

NEC Machine Translation Service and Technology for Mobile Phones

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Background

In a ubiquitous network society,
new forms of communication and new values will emerge.



Creating new ideas Generating mutual understanding

Sharing feelings and ideas Building fellowship and consensus

To create the ubiquitous network society,
it is necessary to break through communication barriers.

Machine translation technology will break through language barriers.

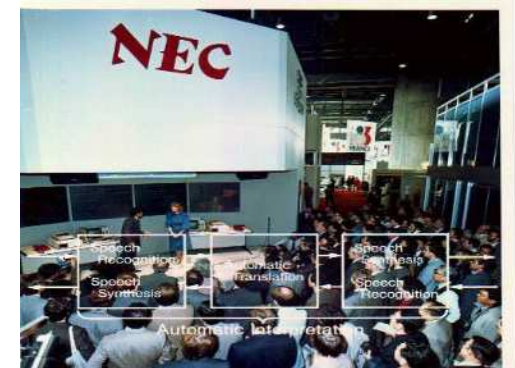
NEC has been developing technologies for C&C concept.

NEC Concept: C&C

- Dr. Koji Kobayashi
 - former CEO of NEC, 1907 - 1996
- Presented C&C, integration of Computers and Communications at INTELCOM 1977 in Atlanta
- Proposed the concept of speech translation telephone at Telecom 1983 in Geneva
- Established R&D and business scheme for C&C.



