Deliverable

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D4.3 – Sign Language Editor

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Authors: Enric Torres Feixas & Kimiasadat Mirehbar (Anglatècnic)

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Dissemination Level		
P	Public	X
C	Confidential, only for members of the consortium and the Commission Services	

Abstract:

This document is meant to address the concepts, progress made during the project in its second iteration, vital relevant information, installation and access guide and a user manual, all related to ImAc Sign Language Editor.

Revision history

Revision	Date	Author	Organisation	Description
0.1	30-10-2018	Kimiasadat Mirehbar	ANGLA	Template and ToC
0.2	19-11-2018	Kimiasadat Mirehbar Enric Torres	ANGLA	First version
0.3	22-11-2018	Chris Hughes	USAL	Reviewed by USAL
1.0	23-11-2018	Kimiasadat Mirehbar Enric Torres	ANGLA	Final version – First iteration
2.0	19-08-2019	Kimiasadat Mirehbar	ANGLA	Template and ToC – Second iteration
2.1	25-09-2019	Kimiasadat Mirehbar Enric Torres	ANGLA	Final version – Second iteration
2.2	30-09-2019	Kimiasadat Mirehbar Enric Torres	ANGLA	USAL comments

Executive summary

This document is meant to be a comprehensive guide through the professional tools that are dedicated to production and edition of Sign Language access services for 360° videos in an interactive and user-friendly manner destined to professional users.

Professional users are defined as broadcasters and certified sign interpreters who can be either external entities or freelancers contracted by the broadcaster or an access service provision department at broadcasters facilities and this tool helps them edit sign language files for immersive media type.

The deliverable mainly reports the progress made in T4.3 (Sign language editor) of ImAc up to the date of submission and addresses issues such as structure, workflow, user manual and related activities in ImAc workframe.

CONTRIBUTORS

First Name	Last Name	Company	e-Mail
Enric	Torres Feixas	ANGLA	enric@anglatecnic.com
Kimiasadat	Mirehbar	ANGLA	kimia@anglatecnic.com
Àlex	Soler de Ferrater	ANGLA	alex@anglatecnic.com

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ILLUSTRATIONS AND TABLES

Acronym	Description
ACM	Accessibility Content Manager
AD	Audio Description
AST	Audio Subtitles
D	Deliverable
FoV	Field of View
HQ	High Quality
LQ	Low Quality
SL	Sign Language
SSH	Secure Shell
ST	Subtitles
T	Task
TC	Time Code
URL	Uniform Resource Locator
WP	Work Package

1. Introduction

1.1. Purpose of this document

This deliverable presents a comprehensive description of the ImAc Web SL Editor developed under the framework of T4.3 “Sign Language editor” of the ImAc project, which is aimed to edition/production of SL files for 360º videos. In D4.1[i] and D4.2[ii], Web ST Editor and Web AD Editor are developed and discussed respectively. This deliverable is the last access service editor that has been developed under ImAc framework and is specifically aimed to “professional users” who are certified to perform sign language interpretation.

1.2. Scope of this document

This deliverable (D4.3) is a software tool that allows production/edition of sign language files for 360º videos. This document has an accompanying role to this software and aims to shed a light on this software main characteristics, behaviour and functionalities.

1.3. Status of this document and structure

This document is the second and last version of this deliverable which presents the second and last iteration developments on this issue and it is foreseen to be published in M24. The delivery date is on-time.

The first version of this document was submitted in November 2018 with the progress made in Web SL Editor (T4.3) in the first iteration.

Moreover in this report, during first chapter, an introduction is presented. The introduction is followed by a presentation of a brief description in chapter 2. The next chapter is a guide explaining the installation process and user access to Web SL Editor followed by chapter 4 with a detailed user manual for professional users.

1.4. Relation with other ImAc works

Illustration 1 demonstrates the interconnection between various tasks of ImAc. T4.3 is influenced from its own ancestors and it feeds the future tasks in WP5.

As stated, T4.3 evolves around development of an online editor of sign language for 360º videos. This editor is required to fulfill the user requirements in T2.2 and be compatible to platform specifications in T3.2.

Also, the editor is examined in ImAc pre-scheduled pilots with results presented in WP5.

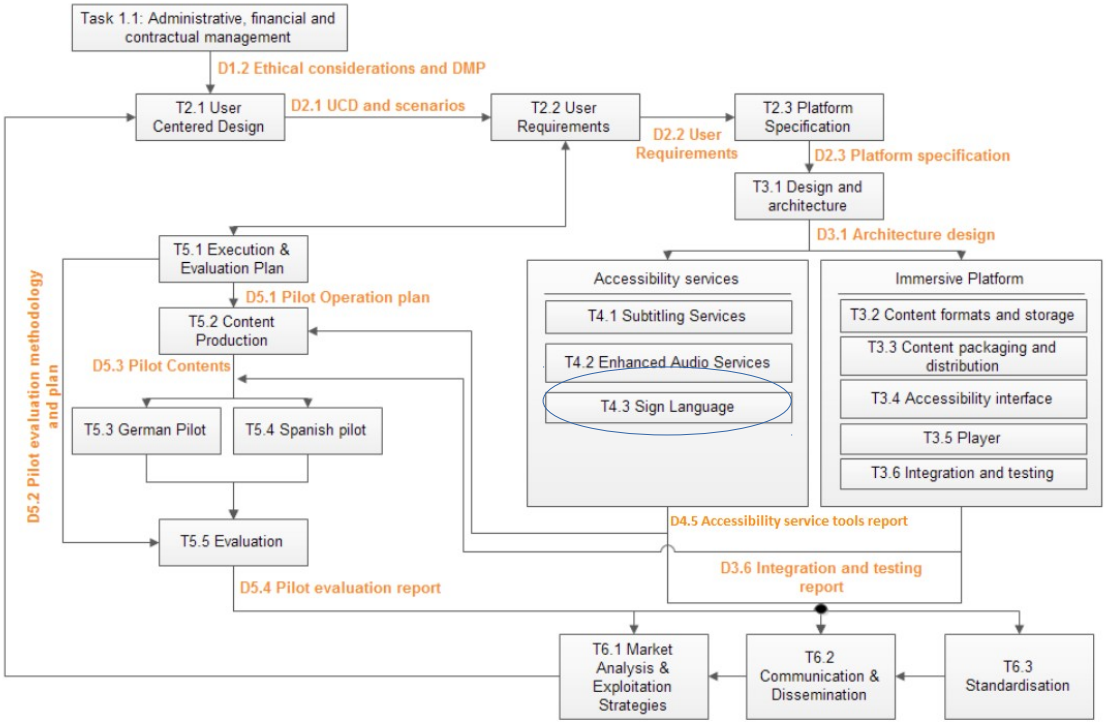


Illustration 1: Dependencies between tasks and deliverables of ImAc

2. Component description and primary concepts

In chapter 2, the primary structure and theories are discussed. The role of the tool in the project workflow and the observations on how the tool has improved from first until second iteration are the essential points of this chapter.

2.1. Structure

It is necessary to recognize the localization of this editor on larger scales. Illustration 2, displays one of the important concepts of the project which is a cloud-based platform for inter-connection of professional users with aims to management/production/edition/transmission of access services for immersive content which offers: **security**, **API management**, **user settings**, **interconnection**, **user dashboard** and **communication protocols**. The role of this editor is for professional users to produce and edit sign language content in the production/edition phase of the platform (marked in orange in illustration 2).

