	4	1		

[12] Sauro, J. (2011). Measuring usability with the System Usability Scale (SUS). Retrieved from http://www.measuringu.com/sus.php

3. I thought the system was easy to use				4	9
4. I think that I would need the support of a technical person to be able to use this system	9	3		1	
5. I found the various functions in this system were well integrated			2	5	6
6. I thought there was too much inconsistency in this system	7	3	2	1	
7. I would imagine that most people would learn to use this system very quickly			2	5	6
8. I found the system very cumbersome to use	6	4	1	2	
9. I felt very confident using the system				5	8
10. I needed to learn a lot of things before I could get going with this system	8		3	2	

The SUS average score is **82.9** (**above average**, 68 or more is considered above average).

The graph below shows how the SUS scores associate with the percentile ranks and letter grades[13] and the red line specifies where the ImAc Player - Tablet is at this moment.



[13] Sauro, J. (2011). Measuring usability with the System Usability Scale (SUS). Retrieved from http://www.measuringu.com/sus.php

The letter grade is A and our score corresponds to the percentile rank: 90-95%.

The excel spreadsheet with scores calculations can be consulted here: https://drive.google.com/open?id=1ZvBlx0NlKreoREdb6fC_cBQWOBoKNxUS

c) Open questions – General

11.	Did you use the setting "Indicator"?	13 Yes
12.	What was the function of "Indicator"?	CCMA1: It serves to indicate where the voice comes from. CCMA2: Arrow indicating where the sound is subtitled CCMA3: To set the type of indicator, which allows signaling from where the sound comes from. CCMA4: To know who is talking. CCMA5: Position the transmitter. CCMA6: Put the voices of the actors in the direction they are, regardless of where you look with the glasses. CCMA7: From where you talk / Position from where the voice speaks or comes out CCMA8: Shows an arrow where the person speaking speaks. There are more options. CCMA9: To know who speaks CCMA10: The cursor to activate the functions CCMA11: To know and where to speak, who to speak. CCMA12: Serve the digital button by clicking on the configuration tools. CCMA13: Arrow, radar and without, I think very well, but the radar should separate a bit more with the subtitles
13.	Did you use the setting "Area"?	9 Yes / 4 No

14.	What was the function of “Area”?	CCMA1: No. CCMA2: In a circular space the position that we are seeing is presented and where the emission of the sound is located. CCMA3: Allows you to configure the visual field of the menu and subtitles. CCMA4: To be more focused. CCMA5: To focus more on the view in a certain area of the screen. CCMA6: Place the directions of the menus in a visual field, regardless of where you look with the glasses. CCMA7: Adjust the viewing of subtitles within your field of vision. CCMA8: Shows a point inside or outside the viewing area. The tip is the person speaking. CCMA9: - CCMA10: I have not appreciated the difference. CCMA11: --- CCMA12: Place the subtitles in the area of the screen that can be viewed more comfortably. CCMA13: I like this feature because some people like it closer or close

15. Which other subtitle personalisation options did you use?

CCMA1: Change language, size, position on screen, indicator.
CCMA2: Size, situation, language
CCMA3: The large font control
CCMA4: All options, less easy reading.
CCMA5: All less easy reading.
CCMA6: Size, language, position and background.
CCMA7: All
CCMA8: ---
CCMA9: Size
CCMA10: Transparent and solid
CCMA11: All except area
CCMA12: Text format, size, area.
CCMA13: Average size, contrast and average position.

16. What did you like most about the ImAc Player?

CCMA1: Images in 360º.
CCMA2: The ability to choose as a subtitle and immersion in space
CCMA3: The letter of the subtitles. The function of the indicators is very useful.
CCMA4: This is a new experience, a new feeling that I liked.
CCMA5: The flexibility that allows the configuration of subtitles (moving head and subtitles are always there) and the location of the issuer (indicator).
CCMA6: Provides a new, more extensive and personalized view of the contents. I think it's a

good tool for the future. Good usability
CCMA7: Customizing Subtitles.
CCMA8: The simplicity of the options and the comprehensive facility.
CCMA9: Subtitles
CCMA10: Sound quality, quick options
CCMA11: Subtitling, immersion sensation
CCMA12: Accessibility of subtitles to the contents.
CCMA13: When I use the tablet it is more comfortable than virtual visual, but in general I like it a lot because I have never seen this project!

17. What did you like less about the ImAc Player?

CCMA1: The difficulty to activate / deactivate with the cursor (HMD) and with the finger (Tablet)
CCMA2: It may take a while to find the pointer to select
CCMA3: The yellow dot disappears when I am not focusing the field where the menu bar is.
CCMA4: yellow pointer.
CCMA5: The yellow dot to select (it needs a lot of precision).
CCMA6: The need to move the body or head 360º to see everything.
CCMA7: The indicator, the graph.
CCMA8: Design.
CCMA9: With glasses it is difficult to find a yellow spot
CCMA10: The indicator
CCMA11: Everything else
CCMA12: The caption outline does not look great. It would be necessary to change the color of white to the other yellow. The indicator should be improved, which is not used on the entire screen.
CCMA13: When I use visual reality I do not feel comfortable when I want to click on the menu bar.

18. What do you think could be improved, and how?

CCMA1: It could be improved by making the buttons larger and the cursor visible.
CCMA2: Access to the menu.
CCMA3: Allow the yellow dot to be visible whenever the visible menu is.
CCMA4: The pointer, when moving, appears outside of my visual field.
CCMA5: "- The option to enable / disable subtitles is not visible.
- The subtitles in the SUPERIOR position should go higher on all devices.
- The cursor should be visible during the active menu (visible on the entire screen). "
CCMA6: "Reducing the need to move the body and the 360º head ... Maybe 180 ° was possible?
The small size, for me, is the most appropriate. Large size occupies too much screen. "
CCMA7: Yes. The user made a drawing proposal. It would eliminate the gray triangle of vision and replace it with an eye.
CCMA8: Design more attractive or customizable. The items seemed pretty good to me. letters in other colors, according to screen backgrounds.
CCMA9: Yellow spot always visible
CCMA10: The indicator changes its size outside the menu bar, the larger the farthest and the smaller the smaller.
CCMA11: Language signs (LSC)
CCMA12: Answer itself 7
CCMA13: "Propose a yellow dot in the proximity of the menu bar. (It provides a drawing that we have attached to the paper copy.) The subtitle must lower a bit more."

