Sign Language Translation Mobile Application and Open Communications Framework

Deliverable 1.11: Final Community Building Report

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Overview: This report provides an overview of our initiatives to build out our community with co-creation events, detailing the co-creation events we carry out. Other avenues of community building are also explored, such as the use of our social media channels and the building of a scientific community.

Revision History

Version #	Implemented by	Revision Date	Description of changes
V0.1	EUD	29/06/2023	First draft based on D1.5
V0.2	EUD	24/08/2023	Updated information
V1.0	EUD	18/09/2023	Incorporation of final comments for submission

Approval Procedure

Version #	Deliverable Name	Approved by	Institution	Approval Date
V0.2	D1.11	Shaun O'Boyle	DCU	11/09/2023
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V0.2	D1.11	Adrián Núñez-Marcos	UPV/EHU	05/09/2023
V0.2	D1.11	John O'Flaherty	MAC	04/09/2023
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V0.2	D1.11	Mathieu De Coster	UGent	04/09/2023
V0.2	D1.11	Jorn Rijckaert	VGTC	05/09/2023
V0.2	D1.11	Henk van den Heuvel	RU	04/09/2023
V0.2	D1.11	Lien Soetemans	KU Leuven	05/09/2023
V1.0	D1.11	Davy Van Landuyt	EUD	18/09/2023
V0.2	D1.11	Mirella De Sisto	TiU	11/09/2023

Acronyms

The following table provides definitions for acronyms and terms relevant to this document.

| Acronym	Definition
BSL	British Sign Language
CNSE	Confederación Estatal De Personas Sordas (Spanish Confederation of Deaf People)
DoA	Description of the Action (Annex 1 to the Grant Agreement)
FeSorCam	Federación de Personas Sordas de la Comunidad de Madrid (Federation of Deaf People of the Community of Madrid)
IS	International Sign
ISL	Irish Sign Language
LSE	Lengua de Signos Española
MEP	Member of the European Parliament
NGC	Nederlands Gebarencentrum
NGT	Nederlandse Gebarentaal
UI/UX	User Interface/User Experience
VGT	Vlaamse Gebarentaal

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1. A community to co-create

SignON aims to reduce the gap between the stakeholder communities through a user-centred and community-driven research and development approach, involving stakeholder-led user profiles from its inception. Our methodology revolves around a co-creation workflow – a constant exchange of information and ideas between the user community and technical experts – which is guided by (sign) language and/or deaf community experts.
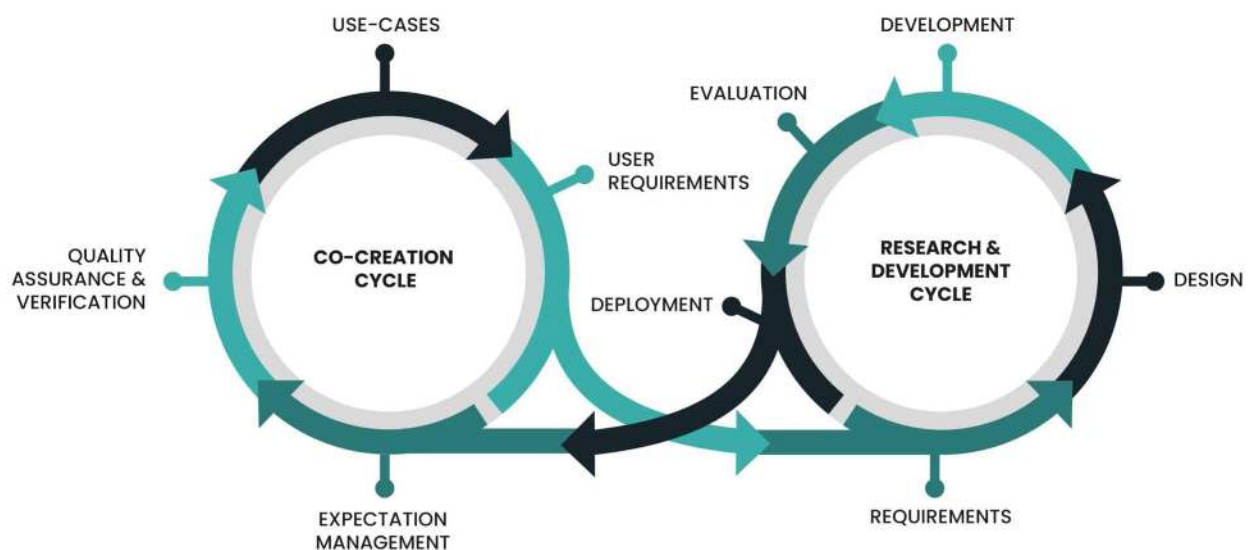
Within this co-creation strategy, we collaborate tightly with European deaf and hard of hearing communities to iteratively (re)define use cases, co-design and co-develop the SignON service and application, assess the quality and validate user acceptance. Elements of the research and development cycle that are heavily influenced by the co-creation workflow are the user requirements, the UI/UX design, the use cases and the user evaluations.

