

Datacasting: A Public Television Solution to Public Safety Communications Challenges

Local public television stations provide a secure data centric network using existing television broadcasts to deliver encrypted video, files, alerts and other data to public safety recipients via datacasting. Recent DHS pilot projects have demonstrated the effectiveness of this datacasting technology. Local public television stations currently reach over 97 percent of the U.S. population, including serving some of the most rural and geographically difficult to serve areas, ensuring that partnerships with public television stations utilizing datacasting can greatly enhance any public safety communications network.

What is datacasting?

Datacasting is the process of delivering computer (IP) data over a traditional broadcast television signal. This turns television stations into a wireless data network. TV sets do not display IP data, so it is invisible to traditional over-the-air viewers. In addition, all datacasting content is encrypted, thereby restricting access to authorized users.

What Advantages Does Public Television Offer?

Television's native one-to-many delivery model uses bandwidth very efficiently. The same model that lets broadcasters deliver the Super Bowl to 130 million people allows a large number of public safety users to be served with a small amount of bandwidth. One Mbps per second (1/20th of a station's capacity) can deliver one live video stream, large files, alerts and other data to an unlimited number of users. Additional video streams serving separate end users would require 500 Kbps of additional bandwidth per stream.

Why is this useful?

Traditional wireless networks establish a separate path to each end user. This means that delivering the same content to 10 users requires 10X the bandwidth, 100 users requires 100X and so on. This lack of scalability can be a problem in emergency situations for cellular networks.

What are the Benefits of Datacasting?

Improve Rural Coverage with Large Geographic Reach:

Because broadcast TV signals are widely available geographically in urban, suburban and rural environments, datacasting coverage typically exceeds that of cellular systems and land mobile radio. For example, digital TV broadcasts can cover 10,000 square miles or more, which is orders of magnitude greater than cellular coverage. TV broadcasts can reach both remote areas, and urban "dead spots" not covered by existing public safety communications systems.

Highly Reliable:

Because datacasting uses the infrastructure provided by a broadcast TV station, it is a highly reliable and available method of communication, and the spectrum never overloads with use.

Unlimited Capacity:

Datacasting is not subject to congestion during emergencies. Unlike other public safety communications systems, datacasting does not need to share infrastructure or capacity with commercial communication networks.

Extremely Efficient and Cost Effective:

Datacasting can be used to multicast data to a large number of users in a cost effective way. Datacasting can be an efficient use of available bandwidth and possibly reduce the cost of commercial service to the public safety agency by reducing the overall demand for bandwidth.

Native Video Technology:

Datacasting leverages a system designed primarily for the transmission of high quality video and audio streams. Thus, it has the innate ability to address the public safety community's desire for high quality audio and video data sharing.

Utilizes Existing Technology:

Datacasting could be implemented relatively quickly and operated efficiently. Many public television stations are already configured to support datacasting. The existing digital TV transmission infrastructure (i.e., power, radio frequency equipment, antenna, tower) is used, so datacasting does not add a significant cost to the broadcaster.

DHS Pilots Prove Datacasting Technology Works

Since 2015, , the Department of Homeland Security's Office of Science and Technology conducted five successful pilots and experiments in Houston, Chicago, Washington, D.C., Boston and rural Washington State, working with local public television stations to utilize public television's datacasting technology to deliver encrypted video and data to a multitude of public safety end-users. The John Hopkins Applied Physics Laboratory released reports on these pilots pointing to the highly effective nature of the tests with officers participating in the tests reporting "that datacasting provided video and audio quality far exceeding current capability (which is frequently non-existent)." One officer reported that "he considered the ability to receive high-quality video in particular to be a life-saving feature."

The technology meshed very well with existing technology and operations and proved to enhance interoperability between different end-users. Public safety personnel involved in the pilots were impressed with the ease of installation of the equipment and ease of use, even with very little training.

Tested Use Cases

With equipment installed at local public television stations and first responder agencies, local public safety officials in Houston have been able to utilize datacasting to enhance public safety in several real-time events including:

- Providing seamless communications and security between multiple agencies during a 2016 Presidential debate;
- Increasing situational awareness and mitigating potential safety issues at a NCAA Men's Basketball Final Four Tournament;
- Quickly survey flooding damage, filling capability gaps and sharing live video feeds of impacted areas during the 2016 floods;
- Enhancing safety and security at the 2017 Chevron marathon which safeguarded the event and maintained situational awareness through the uses of live streamed video footage.

The DHS pilots and other uses cases prove that public television can provide solutions for the current communications challenges of the public safety community and that public television can be a valuable partner for public safety networks going forward, including FirstNet. Public television stations stand ready to partner with first responders and public safety officials to enhance their public safety communications networks with Infrastructure that is largely in place today, reaches nearly every corner of the county and does not face the bandwidth constraints of traditional communications networks.