19. Did you miss any options? If yes, can you tell us which?

CCMA1: No.
CCMA2: Subtitle color changes to adapt to different environments and case of several people talking.
CCMA3: More types of subtitles sizes (the large font option should have the smaller font option). Also have a thicker contour. Have an option where the user can decide where to place the subtitles, to move the menu bar (in glasses).
CCMA4: A Zoom option is missing from the menu.
CCMA5: Lots of options.
CCMA6: No.
CCMA7: Yes, choose color
CCMA8: Colors (letters). Curious or not if "sing", intonation ...
CCMA9: No
CCMA10: Option of visual quality, option to visualize. The file size or visual resolution.
CCMA11: No
CCMA12: ---
CCMA13: Missing Catalan sign language.

20. Other comments:

CCMA1: It is great to be able to enjoy subtitles in 360º content.
CCMA2: I find it a very useful and easy to use tool that will be of frequent use in the near future. Thanks for making it accessible.
CCMA3: No.
CCMA4: Very good experience.
CCMA5: Subtitles are too focused, just at the center of the visual field, hindering the image. Consequently, they should have a transparent, not black background.
CCMA6: Being a concert I could not see how it works with dialogues ... text colors, read speed, etc.
CCMA7: Improve the indicator with radar
CCMA8:
CCMA9: -
CCMA10: The radar is a little uncomfortable, but it is useful.
CCMA11: Everything ok.
CCMA12: ---
CCMA13: -

4. PART 2 – Task 3

a) IPQ – Arrow (I Philip)

Please indicate the number of replies that you have received for each rating.

IPQ Question	1	2	3	4	5	6	7
In the computer generated world I had a sense of "being there".			1	1		6	5
Somehow I felt that the virtual world surrounded me.			1		2	5	5

I felt like I was just perceiving pictures.	5	3	3	1		1	1
I did not feel present in the virtual space.					3	7	3
I had a sense of acting in the virtual space, rather than operating something from outside.	1		1	2	1	5	3
I felt present in the virtual space.			1	1	2	5	4
How aware were you of the real world surrounding while navigating in the virtual world? (i.e. sounds, room temperature, other people, etc.)?	1	2		5	3	2	
I was not aware of my real environment.	1	2	2	2	1	3	2
I still paid attention to the real environment.	4	3		2	1	3	
I was completely captivated by the virtual world.		1	1		2	4	5
How real did the virtual world seem to you?	1	4	2	3	2	1	
How much did your experience in the virtual environment seem consistent with your real world experience ?	1	1	3	1	3	3	1
How real did the virtual world seem to you?		2	3	1	3	4	
The virtual world seemed more realistic than the real world.	2	5	4	1		1	

b) IPQ – Radar (I Philip)

Please indicate the number of replies that you have received for each rating.

IPQ Question	1	2	3	4	5	6	7
In the computer generated world I had a sense of "being there".				2	2	7	2
Somehow I felt that the virtual world surrounded me.			2	1	1	5	4
I felt like I was just perceiving pictures.	4	1	3	1	1	2	1
I did not feel present in the virtual space.			2	1	3	5	2
I had a sense of acting in the virtual space, rather than operating something from outside.			1	3	1	5	3
I felt present in the virtual space.			2	1	2	6	2
How aware were you of the real world surrounding while navigating in the virtual world? (i.e. sounds, room temperature, other people, etc.)?	1	3	2	2	4	1	
I was not aware of my real environment.		1	2	2	2	4	2
I still paid attention to the real environment.	4	2		1	2	4	
I was completely captivated by the virtual world.		1	1		3	4	4
How real did the virtual world seem to you?	2	2	1	4	3	1	
How much did your experience in the virtual environment seem consistent with your real world experience ?			4	4	2	2	1
How real did the virtual world seem to you?		2	3	3	2	2	1

The virtual world seemed more realistic than the real world.		7	4	1	1	1	

Median table for IPQ questionnaire results, where SP = Spatial presence, INV = Involvement, and REAL = Experienced Realism.

Language	Symbol	SP	INV	REAL
Catalan	Arrow	5.60	4.00	3.50
	Radar	5.80	4.75	3.50

Comparison of Arrow vs Radar in Catalan users per Scale

Test: Related Samples Wilcoxon Signed Rank test

SP = Spatial Presence.

A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Spatial Presence scale are not statistically different (Z=36.5, p=.094)

INV = Involvement

A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Involvement scale are not statistically different (Z=22, p=.952)

REAL = Experienced Realism

A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Experienced Realism scale are not statistically different (Z=28.5, p=.918)

SUMMARY: There is no significant difference in terms of presence between the arrow and the radar.

Comparison German vs Catalan users per scale and symbol

Test: Independent Samples Mann-Whitney U Test

The distribution of Arrow for Spatial Presence is the same across categories of Language (Mann–Whitney *U* =73.00; p= .648)

The distribution of Arrow for Involvement is different across categories of Language (German: 3,7; Catalan: 4). (Mann–Whitney *U* =102.00; p= .021)

The distribution of Arrow for Experienced Realism is the same across categories of Language (Mann–Whitney *U* =61.00; p= .832)

The distribution of Radar for Spatial Presence is the same across categories of Language (Mann–Whitney *U* =83.50; p= .257)

The distribution of Radar for Involvement is different across categories of Language (German: 2,62; Catalan: 4,75). (Mann–Whitney *U* =110.00; p= .004)

The distribution of Radar Experienced Realism is the same across categories of Language (Mann–Whitney *U* =60,50; p= .784)

SUMMARY: There is a difference between the level of involvement between Catalan and German users, but not related to the variables arrow vs radar.

c) Preferences & Usability (arrow and radar)

1. When directions need to be indicated, what system do you prefer?

a) Arrow	b) Radar
9	4

2. Please, explain why you prefer the above indicated option.

CCMA1: Because the arrow does not bother and, in a simple way, indicates the direction.
CCMA2: It is a simple, clear and unambiguous option and it is easy to locate.
CCMA3: Why is it more aesthetic and discreet? Both options are good.
CCMA4: Because I automatically know where and who you are talking about.
CCMA5: Easier, intuitive and coupled to captions, which is where you look. Although it does not specify who talks if more than one person is together.
CCMA6: The radar is more complete. You indicate dialogues of more than one person. And you identify with different colors.
CCMA7: Arrows distract less but there can not be both things at the time.
CCMA8: The search for the person who spoke has made me more relevant and with less latency to search for it with the arrow. The arrow "directs" me.
CCMA9: Agile
CCMA10: Radar occupies visual space and is annoying.
CCMA11: It bothers me in circles (radar) but sometimes I need to use radar
CCMA12: It helps me more where exactly the person is talking.
CCMA13: Because I feel more real and the radar helps me visual orientation.