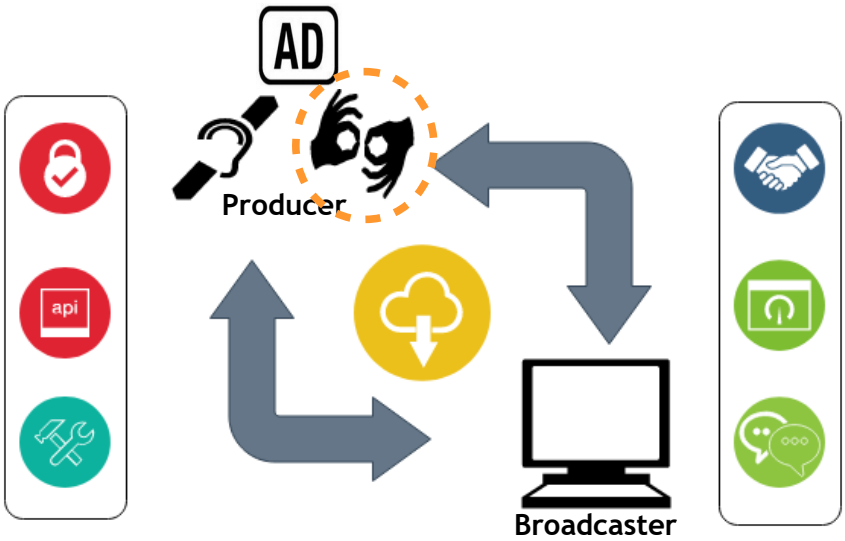


Illustration 2: Parties relation & characteristics

Also, on a smaller scale of working and on software level, an ACM (accessibility content manager)[iii] is developed in T3.2 which grants access to professional users directly to the editors in a cloud-based environment with this name (ACM). This ACM has a section named “ED” that stands for Editor interface which is a direct access to three ImAc professional editors (ST, AD and SL editors). It is recommended to study D3.2 carefully in order to comprehend the relation between elements of ACM.

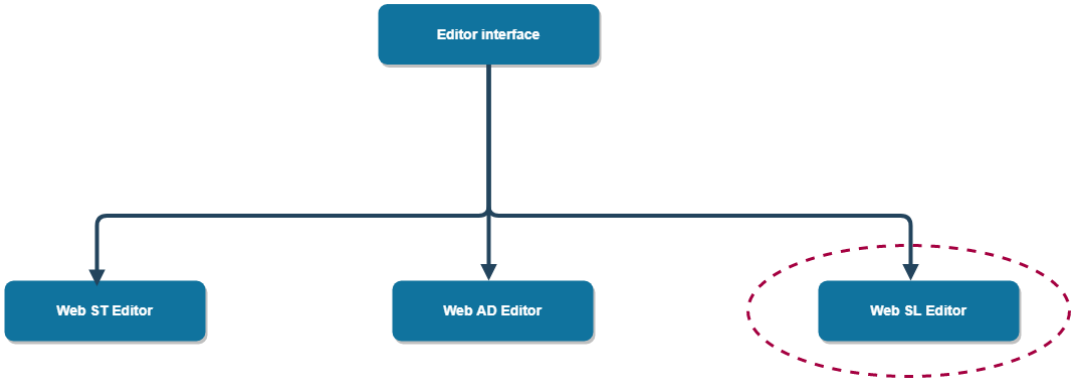
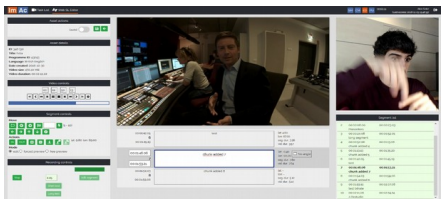
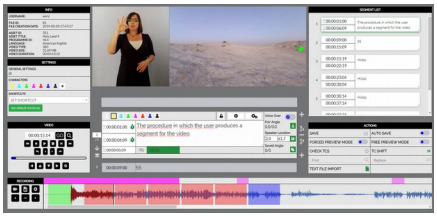


Illustration 3: Editor access

2.2. Work done in second iteration

As stated, this version describes the Web SL Editor in the second iteration. To show the progress made in the recent months table 1 has been plotted. This table does not reflect the editors full features but only the characteristics that have been added since after first iteration. The editors full requirements and their implementation status is found in D4.5[iv].

First iteration vs. Second iteration		
Characteristics		
User-friendly environment	No	Yes
Shortcuts for essential operations	No	Yes
Videos alignment options	No	Yes
Sound-wave in time	No	Yes
Prototype vs. Exploitation	Prototype	Exploitation
Users Personalised	No	Yes

First iteration vs. Second iteration		
settings		
Visualised recording configuration	No	Yes
Deaf professional user consideration	No	Yes
Time codes debugger messages	No	Yes
Character definition	No	Yes

Table 1: Iterations comparison

3. How to

3.1. Introduction

This chapter describes the ImAc Web SL Editor software installation process and the user access to it. The source code is not publicly available and the server is protected via username and password, however the access to the code is open to EC reviewers and consortium members. Chapter 3.2 describes how it is possible to access the code (the info of the **** fields in chapter 3.2 will be revealed separately).

3.2. How to install SL Web Editor source code

- **System requirements**

  OS: Linux Debian 9

  Processor: 2-core

  RAM: 8 GB

  Disk space: 2 TG (at the moment of document submission)

- **Access**

  In order to install the ImAc ACM, the user needs to access the server via SSH (console)

  - **Server**: ****
  - **User & pass:** ****

- **Installation**

  In order to start packages installation, it is required to install a Linux Debian 9 OS. A "Root" user with full access is essential for installing and setting procedure which comes next in this chapter.

- **Packages**

  Packages are installed into the server in order to have all the tools and programs to run it:

```
apt-get update

apt-get install vim screen rsync ntp less man net-tools apache2 php php7.0-mysql php7.0-curl php7.0-gettext php7.0-mbstring php7.0-xml openssl mysql-server

php7.0-odbc curl apt-transport-https php7.0-sybase freetds-common libsybdb5 exim4
```

These commands install the main tools for the system:

- Apache Web Server
- MySQL Database (MariaDB)
- PHP 7.0 engine
- System Tools

Each package has to be configured accordingly.

Note: the user will use “Vim” editor to edit each file.

