

**ITU Workshop on
“Making Media Accessible to all:
The options and the economics”**

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**Sign Language Interpretation in
Broadcasting Service**

**Takayuki Ito, Dr. Eng.
Executive Research Engineer,
NHK Engineering System Inc.
itou.Takayuki@nes.or.jp**

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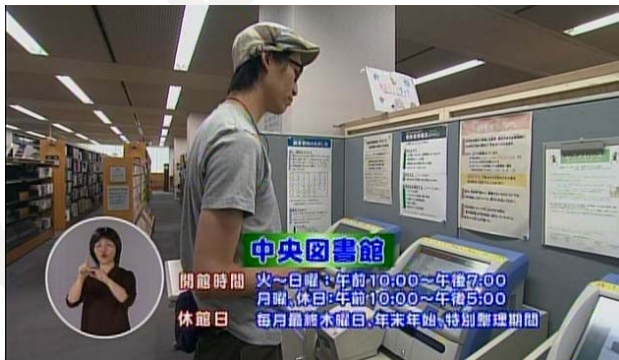
Sign Language Service in Broadcasting

- Sign language (SL) is the first language for deaf people.
 - ➔ Deaf people prefer SL to captions.
- Service rate is not satisfactory.

Broadcaster	CC	AD	Sign
NHK G(Japan)	56.2%	5.9%	0.1%
PBS(USA)	~100%	a few	-
BBC One(UK)	99.8%	15.6%	5.6%
KBS(Korea)	99.0%	4.1%	8.4%
CCTV G(China)	75.4%	-	-

How to broadcast SL service? (I)

- Broadcaster mix : "Open signing"
 - Synthesize signer video at broadcaster-side
 - Various appearances of open signing : all users are not satisfied.



SL users	--	++	++
Non-users	--	-	+-

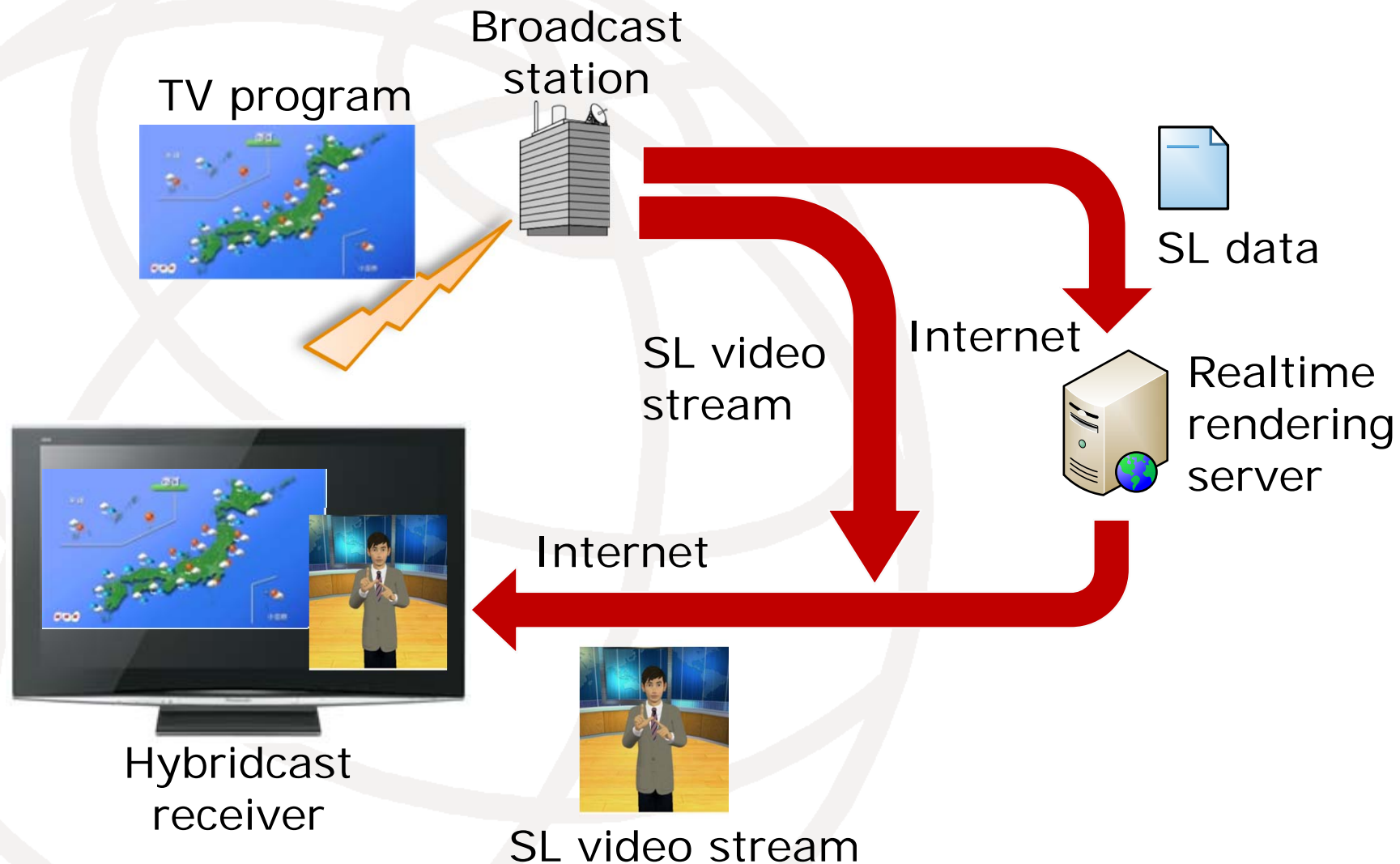
How to broadcast SL service? (II)

