



## **Emerging Technologies Discussion Paper**

This discussion paper is an opportunity to share with you emerging (new and recent) technology that is or may have benefit to Deaf people in Australia. As you know, modern technology changes and improves so rapidly. As soon as you have bought a new computer, an improved version is already being made.

The **Deaf Telecommunication Access and Networking Project (DTAN)** would like to keep you up to date with new (emerging) telecommunication products and services that are becoming available to Deaf people and the general population. Some will be of interest to you and we also provide website addresses so that you can find out more specific information yourselves. We also ask some questions, so that DTAN can understand the level of interest or what issues may arise from the emerging technology.

This paper only covers the products or services that we believe are of strong interest to Deaf people - there may well be other technology that we have not talked about. We welcome your suggestions of other emerging technology that you think DTAN should investigate and report on. Topics of interest include:-

- 1) Videotelephony
- 2) Signing Avatars
- 3) Mobile TTYs
- 4) Interactive Voice Response or 'Voice Portals' - The Text Alternative
- 5) Smart Internet Technology
- 6) Relay Services

Because this paper has many technical terms, a glossary at the end of the paper has been provided.



- 1) **VIDEOTELEPHONY** (video communication through the telephone line)

Videotelephony is a rapidly developing area of telecommunications. It started with **videoconferencing** which many businesses, government, education facilities and others used as a way of networking (or meeting) without physically being face-to-face.

Source: [www.thenorthwest.com](http://www.thenorthwest.com)

Over the last few years, **videophones** have emerged as another way of communicating and provided a cheaper option to videoconferencing. Videophones are more portable and can be taken from one place to another quite easily.



For most users of videotelephony, the picture quality was not as important as the sound quality, so transmission speed was not critical. However, as phone costs began to get cheaper, video conferencing and videophone users started to use ISDN or cable (broadband) line access which allowed for faster transmission and much improved picture quality. Videotelephony is now being used for telemedicine, job interviews, distance education, Board meetings, staff training, conferences and so on.

Source: [www.motion-media.com](http://www.motion-media.com)

Access to faster transmission speed can now enable Deaf people who use sign language to use videotelephony in the same way. Research has shown that at least 128kbps bandwidth is necessary for reasonable visual communication in sign language using either video conferencing or videophones. However, 384kbps is preferred because it is more comfortable; fingerspelling is also easier to read as well as better synchronisation between lip patterns and sound. The more kbps you require, the more it costs, however, the prices are slowly getting cheaper.

Overseas, videotelephony has become increasingly used for providing services to Deaf people:

- United Kingdom - libraries, local councils, Information services, interpreting relay services.
- Sweden / Finland - direct contact (instead of textphones), interpreting relay services
- Norway - Government has provided all young Deaf people with a videophone so they can contact each other.
- USA - interpreting relay services, meetings
- Germany - government provides a subsidy for cheaper ISDN call charges for Deaf users of videotelephony.

In Australia, research by the Australian Communication Exchange (ACE) and the Deaf Australia Online\* I & II projects have found strong local interest in videotelephony amongst Deaf people and Deaf service providers.

*Video Relay Interpreting (VRI)* has been heavily supported by Deaf organisations such as AAD to be included in the National Relay Service as an alternate means of communication with hearing people. It allows Deaf people to communicate in their first or preferred language (Auslan), rather than in English text. More detail is provided in the section called “Relay Services”.

*Video over Internet Protocol (VoIP)* is also an emerging concept of videotelephony. It allows videocommunication via the internet which means you can communicate on your computer which has a video camera attached. The current difficulty with VoIP is that the quality of transmission speed is dependent on how many internet users are accessing that same broadband cable (internet traffic). If it is heavy, then transmission is slow and this impacts on picture quality, distorting the sign communication. Like videoconferencing and videophones, for VoIP to work effectively, it is preferred to have your own cable or at least very fast bandwidth access.

Omnitor AB, a Swedish company dedicated to improving access to communication technology for Deaf people, has for many years worked on the development of a multi-functional computer terminal that allows communication in sign language, text and speech. Just recently they have improved their Allan 10 'total conversation' project to enable access via the internet. It is called the Allan eC. It includes a hardware and software kit comprising of a camera, video capture board, headset, alerting system adaptor, manual and adaptive software.