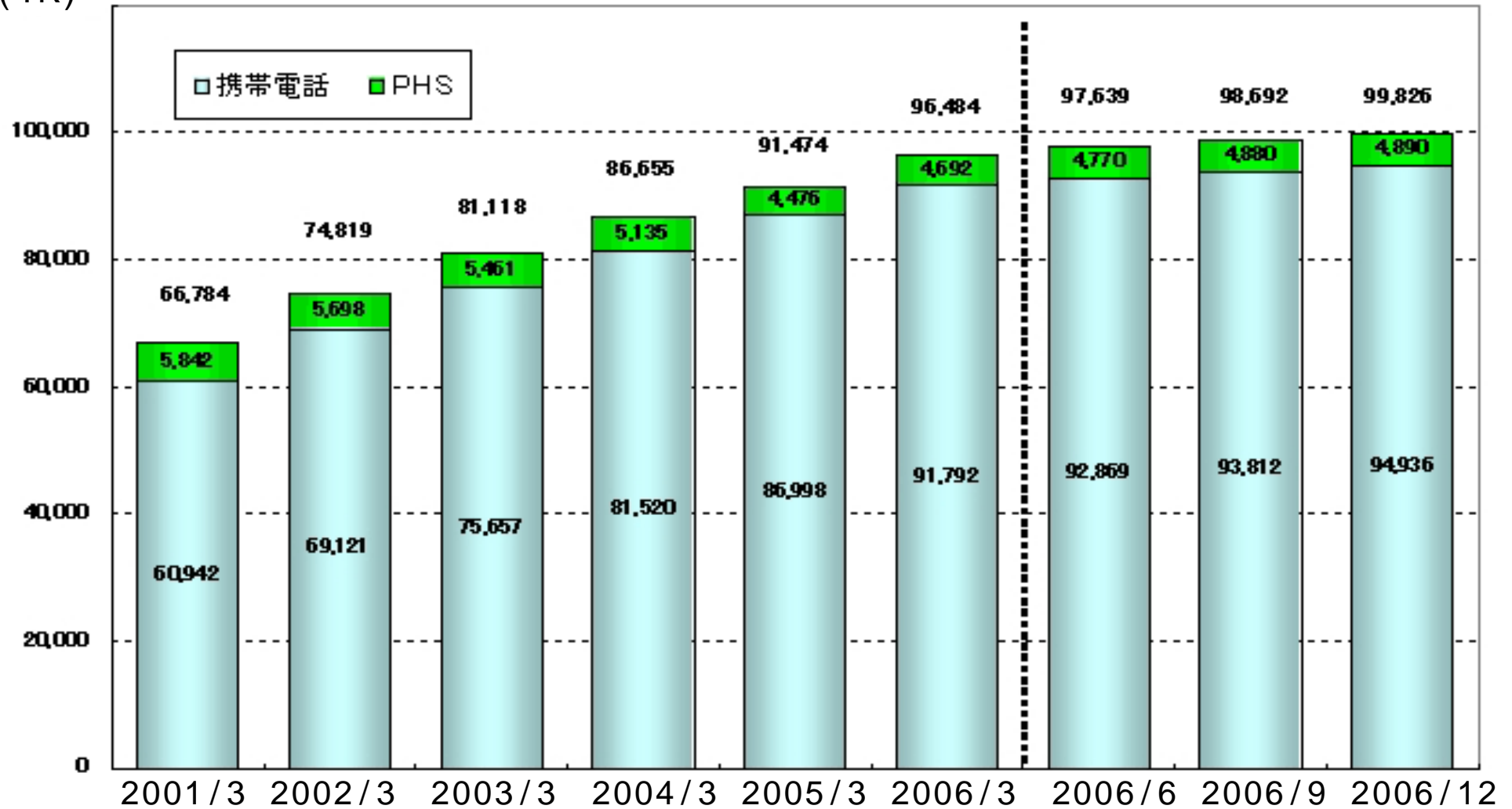
INTELCOM'77



Telecom'83

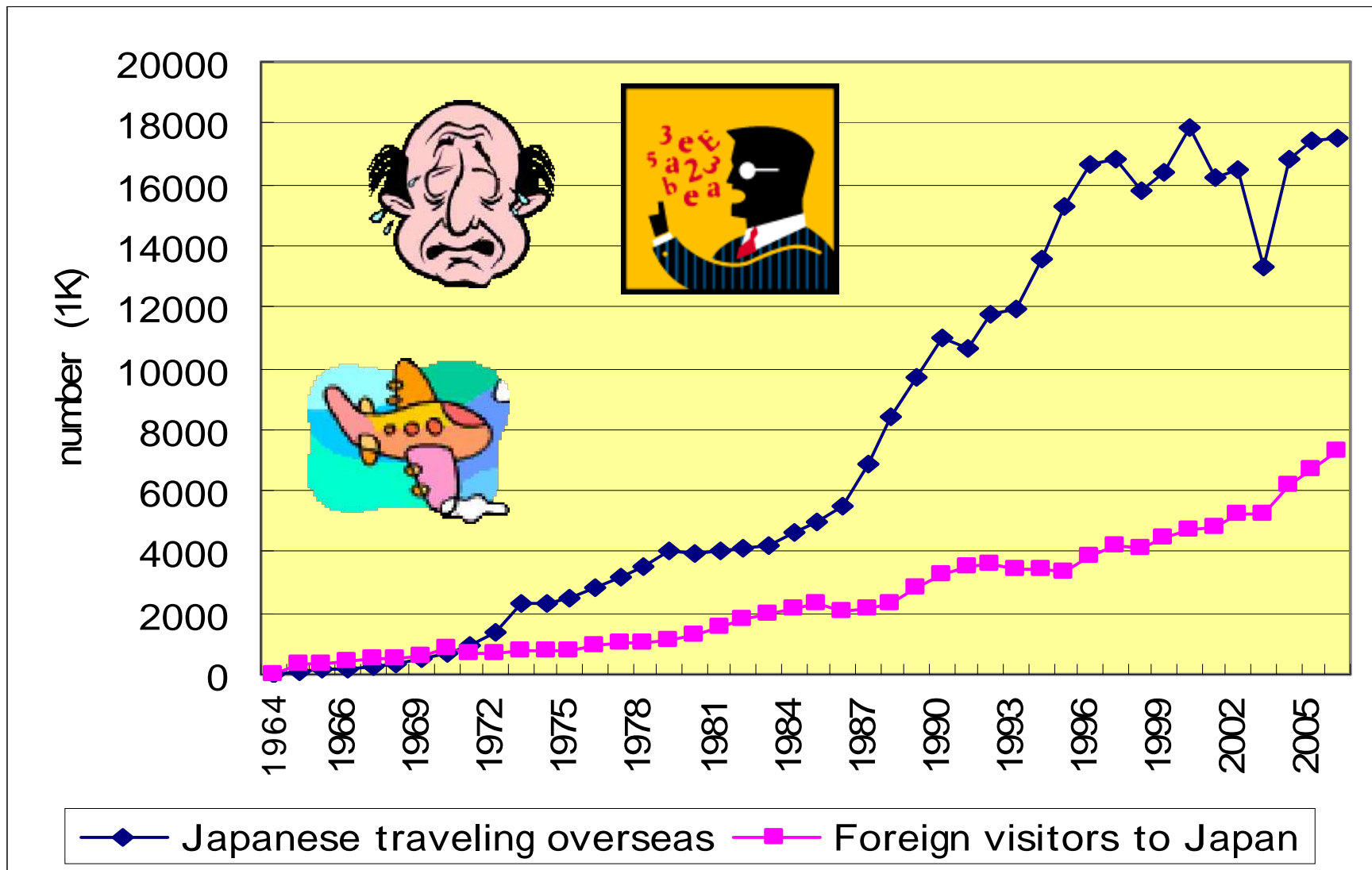
Numbers of Mobile Phone Users in Japan

(1K)



From Report by Ministry of