- Broadcaster mix : “Open signing” in another stream
 - ➔ If you have enough spectrum, use two channels:
 - one for regular programs,
 - the other for those with SL.
 - ➔ If you have enough time slots, use spare time slots for those with SL.

How to broadcast SL service? (III)

- Receiver mix : “Closed signing”
 - The two streams are sent to receiver-side.
 - Viewers can select on/off and size of SL.
 - Both users and non-users are satisfied.
- (1) Original channel + additional broadcast channel
- (2) Original channel + Internet
IBB=Integrated Broadcast and Broadband
 - Example : HbbTV(Europe)
Hybridcast (Japan)

System image of SL service in IBB (Hybridcast)



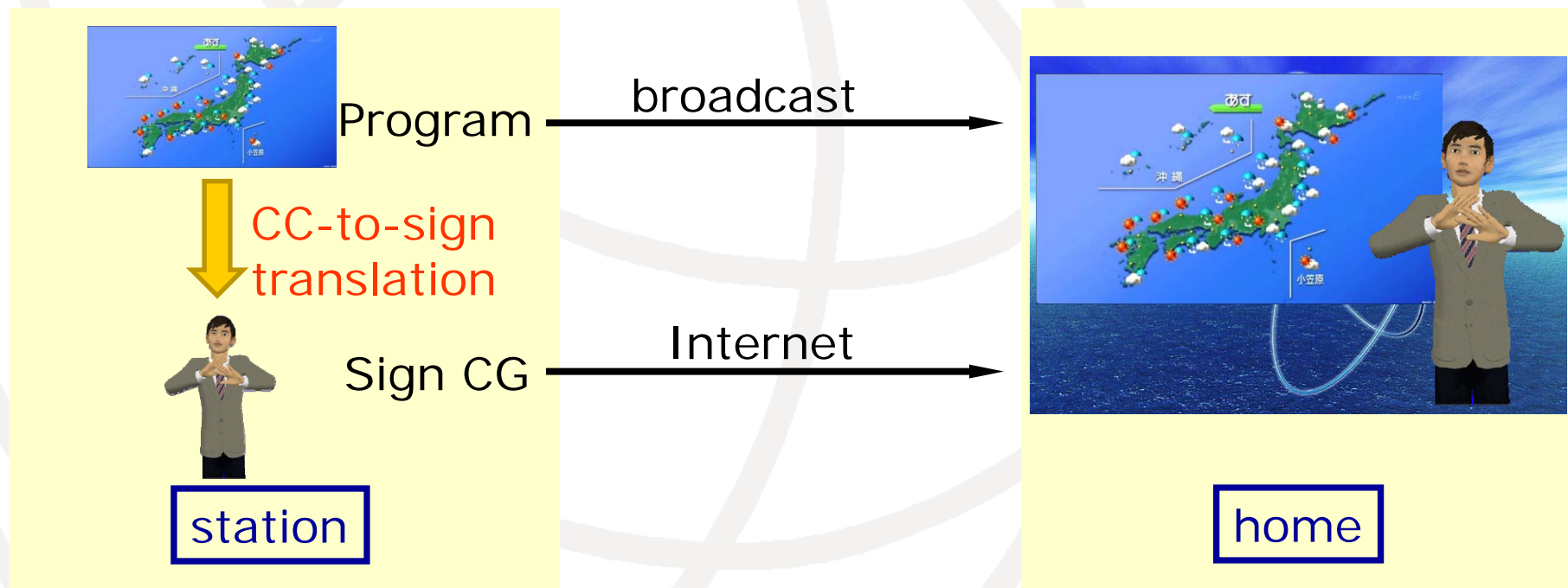
Issues of IBB system

■ Synchronization

- ➔ **Coinciding of start points** of main program and SL video by using time-stamp.
- ➔ **Delays** of generating CG and network transmission **should be taken into account.**
- ➔ Length of SL video should be adjusted so as **the end-point of that would not run over** (may need speed control of SL video).

