An Overview of ViSiCAST

- **Virtual Signing: Capture, Animation, Storage and Transmission**

- **John Glauert, Andrew Bangham, Stephen Cox, Ralph Elliott, Ian Marshall**

UEA NORWICH

- **Sanja Rankov, Mark Wells**

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ViSiCAST Aims

- **Improved access for deaf citizens**
- **... information and services**
- **... preferred medium is sign language**

- **Builds on SignAnim and Tessa**

ViSiCAST Project

- **Extend applications of virtual signing**
- **Target to natural sign languages**
  - **BSL (British Sign Language)** **rather than**
  - **SSE (Sign-Supported English)**
- **Improve animation technology**
  - **increasingly natural avatars**
  - **easier but more accurate sign capture**

ViSiCAST Partners

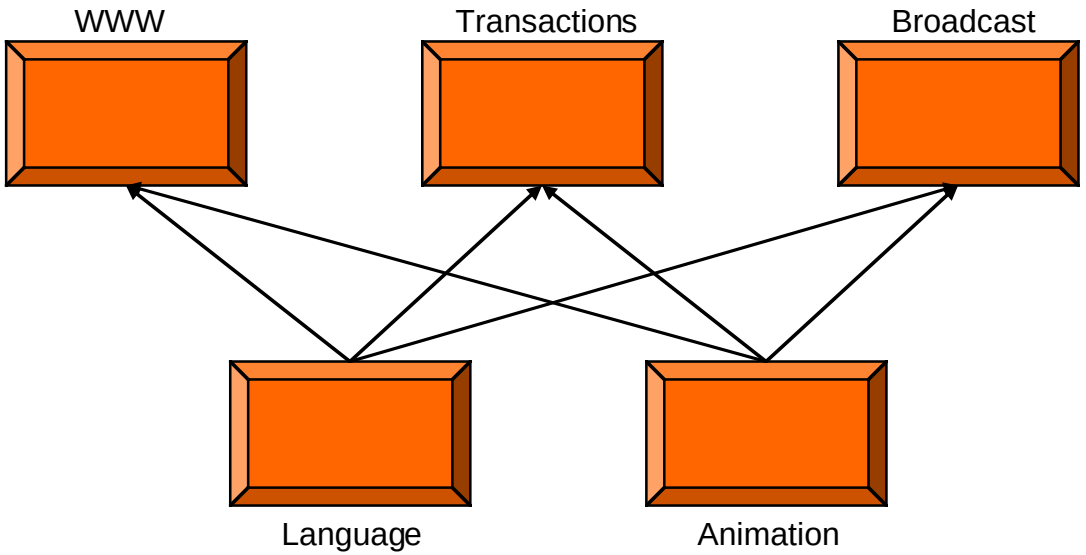
- **ITC, UK : Project coordination**
- **IRT, Germany : Broadcast technology**
- **TeleVirtual, UK : Virtual humans**
- **IDGS, Hamburg, Germany : Sign language notation**
- **UEA, Norwich, UK : Language processing, Speech, and Image**

ViSiCAST Partners

- **INT, Paris, France : Animation standards**
- **IvD, Netherlands : Multimedia content creation**
- **Post Office, UK : Interactive dialogue systems**
- **RNID, UK : Monitoring and evaluation**

ViSiCAST Structure

- **Applications**



- **Enabling Technologies**

Multimedia and WWW Applications

- **Adding signing services to multimedia**
  - **improves access to information**
  - **enhances communication for deaf people**
- **Browser plugin**
  - **accurate signing of prepared content**
  - **simplistic translation of general text**
  - **Gesture Markup Language (GML)**

Face-to-Face Transactions

- **Post Office, Advice Services, Shops**
- **More flexible speech recognition**
  - **“ Do you want first or second class postage?”**
  - **“ First or second?”**
- **Dialogue between customer and clerk**
  - **recognition of a very few signs**
  - **translation to text or speech for clerk**

Television and Broadcast

- **Developing transmission technology**
  - virtual signer in set-top boxes
  - transmission of signing through GML
- **Incorporation in emerging standards**
  - Multimedia Home Platform (MHP) in DVB
  - face and body animation through MPEG-4
  - GML within Multimedia Content Description Interface of MPEG-7