- **Apache**

  The user needs to configure the project, its locations and parameters:

```
vim /etc/apache2/sites-available/acm_deliverable.conf
```

```
Alias /acm_deliverable/ /var/www/content_manager_deliverable/html/

<Location /acm_deliverable/>
  order deny,allow
  deny from all
  allow from *SERVER IP*
  allow from *SERVER IP*
  allow from all
  Options Indexes FollowSymLinks MultiViews
  php_flag magic_quotes_gpc Off
  php_flag short_open_tag Off
  php_flag register_globals Off
  php_value upload_max_filesize 5G
  php_value post_max_size 5G
  php_value memory_limit 2G
  php_value max_execution_time 600
  php_value max_input_time 60
  php_value max_file_uploads 50
  AddDefaultCharset UTF-8
  php_value session.gc_maxlifetime 14400
  ErrorDocument 404 /acm_deliverable/404_not_found.php
</Location>
```

```
vim /etc/apache2/sites-available/editor_deliverable.conf
```

```
Alias /editor_deliverable/ /var/www/content_manager_deliverable/html/ed/
```

```
<Location /editor_deliverable/>
  order deny,allow
  deny from all
  allow from *SERVER IP*
  allow from *SERVER IP*
  allow from all
  Options Indexes FollowSymLinks MultiViews
  php_flag magic_quotes_gpc Off
  php_flag short_open_tag Off
  php_flag register_globals Off
  php_value upload_max_filesize 5G
  php_value post_max_size 5G
  php_value memory_limit 2G
  php_value max_execution_time 600
  php_value max_input_time 60
  php_value max_file_uploads 50
  AddDefaultCharset UTF-8
  php_value session.gc_maxlifetime 14400
  ErrorDocument 404 /editor_deliverable/404_not_found.php
</Location>
```

Now the user has to reload the Apache Web Server in order to apply this configuration.

```
a2ensite acm
a2ensite editor
service apache2 reload
```

- **PHP**

  This modification disables some logs from the Apache server log trace:

```
vim /etc/php/7.0/apache2/php.ini
```

```
error_reporting = E_ALL & ~E_DEPRECATED & ~E_STRICT & ~E_NOTICE
```

- **CODE**

  A zipped file will be provided for the installation:

```
content_manager_r20.tgz
```

The user is required to navigate to the web server code folder:

```
cd /var/www/
sudo mkdir content_manager_deliverable
sudo chown www-data:www-data content_manager_deliverable
sudo chmod 775 content_manager_deliverable
```

```
cd content_manager_deliverable
```

Unzip the code file:

```
tar xvfz content_manager_rXX.tgz
```

The user needs to configure the path in the following file

```
vim html/includes.inc.php
```

```
<?php
require_once("/var/www/content_manager_deliverable/includes/connection.inc.
php");?>
```

The user needs to configure paths and database parameters in the following file:

```
vim includes/config-local.inc.php
```

```
//PATHS
define("PATH_ROOT","/var/www/content_manager_deliverable");
//ROOT
define("ROOT_PAGES","/acm_deliverable");
define("ROOT_PAGES_ED","/editor_deliverable");
//BBDD
$bbdd_usuari='imac';
$bbdd_pwd='****';
$bbdd_servidor='localhost';
$bbdd_bbdd='content_manager_deliverable';
$bbdd_driver='mysqli';
```

- **MYSQL**

This is a MariaDB 10.1.26. the user "imac" is added to import the database:

```
mysql -u root -p
```

```
GRANT ALL PRIVILEGES ON *.* To 'imac'@'%' IDENTIFIED BY 'PASSWORD';
FLUSH PRIVILEGES;
exit;
```

Note: 'PASSWORD' to be changed to the correct value. The user many ask the administrator about the issue.

```
cd /var/www/content_manager/bbdd

mysql -u imac -p content_manager < content_manager_r20.sql
```

It is required to enter the password in order to import.

- **Crontab**

  This file configures the Linux Task Manager to execute periodically some scripts:

```
vim /etc/crontab
```

```
#CONTENT_MANAGER
* *  * * *   root /var/www/content_manager/scripts/generate_transcoding.php
0 0    * * *   root /var/www/content_manager/scripts/clean_transcodings.php
```

The periodically executed scripts include two scripts: one for generation of trancoding process and the other one belonging to cleaning transcodings. More information on transcoding process is available in D3.2.

3.3. How to access the Web SL Editor interface

Login information

Once everything is installed and set, the user should be able to access the web interfaces normally. To access the current installed version of the tool:

1. Open the preferred browser (Chrome and Firefox latest versions).
2. Introduce the URL provided by ACM administrator:

   https://imac.gpac-licensing.com/editor/

3. A login page will appear as shown in illustration 4:
4. Enter username and password provided by ACM administrators:

Illustration 4: Editor login page

System requirements for professional use

Before starting it is important to be sure that the system requirements are met:

- **Hardware:** PC with at least i5 processor, 8 GB RAM with a good graphics card (with hardware accelerated h264 codec and it is also recommended for VP8 codec).
- **Video recording setup:** Good quality webcam (we recommend HD webcam), microphone and headphones.
- **Web browser:** Last version of Chrome or Firefox (at least Chrome version 74 or Firefox version 65).
- **Screen resolution:** At least 1920×1080 pixels and in the case of using this resolution make sure that "Size of text, apps and other items" is not scaled to 125% or more. In any case, the user can always click Ctrl+"mouse wheel down" to zoom out in order to get the right layout where all buttons in the edition area are shown (see Illustration 5 where the edition area is circled in red).

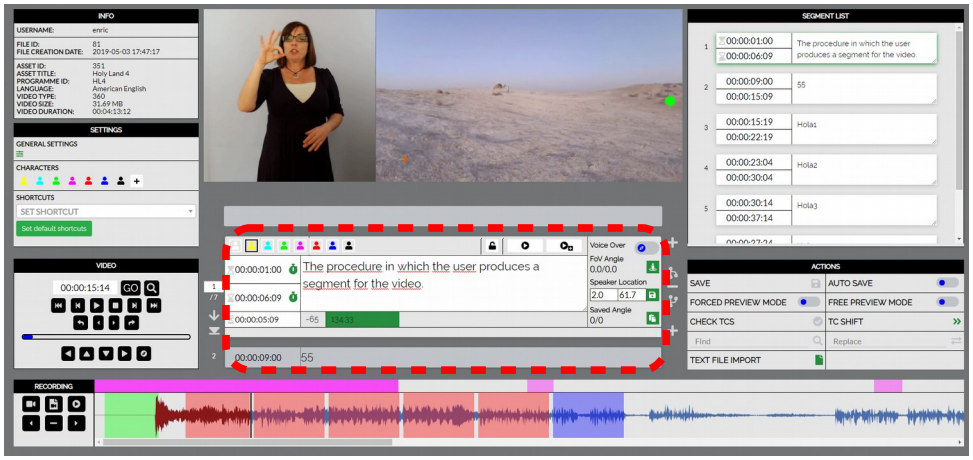


Illustration 5: Web SL Editor layout

- Good internet connection (we recommend at least 10 Mbps for both upload and download) as the editors and the videos used during the sign production are online.
- Although the video is provided to the sign language producers it is important to notice that the provided video must be an HTML5 compatible Low Quality video to assure that the 360º web player runs smoothly.

Also it is important to be aware of the following:

- The web editors are online tools, so after opening them some features may take some time before they are available such as the waveform and some data in the info box.

4. USER MANUAL

4.1. Login

User accesses the Editor Interface of ACM via the web browser (illustration 4) and enters username and password previously provided by administrator.

