Computer-Controlled Versus Computer-Aided Dispatching

G. H. McAdoo, Regina Transit System, Saskatchewan

The city of Regina, Saskatchewan, instituted demand-responsive transit on a very limited budget. The author describes the training program designed for the system's initial personnel, who worked without computer assistance, and notes the benefits of the computer programs that are now in use.

In considering dispatching and its function in paratransit operations, we would do well to start with a definition of the dispatching function. In consulting my dictionary, I find that the most appropriate meaning for "dispatch" is "a method of effecting a speedy delivery of goods." As I see it, if we should choose a meaning less than this we have surely missed the prime function required to successfully operate a demand-responsive transit service.

Dispatching must then be considered as the operation in its entirety. The system must become activated immediately on receipt of demand and remain operational until the demand has been satisfied. With this concept of the dispatching function, the discipline of accumulating and distributing information becomes merely one area of the operating sphere. If dispatching should be considered the orderly control of vehicular equipment in order to attain a predetermined objective, the entire operation of a demand-responsive service must be considered the dispatching function.

With this definition, we must consider what activities are involved in the overall function—telephone answering, information storing, communications distribution, and vehicle operations. This group as a whole, and only as a whole, can complete the dispatching function. In order to emphasize this basic principle I shall describe the Regina experience in demand-responsive operations. We do not consider our system unique, nor would it be fair for me to say that this is the way it should be done. We do feel, however, that our operations have been moderately successful, with the primary and basic cause being that the staff participates in a working team, on a work program that can satisfy the individual's need for personal contribution and job satisfaction.

BACKGROUND

In September 1971, Regina instituted an experimental program in demand-responsive transit services. For those who are not familiar with previously published reports, I shall present a short overview. Regina is the capital city of the province of Saskatchewan and has a population of 150,000 persons. The prime employers of the area are the city of Regina and the province of Saskatchewan. Industrially, the city is primarily a distribution center with a few manufacturing industries that are generally agriculturally oriented. The city's public transit service dates back to 1911, at which time vehicles were electrically powered on fixed routes. Basically, this type of vehicle was maintained until 1962. At this time conversion was made to the more flexible diesel-powered vehicles of current transit operations. Unfortunately, the old school of fixed-route transit operations remained in charge, which resulted in a loss of passengers to the more flexible personal automobile.

In 1969 our transportation engineers, realizing the plight of public transit, embarked on a program to investigate the possibility of using the flexibility inherent in new transit vehicles. It was hoped that such investigations would provide a system that could cause public transit to become a workable alternative to the personal automobile. Subsequently, the Regina experiment was designed as a system of demand-responsive services within an area or zone to feed an established fixed trunk route. The area chosen was the high-income district in which transit ridership was the lowest in the city.

Until now nothing has been said that would indicate that the Regina operation might be unique. What I am, in fact, attempting to stress is that the city of Regina's transit operations were completely like those of most Canadian cities of comparable size. What was unique in this experiment was the fact that there was no funding for operations. Money was provided by the federal and provincial governments for such software purposes as feasibility and engineering studies, while the municipal government was to provide operational funding. But with growing transit deficits and an apparently bleak future for transit operations, the urban government was not sympathetic to further expenditures. In addition, the idea of buses running around from door to door to gather and distribute their passengers was ridiculous to some. Surely if transit buses operating on fixed routes were a losing proposition, then the time involved in doorstep
peaked at 8:00 a.m. Our dispatcher and operating team were as well prepared as possible for the situation. Calls began to roll in moderately at first but with an increasing tempo, and they peaked at 8:00 a.m. Our dispatcher and operating team were working beyond capacity. Calls continued to flow in, with backlogs developing. Something had to be done, but what? There was no extra equipment available and, even if it were, by the time it was in service the backlogs would be in a hopeless state.

Here is the resourcefulness of the human brain, coupled with a conscientious working team, made an obvious adjustment to meet the situation. Since vehicles can only make so many house calls within a given time, the objective was to permit the system to collect more persons per stop and to eliminate as much driving distance as possible. People calling in were directed to walk to a neighboring address where somebody was already awaiting a bus. Others were directed to go to a certain street where the bus would be passing within a few minutes. In this manner the morning rush was accommodated and pressures dropped by 9:00 a.m. A count of the recorded pickups revealed that, between 6:30 and 9:00 a.m., the dispatcher had processed 360 transactions. Each involved receipt of a call, dispatching a communication, and operator responses; many also involved inter-vehicular cooperation at fringe zones.

Surely that morning was the moment of truth and the proof that the system would work. It was also the proof of what had really happened in the training program. We had not had the budget for a computer-assisted program, but our training program had produced many human mini-computers—minicomputers who could think and adjust, who had feelings and compassion, and who had an operating cost of $5.50 per hour. Herein lay the ultimate secret of success or failure of any such venture.