Internal Affairs and Communication

Travelers to and from Japan



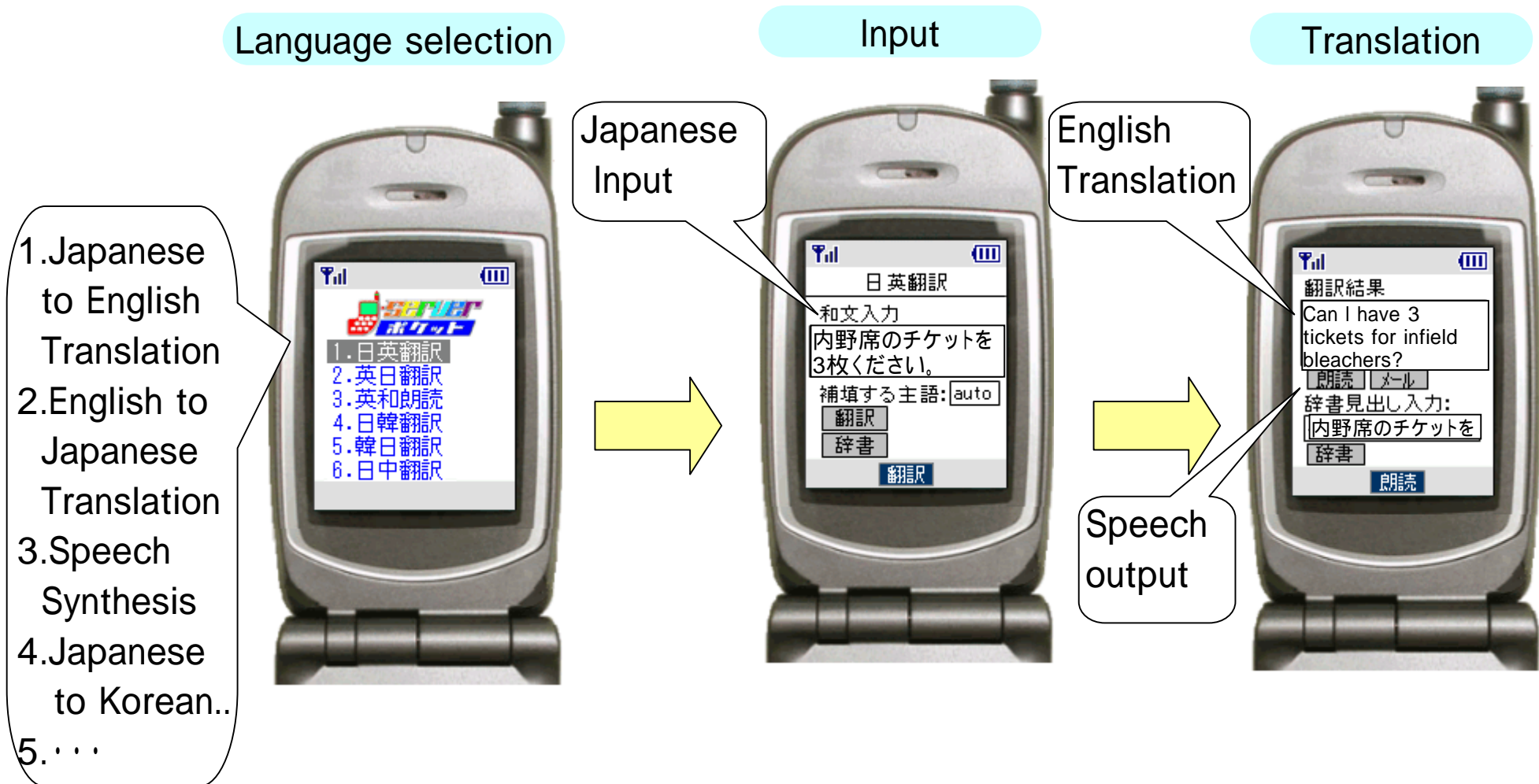
From White Paper on travel by Ministry of Land, Infrastructure and Transport