4.2. Navigation on main page

When entered, a window with the list of assigned production tasks (sign language tasks for the purpose of this document) to the user with their corresponding videos appears (Table 2). Then the user can make use of the following tools:

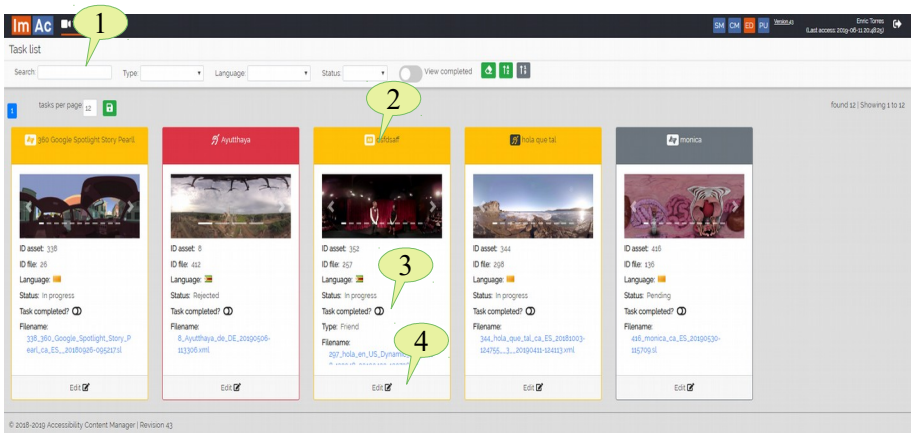
Navigation elements on the Editor interface	
	
Search bar (1)	With this tool, the user can search through their assigned production tasks and view them alphabetically, including completed tasks or not, etc.
Task icon (2)	These icons show the type of production task we are dealing with: it can be either a subtitle, a sign language or an audio description task. For the purpose of this document we will only focus on the sign language tasks. The colour of the row shows the status of the task ("Pending": in grey, "In progress": in yellow, "Completed": in blue, "Rejected": in red, and "verified": in green).
Task status (3)	The user can view the current status of the work and only can change it to "Completed" when the task is done.
Edit icon (4)	By clicking on this button in the sign language task card (for the purpose of this document) the Web SL Editor will be run with the video file and the sign language file for the SL production. The same applies with the other access service tasks however with the corresponding editor.

Table 2: Navigation elements on the Editing interface

User selects the sign language task, presses the “Edit” button and the Web SL Editor will open in a new window.

4.3. Web SL Editor

Illustration 6 displays the two main areas of the editor. The upper area (INFO, SETTINGS, VIDEO PREVIEW, SEGMENT LIST) is only designed for viewing, setting and verification purposes. The down area (VIDEO CONTROLS, EDITION AREA, ACTIONS, RECORDING and SOUND-WAVE) is purely for edition.

The editor is responsive, so users may wish to set the browser zoom adequately (Ctrl+mouse wheel up or Ctrl+mouse wheel down) to fit all the boxes adequately in the screen.

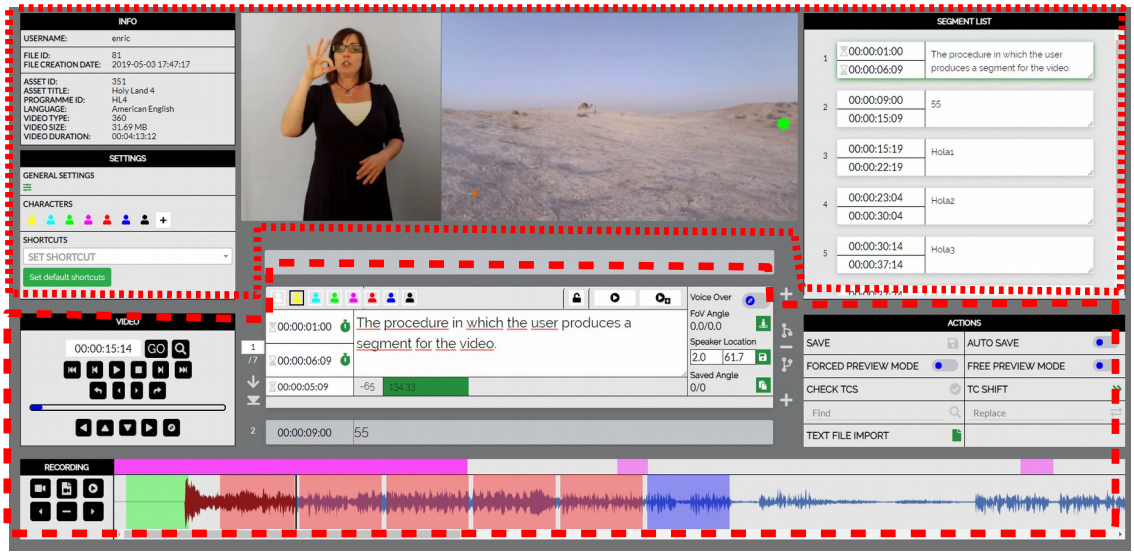
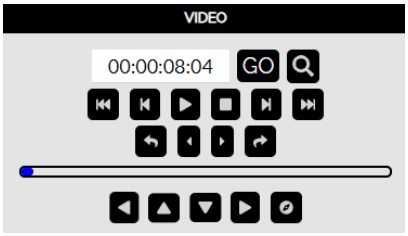


Illustration 6: Web SL Editor main areas

It is assumed that now user is inside the Web SL Editor. In this editor the user deals with two videos (original video to be sign interpreted and the second video to be recorded by the signer). In this document the first video is referred to as “Main video” and the second one is referred to as “SL video” (see Glossary).

The user first tools are the video controls. Table 3 demonstrates all the buttons with their functionality. With these buttons the user navigates through the video, move the video FoV (Field of View) and jump to the video frame.

Video controls	
	
Frame backward	This button makes the video go backwards frame by frame (Alt+shift+left).
Fast backward	This button makes the video go backwards with a fast speed (F5).
Slow backward	This button makes the video go backwards with a slow speed (F6).
Toggle play/pause	This button plays and pauses the video (F2). **Note:** The F2 shortcut is used to Play and to Pause the video alternatively, nonetheless the F3 shortcut has also been added to Pause the video only.
Stop	This button makes the video stop and go to the beginning (F9).
Slow forward	This button makes the video go forward with a slow speed (F7).
Fast forward	This button makes the video go forward with a fast speed (F8).
Frame forward	This button makes the video go forward frame by frame (Alt+shift+right).
Find segment by TC	With this button, the user can find the segment that contains the TC (Ctrl+Shift+F).
Jump backward	This button helps the user to jump some frames backward. The number of the frames to be jumped is configurable in General Settings (see table 6) (F1).
Jump forward	This button helps the user to jump some frames forward. The number of the frames to be jumped is configurable in in General Settings (see table 6) (F4).
Move FoV left	With this button the user moves the Filed of View (FoV) to the left in the spherical video (Alt+left). Also it is possible to use the mouse and left button over the video, and move to the left to do the same. The angle of the FoV in the edition area is seen.

Video controls	
Move FoV up 	With this button the user moves the FoV up in the spherical video (Alt+up). The user can also use the mouse and left button over the video, and move up to do the same. User can see the angle of the FoV in the edition area.
Move FoV down 	With this button the user moves the FoV down in the spherical video (Alt+down). users can also use the mouse and left button over the video, and move to the bottom to do the same. The angle of the FoV in the edition area is seen.
Move FoV right 	With this button the user moves the FoV to the right in the spherical video (Alt+right). Users can also use the mouse and left button over the video, and move to the right to do the same. The angle of the FoV in the edition area is seen.
	Enter a specific time of the video, press GO and user is taken to that video frame.
Move FoV to "Speaker's location" 	By pressing this button the FoV moves to the angle where the current segment is set (Alt+F).