Source: [www.omnitor.se](http://www.omnitor.se)

The Allan eC enables a Deaf person to communicate in sign language, converse with TTYs, have text conversations, send emails, faxes, download files and so on.

The benefits of videotelephony are many. They include:

- Visual communication in Auslan
- Faster and more natural communication than by TTY
- Provide an alternative interpreting service - assists rural and remote areas
- Allows 'face-to-face' contact from a distance
- Can save on travel and work time costs
- Improved work / educational performance

Good lighting and contrast between the person and a plain background can improve visual clutter; this is particularly important for reading sign language.

Typefaces should be clear with high contrast backgrounds.

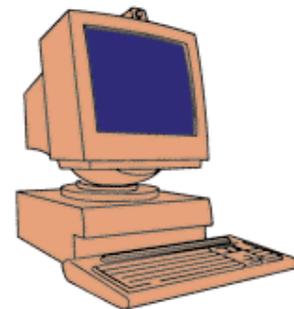
The ability to select larger type or special volume settings will be helpful for persons with visual or hearing impairments.

A keyboard permits the addition of text messages which can be particularly useful for deaf persons.

Visual and sound indication of line status will help persons with low vision or hearing impairments.

Visual indicator for ringer, or a socket for external flashing light, is particularly important for hearing impaired users.

Higher bandwidth and better processing will permit lip reading as well as sign language communication which requires at least 25 frames per second.



PC-based systems are particularly useful when integrated into an office network.

Source: [www.tiresias.org](http://www.tiresias.org)

What are the issues that have to be solved before videotelephony becomes more accessible to Deaf people in Australia?

Costs - equipment and phone line costs. At the moment, videoconferencing facilities and videophones are expensive. ISDN or cable (broadband) connection as well as call charge costs are still fairly high.

Availability - because videotelephony products are still exclusive (only available to those who can afford it), they are hard to access and therefore not in demand. [TTYs when they were first introduced also had the same problem - too expensive and too few people had one].

Websites for more information

- [www.motion-media.com/html/video/application/deafcommunity.htm](http://www.motion-media.com/html/video/application/deafcommunity.htm)
- [www.omnitor.se](http://www.omnitor.se)
- [www.aceinfo.net.au/Resources/Research/index.html](http://www.aceinfo.net.au/Resources/Research/index.html)
- <http://circuit.primeinternet.com.au/projects/dao1/>
- <http://circuit.primeinternet.com.au/projects/dao2/final1.htm>
- [www.tiresias.org/telecoms/vid.htm](http://www.tiresias.org/telecoms/vid.htm)

**QUESTIONS:**

1. Does videotelephony interest you?
2. Do you think it will be of benefit of you had access to videoconferencing, videophones or an Allan eC in your home and workplace?

**2) SIGNING AVATARS**

This is an interesting development occurring in the USA and Japan.



An avatar is a virtual 3D human animated model created by computer software. It can move, talk and use the body like humans. You will see them in recent computer games, movies or TV commercials (eg; Tomb Raider). **Signing avatars** are computer characters that can communicate in sign language as well as voice.

With the advances in computer technology and multi-media special effects, signing avatars have become a useful tool in:

Source: [www.signingavatar.com](http://www.signingavatar.com)

- teaching people about sign language and learning signs
- helping young deaf children learn language and literacy (reading / writing)
- translation of printed subtitles into sign language on digital TV
- helping parents learn about sign language to communicate with their deaf child
- providing information on sign language as an alternative to voice / text (internet).

One important aspect that signing avatars currently lack is good facial expression. This may improve as technical ability improves.

The quality of a signing avatar program depends on the number of signs in its vocabulary file and ability to accurately interpret text (English) into sign language (Auslan, ASL, etc.). Many signing avatar programs use signing in English word order. An authoring tool is required to assist webmasters who have designed avatar programs to accurately translate text into sign language.

