Ad Hoc Selection for Voice Over Internet Streams

A method and apparatus for distributing audio streams, in the form of encrypted data packets, to the personal computers of authorized listeners in near real time.

NASA seeks interested parties to license the Ad Hoc Selection for Voice Over Internet Streams technology developed by engineers at Johnson Space Center. This technology features the ability to select specific audio streams from one or more sources and then convert them into a multicast to the user's audio player. This selection ability benefits the user by allowing a wide range of information and/or data to be monitored from a remote location using existing network technologies in near real time.

Benefits

- **Flexible and compatible with industry standards:** Uses proven, standard Voice over Internet Protocol (VoIP) technologies that are currently used in commercial Internet voice and video conferencing systems

- **Private:** Features real-time encrypting of the multicast audio streams to ensure privacy and integrity

- **High capacity:** Integrates multiple audio streams into a real-time, single-audible source without the need for a dedicated connection

- **Individuality:** Allows users to receive audio at any location and individually control volume and muting for each of the audio streams

- **High quality and efficient:** Provides a high-fidelity system with excellent reproduction of voice, using relatively small bandwidth at a low cost

Technology Details

This technology was initially developed to broadcast multiple audio streams through the NASA MCC VoIP system. It is comprised of hardware and software that affect simultaneous, nearly real-time transmission of as many as 21 separate audio streams into multicast streams to authorized listeners via the MCC Intranet and/or the Internet. The technology has provided significant benefits to NASA by enhancing situational awareness among flight-support personnel and management who are located outside of the Mission Control Center (MCC), and it has excellent potential to provide similar benefits in commercial applications.

How it Works

In this patented system, the audio distribution process begins with feeding the audio signals to analog-to-digital converters. These converters create digital streams of MP3 VoIP audio packets. The resulting digital streams are sent through an audio Intranet, using a user datagram protocol (UDP), to a server that converts them to encrypted multicast data packets. These packets then are routed throughout the network to provide access to one or more audio streams concurrently on personal computers of authorized users. By using Internet Protocol (IP) multicast, the total data-processing load on the portion of the system downstream of and including the encryption server is the total load imposed by all of the audio streams being encoded, regardless of the number of listeners or the number of streams being monitored concurrently by listeners.

An authorized user's personal computer must be equipped with special purpose, audio player software. When a user launches the program, the system prompts the user to provide identification and a password. Access control is provided in two ways: (1) the program is hard-coded to validate the user's identity and password on a list maintained on a domain-controller computer, and (2) the program verifies that the user is authorized to have access to the audio streams.

Once both access control checks are completed, the audio software presents a graphic display that includes audio stream and volume control buttons. The user can select up to 21 streams to monitor simultaneously and can mute or adjust the volume of each stream individually.

Why it is Better

This innovation offers significant advantages over competing technologies because it allows multiple users to monitor the activities taking place at various locations by integrating multiple audio streams into a single source in real time. Users can access the audio streams from home, office, or a remote location, and they can individually control volume and muting. The technology is compatible with industry standards, offers excellent sound reproduction, and adds users automatically for networks supporting multicast traffic. The technology does not require dedicated connections, and the total data-processing load on the distribution system is relatively minimal, allowing for wide and secure distribution at low cost.

Patents

NASA's Johnson Space Center has received patent protection for this technology: U.S. Patent No. 7,415,005.

Licensing and Partnering Opportunities

This technology is being made available as part of NASA's Innovative Partnerships Program (IPP), which seeks to transfer technology into and out of NASA to benefit the space program and U.S. industry. NASA invites companies to consider licensing the Ad Hoc Selection of Voice Over Internet Streams Technology (MSC-23349-1) for commercial applications.

For More Information

If you would like more information or want to pursue transfer of this technology, please contact:

msc23349@fuentek.com

For more information about other technology licensing and partnering opportunities, please visit:

Innovation Partnerships Office
NASA's Johnson Space Center
Web: http://technology.jsc.nasa.gov