To maximise the potential of the co-creation workflow, we need to expand our community of stakeholders. The SignON community building strategy consists of three major areas: (1) co-creation events within the SignON project, (2) community building through social media, and (3) scientific community building. With an ongoing feedback loop from deaf, hard of hearing, and hearing

stakeholders back to the consortium, we ensure that user responses are woven into the ongoing plans for the project, that expectations are met and that issues related to diversity and bias are explicitly addressed. Together with the users, we explore new and redefine old use-cases supported by the SignON service. Thus, the user is proactively involved in the evolution of the SignON project.

In this deliverable, we elaborate further on each one of the three areas of community building within this project.

2. Co-creation events within the SignON project

Through a series of co-creation events, we engage with stakeholders and showcase the progress of the SignON project to reach the specific objectives of each WP, aiming to enlarge the active-user community. Within Task 1.5 (Building a bias-free community within and outside the SignON project), we steer the communities toward the execution of T1.2 to define the end-user scenarios and use-cases and towards T1.3 to obtain the end-user requirements. Within this task, we also get the user groups for the UX design process and user testing (T1.4). We focus on eliminating bias and gathering representatives from stakeholder communities regardless of gender, ethnicity, religion, etc.

We identify several categories of co-creation events carried out within the SignON project: (1) interviews (either one-on-one or in focus groups), (2) round tables, (3) workshops and (4) surveys. For all of these events, research ethics approval is secured in advance under the auspices of DCU, our project coordinator, with supplementary ethics approvals secured in partner institutions as required. The results of these interviews, roundtables and workshops can be found in D1.3, D1.7 and D1.8, the three versions of our User Requirements Report.

2.1. Interviews

2.1.1. Definition of interview

According to the SignON project proposal, the definition of an interview is the following:

An online or a face-to-face semi-structured dialogue with individuals or groups of users. Duration up to two hours.

2.1.2. Data collection during interviews

The SignON researchers focused specifically on sampling deaf, signing participants for these focus groups (or, with deafblind participants, one-on-one meetings if needed). Potential participants were invited to the focus groups with an invitation letter containing an informed consent form that provided information about a) the project and the focus group, b) possible benefits and disadvantages, c) confidentiality and d)

their rights. Careful attention to various dimensions of diversity was paid, to maintain a diverse balance in participants' profiles, e.g. considering age, gender, ethnic background, etc.

Participants	Language	Format	Consortium Partner involved	External Partner
Flemish deaf community	VGT	one-on-one/focus group	EUD	
Spanish deaf community	LSE	one-on-one/focus group	EUD	
Irish deaf and hard of hearing community	ISL, English	focus groups	TCD	
Dutch deaf community	NGT	focus group	TaalUnie	NGC
Deafblind signers	Various	one-on-one	EUD	
Signers from ethnic minorities	IS	focus group	EUD	Saved by the Sign

Table 1: Summary of all interviews carried out

With the question grid prepared beforehand, the SignON researchers engaged freely with the participants in a video meeting for no more than two hours through Zoom if social distancing requirements applied, where the opinions of the participants are asked. If there were no social distancing requirements, the meeting could take place physically. It was important to keep the discussion flowing; as such, the SignON researchers used a semi-structured focus group approach instead of a 'formal' interview. Focus group participants were invited to a group using a sign language that they are most comfortable with: Irish Sign Language, British Sign Language, Sign Language of the Netherlands (*Nederlandse Gebarentaal*), Flemish Sign Language (*Vlaamse Gebarentaal*) and Spanish Sign Language (*Lengua de Signos Española*), or using International Sign. This opened up opportunities for participants from Ireland, the United Kingdom, the Netherlands, Flanders (Belgium), Spain and across Europe to engage in a sign language-led discussion about key concerns, views, and beliefs about machine translation as it pertains to sign language users.

The moderator made sure that all participants were able to share their ideas on an equal level. Due to the informed consent form, all participants were made aware that the answers they give can be used anonymously further on in the project, removing any fears about possible identification and the possible consequences thereof. This way, we could ensure that they answer freely and give their honest opinions.

Sometimes, participants could not join the focus groups as their schedules did not allow this or because of specific needs, such as deafblindness or age. Older people may be 'intimidated' by the knowledge of younger generations and may hesitate to share their own opinions. For these people, we set up one-on-one interviews in a semi-structured way. That is, we used the same questions as in the focus groups and, like in the focus groups, we also allowed ourselves to ask additional questions or allowed the participant to elaborate a bit more on a certain idea and so on. This way, the answers became more detailed, which is very important in order to get a good overview of what the average future user of the app requires. The moderator always added some views from other participants that were collected during the focus group interviews to ask the opinion of the participant about these views, building iteratively on learning as we proceed. This way, we were able to collect a wide range of answers and more detailed/outspoken reactions and opinions, even during the individual interviews.

