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A STUDY OF MICROWAVE TELEVISION FOR TRAFFIC SURVEILLANCE IN TEXAS

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TEXAS TRANSPORTATION INSTITUTE

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A Study of Microwave Television for Traffic Surveillance in Texas

by

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Even though closed circuit television systems have been used for traffic surveillance for over 10 years, there are not many systems in operation today because of the lack or organization and staff to operate the systems. However, urban areas are now beginning to develop these operational systems, and the need for closed circuit television is becoming more apparent as these agencies design, install, and operate traffic surveillance and control systems. These traffic systems are being designed along urban freeways, but the area of influence is being expanded to include the street network that supports the freeway. Visual sur-



Figure 1. Microwave receiver installation at the Surveillance Center.

veillance of the area from the freeway is impossible and the establishment of an adequate electronic surveillance system of detectors and computers is impractical during the early stages of development. A video surveillance system of a portable design, capable of being moved to several locations, offers considerable promise for urban freeway-arterial network projects.

The objective of this study was to design, procure, install, operate, and evaluate for traffic surveillance a typical microwave closed circuit television system which uses microwave transmission of the video signal.

Conduct of the Study

A survey was made of the television industry to determine the equipment that was available for microwave transmission of video signals. A typical system was designed around available transmission equipment and the other video equipment necessary to complete the television system was designed according to the experience gained through the operation of the television surveillance system on the Gulf Freeway in Houston. The State Department of Highways and Public Transportation received three bids on the system and awarded a contract to the low bidder of \$14,599 for the installation of a one-camera system.

The system was installed at the intersection of Wayside Drive and Telephone Road near the Gulf Freeway in Houston, June 1972. The monitor was located in the Gulf Freeway Surveillance Center and the quality of the video transmission was compared to that of direct cable transmission from 14 cameras positioned along the freeway. Maintenance records of video and control systems were kept for both types of transmission systems.



Figure 2. Television camera and microwave transmitter installation at Wayside Drive and Telephone Road.



Figure 3. Monitor for the microwave television system.

Results of the Study

Results of the study suggest that microwave transmission for closed circuit television systems for traffic surveillance is technically feasible and economically competitive to cable systems, especially for long transmission distances.

1. Horizontal resolution is limited by the microwave system, but vertical resolution is approximately equal to the cable system. The quality of the picture was not impaired by the microwave link which was approximately 1000 meters.

2. The system reliability was better than the cable system. Most outages were caused by lightning.

3. Cost of installation of cable for long distances can only be justified if several cables are installed at the same time. Microwave systems are very cost competitive when individual links or long distances are considered.

4. The portability of the system is a distinct advantage over cable systems. The microwave system can be relocated within a 5- to 10-mile radius for less than 1,000.

Based on the experience of three years of operation of the microwave system, the following recommendations are made:

1. Microwave transmission should be included in consideration of alternate designs for CCTV systems for traffic surveillance.

2. The use of microwave for transmission of traffic data and signal controls in urban-wide surveillance and control systems should be considered.

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