ITU Workshop on
"Making Media Accessible to all:
The options and the economics"

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Sign Language Interpretation in Broadcasting Service

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Sign Language Service in Broadcasting

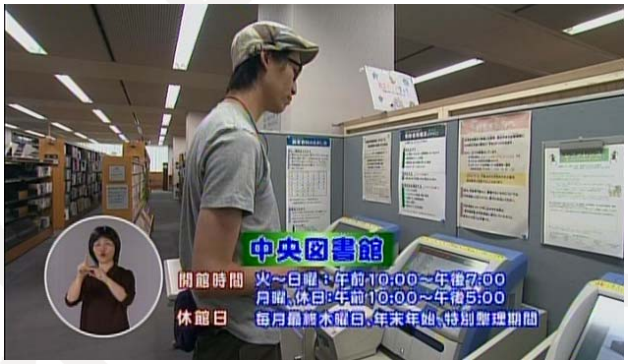
- Sign language (SL) is the first language for deaf people.
  - Deaf people prefer SL to captions.

- 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	--	-	+-

Evaluation

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.

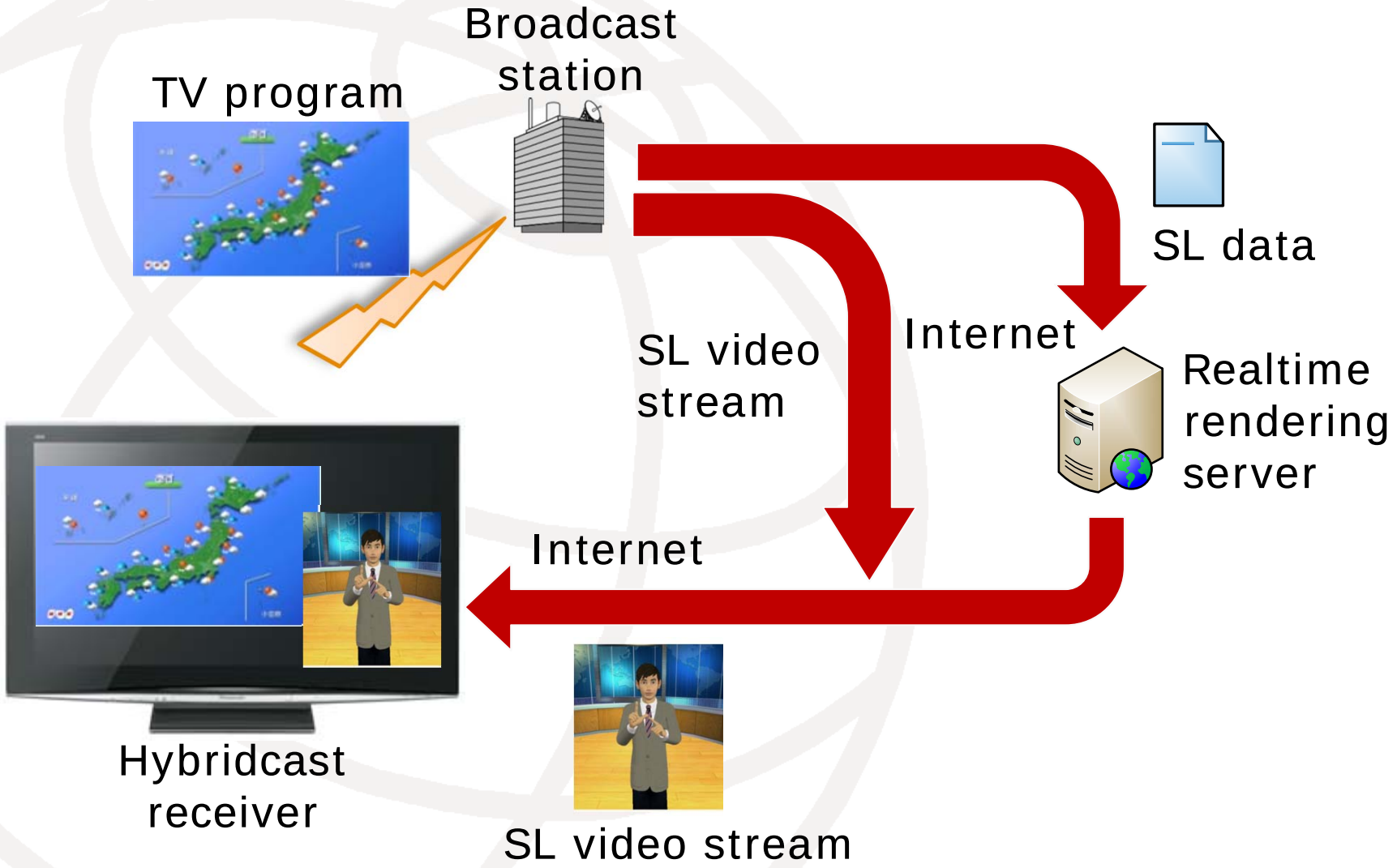
(1) Original channel + additional broadcast channel