These interviews were video recorded to facilitate post-hoc transcription, anonymisation, and thematic analysis. After the meetings, focus group leads prepared an anonymised transcript of the interviews in English. This anonymised dataset was then shared with colleagues from the SignON consortium for thematic analysis.

2.2. Round tables

2.2.1. Definition of round table

According to the SignON project proposal, the definition of a round table is the following:

A one-day event focused on a specific technical, scientific or social feature of SignON (e.g. the user interface). The event will include demonstrations and discussions.

2.2.2. Data collection during round tables

With the topics and/or use-cases prepared beforehand, the SignON researchers engaged with the participants during a physical event. The objective of these co-creation events was to enlighten the participants about the finer details behind the scenes of sign language machine translation and to collect their opinions and perspectives on the discussed topics.

Roundtables were video-recorded to facilitate post-hoc transcription, anonymisation, and analysis. After the meetings, roundtable organisers prepared an anonymised data summary in English. This anonymised dataset was then shared with SignON colleagues for analysis, reports and deliverables.

Participants	Language	Date and location	Consortium Partner involved	External Partner
Dutch deaf community	NGT	29 November 2022 in Amersfoort, the Netherlands	EUD, TiU	NGC
Spanish deaf community	LSE	25 April 2023, in Madrid, Spain	EUD, UPF	CNSE, FeSorCam
Delegates from National Associations of the Deaf	IS	25 May 2023, in Stockholm, Sweden	EUD, TiU	EASIER Project
Irish deaf community	ISL	11 November 2023, in Dublin, Ireland	EUD, TCD, DCU	

Table 2: Overview of roundtable events

These in-person events were organised in different countries across the consortium in order to engage audiences in the various target sign language communities and to bring technical partners in contact with deaf communities to create open dialogue and space for mutual exchange. In each country, partners worked in collaboration with local deaf organisations to plan an appropriate event tailored to the local communities and recruit participants. This meant the precise format of each event varied

slightly from country to country; however, they generally involved short presentations from consortium partners (from that country) on either specific components of the SignON technology or an overview presentation of the SignON project. This was followed by open discussion, or question and answer sessions. EUD was present at all events to introduce the project and the process of co-creation to the audience. To facilitate involvement of outsiders to the local signing communities, interpreters were present at all these events to interpret presentations into the local sign language (from International Sign, English or the local spoken language). All discussions were moderated in the local sign language.

Image: Victor Ubieto, Horacio Saggion (UPF) and Davy Van Landuyt (EUD) at the Spanish roundtable

The final roundtable of the SignON project is scheduled to take place on the premises of Trinity College Dublin, Ireland, on 11 November 2023.

2.2.3. EUD General Assembly 2023

In addition to the country-specific roundtables, one co-creation event was held at the annual General Assembly of the EUD, which took place in Stockholm, Sweden, in May 2023. This roundtable took a similar format to the rest, but instead of engaging a single deaf community, it addressed the audience of the EUD GA: deaf delegates from around Europe attending the General Assembly as representatives of their National Associations of the Deaf. The roundtable was conducted in the working language of the

larger event, IS, with interpreting from English for the presentations from consortium partners. This event was held in collaboration with the EASIER project, with representatives from both projects presenting different aspects of the technology and co-creation to the audience of deaf leaders from the whole EU.

Image: Representatives from both the EASIER and SignON projects at the EUD General Assembly 2023

2.3.   Workshops

2.3.1.   Definition of workshop

According to the SignON project proposal, the definition of a workshop is the following:

> *A two-day event presenting the current development of SignON and discussing the next research & development cycle. The event will include presentations and panel discussions.*

2.3.2. Data collection during workshops

After the meetings, the workshop organisers prepare an anonymised data summary in English. This anonymised dataset is then shared with SignON colleagues for analysis, reports, and deliverables.

Quite similar to roundtables, workshops are organised to bring technical partners in contact with deaf communities and other stakeholders to create open dialogue and space for mutual exchange. In each country, partners worked in collaboration with local deaf organisations to plan the event.

Participants	Language	Date and location	Consortium Partner involved	External Partner
Irish deaf community and hearing stakeholders	ISL	12 and 25 November 2022, in Dublin, Ireland	EUD, DCU, TCD	Deaf Village Ireland
Flemish deaf community and hearing researchers	VGT	23 September 2023, in Bruges, Belgium	EUD, VGTC	Doof Vlaanderen

Table 3: Overview of workshops

The Dublin workshop in November 2022, modelled after the ADAPT Centre's "Citizen Think-In" events (link), has been successfully conducted. This proven successful format of the ADAPT Centre indeed served as a strong foundation for our Irish co-creation workshop. The collaboration even resulted in the ADAPT Centre updating the format for all future Think-Ins, so that they are more accessible and inclusive for deaf and hard of hearing participants.