3. Please explain why you did not choose the other option in question 1).

CCMA1: Because the radar annoys me. The gray round was too intrusive.
CCMA2: Maybe you give too much information, it's good to know where we look and where the transmitter is, but the simplicity of the arrow helps to pay attention to the text and the image in a more natural way.
CCMA3: Why is the radar right in the visible area and covers a bit?
CCMA4: Because I confused myself several times.
CCMA5: Because it has a greater complexity since the issuer's location with regard to your field of view must be processed.
CCMA6: Although the arrow is simpler than the radar, the arrow gives you less information. It's more basic. The radar is more advanced.
CCMA7: The radar distracts but it is a very good option.
CCMA8: I have to do "two steps": look up the point and find out what my area was.
CCMA9: More difficult to find who talks
CCMA10: It is uncomfortable and distracted.
CCMA11: The above, and also the arrow simpler and easier
CCMA12: It does not help me much where the voice that arises and makes me doubt where to

find the voice.
CCMA13: Because the arrows are joining the subtitles and does not give me comfort.

4. What do you think could be improved, and how?

CCMA1: The radar could be smaller.
The radar must separate a little more from the subtitles (more behind)
The radar must be smaller, with more 3D design, more blurry, more diluted when they do not speak (adds an explanatory graph in the printed version of the questionnaire) "
CCMA2: I think it's fine as well.
CCMA3: Yes, make a more discrete, smaller radar and place it on one side of the visible area of the user.
CCMA4: The truth is that I would not know it.
CCMA5: The radar is much more useful (more than the arrow) for the exact location of the transmitter, but it could be more transparent and with the visual field of the motionless person.
CCMA6: "The radar is very large (the size may be smaller). Long texts with large print costs too much to read."
CCMA7: Yes, improving and giving radar option to the arrows.
CCMA8: I find the arrow is more direct. Facilitates the information. It's simpler. The radar is more complex but also useful.
CCMA9: -
CCMA10: Improving depends on the likes of each user by configuration.
CCMA11: All right
CCMA12: It would be necessary to incorporate the vibrations of the sounds / noises since I feel nothing.
CCMA13: "The arrow puts the back or left of the screen.

5. Would you implement another system to guide you to the user?

CCMA1: right now no.
CCMA2: No, because it can be too invasive. I like to know what they say despite being looking elsewhere.
CCMA3: No.
CCMA4: No.
CCMA5: No, there are very good options both.
CCMA6: Radar I like it as it is posed. The arrow is too simple. Maybe put the system of names of the speaker and the text ... it could go well according to which people.
CCMA7: Yes.
CCMA8: Put the subtitles in the address where they are spoken. That the subtitles find the person who speaks.
CCMA9: It is also
CCMA10: By intermittent arrows if the talking character is not focused.
CCMA11: No
CCMA12: No, it's fine just like it is.
CCMA13: The radar itself, the arrows not because the arrows do not put the colors that are related to the colors of the subtitles. Radar is perfect!

6. How easy was it to identify who was speaking on the clip with the arrow system?

1- very difficult	2	3	4	5- very easy
	2	2	3	6

7. How easy was it to identify who was speaking on the clip with the radar system?

1- very difficult	2	3	4	5- very easy
	3	3	2	5

8. Do you think you will be able to enjoy 360º videos with these types of subtitles? Explain your answer.

CCMA1: Yes. I found them useful.
CCMA2: I think they would enjoy them a lot. I only find that it is a personal experience, difficult to share and isolates some of the environment. Maybe it's the only handicap that I see.
CCMA3: Yes, because in this way I can know who speaks, where the sound comes from, etc ...
CCMA4: Yes, it is a good option to integrate and be more attentive.
CCMA5: Yes. These subtitles are very well adapted to the great mobility that allow this type of content.
CCMA6: Yes, no problem. Its vision is very comfortable. But whenever there is more quality or resolution in the images. Uncomfortable to know that I am losing myself behind ... Perhaps instead of turning to me continuously to see what happens behind, it would be possible to project with a visual head of 180º (more comfortable for the viewer) than not 360º.
CCMA7: Not as much as you thought, it tires the view of having distractions or thinking about where to go. It must be simpler.
CCMA8: Yes, I think the subtitles were a long way ahead and the person further away. I do not know if it is possible to put the subtitles further on where the person is. The color letter also facilitated when it came to indicating which person spoke. I think that colors are associated very quickly, rather than putting the name of the person.
CCMA9: If it's new
CCMA10: Yes, but changing the position of the subtitles.
CCMA11: Yes, because they help me locate the characters.
CCMA12: Yes, I enjoy getting into the virtual world in an accessible way.
CCMA13: Yes, I am enjoying but I am a little apprehensive because I feel that the subtitles are near the middle of the screen.

5. Conclusions

a) User interface

The user interface is well-received by all of users, because it offers the possibility to access to Immersive 360º videos adding the accessibility services adapted to this new environment.

Most users have expressed their disagreement with the solution developed with the yellow pointer that is used to access the interface menus. The main reason is the difficulty that it represents using it because it disappears constantly, which leads to the absolute disorientation of the user.

One of the users has even made a graphical proposal on how to implement the solution, recommending that the pointer is always active at a comfortable distance from the menu.

Some users have had difficulty finding the switch to activate / deactivate the subtitles, lthough they have previously been explained in detail how the interface works.

Some users disagreed with the different color of the arrow and recommended to use the same color as the subtitle.

But in general terms the users feel happy with the results and would like to repeat in new tests.

b) Presentation modes

Most of the users preferred the arrow indicator, as it is simple and easy to understand. No differences in terms of presence have been reported, according to IPQ results.

However, some users have shown much more interest with the radar, as this allows them to have much more accurate information about the position of the speakers.

The users felt that the radar was too big and interfered when trying to enjoy the video, but they agree it's quite interesting to use this indicator, and some improvements in the design would definitely help. Some users proposed improvements which were contrasted with the interviewers through the help of hand painted graphs on a blackboard.

All users were really interested in ImAc subtitles implementation for immersive 360º contents, the felt very satisfied with the first results and expressed a great desire to collaborate in the future developments through the contribution of ideas.