Table 3: Main video controls

4.3.1. Preparation of data segments

Before any recording the user needs to prepare the data segments. This is necessary for the following main reasons:

In case of a deaf or hard of hearing sign interpreter, it is necessary to previously enter the dialogue texts as subtitles with its time codes.

- The character gives information to the segment as the speaker's name (that can be used by the 360º player with SL access service) and also the style of the text that will be shown during the recording in case the sign interpreter is deaf or hard of hearing.
- The sign interpreter watches the main 360º video during the recording and because the speaker can be in any FoV in the 360º video it is important that the video turns automatically to the appropriate FoV during the main video playback. For this it is necessary to prepare the data segments with the right angles to where the speaker is located in the 360º sphere.
- If subtitles have already been produced for the video previously, the new sign language file may already contain the subtitles in its data segments with time codes, character and speaker's location (angle).

In case of not having the subtitles, for each data segment the user can manually enter the text

(transcription of the dialogue) in the text field and after finding the appropriate video frames the time codes (TCs) must be entered: TCin by clicking on the TCin clock icon (Shift+Page up) and TCout by clicking on the TCout clock icon (Shift+Page down). Then the user may assign a character (from C1 up to C10, also possible to do this using shortcuts Shift + F1 to shift + F10) to the segment. And finally the right angle must be assigned to the "Speaker's Location" fields as it is explained in detail in table 4.

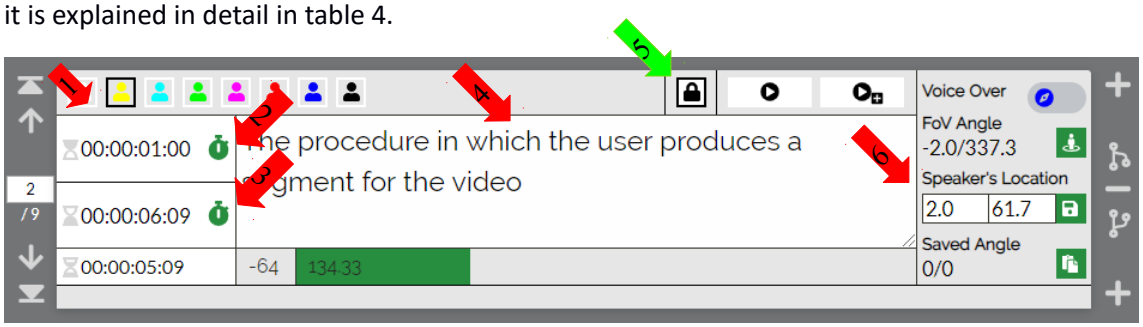


Illustration 7: Data segment edition area

Illustration 7 displays with red arrows all the previous data segment, the arrows correspond to the following metadata:

1. Characters
2. TCin
3. TCout
4. Text
5. Keep SL video between segments
6. Angles

A text file with subtitles can also be imported from the editor as explained in table 8. In this case some data in each segment may also be added manually by the user (time codes, character and angle).

The user needs to decide if they want to turn the sign interpreter video off between the previous and the current data segment by deselecting the "lock" icon of the segment (displayed with a green arrow in Illustration 7). This is useful when the time span between the previous and the current segment is high so the sign interpreter video will not be shown to the consumer (360º video player with SL access service) from the end of the previous segment to the beginning of the current one.

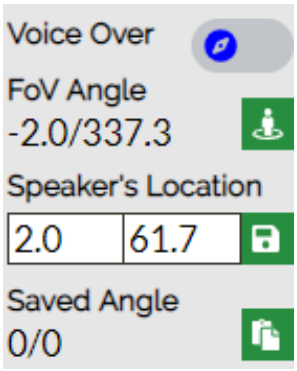
data preparation – Angles	
By default, at first the video has the current FoV angle as longitude: 0.00° and latitude: 0.00° Also the **Voice Over** option can be marked when there is no speaker in the 360º scene.	
	**Voice Over:** Only when there is only voice and no speaker in the 360º video frame (Alt+O).
	FoV angle: This is the current field of view (camera) angle and it changes while navigating through video ourselves and it corresponds to the video direction that we see (users can change the FoV angle using the navigation buttons in the video control area or moving the mouse with left button over the video). The green button next to it (Alt+Enter) sets the FoV angle to the "Speaker's Location" of the segment (see next row).
	Speaker's Location: This is set by the producer and corresponds to the angle of the FoV where the speaker is located. This is done solely by finding the desired FoV and setting its angle to the segment (see previous row). By pressing the green save button next to it, the "Speaker's Location" value is copied to the "Saved angle" (Alt+C) for it to be used in other segments (see next row). The aim of this button is to copy this angle for later pasting it to other segments.
	Saved angle: This angle is kept in this register (see previous row) so it can be used in other segments. The button next to it pastes the "Saved angle" to the "Speaker's Location" of the segment (Alt+V). The aim of this button is to use the angle from another segment that was copied previously.

Table 4: SL preparation

The tools to operate between data segments such as move to next segment or split a segment into two are explained in Table 5.

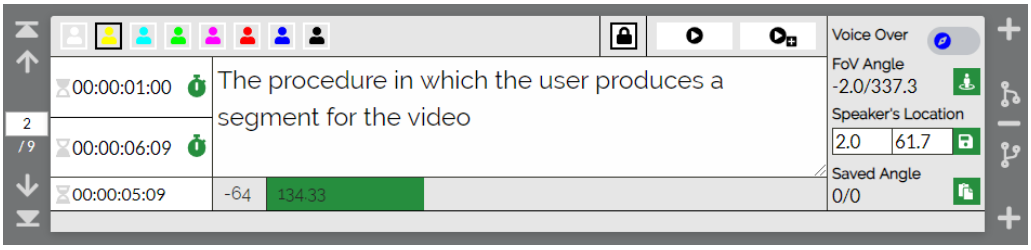
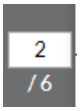
Data segment operations – buttons	
	
First segment 	This button takes the user to the first segment (Alt + Page Up).
Previous segment 	This button takes the user to the previous segment in relation to their current position (Page Up).
Next segment 	This button takes the user to the next segment in relation to their current position (Page Down).
Last segment 	This button takes the user to the last segment (Alt + Page Down).
Jump to segment value 	This part takes the user to a specific segment by entering the number of the segment. It also informs the user of the number of segments.
Insert before 	This button is useful for the insertion of a new segment before the existing segment (Ctrl + U).
Split from cursor position 	This button splits the current segment text into two separate segments (Ctrl + Insert). The timing is organized accordingly.
Delete segment 	This button deletes the selected segment (Ctrl + D).
Join this with next 	This button joins the current segment with the next one and creates a single segment containing both texts of the previous ones. The reading speed thermometer is modified accordingly but timings remain the same as the first previous segment (Ctrl + Delete).
Insert after 	This button is useful for insertion of a new segment after the existing segment (Ctrl + Shift + U).