The Flemish workshop took place in September in Bruges, during the 2023 edition of the annual World Deaf Day event, organised by the Flemish Association of the Deaf. This event is a highlight for the Flemish deaf community and well-attended, and for the SignON project it was the ideal platform to hold the workshop and present our work to a significant and diverse audience from the Flemish deaf community and other (hearing) stakeholders, and co-create with them. Furthermore, we also added an artistic and

entertaining perspective to the event with some shows by deaf artists about "sign language technologies".

2.4. Surveys

2.4.1. Definition of surveys

According to the SignON project proposal, the definition of a survey is the following:

An evaluation form containing a questionnaire about the quality of SignON, its performance and features (current and expected). The form will be presented and completed online. The anticipated duration is 15-20 minutes.

2.4.2. Data collection during surveys

In 2022, KU Leuven (KUL), with the Flemish Sign Language Centre (VGTC) assistance, developed an online survey to collect feedback from deaf, hard of hearing and hearing potential end users of the SignON App. This survey was then translated into all the (sign) languages which are involved in the project.

The main goal of this survey was to identify to what extent potential end users would be willing to use (or not use) the SignON app in 15 proposed use case settings. The results of this survey helped guide the SignON consortium to (re)define use case settings and adopt new ones in order to meet the user's needs and requirements in the best possible way.

As everyone (i.e. every deaf, hard of hearing and hearing person) is a potential end user of the SignON App and as it is not for the researchers to determine the hearing status of someone, it was decided to create one single version of the survey instead of a separate survey for each of the different user communities as defined in the project proposal (i.e. deaf, hard of hearing and hearing people). In this single version, all the information and questions could be consulted both in sign language and written language.

The survey consisted of four parts which questioned people about their:

- linguistic background;
- experience with different translation tools and software;
- willingness to use the SignON App in the 15 proposed use case settings;
- gender, age and hearing status.

The 15 proposed use case settings of the SignON app were selected based on extensive literature research as well as discussions with the Flemish Sign Language Centre and other stakeholders. The set of 15 includes the four use cases suggested in the SignON project proposal and ranges across three thematic domains: professional, private, and educational.

Q2.

Welke taal (talen) gebruik je in werksituaties?
Je kan meerdere antwoorden aanklikken.

Vlaamse Gebarentaal (VGT)
International Sign
Nederlands
Frans
Engels
niet van toepassing
andere:

The Flemish version of the survey was launched at the beginning of April 2022 and closed at the end of that month. The link to the online survey and an accompanying informative video in VGT and text in

written Dutch was distributed by e-mail amongst different stakeholder organisations and individuals and through the social media channels of the SignON project, the Flemish Sign Language Centre (VGTC) and *Doof Vlaanderen* (the Flemish National Association of the Deaf).

This version served as the base for the surveys in the other sign languages of the project. The written Dutch version was also translated into English and Spanish, the versions in these three languages then formed the basis for the translations into NGT, LSE, ISL and BSL through VGTC's pool of deaf national sign language translators.

These local versions of the surveys were then carried out by the respective local consortium partners in collaboration with KU Leuven and EUD. A detailed presentation of the results is to be included in D1.2 (also due September 2023).

2.5. App testing

SignON partners and their users installed, reviewed and provided structured formative evaluation feedback through the cognitive walkthrough method on the SignON mobile app prototypes on their own Android or iOS phones. As described in D1.4, D1.9 and D1.10, the three Technical Requirements Reports, an online form asked users to undertake several tasks with the prototype SignON apps and record any problems they encountered. The survey asked each person to answer some questions on the app's system usability and their overall feedback. The results from these tests can be found in D1.4, D1.9, D1.10 respectively, and in the upcoming D1.6, the Quality Assessment Report, due in November 2023.

2.6. Presentations

2.6.1. VGTC event

Part of our communication and dissemination plan is to enter into dialogue with potential users, representatives and organisations. Because of the COVID-19 regulations that impeded the social gathering of deaf and hard of hearing people during a large portion of the project lifespan, it was not easy to achieve this goal. On 20th November 2021 VGTC organised a workshop entitled "Language police or not?". We took the opportunity to give a short presentation about the SignON project to about one hundred Flemish VGT signers, followed by a Q&A session. This raised interest among the audience and

there were several positive reactions, but some were concerned about the SignON project and its objectives. We noted their concerns and questions, and based on this we updated the FAQ page on our website (https://signon-project.eu/about-signon/faqs/).

2.6.2. *Interparliamentary Commission of the Dutch Language Union*

On the 16th of May 2022 there was a session of the Interparliamentary Commission of the Dutch Language Union (TaalUnie) in the Flemish Parliament. This is an institution comprising members of the Dutch and Flemish Parliaments, that focuses on issues regarding the Dutch language.

Jorn Rijckaert (VGTC) gave a presentation of our work on the SignON project to this commission and Catia Cucchiarini (TaalUnie) emphasised the importance of research on the Dutch and Flemish sign languages (and language technologies) to ensure accessibility for deaf people.