ANNEX 12. RBB SUBTITLING PILOT REPORT

1. General information

- Partner responsible for the workshop: RBB
- Place and date: Potsdam, 27./28.9.2018, 15.-19.10.2018
- Access service(s) discussed: *subtitling.*

2. Demographic questionnaire

- Number of end users: 12
- Demographics for users.

1.	Sex	5 male 7 female 0 other 0 prefer not to reply
2.	Age	36, 37, 40, 41 (3x), 46, 52, 54, 56, 59, 63
3.	Main language of the participants:	German (5x), German sign language (6x), Serbian (2x) NB: 1 user selected both DGS and German
4.	Level of studies	0 no studies 2 primary education 4 secondary education 3 further education 3 university
5.	I define myself as a…"	7 deaf person 4 hearing impaired person 0 deaf-blind person 1 other: Cochlear implant (user is deaf)
6.	Age in which your disability began	6 From birth 4 0-4 0 5-12 0 13-20 0 21-40 2 41-60 0 More than 60
7.	What technology do you use on a daily basis? You can select more than one.	9 TV 6 PC 9 Laptop 11 Mobile Phone 6 Tablet 0 Head Mounted Display (HMD) 1 other: hearing aid

8. How often do you watch virtual reality content (for instance, 360º videos)?

	Never	Occasionally	At least once a month	At least once a week	Every day
In smartphone	10	1			1

On a tablet	11				1
On a PC	11				1
In smartphone plugged to HMD	11	1			
In HMD	11	1			

9.	If you have never used virtual reality content such as 360º videos or only occasionally, please indicate why. Multiple answers are possible.	4 Because I am not interested 0 Because it is not accessible 7 Because I have not had the chance to use it 4 Other reasons: • Because it is rare • Perhaps in the future with other content • No time and it is not important to me • I am not the type that sits in front of a TV the whole day
10.	Please state your level of agreement with the following statement: "I am interested in virtual reality content (such as 360º videos)."	5 Strongly agree 2 Agree 5 Neither agree nor disagree 0 Disagree 0 Strongly disagree
11.	Do you own any device to access virtual reality content?	1 Yes 8 No 3 I don't know or I don't want to reply
12.	If you replied "yes" to the previous question, please specify which device(s).	Tablet

13. Do you like watching the following types of content on television or online?

	I like it very much	I like it	Neither like it nor dislike it	I don't like it	I don't like it at all
News	7	7			
Fiction (series, films)	10	2			
Talk shows	2	4	2	2	2
Documentaries	7	3	1		1
Sports	5	1	3	2	1
Cartoons	3	1	4	1	3

14. When subtitling is available, do you activate it for the following type of content

	Always	Sometimes	Rarely	Never
News	8	3		1
Fiction (series, films)	10	1		1
Talk shows	7	2		3
Documentaries	8	3		1
Sports	9	1	1	1
Cartoons	8	1		3

15.	If it is available and you do not activate it, please select the reasons why.	0 Because the interface is not accessible 3 Because I don't want subtitling in all the content, only in certain types of content 9 Other reasons: • I always use them (7x) • Because sometimes I understand well enough just like that (2x) NB: RBB5 wanted to select "because the interface is not accessible" and the second option which was not possible and decided that option two is more important
16.	How many hours a day do you watch subtitled content?	1 None 2 Less than 1 hour 1 1-2 hours 3 2-3 hours 3 3-4 hours 2 4 hours or more
17.	What do you use subtitles for?	4 They help me understand 4 They are my only way to have access to the dialogue 0 I use them for language learning 2 Other: • Because I am deaf • To understand everything • Currently no use of subtitles • Option 1 and 2 • Option 1, 2 and 3 NB: RBB5 wanted to select reason 1 and 2 which was not possible and decided that option one is more important

Summary

7 female and 5 male users aged between 36 and 63 took part in the tests. 5 users indicated German as mother tongue, 6 indicated German sign language and 2 users indicated Serbian. Most of the users had at least a secondary education or higher. 7 testers saw themselves as deaf, 5 as hearing impaired, one user had a cochlear implant. For almost all users, the impairment began at birth or below the age of 4, while for 2 users the impairment started between 41 and 60 years.

The technical device used most often on a daily basis was a smartphone (11 users), followed by TV and laptop (both 9 users), while tablet and PC were least often used (both 6 users). HMDs were not used by any of the testers. Almost all of the users had never watched VR content before, mostly because they were not interested or had not had the chance to. When directly asked if they were interested in VR content, most of the testers agreed while some were not sure. The majority of the users did not own a device to access VR content.

In terms of content preferences, the majority of the testers liked news, fiction and documentaries, while some also liked sports, talk shows and cartoons. Almost all of them used subtitles for all types of content. The smaller group of testers that did not always use subtitles explained that they only use ST for certain types of content or that they sometimes understand well enough without ST. There was an even distribution between 0 and more than 4 hours among the testes in terms of how many hours a day they consume subtitled content and the majority of the testers used ST because it is their only way of accessing the dialogues.

3. PART 1 - Task 1 & 2

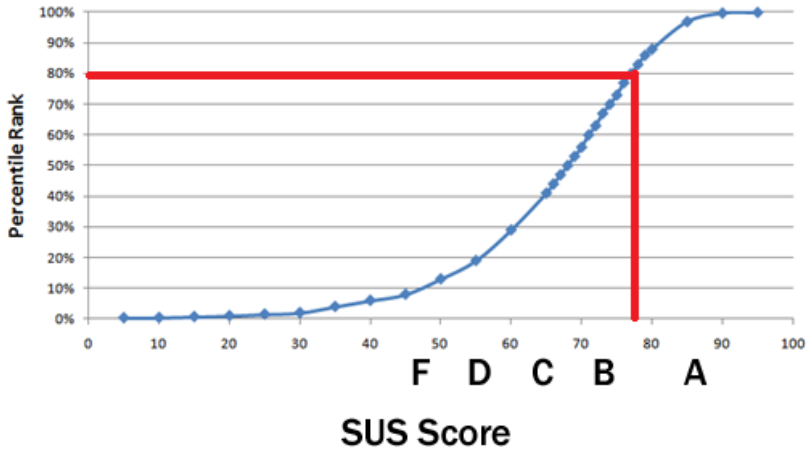
a) SUS + Open questions – HMD

SUS statements	1	2	3	4	5
1. I think that I would like to use this system frequently		1	2	1	8
2. I found the system unnecessarily complex	9	1	1		1
3. I thought the system was easy to use	2	1		2	7
4. I think that I would need the support of a technical person to be able to use this system	8	1		1	2
5. I found the various functions in this system were well integrated	2 (1 is probably an error and should		1	1	7

	be 5)				
6. I thought there was too much inconsistency in this system	7	2	1		2
7. I would imagine that most people would learn to use this system very quickly	2				10
8. I found the system very cumbersome to use	8		2		2
9. I felt very confident using the system	2	1	1	2	6
10. I needed to learn a lot of things before I could get going with this system	7	1	3		1

The SUS average score is **77.3** (**above average**, 68 or more is considered above average).