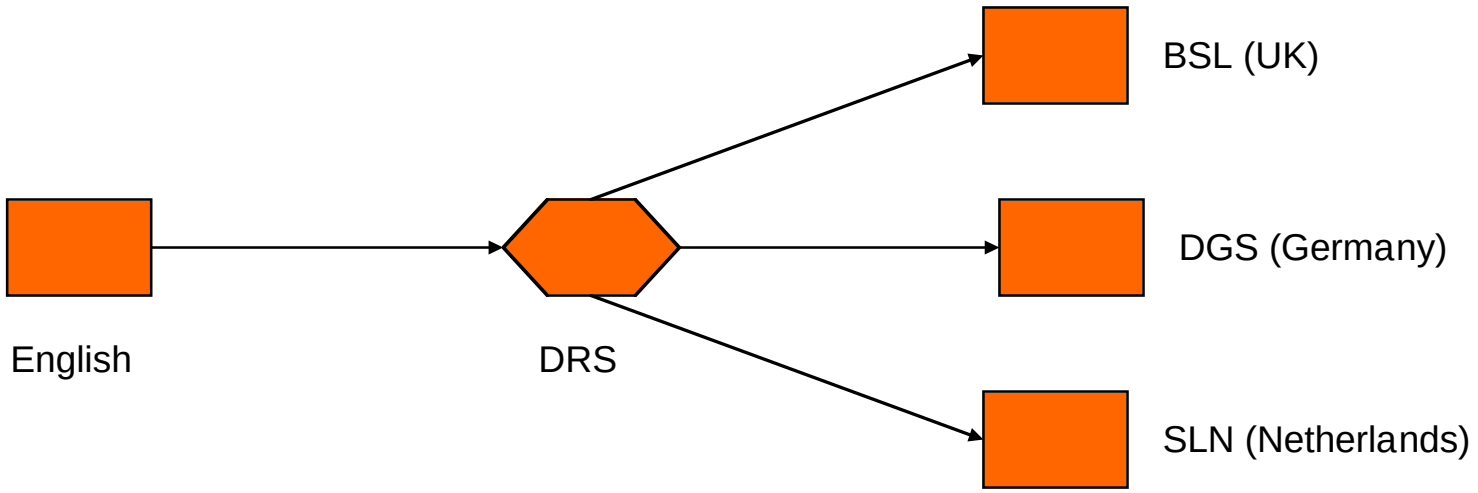
Language and Notation

- **UEA, Norwich and IDGS, Hamburg**
- **Translate English text to European sign language**
  - **BSL, DGS, SLN**
- **Define Gesture Markup Language**
  - **an XML-compliant notation for gestures**

English to Signing

Translation via DRS

Discourse Representation Structure



English to Signing

- **Morphology : “ phonemes” for signs**
  - **hand shape**
  - **hand orientation**
  - **position in “ signing space”**
  - **movement**
- **Directional Verbs**
  - **I give X to you**
  - **You give X to him**

GML Notation for Signing

- **Hamburg Notation System**
  - **HamNoSys**
  - **Code for hand shape and orientation, location, and movement**
- **Gesture Markup Language**
  - **XML Compliant (W3C standards)**
  - **Builds on HamNoSys**

GML Notation for Signing

- **Gloss level**
  - GIVE_BOOK_I_YOU
  - code for a complete sign
  - similar to SignAnim and Tessa approach
- **HamNoSys level**
  - encodes sign “ phonemes” as in HamNoSys
- **Articulation level**
  - represents captured or synthesised motion
  - encodes arbitrary gestures

GML Notation : Illustration

```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>

<!DOCTYPE gml SYSTEM "gml.dtd" >

<gml>

<avatar url="Tessa.ava" id="A" alt="Tessa" />

<sign gloss="TO-AND-FRO">
    <hamnosys>
        <righthandgesture>
            <handshape form="fist" thumb="across" />
            <handlocation where="shoulder" offset="rightOf"/>
            <handorientation extfinger="upN" palm="down"/>
            <movement direction="horW" repetitions="repeat1" repeatmode="fromstart" />
        </righthandgesture>
    </hamnosys>
</sign>

</gml>
```