NEC Text Translation Service for Mobile Phones

- **J - SERVER Pocket** provided by NEC and Kodensha offers mobile phone users bi-directional text translation between Japanese and English, Japanese and Chinese, and Japanese and Korean.
- <http://www.nec.co.jp/press/ja/0501/1101.html>
(in Japanese)
- The service is available via four major portals of mobile-phone carriers in Japan.

J-SERVER Pocket

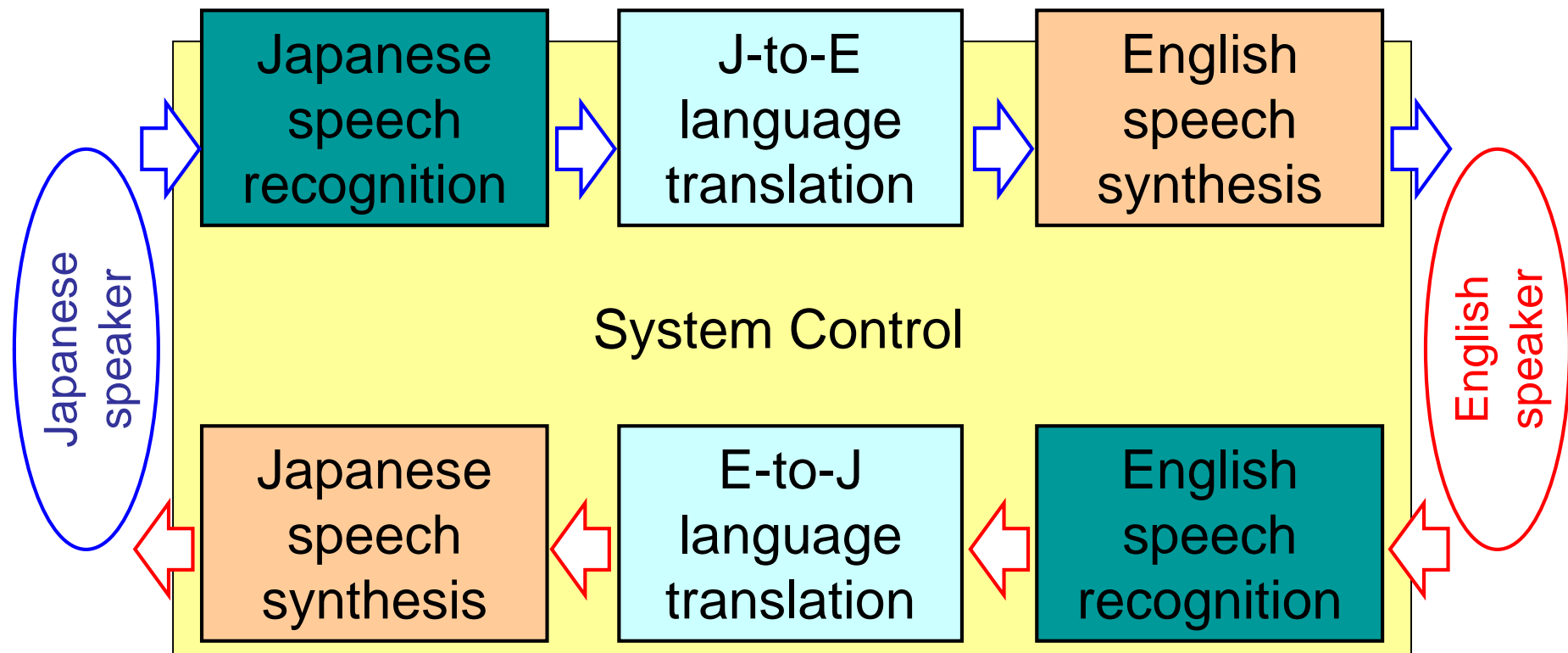
Multi-lingual Translation Service through Internet