**PLANNING THE SERVICE**

First, an accounting of available resources had to be made. At our disposal was a fleet of regular transit buses that would be freed by the elimination of many fixed routes within the area. Second, we had the good fortune to have had some of these vehicles radio-equipped. Third, we had manpower, and this had to be the prime resource that could make or break the entire project.

The course of action now was to systematically build a public-relations-oriented door-to-door pickup and delivery transit service. It was realized at the outset that our success or failure would hinge on the operating personnel. The prime task confronting management lay in the training and indoctrination of personnel. Training programs were immediately instituted. Personnel were given a classroom session that began with general public relations and department responsibilities and concluded with an orientation to demand-responsive services in principle, practices, and expected results. Then came the simulated operations. Operating personnel were taken on location and presented trip tour sheets complete with pickup and drop-off addresses. The principle of the game was to have the operator accurately plan and execute, from a map provided, a route that would lend itself to the maximum convenience of the passengers and still return to the point of departure within a predetermined time.

With a well-planned training program, we can give our personnel an appreciation of the objectives of the operation and, more important, an appreciation of their contribution to the success or failure of the operation. No longer are personnel merely pawns in the organization’s structure. They now have a position of responsibility, of involvement in decision making, contributing to the success or failure of the overall objective.

Having created this team, we entered the field of operation. Here was the proving ground for our planning. Our operations were small at first—a dispatcher and one radio-equipped bus with operator. Our planning told us that operations should run smoothly, as they certainly did through the first day. Not a hitch was encountered, nor should it be with a well-trained team. On the first day we carried eight passengers in an 8-hour shift. As the days passed, the number of passengers grew and more buses were added. Another zone was added and there were more passengers and more buses. As winter arrived again the number of passengers grew, buses were added, and another zone was added. By this time winter was fully upon us. Our system was operating effectively and nearly flawlessly.

Then came the crunch, as it can only come in a western Canadian climate. As the day broke at 6:00 a.m., the temperature was -41°F (-44°C). Only those who have experienced such conditions can fully appreciate how devastating they can be to the personal automobile. Our dispatcher went to work with the telephone in one hand and the radio transmitter in the other. His fleet of buses and operators were as well prepared as possible for the situation. Calls began to roll in moderately at first but with an increasing tempo, and they peaked at 8:00 a.m. Our dispatcher and operating team were funded indeed created operational hardships since costs had to be maintained within the predetermined budget. The consequences of this restriction placed the department squarely behind the eight ball. It became very obvious to the management team that, in order to maintain credibility, the idea of demand-responsive transit must not fail.

**COMPUTER USE**

By now I may have given the impression that the computer and its assistance are not required in our or any similar operation. This is not so. We in Regina now use a computer to assist in dispatching. Our passengers are divided into those with permanent bookings and those who book on demand. Regular riders are programmed into the computer files according to the days service is required and the time of day the trip has to be made. Daily printouts are produced on the operators’ trip sheets and are distributed to the operating personnel. This provides a convenience to the passenger since one call to the control center can establish a regular daily pickup. Should this service not be required during a given time (vacations), a simple call to our dispatcher can suspend or reinstate service as required.

Among those who prebook are many students who use the system five days a week with the exception of regular and special school holidays. Needless to say, a lot of work would be required to suspend and reinstate each booking in this category. A simple and relatively inexpensive computer program adjustment has now made it possible to provide this transaction en masse. The program also provides an assist in overall operations that eliminates the need for daily call-ins by this group, which frees the telephone lines for additional demand calls. We have also consulted our computer center with regard to the effective programming of demand calls. This service can be provided with keypunch input by one of our telephonists. The stored information can then be released on command to either the vehicle or the terminal teletypewriter. Though the costs are somewhat greater, such a service could be beneficial in both time and labor costs.

At the time of writing, the Regina system was operating with 13 vehicles during peak-hour operations and 15 vehicles during off-peak hours. These units are serviced by a total of 2% dispatchers and 2% telephonists, aided by the computer printout. One could consider
such overhead in communications personnel as being costly, but since our operations cover an 18-hour period with a minimum requirement of 2 persons during daytime hours, no fewer communications personnel can be provided. The provision also leaves room for fleet expansion, particularly during off-peak periods. What must also be considered is that we are not yet sure what our actual capacity is. We do know that an average winter day produces some 3000 passengers and this may now double with our larger fleet. Also important in this regard is our theory of decentralization. Though the Regina system is fully integrated in the total operation’s financial structure, our demand-responsive service is operationally decentralized.

In summation, I do agree that the computer is an effective tool in a people-oriented operation, but it is only a tool. No other system is as economically effective as a human being with a mechanical aid.