Animation & Modeling

- **Overview of the ViSiCAST Project**

- **Sanja Rankov**
- **Mark Wells**

Motion Capture, Calibration and Display System

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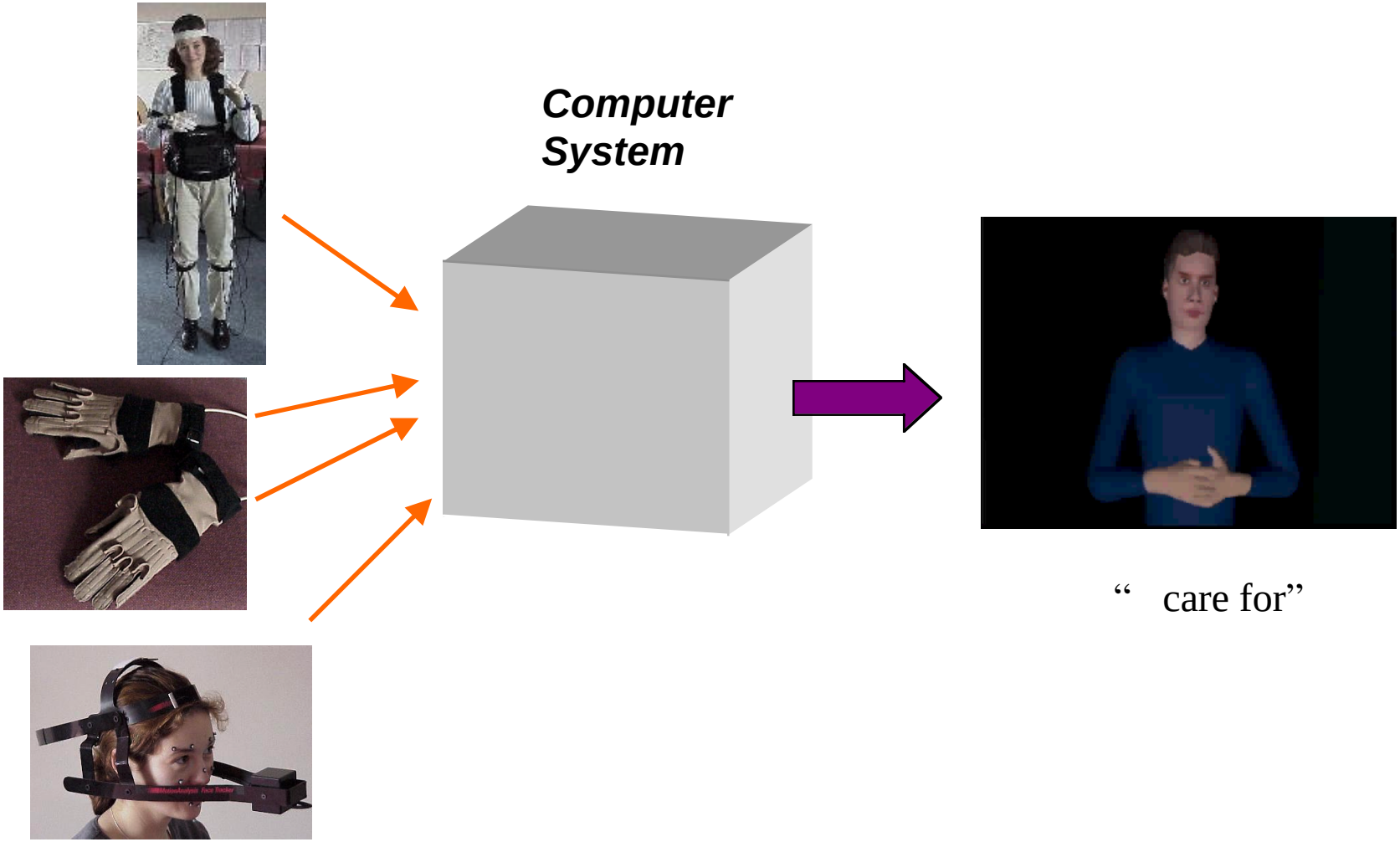