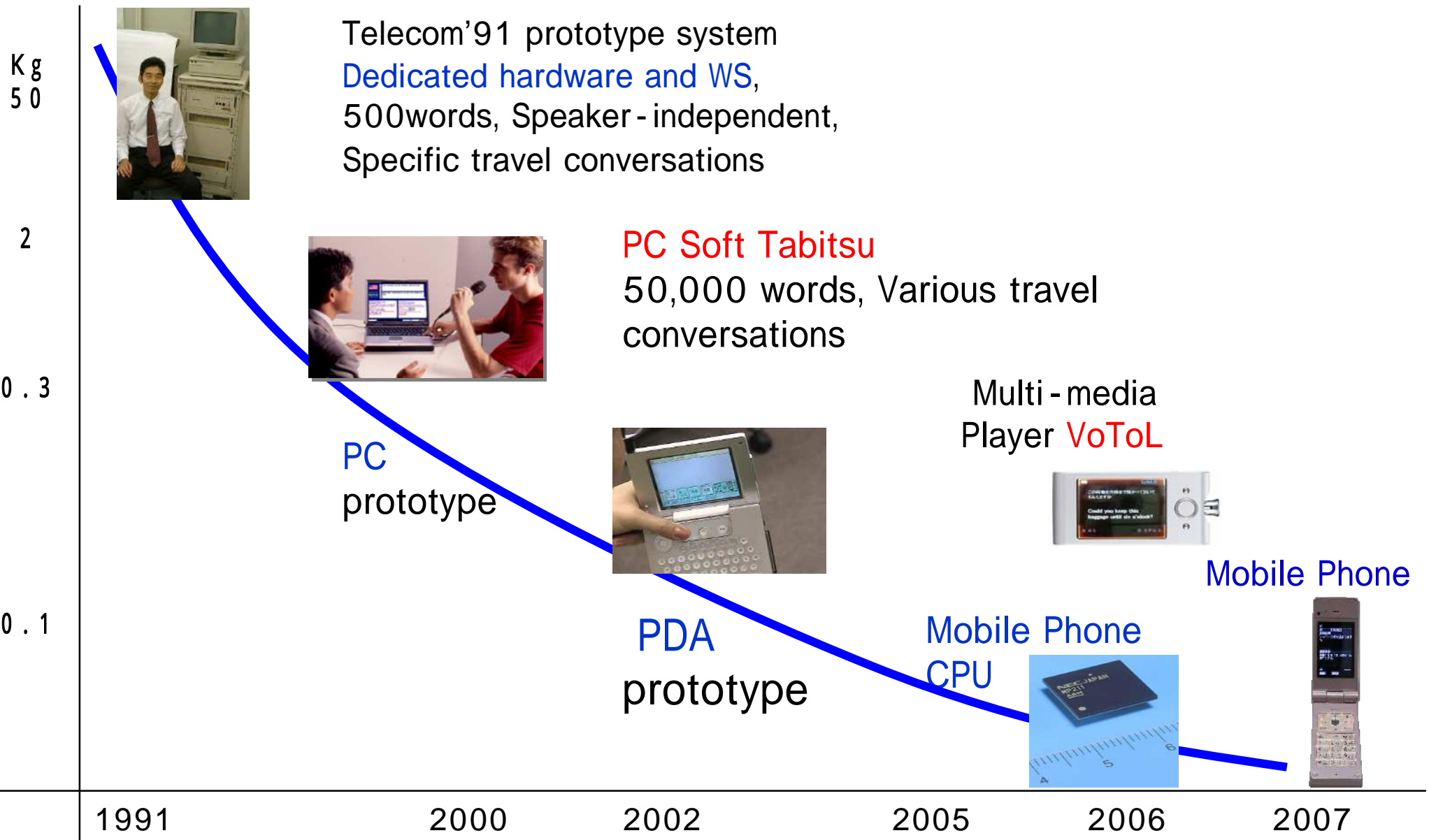
NEC Speech Translation Software

- Speech translation software for embedded devices with low power consumption
- Related URL list
 - <http://www.nec.co.jp/rd/Eng/innovative/E5/top.html>
 - <http://www.nec.co.jp/rd/innovative/E5/top.html>
(in Japanese)
 - <http://www.nec.co.jp/rd/Overview/soshiki/media/natural-language.html>
(in Japanese)
 - <http://www.nec.co.jp/techrep/ja/journal/g05/n05/t050511.pdf>
(in Japanese)
- Press Release
 - <http://www.nec.co.jp/press/en/0601/0401.html>
 - http://www.neceurope.com/news_and_events/news_archive_2005/24_october_2005.html
 - <http://www.nec.co.jp/press/ja/0501/1101.html>
(in Japanese)
 - <http://www.nec.co.jp/press/ja/0711/3002.html>
(in Japanese)