Image: Jorn Rijckaert (VGTC) presenting before the Interparliamentary Commission

2.6.3. *EUD General Assembly 2022*

The General Assembly of the European Union of the Deaf is an annual event for EUD's member countries where deaf representatives from the national associations of the deaf from all the 27 EU countries, 3 EFTA countries (Iceland, Norway, and Switzerland), and the United Kingdom are present. This General Assembly also goes paired with workshops and presentations for the deaf representatives.

On 26th May 2022, the EUD staff working on the project held a presentation to present the work we are doing in SignON. This presentation was well received by the audience of 71 delegates to the General Assembly.

Image: EUD's Davy Van Landuyt presenting the work done by EUD in SignON to the General Assembly

2.6.4. European Parliament

On invitation from Mr. Ádám Kósa, a deaf Member of the European Parliament, who is also part of the Advisory Board of the SignON project, we held a two-hour workshop to present our project at the European Parliament in Brussels on the 28th of September 2022.

Image: EUD President Sofia Isari introducing the SignON workshop at the European Parliament

2.6.5. "VGT in de kijker"

On 28 January 2023, the VGT department of KU Leuven organised one of their regular "VGT in de kijker" events. At these events, master students and (PhD) researchers present recent or ongoing research projects in Flemish Sign Language, with the specific aim to present their work to the Flemish deaf community. Lien Soetemans presented on the SignON project. The title of her presentation was: "Een Google Translate voor VGT: back to the future of toch niet? (A Google Translate for Flemish Sign Language: Back to the Future or not?") (link). The VGTC created a video-report of the event (link)

2.7. Ethical considerations and data management

In order to host co-creation events, the partner organisations received ethical approvals from the relevant ethical committees. Every participant received information beforehand about what would happen with their (personal) data and what could be expected from the co-creation event. Participants were informed both via a consent form and by the organisers at the beginning of each co-creation event that by participating in the event they were agreeing to give their informed consent.

After co-creation events were concluded, only the researchers who were appointed to the specific co-creation event were allowed to watch the recordings, to access the answers to the surveys or to access the collected personal data. In the case of recorded focus group interviews, round tables and workshops, they transcribed all the discussions, questions and answers from the participants. All data was then anonymised and compiled into a report for the SignON partners.

3. Community building through social media

Social media strategy plays a huge part in community building. As part of our communication and dissemination plan we have launched the website and several social media channels: Facebook, Twitter, LinkedIn and Instagram. To provide transparency in the structure and operations of the SignON project, we collected and presented the essential information about the project on our website with translation videos in International Sign. Because it is important to us that everyone can contact us in their own preferred language, on the contact page of our website, visitors can choose between written form or video message (the camera of the device opening the page turns on automatically and deaf signers can record themselves in their sign language).

News and updates of our project are posted in every social media channel and provided with a video translation in International Sign. In addition to these posts, we also launched three video series:

- SignON Encyclopedia: aims to cover various topics related to the deaf communities, sign language and the SignON project, such as machine translation systems between spoken languages and sign languages and sign language avatars. These videos not only aim to raise awareness about the deaf communities and sign languages, but also explain the SignON project and its objectives. So far eight videos have been posted.
- SignON Forum: we strongly believe in maintaining a constant dialogue with our target audiences. That is why we have launched a new video series where we invite everyone to share their questions, concerns, comments or ideas with us. So far one video has been posted.
- SignON Interviews: where we interview the experts in our consortium, as well as external experts such as (deaf) academics, about topics related to the SignON project. So far two videos have been posted.

A fourth video series is in the developmental stages:

- SignON Art: where deaf artists express their vision on sign language technologies via art.

Even though the targets to be achieved are very ambitious, we still record a relatively low number of followers on social media, despite our weekly posts (with different periods of holiday breaks). We suspect this level of engagement is because sign language technologies are still a very new issue for deaf communities, and that science content overall is reducing on social media, especially on Twitter / X

(link), however it should be noted that we are doing significantly better than other sign language technologies projects in Europe:

Channel	Measure	Project target	Numbers (Aug 2023)
Project website	# site visits	6,000 during the project lifecycle	8,400 unique visitors 9,200 site visits
Facebook	# followers	10,000 during the project lifecycle	608 followers
Twitter			489 followers
LinkedIn			148 followers
Instagram			242 followers

We also have started a quarterly newsletter. The number of subscribers is currently 47 (of 200 which is the project target).

In addition to actively recruiting end-users for testing ourselves, our website (https://signon-project.eu/co-creation/i-want-to-join/) also offered potential end-users the opportunity to sign up as participants for focus groups and interviews, in this way it contributes to passive community building.

4. Scientific community building

The SignON project is made up of a large consortium including several academic partners, providing ample opportunity for scientific community building. Through participation in a variety of conferences and workshops, partners have actively worked to share insights and advancements made within the project to the wider scientific community (and continue to do so). In addition to participation in conferences, project members have also organised dedicated workshops for the scientific community to present and discuss cutting edge research in relevant fields. Through these events, partners have promoted the work of the project among members of the scientific community.

