Sign Language for the information society
An ICT roadmap for South African Sign Language

G OLIVRIN

Meraka Institute, CSIR, PO Box 395, Pretoria, 0001
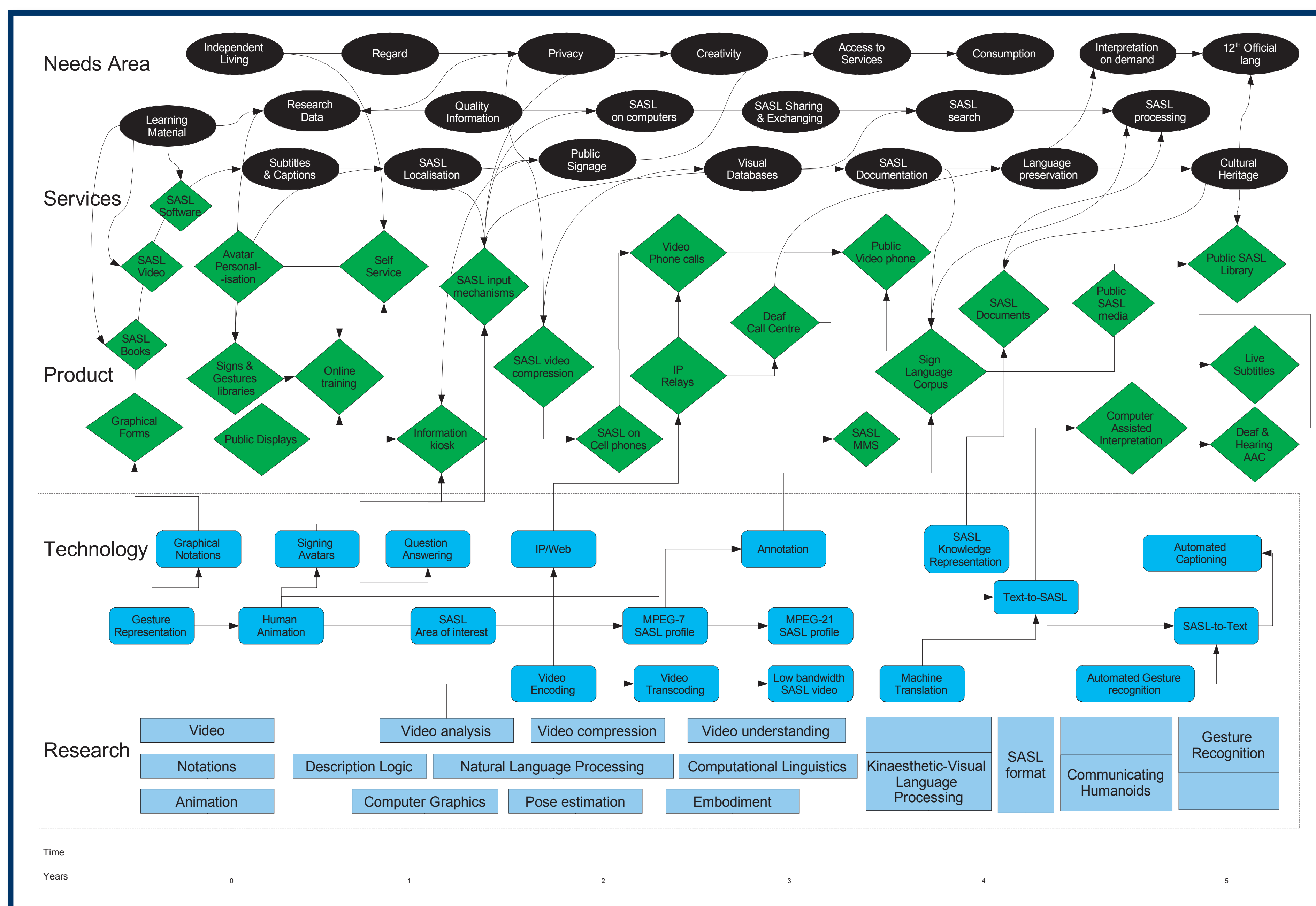
Email: golivrin@csir.co.za

Figure 1: ICT roadmap showing the way forward for Sign Language technologies

ICT has the potential to promote the use of South African Sign Language as a well-understood and practical tool for both the Deaf and society in general.

ABSTRACT
This poster provides a scientific roadmap towards a multilingual and inclusive society in which Sign Language features and empowers us all. Case studies present the technologies, products and services of tomorrow, which respond to the needs for visual communication expressed by both the Deaf community and by our society.

GENERAL INTRODUCTION
South African Sign Language (SASL) strives to become South Africa's 12th official language, which will be legal recognition of its status as a language. SASL is not merely a medium for education; it is a language with a community of over a million users and is accessible and usable by all. To unlock the potential of Sign Language is to empower the society at large. But to gain wider acceptance and support, SASL must become practical, economically sustainable, well-documented and understood. The visibility, usage, sharing and content creation of visual and gestural information must be facilitated.