(2) Original channel + Internet

IBB=Integrated Broadcast and Broadband

- Example : HbbTV(Europe)
  Hybridcast (Japan)

System image of SL service in IBB (Hybridcast)

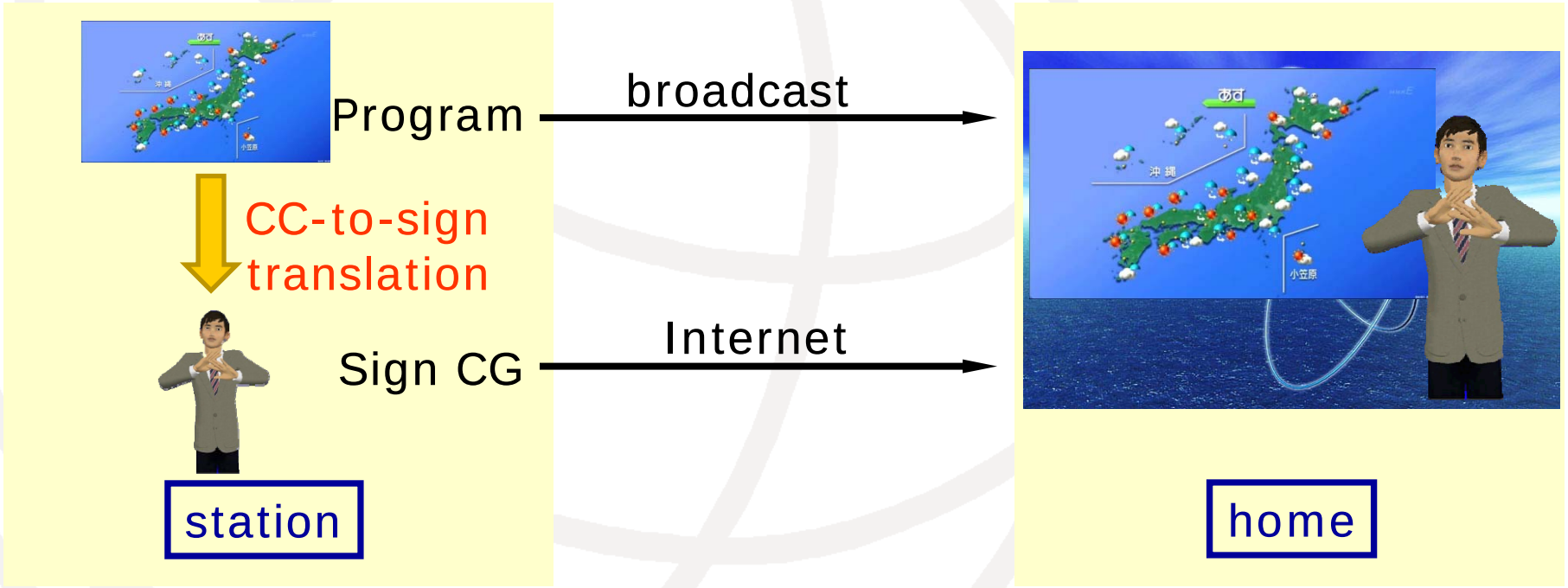


Issues of IBB system

- 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 tranlation

- 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

JSL dictionary evaluation web site

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

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)

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.