4.1. Attended academic events

4.1.1. CVPR 2021 (25 June 2021, online)

At a workshop entitled "ChaLearn LAP Sign Language Recognition in the Wild Workshop" at the conference for Computer Vision and Pattern Recognition (CVPR), Mathieu De Coster, Mieke Van Herreweghe and Joni Dambre presented a paper entitled "Isolated Sign Recognition from RGB Video using Pose Flow and Self-Attention" on sign language recognition models in the context of a machine learning challenge.

4.1.2. CLIN31 (9 July 2021, online)

At the 31st Meeting of Computational Linguistics in the Netherlands, a team from SignON presented a poster titled "The SignON project: a Sign Language Translation Framework". SignON hosted a booth there with the support of TaalUnie.

4.1.3. AT4SSL workshop (20 August 2021, online)

The First International Workshop on Automatic Translation for Signed and Spoken Languages was organised by SignON and conducted within the MTSummit2021. Four papers related to the SignON project were presented at the workshop. One long paper entitled "The Myth of Signing Avatars" was presented by John C. McDonald, Rosalee Wolfe, Eleni Efthimiou, Evita Fontinea, Frankie Picron, Davy Van Landuyt, Tina Sioen, Annelies Braffort, Michael Filhol, Sarah Ebling, Thomas Hanke, Verena Krausneker, and one short paper entitled "Defining meaningful units. Challenges in sign segmentation and

segment-meaning mapping" was presented by Mirella De Sisto, Dimitar Shterionov, Irene Murtagh, Myriam Vermeerbergen and Lorraine Leeson. Mathieu De Coster, Karel D'Oosterlinck, Marija Pizurica, Paloma Rabaey, Severine Verlinden, Mieke Van Herreweghe and Joni Dambre presented a long paper entitled "Frozen Pretrained Transformers for Neural Sign Language Translation". Additionally, Lorraine Leeson presented a plenary paper entitled, "Co-constructing a road map for Sign Language Machine Translation".

4.1.4. TaalStudio's forum "Language and Technology: A Successful combination" (12 November 2021, Utrecht, the Netherlands)

The workshop was part of the Translation Europe-project of the European Commission, and was about different topics such as automatic translation/interpretation and various applications of language technology. In his session, our scientific project leader Dimitar Shterionov (TiU) talked about the SignON project, differences and similarities between sign and spoken languages, and technical challenges related to machine translation. After his lecture there was a brainstorming session with students about what would be a good way to represent sign language in a written-like form.

4.1.5. META-Forum 2021 (15 November 2021)

SignON had a booth at the project expo on the first day of META-FORUM, the international conference series on powerful and innovative Language Technologies for the multilingual information society.

4.1.6. LEAD ME Winter Training School Madrid 2021 (15 November 2021)

UPF-GTI ran the 2-hour workshop "*Virtual Signers generation within SignON at the winter school Media Accessibility Training: Sign Language and Subtitling for the Deaf and Hard-of-hearing*" organised by the COST action LEAD ME (Leading Platform for European Citizens, Industries, Academia and Policymakers in Media Accessibility), attended by around 25 persons.

4.1.7. MIDAS Ireland (18 November 2021, County Meath, Ireland)

Professor Lorraine Leeson presented on the topic, "Sign of the Times - Technology and Sign Languages" at this one-day conference that brought together speakers from the European Commission, Intel, IBM

Research, Enterprise Ireland, Microchip, and others, which focused on "Digital Transformation enabling a sustainable world".

4.1.8. Irish Association of Applied Linguistics Annual Conference (26 November 2021, online)

Dr Irene Murtagh (TU Dublin), Prof. Lorraine Leeson (TCD) and Rachel Moiselle (TCD) co-presented on the topic of "Sign Languages and Language Technology: Linguistic and Technical Challenges" at this national conference.

4.1.9. NITS2022 (13 May 2022, Groningen, the Netherlands)

Tim Van de Cruys (KU Leuven) gave an overview of the SignON project in the Network of Interdisciplinary Translation Studies in the Netherlands and Flanders.

4.1.10. EAMT2022 (1-3 June 2022, Ghent, Belgium)

At the 23rd Annual meeting of the European Association for Machine Translation, the presentation "Sign Language Translation: Ongoing Development, Challenges and Innovations in the SignON Project" was made by Dimitar Shterionov, Mirella De Sisto, Vincent Vandeghinste, Aoife Brady, Mathieu De Coster, Lorraine Leeson, Josep Blat, Frankie Picron, Marcello Scipioni, Aditya Parikh, Louis ten Bosh, John O'Flaherty, Joni Dambre and Jorn Rijckaert.