THE NEEDS AND MARKET
- **Cultural heritage and literature corpus:** The creation of a national resource and service for the conservation and consultancy of work made in SASL. There is currently no collection of the cultural and linguistic heritage of SASL.
- **Public signage and localisation:** Provision for SASL-specific sign names of places, people, companies and brands, as well as the localisation of existing products and services in SASL.
- **Learning material:** The absence of reference material, teaching resources and linguistic documentation must be addressed by producing innovative media adapted to Sign Language.
- **Research data:** Recording usage of Sign Language in the form of videos, 3D gestures, notations and simulation models is essential to analyse, document, develop and test technologies such as machine translation.
- **Interpretation on demand:** There is a lack of human resources to provide interpretation services and it is expected that technology will provide some support and relief to the situation.
- **Quality information:** The lossy process of encoding and storing complex visual-gestural information must be quantified in terms of intelligibility and signal to noise ratio.
- **Sign Language processing on computers:** Making SASL easy to capture or compose, edit, process, publish and exchange is essential. Video on computers is not currently a practical format for informative or communicative purposes.
- **Accessing and contributing information in SASL:** Most information and services available in print or via voice are not accessible to people who do not read or write and whose mother tongue is SASL. Are there ways of receiving interpreted information and contributing to society in Sign Language?

SERVICES AND PRODUCTS
- **National public SASL library:** Provides indexing and referencing of cultural and literature contributions in SASL.
- **Public videophones:** To enable new services such as MMS, record and send video messages and video conferencing 'from the street' (Figure 2).
- **Public TV displays:** To provide support for SASL information and advertising.
- **Online training:** Video and computer animated Sign Language lessons.
- **Interpretation video relay services (VRS):** New services based on IP video technologies are offered in the UK and the US. The quality of service of the network remains paramount to offer these services; new low-bandwidth optimised compression algorithms are the way forward for congested networks and developing countries.
- **Captioning of soundtracks:** This is problematic because it cannot be done by Deaf people. However, the captioning of SASL provides accessibility for the hearing and material for the learner.
- **SASL on cell phones:** Popular in the Deaf community, mobile technology needs better support for Sign Languages (interface, quality, design).
- **Deaf alternative and augmentative communication technologies:** Either portable devices, teller supports in the form of surface computing (Figure 3).

Figure 2: Results of the research conducted for project 'Enabling Environments' suggested upgrading to video public phones. (Concept art by B. Smith).

Figure 3: Surface computing can be used to embed new augmentative and assistive technologies at tellers to support transactions with visual artefacts, ideal medium for Sign Language information systems. (Concept art by B. Smith).

TECHNOLOGIES
The first stages of initiating critical mass around Sign Language technologies is to prepare Sign Language authoring software [1] for building dictionaries of signs and libraries of gestures. Composing SASL documents involves a combination of gesture modelling and video descriptions, which are both human-readable and processable by computers.

Better compression algorithms are being researched [7] that make SASL information out of video data, hence improving compression ratio, bandwidth efficiency and information quality.

This information forms the basis for the creation of archives of SASL literature, reference material and learning resources [6]. Once a significant body of knowledge has been established, it will be the foundation for more advanced information and communications technology (ICT) solutions such as text-to-sign and machine translation [4] — computer-assisted interpretation [3].

CONCLUSION
When upgrading the aging data and voice infrastructures for visual grade technologies, new usages of technologies will emerge in public signage and communications, in advertising and for visual languages such as SASL. Research and development in Sign Language technologies are exploring new foundations for inclusive, multilingual and multimodal societies.

REFERENCES
[1]   OLIVRIN, G., 2007. Gesture Modelling for Linguistic Purposes Gesture Workshop, **2007**.
[2]   OLIVRIN, G., AbTi Ninth Report: Adjusting literacy with language transformations and alternative representations, *Meraka Institute*, **2008**.
[3]   OLIVRIN, G. & VAN ZIJL, L., South African Sign Language Assistive Translation Assistive Technologies, **2008**.
[4]   VAN ZIJL, L., The South African Sign Language Machine Translation Project ASSETS06, 233-234, Uni. Stellenbosch, **2006**.
[5]   COETZEE, L. et ali., The National Accessibility Portal of South Africa, http://www.napsa.org.za/portal, Meraka Institute, **2006**.
[6]   MOHLAMME, I. & NHLAPO, S., Online SASL Services, http://www.thibologa.co.za, Thibologa Sign Language Institution, **2008**.
[7]   FERGUSON, K.L., ALLINSON, M.N.: Modified Steepest-Descent for Bit-Allocation in Strongly-Dependent Video Coding, Submitted for publication, **2008**.