

---

# Early-stage development of the SignON application and open framework – challenges and opportunities

**John O’Flaherty**<sup>α</sup>

**Marcello Paolo Scipioni**<sup>β</sup>

**Matteo Villa**<sup>β</sup>

**Edward Keane**<sup>α</sup>

**Marco Giovanelli**<sup>γ</sup>

j.oflaherty@mac.ie

marcello.scipioni@finconsgroup.com

matteo.villa@finconsgroup.com

e.keane@mac.ie

marco.giovanelli@finconsgroup.com

<sup>α</sup> MAC Ltd., Suparule House, Holland Rd., National Technology Park, Limeric, Ireland

<sup>β</sup> FINCONS SPA, Via Torri Bianche 10, Vimercate (MB), Italy

<sup>γ</sup> FINCONS Group AG, Via San Gottardo 12, Lugano, Switzerland

---

## Credits

SignON is a Horizon 2020 project, funded under the Horizon 2020 program ICT-57-2020 – “An empowering, inclusive Next Generation Internet” with Grant Agreement number 101017255.

## Abstract

The SignON communication service aims to use machine translation between Sign and spoken languages. This service will facilitate the exchange of information among deaf and hard of hearing, and hearing individuals. In the user-centric and community-driven SignON Horizon 2020 project all 17 of its partners will tightly collaborate with European deaf and hard of hearing communities to (re)define use-cases, co-design and co-develop the SignON application and open Framework, assess the quality and validate their acceptance. The ultimate objective is the fair, unbiased and inclusive spread of information and digital content in European society.

SignON will be a free, open application and Framework for conversion between video (capturing and understanding Sign language), audio and text and translation between Sign and spoken languages. To facilitate these challenging tasks SignON is using a common representation for mapping of video, audio and text into a unified space, that will be used for translating into the target modality and language. To ensure wide uptake, improved sign language detection and synthesis, as well as multilingual speech processing on mobile devices for everyone, the SignON service will be deployed as a smart phone application running on standard modern devices.

The project will be driven by a focused set of use-cases tailored towards the deaf communities. The project is initially targeting the Irish, British, Dutch, Flemish and Spanish Sign and English, Irish, Dutch, Spanish spoken languages. However, one of the challenges that SignON will face is its extensibility, to eventually incorporate machine learning capabilities allowing to learn new Sign, written and spoken languages; style-, domain- and user-adaptation; and automatic error correction, based on user feedback.

The SignON App will be designed as a lightweight interface. The SignON Framework of services, however, will be distributed on a cloud platform where the computationally intensive

services will be executed. In the early-stage development of SignON, several challenges will be faced to engineer and implement the free, open framework that will integrate all of the SignON components: key elements will be the hardware/software requirements of single modules, the choice of communication protocols and patterns between all of the components, or the architectural decisions needed to encompass the different requirements of the various components, as well as its ability to scale in real time responding to changing user demand.

The SignON Communication and translation mobile application is being developed using industry-standard components and open frameworks to run on standard modern smartphone and tablet devices and Operating Systems, using their existing cameras, other input sensors and user interfaces. An Agile DevOps approach is being used, with an initial fast prototype to enable users to become actively involved in the co-creation process of its functional specification and its co-development from early in the project, resulting in its first formal operational release in two stages. The evolution of the application with a co-creation approach until its final release at the end of the project is a concrete opportunity to ensure wide uptake, improved sign language detection and multilingual speech processing on mobile devices for everyone.