The graph below shows how the SUS scores associate with the percentile ranks and letter grades[14] and the red line specifies where the ImAc Player - HMD is at this moment.



The letter grade is B+, and our score corresponds to the percentile rank: 80%.

The excel spreadsheet with scores calculations can be consulted here: https://drive.google.com/open?id=1WERtdYy_49S_blc6vNDjGkAn3Sihdoyj

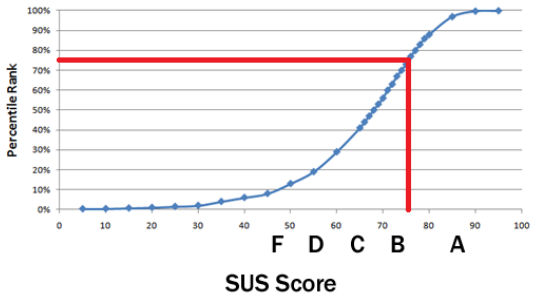
RBB9: only tested very shortly on the HMD

[14] Sauro, J. (2011). Measuring usability with the System Usability Scale (SUS). Retrieved from http://www.measuringu.com/sus.php

b) SUS + Open questions – Tablet

SUS statements	1	2	3	4	5
1. I think that I would like to use this system frequently	2		1	3	6
2. I found the system unnecessarily complex	7	3	1		1
3. I thought the system was easy to use	2		1	2	7
4. I think that I would need the support of a technical person to be able to use this system	6	1	1		4
5. I found the various functions in this system were well integrated	1		1	3	7
6. I thought there was too much inconsistency in this system	6	1	2	1	2
7. I would imagine that most people would learn to use this system very quickly	2				10
8. I found the system very cumbersome to use	10				2
9. I felt very confident using the system	3			1	8
10. I needed to learn a lot of things before I could get going with this system	8	1	1		2

The SUS average score is **75.4** (**above average**, 68 or more is considered above average). The graph below shows how the SUS scores associate with the percentile ranks and letter grades[15] and the red line specifies where the ImAc Player - Tablet is at this moment.



[15] Sauro, J. (2011). Measuring usability with the System Usability Scale (SUS). Retrieved from http://www.measuringu.com/sus.php

The letter grade is B, and our score corresponds to the percentile rank: 74%.

The Excel spreadsheet with scores calculations can be consulted here: https://drive.google.com/open?id=1CoTevKBJ4MMbB5RsRiUdwit7qMZKSPZy

11.	Did you use the setting “Indicator”?	10 Yes 2 No
12.	What was the function of “Indicator”?	RBB1: Arrow was clear, the others weren’t so clear. After trying the options, the function was clear, the arrow was very important (NB: it turned out later that the user had not understood what the indicators were meant for) RBB2: The term itself is not clear, but it gets clear with trying RBB3: I did not understand the term, should be translated to Easy to Read. After trying, I understood the function of the radar. RBB4: At first it was not clear, when trying the radar I understood the function. The second time (HMD) it was immediately clear. RBB5: At first it was not clear what the indicator means. After trying I understood that it guides to the speaker. RBB6: At first, I didn’t understand what indicator means. This functionality seems to be superfluous even after trying it out. RBB7: It was not clear what the indicator means. The term itself doesn’t explain the functionality. RBB8: It was not clear what the indicator means and only by selecting the different options I had an idea about the functionality. RBB9: It was not clear. If I had selected the option, I might have understood but I did not want to try it out because the device was not mine. With my own device I would have tried. RBB10: I did not understand. RBB11: It shows where the speaker is, but that was only clear after trying. A better word might be “Anzeiger”/”Hinweiser” (NB: these German words basically mean “indicator”) RBB12: The term was not clear, only after trying it was clear that it is a function to lead to the speaker
13.	Did you use the setting “Area”?	11 Yes 1 No
14.	What was the function of “Area”?	RBB1: The function becomes clear by trying it out, only the word “area” does not make the function clear (NB: it seems that the user thinks she just changed the size of the ST with this function) RBB2: The term itself makes me think it refers to the position of the subtitle. When trying it out, it becomes clear. (NB: it seems that the user thinks she just changed

		the size of the ST with this function) RBB3: I did not understand it. (NB: the option was used unconsciously.) RBB4: I did not really understand it. The font went smaller and went up a bit. “Area” refers to right/left top/bottom for me. RBB5: I don’t know. RBB6: I did not really understand it. (NB: User tested the different settings.) I recognized a difference in the ST but I still didn’t know what the benefit of this setting. RBB7: I did not really understand it. It could be the area to show the subtitles together with the background. RBB8: Change of size of the subtitles RBB9: I didn’t know what it means. I thought it might be access to different content but I didn’t think it had anything to do with subtitles. RBB10: I didn’t understand but I just tried, then the size of the ST changed. RBB11: Not really RBB12: It wasn’t clear, even after trying.

15. Which other subtitle personalisation options did you use?

RBB1: Size, Area, Language, Easy to read, Position, Loudness, Play/Pause. (NB: In the HMD, the user did not find the on/off button to switch on the subtitles and needed help by the facilitator. The user asked how she could close the menu, only managed after help by the facilitator. On the tablet, the user did not find on/off button, even though the tablet was tested after the HMD. The user did not notice the function “Background” among the many options)

RBB2: Size, Area, Language, Position, Loudness, Play/Pause

RBB3: Loudness, Play/Pause, Size, Position, Background, Language, Sign Language (NB: The user did not find the on/off button on the HMD (tested first) and needed help by the facilitator. The user switched on the signer because the function was there.)

RBB4: All other functions.