Table 5: Data segment tools

4.3.2. Sign language video recording

After finishing preparing the data segments, the sign interpreter may start the procedure of SL videos recording. Table 6 explains the recording video controls. There is no time limit for video

recording. This means that that user can interpret the whole main video as a single recording or record multiple videos, then adjusting the recorded videos by moving the pink lines with the mouse button, and finally adjusting the previously time-coded data segments.

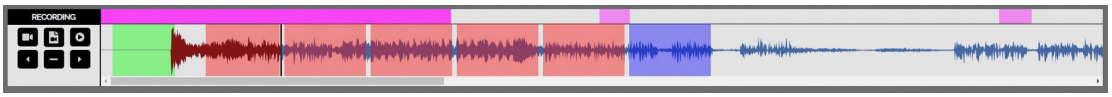
Recording video controls	
 The sound-wave displays the video sound, the black vertical line shows the current moment of the main video. The transparent colours along the sound-wave reflect the Data segments in time that have been prepared previously, this colour can vary according to the character colour chosen by the user previously. The far left buttons are designed for SL video actions and explained in detail in this table. The top pink colour symbolizes the SL videos in time which can be multiple or a single one. Each SL videos is selected by clicking on the pink areas and actions can be performed on them.	
	The user is able to record the SL video by pressing the “Record” button (Shift + F2). This recording can be as long as desired. When the “Record” button is pressed, some time is given to the interpreter for preparation, either a countdown or a **yellow** bar under the text area depending on the Recording Layout selected in General Settings (see table 7). When the countdown finishes or the yellow bar turns **red** it means that the recording has started so the user has to sign interpret now. The pink bar above the sound-wave symbolizes the SL video and can be selected using mouse button. After recording, the pink bar may take some time to be shown as the SL video that has just been recorded is uploaded to the Internet server.
	By this button, the user is able to import a pre-recorded SL video from hard disk (Ctrl + alt + i).
	This button previews the selected SL video. While being played, the same button acts as a “Pause” button (Ctrl + alt + F2).
	This deletes the selected SL video (Ctrl + Shift + F2).
	These two buttons are used to move the selected SL video frame by frame and it helps adjusting the recorded video to the main video. Both frame backward (Ctrl + alt + left) and forward are possible (Ctrl + alt + right). It is possible to move the SL videos via right mouse button.

Table 6: SL recording video controls

4.3.3. Data segment test and adjustments

After finishing the recording the user needs to test and adjust each data segment individuality. The arrows in Illustration 8 show the buttons available for testing the segment:

- **Short test:** it runs a test of the result from 2 seconds before TCin until 2 seconds after TCout of the segment (Shift + F3).

- **Long test:** it runs a test of the result from 4 seconds before TCin until 4 seconds after TCout of the segment (Shift + F4).

The durations above are customisable by the user in the General Settings (see table 7).

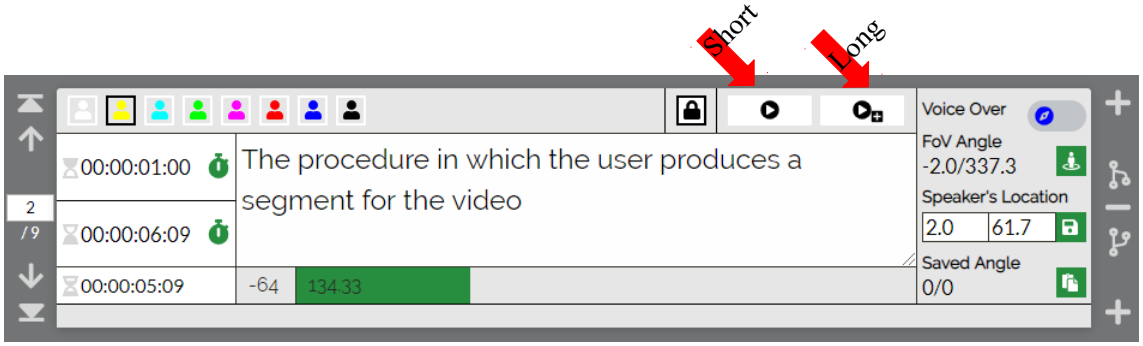
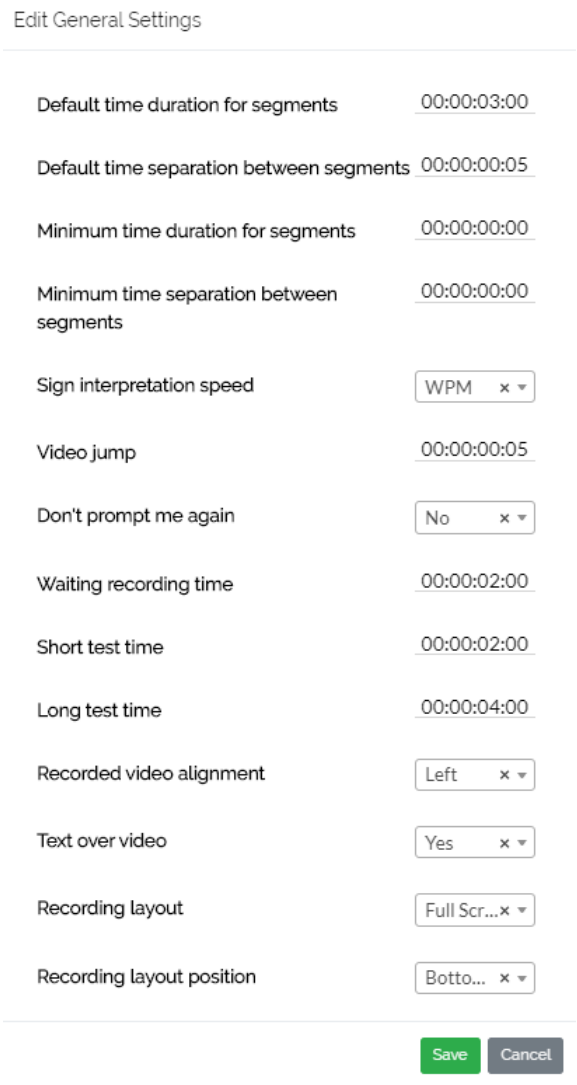


Illustration 8: Segment verification

If necessary the user adjusts the data segment (time codes, angle, etc.) the same way as when preparing the data segments (see explanation above in “Preparation of data segments”).

More options

The procedure in which we produce the sign language content is over, but we still have more options to work with. Remember the buttons that were introduced earlier, all these are customisable using “SETTINGS”. Table 6 shows the setting for the file and editor.

SL settings	
General settings	 By pressing this icon the following dialogue appears for the general setting of the editor that are set and saved by the user (sign interpreter).  If any of the minimal numbers above are not met the user gets an error when verifying the SL file and needs to fix it before continuing.