Signing avatars are also being considered as a way to providing a quick translation service for computer, website or TV programs as an alternative to text captioning. It may save on costs and production time compared to using real time signing (live person) or a downloaded signing video.

Websites for more information:

[www.signingavatar.com](http://www.signingavatar.com)

[www.visicast.co.uk](http://www.visicast.co.uk)

### QUESTIONS:

1. Would you prefer a signing avatar to a 'live' signing person translating the news?
2. Do you have other ideas how a 'signing avatar' could be used?

### 3) **MOBILE TTYs**

The closest Deaf people in Australia ever got to a mobile TTY was a few years ago before the analogue mobile phone system was closed. We were able to use our compact TTYs with the 'brick' mobile phones. This was no longer available after 2000.

Deaf people have since protested loudly to the government and mobile phone providers but not a lot of progress has been made. Short Message Service (SMS) has since proven to be a useful substitute for many Deaf people as a simple and reasonably affordable communication service, however it does not allow for 'real time' interaction, nor long conversations.



In Europe, the Nokia Communicator 9000 range mobile phones include the ability to communicate with TTYs. Deaf people all over Europe have these Nokia phones as a multi-communication phone (text, email, fax, voice) and they have access to a specialist Relay Service (Telesta) based in Sweden.

Source: [www.nokia.com](http://www.nokia.com)

The Telesta Mobile TextPhone, a service developed by Swedish mobile Internet company Aspiro, allows callers and receivers to type messages to each other and instantly see the letters appear on a screen, making it as near to standard telephony as it is possible to get. Mobile TextPhone also allows callers to communicate with fixed-line phones. Local mobile operators sell the service in roughly the same way as a standard mobile phone subscription.

The Nokia Communicators also have a V.18 technical standard included in the modem that allows them to communicate with other text phones. Australia does not use this international standard as yet. Nokia Communicators are currently an expensive product in Australia and they do not have vibration alert nor predictive text which Deaf people require on their mobiles.



The *WISDOM (Wireless Information Services for Deaf people on the Move)* project based in Europe is attempting to go one step further than mobile TTYs. The WISDOM mobile phone will also include video communication. WISDOM is an innovation sponsored by the European Commission with many direct partners that include British Deaf Association, Vodafone (UK), Bristol University Centre of Deaf Studies, Motion Media technology (UK), Omnitor AB (Sweden), Ericsson (Spain) and others.

Source: [www.mobilewisdom.org](http://www.mobilewisdom.org)

This product, still being researched and developed with the assistance of \$6m from the European Commission and the partners, will allow many things:

- live video communication in sign language with other WISDOM mobile phones
- access to a 24 hour / 7 day signed video information service
- access to emergency services
- video relay service
- interface with many 3rd generation mobile phones

#### Websites for more information

[http://www.aspiro.com/templates/Page\\_2206.asp](http://www.aspiro.com/templates/Page_2206.asp)

[www.mobilewisdom.org/mail.htm](http://www.mobilewisdom.org/mail.htm)

[www.bris.ac.uk/deaf/research](http://www.bris.ac.uk/deaf/research)

#### **QUESTIONS:**

1. Should we aim to have Australian Nokia 9210 Communicators being able to do the same as in Europe?
2. Should the Nokia Communicator be part of the Disability Equipment program?
3. Can we afford a mobile phone that also includes TTY and video communication?
4. Using a mobile phone can be expensive - should Deaf people have access to a discount plan?

#### ***4. INTERACTIVE VOICE RESPONSE OR “VOICE PORTALS” - THE TEXT ALTERNATIVE?***

Interactive Voice Response (IVR) systems have become a popular way for business and government services to begin communicating with people making inquiries over the phone.

IVR allows the service provider to find out what the inquiry is about, then the system will transfer you to a live service operator. Sometimes, you may go through 4 or 5 questions before you reach the live service person. When you ring the National Relay Service (NRS), you are greeted by an IVR system that requests details before passing you onto a Relay Operator.

A 'voice portal' service is also where you can speak on the phone and the computer has speech recognition software that tries to understand what you say in response to their question before passing you on the requested service. Other services that use IVR or 'voice portal' systems include Centrelink, banks, government and local councils, Telstra, cinemas and so on.