4.1.11. CLIN32 (16 June 2022, Tilburg, the Netherlands)

The 32nd Meeting of Computational Linguistics in the Netherlands has a special track on Language technology for Dutch Sign Language (NGT) and Flemish Sign Language (VGT), where the following presentations were made by project partners:

- "A corpus for training Sign Language Recognition and Translation: The Belgian Federal COVID-19 Video Corpus" by Vincent Vandeghinste, Bob Van Dyck, Mathieu De Coster and Maud Goddefroy

- "Design principles of an Automatic Speech Recognition functionality in a user-centric signed and spoken language translation system" by Aditya Parikh, Louis ten Bosch, Henk Van den Heuvel and Cristian Tejedor-García
- "Sign segmentation using glosses time-stamps of the Corpus NGT" by Mirella De Sisto and Dimitar Shterionov
- "Data augmentation for machine translation of sign language of the Netherlands and Flemish Sign Language" by Maud Goddefroy and Tim Van de Cruys
- "Progress, Challenges and Innovations of the SignON Project" by Vincent Vandeghinste, Mirella De Sisto, Dimitar Shterionov, Aoife Brady, Mathieu De Coster, Lorraine Leeson, Josep Blat, Frankie Picron, Marcello Scipioni, Aditya Parikh, Louis ten Bosch, John O'Flaherty, Joni Dambre and Jorn Rijckaert

In the poster sessions of the main conference there were also three posters:

- "Attention analysis of a sign language recognition task on the AUTSL dataset" by Jeanne Coppin, Mathieu De Coster and Joni Dambre
- "WordNets? SignNets!" by Ineke Schuurman, Vincent Vandeghinste, Caro Brosens, Margot Janssens and Thierry Declerck
- FullStop Punctuation Prediction for Dutch by Vincent Vandeghinste and Oliver Guhr

4.1.12. NLDB2022 (15-17 June, 2022, Valencia, Spain)

At the 27th International Conference on Applications of Natural Language to Information Systems (NLDB2022) in Valencia, Spain which took place from 15-17 June 2022, the presentation "Linguistically Enhanced Text to Sign Gloss Machine Translation" was given by Santiago Egea Gómez, Luis Chiruzzo, Euan McGill and Horacio Saggion.

4.1.13. LREC2022 (20-25 June 2022, Marseille, France)

At the 13th edition of the Language Resources and Evaluation Conference, the following presentations were made:

- "Challenges with Sign Language Datasets for Sign Language Recognition and Translation" by Mirella De Sisto, Vincent Vandeghinste, Santiago Egea Gómez, Mathieu De Coster and Dimitar Shterionov.

- Rachel Moiselle and Lorraine Leeson presented "Language Planning in Action: Depiction as a Driver of New Terminology in Irish Sign Language".
- Ruth Holmes, Ellen Rushe and Anthony Ventresque presented "Improving Signer Independent Sign Language Recognition for Low Resource Languages" at LREC2022's *Seventh International Workshop on Sign Language Translation and Avatar Technology: The Junction of the Visual and the Textual*.

4.1.14. SLTAT2022 (24 June 2022, Marseille, France)

At the Seventh International Workshop on Sign Language Translation and Avatar Technology: The Junction of the Visual and the Textual (SLTAT 2022), Ruth M. Holmes, Ellen Rushe, Frank Fowley and Anthony Ventresque gave the presentation "Improving Signer Independent Sign Language Recognition for Low Resource Languages".

4.1.15. ISGS2022 (13-15 July 2022, Chicago, United States)

Rachel Moiselle and Lorraine Leeson gave a poster presentation on their scientific publication about depiction as a driver of new terminology in Irish Sign Language in 9th International Society for Gesture Studies in Chicago.

4.1.16. LoResMT@COLING 2022 (16 October 2022, Gyeongju, South Korea (online))

COLING 2022 hosted a workshop on machine translation for low resource languages. Work on research done at UPF into rule-based data augmentation strategies as input to transformer-based neural machine translation between Spanish and Spanish Sign Language (LSE) was presented. Paper presented by Euan McGill (UPF).

4.1.17. SCI:COM (December 7, 2022, Dublin, Ireland)

A poster entitled "Using co-creation to develop sign language machine translation technologies" was presented by Shaun O'Boyle on behalf of several authors from the SignON team at SCI:COM, an annual conference on science communication.

4.1.18. NNDR 16 conference (May 10 - 12 2023, Reykjavik, Iceland)

An oral presentation regarding SignNets was given by Ineke Schuurman and Caro Brosens.

4.1.19. Colloquium Vlaamse Gebarentaal - KANTL (12 May 2023, Ghent, Belgium)

On 12 May 2023, Lien Soetemans gave a presentation at the "Colloqium Vlaamse Gebarentaal" organised by KANTL (Koninklijke Academie voor Nederlandse Taal en Letteren) titled "Vertaaltechnologie voor gebarentalen: uitdagingen en lessons learned in het SignON project" (Translation technology for signed languages: challenges and lessons learned within the framework of the SignON project)

4.1.20. SLTAT 2023 (10 June 2023, Rhodes, Greece)

Mathieu De Coster (UGent) presented work on "Querying A Sign Language Dictionary with Videos Using Dense Vector Search" (by Mathieu De Coster and Joni Dambre) at SLTAT 2023, related to evaluating the quality of the SLR models developed in the SignON project.
Lien Soetemans and Myriam Vermeerbergen presented their work on "When (shared) space and time don't matter. Remote video-mediated (synchronous and asynchronous) communication in Flemish Sign Language" at SLTAT 2023, regarding the potential impact of video-mediated and video-recorded communication on the sign language production of Flemish signers.