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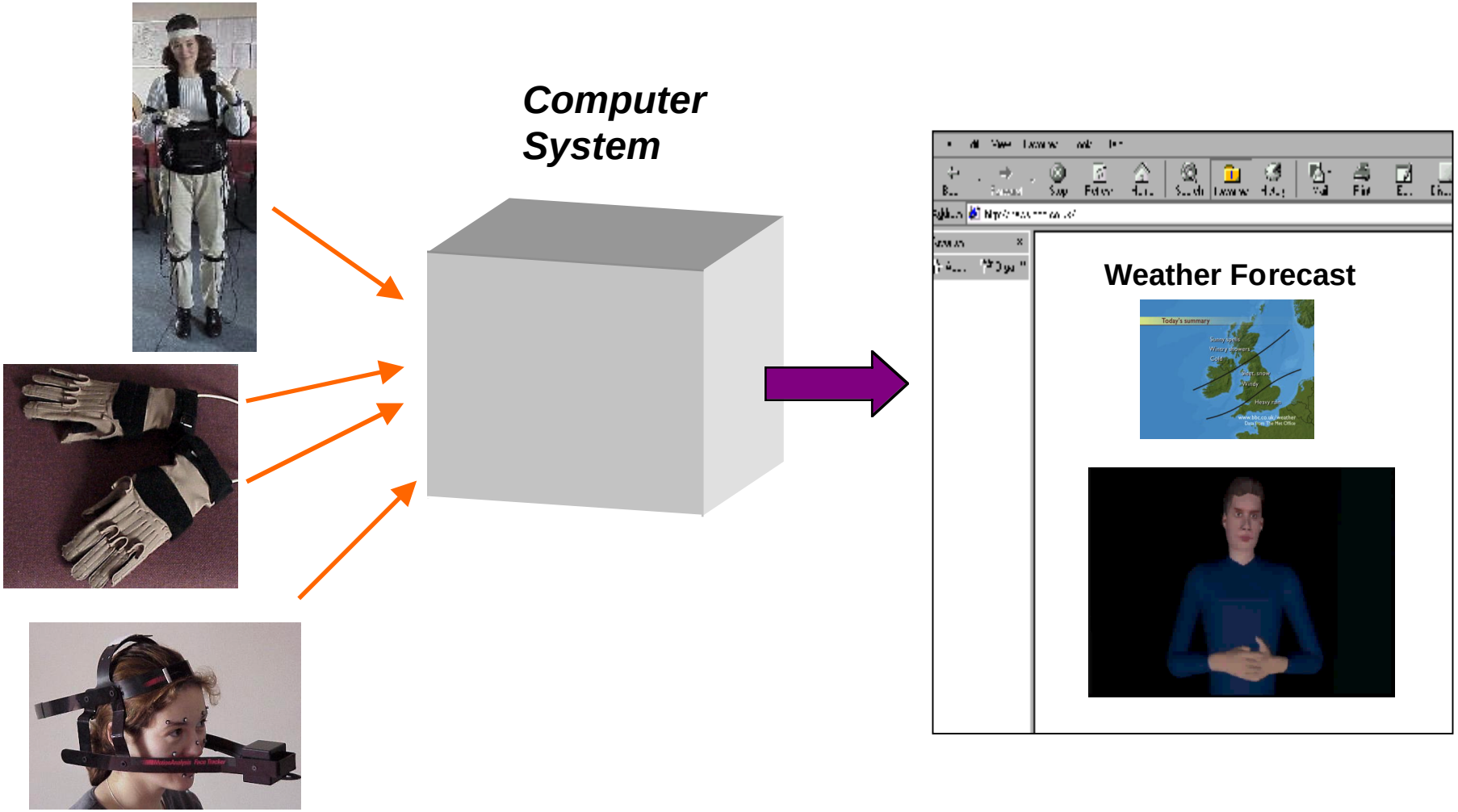