In other examples that include internet banking or when paying bills, a customer can use the IVR or a 'voice portal' system to complete the transaction without having contact with a 'live' person.

Currently there are no direct text (TTY) versions of these services. You could access them via the National Relay Service; however there are 'timeout' problems because of time delay issues.

Some companies prefer to make available a TTY number for Deaf customers to answer all queries or require them to use the NRS to contact them by phone rather than use the IVR. However, the call may take a long time because the service operator has to contact other people or act as a 'go-between' in order to get the information required.

Recently, the Australian Bankers Association (ABA) had an inquiry into the development of industry standards to make ATMs, EFTPOS and internet banking more accessible to Deaf people and people with disabilities. They recommended that banks provide an alternative mechanism to IVR service such as an 'interactive text response' service for TTY customers.

Telstra's Disability Equipment Hotline (DEH) TTY number 1800 808 981, is no longer answered by a TTY. They have installed modem software called 'Next Talk Software' which enables their computers to talk with your TTY or telebraille machine. It is a product from the United States of America which has been modified to suit Australian standards.

This is the first time we have seen a major service provider provide conversion of modem software that allows their customer service computers to talk with TTYs in Australia.

*Websites for more information*

[www.waelect.com.au](http://www.waelect.com.au)

## **QUESTIONS:**

1. Do you use the NRS when contacting Centrelink or a bank's IVR service?
2. Do you believe services such as banks, Centrelink, telephone carriers (Optus, Telstra, etc.), Councils, should have an interactive text response service for TTY users?

## **5. SMART INTERNET TECHNOLOGY**

Combining the many features available on the internet and clever technology development, smart technology is about making internet services more accessible and an important part of our daily lives.

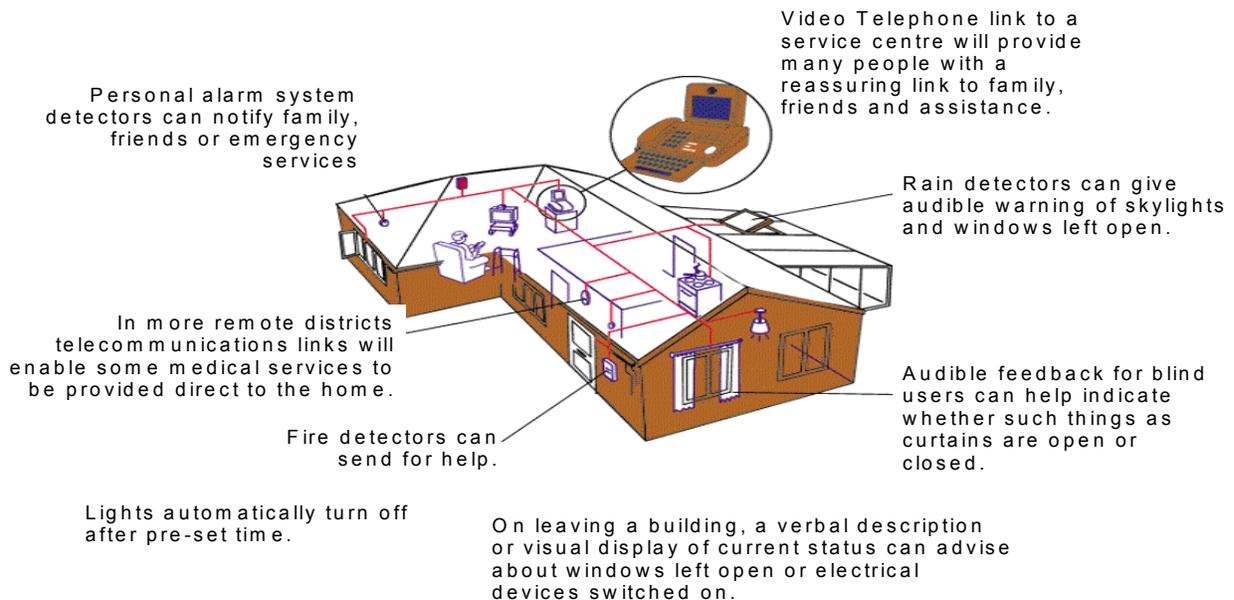
You may already have seen TV advertisements where they show that you can make a mobile telephone call (using the web browser) to your home to adjust the air-conditioning in the home or to turn on your microwave to cook your dinner.

