Chapter Five Considerations for Future Technologies

Traditional methods of data collection are both time consuming and relatively expensive. Indeed, reliance on traditional data collection may in the short term make full implementation of SRA performance monitoring infeasible. It is clear, however, that advances in both collection methods and data processing will significantly reduce the cost and improve the quality of data available for performance monitoring.

This chapter of the report addresses issues of technology and future opportunities for SRA performance monitoring.

Several technologies now under development and implementation may be cost effective and appropriate for use in monitoring traffic on the SRA routes. In some cases, the technologies are proven and indeed in the process of implementation. In other cases, the technologies are in various stages of research and development.

Among the equipment and systems which are potentially available and show the most promise for use in monitoring performance of the SRA system are:

Traffic Logging Systems— a method of collecting traffic volume data from intersection and/or roadway loop detectors. Traffic data are accumulated in time increments from 5 to 60 minutes and stored within the controller for approximately two months. Data can be downloaded and tabulated using a portable computer connected to the controller cabinet. The advantages of this system is that existing traffic control equipment can be used to collect data, field safety is increased by not having to place and remove count tubes, equipment costs are reduced, and data collection costs are reduced. The disadvantage is that the data collection points may only be located at places where the detectors are already in place for other purposes.

Microwave Detectors—microwave detectors mounted on traffic signal poles can be used to count vehicles by classification and measure speeds by speed range. Data are accumulated in devices mounted in controller cabinets. Advantages of this equipment are similar to loop detection logging systems. Disadvantages are that detectors located at intersections do not measure free flow travel speeds and therefore require installation at locations where compatible equipment is not installed.

Video Cameras—site installed observation cameras can be used for real time traffic data collection, determination of traffic flow, measurement of travel times, etc. Comprehensive data are collected by this system, however, analysis and processing time are increased. In recent years, the state-of-the-art has advanced to where software exists that enables direct translation of video images to data describing presence and speed of traffic.

Global Positioning Systems (GPS)—Real time monitoring of travel can be performed at office locations using transmitters installed in trucks, buses and cars. Detailed trip logs can be documented and on-street performance measured using vehicles in the commercial and

private fleets without driver influence on survey procedures and results. Data processing and tabulation is more efficient. This is a commonly used technology employed by the trucking industry to monitor fleet performance.

Aerial Reconnaissance for Traffic Surveys—Experiments have already successfully demonstrated the effectiveness of aerial photographs in performing studies of vehicle speeds and presence. High-resolution photography, translated to electronic images, can be processed relatively quickly to provide operational performance measures.

Finally, note that data acquisition and analysis that is technologically on the horizon is use of the satellites to actually monitor volume, density and traffic operations. As of 1997, the combination of satellite and high resolution photography have advanced to the stage that real time traffic monitoring is technically feasible. A number of research projects, including one such effort by Ohio State University, have demonstrated the feasibility. Although the costs of the use of satellites are currently high, there is little question that these costs will quickly decline over the next few years. The authors of this report believe that the answer to traffic data collection of most types, and certainly of the SRA system, lies with the use of satellites. It is reasonable to expect that within 5 to 10 years, substantial implementation of satellite-based data collection for traffic will begin. Such technology will eliminate essentially all of the labor associated with the task of data collection. As labor represents by far the greatest cost item, it is clear that in the future, there should be no reason why sufficient data are not available to fully monitor SRA performance.

Summary

This report endeavors to develop a system by which performance of the SRA system, and specific system improvements, can be monitored. However, the pace at which technological innovations are being made is so rapid that it poses a dilemma in arriving at an optimum performance monitoring system. Techniques that are most appropriate utilizing existing technology may be outdated a few years from now.

It is our recommendation, therefore, that the initial performance monitoring system be the least cost-intensive combination of existing techniques that will satisfy minimum needs. Concurrently, IDOT and CATS should carefully monitor advances in GPS-based and similar technologies to determine the appropriate system or systems for long-term application. We believe that an advanced performance monitoring technique will be sufficiently developed for SRA application within the next decade.