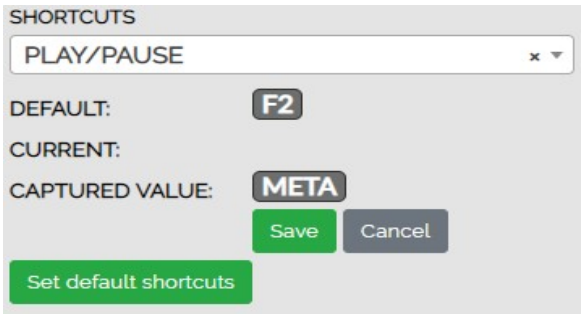
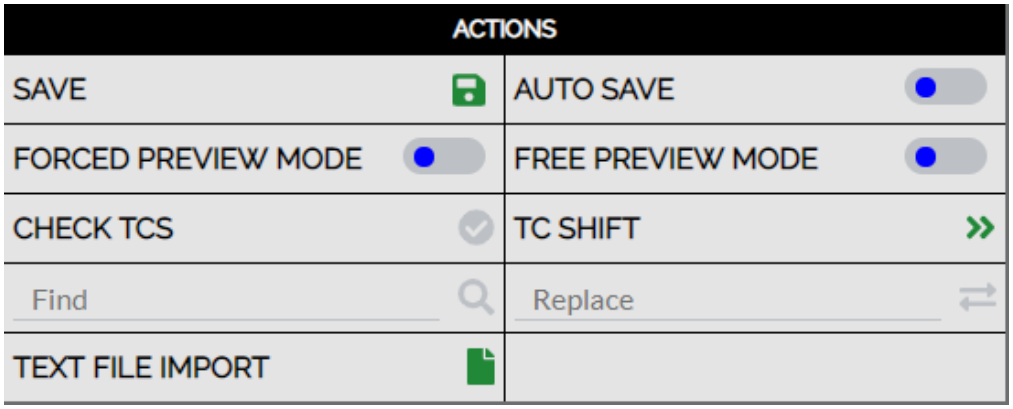
SL settings	
Characters	 A full list of existing characters and the possibility to add new ones by the user using the plus sign. By clicking on any of these characters, a dialogue opens for editing the character properties such as the character name, etc.
Shortcuts	During the production of the sign language file, it is convenient to work only with keyboard instead of changing between keyboard and mouse buttons constantly. As a result, most of the buttons of the editor have default shortcuts. These shortcuts are configurable and can be changed by the user if desired. A full list of the default shortcut buttons of the editor is presented as an annex at the end of this document. The default shortcuts are also shown when hovering over the buttons in the Web SL Editor. Also a button is designed to reset all the user-configured buttons back to default ones.  **WARNING: Some shortcuts are not advisable (for example the ones that are used for editing the segment text and some that are used by the browser). There is a blacklist of key combinations that cannot be used as shortcuts, however the user must be aware when customizing specific shortcuts (for instance, not to use the same key for two different shortcuts).**

Table 7: SL settings

The last step after finishing edition is verification and for that we use the preview modes. The general actions on the SL file are explained in Table 8, so here we can also find a description of the preview modes.

SL actions	
	
Save	This button saves the work.
Auto save	Saves the contents automatically when activated.
Check TCs	By pressing this icon the timings are checked. As mentioned in table 6, if the minimal criteria set in the settings is not met in some segments, an error will appear for those segments. If everything is OK the icon turns green (Ctrl + Q). Hovering over the segment with the error will show the description and possible solution. A table containing the possible errors is presented as an annex at the end of this document.
Forced preview	This mode is used for verification. This verification mode makes it easier for the producer as the video will change angle when needed during the playback of the video. Segments and angles are bound with the video. The user cannot freely change FoV at their wish, as the video itself takes them to the "Speaker's Location". When this mode is being on, the user cannot do editing any more and needs to turn it off (F11). **Note**: when clicking this button, "CHECK TC" (see previous row) is run first and if there is any error the preview is not run until the errors are fixed.

SL actions	
Free preview	This mode is used for verification. This verification mode is more real for the producer as if playing back the video using HMD (Head Mounted Display). Segments are bound to the video time code, but angles are not. It means that the user can move the FoV during the playback of the video. When this mode is being on, the user cannot do editing any more and needs to turn it off (F12). **Note**: when clicking this button, "CHECK TC" (see the row before the previous one) is run first and if there is any error the preview is not run until the errors are fixed.
TC shift	This shifts the time codes of a group of data segments.
Find/Replace	This helps the user find specific words in the data segments and replace them if needed.
Text file Import	Via this option, the user can import a text file (with subtitles) from hard disk for the data segment text. It is necessary that subtitles are separated by at least one blank line. Each subtitle will be inserted as a new data segment.

Table 8: Actions

Also at the upper area, informative sections are visible (Illustration 9):

- On the left, general information of the production task.
- On the right, the data segment texts with their number and time-codes.
- Yellow dot, current "Speaker's Location" belonging to the data segment.
- Alongside the two videos (main video, SL video), data segment text is visible according to the settings configured by the user. Normally deaf or hard of hearing interpreters would like to have the texts visible during work.

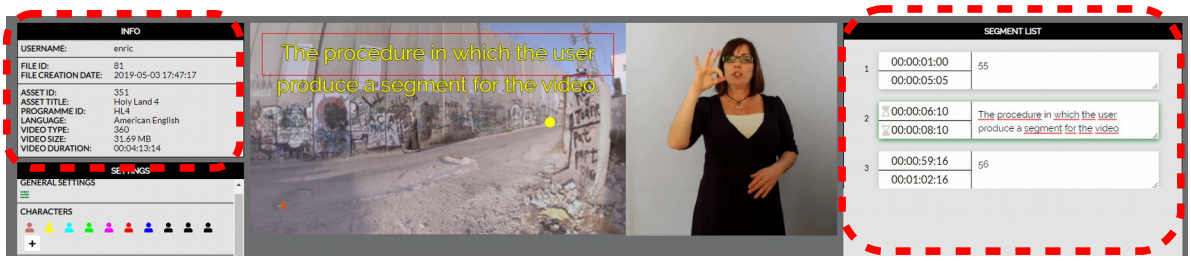
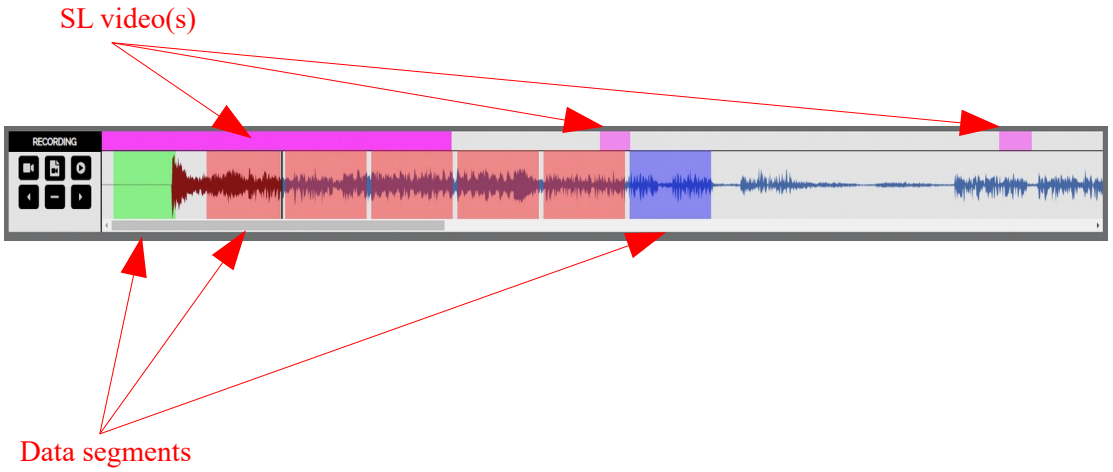


Illustration 9: Informative sections

The important terms are shown by arrows in the below graph. However, if the user has a hard time comprehending these terms, a terminology table is presented as a Glossary at the end of this document.



