**Evaluation of the Advanced Operating System of the
Ann Arbor Transportation Authority**

October, 1999

Executive Summary

These reports constitute an evaluation of the intelligent transportation system deployment efforts of the Ann Arbor Transportation Authority. These efforts, collectively termed "Advanced Operating System" (AOS), represent a vision of an integrated advanced public transportation system incorporating travelers, vehicles and a operation center. The system was deployed in stages during 1997, 1998 and 1999, and this evaluation contains data through calendar year 1999. As such it may be a better indicator of the potential of such a system than a definitive statement on the system's established benefits.

The benefits that public transportation operators seek through advanced public transportation systems are multifaceted; as a consequence this evaluation was designed around multiple studies to gauge the various types of system impacts. Studies included:

Impacts of an Advanced Public Transportation System Demonstration Project: This is a stand-alone overview paper on impacts of the project as a whole.

Transfer and On-Time Performance: AOS significantly improved the on-time performance of bus departures. No consistent improvement was demonstrated in on-time arrivals, however. A systematic investigation of transferring and schedule adherence demonstrated modest improvement during the course of the evaluation.

Safety: The safety study used data from on-board surveys to gauge the extent to which passengers perceived safety improvements, and the extent to which the safety improvements affected their perceptions of safety. The study found significant impact of improvements on the perceptions of female passengers, and in locations that were perceived as the less safe locations within the AATA system.

Driver and Dispatcher Perceptions: Focus groups and a survey were used to gather the initial perceptions of driver and dispatchers regarding AOS. Drivers appreciate certain of the services provided by AOS, especially automatic voice messaging and sign changing. Other aspects seem to receive a less favorable reception; there is concern that AOS may impede driver-to-driver and driver-to-dispatcher communications. Dispatchers report positive results with real-time display information.

Evaluation of Automatic Vehicle Location (AVL) System Accuracy: This study systematically matched the location of AVL-triggered events to known locations on the ground in order to establish the spatial accuracy of the AVL function. The study indicated a median positional error of 85 meters. The distribution of error suggested a some nonrandom process producing the error observed; it may be that intermittent loss of the differential GPS correction was responsible.

Customer Satisfaction and Response to AOS: The study assesses customer response through before-and after on-board surveys. While customers generally indicate favorable response to those elements of AOS that they perceive, there were few changes in customers' overall perception of levels of service

Archives and Records: AATA records were to be used before and after AOS implementation to track changes in on-road incidents, passenger complaints and on-time performance. During the implementation of AOS, AATA record keeping regarding on-road vehicle- or passenger-related incidents changed significantly, precluding a definitive before-and-after quantitative comparision. The report does, however, document significant reduction in passenger complaint activity, potentially indicating passenger perception of improved service with AOS.

AATA Web Survey: A non-scientific sample of visitors to the AATA worldwide web site revealed very favorable responses to web-based provision of transit information.

Telephone System Evaluation: Anticipated telephone system improvements had not been deployed by the time this report was written. The report represents a systematic documentation of the condition of the telephone system before AOS implementation.

Cost Study: Over the longer term, AOS has potential to generate additional operating costs, as well as to save costs in other areas. This study identified no current areas of operating cost increases directly attributable to AOS. The report anticipates future cost savings based on AOS deployment, together with modest costs associated with maintaining AOS itself.

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