Automatic SL translation

- Helps to increase SL service, especially for emergency at night,
 - ➔ Automatic SL interpretation to CG avatar is a candidate.



Overview of Automatic Translation System researched in NHK

Input Japanese sentence: 私の名前は金子です (“My name is Kaneko.”)

Convert Japanese sentence into sequence of symbols representing JSL words

[私, 名前, 金子, 言う, N]
(I, name, Kaneko, say, nodding)

Generate signing motion for each symbol (including hand and finger motions, facial expressions, and so on).

Generate seamless motion transitions between each symbol by using motion interpolation.

Corpus of JSL-Japanese

Japanese-JSL dictionary

Computer-animated JSL



Demonstration



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JSL dictionary evaluation web site

- “Nothing about us without us.”
- Gain better quality through communication with deaf society and JSL users

The screenshot shows the homepage of the NHK Sign Language CG website. At the top, there is a navigation bar with the NHK logo and a search box labeled '手話CG検索 (キーワードを日本語で入力してください)'. Below the navigation bar, there is a main content area with a large heading: 'より多くの方にとって「やさしい」手話放送をお送りするために。' (To deliver sign language broadcasts that are 'easy' for more people). A small cartoon character is next to this heading. Below the heading, there is a paragraph of text: '手話は、お住まいの地域や環境、世代によって、幅広い個性を持っています。より多くの方にとってわかりやすい手話放送を作るため、「NHK手話CG」へご意見をお寄せください。' (Sign language has a wide range of personalities depending on the region, environment, and generation. To create sign language broadcasts that are easy for more people to understand, please send us your opinions to 'NHK Sign Language CG'). A red ribbon graphic highlights a text box containing the following text: 'NHKは手話放送を通じて、より多くの方々に情報をお伝えし、楽しんでいただくことを目指しています。その取り組みの1つが「手話CG」です。「手話CG」は手話をCGアニメ化したもので、手話キャスターが放送局に居ない時間の急なお知らせに应用することを目標に研究しています。このCGアニメの手話の分かりやすさについての評価とご意見をいただき、CG技術の改善につなげていくために、この「手話CG評価サイト」を立ち上げました。まだまだ、放送に向けて第一歩を記したばかりですが、ぜひみなさんのお声をお聞かせください。' (NHK aims to provide information to more people and let them enjoy it through sign language broadcasts. One of our initiatives is 'Sign Language CG'. 'Sign Language CG' is a CG-animated sign language, and we are researching its application for urgent announcements when sign language casters are not in the broadcast room. To improve the understandability of this CG-animated sign language, we have launched this 'Sign Language CG Evaluation Site' based on your evaluations and opinions. We are still in the first steps towards broadcasting, but please let us hear from you.) Below this text box, there is a section titled '今月のピックアップ 手話' (This Month's Sign Language Pick) with a sub-heading 'スポーツ' (Sports). It features a small video player showing a woman and a text box: '誰でもスポーツを楽しむ社会を作るために、国が目標を設けているのはご存知ですか？ その目標の1つで、成人の週1回以上のスポーツ実施率が「3人に2人(65%程度)、週3回以上が3人に1人(30%程度)」とのこと。さてこの目標、あなたはどうですか？ ※文部科学省、スポーツ基本計画より' (To create a society where everyone can enjoy sports, do you know the target set by the government? One of the targets is that the sports participation rate for adults is '2 out of 3 people (65% level) once a week or more, and 1 out of 3 people (30% level) three or more times a week'. So, how do you feel about this target? ※From the Ministry of Education, Culture, Sports, Science and Technology, Basic Sports Plan). A button at the bottom right of this section says 'この手話の動画を見て評価する' (Evaluate this sign language video).

Conclusions and Recommendations

- Deaf society prefer SL service rather than CC while, in many broadcasters, service rate of SL is not enough.
- To increase SL service,
 - **Production guidelines** are useful to increase better SL programs. (see **FG AVA Tech. Report Part 11**)
 - **Closed signing service**, which both users and non-users are satisfied, would be a main service.
 - **Automatic translation from CC to SL** is a candidate.
- **Integrated Broadcast and Broadband (IBB)** is a promising **platform for access services**.
 - Technical issues such as **synchronization** should be standardized. (**FG AVA Tech. Report Part 10**)



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Closed sign by broadcast+broadcast

“Listen with your eyes TV”



“Listen with your eye TV” (Japan)
Organization independent from broadcasters
providing access service for TV programs.