The graph shows the important terms of SL production. The final SL file is created by organization between SL videos and data segments done manually by the user. Normally and based on users convenience the sequence is as it follows:

1. Preparing data segments
2. Recording or importing video using buttons described in table 6 (pink area)
3. Adjust 1. and 2. in order to have the final SL file.
4. Using more options, if necessary and finally previewing the result

5. Conclusion

This deliverable reflects the result obtained by ImAc project for development of a cloud-based tool aimed to edition/production of sign language access service in 360º media industry.

This document has described the tool in a practical manner and gives the reader a comprehension of the editor in real use-cases. However, in ImAc D4.5, a theoretical view of the editor result is observed and discussed based on user requirements and objectives. It is recommended to the reader to study both documents in order to comprehend the editor both theoretically and practically.

Finally, it is noteworthy to observe the main points in which the editor has wished to make difference in the field:

Integrated and cloud-based environment

The ImAc access services production platform is the first cloud-based software with full support of all essential access services in media industry that sign language is one of them.

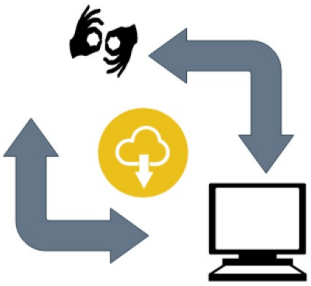


Illustration 10: Integrated & cloud-based

Immersive media support

The main objective of ImAc is making 360º videos accessible by offering full access services edition tools. This editor as well offers the professional user the possibility to work with angles in 360º spherical space which makes it a pioneer among of its legacy editors.

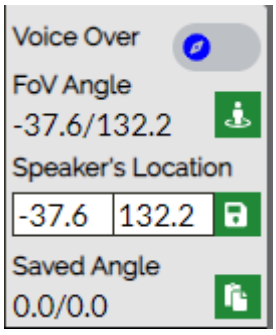


Illustration 11: Angle configurations

Positive feedback from professional user

To the submission date of this deliverable the editor has been tested and used by many professional users in and outside Europe with positive feedback and a quite bright predictions of commercialization. More information on these feedbacks and pilot result are available in deliverables of WP5 and WP6.

Illustration 12: Professional demo & feedback

Alphabetical support

Ethically and professionally and based on today´s market needs, the editors are obliged to support alphabets in addition to Latin types which is true about this editor as well with support of other types such as Chinese and Arabic (illustration 13).

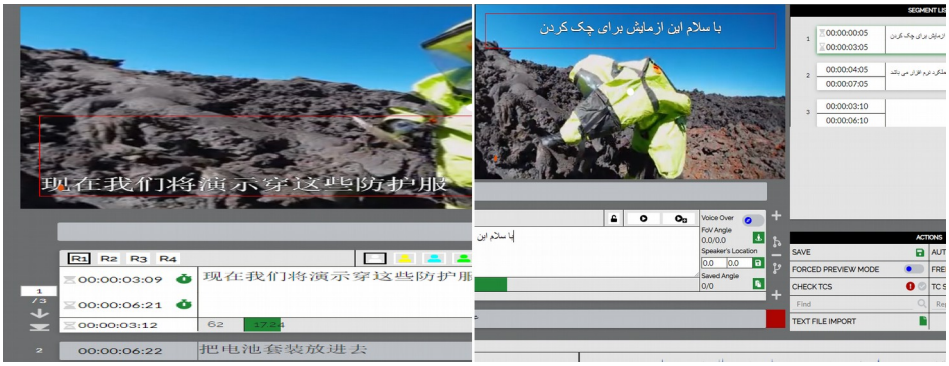


Illustration 13: Alphabetical support

GLOSSARY

Term	Definition
Main video	The video on which the user needs to work on in order to make it accessible.
SL video	Recorded video is a video file directly recorded or imported as a file from PC by the user. The maximum duration of this file can be as long as the main video. This video can be individual or multiple in time.
Data segment	The term refers to a segment produced by the user that contains information about subtitle text, time cueing (TCin and TCout) and character and angle.

Annex I: Errors

Error message	Cause
Minimum duration fail	This error appears in the data segments that don't meet with the minimum duration (TCout – TCin < minimum duration). **Observation:** The minimum duration can be changed in General Settings.
Minimum separation fail	This error appears in the data segments that don't meet with the minimum separation between adjacent segments (TCin current segment – TCout previous segment < minimum separation). **Observation:** The minimum separation can be changed in General Settings.
Segment overlapping	This error appears when two data segments are overlapped. Either the TCs overlap (TCin current < TCout previous) or the videos overlap (TCin current < TCin previous + sign language). **Solution:** Re-ordering TCs properly.
Unordered TC values	This error appears in the data segments that are not in order (TCin current < TCin previous). **Solution:** Re-ordering TCs properly.

Annex II: Default shortcuts

Functionality	Shortcut button
Toggle play/pause	F2
Pause	F3
Jump backward	F1
Jump forward	F4
Fast backward	F5
Slow backward	F6
Slow forward	F7
Fast forward	F8
Stop (jump video to first frame)	F9
Frame backward	Alt + Shift + Left
Frame forward	Alt + Shift + Right
Move FoV left	Alt + Left
Move FoV right	Alt + Right
Move FoV up	Alt + Up
Move FoV down	Alt + Down
Move FoV to “Speaker’s Location” of the segment	Alt + F
Previous segment	Page up
Next segment	Page down
First segment	Alt + Page up
Last segment	Alt + Page down
Find segment with video TC	Ctrl + Shift + F
Set TCin	Shift + Page up
Set TCout	Shift + Page down

Functionality	Shortcut button
Jump video to TCin frame	Ctrl + Alt + Page up
Jump video to TCout frame	Ctrl + Alt + Page down
Voice Over on/off	Alt + O
Set the FoV angle to “Speaker’s Location” of the segment	Alt + Enter
Copy “Speaker’s Location” of the segment to “Saved angle”	Alt + C
Paste “Saved angle” to “Speaker’s Location” of the segment	Alt + V
Record video	Shift + F2
Import video	Ctrl + Alt + i
Preview selected recorded video	Ctrl + Alt + F2
Move selected recorded video left	Ctrl + Alt + Left
Move selected recorded video right	Ctrl + Alt + Right
Delete selected recorded video	Ctrl + Shift + F2
Short test	Shift + F3
Long test	Shift + F4
Split segment from cursor position	Ctrl + Insert
Join segment with next	Ctrl + Delete
Delete segment	Ctrl + D
Insert segment before	Ctrl + U
Insert segment after	Ctrl + Shift + U
Check TCs	Ctrl + Q
Forced preview	F11
Free preview	F12

References

i ImAc Deliverable 4.1. Subtitle Production Tools, Peter thp Pesch, 2019.

ii ImAc Deliverable 4.2. Audio Production Tools, Ronlad Mies, 2019.

iii ImAc Deliverable 3.2. Content Manager, Kimiasadat Mirehbar & Enric Torres, 2019.

iv ImAc Deliverable 4.5 Access Services Tools Report, Kimiasadat Mirehbar, Enric Torres, 2019.