of dual-mode bus transportation is the selection of system operating policies. This decision is of immediate concern because of its influence on system hardware and software design requirements. This paper evaluates a station service policy in which the decision for vehicles to stop at stations is made on a real-time, demand-responsive basis. A steady-state analysis of the impacts of demand-responsive station stopping, from the perspective of the system and the passenger, was performed for an urban dual-mode system. The results of this analysis suggest that demand-responsive operation has a more significant impact on system measures of performance (e.g., CBD station flows, vehicle kilometers and hours of operation). These results imply that operating policies for on-guideway, demand-responsive service should give equal priority to system design and operational considerations and to passenger service goals.

DYNAMIC SCHEDULING FOR DUAL-MODE NETWORK CONTROL

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Dynamic scheduling, a new approach to network control, is evaluated by simulation techniques. Although this approach was the concept of synchronous slots, it does not use preprogramming or origin-destination slot reservations as is common to many schemes. Rather it uses a combination of path reservations through interchanges (as each one is approached) and maneuvering-space reservations (for the next interchange). Control tasks concerned with individual vehicles (e.g., scheduling and maneuvering) are handled at the local level, and those concerned with vehicles in the aggregate (e.g., lane flow distribution and entrance flow control) are handled at the central level.

Dynamic scheduling was evaluated by simulations of a variety of networks including directional interchanges, entrance-exit interchanges in a loop, and a 12-interchange urban network. The findings are that (a) flow rates through interchanges will, in general, be limited by the interactions among vehicles maneuvered on the approach lanes; (b) a traveler's expected total longitudinal maneuvering delay and its dispersion increase with both the level of demand on the system and the number of interchanges traversed; and (c) based on simulated egress flow restrictions, blockages appear to be effectively handled by this approach.

DUAL-MODE SYSTEM MANAGEMENT

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Aspects of construction and operation of an effective dual-mode transit system (DMTS) are considered in this paper. A general network geometry model is suggested for guideway configurations. A preliminary result suggests that the CBD guideway might best be a rectangular form. Off-guideway zoning, based on a modified Manhattan distance approach, provides possible zones with a theoretically minimal distance for vehicle dispatching. The present concept of medium-sized vehicles and liberal headways has reduced the degree of complexity of network control problems. However, future research in controls should concentrate on areas unique to dual-mode characteristics.

There is a need for selecting a DMTS network configuration according to an optimal geometry to provide a system with minimum cost. Some methods that can be used to initiate such a study are suggested. However, physical constraints, such as land use and engineering, may yet dominate any changes in the network geometry. As for the command and control of DMTS, this paper emphasizes that future research should be directed toward topics that are particularly significant to the dual-mode characteristics, both in vehicular control and demand-responsive applications.

DUAL-MODE TRANSIT SYSTEM HAVING DEMAND SERVICE, SCHEDULED SERVICE, AND A DYNAMICALLY ADAPTIVE CYCLE ROUTE POLICY

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A dual-mode transit is assumed in which in mode one a vehicle is driven on city streets by an operator and in mode two the vehicle enters a guideway system to travel under automatic control. The system offers point-to-point demand service, scheduled service, and a service called cycle route policy (CRP).

The CRP dynamically recomputes routes and allots vehicles to routes in response to changes in link travel times and demand. Each passenger travels a minimum-time route from origin to destination. The vehicle paths are cycles. Every origin-destination (trip) pair generates a cycle consisting of the minimum-time route from origin to destination and return. In this process several pairs may generate the same cycle. The cycle routes are the distinct members in the set of cycles so formed. The number of vehicles circulating on each cycle is adequate both to service all passenger requests for trips that are generators of the cycle and to provide at least a minimum frequency of service.

The three types of service are compared with respect to cost and the demand conditions for which each is appropriate. A vehicle management system that uses all three types of service simultaneously is recommended. The method applies to vehicle paths on or off guideway.