

The Advanced 800 Service Speech Recognition Feature Gives AT&amp;T . . .

# The Competitive Edge

BY CHRISTINE WARING

AT&T is the first long-distance carrier to provide voice-activated call routing in an 800-service network, thanks to speech recognition technology developed at Bell Laboratories.

A new network-based feature, called AT&T 800 Speech Recognition, allows AT&T Advanced 800 Service subscribers to automatically route calls — even those associated with dial-pulse telephones (rotary and key-pulse) — through commands spoken by callers. It will complement an existing service, called AT&T Call Prompter, which lets callers using “touch-tone” telephones direct their calls by responding to menu prompts through their keypads.

## Filling the Need

A 1991 study by the Advanced Telecom Services Group, an independent market research firm, found that 39 percent of the telephones in the U.S. are dial-pulse. When callers with rotary or key-pulse phones reached an advanced 800 number, they typically had to wait for a representative to route their calls.

Now, AT&T Advanced 800 Service customers who subscribe to the speech recognition feature will be able to prompt their callers to speak a number — from “one” through “nine” — corresponding to a menu of options identifying the department or location they wish to reach. The feature will lower a subscriber's costs because fewer operators will be needed to route its 800-number traffic, caller requests will be handled faster and call duration times will be shorter.

## How it Works

When a call is made to an AT&T 800 number, it is switched by the local exchange carrier to an AT&T 4ESS™ network switch, which queries the Network Control Point (NCP) database for information on how to route the call. If the called customer has subscribed to AT&T Speech Recognition, the NCP signals the switch to

AT&T 800 Speech Recognition will prompt callers to speak or dial a number identifying the department or location they wish to reach.

instruct a peripheral device — called the Network Services Complex — to play an announcement and then collect the caller-entered response. The response can be either in the form of a spoken number (“one” through “nine”) or a touch tone.

The centerpiece of the patented AT&T 800 Speech Recognition service is the Automatic Speech Recognizer (ASR), a device that resides in the AT&T network within the Network Services Complex. Dan Krasinski, MTS, Services and Speech

Technology Department, Indian Hill Park, explains that the ASR's software program developed within his department analyzes and matches callers' spoken words to speech models within the program. The software program was based upon an algorithm originally developed at Murray Hill's Information Principles Research Laboratory.

“Once the caller speaks his or her selection, the ASR takes the number and converts it to signaling information, which results in the call being routed over the AT&T network to the appropriate destination,” explains Krasinski.

Norm Tiedemann, MTS, Network Services Complex Development Group, Indian Hill, says his organization has implemented the ASR program on hardware attached to the Network Services Complex. This equipment will be installed in about 20 4ESS switching offices across the country by the end of the year.

## Built on Past Development

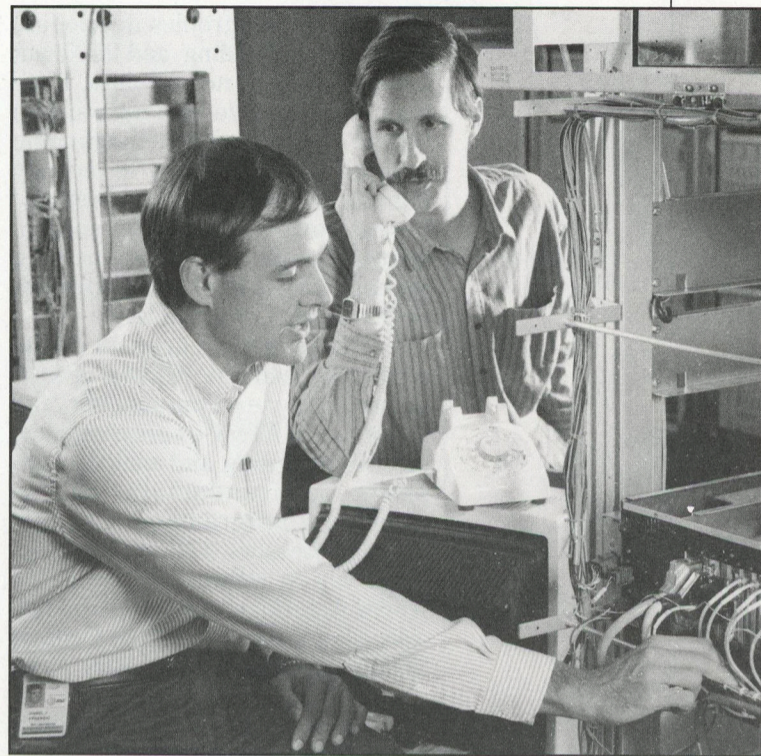
The ASR is built upon technology originally developed in 1989 for Spain's telephone network. “Only 3 percent of Spain's phones were touch-tone at the time. AT&T won a contract to supply the country with an intelligent network, including several 5ESS® switches and other network components. The speech recognizer understood ‘uno, dos, tres’ (Spanish for ‘one, two, three’),” Tiedemann recalls. In 1991, British Telecom wanted to expand its network to include speech recognition, and AT&T provided a speech recognizer that understood “one” through “four,” “yes” and “no.”

In June 1991, AT&T began an ASR field trial in San Diego for three major AT&T Advanced 800 Service customers — Fidelity Investments, United Airlines and Hewlett-Packard. During the six-month trial, AT&T 800 Speech Recognition's identification of callers' spoken digits was correct 97.8 percent of the time. The customers were pleased with the service and AT&T Inbound Services gave the go-ahead to fund and support further development.

The Speech Processing group, the Network Services Complex Development group and the Toll Physical Design group have been actively involved in hardware and software development for various ASR applications during the past several years. For the Advanced 800 Service application, “Bell Labs has been involved from the requirements phase through implementation, performance verification and support,” Tiedemann adds.

## Other Contributions

AT&T 800 Speech Recognition also draws from two other key Bell Labs advances to make the service more effective, Krasinski notes. One is a “talk through” capability that lets callers interrupt the recorded announcement at any time to speak



Dan Krasinski, left, and Norm Tiedemann use a rotary phone to verify that caller-spoken numbers are being received by AT&T 800 Speech Recognition, installed in the rack at right.

their selection. The other is “word spotting,” in which the system can detect the spoken number when it is embedded in a phrase (for instance, “My choice is one, please”).

The AT&T Conversant® Voice Information System (VIS), a customer premises-based speech recognition product used by businesses for

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applications such as catalog shopping by phone and banking transactions, also has ASR capabilities. Used in tandem with AT&T Call Prompter and AT&T 800 Speech Recognition, Conversant VIS could be used by the business customer to further route callers to specific departments and to provide automated transaction services. Similar ASR technology was applied to automating AT&T long-distance operator services last year.

## Future Development

Krasinski notes that AT&T 800 Speech Recognition represents the latest step in the company's drive to provide its customers with completely automated transaction processing. Development continues to expand ASR's capability to understand the spoken words “zero,” “yes” and “no” within a year or so, he says.

“Eventually, the ability to recognize more meaningful key words and entire phrases will make it possible for automatic speech recognition systems to process callers' orders, dispatch repair crews, provide account information or handle other functions in a cost-effective way,” he explains. ■