Speech Translation System Overview



Progress of Speech Translation Software and Devices



Compact Implementation on PDA and Mobile Phone

- Speech recognition
 - decreased memory size of acoustic model and decoder by reducing total number of Gaussian mixtures and by improving dictionary structure
- Language translation
 - decreased memory size by using external storage effectively and improving internal data structure
- Japanese speech synthesis
 - decreased memory size by improving pronunciation dictionary structure and speech synthesis units

cf: Isotani et al., "An Automatic Speech Translation System on PDAs for Travel Conversation", Proc. ICMI'02, pp.211-216, Oct. 2002.

Mobile Multimedia Player *VoToL* featuring Speech Translator

- ◆ Provide users with music and video playing functions as well as speech translation between English and Japanese

<http://www.nec.co.jp/press/ja/0602/1401.html> (in Japanese)

Future Work: Communication Agent

- Communication Agent can help mutual understanding by filling in gaps between messages and background knowledge.
 - Rich-media message creation robot is the first step.
- Related URL list
 - <http://www.nec.co.jp/press/en/0703/0501.html>
 - http://www.incx.nec.co.jp/robot/english/robotcenter_e.html
 - <http://www.nec.co.jp/press/ja/0703/0501.html> (in Japanese)
- Related Papers
 - Okumura et al, “Multimedia Blog Creation System using Dialogue with Intelligent Robot”, Proceedings of the ACL 2007 Demo and Poster Sessions, pages 9–12, Prague, June 2007.
 - Okumura et al, “Evaluation of Multimedia Blog Creation System using Dialogue with Intelligent Robot”, FIT2007 (The 6th Forum on Information Technology), LE-009, pp.135-138, September 2007 (in Japanese)

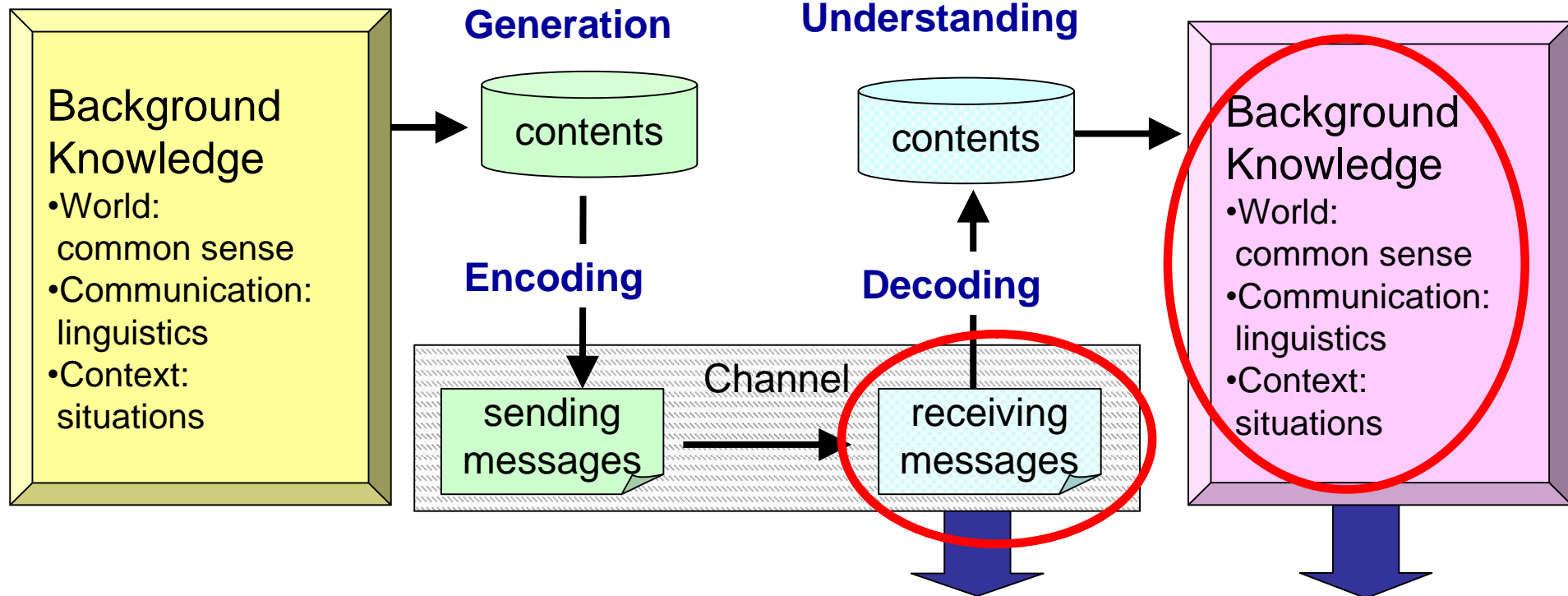
Understanding Model using Background Knowledge