Motion Capture, Calibration and Display System

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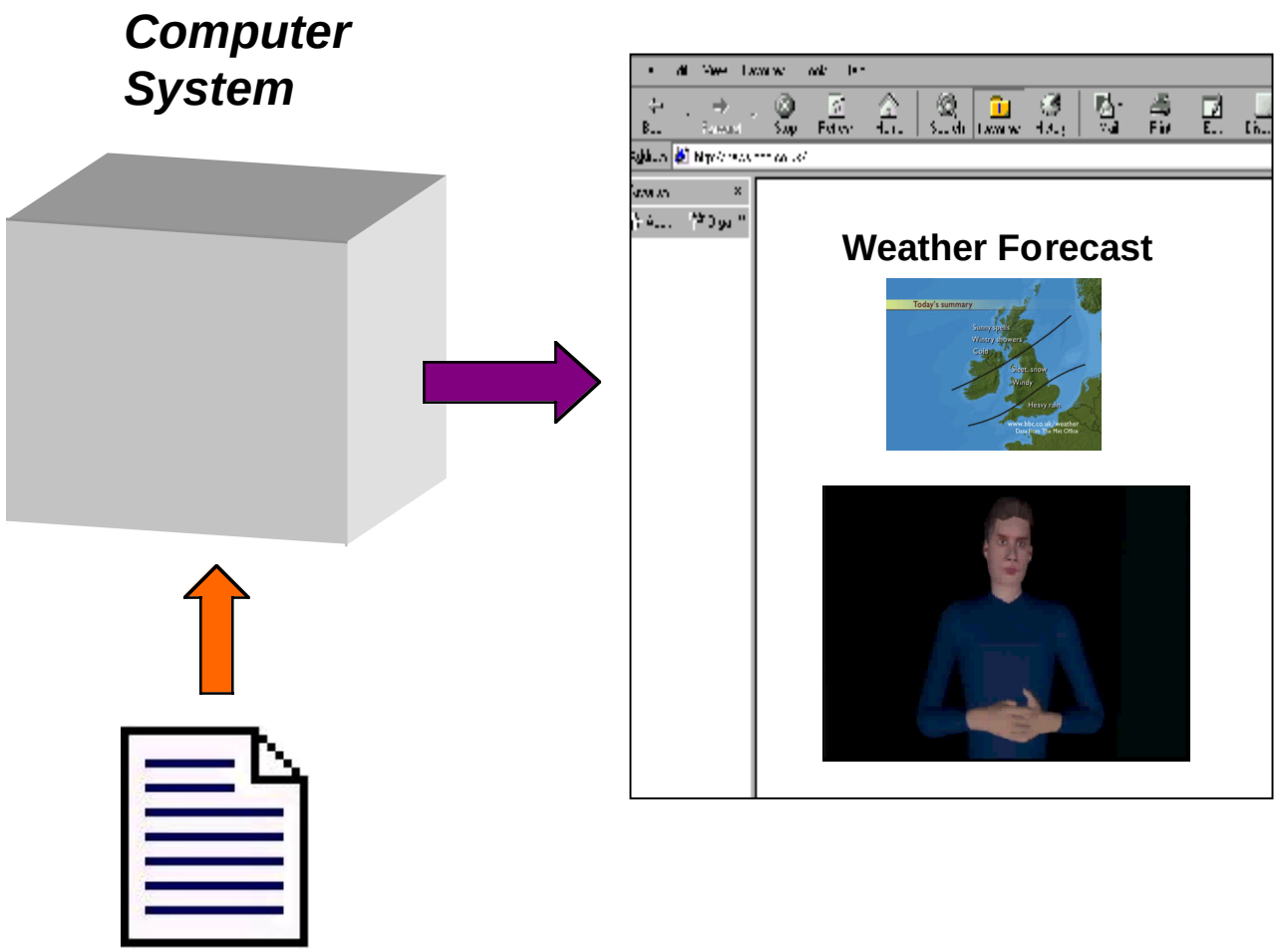

Post-processing

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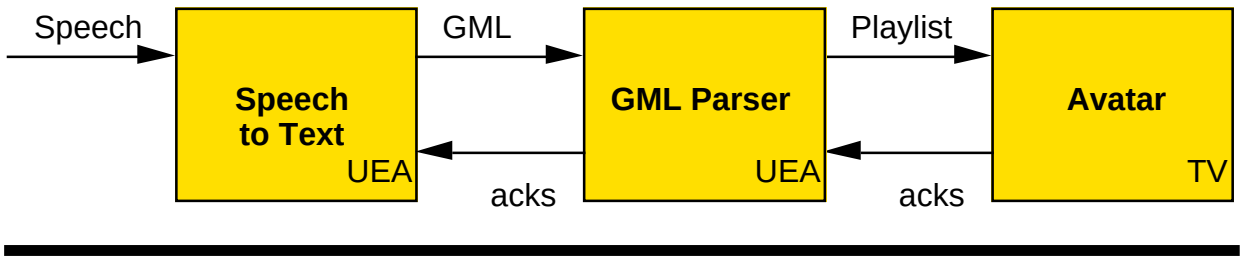
- Motion data decomposed into individual recorded signs
- Signs are blended and played back through an avatar that can sign a sentence

Improvements for GML driven player

- ✖ identification of basic physical avatar features
- ✖ development of methods for generation of realistic gestures

ViSiCAST : Conclusion

- **Ambitious three-year project**
- **Novel computational linguistics work to generate and represent signing**
- **Advanced avatar technology for signing virtual humans**
- **Access to services for deaf citizens**



Tessa with GML