Smart Technology includes artificial intelligence, networking, security, software engineering and human behaviour to try and manage some home and work tasks in an easier way.

Imagine in the near future, walking into your kitchen, looking at a medium-sized smart video screen that also includes touch buttons - you activate the screen. You communicate to the screen in sign language by signing 'phone', then signing a phone number. The screen connects you to your friend at work who can watch you on their computer. After you have finished the conversation, you sign 'hang up' and the screen disconnects without you having to press a button. This is smart technology research at work.

Some examples that may be developed include:

- Visual, voice or touch recognition interface devices (eg; Smart Kiosk)
- Smart Personal Assistants (eg; requesting home security check, seeking specific information over the internet, etc.)
- Smart housing (device control, comfort change [heat, lighting, safety], telephone or television options, etc.)



Source: [www.tiresias.org](http://www.tiresias.org)

DTAN is involved with the Smart Internet Technology Cooperative Research Centre project and a member of the User Needs Expert Panel on Disability.

### Websites for more information

[www.crc.gov.au/centres/info/smart\\_internet.htm](http://www.crc.gov.au/centres/info/smart_internet.htm)

[www.smartinternet.com.au](http://www.smartinternet.com.au)

[www.atcrc.com/JSindex.html](http://www.atcrc.com/JSindex.html)

[www.tiresias.org.guidelines/smarthousing.htm](http://www.tiresias.org.guidelines/smarthousing.htm)

## QUESTIONS:

1. Is life getting too complicated?

## 6. RELAY SERVICES

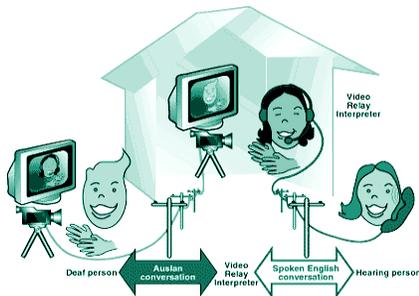
Since 1995, Australia has had its own National Relay Service (NRS) facilitated by the Australian Communication Exchange (ACE). Its services include:

- Text (TTY) to Voice
- Voice to Text
- Voice Carry Over
- Hearing Carry Over
- Speech to Speech
- 106 Emergency service

With the popularity of SMS calls, ACE is now considering establishing a SMS Relay to enable Deaf people with mobile phones to contact others who don't have a mobile.

As mentioned earlier in this paper, there has been extensive lobbying and argument that the NRS should also include the Video Relay Interpreting (VRI) service. VRI allows communication in sign language which for many Deaf people is their first or preferred choice of language to use.

Source: [www.aceinfo.net.au](http://www.aceinfo.net.au)



VRI has been extensively researched overseas and in some respects here in Australia. Some US Relay services have included VRI as part of their services. Others have chosen not to include it at this time because of establishment and call cost issues and accessibility concerns.

For VRI to work, Deaf people would need to have their own videotelephony equipment (such as video-conferencing or videophone) or have access to this equipment through a nearby service provider, as well as ISDN or broadband line access. The requirements to access VRI do raise questions of how achievable this is.

However, AAD and many Deaf people see VRI as a service access issue and related technical or access difficulties should not be barriers that prevent such a service from being established.

In recent times in the USA, Relay services over the internet have evolved as another relay option. Although currently text-based and still on trial, it is highly possible that this could develop into video communication over the internet (VoIP). With the majority of Australians having a computer and modem at home and with the current expansion of broadband access, we may see a Relay Service that includes VoIP

Websites for more information

[www.aceinfo.net.au](http://www.aceinfo.net.au)

[www.ip-relay.com/index.htm](http://www.ip-relay.com/index.htm)

## QUESTIONS:

1. Will SMS Relay be of interest to you?
2. Should VRI or VoIP be included in the NRS?
3. Should other services be providing VRI or Vo IP?