RBB5: Loudness, Play/Pause, indicator, size, background, position (preferred the subtitle bottom) (NB: the user did not find the on/off button to switch on the subtitles and needed help by the facilitator and additionally switched on the sign language service)

RBB6: pause / play video, open subtitle menu (NB: User need help to find the on/off button), size, position, background, indicator, area (is the same as size: small and large), language

RBB7: The user tried every option, but not all functionalities were clear only the ones which are familiar from the TV subtitle service. (NB: Tester needed help to activate the subtitles)

RBB8: activate subtitles, position, background, size, indicator, area, play/pause video, (NB: HMD: The tester opened the menu without difficulties but didn’t see the menu the menu bar immediately and tried again to open the menu by moving down the head)

RBB9: pause / play video, loudness, size, background, area language – only selected the categories but didn’t try the different options (NB: Tester needed help to activate the subtitles)

RBB10: Play/pause, loudness, position (NB: Tester needed help to activate the subtitles; HMD: The tester opened the menu without difficulties but didn't see the menu the menu bar immediately and tried again to open the menu by moving down the head)

RBB11: All options were used.

RBB12: All functions were used (NB: Tester needed help to activate the subtitles)

6. What did you like most about the ImAc Player?
RBB1: Controller worked very well, the menu was easy, a lot of setting options
RBB2: I liked the subtitles and the look of the player. The subtitles moved with me when I moved my head (HMD).
RBB3: That I could switch on subtitles and change their position.
RBB4: That there are so many personalisation options.
RBB5: That there are so many options to customize the subtitles (size, background, language).
RBB6: All the settings are shown in only one level of the menu – very clear.
RBB7: That there are so many options to customize the subtitles. I liked the word by word translations and the small and compact area in which the subtitles are presented.
RBB8: Subtitles always follow the head movement, the experience was amazing, I liked the subtitle background and size, and terms were clear in the menu
RBB9: I liked the subtitles, but I didn't see them clearly (NB: sight problems, tester saw 2 subtitles)
RBB10: I liked the subtitles.
RBB11: All the significant customization options are available. There is a speaker indicator.
RBB12: It's a normal menu just like I know them.

17. What did you like less about the ImAc Player?
RBB1: Nothing negative, all the necessary functions were there (HMD). Menu cannot be zoomed; on/off button: it was not clear if the button has to be pressed or it is a sliding button (tablet).
RBB2: 360° video was rather unfamiliar
RBB3: The audio functions (tester is deaf).
RBB4: The opened menu did not go away once a function was selected. Therefore the menu obscured the subtitles and the video. Maybe it could close automatically but then again this might also have disadvantages, e.g. someone wants to select more personalisation options.
RBB5: Tablet: It was difficult to switch on / off the subtitles. HMD: It was cumbersome to close the accessibility menu. Both devices: In general is the menu too small. The term "Zeichensprache" is wrong; it should be "Gebärdensprache".
RBB6: The subtitles should be fixed to the field of view, especially horizontally. Subtitles should be activated as soon as I select an option in the subtitle menu, e.g. language. I didn't recognize the on/off button.
RBB7: HMD: I didn't like that the subtitles followed my head movement. Tablet: The menu was too small and it was cumbersome to select an option.
RBB8: The content wasn't very suitable for deaf people.
RBB9: Nothing
RBB10: Nothing

RBB11: Nothing
RBB12: On/off button was difficult to find.

18. What do you think could be improved, and how?
RBB1: Better feedback for on/off button, button should be similar to “sliding button” as in iPhone
RBB2: Quality of the video was not very good (HMD). I could not detect the menu after opening it, it was too much integrated into the video (HMD).
RBB3: The tablet was good. In the HMD the signer and the subtitles were too wide apart, they should be wider apart if they are used together.
RBB4: Personalise the colours of the subtitles.
RBB5: Switch on/off subtitles by selecting the abbreviation “UT”. Zooming functionality for menu or customize size in the settings. HMD: Close accessibility submenu by “clicking” outside the menu.
RBB6: See question 17. Indicator and area are not a good choice to describe the functionality behind it.
RBB7: It should be customizable if the subtitles are a one-to-one translation or an easy to read version. I would like to have simultaneous subtitles to the spoken word. (NB: She mentioned that the subtitles were too fast in the first video clip and thus maybe had the feeling that the provided subtitles were one-to-one translation of the spoken word without any simplification as it is done in the TV service)
RBB8: Display both subtitles and sign language, different fonts, add genre of music, better description of music or sound in subtitles (e.g. vibration for sounds or music)
RBB9: Nothing
RBB10: Nothing.
RBB11: The menu does not open at the same position as the blue loading circle – this was inconvenient. The contrast of grey/white was not ideal. It should be possible to move the radar by drag/drop to move it away from the video image.
RBB12: The on/off button should be on the right side of “Subtitles” not on the left.

19. Did you miss any options? If yes, can you tell us which?
RBB1: Zooming function, Menu should be bigger, was difficult to see, difficult to select with finger (tablet).
RBB2: No.
RBB3: No, I was surprised by the amount of options.
RBB4: Personalise the colours of the subtitles.
RBB5: No
RBB6: See question 18.
RBB7: Visualisation of music, e.g. spectrum, especially for concerts
RBB8: Display both subtitles and sign language interpreter
RBB9: Subtitles should already be activate by default when video is playing
RBB10: No.

RBB11: Changing the colours of the ST or at least deselect certain colours in case a user has a visual impairment for certain colours. Also the colour of the menu itself should be customizable.
RBB12: No.

20. Other comments:
RBB1: No.
RBB2: The HMD is not so comfortable.
RBB3: Well done.
RBB4: No.
RBB5: User asked if it is possible to connect the hearing aid with the VR glasses as it is uncomfortable to wear headphones with a hearing aid.
RBB6: No
RBB7: No
RBB8: Enhance the experience for music and sounds with vibrations
RBB9: No
RBB10: No
RBB11: No
RBB12: No

4. PART 2 – Task 3

a) IPQ – Arrow (I Philip)

Results from only 10 users could be gathered, as one user (RBB 10) felt uncomfortable using HMD and in one test (RBB11) there were technical problems.