Sender



Receiver



Filling in gaps between his messages and her background knowledge can help a receiver understand!

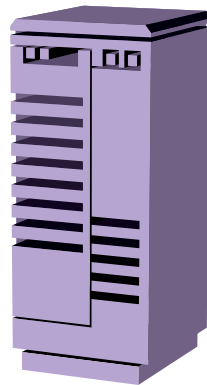
Rich-media Message Creation Robot

- As the first step for Communication Agent, we developed Rich-media Message Creation Robot.
- The robot called PaPeRo creates rich-media blog pages.
 - Recording a video message through dialogue
 - Translating the message
 - Searching related information through Internet.
 - Creating rich-media message in the form of blog pages



Outline of Rich-media Message Creation

Fuyuyasumini Las Vegas ni ittekimashita. Hajimete roulettewo shimasita. Takusan moukarimashita. Totemo shiawasedesu.



Web Server

Blog Creation by Chatting with PaPeRo

First, please push the button on my head and I can start recording you. After you are finished, please push the same button again. I can help you make your blog!

2007/01/05 (Fr) 21:34

key word ラスベガス Las Vegas/ ルーレット Roulette

drawing

song

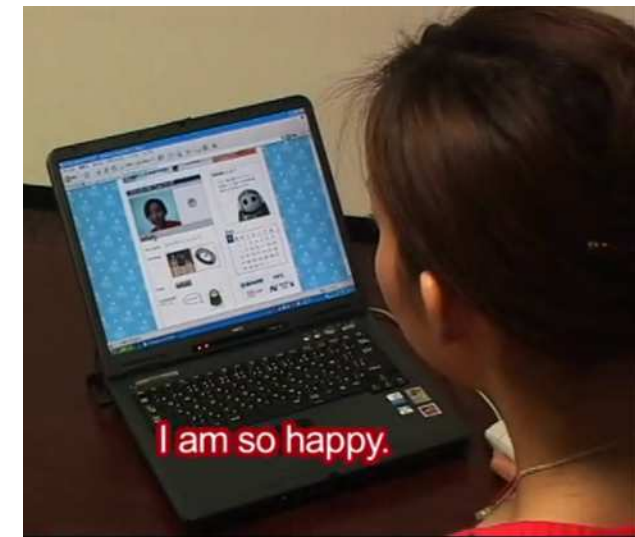
PaPeRo's translation:

I went to Las Vegas in winter holidays. I played roulette for the first time. I earned a lot. I am very happy.

Diary

1	S	M	T	W	T	F	S
-	1	2	3	4	5	6	
7	8	9	10	11	12	13	
14	15	16	17	18	19	20	
21	22	23	24	25	26	27	
28	29	30	31	-	-	-	

Video Demo



Summary

. NEC C&C

- C&C, integration of Computers and Communications

. Translation Service and Technology for Mobile Phones

- Text Translation Service for Mobile Phones
- Speech Translation Software

. Future Work

- Rich - media Message Creation Robot
- The First step for Communication Agent

Thank you very much. Grazie mille.



ありがとうございました。 Arigatougozaimashita.

Empowered by Innovation **NEC**