## Comments and feedback

AAD looks forward to your comments on this paper. As you can see it addresses many issues. We may have missed some, so please tell us your ideas, concerns and thoughts.

**The deadline for feedback is Friday 9<sup>th</sup> August 2002.**

If you wish to provide feedback or ask questions, you can do one or all of the following:

1. Contact the DTAN Officers via email:-  
Catherine Clark      [cathy.clark@aad.org.au](mailto:cathy.clark@aad.org.au)  
Phil Harper            [phil.harper@aad.org.au](mailto:phil.harper@aad.org.au)
2. Visit AAD's website, check into DTAN discussion site and type your comments.  
[www.aad.org.au](http://www.aad.org.au)

We look forward to receiving your comments and feedback.

After receiving feedback from the community, we will share your comments with the government, telecommunications industry, mobile phone providers, community services and the other members of the Deaf community.

Phil Harper  
Cathy Clark  
DTAN Project

**GLOSSARY**

- Analog:** Analog is “shorthand” for the word analogous, which means similar to. The signal being sent — voice or video — is sent as a stream of changing radio waves and is similar to what is received.
- Bandwidth:** A range of frequencies within a signal. This allows the signal to be transmitted without distortion or loss of information.
- Broadband:** Broadband is a descriptive term for evolving digital technologies providing various services through the one phone line. Eg. telephone, high-speed data (internet, email, etc.), video-demand services.
- Cable:** A dedicated subscriber line that allows television, radio as well as data transmission.
- Carrier:** A telecommunications provider which owns telephone switch equipment
- Digital:** A device that can transmit signals for sound, video, computer data or other information. Digital communications technology generally permits higher speeds of transmission with a lower error rate than can be achieved with analog technology. When analogue signals are received and amplified at each repeater station, any noise is also amplified. More reliable than analog for transmitting data signals.
- ISDN:** Integrated Services Digital Network. This is switched network providing end-to-end digital connection for simultaneous transmission of voice / video and data.
- IVR:** Interactive Voice Response. A computer software generated service that accepts a combination of voice and touch-tone keypad selection to help search for or provide information through the phone line.
- NRS:** National Relay Service. A 3rd party operation that helps facilitate communication allowing TTY users to contact hearing people who do not have a TTY (and vice versa) through the telephone line.
- Smart Kiosk:** A facility where you touch the windows to send or get information. This could include travel information (trains, trams, etc.), shopping, banking, purchasing theatre tickets and government services. Each kiosk may have its own special information depending on where it is available.
- SMS:** Short message service. A text based communication application available on mobile phones.

**Telecommunications:** Any transmission or signal reception (including voice, data, video) by phone line, radio, optic wire, etc.

**3D:** Three dimensional. Being able to see an object in its true shape.

**3rd generation mobile phone:** Emerging mobile phone that includes new and more powerful applications such as multimedia messaging service (eg; video) as well as voice, data, internet, email and fax.

**TTY:** A machine that allows coded signals (alphabetic letters and numbers) that can be transmitted through the phone line. A device used by deaf people to communicate in text.

**Videoconferencing:** A two-way telecommunications service that allows live video images and speech of participants in a conference to be transmitted between two or more locations. Effective videoconferencing services generally require digital transmission.

**Videophones:** A compact telephone device that includes a video screen allowing visual communication between users. Generally requires digital and high bandwidth (min. 128Kbps) to allow for sign language communication.

**VoIP:** Video over Internet Protocol. Using a computer with a camera, visual communication is achieved when a 'phone' link is made through the internet. Effective visual communication requires having high bandwidth and / or own cable line access.

**VRI:** Video Relay Interpreting. Having access to videoconferencing facilities (or videophone), a Deaf person will be able to use Auslan via sign language interpreter (also accessing videoconferencing facilities), who then relays the communication to a hearing person using a standard telephone. Like the NRS, a conversation can occur between the two parties with the 3rd party (sign language interpreter) facilitating.

**V.18:** An international technical standard that can be integrated into modems allowing all forms of text communication technology such as TTY's, computers (ASCII) to communicate with each other.