IPQ Question	1	2	3	4	5	6	7
In the computer generated world I had a sense of "being there".	1	1	1			1	6
Somehow I felt that the virtual world surrounded me.	2						8
I felt like I was just perceiving pictures.	8						2
I did not feel present in the virtual space.	3	1		2			4
I had a sense of acting in the virtual space, rather than operating something from outside.	4	1		1		3	1

IPQ Question	1	2	3	4	5	6	7
I felt present in the virtual space.		2				2	6
How aware were you of the real world surrounding while navigating in the virtual world? (i.e. sounds, room temperature, other people, etc.)?	6	1	2				1
I was not aware of my real environment.	6	2			1		1
I still paid attention to the real environment.	2	3		1		1	3
I was completely captivated by the virtual world.	1			1	1	1	6
How real did the virtual world seem to you?	6	2			1		1
How much did your experience in the virtual environment seem consistent with your real world experience?	1	1		3	1	2	2
How real did the virtual world seem to you?	4	1	1	1	1		2
The virtual world seemed more realistic than the real world.	6			2	1		1

b) IPQ – Radar (I Philip)

Results from only 10 users could be gathered, as one user (RBB 10) felt uncomfortable using HMD and in one test (RBB11) there were technical problems.

IPQ Question	1	2	3	4	5	6	7
In the computer generated world I had a sense of "being there".	1				1	2	6
Somehow I felt that the virtual world surrounded me.		1		1		2	6

I felt like I was just perceiving pictures.	6	1		1			2
I did not feel present in the virtual space.	5	1	1	1			2
I had a sense of acting in the virtual space, rather than operating something from outside.	1			2		1	6
I felt present in the virtual space.		1		2		2	5
How aware were you of the real world surrounding while navigating in the virtual world? (i.e. sounds, room temperature, other people, etc.)?	7	2					1
I was not aware of my real environment.	6	1				1	2
I still paid attention to the real environment.	2	1		1		1	5
I was completely captivated by the virtual world.	2				2	2	4
How real did the virtual world seem to you?	3	1	3				3
How much did your experience in the virtual environment seem consistent with your real world experience ?	2			1	1	4	2
How real did the virtual world seem to you?	6			1			3
The virtual world seemed more realistic than the real world.	5			1	1	1	2

Median table for IPQ questionnaire results, where SP = Spatial presence, INV = Involvement, and REAL = Experienced Realism.

Language	Symbol	SP	INV	REAL
German	Arrow	4.70	3.37	3.62
	Radar	5.30	2.62	3.87

Comparison of Arrow vs Radar in German users per Scale

Test: Related Samples Wilcoxon Signed Rank test

SP = Spatial Presence.

A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Spatial Presence scale are not statistically different (Z=21, p=.858)

INV = Involvement

A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Involvement scale are not statistically different (Z=3.5, p=.276)

REAL = Experienced Realism

A Wilcoxon Signed-Ranks test indicated that the ranks of Arrow and Radar for Experienced Realism scale are not statistically different (Z=12.5, p=.799)

SUMMARY: There is no significant difference in terms of presence between the arrow and the radar.

Comparison German vs Catalan users per scale and symbol

Test: Independent Samples Mann-Whitney U Test

The distribution of Arrow for Spatial Presence is the same across categories of Language (Mann–Whitney *U* =73.00; p= .648)

The distribution of Arrow for Involvement is different across categories of Language (German: 3,7; Catalan: 4). (Mann–Whitney *U* =102.00; p= .021)

The distribution of Arrow for Experienced Realism is the same across categories of Language (Mann–Whitney *U* =61.00; p= .832)

The distribution of Radar for Spatial Presence is the same across categories of Language (Mann–Whitney *U* =83.50; p= .257)

The distribution of Radar for Involvement is different across categories of Language (German: 2,62; Catalan: 4,75). (Mann–Whitney *U* =110.00; p= .004)

The distribution of Radar for Experienced Realism is the same across categories of Language (Mann–Whitney *U* =60,50; p= .784)

SUMMARY: There is a difference between the level of involvement between Catalan and German users, but not related to the variables arrow vs radar.

Preferences & Usability (arrow and radar).
Results from 11 participants were gathered, as one participant (RBB10) felt uncomfortable using the HMD. RBB11 input is based on the User interface test, as there were technical problems and could not watch "I Philipp".

1. When directions need to be indicated, what system do you prefer?

a) Arrow	b) Radar
8	3

2. Please, explain why you prefer the above indicated option.
RBB1: I am used to it and it is better. It might be important but the colour coding of the subtitles (including the introduction of who the speaker is) helps a lot already.
RBB2: The arrow points directly in the direction of the speaker
RBB3: The arrow was immediately clear (but the radar was good as well).
RBB4: Clear information
RBB5: The radar was immediately clear and it was possible to identify the position of the speaker very fast.
RBB6: The arrow is concise and didn't distract. Very clear.
RBB7: The arrow was immediately clear and a good help to find the speaker.
RBB8: The arrow was clear and I immediately understood where the speaker is located.
RBB9: With the radar it was clearer where the speaker is (arrow was good as well).
RBB11: Radar is better for something like a panel discussion, a situation with many speakers (arrow is good as well).
RBB12: Radar is independent of the text, more modern, more intuitively comprehendible

3. Please explain why you did not choose the other option in question 1).
RBB1: It was new to me, visually rather disturbing
RBB2: It was visually disturbing, in the middle of the screen. The link between speaker and position wasn't very clear.
RBB3: It was visually disturbing, a bit too big and it distracted me. It was new and I had to get used to it.
RBB4: I had to orient myself first. Later I had an even better feeling for spatiality than with the arrow.
RBB5: The arrow was not precise enough at least when more than two speakers are there.
RBB6: The radar disturbs the view and is too complex. It distracts more than the arrow.
RBB7: The radar didn't exactly match the speaker position. The illustrated area was too wide. (NB: I think the concept of visualising the field of view was not understood by the tester and she mentioned that she was more aware of the different colours for the speakers.)
RBB8: The radar was not clear at the beginning. If I used it more often, I assume that I would get used to it and then it might be an alternative to the arrow.
RBB9: The arrow is better when there are many speakers (radar was good as well).
RBB11: The arrow is better for few speakers, it is immediately clear.
RBB12: The arrow was very close to the text.

4. What do you think could be improved, and how?
RBB1: I was not aware that I was the person that is speaking (I, Philip).
RBB2: No
RBB3: The arrow should be there before a person starts speaking. Otherwise it is difficult to follow fast dialogues, even with the radar.
RBB4: With very fast dialogues it gets confusing to follow the speakers, even with the arrow. A larger field of view would be better (to overview more speakers at a time).
RBB5: Nothing

RBB6: It is confusing that the subtitles follow each head movement. Subtitles should only follow when turning the head and be fixed in the horizontal position.

