

## Trilingual computers span globe with words

TOKYO (AP) — "Moshi-moshi," a Japanese researcher said into a microphone.

Eight seconds later, a computer in Pittsburgh gargled the translation: "Hello."

Thus did people and computers in Japan, Germany and the United States begin a transoceanic chat yesterday in the first international test of a system that transforms spoken words from one language into another without a human interpreter.

The \$128 million computer has taken seven years to develop. It understands about 1,500 words in Japanese, English and German, said researchers at Kyoto's Advanced Telecommunications Research Institute.

Sales of the system are unlikely for another 10 years because of the high costs — the current system uses four powerful computers — and because of the challenge of understanding everyday speech.

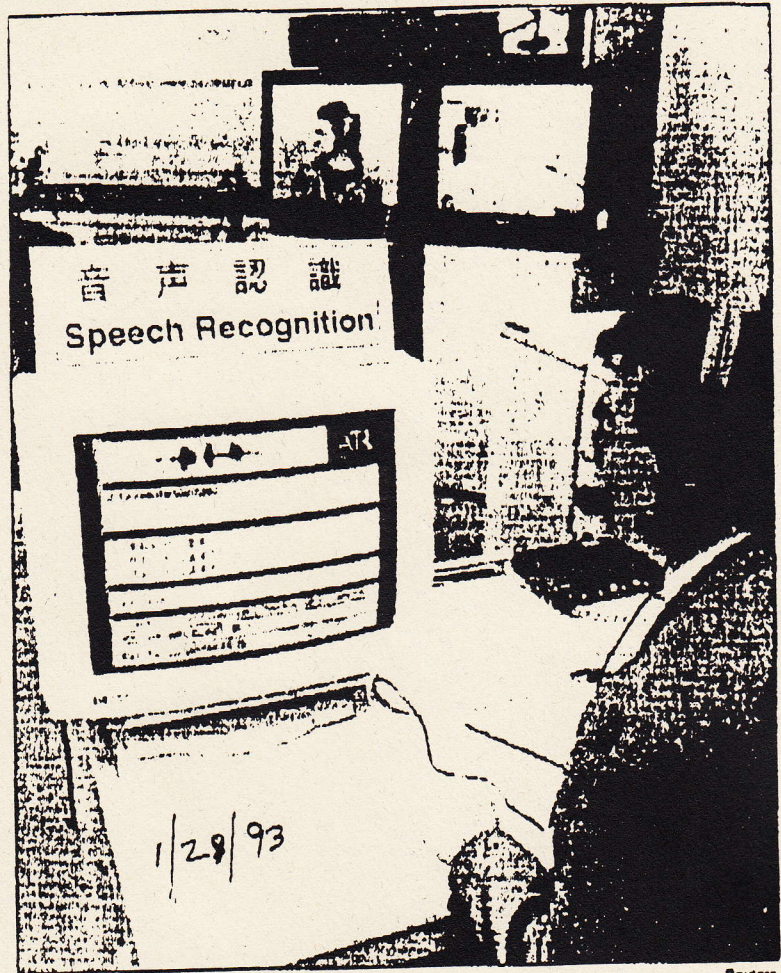
Japanese researchers conversed for about 15 minutes yesterday with colleagues at Carnegie Mellon University in Pittsburgh, then with electronics giant Siemens AG in Munich.

The sentences were recognized and translated into written text by a computer, which sent the words by modem over a telephone line. A voice synthesizer on the other end "spoke" the translated words.

"It was a success," said Shigeaki Sagayama, the head of speech-processing for Advanced Telecommunications. "It recognized and translated all of the conversation."

Researchers agreed in advance to talk about an imaginary conference, and likely phrases — such as "This is the conference office. May I help you?" and "I'd like to apply to attend the conference" — were programmed into the computer.

For the foreseeable future, Mr. Sagayama said, automatic translation systems will be limited to particular kinds of conversations be-



A researcher in Kyoto, Japan, works with a computer that translates words spoken in Japanese, German or English and transmits them overseas.

cause errors increase dramatically as topics and vocabulary grow.

"For a subject like this, we can translate about 90 percent of common expressions. That's quite a lot," he said.

"The system might be used by rental agencies or hotels for reservations when multilingual staff aren't available and the range of conversation isn't too broad," he said.

The program allows some variation in phrasing, but it can't understand unusual forms of speech.

Each new user of the system must introduce his voice, a process that takes two or three minutes. Once the computer learns a vocal range, it can understand most words a given person says.

Current computer speech-recognition devices are quite primitive,

largely because of the difficulty of determining when words and sentences begin and end and the inability to incorporate context, which is key to meaning.

Matsushita Electric Industrial is selling a speech-recognition device that allows oral programming of videocassette recorders, and Toshiba Corp. has an experimental machine that can take simple orders at a fast-food restaurant.

A variety of computer programs can "read" text to blind people. For a computer, reading and talking are much easier than listening.

The Kyoto lab, established in 1986, is sponsored by the Japanese government and private telecommunications, broadcast and electronics companies.