4.1.21. XIX World Congress of the World Federation of the Deaf (11-15 July 2023, Jeju, South Korea)

Mark Wheatley, the EUD Executive Director, gave a presentation on the 2023 WFD Congress, titled "Sign Language Machine Translation and Deaf Communities: the case for co-creation" which built on EUD's experience with co-creation in the SignON project.

4.1.22. ESANN 2023 (6 October 2023, Bruges, Belgium)

Mathieu De Coster and Joni Dambre (UGent) are co-organizing a special session on "Machine Learning applied to Sign Language" at the upcoming ESANN 2023 conference in Bruges, Belgium, with researchers from the University of Namur (Belgium).

4.1.23. EAMT 2023 (12-14 June 2023, Tampere, Finland)

Vincent Vandeghinste, Dimitar Shterionov, Mirella De Sisto, Aoife Brady, Mathieu De Coster, Lorraine Leeson, Josep Blat, Frankie Picron, Marcello Paolo Scipioni, Aditya Parikh, Louis ten Bosch, John O'Flaherty, Joni Dambre, Jorn Rijckaert, Bram Vanroy, Victor Ubieto Nogales, Santiago Egea Gomez, Ineke Schuurman, Gorka Labaka, Adrian Nunez-Marcos, Irene Murtagh, Euan McGill and Horacio Saggion presented the SignON project at the 24th annual conference of the European Association for Machine Translation. Mirella De Sisto, Vincent Vandeghinste, Lien Soetemans, Caro Brosens and Dimitar Shterionov presented the GostParC-Sign corpus.

4.1.24. AT4SSL 2023 (15 June 2023, Tampere, Finland)

The second international workshop on Automatic Translation for Signed and Spoken Languages was collocated with the European conference on Machine Translation (EAMT). It was co-organised by SignON and EASIER. Vincent Vandeghinste (INT) gave a keynote on the challenges with sign language datasets. Sam Bigeard presented joint work with, among others, Irene Murtagh and Ineke Schuurman of SignON on "A Linked Data Approach for linking and aligning Sign Language and Spoken Language data". Mirella De Sisto presented joint work with Vincent Vandeghinste and Dimitar Shterionov on a new multilingual dataset for the hospitality domain. Euan McGill introduced BSL-Hansard, work done with Horacio Saggion, on a dataset of parliamentary proceedings for English and interpreted British Sign Language. And Zaid Mohammed talked about the position of gerunds in a sign language lexicon, linguistic work together with Irene Murtagh.

4.1.25. METAFORUM 2023 (27 June 2023, Brussels, Belgium)

The NGT-HoReCo corpus was presented by Mirella De Sisto at METAFORUM.

4.1.26. CLIN33 (22 September 2023, Antwerp, Belgium)

A poster was presented regarding SignNets by Ineke Schuurman en Caro Brosens.

4.1.27. CLARIN Annual Conference 2023 (16-18 October 2023, Leuven, Belgium)

Mirella De Sisto presented joint work with Vincent Vandeghinste, Dimitar Shterionov, Lien Soetemans and Caro Brosens on two new parallel corpora of sign and spoken languages, NGT-HoReCo and GoSt-ParC-Sign.

4.2. Scientific publications in International Sign

Furthermore, as the SignON project partners release scientific publications, we make the extra effort to have the abstracts translated into International Sign. This way we can also make the academia a little bit more accessible to deaf people who might be interested in state-of-the-art (sign) language technologies and keep them following up on our project. We then post these publications with the videos on our SignON website. At the moment of writing this deliverable, there are sixteen SignON publications with translated abstracts on our website (https://signon-project.eu/publications/scientific-publications/), with more videos in the pipeline to be published before the end of the project.

5. Conclusion

We are now nearing the end of the SignON project. In the first co-creation phases of the project, we were mainly working with (online) focus group interviews and surveys to get a good understanding of acceptable use case scenarios, (technical) user requirements and user needs.

Along with the development of the technical components of the SignON application and service and the loosening of COVID restrictions, this focus shifted to include an approach that made more use of physical events, such as the round tables and workshops during the second half of the project. With these kinds of events, we could show the user audience more practical examples and components of the SignON technology, and collect their reactions, evaluations and assessments. These were then included in our co-creation cycles, leading to an application and service of the best possible quality we can deliver within the project timeframe.

The physical events allowed us to boost community building in a post-COVID era, where we could create direct engagement between end users and tech developers. The fact that we have had many physical events in collaboration with trusted local deaf organisations/NADs also has allowed us to effectively boost awareness about the project and demonstrate our commitment to partnership with deaf communities, ultimately building trust and credibility in this project.