RBB7: I didn't immediately understand that I was the person who is speaking. This should be added to the subtitles.
RBB8: The subtitles were too fast in the dialog between the journalists, the inventor and Philip so that I missed some content. It is possible to rewind the video but that is cumbersome with opening the menu and using rewind several times. It should be possible to choose between different answers and thus to change the plot.
RBB9: The colour should be displayed outside the radar
RBB11: It should be possible to move the radar by drag/drop to move it away from the video image. It would be nice to see the depth of a speaker in the radar, how far away in the room he is.
RBB12: Nothing

5. Would you implement another system to guide you to the user?
RBB1: No
RBB2: No, the arrow was ideal.
RBB3: No, this is all very new for me.
RBB4: Maybe adjusting the field of view to see more speakers at a time.
RBB5: No
RBB6: Perhaps the voices coming more from left or right depending on their position.
RBB7: No
RBB8: No
RBB9: No
RBB11: Just like in football games: an arrow above the speaker shows who is speaking.
RBB12: No

6. How easy was it to identify who was speaking on the clip with the arrow system?

1- very difficult	**2**	**3**	**4**	**5- very easy**
	2	3	3	3

7. How easy was it to identify who was speaking on the clip with the radar system?

1- very difficult	**2**	**3**	**4**	**5- very easy**
1	4	2	1	3

8. Do you think you will be able to enjoy 360º videos with these types of subtitles? Explain your answer.
RBB1: Yes, I like it a lot.
RBB2: Yes, not all the time but once in a while. It is nice to be pulled into the virtual world, "being there".
RBB3: Maybe once in a while, not regularly. I was totally "in there".
RBB4: Yes, because it is something new. One feels "inside", really being there.
RBB5: Yes, because it was an amazing experience.
RBB6: Yes, because it reflects reality more intensely than a two-dimensional image. It depends on what is shown (crime thriller rather not, I want to have the distance there). Nature or animal videos would be nice. Music concert, so that one sits in the auditorium.
RBB7: It was very exhausting to consume subtitles in 360° content and thus I couldn't enjoy the experience. Maybe other content is more interesting, e.g. documentaries.
RBB8: Yes, because I'm interested in it and I could follow the content with the subtitles.
RBB9: No, the HMD is very uncomfortable together with my glasses and it is too heavy so that my neck hurts. Maybe if the device was lighter.
RBB11: Yes, when I am alone I can enjoy that and immerse into the content.
RBB12: Not in this video quality and the weight of the HMD disturbs a lot. This prevents me from immersing into the video.

5. Conclusions

Observations by facilitator and assistant: We recognized that the usage of the HMD was uncomfortable for users wearing glasses, cochlear implants or hearing aids. The users wearing the last two devices asked explicitly if it is possible to stream the audio directly to their device. The consequence was that the users either tried to use the headphones and their hearing aids together or just take off the hearing aids. The same applied for the glasses. Additionally, some users mentioned that the HMD is too heavy and it is not comfortable to wear it longer.

All users didn't use 360° content in a HMD before the test and were mainly amazed by the experience. They mentioned that they would like to see documentaries or concerts. The low video quality in comparison to standard resolution of TV content together with the weight and fit of the device were another reason why the user would not use a HMD on a regular basis. We could see that the users were partially part of the story and reacts with body movement if something comes nearer or in conversation with "I, Philip" a tester shakes his head for no.

Although all testers didn't use a HMD before was it easy for them to learn the usage of the controller to select an option in the menu and the large number of personalisation options was positively evaluated. The specific options like indicator and area for the usage in a HMD were not clear immediately. The testers got an idea about the functionalities once they tried them. We assume that this is part of a learning procedure and we should maybe revise the current wording. The main problem for all users was to locate the on/off button and to find the menu

once it was opened as it was not in all cases in the field of view or the contrast was not high enough.

The usage on the tablet was mainly difficult because the size of the menu was too small and we propose to use the enhanced accessibility menu for tablets and smartphones to avoid this problem. Please find all details below.

a) User interface

Tasks: Almost all the testers completed the tasks of the UI test without problems. However, 8 users had great difficulties in finding the on/off button for the subtitles and needed help with this task. It thus seems to be necessary to change the position of the on/off button in the accessibility interface.
Indicator/area: Most of the users tried out all the ST settings, including "indicator" and "area". Both of these terms were not clear for the users, but at least the indicator was understood by most of them after trying. The area setting was not understood by any user because most of them only recognized the change in font size. We therefore conclude that the wording for these functions should be revised and we doubt the benefit of the area function.
Positive feedback: What the testers liked most about the player were the amount of personalisation settings and the clear design of the menu.
Negative feedback: Two users did not like the subtitles following their head movements (especially when tilting the head but also when turning the head) and two users found in difficult to find the menu in the HMD after opening it. Furthermore, it bothered many users that they did not find the on/off button and that the menu was very small on the tablet, which made it very difficult to select the options. Instead of adding a zooming function (as suggested by one user), we conclude that it might be necessary to show the enhanced accessibility interface in tablets by default.
Improvements: One user suggested that the ST-submenu is closed by clicking somewhere outside the menu in the HMD (NB: this is already the case in the tablet mode). One user asked for a better (or adjustable) contrast in the menu (not white/grey).
Missing functionalities: Two users would like to be able to customize the ST colour (e.g. for visual impairments regarding certain colours). Two users wanted to display subtitles and signer at the same time. One user had the idea to drag/drop the radar to a different position if it obscured an important area of the video. One user asked for a better "translation" of sound and music, e.g. with vibrations or visualizations such as spectra.

b) Presentation modes

Arrow vs. radar: The majority of the users preferred the arrow because it was immediately clear and easy to understand. Those few users who preferred the radar liked it because it gave them a good overview and found it especially suitable for many speakers at the same time.
The majority of the testers did not like the radar because it was not intuitive and visually disturbing.

No differences in terms of presence have been reported, according to IPQ results.

Improvements: Two users asked for a better way to understand that an off-voice is speaking. A few testers found it difficult to follow fast conversations and suggested that either the arrow is displayed before a person starts speaking or that the field of view can be enlarged in order to have a better overview. One user asked for a drag/drop function for the radar to move it away in case it obscures the video. One user had the idea to also display the depth of speakers in the radar (at least relative to each other).

Other ideas: There were two ideas for other guiding mechanisms: indicating the speaker position via audio (3D audio) or showing an arrow above the speakers (similar to football analysis videos).

Enjoyment: Most users thought they could enjoy 360° videos with subtitles but not too often and depending on the content. A few users found the HMD uncomfortable or not technically satisfying.

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